

Senior Management Board/MMR Cleanup Team

**Joint Meeting
Bridge Bourne Hotel
Bourne, MA**

November 19, 2008

6:00 – 9:00 p.m.

Meeting Minutes

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Action Item:

1. Mr. Dow requested a breakout of IRP optimization cost savings to differentiate between technological savings and staff savings.

Handouts Distributed at Meeting:

1. Responses to Action Items from the 10/8/08 MMRCT Meeting
2. Presentation handout: Testing of Private Wells; Ponds; Harbors
3. Presentation handout: Optimization of Groundwater Treatment Systems
4. Presentation handout: CS-10 Groundwater Proposed Plan
5. Presentation handout: Chemical Spill 19 Plume Update
6. Presentation handout: UXO Working Group
7. Presentation handout: Remediation & Investigation Update
8. Presentation handout: Camp Edwards Training Update
9. Web page printout: RDECOM Implements “Green” Simulators

Agenda Item #1. Introductions, Agenda Review, Approval of 9/24/08 SMB Minutes and the 10/8/08 MMRCT Minutes

Mr. Mealy convened the meeting at 6:09 p.m. and the Senior Management Board (SMB) members and Massachusetts Military Reservation Cleanup Team (MMRCT) members introduced themselves. Mr. Mealy asked if there were any additions or corrections to the September 24, 2008 SMB meeting minutes. No changes were offered and the minutes were approved as written. He then turned the meeting over to Patrick Field, the facilitator from Consensus Building Institute (CBI). Mr. Field asked if there were any additions or corrections to the October 8, 2008 MMRCT meeting minutes. No changes were offered and the minutes were approved as written.

Agenda Item #2. Late-Breaking News

LTC Cordeiro announced that Camp Edwards will be issued a Notice of Violation from the Environmental Management Commission (EMC) due to a violation of the Tango Range Operation, Management, and Maintenance Plan (OMMP). He explained that rubber granules and dust from within the STAPP bullet catcher system came in contact with the ground while the contractor was conducting a mass balance exercise. He also noted that corrective action had been taken and that Shawn Cody would provide greater detail during his presentation later this evening.

Ms. Sanderson presented the Environmental & Readiness Center's (E&RC's) former deputy director, COL Bill FitzPatrick, with a plaque from the U.S. Environmental Protection Agency (EPA) regional administrator to honor him for "his collaborative and creative approach toward the protection of Cape Cod's drinking water." Ms. Sanderson acknowledged that COL FitzPatrick would be moving away from the area soon and thanked him for his excellent work while at the Massachusetts Military Reservation (MMR).

Agenda Item #3. SMB/Community News – Documents in Review & Comment Period Timeframe

Mr. Cowles stated that the Juliet Range and Kilo Range Best Management Practices for OMMPs documents, both dated October 22, 2008, have been out for public comment since October 24, 2008, with the comment period closing on November 24, 2008. He also noted that comments should be submitted to Lynne Jennings of EPA by mail or email, and that the documents are available for review at the Bourne, Falmouth, and Sandwich libraries. Mr. Cowles then reported that additional documents (from the U.S. Army Corps of Engineers [USACE] dated July 2008; and from the Installation Restoration Program [IRP] dated September 2008, and from the E&RC dated September 2008) also are available for review at the Bourne, Falmouth, and Sandwich libraries – details of which can be provided. Ms. Grillo asked if a list of documents that are out for public comment is posted on the E&RC website. Mr. Cowles replied that he believes so, but isn't entirely certain. He also confirmed that all of the documents are available at the libraries.

Agenda Item #4. Installation Restoration Program Updates

Residential and Surface Water Sampling

Ms. Forbes stated that between June and September 2008 the Air Force Center for Engineering and the Environment (AFCEE)/IRP tested 19 private wells for volatile organic compounds (VOCs). All of the test results met applicable safe drinking water standards, with no MMR-related contaminants of concern (COCs) detected in any of the wells. Low levels of chloroform and MTBE were, however, sporadically detected, mostly at levels below 1 microgram per liter ($\mu\text{g/L}$). The next program-wide sampling event is planned for spring 2009.

Ms. Forbes also reported that in July 2008 AFCEE conducted recreational pond monitoring for ethylene dibromide (EDB) at Coonamessett, Jenkins, Deep, Round, and Snake Ponds, with all nondetect results. In addition, Ashumet, Johns, Deep, and Coonamessett Ponds were sampled for VOCs, and no MMR plume-related COCs were detected, although toluene (from outboard motors, gasoline engines and the like) was detected in three samples from Johns Pond, at levels below 1 $\mu\text{g/L}$.

Ms. Forbes then discussed the monitoring at Squeteague and Red Brook Harbors in Bourne, associated with the Landfill 1 (LF-1) plume, noting that as a result of monitoring network optimizations, the number of sampling locations at the harbors has been reduced over the years from eight or nine to four locations. She also stated that some low-level detections of the primary COCs in the LF-1 plume (trichloroethylene [TCE] and perchloroethylene [PCE]) have been detected at the harbors, with the highest concentration – 2.9 $\mu\text{g/L}$ of TCE – seen in a seep sample at Red Brook Harbor. She also noted, however, that this was consistent with the conceptual understanding of the LF-1 plume, and added that it's possible that concentrations could reach as high as 5 to 10 $\mu\text{g/L}$ in the future. Ms. Forbes mentioned the below-reporting-limit (BRL) detections at Squeteague Harbor, and said that low-level detections of non-MMR contaminants chloroform and MTBE were also seen at the harbors.

Ms. Forbes also reported that some sediment sampling was conducted at the request of the Town of Bourne. Five of the six sediment locations tested nondetect, while the sixth, at a groundwater seep in an area where the plume was expected to upwell, had BRL detections of PCE and TCE, at 7

micrograms per kilogram ($\mu\text{g}/\text{Kg}$). She also noted that $7 \mu\text{g}/\text{Kg}$ is well below EPA's marine sediment screening benchmarks, and added that the sediment sampling results were provided to the Town of Bourne.

Questions and Comments from SMB/MMRCT and Public

Mr. LoGuidice asked if the non-MMR contaminants detected at the harbors could be from boating. Ms. Forbes replied that the MTBE probably is from boating, and noted that there's chloroform in the groundwater. Mr. LoGuidice asked if the Town of Bourne was notified about these detections, and Ms. Forbes confirmed that it was.

Mr. Dow asked if any sediment sampling was conducted off-shore. Ms. Forbes clarified that it was conducted around surface water locations where the plume is known to be upwelling. Mr. Dow said that past studies have found contaminants in off-shore sediments. Ms. Forbes replied that she believes that Mr. Dow is thinking of the U.S. Geological Survey (USGS) study; however, that study looked at groundwater upwelling beneath the pond, and she doesn't think it included sediment testing. Mr. Dow said that contaminant must have been in the sediment there since it was found in the low-permeability clays and silts. He also said that he believes the concentrations were higher than what was found on the shoreline. Ms. Forbes said that she thinks there was one location farther out in the harbor with a concentration around the drinking water level, but a drinking water standard wouldn't apply in that area. She further noted that the sediment criteria for PCE is $190 \mu\text{g}/\text{Kg}$ and for TCE is $8,950 \mu\text{g}/\text{Kg}$, while the highest detection ever seen in the plume was $150 \mu\text{g}/\text{L}$, and the highest concentrations seen downgradient of the base boundary were TCE from 20 to $30 \mu\text{g}/\text{L}$.

Optimization of Groundwater Treatment Systems

Ms. Forbes stated that the primary contaminants that AFCEE is addressing in the IRP plumes at MMR are chlorinated solvents (PCE and TCE), and ethylene dibromide (EDB), a fuel additive. Contaminant concentrations are relatively low, generally less than 1 milligram per liter (mg/L), although some concentrations between 1 and $2 \text{mg}/\text{L}$ have been seen in the Chemical Spill 10 (CS-10) plume. She also noted that AFCEE manages 12 plumes, which are typically deep (greater than 100 feet into the aquifer), thick (greater than 100 feet thick in some cases), and heterogeneous. She further noted that eight IRP treatment systems are operating – pumping and treating 15 to 16 million gallons of groundwater per day – and involving more than 27 miles of pipeline, and more than 100 extraction wells and reinjection wells (not all of which continue to operate), and more than 3,000 monitor wells (not all of which continue to be sampled).

