

**Massachusetts Military Reservation Cleanup Team
 Building 1805
 Camp Edwards, MA
 March 16, 2011
 6:00 – 8:35 p.m.**

Meeting Minutes

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Alec Joyce	Resident		
Jane Gasper	Innovar Environmental	508-759-9114	jgasper@innovar-env.com

Action Items:

1. Mr. Goddard requests that the IAGWSP keep the Bourne Board of Health informed of Demolition Area 1 investigation testing results near Lily Pond.
2. Alec Joyce requests that the IAGWSP conduct perchlorate sampling at the wetland west of Demolition Area 1 monitoring location 2H.

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3. Resident Susan Ross requests more timely communication with residents affected by investigation and cleanup activities related to the Demolition Area 1 plume.
 4. Mr. Taylor requests that future Demolition Area 1 presentations include cross-section figures.
 5. Mr. Taylor requests information on the depth of the Bourne production wells and the sentry wells associated with them, and the distance between the sentry wells and production wells.
 6. Mr. Goddard expressed a desire for the PIT “Lessons Learned” to be taken into consideration/incorporated into ERP-O and DoD Annual Report to Congress.
 7. Mr. Goddard requests that the MMRCT be informed of next steps for the NRTC, once those steps are identified.
 8. Mr. Goddard requests that an update on the MMRP be scheduled for a future MMRCT meeting, when appropriate.
 9. Mr. Goddard requests that IAGWSP and IRP Plume Booklets contain a paragraph to inform the public of the other cleanup program and associated plumes.

Handouts Distributed at Meeting:

1. Response to Action Items from the December 15, 2010 MMRCT/SMB Meeting
2. Presentation handout: Demolition Area 1 Update
3. Presentation handout: LF-1/CS-23 Plume Update
4. Presentation handout: Environmental Restoration Program – Optimization (ERP-O)
5. Presentation handout: Land Use Controls
6. Presentation handout: Testing of Private Wells, Ponds, Harbors
7. Presentation handout: MMR Natural Resource Damages (NRD) Update
8. Presentation handout: J-2 range Northern and Eastern Plumes Groundwater Monitoring Update
9. MMR Cleanup Update – Summer 2010
10. MMR Cleanup Team Meeting Evaluation Form

**Agenda Item #1. Introductions, Agenda Review, Approval of December 15, 2010
MMRCT/SMB Meeting Minutes**

Ms. Donovan convened the meeting at 6:00 p.m., reviewed the agenda, and asked if there were any changes or additions to the December 15, 2010 Massachusetts Military Reservation Cleanup Team (MMRCT)/Senior Management Board (SMB) meeting minutes. No changes were offered and the minutes were approved as written.

Mr. Michaud inquired about the possibility of an update on the disbursement of Textron funds and the Sagamore water study. Ms. Donovan informed him that these topics would be covered this evening, under the Natural Resource Damages Assessment (NRDA) update.

Agenda Item #2. Demolition Area 1 Groundwater Update

Mr. Gregson displayed a figure of the Demolition Area 1 (Demo 1) groundwater plume and pointed out the source area (a disposal pit where munitions were burned), the area of perchlorate contamination exceeding the state drinking water standard of 2 parts per billion (ppb), the base boundary, Route 28 (also known as MacArthur Boulevard), and the residential neighborhood on the other side of MacArthur Boulevard. He also pointed out the extraction wells treating the plume, noted that the plume has collapsed in response to treatment, and referred to the location where an additional extraction well will be installed to capture the perchlorate contamination to the east.

Mr. Gregson reported that the new treatment system, which will involve an extraction well and a mobile treatment unit (MTU) pumping at 30 gallons per minute (gpm), will be located along the NStar right-of-way at the western boundary of MMR. The scheduled startup date of the new system is May 15, 2011. Mr. Gregson then displayed a figure showing the components of the treatment system: the extraction well, the MTU, an infiltration trench to return the treated water to the aquifer, and new utility poles to power the system. He reported that the Impact Area Groundwater Study Program (IAGWSP) has worked with state Natural Resources and Cultural Resources, and with NStar to obtain approval to install the system components.

Mr. Gregson also spoke about the ongoing off-post investigation that involves drive-point work on private property at the corner of MacArthur Boulevard and Williams Avenue, and on public roads (Williams Avenue and Windrush Avenue). He reported that perchlorate at concentrations greater than 2 ppb was detected at two locations, and that the IAGWSP is mobilizing a larger drill rig in order to obtain deeper samples at several locations. Mr. Gregson then showed a zoom-in figure of the toe of the plume, pointed out the drive-point locations and perchlorate results (7.4 ppb, about 2 ppb, and five locations with less than 2 ppb), and the three locations where deeper drilling will be done.

Mr. Gregson reported that no private drinking water wells have been identified in this area, and the IAGWSP is continuing to confirm that fact. He displayed a map of the neighborhood and explained that the parcels shown in pink indicate properties where the homeowners responded to an IAGWSP letter requesting confirmation that there are no private wells on the property. A second letter was sent to the other property owners, and if the IAGWSP does not receive a response to that letter, additional actions will be taken to confirm that there are no exposure points to groundwater in that area.

Mr. Foster inquired about the dashed line at the end of the plume outline. Mr. Gregson explained that the dashed line indicates that additional work needs to be done in order to define that contour, and he mentioned the deeper drilling that's planned.

Mr. Saucier asked if the small pond downgradient of the plume outline will be tested for perchlorate. Mr. Gregson replied that the pond (Lily Pond) has not been tested yet, but the IAGWSP plans to do so after data from the deeper drilling become available. Mr. Saucier inquired about the depth of the current drilling locations. Mr. Gregson pointed out one location that made it to about 195 feet and pointed out the ones that made it only to about 100 feet. Mr. Saucier asked about the depth of the pond. Mr. Gregson replied that he believes it is relatively shallow, perhaps about 20 feet. Mr. Saucier then asked if there are any shallow wells. Mr. Gregson explained that when drilling, samples are collected from the water table down to depth; then screens are set based on where contamination is detected.

Mr. Reif asked why there's no extraction well in the portion of the plume that's crossing the base boundary. Mr. Gregson replied that when the Demo 1 treatment system was installed, that particular part of the plume wasn't known to exist. Rather, it started to become known based on investigation results from 2009, and more recent results showed the plume at the base boundary. Mr. Reif inquired about contaminant concentrations in that part of the plume relative to other areas where extraction wells were installed. Mr. Gregson replied that concentrations there are about an order of magnitude lower – with a maximum of about 23 ppb versus hundreds of ppb in upgradient portions. Mr. Reif asked if monitored natural attenuation (MNA) is the plan for the most downgradient part of the plume. Mr. Gregson replied that that remains to be seen, based on data from the additional monitoring locations.

Mr. Goddard asked if Lily Pond is used for swimming. Mr. Gregson said that he doesn't think so, and noted that there's no public beach on the pond. Mr. Goddard suggested that, once the new data become available, the IAGWSP inform the Bourne Board of Health as to whether or not the plume is upwelling into Lily Pond. Mr. Gregson noted that even if the plume is upwelling into the pond, it's highly likely that, given the concentrations, it would dilute so quickly that it would be below detectable levels. Mr.

Goddard said that the public still needs to be reassured that someone's looking at that issue, and Mr. Gregson agreed.

In response to Mr. Reif's question, Mr. Jacobs clarified that at the time when the Demo 1 treatment was installed, some perchlorate concentrations above the maximum contaminant level (MCL) were seen beyond the farthest downgradient extraction well. However, modeling suggested that it would dissipate to levels below 2 ppb before reaching the base boundary. He said that the regulatory agencies advocated a farther-downgradient extraction well, but settled for a contingency remedy requiring an additional extraction well, should monitoring results or modeling predictions indicate that contamination exceeding 2 ppb is traveling past the base boundary – which is what's happening, and why an additional extraction well is being installed.

