

Massachusetts Military Reservation Cleanup Team (MMRCT)
Bridge Bourne Hotel
Bourne, MA
April 8, 2009
6:00 – 8:30 p.m.

Meeting Minutes

<u>Member:</u>	<u>Organization:</u>	<u>Telephone:</u>	<u>E-mail:</u>
Jon Davis	AFCEE/MMR	508-968-4670	jon.davis@brooks.af.mil
Mike Minior	AFCEE/MMR	508-968-4670	mike.minior@brooks.af.mil
Kent Gonser	IAGWSP	508-968-5107	kent.gonser@us.army.mil
Ben Gregson	IAGWSP	508-968-5821	Benjamin.p.gregson@us.army.mil
Lynne Jennings	US EPA	617-918-1210	Jennings.lynne@epa.gov
Paul Marchessault	US EPA	617-918-1388	Marchessault.paul@epa.gov
Leonard Pinaud	MassDEP	508-946-2871	Leonard.Pinaud@state.ma.us
Ellie Grillo	MassDEP	508-946-2866	ellie.grillo@state.ma.us
Scott Michaud	MMRCT/CCC	508-362-3828	smichaud@capecodcommission.org
Harold Foster	MMRCT/Falmouth	508-564-4818	
Diane Rielinger	MMRCT/Falmouth	508-563-7533	one-brain@verizon.net
Phil Goddard	MMRCT/Bourne	508-759-3043	pgoddard@aol.com
Charles LoGiudice	MMRCT/Falmouth	508-563-7737	irextut@msn.com
Greg Taylor	MMRCT/Sandwich		gregtaylor1@prodigy.net
<u>Facilitator:</u>	<u>Organization:</u>	<u>Telephone:</u>	<u>E-mail:</u>
Patrick Field	CBI	617-492-1414	pfield@igc.org
<u>Attendee:</u>	<u>Organization:</u>	<u>Telephone:</u>	<u>E-mail:</u>
Doug Karson	AFCEE/MMR	508-968-4670	doug.karson@brooks.af.mil
Bill Gallagher	IAGWSP	508-968-5826	William.gallagher@us.army.mil
John McDonagh	IAGWSP	508-968-	john.mcdonagh@us.army.mil
Paul Nixon	IAGWSP	508-968-	paul.nixon@us.army.mil
Kris Curley	IAGWSP	508-968-5626	kris.curley@us.army.mil
Pam Richardson	IAGWSP	508-968-5630	Pamela.richardson@us.army.mil
Lori Boghdan	IAGWSP	508-968-5635	lori.boghdan@us.army.mil
Dave Hill	IAGWSP	508-968-5621	dave.hill@us.army.mil
Lynda Wadsworth	E&RC	508-968-5152	wadsworth.lynda@us.army.mil
Bill Sullivan	E&RC	508-968-5147	William.g.sullivan@us.army.mil
JoAnne Palmer	MAARNG	508-233-6517	jbeanpalmer@yahoo.com
Jim Murphy	US EPA	617-918-1028	murphy.jim@epa.gov
Bob Lim	US EPA	617-918-1392	lim.robert@epa.gov
Jeanethe Falvey	US EPA	617-918-1020	Falvey.jeanethe@epa.gov
Jane Dolan	US EPA	617-918-1272	dolan.jane@epa.gov
Elliott Jacobs	MassDEP	508-946-2786	elliott.jacobs@statet.ma.us
Mark Panni	MassDEP	508-946-2898	mark.panni@state.ma.us
George Green	SMB/Mashpee	508-534-1900	cgreen@mwtribe.com
Stephen Mealy	SMB/Bourne	508-759-0600	smealy@townofbourne.com
Virginia Valiela	SMB/Falmouth	508-763-5924	Valielav@hotmail.com
David Dow	Sierra Club	508-540-7142	ddow420@comcast.net
Katie Thomas	Jacobs	508-743-0214	Katie.thomas@jacobs.com
Lonnie Fallin	Jacobs	508-743-0214	Lonnie.fallin@jacobs.com
Jane Gasper	Innovar	508-759-9114	jgasper@innovar-env.com

Action Items:

1. Mr. Dow requested that future Central Impact Area updates include a conceptual model that shows how specific compounds move from soil to the groundwater surface and from the groundwater surface out to the extent of the plume.
2. Mr. Goddard requested that a future MMRCT meeting agenda include an update on efforts to move forward the NRTC process.
3. Mr. Goddard recommended having a joint MMRCT/SMB meeting in September 2009.
4. Mr. Goddard requested that program managers consider the use of Mobile Treatment Units for CIA groundwater.