Ms. Forbes stated that the goals of optimization, or the “better, cheaper, faster approach,” are to streamline the program, reduce impacts of the IRP cleanup on the environment (integrating sustainability into remediation), reduce costs to the taxpayer, shorten the cleanup timeframes, and document/track the optimizations so they might be used elsewhere.

Ms. Forbes then explained that the years 2002/2003 are used as a baseline for discussing optimization because most of the IRP systems had been in operation for three to five years at that time. And also at that time, the IRP was: using more than one million pounds of carbon per year, at a cost of \$800,000 per year; spending more than one million dollars per year on energy costs; spending about \$670,000 per year on well maintenance, which included subcontract costs; collecting and analyzing more than 5,000 samples per year; producing frequent reports and holding weekly meetings with the regulators; and employing 45 full-time contactors for monitoring and operations. Ms. Forbes also noted that the IRP costs through Fiscal Year 2002 (FY'02) were \$479 million, and it was estimated then that the cost to complete would be \$501 million, with a final plume cleanup year of 2050.

Ms. Forbes then began discussing the identification of opportunities for optimization by noting that the IRP looks at the “low-hanging fruit”, or high-cost items. She also noted that project teams are assigned to look at different areas of optimization, but the teams are also asked to communicate with each other and share ideas in brainstorming sessions. She further noted that staff members are taught to ask themselves why they do things the way they do, and if there might be a different or better way to do things. In addition, IRP staff members recognize that no optimization opportunity is too small to be worthwhile.

Ms. Forbes then spoke about System Performance and Ecological Impact Monitoring (SPEIM)/Long-Term Monitoring (LTM) optimization, noting that as the plumes change over time and data trends are examined, the IRP has optimized its SPEIM/LTM programs by looking at and changing the number of sampling locations, frequency of sampling, and the analytes. In addition, at a cost savings of about \$50,000 per year, the IRP has integrated no-purge sampling into its monitoring program, a method that involves the use of passive diffusion bag (PDB) samplers that are dropped down a well and left for a period of time rather than traditional sampling that involves pumping the well. She explained that PDB sampling is more sustainable because it doesn't require a generator to burn fuel and power a pump, and she also mentioned the use of another passive diffusion sampler known as a hydro-sleeve, which is better for metals sampling. Ms. Forbes also reported that an IRP contractor is currently working on developing a thinner PDB that can fit into smaller-diameter wells that were drilled with a geoprobe.

Ms. Forbes stated that other SPEIM/LTM optimizations include: the elimination of routine hydraulic monitoring (now being conducted as a focused event) at a savings of \$34,000 per year; the elimination of hourly field parameter monitoring at a savings of \$5,000 per year; the utilization of auto data validation, rather than having a person “crunch the numbers,” at a savings of \$69,000 per year; elimination of annual performance evaluation reports, which were replaced with as-needed, focused reports; and the use of an on-site laboratory, at a savings of \$40,000 per year – a more sustainable approach to sample analysis, which saves time and money and helps protect the environment. Ms. Forbes also displayed a bar chart that illustrated how the total number of samples collected for chemical monitoring had decreased over the years, and mentioned that the chart does not include one-time sampling and samples collected through use of the geoprobe.

Ms. Forbes continued her presentation by discussing Operations & Maintenance (O&M)/SPEIM optimizations, which have included changing pumping rates, eliminating or adding extraction wells and/or reinjection wells, packering well screens (to focus extraction stress to where the contamination is located), turning a reinjection well into an extraction well, and turning off treatment plants. She also showed a slide that listed a number of specific optimization measures taken over the years, which included: in April 2003, decreasing the flow at the Fuel Spill 28 (FS-28) shallow well-point system; in March 2005, turning off four extraction wells and packering off four extraction wells at FS-12; and in October 2007, reducing the plant flow rate by shutting off one extraction well at FS-1.

Ms. Forbes then showed a map of the Ashumet Valley plume, noting that the treatment system there began operating in 1999, and was made up of three extraction wells pumping at 1,200 gallons per minute (gpm), two treatment plants each housing two vessels, each containing 20,000 pounds of carbon, and two infiltration galleries to return the treated water to the aquifer. The system was optimized in May 2007, after it was realized that two of the extraction wells were pulling in very low contaminant concentrations and could be shut off, with any remaining contamination to be captured by the downgradient third extraction well. The optimization reduced the overall pumping rate from 1,200 gpm to 350 gpm, at a savings of \$180,000 per year in carbon exchanges, energy costs, and well maintenance. Ms. Forbes also pointed out on the map where a new extraction well is being installed for the Ashumet Valley plume.

Ms. Forbes noted that another good example of optimization is the FS-12 plume treatment system in Sandwich, which began operating with 24 extraction wells, to which an additional well was added by converting a reinjection well into an extraction well. The 25 wells were pumped at 772 gpm, but as the system was remediating the plume, it was determined that a number of extraction wells were no longer necessary and they were shut off. Today, after just having completed another optimization at FS-12, only four of the extraction wells are being pumped, at a rate of 360 gpm.

Ms. Forbes also spoke about alternative technologies (alternatives to pump-and-treat), such as: monitored natural attenuation (MNA) at the uncaptured portion of the LF-1 plume; the use of recirculating wells at CS-10 and Storm Drain 5 (SD-5) (although those wells are no longer operating); the zero valent iron (ZVI) barrier pilot test at the CS-10 plume near the old Unit Training Equipment Site (UTES); and the ZVI barrier at Ashumet Pond, a very sustainable approach because it has no moving parts or air emissions associated with it. She further noted that AFCEE had pilot tested air stripping as pretreatment to extend the life of the carbon (but it didn't work very well). In addition, AFCEE screened about 25 different in situ technologies and settled on pilot testing in situ chemical oxidation (ISCO). Ms. Forbes displayed a photo of the ISCO pilot test site and explained that the plan is not to remediate entire plumes using this technology, but is instead to perhaps supplement pump-and-treat systems – possibly by using an ISCO system upgradient of an extraction well so that the well could be shut off sooner. She further noted that AFCEE looks at cyclical pumping, which is turning pumps on and off to help break up stagnation zones caused by competitive hydraulic stresses. She also said that tomorrow AFCEE will be observing a presentation by Bill Kerfoot of Cape Cod, on his micro/nanobubble ozone technology, to see if it would help extend the life of the carbon used in treatment systems.

Mr. Mullennix asked if MNA is still being performed on the uncaptured portion of LF-1, and Ms. Forbes confirmed that it is.

Mr. Goddard asked for more information about ISCO. Ms. Forbes explained that ISCO is an injection of an oxidizer (like bleach) into the subsurface to target and degrade chlorinated solvents by oxidizing them.

Ms. Forbes then reviewed optimizations associated with O&M of the treatment plants: reconfiguration of FS-12 carbon trains so that there's a longer mass transfer zone, which helps load the carbon vessels with more contamination while guaranteeing that effluent discharge criteria are met, and redesign of the FS-1 system such that there are three carbon vessels in series instead of two, allowing more loading on the initial carbon vessel and reducing the frequency of carbon change-out, at a savings of \$75,000 per year; contacting Verizon when wells or plants are shut off, thereby ensuring that communication accounts are closed, at a savings of \$12,000 per year; elimination of annual Toxicity Characteristic Leaching Procedure (TCLP) analysis (savings of \$9,000 per year), elimination of bi-weekly plant field parameter readings (savings of \$3,000 per year), and reduction in sodium hypochlorite monitoring (savings of \$1,700 per year); working with the base's Natural Resources office, which is promoting the use of the landfill cap for bird nesting, and thereby reducing IRP's responsibility for the cap's maintenance (savings of \$7,000 per year); and the "low-hanging fruits" – carbon and energy optimizations.