Mr. Saucier mentioned that at a previous MMRCT meeting, some residents in the neighborhood said that Lily Pond is used recreationally. Ms. Donovan asked if Lily Pond is included in the Massachusetts Department of Public Health (MDPH) fact sheet about the local ponds. Mr. Gregson replied that it currently is not.

Mr. Joyce asked if the IAGWSP plans to test for perchlorate in the wetland that's approximately 150 feet west of monitoring location 2H. Mr. Gregson agreed to see that that wetland is tested for perchlorate.

Ms. Ross, a Bourne resident, asked Mr. Gregson to again point out drilling locations toward Lily Pond. Mr. Gregson pointed them out and reminded the group that the IAGWSP plans to drill there again with a larger drill rig that can reach greater depth in order to ensure that deeper parts of the aquifer are still below 2 ppb. Ms. Ross asked if the investigation will continue near the larger pond in the area (Picture Lake, which is deeper and regularly used for recreation), should the deeper drilling show contamination. Mr. Gregson pointed out the direction of groundwater flow, and explained that if the deeper drilling shows significant concentrations, the investigation would continue across Lily Pond. Ms. Ross noted that there are wetlands in that area, and Mr. Gregson agreed.

Mr. Hamilton, who noted that he owns the lot on the corner of Williams Avenue where the IAGWSP has done significant testing, said that he submitted a well sample today, results from which are expected on Friday. He then asked what will happen should his well be contaminated above 2 ppb. Mr. Gonser stated that the standard procedure would be to offer hookup to the town water system; although in this case, that hookup already is in place. He also noted that the IAGWSP would contact the Board of Health, and he explained that the objective would be to prevent drinking water exposure.

Mr. Hamilton said that his well that was tested is much larger than the town service he has, and noted that he has designed his irrigation system to operate with that 1.25-inch service. Mr. Gonser noted that an upgrade could be considered, if needed. He also expressed his appreciation for Mr. Hamilton's assistance in allowing access to his property to investigate the plume. Mr. Hamilton noted that the Town of Bourne would not allow him to irrigate with town water. Mr. Gonser said that, in that case, the IAGWSP would have to talk to the town water and health departments, and added that the IAGWSP would make every effort to ensure that Mr. Hamilton is not put at a disadvantage.

Mr. Pinaud said that in the past, the Air Force Center for Engineering and the Environment (AFCEE) has asked MDPH to conduct a health consult to determine whether the use of an irrigation well would cause any harm to individuals from breathing, and that could be done in this case. Mr. Davis added that in one instance, MDPH looked at some irrigation wells with perchloroethylene (PCE) concentrations up to 20 ppb at a golf course in Falmouth, and found that there would be no health effects. The golf course continues to use those wells, and concentrations have decreased since that time, as would happen in this case as well.

Mr. Hamilton asked if there's a plan to install an extraction well near his property. Mr. Gregson replied that it's unknown at this time whether an off-base extraction well will be needed. However, if the current plume depiction holds up after additional data are gathered, one alternative would be to look at the modeling and see how far the contamination is projected to migrate and attenuate naturally.

Mr. Hamilton then asked how frequently his well should be sampled, if the sample submitted today tests negative. He also noted that he's irrigating 1.5 acres with water from that well, and added that he believes it's about 60 feet from his well to where perchlorate exceeding 2 ppb was detected. Mr. Gregson replied that he can't say what the sampling frequency should be until the additional data are available. Mr. Gonser added that screens would be installed in the monitoring well close to Mr. Hamilton's irrigation well; that monitoring well will be sampled quite frequently and results would reflect the water condition in that area. Ms. Donovan asked if Mr. Hamilton had his irrigation well tested himself. Mr. Hamilton replied that Tetra Tech tested the well, and Mr. Gregson clarified that Tetra Tech is an IAGWSP contractor, and the IAGWSP arranged for the testing.

Mr. Hamilton then stated that he received government paperwork requesting access to his property to conduct testing for a 25-year period, and he doesn't think the compensation designated for that time period is an appropriate amount. Mr. Gonser explained that 25 years is the standard time period that the U.S. Army Corps of Engineers requests; however, the Corps has been informed that the IAGWSP will not need access that long; rather, the need for access will more likely be on the lower end of a five- to ten-year range. He said that the IAGWSP could certainly work toward reducing the timeframe. With regard to compensation, Mr. Gonser noted that amounts are determined in Washington, DC, and while there's some flexibility there, it's somewhat limited. Nevertheless, the IAGWSP can try to work with the people in Washington regarding that issue.

Ms. Ross, of Bourne, said that the residents were notified about the initial investigation work in the neighborhood, but not about subsequent work. She also mentioned that the plume map shown tonight differs from the one the residents received. She asked if there was a way to improve communication with the residents. Mr. Gregson inquired about the best way to communicate, such as email or website postings. Ms. Ross replied that letters are great, but not if they arrive after activities have already occurred.

Mr. Gregson then explained that tonight's plume map, a revised version that shows the extent of contamination, was approved by the regulators just this Monday. Mr. Gonser added that the IAGWSP is trying to complete its investigation as quickly as possible; therefore, if a drill rig hits refusal in one place, it's immediately moved to another drilling location. He said that the IAGWSP could certainly keep the residents informed by email, but it's important to realize that things are happening in real time, and don't always go according to plan. Ms. Donovan noted that she (as the community involvement coordinator for the Massachusetts Department of Environmental Protection [MassDEP]), Jeanethe Falvey (the community involvement person for the U.S. Environmental Protection Agency [EPA]), and Pam Richardson (the community involvement person with the IAGWSP) would get together and discuss best ways to communicate with residents of the neighborhood.

Mr. Taylor remarked that cross-section figures would have been helpful during this discussion. Mr. Gonser agreed, but explained that the data are somewhat limited now. Once additional data are available from the deeper drilling that's planned, it will be a little easier to provide cross-sections.

Mr. Saucier inquired about the depth of Mr. Hamilton's irrigation well. Mr. Hamilton replied that it's 48 feet deep. He also noted that the well is associated with his commercial tree and landscape business, not his home. Mr. Saucier then asked how the irrigation well is related to that business. Ms. Hamilton informed him that the town requested that the business sink a well to irrigate and maintain the vegetation barrier along the highway. Mr. Hamilton added that he also uses the well to fill spray trucks.

Mr. Saucier asked if the spray trucks are used for diluting pesticides and fertilizers, and Mr. Hamilton confirmed that they are.

Agenda Item #3. J-1 Range Update

Mr. Gregson stated that the IAGWSP is conducting some additional investigation at the leading edge of the J-1 North plume, most of which is located within the Impact Area, in the central part of the base. He then showed a map of the plume and pointed out a number of wells along Wood Road where no perchlorate concentrations above 2 ppb were found, and monitoring well 370 (MW-370) where the historic maximum perchlorate concentration of 78 ppb was detected in November 2008, but concentrations there have declined to 19 ppb as of November 2010.

Mr. Gregson said that it appears that an area of higher perchlorate contamination passed through that location, and in order to figure out the extent of that contamination, the IAGWSP has been installing some additional monitoring wells. He again referred to the map and pointed two locations where only trace levels of perchlorate were detected. He also pointed out MW-549 where perchlorate was detected at 7.7 ppb. He said that the next step in the investigation is to move out to the left and right to try to understand where the center of mass is located. Based on that information, the IAGWSP can determine if additional wells are needed to define the extent of the plume. Mr. Gregson also explained that it's important to understand the distribution of mass so that the planned extraction well can be located in the right spot.

Ms. Donovan took this moment to mention that the deadline for MMRCT members to submit comments on the draft IAGWSP Plume Booklet has been extended to Friday, March 18, 2011.