Handouts Distributed at Meeting:

1. Presentation handout: CS-19 Groundwater Proposed Plan
 2. Presentation handout: Central Impact Area Update
 3. Presentation handout: Demolition Area 1 Decision Document Addendum
 4. Presentation handout: BA-4 Disposal Area Decision Document
 5. Presentation handout: Textron Work at the J-3 Range
 6. Presentation handout: L Range Soil Update
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Agenda Item #1. Introduction, Agenda Review, Action Items Review, Approval of 3/11/09 MMRCT Meeting Minutes

Mr. Field convened the meeting at 6:02 p.m. and reviewed the agenda, and the Massachusetts Military Reservation Cleanup Team (MMRCT) members introduced themselves. Ms. Grillo noted that Senior Management Board (SMB) members attending the meeting are welcome to sit at the table with the team, but they declined to do so. Mr. Field asked if there were any changes or additions to the March 11, 2009 MMRCT meeting minutes. No comments were offered and the minutes were approved as written.

Agenda Item #2. Brief Update

Mr. Davis announced that since the last MMRCT meeting, the Air Force Center for Engineering and the Environment (AFCEE) has obtained a signed access agreement for installation of an additional extraction well for the Ashumet Valley plume. A Falmouth Conservation Commission hearing is scheduled for April 22, 2009 for the Notice of Intent, and construction is expected to begin soon after. Mr. Davis said that a construction schedule would be available by the next MMRCT meeting.

Agenda Item #3. Chemical Spill 19 (CS-19) Proposed Plan

Ms. Thomas showed a map and pointed out the CS-19 plume, the base boundary, and Route 28. She noted that the plume, which is an RDX plume, is migrating to the west, and is one of the plumelets from the Central Impact Area.

Ms. Thomas noted that the CS-19 plume was investigated in the 1990s/early 2000s and an Interim Record of Decision (IROD) for long-term monitoring was signed in 2006. She also explained that the IROD was signed with the understanding that a final decision for the CS-19 plume would be made once more information about the Central Impact Area plume was gathered and understood. She further noted that long-term monitoring of the CS-19 plume has been ongoing since 2004, during which time the Central Impact Area plume was investigated further and a feasibility study began to be developed. Based on this information, AFCEE, the U.S. Environmental Protection Agency (EPA), and the

Massachusetts Department of Environmental Protection (MassDEP), reached consensus in 2008 that enough was known to move forward with looking at CS-19 alternatives and evaluate them for a final remedy for the plume – while, at the same time, the Impact Area Groundwater Study Program (IAGWSP) would be evaluating alternatives for the Central Impact Area plume. In 2008 and the beginning of 2009 the CS-19 Groundwater Feasibility Study (FS) was conducted. The Remedial Action Objectives (RAOs) for CS-19 groundwater are: to prevent residential exposure to CS-19 groundwater containing concentrations of RDX greater than 0.6 parts per billion (ppb) and to restore usable groundwaters to their beneficial uses wherever practicable. Ms. Thomas noted that these RAOs are consistent with the RAOs the IAGWSP is using for other RDX plumes.

Ms. Thomas stated that the alternatives presented in the CS-19 FS and Proposed Plan (PP) are: Alternative 1 – no action, the baseline alternative; Alternative 2, monitored natural attenuation (MNA) with land-use controls (LUCs); and Alternative 3, active treatment with long-term monitoring and LUCs (includes one extraction well and an infiltration trench). She also reported that; the estimated cleanup year for Alternatives 1 and 2 is 2037; Alternative 3 would remove approximately 1.7 pounds of RDX; there is no cost associated with Alternative 1; present value cost for Alternative 2 is approximately \$0.9 million; present value cost for Alternative 3 is approximately \$5.3 million; under Alternative 3, with a cleanup year of 2030, the plume volume would be zero at that time, while under Alternatives 1 and 2 the plume volume would be approximately 116 million gallons at that time; but also under Alternatives 1 and 2, between 2030 and 2037, the plume volume would reduce to zero.

Ms. Thomas then noted that the components of AFCEE's preferred remedy, Alternative 2, are groundwater monitoring to ensure that the plume is attenuating as predicted and LUCs to ensure that no residents are being exposed to the plume. She also mentioned that the remedy would be evaluated every five years to make sure that it's performing as predicted. The expected outcomes of Alternative 2 are cleanup by approximately 2037, no migration of the plume past the base boundary at concentrations exceeding 0.6 ppb, and a present value cost of \$0.9 million. Ms. Thomas further noted that the public comment period on the CS-19 Proposed Plan runs from April 9 to May 8, 2009, a public hearing is scheduled for May 6, 2009, and comments can be submitted by mail, fax, email, or Internet.