Ms. Forbes reported that the IRP has 56 carbon vessels, each of which contains 20,000 pounds of carbon. She then noted that when the program first began, virgin carbon was used. But then the IRP tested different carbons to see if there was something better, and settled on custom segregated reactivated carbon, which reduced carbon costs by 25%, and proved to be a more sustainable approach in that the carbon is recycled and isn't shipped in from China. Ms. Forbes also said that the carbon change-out criteria were adjusted based on the COCs, which helped reduce carbon usage, and added

that an acquisition strategy that involved competitive contracting has reduced carbon costs even further. She then reported that the IRP was paying nearly \$18,000 for each 20,000-pound carbon load when the cleanup program first began, and the cost is now down to \$10,000 per load.

Ms. Forbes stated that the cleanup program realized a cost savings of \$200,000 per year by self-performing well maintenance, an important component of O&M, rather than contracting out the work. She said that having people on site to perform well maintenance means that they can be more responsive, and the arrangement is also more sustainable in that fewer resources are consumed because the rigs use bio-diesel and because contractor travel is eliminated. Ms. Forbes also reported that the IRP now self-performs its direct-push drilling rather than contracting out the work, at a savings of well over \$150,000 per year. She noted that the program owns its own geo-probe, which is often used in place of an auger or sonic rig. She also said that the geo-probe has a small footprint, causing less impact to the environment, is powered by bio-diesel, and has hit a record of depth of 319 feet.

Ms. Forbes then reviewed energy optimizations that the program has undertaken: the ongoing wind turbine project (with an expected 25% to 30% savings in energy costs); the installation of variable frequency drives (VFDs) to increase efficiency of the pumping motors (a savings of more than \$100,000 per year); after an energy audit conducted by Cape Light Compact, the replacement of overhead sodium vapor lighting in the treatment plants with high-efficiency fluorescent lighting (a savings of \$53,000 per year); the elimination of booster pumps and pump motor downsizing (a savings of more than \$45,000 per year); the use of bio-diesel (a savings of \$2,000 per year); a reduction in propane use by turning down the heat at the treatment plants (a savings of \$1,500 per year); and other miscellaneous energy optimizations such as motion sensors, programmable thermostats, LED exit lighting, and so forth (a savings of \$170 per year). Ms. Forbes also noted that the IRP is currently evaluating NStar's load response program, where NStar will pay the cleanup program to shut down its plants during peak load periods, and NStar's power purchase agreements, which include purchasing green power.

With respect to sustainability, Ms. Forbes mentioned: the wind turbine; the ZVI barrier at Ashumet Pond, which reduces the amount of phosphorus upwelling into the pond and improves the water quality; and the Veterans Affairs (VA) cemetery's use of LF-1 effluent for irrigation purposes. She also showed a slide that listed "Systems, Processes, and Management" optimizations: elimination of proprietary software (a savings of \$55,000 per year); reduction in vehicle costs as the program downsizes (a savings of \$100,000 per year); reduction in office trailers (a savings of \$34,000 per year); a change to option-year contracting (a savings of \$8,000 per year); on-site lab rate reductions (a savings of \$55,000 over four years); having the on-site lab utilize additional methods (a savings of \$10,000 per year); switching to Web publications instead of producing hard copies of all program documents (a savings of \$10,000 per year); and over time, a reduction in full-time staff, from 45 to 17.

Ms. Forbes then reviewed what she considers the biggest sustainability and optimization successes: renewable energy (the wind turbine) and energy conservation, through audits; switching from virgin carbon to custom segregated reactivated carbon and doing competitive contracting; self-performing well maintenance and direct-push work; implementing wellfield and monitoring network optimizations; and using an on-site lab. She also noted that the net cost-to-complete reduction is \$195 million.

Ms. Forbes concluded her presentation by reviewing the "Recommendations" slide: continue (to look for and implement ways to optimize); check back to ensure that incorporated optimization are working as expected; share equipment (such as the geo-probe) with other federal entities; look at regionalizing O&M and performance monitoring; watch for and participate in new technologies; and develop an exit strategy, which considers water supply, risk, sustainability, and public acceptance.

Questions and Comments from SMB/MMRCT and Public

Mr. LoGuidice asked if the IRP is sharing its expertise with other federal agencies, as well as its equipment. Ms. Forbes replied that it does communicate with other agencies, and noted, for example, that the wind workshop that was held at MMR where the IRP shared its lessons learned was attended by different federal agencies. She also noted that technology is shared. Mr. Davis added that AFCEE, which oversees all restoration activity in the Air Force, and is headquartered in San Antonio, Texas, currently has a small team at MMR to look at the optimizations that the IRP has done. A larger team is scheduled to visit in February, and will end up visiting every base in the Air Force to provide optimization suggestions.

Mr. Goddard said that he's glad to hear about the AFCEE team and has always been hopeful that the goings-on at MMR are shared with at the highest levels of the different branches of the military. He then asked if the IRP and the Impact Area Groundwater Study Program (IAGWSP) are sharing ideas at MMR. Ms. Forbes noted that she'd mentioned sharing the geo-probe with the IAGWSP, and added that the two offices have been talking about the wind turbine and energy savings. She further noted that both offices participate on the MMR Energy Committee.

Mr. Mullennix remarked that he's extraordinarily pleased about all the optimization work that's being done. He also noted that he thinks the reduction in the predicted cost-to-complete figure is absolutely tremendous. He then asked the regulators if this cost reduction in any way compromises the environmental cleanup or cleanup requirements. Mr. Pinaud replied "absolutely not" and noted that all of the optimizations are reviewed and approved by the Massachusetts Department of Environmental Protection (MassDEP) and EPA. Mr. Jacobs added that MassDEP has always been a strong advocate for optimization of groundwater treatment systems over time. He also explained that running a treatment system in an un-optimized state can prolong the amount of time it takes to clean up a plume because excess clean water ends up being pumped along with the contaminated water. He further noted that the objective of optimization is to, as much as possible, try to match the extraction stress to where the contamination resides. Mr. Jacobs also said that MassDEP works with AFCEE to identify opportunities for optimization, such as the SD-5 and FS-12 plumes, and develop strategies for faster cleanup. He then said that the plumes are cleaning up faster than the models predicted because the models don't have an optimization algorithm built into them. He also mentioned that as the plume shrinks there's no longer any need to monitor the wells outside the plume boundary, and added that MassDEP strongly supports AFCEE's efforts in this regard. On behalf of EPA, Ms. Sanderson said simply "team effort."

Mr. Dow asked if the wind turbine is operational at this time. Ms. Forbes clarified that it is not, and noted that the foundation insert was just delivered today. She also said that the tower is scheduled to be delivered in spring 2009, and the blades in summer 2009.

Mr. Dow also asked if an inter-comparison exercise was done between the on-site lab and the labs that used to perform chemical analyses for the cleanup program, to ensure that the results were comparable. Ms. Forbes replied that that type of comparison wasn't done; however, the on-site lab is certified and is audited by EPA, so there are no questions about the quality of the data. Mr. Dow said that results often differ quite a bit when these comparisons are made, and suggested that that is something that the IRP might want to consider. Ms. Sanderson said that she believes that the quality assurance program is quite rigorous and she mentioned splits and blind tests. She also said that while she appreciates Mr. Dow's comment, the audits of the system make EPA quite confident of the quality of the data. Ms. DeGroot confirmed that the quality assurance program is rigorous and includes duplicates and blind tests where samples of known and proven concentrations come into the lab, an analysis is run, and the

results compared to the standard that was sent in. She also noted that the lab is MassDEP certified for drinking water.

Mr. Dow stated that most labs use standardized techniques, and they might use the same machines but get different results. He also noted it's been said quite commonly in the past that some detection in groundwater was actually laboratory contamination – therefore he would guess that different laboratories have different kinds of contamination issues. Ms. Forbes replied that Mr. Dow might be referring to something like common solvents used in labs that cause contaminated samples. Mr. Dow agreed, and also mentioned chloroform and MTBE, adding that if the levels were above the detection limit but below the action level, it was said that they had to with contamination in the laboratory – and he thinks this is a “serious issue” to consider. Mr. Marchessault noted that someone from EPA's Lexington lab performed an audit over several days at the on-site lab and found no problems at all. He assured Mr. Dow that EPA is very comfortable with the results from the on-site lab.