Agenda Item #4. LF-1/CS-23 Update

Ms. Forbes stated that the Landfill 1 (LF-1) and Chemical Spill 23 (CS-23) plumes originate in the southwest portion of the base and migrate off base. She reported that the chemicals of concern (COCs) at the LF-1 plume are: PCE, trichloroethene (TCE), carbon tetrachloride (CCl₄), 1,1,2,2-tetrachloroethane (1,1,2,2-TeCA), vinyl chloride (VC), 1,4-dichlorobenzene (1,4-DCB), ethylene dibromide (EDB), and manganese. The COCs at the CS-23 plume are TCE and CCl₄. Ms. Forbes also noted that the maximum historical contaminant concentration at LF-1 was TCE at 150 micrograms per liter (µg/L), which occurred August 1999 in 27MW0031A; TCE concentrations in that well are now around 35 µg/L. In 2010 the maximum contaminant concentration at LF-1 is TCE at 52 µg/L, in 27MW2135A. At CS-23, the maximum historical contaminant concentration was TCE at 57 µg/L, and in 2010 the maximum was TCE at about 20 µg/L.

Ms. Forbes reported that the LF-1 treatment system started up in August 1999 and consisted of five extraction wells pumping a total of 700 gpm, a treatment building with carbon to remove the contaminant, and infiltration trenches and an infiltration gallery. In December 2006 the system was expanded in the southern portion of the plume with the addition of extraction well 6 (27EW0006), as well as two additional extraction wells to address the CS-23 plume. In March 2008, a reinjection well was installed to replace the failing LF-1 infiltration trenches and gallery, and that well has been operating fine ever since. In May 2008, AFCEE worked with the Veterans Affairs cemetery to divert LF-1 treated water to the cemetery grounds for irrigation purposes. Ms. Forbes also reported that the CS-23 treatment system, which was installed in December 2006, consisted of two extraction wells, and two infiltration trenches. She noted that the CS-23 system pumped a total of 700 gpm.

Ms. Forbes displayed a figure showing the LF-1 and CS-23 plumes and pointed out the LF-1 source area, which is the main base landfill on Connery Avenue. She also mentioned that the CS-23 source area is unknown. She pointed out the remediation system along the base boundary, noting that it involves eight extraction wells, six of which are designated as LF-1 wells and two of which are designated as CS-23 wells. Ms. Forbes also explained that when the CS-23 system was installed in

2006, AFCEE took the groundwater being pumped from the southernmost LF-1 extraction wells, combined it with groundwater being pumped from the CS-23 extraction wells, and piped that flow (1,350 gpm) to the Hunter Avenue Treatment Facility, leaving the remaining 595 gpm of flow to be treated at the LF-1 Treatment Plant.

Ms. Forbes again referred to the map and stated that the most recent change to the LF-1 plume depiction is the separation of the northern lobe, which is primarily due to treatment associated with 27EW0005. She also pointed out Bourne public water supply wells 2 and 5, located between the northern and southern LF-1 plume lobes. Ms. Forbes also mentioned invasive species monitoring, which would be discussed later in the presentation, and noted that one of the infiltration galleries is located entirely in the Crane Wildlife Management Area (the Crane), which is managed by the Massachusetts Division of Fisheries and Wildlife (MDFW). She further noted that a portion of the extraction pipeline and an extraction well are located in the Crane.

Ms. Forbes then showed a figure of the LF-1 source area, the landfill. She pointed out the six landfill cells and noted that the three older cells, known as the Northwest Operable Unit (NWOU), don't really have any contamination coming from them. She also reported that the three newer cells (known as the 1970 cell, the kettle hole cell, and the post-1970 cell) were capped in 1995 in order to prevent water from infiltrating and causing contaminants to dissolve and migrate out from underneath them. She explained that this is what had caused the LF-1 plume, but now that the cells have been capped, high contaminant concentrations are no longer seen coming out of the landfill, which indicates that the cap has been very effective. Ms. Forbes also mentioned that there are vapor ports around the perimeter of the landfill, which are monitored to ensure that no methane is migrating out and posing a potential safety hazard.

Ms. Forbes then reported that as part of the Interim Record of Decision to Record of Decision (IROD-to-ROD) process, the final LF-1 and CS-23 RODs were signed in October 2007. The LF-1 ROD called for: continued monitoring and maintenance of the landfill cap; continued active treatment of the plume using the existing extraction/treatment/infiltration/reinjection system plus expansion of the system (27EW0006) to increase capture of the southern portion of the plume; the implementation of Land Use Controls (LUCs); and the Bourne Water Provision (an agreement to replace Bourne supply wells 2 and 5 at some point in the future). The CS-23 ROD called for: active treatment of the plume along the base boundary, and shared treatment with the southern portion of LF-1 at the Hunter Avenue Treatment Facility; and the implementation of LUCs.

Ms. Forbes showed a schematic diagram of the LF-1 Treatment Plant and pointed out the various components. She then showed a diagram of the Hunter Avenue Treatment Facility, and noted that it treats six plumes, including LF-1 and CS-23. She also noted that according to 2007 model predictions (the last time the model was updated) the CS-23 treatment system is predicted to be shut down in 2018, although some contaminants exceeding the MCL are expected to remain until about 2031. For LF-1, the predicted system shutdown date is 2047, much farther out due to the plume having to migrate from the landfill down to the extraction system along the base boundary. It's also predicted that MCL exceedances will persist until approximately 2058 in groundwater upgradient of the treatment system; until 2034 in groundwater downgradient of the LF-1 southern lobe; and until 2033 in groundwater downgradient of the LF-1 northern lobe.

Ms. Forbes then reviewed costs associated with LF-1 (for fiscal year 2010 – \$2.8 million, for 1997 through 2009 – \$44.7 million, and estimated from 2011 through 2041 – \$22.8 million) and those associated with CS-23 (for fiscal year 2010 – \$0.88 million, for 1997 through 2009 – \$6.75 million, and estimated from 2011 through 2041 – \$1.9 million). She noted that the figures include monitoring, operation & maintenance, carbon costs, utility costs, Scraggy Neck town water hookups, replacement of Bourne wells 2 and 5, the Long Range Water system, and the wind turbine.

Ms. Forbes displayed a figure depicting the chemical monitoring network for the LF-1 and CS-23 plumes. She then pointed out the four sentry wells associated with Bourne wells 2 and 5, which include one at the base boundary (27MW0093) that's really too far upgradient of the supply wells and was flooded with treated water when the reinjection well was installed and so is no longer appropriate to monitor. Ms. Forbes reported that the sentry wells all tested nondetect for LF-1 COCs, which means that the plume is not migrating toward the supply wells.

Ms. Forbes stated that vapor probe monitoring at the landfill is conducted semi-annually. She then reported that while no methane was detected in the July 2009 sampling event, in January 2010 a very low amount of methane was detected in a couple of the vapor probes. She said that the detection at vapor probe 2 (27VP0002) makes sense since it's located at the cell that was most recently used, but the other detection was probably due to instrument error, especially since the concentration was so low. Ms. Forbes further noted that methane concentrations have decreased overall, and methane is no longer considered a safety issue.

Mr. Taylor inquired about the distance of the sentry wells from the public water supply wells. He also asked about the depth of the sentry wells and the supply wells. Ms. Forbes replied that she does not know that information offhand, but she does know that the sentry wells are appropriately screened to monitor the capture zone for the supply wells, which are also monitored by Bourne Water District. Mr. Davis said that one of the sentry wells is within 100 feet of Bourne production well 2. Ms. Forbes added that she would note it as an action item to provide Mr. Taylor with all of the information he requested.

Mr. Saucier inquired about the harbors receiving contaminants from the LF-1 plume. Ms. Forbes replied that the northern plume lobe discharges to Red Brook Harbor and the southern plume lobe discharges to Squeteague Harbor – both at very low concentrations. Mr. Saucier asked if the harbors are used for shellfishing or recreation. Ms. Forbes confirmed that they're used for both. She also noted that years ago MDPH conducted shellfish sampling at the harbors and concluded that volatile organic compounds (VOCs) do not accumulate in shellfish. Mr. Saucier asked if the tissue of the shellfish was tested. Ms. Forbes confirmed that it was. She also said that there were two sampling events, about six or seven years ago, but given the concentrations in the plume and that VOCs don't accumulate in the tissue, there was no cause for concern. Mr. Saucier then asked if people swim in the harbors. Ms. Forbes replied that people might swim in the harbors, but most likely not in areas where the plume is upwelling, because it's very mucky there and inhabited by many insects. Mr. Saucier asked if the expectation is that the contamination will just upwell into the ocean and dissipate. Ms. Forbes replied that everything upgradient of the base boundary is being captured by the extraction well fence, while everything downgradient is being allowed to naturally attenuate and ultimately discharge into the harbors.