Ms. Jennings asked Ms. Thomas to show the animations for the CS-19 alternatives. Ms. Thomas showed the animation for Alternatives 1 and 2, pointed out the 0.6 ppb, 2 ppb, and 6 ppb plume contours, and noted that the plume is not predicted to migrate past the base boundary at concentrations above 0.6 ppb. Mr. Field inquired about the significance of 0.6 ppb. Ms. Thomas replied that 0.6 ppb is equivalent to a cancer risk of 1×10^{-6} , the cleanup value the IAGWSP uses for RDX plumes. She then showed the animation for Alternative 3, pointed out the extraction well location, and noted that the contamination does not migrate quite as far as it does under the first two alternatives and is predicted to achieve cleanup about seven years sooner.

Ms. Grillo reminded the group that as a matter of practice, MassDEP does not put forth its official position on a preferred alternative until the public comment period has ended. She also asked if Mr. Field plans to offer to compile and submit MMRCT comments on the proposed plan, as he's done in the past. Mr. Field confirmed that later in this meeting he would see whether the team wants to develop joint comments and finalize them via email.

Mr. Foster asked if additional monitoring wells would be installed for Alternative 2, and if so, whether the cost of \$0.9 million includes their installation. Ms. Thomas said that she believes that Alternative 2 involves the installation of two new monitoring wells, which are included in the present value cost. She also noted that additional monitoring wells could be installed, if needed.

Mr. Goddard inquired about the LUCs associated with the preferred remedy. Mr. Davis replied that because the plume is on base, the residential well verification program is not one of the LUCs. Rather,

the LUCs are Dig Safe, the base drilling moratorium, and MassDEP's permitting process for wells serving 25 customers or more.

Mr. Goddard said that he wonders about including something in the CS-19 decision to ensure that the possibility of utilizing Central Impact Area plume future treatment could not be prohibited. He also inquired about any monitoring between Donnelly Pond and the anticipated dissipation point of the plume, noting that he wouldn't want the Town of Bourne to be held responsible for any plume contamination that might be detected in the Bourne landfill sentinel wells in that area. Ms. Thomas referred to the map and pointed out the monitoring wells downgradient of CS-19. She also noted that the plume dives deep as it migrates, and therefore is not anticipated to upwell into the downgradient ponds. Mr. Goddard then pointed out the location of the Bourne landfill's sentinel wells and urged the regulators to consider installing monitoring wells "a little closer" so that the Town of Bourne would not be finding out about any RDX contamination at the last minute.

Mr. Taylor inquired about the thickness of the plume. Ms. Thomas replied that it's very thin, and pointed out a portion that is less than 50 feet thick. Mr. Taylor also asked about the modeling history. Ms. Thomas replied that model development has been ongoing for numerous years, and the current model, which was done recently, is based on all of the information that's been accumulated since the program began to try to predict the fate & transport of the plume. She noted that the model also incorporates data gathered by the IAGWSP.

Mr. LoGuidice asked Ms. Thomas to explain the cost difference between Alternatives 2 and 3. Ms. Thomas explained that the difference in cost is related to the installation of the extraction well, treatment system, and infiltration trench associated with Alternative 3, as well as additional monitoring that would be done to support evaluating the treatment system, and operation & maintenance of the treatment system over time.

Ms. Rielinger asked if there are any other wetlands or ponds that might be affected by the plume. Ms. Thomas replied that there are not. Ms. Rielinger also asked about a cross-section figure that shows both the CS-19 and Central Impact Area plumes. Ms. Thomas noted that a presentation on the Central Impact Area plume would follow this presentation. She also said that CS-19 is one plumelet of the Central Impact Area plume, which has additional constituents besides RDX. She further noted that the conceptual site model shows part of the Central Impact Area plume underneath and upgradient of the CS-19 plume. She further noted, however that CS-19 has a very specific source area (a disposal area), and that the Central Impact Area plume is more diffuse. Ms. Thomas also stated that AFCEE was able to isolate and evaluate CS-19 separately from the Central Impact Area plume for the CS-19 remedy decision. Ms. Rielinger asked if an active system for the Central Impact Area plume would be expected to affect the movement of the CS-19 plume. Ms. Thomas replied that that possibility would be evaluated if an active remedy is chosen for the Central Impact Area plume.