Mr. Dow also requested a breakout of IRP optimization cost savings to differentiate between technological savings and staff savings. Ms. Forbes replied that she does not have those numbers off hand, but could provide them at a later date, and Mr. Dow's request for this information was noted as an action item.

CS-10 Proposed Plan

Mr. Minior showed a map of the CS-10 plume, noting that it began at the old BOMARC site on the base, has multiple source areas, and extends down toward Ashumet Pond and across the isthmus between Ashumet and Johns Ponds.

Mr. Minior then noted that although CS-10 was meant to be the first Interim Record of Decision (IROD) to Record of Decision (ROD) plume, as it turns out it will be last of the IROD-to-ROD plumes. He said that three feasibility studies were conducted for the plume: the 2003 CS-10 Feasibility Study (FS), which addressed the main body and leading edge of the plume; the 2007 CS-10 FS Addendum, which addressed the main body and leading edge of the plume; and the 2008 Supplement to the CS-10 FS Addendum, which addressed the main body of the plume. He also explained that the addendum and supplement came about because of the discovery of some contamination east of Johns Pond, near the zone of contribution for a Mashpee public water supply well, and because of the discovery of some contamination coming from the eastern edge of the on-base southern infiltration trench, which wasn't being captured by the Sandwich Road extraction wells.

Mr. Minior then reported that in October 2008, AFCEE, EPA, and MassDEP reached agreement on a preferred alternative for the CS-10 plume, with the final decision to be made after the CS-10 Proposed Plan (PP) undergoes a public comment period and any comments are evaluated. He also noted that the remedial action objectives (RAOs) for CS-10 groundwater are: to prevent residential exposure to CS-10 groundwater containing concentrations of TCE and PCE greater than 5 µg/L, and to restore the usable groundwaters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site.

Mr. Minior also showed a table entitled “CS-10 FS Addendum Alternatives (2007)” and said that before the issue east of Johns Pond, AFCEE was hoping to convince the regulators that Alternative 3 was the best alternative; Alternative 3 having been the status quo alternative, which meant continuing to operate the existing systems. He then referred to the Southern Trench contamination, and said that AFCEE had considered converting a reinjection well into an extraction well to address that issue, but then upon further discussion, decided to address it as part of a Supplemental FS Addendum, which looked at additional alternatives, including: Alternative 9 (the status quo alternative) and Alternative 10 (with remediation in the Southern Trench area – an additional extraction well, near the boat ramp

on Ashumet Pond). Mr. Minior noted that the projected cleanup year for the Southern Trench area under Alternative 10 is 2020, and for the Sandwich Road area is 2038, and for the CS-10 In-Plume area is 2094. He then explained that the 2094 estimated cleanup year is based on the current pumping strategy and does not account for optimization. He also noted that efforts are under way to see if better capture can be achieved in that area so that cleanup can be accomplished well before 2094.

Mr. Minior further noted that Alternative 9 is estimated to remove about 1,125 pounds of contaminant mass, while Alternative 10 is estimated to remove about 1,191 pounds of contaminant mass – a difference of about 70 pounds. He also mentioned that the costs of the two alternatives are very close (\$29 million and \$30 million respectively). Mr. Minior then reported that the preferred remedy to be presented in the CS-10 PP will be Alternative 10 as presented in the Supplement to the FS Addendum. The remedy encompasses: land use controls and monitoring for the entire plume; remediation through the existing extraction/treatment/reinjection systems (In-Plume, Sandwich Road, and Northern Lobe) plus additional extraction in the Southern Trench area with reinjection north of Sandwich Road. Mr. Minior also mentioned that the estimated cleanup year for the leading edge of the plume is 2046.

Mr. Minior concluded his presentation by reviewing upcoming steps: MMRCT review of the Final Draft CS-10 PP, in December 2008; the public comment period on the CS-10 PP in January 2009; submittal of the Draft CS-10 ROD to the regulators in April 2009, to include the responsiveness summary to public comments; and the signing of the ROD in July 2009.

Questions and Comments from SMB/MMRCT and Public

Mr. Goddard asked when the CS-10 In-Plume treatment plant began operating. Mr. Minior replied that it began operating in 1999/2000. Mr. Goddard asked how the plume shell has changed since then, given that it's estimated to take another 86 years to clean up at the current pumping rates. Ms. Forbes replied that although the plume looks very similar because it's so large, about 6,000 pounds of contaminant mass has been removed from the CS-10 plume so far. She also noted that the plume is delineated at 5 µ/L, but the extraction wells are situated in areas of higher mass, and it takes a longer time to "change a large plume like this." Mr. Goddard said that the optimization of the plume would come with the Five-Year Review. Ms. Forbes corrected him by noting that optimizations are done all the time. She also said that right now AFCEE is looking at areas upgradient of extraction well 2 (EW-2), where there are high concentrations, as well as areas upgradient of EW-10, EW-4, and EW-7, to see if it's possible to shut those wells down earlier.

Mr. Goddard remarked that it's possible then that the cleanup could be accelerated greatly. Mr. Davis had Mr. Minior show a computer animation, mentioned that there are silts in the plume area, and noted that at 2025 it probably would be possible to install a water supply well in that area without seeing any contaminant in the influent. He then explained that although the model is running until 2094 until the last bit of contamination goes away, it's important to keep in mind the objectives of eliminating exposure and making the aquifer useable – objectives that can be met before 2094. Mr. Goddard noted that it would be good to provide this kind of explanation to members of the public. Ms. Grillo said that it would be helpful in future presentations, when talking about the amount of mass removed, to also talk about the amount of mass remaining. Mr. Goddard added that he thinks it's very important to put the information in context and make the situation very clear to the public, who might otherwise just read in a newspaper report that the cleanup will take until 2094.

CS-19 Plume Update

Mr. Minior stated that AFCEE is on target to have the CS-19 final remedy in place by the end of September 2009. He then showed a map and pointed out in the Impact Area the CS-19 groundwater plume and the CS-19 disposal site, and noted that the depiction, which is based on data through 2007,

will be updated before the next CS-19 presentation to the MMRCT. Mr. Minior also said that the CS-19 IROD was signed a couple years ago, and the plume is being monitored and land use controls (LUCs) are in place to prevent exposure. He also mentioned that AFCEE has an agreement with EPA and the IAGWSP that ties CS-19 in with the IAGWSP's completion of the Central Impact Area FS and for the cleanup programs to come up with a comprehensive final remedy for the two plumes.

Mr. Minior noted that the contaminant of concern in the CS-19 plume is RDX, for which the state has a GW-1 standard of 1 µ/L. He also reported that the current maximum RDX detection in the plume is 15 µ/L and the historic maximum is 21 µ/L. He further noted that AFCEE has been periodically sampling a couple of wells at the source area for perchlorate and hasn't found any recently; the historic maximum perchlorate detection was 1.4 µ/L.

Mr. Minior then reviewed a slide entitled "CS-19 Feasibility Study": update the 2002 plume shell using data collected from the past couple of years, in November 2008; update the groundwater model, in November 2008; and evaluate alternatives (no action, long-term monitoring, and active treatment), from November 2008 to January 2009. He also noted that AFCEE would show the CS-19 animation at the next MMRCT presentation (likely April 2009), and added that in order to keep moving forward with the goal of signing the ROD by no later than September 2009, the CS-10 FS and PP would both be submitted to the regulators in January.