Mr. Saucier then inquired about private wells. Ms. Forbes replied that later in the meeting Mr. Karson would be making a presentation on LF-1 LUCs and any private wells in the area. Mr. Saucier said that the reason he asks is that he's a resident of Sandwich and is really interested in how these situations are handled outside the boundaries of the base. Ms. Forbes noted that AFCEE has a long history of community involvement with the Cataumet/North Falmouth area with respect to the LF-1 plume. She also mentioned that in fact it was the residents who objected to treatment downgradient of the base boundary, which is why the plume is being allowed to naturally attenuate there. Mr. Goddard added that, as someone who's been involved with the base cleanup for 14 years, he can attest to the amount of community involvement work that was done. He also said that the citizens of Cataumet were very active in conducting their own sampling and working with AFCEE contractors to show them upwelling areas.

Mr. Reif inquired about the current condition of the landfill cap. Ms. Forbes replied that the cap is inspected annually and annual surveys of the slope are done to ensure that the cap meets MassDEP solid waste guidelines. She said that the cap is in great shape. Mr. Reif asked if it's correct then that the cap is on a preventive maintenance program. Ms. Forbes confirmed that it is.

Mr. Reif referred to the schematic diagram of the treatment system and asked Ms. Forbes to remind him how the effluent is sampled and tested in order to be sure that contaminants aren't reinjected into the aquifer. Ms. Forbes replied that the schematic includes a number of location identifiers that represent all the locations where sampling is conducted. She noted that the influent is sampled, the intermediate is sampled (to determine when a carbon exchange is needed), and the effluent is sampled on a monthly basis.

Mr. Reif then asked Ms. Forbes to explain what a seep is. Ms. Forbes replied that a seep is an expression of the groundwater into the surface water.

Ms. Forbes continued with her presentation by noting that groundwater monitoring results at the LF-1 source area have been declining overall and/or have remained consistently low. She showed a figure entitled "LF-1 Landfill Area Concentration Trends" and pointed out that there was a slight increase in only one of the wells monitored for the uncapped portion of the landfill, but that's not expected to pose a problem. She also said that for the capped cells, all detections of COCs are below safe drinking water levels, with the exception of VC at 4.5 µg/L in one well, and the MCL for VC is 2 µg/L.

Ms. Forbes began her discussion of LF-1 northern lobe monitoring results by showing a 2007 figure entitled "LF-1 TCE Cross-Section A-A'." She explained that TCE is the primary COC in the northern lobe, and pointed out the ground surface, the water table, and that there are two separate parts to the northern lobe (a shallow lobe and a deeper lobe), which appears as one large lobe in plan view. She noted that the shallow lobe is being treated by EW-5, while the deeper lobe migrates close to bedrock and eventually upwells into Red Brook Harbor. She added that TCE is detected at about 2 µg/L in one of the seeps at the harbor, and it's projected that that upwelling will continue.

Ms. Forbes then showed a 2010 figure entitled "LF-1 Northern Lobe Concentration Trends" and noted that most of the concentrations have decreased over time. Although some minor concentrations have gone up slightly, that occurs as the plume migrates down and up under Red Brook Harbor. Ms. Forbes also said that the highest concentration seen downgradient of the base boundary is TCE at about 20 µg/L, in 27MW0568D. She further noted that the newest data show the plume separation at the base boundary, which is great news. However, AFCEE is proposing a direct-push location to better understand how much separation exists, as the existing monitoring well in that area cannot be sampled due to access restrictions on the part of the property owner.

Ms. Forbes then displayed a figure entitled "LF-1 Upgradient Central Lobe Concentration Trends" and noted that, again, concentrations are decreasing overall, with few exceptions. She also mentioned that here, in the core of the plume, one begins to see a mix of contaminants, including higher concentrations of VC, due to the strong reducing conditions there.

Ms. Forbes began discussing monitoring at the southern lobe by showing PCE and TCE cross-section figures of that area and pointing out how the downgradient portion is allowed to naturally attenuate and eventually discharge into Squeteague Harbor. She then showed a figure entitled "LF-1 Upgradient Southern Lobe Concentration Trends" and pointed out 27MW0031A, where over time concentrations have dropped from the highest historical detection of 150 µg/L TCE in 1999 to around 30 µg/L – indicating that there's no longer a continuing source. She also pointed out 27MW2135A, where contaminant concentrations have increased because of the mass from upgradient migrating through, although at lower concentrations because of the reductive dechlorination and dilution that occurs as the mass is migrating. Ms. Forbes stated that in the upgradient southern lobe, again, concentrations are decreasing overall.

Ms. Forbes displayed a figure entitled “LF-1 Downgradient Southern Lobe Concentration Trends,” noted that concentrations are declining overall, and pointed out one exception, at 27MW0052. She also noted that concentrations in the downgradient southern lobe are low, with the highest being about 20 to 25 µg/L.

Ms. Forbes then began discussing CS-23 monitoring results by displaying a figure entitled “CS-23 TCE Cross-Section G-G” and pointing out the land surface, the water table (which intersects some of the ponds on the base), the extraction well capturing the plume, and the small amount of mass downgradient of the extraction well, that’s naturally attenuating. She also displayed a figure entitled “CS-23 Concentration Trends” and noted that CS-23 is a more heterogeneous plume, with more sporadic concentrations. She also said that, unlike LF-1, some increasing/decreasing concentrations are seen, but overall concentrations are declining, with many going to nondetect.

Ms. Forbes then showed cross-section figures for TCE and PCE at CS-23, pointed out the extraction wells associated with CS-23 and LF-1, and noted that the LF-1 PCE footprint is a little bit wider than the TCE. She also said that concentrations are relatively stable because the pumping dilutes and homogenizes the plume, resulting in concentrations that stay about the same. She further noted that monitoring wells in the area are sampled on either a quarterly or semi-annual basis and concentrations all hover around the MCL.

Mr. Reif inquired about the point of diminishing returns. Ms. Forbes replied that AFCEE is always looking to optimize its treatment systems, while ensuring that remedial action objectives are met – which, in this case, is cutting off the plumes at the base boundary.

Ms. Forbes reported that at the LF-1 Treatment Plant: about 280 million gallons of groundwater were treated in 2010; about 3.5 billion gallons of groundwater were treated since system startup; 20 pounds of COCs were removed in 2010; and about 390 pounds of COCs were removed since system startup (360 pounds of which were the primary contaminants TCE and PCE). She also noted that 360 pounds of TCE and PCE are enough to put more than 13,000 Olympic size swimming pools at the MCL of 5 µg/L. Ms. Forbes then reported that at the LF-1/CS-23 granular activated carbon (GAC) trains at the Hunter Avenue Treatment Facility: about 667 million gallons of groundwater were treated in 2010; about 2.5 billion gallons of groundwater were treated since startup; about 50 pounds of COCs were removed in 2010; and nearly 215 pounds (most of which was PCE, TCE, and CCl₄) were removed since startup – or enough to put about 7,700 Olympic size swimming pools at the MCL of 5 µg/L.

Ms. Forbes then briefly referred to the following detailed slides, which she encouraged MMRCT members to review at their leisure: LF-1/CS-23 Mass Removal (lbs); LF-1 Treatment Plant Influent COC Concentrations; Hunter Avenue Treatment Facility LF-1/CS-23 Influent COC Concentrations; LF-1 Plant Electrical Consumption and Associated Air Emissions; and LF-1/CS-23 Hunter Avenue Treatment Facility Electrical Consumption and Associated Air Emissions. Ms. Forbes also spoke about AFCEE’s efforts to reduce air emissions associated with the power supplies for its treatment systems – including the purchase of green power at 50% and its wind turbine operation.

Ms. Forbes then reminded the group of the system components at the Crane property, which she had mentioned earlier, and said that the MDFW had requested monitoring to ensure that AFCEE’s construction equipment wasn’t bringing invasive species into the area. She explained that from 2007 to 2010 staff from Camp Edwards’ Natural Resources Office conducted annual invasive species monitoring at the construction area at the Crane, identifying, counting, and hand-pulling invasive plant species. By 2010, the effort had mitigated the area enough that natural flora were taking over and, with MDFW concurrence, it was deemed no longer necessary to continue with the monitoring.

Ms. Forbes also discussed the wetland monitoring conducted at on-base ponds (Osborn, Edmunds, and Spit Ponds) and off-base wetlands (Spectacle Wetland and Vernal Pool 651). She explained that this

monitoring was done because modeling indicated that the treatment systems might have a hydraulic impact (drawdown) on these surface water features. At the ponds only a small amount of drawdown was observed (less than 0.4 feet), no impacts to the species using the ponds were observed, and therefore monitoring there was discontinued in 2008. At the wetlands, however, up to 1.3 feet of drawdown was seen in 2006, and it's been difficult to determine whether or not the treatment system is continuing to drawn down these vernal pools, which have not been drying out because of high water levels. Ms. Forbes noted that hydraulic monitoring at the wetlands will continue on a monthly basis, and vegetation and wildlife surveys will be conducted every other year going forward, to ensure that the system isn't causing any negative impacts.

Ms. Forbes then showed the "Conclusions" slide, which noted: based on a long history of low to no detections, the vent port and NWOU sampling frequencies and/or monitoring networks should be optimized; long-term concentration trends for LF-1 and Cs-23 monitoring wells are generally consistent with the conceptual site model (CSM) for the plumes; there is continued evidence of plume collapse in the central lobe and in the downgradient portion of the southern lobe; there is confirmation of plume separation at the northern lobe downgradient of 27EW0005; results indicate continued evidence of reductive dechlorination in the southern plume core zone only – the natural attenuation processes of dilution, dispersion, and sorption continue to be observed within downgradient lobes; influent and extraction well concentrations were consistent with previous results – some COC concentrations decreased slightly; groundwater, extraction well, and influent data indicate that the remedial goals of the system are being met, and plume cleanup is progressing as expected; and annual monitoring of invasive species (2007 – 2010) at the LF-1/CS-23 construction sites on Crane property indicated the limited number of invasive plant species initially identified had decreased, while native flora re-vegetated the disturbed areas, and inspections were discontinued with MDFW concurrence.

Finally, Ms. Forbes reviewed the "Recommendations" slide, which noted the following: conduct direct-push drilling work in the northern lobe downgradient of the base boundary to fill a data gap; conduct direct-push drilling work at the CS-23 trailing edge (to fill another data gap there); implement regulatory approved changes to the monitoring network, and continue with planned System Performance and Ecological Impact Monitoring (SPEIM) activities (including optimization modeling, the triennial sampling event in June 2011, updating plume shells and models if required, and continuing extraction well and plant sampling, and wetland monitoring).

Mr. Goddard asked Ms. Forbes to explain why the treatment systems are predicted to be shut down before below-MCL levels are reached. Ms. Forbes replied that those lingering concentrations are either so far upgradient of the extraction wells that extraction wouldn't make a difference, or they might be caught up in low-conductivity units. Mr. Goddard suggested rewording this information so it can be more easily understood in future presentations.

Mr. Goddard also said that he thinks that the "mass removal" numbers would be more meaningful if put in context with total estimated mass. Ms. Forbes replied that this easier said than done, given that mass estimates are very subject to change. Mr. Goddard put forth the idea of revising the numbers based on the latest information so it could be said, for example, that a cleanup is 75% of the way there. Mr. Davis noted that even if a certain percentage of the mass were removed, that's difficult to relate to the cleanup timeframe, since typically the largest percentage of mass is removed within the first couple years of system operation.

Mr. Foster noted that in 2007 the predicted CS-23 system shutdown date was 2019, and the current predicted shutdown date is 2018. Ms. Forbes said that those dates are refined, depending on the latest data or changes to the model.

Agenda Item #5. Environmental Restoration Program - Optimization

Mr. Davis stated that the purpose of the Air Force's internal program, the Environmental Restoration Program – Optimization (ERP-O), as stated in its booklet, is to make “a systematic evaluation and enhancement of site remediation processes to ensure protection of human health and the environment, at minimum risk and cost.” He explained that over a two-year period the Air Force sent teams (made up of independent consultants primarily, and some Air Force subject-matter experts) to bases all over the country. A 15-person team visited MMR for two weeks, beginning February 22, 2009, and conducted a technical, regulatory, and programmatic assessment, concentrating on groundwater only. Mr. Davis noted that the ERP-O team's assessment included: verification of cleanup goals and procedures to achieve those goals; assessment of remediation system performance; review of innovative technologies to enhance remedies; and the identification of optimization opportunities. He reported that the ERP-O team didn't come up with any “magic bullets” or anything that would have made AFCEE say, “Why didn't we think of that?”

Mr. Davis reviewed best practices identified by the team at MMR: excellent plume maps and Information Booklets; an institutionalized optimization program; evaluation of alternative technologies; tracking and reporting of mass removal rates; extensive use of updated groundwater model(s); an up-to-date and accessible chemical database; frequent and constructive regulatory interaction; updated Supervisory Control and Data Acquisition (SCADA) control systems at treatment plants; and a strong emphasis on energy use and sustainability.

Mr. Davis then stated that the ERP-O team's report included 32 recommendations in four general categories. Eleven recommendations came under the “programmatic/regulatory” category, five of which pertained to properly documenting site information (in a readily usable format, but more detailed than a Plume Booklet), optimization approaches, and developing an exit strategy. Three of the “programmatic/regulatory” recommendations concerned the application of MNA (documenting and including MNA in decision documents). Two of these recommendations had to do with evaluating whether a waiver based on technical or cost impracticability would be appropriate, based on not being able to achieve MCLs or Massachusetts MCLs (MMCLs) – however, no waiver will be used since MCL/MMCL achievement has been demonstrated. The final recommendation under the “programmatic/regulatory” category was to consider a forensic investigation into whether EDB contamination was from fuel or pesticides. However, AFCEE saw no advantage in doing that, and therefore decided not to pursue that recommendation.

Mr. Davis then showed two slides illustrating AFCEE's response to the first group of “programmatic/regulatory” recommendations: a flow chart figure entitled “Collaborative Process for Optimizing Remedial Actions,” and another flow chart figure entitled “Response-Completion Roadmap – All Actions.”

Mr. Davis reported that the second category of ERP-O recommendations is the “optimization of existing technologies” category, in which there were 13 recommendations. Eight of these recommendations pertained to continuing practices already employed at MMR, such as evaluating pulse pumping, optimizing monitoring networks, keeping extraction well screens out of low-conductivity zones, and maximizing carbon use. Mr. Davis mentioned that there's a great deal of ongoing carbon use optimization work, the results of which will be presented to the MMRCT later this year. He then reported that two of the “optimization of existing technologies” recommendations had to do with the pumping scheme at the CS-10 plume and whether two of the wells were needed. AFCEE's response was that the wells are needed to maintain capture at the base boundary, and are optimized as appropriate. Two of the “optimization of existing technologies” recommendations concern the evaluation and remediation of secondary sources – that is, low-conductivity areas that function as a long-term source by releasing contaminants to surrounding groundwater. Mr. Davis noted that information about this topic will be presented at future MMRCT presentations. He also said that the

final recommendation in the “optimization of existing technologies” category was to evaluate field screening methods, which has been done. He then displayed a map and pointed out the CS-10 extraction wells referenced in the ERP-O recommendation.