Questions and Comments from SMB/MMRCT and Public

Ms. Jennings stated that at the April MMRCT meeting, in addition to a detailed presentation from AFCEE on the CS-10 FS alternatives and PP, the IAGWSP will also give a detailed presentation on the Central Impact Area plume and source areas. She said that when the team sees those technical presentations together, what she is about to say at this meeting will make more sense. She then noted that the Central Impact Area site is very complicated from a source perspective and from a plume perspective. She explained that it's been learned that there are multiple, different kinds of sources, and multiple plumelets. And she noted that a key known source area in the Central Impact Area is at the cross-roads of Tank Alley and Turpentine Road. Ms. Jennings also said that AFCEE has already taken steps to address the key CS-19 source area.

Ms. Jennings further noted that the many different plumelets in Central Impact Area groundwater make it very complicated as far as designing a final long-term remedy, as there are still so many unknowns in terms of how the sources relate to the plumelets themselves. She also said that the IAGWSP had been trying to finish the Central Impact Area FS this year, but decided instead to roll out some Rapid Response Actions (RRAs) for the Central Impact Area, most of which will involve source control work and some focused groundwater treatment options. She noted that what AFCEE evaluates and eventually proposes for CS-19 will fit well into that scheme. Ms. Jennings also said that the RRAs will probably be rolled out a little later this year, but the ultimate goal for the end of the year will be "to have an understanding of where we're heading in the comprehensive sense for both Central Impact Area and CS-19."

Mr. Goddard inquired about the travel time from the leading edge of the CS-19 plume to the base boundary. Mr. Minior replied that the plume isn't expected to ever reach the base boundary. Mr. Goddard indicated that he assumes the plume would diminish in concentration before it reached the boundary, and Mr. Minior confirmed that that is the expectation.

Mr. Dow said that it's his understanding that the CS-19 source area is still being delineated, and he wonders what, if any, influence that might have on the cleanup plan. Mr. Davis clarified that the extent of the CS-19 source area has been determined, and the removal action has reached clean soil on the

outer edges of it. Mr. Dow asked if it's correct that this is an instance where the source area will be cleaned up before plume cleanup commences, and Mr. Davis confirmed that that is correct.

Break

Following a ten-minute break, Mr. Field queried MMRCT members regarding whether they would be interested in attending a December meeting, noting that if there were no December meeting, the January meeting agenda would be quite extensive. Mr. Gonser also clarified for the group that the IAGWSP agenda topics for December would be the BA-4 Investigation Report and Demo 1 Sampling, and the IAGWSP agenda topics for January would be the Northwest Corner, Western Boundary, and Demo 2 FSs. Mr. Field added that the IRP topics for December would be a Wind Turbine Update and an FS-28 Update. The MMRCT members indicated that they would rather have a December and a January meeting, rather than one very long meeting in January. Mr. Field noted that the team would then meet next on December 10, 2008.

Agenda Item #5. UXO Working Group

Mr. Gonser stated that based on the success of the Small Arms Range (SAR) Working Group, EPA's deputy regional administrator recommended that the IAGWSP create an Unexploded Ordnance (UXO) Working Group to coordinate and address some of the UXO issues. The objective of the UXO Working Group, which began holding periodic meetings in early 2008, is to look at UXO issues at MMR from an overarching, holistic perspective, including all the various aspects of how UXO impacts the installation (in terms of cleanup, training, land use, the Army's lease with the state, and operations).

Mr. Gonser reported that membership of the UXO Working Group includes the U.S. Army Environmental Command (USAEC)/IAGWSP, EPA, MassDEP, the Environmental Management Commission (EMC), and the Massachusetts National Guard (MANG), as well as occasional attendance from AFCEE and the National Guard Bureau.

Mr. Gonser then reviewed the UXO Working Group's accomplishments to date: established goals; identified considerations to look at when dealing with UXO, such as environmental impacts – particularly to groundwater – natural resource impacts, and safety risks to UXO technicians, soldiers in training, and trespassers; developed a methodology for looking at UXO sites, beginning with a records search to see what type of ranges were there, what types of munitions and weapons systems might have been used, and determining how to define the site boundaries, and looking at future land use; identified potential sites on the installation that are likely to or could have UXO; looked at various detection and discrimination technologies (beyond geophysical surveys and aerial magnetometry), such as the explosives-detection dogs, and methods for determining whether an anomaly is small and on the surface or large and deep beneath the surface; looked at removal technologies, especially robotics technology to remove UXO; implemented a UXO education program in the nearby schools – particularly the Sandwich schools, and as part of the Environmental Fair held on base, and through cable access television in Bourne and Sandwich – together with the Guard's Trespasser Reduction Program; worked with Dr. Ciaranca in Natural Resources to look at prescribed burns as a way to help in the UXO effort – for example, the Former K Range was recently burned, making it much easier to sweep the area with magnetometers; and began looking at L Range and J-3 Range, going through the process of a records search, determining the boundaries of the parcel, looking at future land use, and so forth.

Mr. Gonser then showed a map that indicated the potential munitions sites on the installation, color-coded to represent those where nothing has really been found, but it's possible that something might be there, and those where UXO actually have been found. He also noted that robotics work was conducted

at the following sites: the Grenade Court, Former A Range, Former K Range, J-1 Range, L Range, J-3 Range, and the Central Impact Area. He also showed a series of photographs of the robotics equipment and pointed out an excavator with a magnet attachment, a remote-controlled bobcat with a brush-cutter attachment, an excavator with a brontosaurus brush-cutter attachment (to cut much larger trees in rough terrain), and a remote-controlled vehicle pulling a magnetometer.

Mr. Gonser then reviewed each of the sites where the robotics equipment was used, beginning with the Grenade Court, which he noted was a heavily wooded area. He reported that the whole area (about one acre) was cleared using a piece of robotics equipment known as the ARTS system, and then the towed magnetometer was used to identify where the anomalies were located. Now the IAGWSP is in the process of using conventional methods to dig up the anomalies there and determine if there are any issues associated with the Grenade Court.

Mr. Gonser then discussed the Former A Range, which had two berms about 50 meters long. He noted that one of the berms was swept with a magnet, picking up a large amount of 50-caliber rounds. Also found were a couple dozen 37mm anti-tank rounds, of which few contained high-explosives. Mr. Gonser said that the work at Former A Range was not completed in order to move onto the Central Impact Area, but the team may return to the site to do more.

Mr. Gonser referred to the Former K Range, noting that the ARTS system with a brush-cutter and tree-snippers was used to cut fire-breaks there. The area was then burned, making it accessible, and has been swept with magnetometers. He reported that large amounts of rocket bodies were found, all of which were inert.

Mr. Gonser then reminded the group that the J-1 Range, which was one of the defense contractor test ranges, had four berms used for direct-firing. He reported that multiple pieces of robotics equipment (including a rotary sifter bucket and the ARTS system) were used at the berms, once of which was taken down altogether in order to have a line of sight to operate the equipment remotely for work on another berm. He then discussed what was found at the J-1 Range: one hundred and fourteen 105mm anti-tank rounds (all inert), four 155mm rounds (two of which turned out to be high-explosive), and eight 81-mm rounds (four of which turned out to be high-explosive). He also noted that the rounds were consolidated and blown up a few weeks ago, with each detonation limited to 40 pounds of explosive weight. Mr. Gonser said that he was unable to hear the detonations from his office on base, but also noted that the IAGWSP had notified the Sandwich police and fire departments and the residents of the Forestdale neighborhood in advance of the detonations.

Mr. Gonser continued by showing a photograph of L Range, the 40mm grenade range, before the robotics work began. He noted that it was quite heavily overgrown, and hadn't been used for many years. He then reported that the ARTS system with a brush-cutter attachment was used to cut down the small pine trees, a rototiller attachment was used to remove the root balls, and another piece of equipment was used to pick up sticks, root balls, rocks, and so forth and transport them along the sides of the range, and then a beach cleaner was used over the entire range (about 80 acres). He also explained that UXO experts identified any munitions, which were then picked up using the ARTS system and move off to the side. He said that approximately sixty-thousand 40mm rounds were dug up by the ARTS system, 42 of which were believed to be high-explosive, with the rest being inert practice rounds. He also mentioned that a consolidated shot will be done next week to destroy the rounds, and added that soil sampling at the range should be finished within the next day or two.