Mr. Davis reviewed the four recommendations in the “alternative technologies” category. The first was to evaluate alternative technologies and implement where appropriate – a process that is in progress, with both in-situ and ex-situ evaluations under way. The second was to conduct batch tests to evaluate the degradation of EDB. Mr. Davis noted that the degradation of EDB isn’t really understood or built into any models, so AFCEE has been working with UMass-Amherst to conduct a microcosm study, results of which will be presented to the MMRCT in the future. The third recommendation in this category was to pilot-test enhanced reductive dechlorination (ERD) in appropriate locations for hotspot removal/containment/treatment. Mr. Davis said that he has reservations about ERD because it involves taking the aquifer to a low dissolved oxygen situation in order to work, and therefore has asked the ERP-O team to provide a case study where ERD has proven successful in a deep, thick, oxygenated aquifer, but hasn’t yet received a response. The final recommendation in the “alternatives technologies” category was to evaluate lease/buy option of cranberry bogs to eliminate the receptor and provide a venue for natural attenuation. Mr. Davis noted that this last recommendation is not a viable option, and was therefore taken off the table.

Mr. Davis then reviewed recommendations in the “modeling” category, noting that two related to adjusting model parameters as appropriate for biodegradation and/or secondary sources, which is ongoing. Another recommendation was to continue using models for optimization assessments, which is something that already is being done routinely. The final recommendation in the “modeling” category was to use models to evaluate remedial options using “optimization software” as an add-on to the models. Mr. Davis noted that this kind of advanced modeling is already under way and will be presented to the MMRCT at a future meeting.

Mr. Davis reported that the Air Force created a follow-on process to the ERP-O report, called the Recommendation Management Review (RMR) process. He noted that AFCEE/MMR and the ERP-O team met in Texas in September 2010 to review progress and provide status updates on the recommendations, which are now being tracked. He said that update meetings will occur every six months until all of the recommendations have been addressed. Mr. Davis then stated that the current status of the recommendations is: 18 have been completed, 12 are in progress, one is under assessment (regarding the reductive dechlorination pilot-test), and one was canceled.

Mr. Goddard suggested including in the ERP-O team’s review the former Public Information Team (PIT) Lessons Learned document, which has a lot of good information about early public outreach and communication. He also said that he thinks it’s important to “apply the resources that you need early on.” He also spoke about the value of the Air Force sharing its lessons learned with other Department of Defense (DoD) branches, and asked if that’s being done. Mr. Davis replied that although that isn’t being done in an ultra-formal manner, information is shared a number of different ways. One is the Annual Report to Congress (available on-line), to which each military base submits a “good news” or “best practice” story. Another way information is shared is through a variety of mixed DoD teams (including Navy, Army, and Air Force personnel) that are in place to look at problems in the remediation programs and put out the call to industry to solve them. Mr. Davis then noted that the Air Force has an ERP-O website that includes all the recommendations made at bases. Mr. Goddard again said that he thinks it’s important to share lessons learned. Mr. Davis said that it’s important to remember that the cleanup programs have matured – most of them have reached all-remedies-in-place and are now talking about optimization and how to get those sites to closure.

Agenda Item #6. Land Use Control Program Update

Mr. Karson stated that Land Use Controls (LUCs), which are also known as institutional controls, are restrictions or controls needed to protect human health and the environment. LUCs limit the use and/or exposure to contaminated soil and groundwater, prevent interference with the remedy that's in place, and are maintained until the remedy reaches cleanup levels. LUCs at MMR include: signs around the landfill, MMR well drilling prohibitions for potable water supply; town well drilling prohibitions and testing requirements for potable water supplies (which AFCEE verifies annually when briefing the local Boards of Health); the monitoring of daily Dig-Safe notices to look for well drilling or digging activity near wells or treatment systems; and verification of the status of existing private and irrigation wells located on parcels in the footprint or in the future path of a groundwater plume.

Mr. Karson said the last major challenge is to verify that there are no unacceptable exposures to plume contaminants from a private well or irrigation well. The process is to identify all private and irrigation wells, verify their status, and evaluate any wells found in plume areas. Mr. Karson explained that this is a formal requirement based on the RODs that have been signed, and the protocol was established and approved by the regulatory agencies with AFCEE. He also mentioned that private wells are regulated by the local Boards of Health, with whom AFCEE coordinates its efforts.

Mr. Karson stated that for wells that are found in a plume area, AFCEE will offer free decommissioning if a potential health risk exists. Wells that are being used will undergo a technical evaluation that may include testing. If a well poses an unacceptable risk and the owner does not accept decommissioning, AFCEE will pursue other options, which could include notifying the Board of Health, and may offer bottled water or treatment. Information about private and irrigation wells that are identified is shared with MassDEP, MDPH, the local Board of Health, and EPA. Wells that exist but are not in service will be reevaluated every two years, and all wells will be reevaluated every five years as part of AFCEE's required Five Year Reviews.

Mr. Karson then displayed a map entitled "Outreach Response by Category for LF-1 (Southern Lobe)." He explained that the parcels on the map are color-coded according to various categories, including parcels with wells that are being used for drinking or indoor use (one of which exists near Squeteague Harbor, but has tested clean), parcels with wells used for irrigation purposes only, and parcels with wells whose operational status is uncertain, parcels with wells that are not operational, and parcels without any existing wells.

Mr. Karson then reviewed "AFCEE Land Use Controls Outreach Summary" slides and noted that AFCEE was required to achieve 100% research completion and technical evaluations by September 2010 for the LF-1 and CS-23 plume area. AFCEE met that deadline, and has provided a project note to the regulators for review, which is expected to be finalized in the very near future. He also mentioned that at the LF-1 plume area 71 wells were identified. He then reported that outreach completion percentages for the Hatchville area plumes are quite high (78% for CS-20, 91% for CS-21, 100% for CS-4, 81% for Fuel Spill 28 [FS-28], and 88% for FS-29), and the deadline for 100% research completion and complete evaluation for those plumes is September 2011. Mr. Karson also noted that the outreach completion percentage at the Ashumet Valley plume (where the effort originally began, before timelines were determined) is quite high (82%), and outreach for the FS-1 and FS-12 plume areas is yet to begin. He stated that overall the well verification program involves nearly 2,000 parcels, is slightly more than 80% complete, and has identified more than 464 wells.

Mr. Davis clarified that the wells identified in the LF-1/CS-23 area had no exposure associated with them. Mr. Karson added that once the project note is finalized, everyone who filled out a form and participated in the survey process will be notified of the determination made about their well, so they will know that it's safe to us. He also said that AFCEE has agreed to a testing protocol for the two properties associated with LF-1 where private wells are in use.

Mr. Foster asked if anyone has ever been cited for improper LUCs. Mr. Davis said that he thinks Mr. Foster is asking what would happen if someone didn't accept decommissioning, for example – he then replied that that is a “what if” situation because it hasn't happened.

Mr. Goddard said that he believes the Town of Bourne has a bylaw that prohibits drinking water wells within a certain distance downgradient or within a plume shell. Mr. Karson clarified that the Town will not issue a drilling permit within plume areas, as is the case with the other towns that surround the base. Mr. Goddard then asked if the Board of Health plans to have the property owners with a private well in the LF-1 area hook up to the Bourne Water District. Mr. Karson replied that the action that was determined for that particular property was annual testing of the well. He also explained that each property has to be evaluated on a case-by-case basis because they are all different – for example, the one being discussed is a seasonal cottage (inhabited only about three to four months of the year) with a hand pump in the basement as the only source of water, so it's not a high-volume well. The well has been tested, and based on what's known about the plume, the regulators have agreed that testing every year is protective of public health for that particular well. The Board of Health becomes involved if there's a situation where a well that's in use has been determined to pose a current hazard and the property owner has refused decommissioning.

Mr. Goddard asked if there's a failsafe that requires a potential buyer to be notified that a property for sale (with a private well) is located in a plume area, such as a filing at the registry of deeds. Mr. Karson replied that there's no mechanism for that at this time. However, wells will be reevaluated every two or five years and new owners will be contacted. Mr. Goddard asked if the failsafe then is that those high-risk properties will be contacted on a regular basis. Mr. Karson clarified that the well on that particular property in the LF-1 area will be tested on a yearly basis, and also confirmed that new homeowners will be afforded the same type of information sharing as previous owners.