Mr. Gonser then spoke about the J-3 Range, noting that an area that could have been used for receiving mortar fire was identified as part of the initial record survey and weapons systems analysis. He said that the ARTS system was used to clear some of the brush in that approximately one-acre area, and the plan is to look around and see what might be there.

Mr. Gonser also discussed the Central Impact Area, which contains a large amount of munitions. He noted that the excavator and brontosaurus attachment (a spinning drum with steel teeth) were used to clear the vegetation at about 20 acres where the highest groundwater detections were seen and the highest density of firing was received. He noted that the next step is to sweep the area with the magnet, which has already been tried out in a one-acre plot where about a dozen munitions (a couple that were high-explosive) were recovered. He said that the magnet was successful at picking up the larger rounds near the surface.

Mr. Gonser concluded his presentation by noting that the UXO Working Group is looking to balance safety, cost, and environmental issues with respect to UXO sites. He noted that UXO cleanup is more difficult than traditional cleanup, as there are many unknowns. He also described the UXO Working Group's activities as a collaborative effort to "look at the big picture" and try to "make some progress on the UXO issue."

Questions and Comments from SMB/MMRCT and Public

Ms. Sanderson thanked Mr. Gonser for his presentation. She also said that although Mr. Gonser laid out a rather broad objective for the UXO Working Group, the group is also trying to come up with specific short- and long-term plans for addressing the very complicated UXO source issue "with that safety overlay." She said that EPA feels that the group has been tasked to "chart that course" with the backdrop of the lease, safety, land use, and so forth. Ms. Sanderson also noted that while Mr. Gonser shared some great successes, particularly with respect to the robotics work, there are still extraordinary challenges ahead, as indicated by the fact that the Central Impact Area FS won't be completed this year. She said that it's a complicated situation, "we sort of wrestle with" how to tell the story, and EPA would like to work with all the parties to coordinate ahead of time how presentations should be made and what they should contain. She added, "We'd like to start to roll out for the group, to have an appreciation of the real magnitude of what these folks are up against here."

Mr. Goddard said that he presumes that the robotics work is a joint effort, since it's the Air Force Research Laboratory (AFRL) working with the Army side. Mr. Gonser agreed and said that the IAGWSP was fortunate to have been able to convince the AFRL to work with the cleanup program, noting that the robotics team has been at MMR since the spring, and was originally only planning to stay for a couple of weeks. He also said that the effort is good for AFRL from a research perspective because it's an opportunity to test the equipment in different scenarios and terrains. He also further noted that what's being learned at MMR is being shared with the USAEC and with other installations, and added that the IAGWSP – and AFCEE too – is benefitting greatly from the robotics work. Mr. Goddard said that he hopes that this good information is reaching the highest levels at the Pentagon.

Mr. LoGuidice inquired about alternatives to conventional munitions. Mr. Gonser replied that the Guard has a whole spectrum of alternatives available, including practice rounds (which don't contain any high-explosives other than a spotting charge), simulated munitions, and computer simulators. He also said that the Army really can't afford to use high-explosives for training anymore, and by-and-large, practice rounds provide the soldiers with the same experience.

Mr. Dow asked about the percentage of collected UXO debris that's not intact, but is breached and would likely be a source of contaminant. Mr. Gonser replied that at this point the IAGWSP doesn't really have good information on that. He explained that the J-1 Range area, where most of the rounds were found, really "wasn't a realistic scenario" as practice rounds had been shot right into a sand berm; however, more will be known once the Central Impact Area site, which has been cleared, is examined. He also noted that the plan is to keep track of how many items are broken or have the potential to leak

contaminant, as that is a critical question. He further noted that it could take hundreds of years for the intact items to rust through.

Mr. Dow then inquired about the percentage of remotely-detected magnetic anomalies that turn out to be UXO components. Mr. Gonsler replied that it depends on the location – for example, at the Central Impact Area, where there were many targets, there’s a great deal of debris, while at the L Range, there are a lot of inert munitions because there isn’t clutter from other range operations. Mr. Dow said that it’s his understanding that some of the ranges were used for different purposes over time, so it could be presumed that there would be “different kinds of distribution in abundance of magnetic anomalies, some of which would be associated with specific rounds with UXO components...” Mr. Gonsler replied that there are two scenarios – a burial scenario and a firing scenario – and usually they didn’t occur at the same place. Most of the burials are located in the contractor-operated ranges, while most of the firing occurred elsewhere. The J-2 Range, however, was used for both purposes, having had both a mortar impact area and a contractor-operations area, but with one located at the top of a hill and the other down in the valley.

Agenda Item #5. IAGWSP Remediation & Investigation Update

Demo Area 1 Drive-points

Mr. Gregson showed a map of the perchlorate portion of the Demolition Area 1 (Demo 1) groundwater plume, and pointed out the source area, the five extraction wells down the center of the plume, the reinjection wells off to the side, the area of the plume near the base boundary, and the outer plume contour, which represents the state drinking water standard for perchlorate, which is 2 parts per billion (ppb). He noted that the Demo 1 treatment system, which pumps about 1.3 million gallons per day, is operating as anticipated. The plume is becoming smaller, maximum concentrations have decreased, the model correlates fairly well with the detections that are being seen, and the system is expected to operate for about 20 years. Mr. Gregson also reported that the model continues to indicate that the plume will not migrate off base at concentrations above 2 ppb, and displayed a series of graphics showing perchlorate concentrations at 2007 startup conditions, and at predicted 2012, 2017, 2022, and 2027 conditions.

Mr. Gregson then reported that the IAGWSP recently began conducting a drive-point investigation in the area of the toe of the plume. He noted that six drive-points will be installed on the east and west side of the pond beyond the current plume outline. He showed a figure of the toe of the plume and pointed out: three monitoring wells that tested nondetect for perchlorate; monitoring well 225 (MW-225), where perchlorate was detected at 20 ppb; MW-258, where perchlorate was detected at 0.5 ppb; and two additional nondetect wells. He then explained that the drive-point investigation is being conducted in response to a 0.6 ppb perchlorate detection in MW-352 and a 0.4 ppb perchlorate detection in MW-353, which along with another well that had tested nondetect, most recently all tested nondetect. He also pointed out the red line on the figure representing the particle track from MW-258.

Mr. Gregson then pointed out the drive-points that had nondetect results in the drive-point data available thus far. He also pointed out a 1.4 ppb detection in drive-point 517, noting that that “correlates fairly well with the previous detections that we’ve had in this well...” He noted that some additional drive-points will be installed downgradient, and also mentioned that one of the drive-points may not be deep enough and could need to be redone. Mr. Gregson then showed some cross-section figures of the toe of the plume, pointed out the drive-point locations, and stated that the IAGWSP is working toward obtaining a complete understanding of the area to ensure that no contamination is migrating off base.

Questions and Comments from SMB/MMRCT and Public

Ms. Rielinger asked if there are any off base water supply wells downgradient of the plume. Mr. Gregson replied that there are not, adding that there are Bourne public water supply wells to the north and south of the area.

Mr. Goddard asked if the possibility of the plume upwelling into the pond is a concern. Mr. Gregson replied that upwelling into the pond is not a concern; however, as the figure shows, the pond certainly has some kind of influence on the particle track, and the IAGWSP wants to be sure to understand how the pond is influencing the flow of contaminant.

Ms. Jennings reminded the group that the Demo 1 decision document includes a contingency for an additional leading edge extraction well. She explained that the contingency was included because of uncertainty about whether or not the plume would migrate off base, about the effects of the pond, and about whether the plume would discharge into or underflow the pond. Ms. Jennings said that the purpose of the drive-point investigation is to determine the best location for a permanent monitoring well in order to see what happens over time. She also noted that the decision document calls for the installation of an additional extraction well if a certain contaminant concentration is reached – either through actual or modeled data.

Mr. LoGuidice inquired about the depth of the pond downgradient of the plume. Mr. Gregson replied that it is about six feet deep.