Mr. Davis clarified that ensuring protectiveness from existing wells is now AFCEE's job. Although local bylaws and drilling moratoriums are concerned with the drilling of new wells, one of EPA's lawyers noted that that doesn't really protect anyone from an existing well, which is why the LUCs program was added to the RODs. With regard to the LF-1 plume, Mr. Goddard asked if it's correct that AFCEE could request to terminate future evaluations of wells once the plume has completely upwelled into the harbors and there's no additional upgradient exposure. Mr. Davis agreed and noted that the LUC areas change and the number of parcels within them change as the plumes are redefined; they are kept in the database as historical, but there's no need to go back for reevaluations.

Ms. Richardson asked if the property owners who respond to AFCEE's surveys are aware of how the information will be used. Mr. Karson replied that the cover letter that accompanies the survey explains that the information will be stored in AFCEE's database and shared only with MassDEP, EPA, the local Board of Health, and MDPH. Ms. Richardson added, “...not in a public forum,” and Mr. Karson agreed. Mr. Davis noted that during a previous LUC update, an MMRCT member inquired about specific addresses of properties and was told that that information would not be shared.

Mr. Saucier suggested that one way to control a contaminated well would be for AFCEE to file a lien at the registry of deeds, specifying that a private well exists on a property and has been determined to be a public health threat, but the owner has declined decommissioning. Mr. Goddard said that this is what he had been thinking of earlier, and said that it might be a good idea in a high-risk situation. Mr. Davis said that, fortunately, none of the concentrations are such that a short-duration exposure, if it ever happened, would be concern. He added that anything over nondetect in a private well would warrant response; however, it's also important to keep in mind that the MCL is 5 µg/L, which is based on a (70-year) lifetime of exposure, and the plume will be gone before then. He said that he doesn't think AFCEE will ever be faced with a situation where a deed notification would have to be put in place.

Agenda Item #7. Harbors, Ponds, and Private Wells Monitoring Update

Mr. Karson reminded the group that all private well sampling has been merged into the LUC program. He also noted that those homeowners whose wells were previously tested but whose properties are not in current LUC areas, were notified by mail of the end of testing for their wells, the rationale behind the decision, and that the decision was made with regulatory concurrence.

Mr. Karson displayed a slide showing May and July 2010 recreational ponds monitoring results, which noted the following: EDB testing was conducted at Coonamessett, Jenkins, Deep, Round, and Snake Ponds, and all results were nondetect; and VOC testing was conducted at Ashumet, Deep, Johns, and Coonamessett Ponds, and all results were nondetect.

Mr. Karson also reported that AFCEE has submitted to the regulators a project note that proposes changes to the 2011 pond testing program. The proposed changes are: to reduce testing from twice a year to once a year at Snake Pond (in Sandwich), Deep Pond (in Falmouth), Ashumet Pond (in both Falmouth and Mashpee), and Johns Pond (in Mashpee); and to eliminate testing at Round, Jenkins, and Coonamessett Ponds (all in Falmouth, and associated with FS-28 groundwater concerns). The Sandwich, Falmouth, and Mashpee Boards of Health were provided with copies of the project note, and while Sandwich and Falmouth concurred with the proposed changes, Mashpee board members did not agree to the changes in testing frequency at Ashumet and Johns Ponds. Mr. Karson said that AFCEE has scheduled some time on the Mashpee Board of Health's agenda on March 23, 2011 at the Mashpee Town Hall, at 7:45 p.m., to hear more about the board's concerns and share whatever information is needed to make an informed decision about the best way forward – whether that's once a year or twice a year sampling.

Mr. Karson displayed a map and pointed out the ponds proposed for reduction or elimination from the sampling program. He also talked about the rationale behind the proposal: test results since 2005 and beyond have shown no plume-related contaminants; and several years of groundwater data collected through sampling have better characterized the extent of the plumes – especially the depth of plumes compared to the depth of ponds, and the lack of potential interaction; and remedial actions on several plumes have reduced the overall size and concentrations of the plumes. Mr. Karson stated that, based on all this information and the past history of test results, AFCEE believes that annual sampling for the ponds is protective of public health.

Mr. Karson then displayed a slide showing the May 2010 results from the annual harbor monitoring event: the groundwater seep at Red Brook Harbor tested nondetect for VOCs; the groundwater seep at Squeteague Harbor had a PCE detection of 2.1 µg/L, which is consistent with past low-level detections, and TCE there was below the reporting limit (BRL); surface water results at Squeteague Harbor were nondetect or BRL. Mr. Karson also noted that the next harbor sampling event will take place in May 2011.

Mr. Saucier asked how surface water samples are taken. Mr. Karson said that it's his understanding that a member of the sampling crew walks into the water at the beach area and collects an air-free sample in a vial containing preservative. He also noted, however, that he's not sure of the exact depth at which samples are collected.

Mr. Goddard mentioned the MDPH's annual recreational ponds fact sheet. Mr. Karson said that he believes the most recent update of that fact sheet was done in August 2010, and was consistent with findings going back a number of years. He also noted that AFCEE provides MDPH with all available information about the plumes and any surface water testing, and MDPH has always concluded that the ponds are safe to use for recreational purposes, including fishing and swimming. The fact sheet does, however, include a mercury advisory due to accumulation of mercury in certain types of fish, but this has nothing to do with MMR. Mr. Goddard asked if the local Town Halls receive copies of the MDPH fact sheet. Mr. Karson replied that he provides electronic and hard copies when doing his annual Board

of Health updates, the fact sheet is also available on AFCEE's website, and the document has been posted on Mashpee Board of Health's website.

Mr. Reif asked if VOCs are currently a COC at the MMR. Mr. Karson replied that they are, and noted, for example, that TCE, PCE, and CCl₄ are all VOCs and COCs at the LF-1 plume. Mr. Reif then asked about the rationale for picking the COCs for the ponds. Mr. Karson replied that that has to do with the plume that's potentially affecting the pond. Mr. Davis clarified that the ponds do not have COCs. Rather, AFCEE chooses what to sample at the ponds based on the COCs in a plume. Decision documents, however, do not require sampling of ponds, and COCs are determined through the remedial investigation/feasibility study (RI/FS) process that leads to a decision document. Mr. Davis further explained that AFCEE conducts pond sampling to address one of the community's biggest concerns, which is surface water. However, the highest contaminant concentration ever detected in a pond – which was right at the bottom of the pond, only six inches above where a 1,000-ppb plume was upwelling – was 2 ppb in surface water, and this was determined to pose no risk, even under a conservative scenario with a child swimming 60 days of the year throughout his entire childhood. Mr. Davis stated that no surface water risk was ever carried forward in a decision document; the sampling AFCEE does is a response to the community.

Agenda Item #8. Natural Resource Damage Assessment Update

Mr. Sims, the Air Force trustee representative for the Natural Resource Trustee Council (NRTC) at MMR, stated that the council has been in place since 1998 and involves five trustees – the Commonwealth of Massachusetts, the Army, the Air Force, the Department of Veterans Affairs, and the Department of Interior (DOI), represented by U.S. Fish and Wildlife. He then noted that the NRTC was tasked to identify projects that could be funded from the Natural Resource Damages (NRD) settlement with Textron Systems, which was finalized in February 2008. Among other things, the NRD settlement awarded \$175,000 to DoD to be used for "...restoration, replacement, or acquisition of the equivalent of the injured natural resources..."

Mr. Sims explained that the Air Force, Army, and Commonwealth trustees agreed to use the \$175,000 to help fund joint projects, and this approach was approved by the NRTC. The Massachusetts Executive Office of Energy and Environmental Affairs (EEA), the Commonwealth trustee, led the action to identify eligible projects and prepared a Restoration Plan to document the trustees' decision on how certain NRD funds, including the \$175,000, would be spent.