J-1 South Drive-points

Mr. Gregson displayed a map of the J-1 Range South area and noted that the IAGWSP is doing a great deal of drive-point work there. He also explained that a 1 ppb RDX detection in MW-402, which occurred earlier this year, indicated that something different than expected was happening with the J-1 South plume, and so an extensive drive-point investigation was undertaken. Mr. Gregson noted that, based on the RDX detections directly south of the toe of the drawn plume, it appears that the plume is turning a bit to the south. He also noted, however, that monitoring points along Grandwood Drive have tested nondetect, so it doesn't appear that the plume has migrated that far. He further noted that overall, where it's been possible to install drive-points and resample existing monitoring wells, concentrations are quite a bit lower (less than 10 ppb) than what's been seen historically (up to 150 ppb RDX). Mr. Gregson said that there may have been a small zone of higher concentrations that has migrated downgradient to some point that isn't being picked up in the existing monitoring network. He also said that the next steps are to revise the modeling and transport modeling based on the current detections and the change in the plume's trajectory and evaluate alternatives for actions off base as part of the J-1 South FS.

More Late-Breaking News

Mr. Cowles announced that Dr. Mike Ciaranca has been appointed to replace COL Bill FitzPatrick as the environmental specialist and deputy director of the E&RC, and John Kelly has been appointed to replace Dr. Ciaranca as the Natural Resource/Cultural Resource manager.

Agenda Item #6. Camp Edwards Training Update

Mr. Cody, the Director of Environmental Affairs for the Massachusetts National Guard, showed a slide, pointed out Tango Range, Juliet Range, and Kilo Range, and pointed out photos of two new facilities at MMR: Tactical Training Base Kelley (where soldiers learn how to live and operate out of an environment like what they'll experience overseas in Iraq or Afghanistan) and Military Operations

on Urban Terrain (MOUT) Calero (where soldiers train for military operations in an urban environment).

Mr. Cody then reported that the Guard recently finished construction of the STAPP bullet catcher systems on Juliet and Kilo Ranges and is coming to the end of the 17-month Tango Range pilot program for firing lead ammunition into the STAPP system there. He noted that the pilot period ends on December 31, 2008, and the final report on the pilot program is due in March 2009. He said that the Guard has asked for approval to continue to utilize Tango Range during the interim period, and has also asked for approval to go forward with using Juliet and Kilo Ranges. Mr. Cody informed the group that on October 1, 2008, the EMC voted unanimously to allow the Guard to continue to use Tango Range and go forward with using Juliet and Kilo Ranges. Prior to that, the Community Advisory Council (CAC) to the EMC, also voted unanimously to allow use of the ranges.

Mr. Cody reported that from August through November 2008, ninety-six thousand seven hundred and forty-four rounds were fired at Tango Range, a standard 25-meter range with a STAPP bullet catcher system. He also mentioned that modifications that had been made to the STAPP system, including the installation of plywood at the top of the berm to detect whether any ricochets or skips were occurring. He said that information about this, as well as all the maintenance operations, will be included in the final report to be submitted in March. Mr. Cody further noted that the "Tango Range" slide includes a breakdown of all rounds fired by caliber and month, as will the final report.

Mr. Cody also reviewed other topics and lessons learned that will be contained in the Tango Range final report: issues pertaining to the tension lysimeters that were used and whether it would be better to use pan lysimeters instead, including at Juliet and Kilo Ranges; the toe berm boxes that were installed along the base of the system to protect the frame; and the water collection issue, which was at first thought to be due to condensation, but later determined to be the result of problems associated with gluing the seams when the weather was too warm. Mr. Cody further noted that the report will include information about programming maintenance funding requirements into the out years, as well as programming funding for analytical sampling that's conducted to ensure that there are no threats to groundwater.

Mr. Cody then stated that the National Defense Center for Environmental Excellence gave the STAPP system to the Mass Guard to conduct a demonstration/validation, and part of that contract was to do a mass balance. Initially it was thought that this could be achieved by removing everything inside the system, placing it in water, and allowing the rubber to float to the surface in order to separate it from the lead. However, it was determined that the rubber does not float and the new plan was to select a 4'x6' hotspot area behind the target, and remove and sift the materials to separate them. Mr. Cody noted that the contractor began setting up to conduct the mass balance at Tango Range this past Saturday and asked to, for the most part, be left alone to do the job that they've been doing for 15 years in Switzerland (where STAPPs originated) and at other military bases. On Monday morning the Guard checked in and found that everything seemed to be set up and working correctly, but came back a couple hours later to find that that was no longer the case. As it turns out, the contractor had not prepared adequately and provided enough containment, the workers were going too fast, the granules were coming out of the system and spilling onto the ground, and the operation was stopped immediately. Mr. Cody clarified that the Guard is nevertheless responsible for what occurred, given that it happened on MMR property, even though it was someone else's contract.

Mr. Cody showed a photo of the spillage and pointed out the dust from the rubber granules and the analytes that were inside the system. He also reported that the contractor immediately came up with a plan to clean up the area, which included vacuuming up the dust, moving the toe berm boxes, and scraping up 1.5 to 2 inches of the soil that might have been affected by the dust and granules. He

further noted that the site is now properly prepared with secondary containment, and the workers, rather than walking where they could cause an avalanche effect, rented a piece of equipment to create a platform from which the sifting operations can be done, which should minimize any type of spillage. Mr. Cody stated that the operation seems to be working well now and is being supervised constantly, as the contractor's quality assurance/quality control efforts did not prove satisfactory.

Mr. Cody then noted that 17 months ago the Guard calculated that about 588,000 rounds would be fired during the Tango Range pilot period; however, a significantly lesser number of rounds were actually fired. He also said that the wear-and-tear of the systems at Tango, Juliet, and Kilo Ranges will be examined as operations go on, and the number of bullets that go downrange will be determined. He explained that the initial mass balance is more for the demonstration/validation, and so it won't be an annual event. He also noted, however, that what happened during the mass balance exercise at Tango Range and the corrective actions that were implemented immediately will be included in the final report.

Mr. Cody stated that the STAPP bullet catcher system at Tango Range supports 15 lanes, the one at Juliet Range supports 17 lanes, and the one at Kilo Range supports 29 lanes. He also reported that the Juliet and Kilo Range OMMP was sent out for public review in May 2008, the comments were incorporated, and a public meeting was held on November 6, 2008. Also during that time period, the Guard submitted a formal petition to both the EMC and EPA to allow continued use of Tango Range and startup of operations at Juliet and Kilo Ranges. Mr. Cody noted that EPA's public comment period on all of the associated documents runs from October 24 through November 24, 2008; the documents can be found on EPA's website, as can EPA's draft response to the Guard's formal petition.

Mr. Cody also noted that the Supplemental Environmental Impact Report (SEIR) pertaining to the Small Arms Ranges improvement projects originally included Sierra Range, a multi-purpose range where soldiers learn how to engage targets at varying distance. He said that the SAR Working Group is in the process of developing an alternatives analysis that looks at different types of bullet catcher systems available that could be implemented at Sierra Range, which is a rifle range, as well as at Echo Range, which is a pistol range, but also has targets at varying distances. Mr. Cody also said that the plan was to file the SEIR in November; however, the Guard wants to ensure that the Juliet and Kilo Range process is completed before filing the SEIR, which, it is hoped, will go out in December, with a public comment period to follow in January.

Mr. Cody continued his presentation by discussing current and future training at MMR, noting that the goal is to enhance Camp Edwards' training facilities and capabilities to support New England National Guard mobilization requirements for deployment. He explained that the requirements are dictated by the Tactics, Techniques, and Procedures (TTPs) that soldiers are encountering in combat to ensure that they're ready and have survivability on the battlefield. He also offered the following examples: driver's training, convoy training, urban training at the MOUT Calero site, simulated munitions and pyrotechnics training at the TTB, live-fire convoys, and additional small arms ranges training.

Mr. Cody also mentioned the Army's "crawl-walk-run" model. He noted that simulation munitions are an important aspect of that model, and that standard commercially-available paintballs have been used for many years. He then noted that there's now a paintball that can be used in military weapons, which is known as the "Less-than-Lethal Ultimate Training Munition (UTM) Man-Marker Round." He said that the spent munition allows for easy cleanup and also clearly identifies when a target has been hit. Mr. Cody also noted that the Guard is working with the regulators on utilizing UTM rounds and is looking into the issue of melamine being listed as a compound on the Manufacturer's Safety Data Sheet (MSDS). He explained that melamine, which is a protein, is the compound that caused problems when it was added to milk and dog food in China. The Guard is now working with the manufacturer of

the UTM rounds to find out how much melamine is in the rounds, and whether it is in every round, as UTM rounds are really “a training enhancer for the soldiers.”

Mr. Cody stated that soldiers also need pyrotechnics (simulated hand grenades and artillery rounds) to enhance their training, although the use of pyrotechnics was banned in EPA’s 1997 Administrative Order. He noted that the Army is working with the regulators on allowing the use of pyrotechnics again and has reengineered the hand grenade simulator and artillery simulator, which used to be made up of about 80% perchlorate. The reengineering effort resulted in an hand grenade simulator that contains no perchlorate, and an artillery simulator that has only a small amount of perchlorate in the whistle component. The Guard is now working with the USAEC, the IAGWSP, the SAR Working Group, and some other chemists and scientists to develop a protocol for testing the newly-formulated rounds and ensure that they are not a cause for concern – in terms of perchlorate and in any other way. Mr. Cody said that once that has been established, the Guard will move forward and submit a petition to EPA requesting to resume the use of these pyrotechnics.

Mr. Cody concluded his presentation by mentioning the ongoing “brainstorming” activities at Sierra and Echo Ranges, including trying out a product called Defense Cell, to potentially be used behind the targets that pop up at varying intervals on the ranges. He explained that the Guard at MMR is trying to be the first to successfully operate a pop-up target range using lead ammunition (with some type of bullet catcher system).

Agenda Item #7. Open Discussion on SMB/MMRCT Combined Meeting

Mr. Field stated that the next MMRCT meeting is scheduled for December 10, 2008 and the next SMB meeting for January 28, 2009. He then asked for any initial thoughts from the team members on this meeting, which was essentially the first combined SMB/MMRCT meeting.

Mr. Goddard asked if the presentations at tonight’s meeting differed from presentations at regular SMB meetings. He also asked if the agenda items differed from a regular SMB meeting agenda. Mr. Harding replied that he found that Impact Area Review Team (IART) and Plume Cleanup Team (PCT) (which combined to form the MMRCT) presentations were more in-depth than SMB presentations, and explained that he thinks this has to do with the fact that the SMB deals with many other issues. He also said that he thought tonight’s meeting was informative, but he also thinks that meetings that run longer than two hours begin to lose their effectiveness.

Ms. Sanderson said that she thinks that the question of level of detail and frequency of SMB meetings still needs to be probed. She also said that tonight’s presentation on “Optimization of Groundwater Treatment Systems” was a little more detailed than most SMB presentations, but overall the topics were similar. Ms. Sanderson also noted that she is in favor of quarterly SMB meetings, but that idea requires a higher level of discussion. She also mentioned that someone looking for more detailed presentations could attend MMRCT meetings. She then asked the selectmen on the SMB what they take from SMB meetings to their boards of selectmen.

Mr. Mealy, a selectman from the Town of Bourne, replied that he offers to provide the other selectmen with copies of the previous SMB meeting minutes, gives a brief summary of what was discussed, and asks if any of the other selectmen want him to bring any issues before the SMB. He also mentioned that he participates in the SMB planning meeting, and also acknowledged that he’s only been to two SMB meetings so far. Mr. Barrette, a selectman from the Town of Sandwich, noted that this was his first SMB meeting, but he plans to provide the other selectmen with a brief update as well as contact information for those who would like to know more about a particular issue.

Mr. Goddard said that he thinks it would be worthwhile to have further discussions about merging the MMRCT and SMB, so that the cleanup programs would not have to repeat their presentations – perhaps having the SMB hold separate meetings a couple times a year to deal with issues outside of the cleanup programs.

Mr. Foster said that he thinks that bringing all the players together is a good idea, but it makes for an overly ambitious agenda. He also said that each group has different priorities, and sometimes the details wouldn't be enough for some and would be too much for others. He reiterated that he thinks merging might be a good idea, but it would "take a while for this situation to work itself out."

Ms. Jennings stated that the MMRCT is looking to hold meetings every other month, but EPA has not bought into that idea yet, in part because doing so would mean having "marathon" meetings. She said that EPA thinks that at this point MMRCT meetings should continue to be held every month, especially given the upcoming decisions over the next six months. That way the group could have meetings that are one to two hours long at most, rather than having longer meetings and rushing through agenda items at the end. Ms. Jennings also said that she thinks tonight's meeting was excessive because the MMRCT had skipped the meeting the month before.

Ms. Grillo said that she thinks there are ways to streamline meetings, such as having dry-runs of the presentations to ensure that they are succinct and contain key messages, and to anticipate questions that might be raised. She suggested that the regulators and the military should explore the idea of a dry-run before having another combined SMB/MMRCT meeting. She also agreed with Mr. Harding that a two-hour meeting "sounds great," and she recommended handling requests for additional information as action items as another way to streamline meetings.

Ms. Rielinger said that she thinks some of the topics lent themselves well to both groups – for example, the presentation on optimization and the training update – and from her perspective as a member of the MMRCT, she thought the level of detail was adequate, and seemed adequate for the SMB. She also noted, however, that she thinks that it makes sense for the MMRCT to deal with some of the plans and feasibility studies (which involve a great deal of detail, animations, and so forth) separately. Ms. Rielinger said that it seems that in addition to considering the frequency of the meetings, it should also be considered which topics could be handled well in a presentation to both teams, and which would be better left as separate, more in-depth items for the MMRCT.

Mr. Cowles agreed with Ms. Sanderson that it comes down to the frequency and the length of the meetings. He then noted that the SMB is scheduled to meet six times a year, but over the last few years has only met five times a year, and he thinks that the SMB planning group needs to discuss what the meeting frequency should be. Mr. Cowles also agreed with Mr. Harding that three-hour meetings are difficult, and therefore if it's decided that the SMB and MMRCT should continue to have combined meetings in the future, it will be important to take a close look at the agendas to ensure that they don't become marathon sessions, and meet together only when it makes sense to coincide. He reiterated that this is something to be discussed at the next SMB planning meeting, which will occur in January.

Mr. Goddard asked if tonight's agenda included any items that wouldn't have been included in a regular MMRCT meeting. Ms. Grillo replied, "Just this open discussion." Mr. Goddard encouraged the regulators and the SMB planning group to keep in mind the degree to which the two teams differ when they have their discussion, and added that he would like to hear about that discussion, perhaps at a future combined meeting.

Mr. Gonser told Mr. Goddard that every topic presented at MMRCT meetings is also presented to the SMB; however, there are topics presented to the SMB that are not presented to the MMRCT (for example, something having to do with the 102nd Intelligence Wing). He also said that he thinks it's

important to keep in mind that it's very difficult to have periodic combined meetings; rather, they should either all be combined or be rarely combined. Otherwise, topics would have to be repeated for the SMB and the MMRCT would have to hear presentations again, or the SMB wouldn't get to hear it at all. Mr. Gonser also said that he thinks that the depth of knowledge that each group needs differs.

Agenda Item #8. Next Meeting Schedule and Adjourn

Mr. Goddard requested that a near future MMRCT meeting agenda include a community involvement item that pertains to combined IAGWSP/IRP annual reports, fact sheets, plume maps, and so forth. He also asked that it include an update on the source of the perchlorate that led to the new water supply well on base. Mr. Field noted that that would be covered as part of the already-scheduled Western Boundary presentation.

Ms. Grillo encouraged team members to contact any of the regulatory, IAGWSP, or IRP staff with any additional thoughts about this combined SMB/MMRCT meeting, rather than waiting for the next meeting.

Mr. Field thanked everyone for coming and adjourned the meeting at 9:15 p.m.