Mr. Sims reported that the final Restoration Plan, which was approved by all five trustees in June 2010, included two projects: Phase I and Phase II of a Comprehensive Water Management Plan for the Town of Sandwich, which is already under way and is being funded wholly by the Commonwealth out of its share of the damages; and the Sagamore Lens Aquifer Sustainable Management of Water Resources Plan for the Upper Cape Regional Water Supply Cooperative, to be jointly funded by the Commonwealth and DoD. Transfer of the \$175,000 DoD award from a DOI trust account required a resolution by the NRTC. That resolution was approved on March 8, 2011, transfer of the funds to EEA is now in progress, and EEA will complete the grant to the Water Cooperative once the funds are received from DOI. Mr. Sims noted that it took some time to finalize the language of the resolution, which had to be reviewed by Air Force and Army general consul and fiscal law people at DoD. He then introduced Karen Pelto of MassDEP, another NRTC member.

Mr. Goddard noted that the Textron settlement was a settlement with a private contractor, but when the MMR NRTC was formed in 1998 it originally began by evaluating plumes associated with AFCEE's Installation Restoration Program (IRP). He said that that work has stagnated for a long time, and he's hopeful that the Textron settlement will provide a template for future projects. He then asked about the possibility of moving forward with the NRTC's original work and perhaps building upon "some of the good projects for green remediation" that have occurred at the base.

Mr. Sims replied that the trustees instructed their representatives to finish the Textron work, after which next steps would be discussed. He said that those discussions are under way, and the NRTC's facilitator, Patrick Field, has been speaking individually with the trustee representatives, as intermediaries to the trustees. Mr. Sims noted, for example, that he represents the Deputy Assistant Secretary of the Air Force, and so Mr. Field will be seeking out his thoughts on the way forward with respect to the bigger NRD issues at MMR. Mr. Goddard requested that the MMRCT be informed of the next steps for the NRTC, once those steps are identified. Mr. Sims said that the council intends to do that. He said that once Mr. Field compiles his responses from the trustee representatives, they will be shared with all the trustees, after which a way forward can be determined. Mr. Goddard further noted that he would like the public to have an opportunity to comment on the NRTC's planned next steps, and added that he can't remember the last time the NRTC held a meeting that was open to the public. Mr. Sims said that he thinks it was about six years ago, and added that it's a requirement that NRTC meetings take place only on Cape Cod or in Boston.

Ms. Pelto clarified that the NRTC's Commonwealth trustee is the Secretary of Energy and Environmental Affairs, Rick Sullivan, and she is his trustee representative.

Mr. Michaud inquired about the anticipated timeframe when Sandwich and the Water Cooperative would have access to funds for their projects. Ms. Pelto replied that work has already begun for the Town of Sandwich project, as that was funded out of the portion of the settlement that originally went directly to the Commonwealth. Regarding the Water Cooperative's project, the scope of work has been determined, the contract is in place, and the Commonwealth will sign it as soon as the funds have been transferred. She said that the transfer request has gone to DOI, and based on past experience, she expects the transfer to happen by the end of this month. Ms. Pelto also mentioned that two land acquisition projects were funded out of the Commonwealth's portion of the settlement – one in Mashpee and one in Sandwich, both for aquifer protection in Zone II of public water supply.

Agenda Item #9. J-2 Range Long-Term Monitoring Update

Mr. Gregson stated that active treatment systems are in place and cleanup is progressing at both the J-2 Eastern and J-2 Northern plumes. He noted that the J-2 Eastern plume consists of perchlorate and RDX, and the treatment system there involves three extraction wells and four MTUs (one at the toe, two in the middle, and one near the source). The treatment units together operate at 425 gpm and to date have treated about 500 million gallons of groundwater, with influent concentrations remaining as expected.

Mr. Gregson displayed a figure entitled "J-2 Range Eastern Groundwater Perchlorate Trends," pointed out the 2 ppb contour, noted that 2 ppb is the MMCL, and said that the perchlorate plume is about 5,000 feet long and about 1,100 feet wide at its widest point. He noted that concentrations near the source area have been decreasing over time, which indicates that the source area is depleting. Concentrations in the middle of the perchlorate plume are fairly constant, at about 50 ppb in some of the more contaminated wells. In the downgradient part of the plume, concentrations are dropping off in response to the extraction well located there.

Mr. Gregson then showed a cross-section figure of the perchlorate plume and pointed out the upper lobe and lower lobe, and the extraction well locations. He again showed the J-2 Eastern perchlorate plume in plan view and pointed out a few other areas of contamination: a southeast lobe, an eastern lobe, and a western lobe. He noted that concentration trends in these lobes are declining, and in fact the plume is no longer being detected in either of the western lobe monitoring wells, although some contamination may still exist between the wells.

Mr. Gregson displayed a figure entitled "J-2 Range Eastern Groundwater RDX Trends" and noted that the RDX contour is based on 0.6 ppb, the one-in-a-million cancer risk number. He also noted that the RDX plume is about 5,000 feet long and about 1,500 feet wide, that low concentrations in the source

area indicate that the source is depleting, and that concentrations in the middle of the plume are fairly stable. Mr. Gregson then showed a cross-section of the J-2 Eastern RDX plume and pointed out the bulk of contamination, upgradient of extraction wells. He also mentioned a monitoring well where concentrations had increased to about 4 ppb, but noted that that would be captured by a downgradient extraction well. He then referred to a downgradient well screen that continues to test nondetect, and again showed the plume in plan view and pointed a small area of downgradient RDX contamination where concentrations have decreased to about 0.3 ppb. Mr. Gregson also stated that the J-2 Eastern RDX and perchlorate plumes are behaving as modeled; there have been no surprises. Perchlorate concentrations are predicted to drop below 2 ppb by 2027, and RDX concentration to below 0.6 ppb in the same timeframe.

Mr. Gregson continued with his presentation by stating that the J-2 Northern plume also has both perchlorate and RDX. He noted that the J-2 Northern treatment system consist of three extraction wells along the axis of the plume operating at 375 gpm, two MTUs located on Wood Road, and infiltration trenches along the sides of the plume. To date, the system has treated 255 million gallons of groundwater. Mr. Gregson also reported that the maximum perchlorate detection during the recent reporting period was 20.7 ppb. He then referred to a map of the perchlorate plume and pointed out how the plume is, for the most part, collapsing in response to the extraction wells.

Mr. Gregson displayed a cross-section of the J-2 Northern perchlorate plume and noted that it shows that the extraction wells are breaking up the plume. He also pointed out a well screen where perchlorate concentrations significantly increased (from 13 ppb to about 179 ppb) and said that that detection, which is in close proximity to an extraction well, will be watched closely. He added that if that contamination isn't captured by the nearby well, it will likely be captured by the extraction well downgradient.

Mr. Gregson displayed a map and noted that the J-2 Northern RDX plume is much smaller than the perchlorate plume. He also reported that the current maximum RDX concentration in the plume is 4 ppb. Decreases in RDX concentrations are being seen at the source area, and concentrations in the upper portion also appear to be decreasing. Mr. Gregson then pointed out a row of monitoring wells where RDX detections are now all below 0.6 ppb. He also pointed out that all RDX concentrations exceeding the cleanup standard are now isolated in an area upgradient of an extraction well, which is expected to capture that contamination. Mr. Gregson stated that the J-2 Northern plumes are behaving as modeled, and he showed a cross-section of the J-2 Northern RDX contamination.

Mr. Gregson reported that the J-2 Range RI/FS is scheduled to be completed this summer, with a Decision Document to be issued later in the summer. He also explained that the J-2 Range treatment systems were installed several years ago as Rapid Response Actions to get the cleanup under way. Mr. Gregson noted that the next monitoring report for the J-2 Range plumes will be out in November 2011.

Agenda Item #10. Next Meeting Schedule and Adjourn

Ms. Donovan announced that the next MMRCT will take place on Wednesday, May 11, 2011. She also reviewed the draft agenda items for that meeting.

Mr. Goddard requested that an update on the Military Munitions Response Program (MMRP) be scheduled for a future MMRCT meeting, when appropriate. He also requested that IAGWSP and IRP Plume Booklets contain a paragraph to inform the public of the other cleanup program and associated plumes.

Ms. Donovan adjourned the meeting at 8:41 p.m.