Ms. Jennings confirmed for Ms. Rielinger that the upcoming Central Impact Area presentation includes cross-sections that show the plume's relationship to the CS-19 plume, as well as the alternatives being considered for the Central Impact Area plume. She also noted, however, that the program managers have been trying to evaluate CS-19 as an independent plumelet because it has a unique source. Ms. Rielinger then asked how things would be handled from a process standpoint should the Central Impact Area remedy affect the movement of the CS-19 plume; that is, would the decision have to be amended. Ms. Jennings replied "not if it doesn't change the remedy," although monitoring requirements may have to be changed. She also said that it is possible that some of the CS-19 plume could be drawn in by an extraction well or even change direction slightly, depending on which Central Impact Area alternative is selected – but an effort would be made to ensure that the modeling provides an understanding of how flow would be affected. Ms. Jennings further noted that if in the future the CS-19 plume behaves differently than expected, the ROD could be amended, although she thinks it's unlikely that that would have to happen, given the contamination that's in the CS-19 plume. She also

said that she thinks that monitoring of the CS-19 plume is “the right thing to do” but it would be a good thing if some of the plume was treated by a Central Impact Area system. Mr. Gallagher agreed that some of the IAGWSP’s treatment alternatives for the Central Impact Area plume (although only preliminarily modeled so far) might capture a significant part of the CS-19 plume.

Ms. Jennings then made a point of noting that the proposal of a non-active treatment for the CS-19 plume does not mean that it should be presumed that a non-active treatment will be proposed for the Central Impact Area plume – a much larger plume, with much higher concentrations. She said that there will be some type of active treatment at the Central Impact Area plume.

Mr. Dow stated that early on in the cleanup program’s history, the Air Force’s Tad McCall promised to “make Cape Cod’s groundwater situation whole, from the pollution” generated by military training. At that time, Sue Walker, who was representing the Association to Preserve Cape Cod (APCC), and himself, representing the Sierra Club, took the position that leaving pollution in the ground would not make Cape Cod “whole,” and therefore an effort should be made toward achieving a natural background situation with respect to the contaminants. Mr. Dow also said that the Sierra Club’s national policy is that “the answer to toxic pollution is not dilution,” which is really MNA, and therefore the Sierra Club definitely opposes the proposed alternative for the CS-19 plume.

Mr. Field told the group that an effort to develop a team recommendation on the CS-19 Proposed Plan would take place following the Central Impact Area presentation.

Mr. Goddard inquired about the highest concentration in the CS-19 plume. Mr. Davis replied that it was 15 ppb.

Agenda Item #4. Central Impact Area Update

Mr. Gallagher reminded the group that the Impact Area, which is centrally located in the northern 15,000 acres of the base (Camp Edwards), is approximately 2,200 acres in size and was the main impact area for artillery and mortar fire from the 1930s through 1997. In 1988, training switched from using live high explosive (HE) rounds to low-intensity training rounds (LITR), which did not contain explosives, but did contain perchlorate in the spotting charge. The Central Impact Area, a roughly triangular area, is believed to be the source area of the Central Impact Area plumes, based on historic site use, particle backtracking, airborne and land-based geophysical results, and artillery and mortar firing fans.

Mr. Gallagher stated that the Central Impact Area groundwater investigation, which has been ongoing since 1997, involved the installation of 138 well clusters and 332 individual wells, and led to the identification of RDX and perchlorate plumes. He showed a figure depicting the RDX plume and noted that while it appears to be contiguous in map view, it’s really a number of individual plumelets, suggesting multiple source areas throughout the 330-acre Central Impact Area. He also reported that: the highest RDX detection in the investigation was 45 ppb; most detections have been below 10 ppb; the current mean detection is around 3 ppb; and the model estimate is that the plume contains approximately 22 kilograms of RDX.

Mr. Gallagher showed a cross-section figure and pointed out the Central Impact Area plume lobe “underlying or sinking beneath” the CS-19 plume. He showed another cross-section figure, right at the Central Impact Area boundary, pointed out the irregular shape of the plume, and noted that the mappable plumelets suggest a heterogeneously distributed source and multiple source areas. Mr. Gallagher then showed another cross-section figure, noted that the Central Impact Area plume is moving deeper in the aquifer as it travels downgradient, pointed out the CS-19 plume, and explained that groundwater flow in the figure is straight toward the viewer. He also showed a cross-section figure at the leading edge of the main body of the Central Impact Area plume and pointed out the “tips of the fingers of the plumelets” near Burgoyne Road and another plumelet farther downgradient, near Avery

Road. Mr. Gallagher then displayed a figure depicting the Central Impact Area perchlorate groundwater contamination, noting that there are currently three areas of perchlorate concentrations exceeding 2 ppb, the state's maximum contaminant level (MCL). He also noted that the highest detection of perchlorate seen during the Central Impact Area investigation was approximately 5 ppb, and then showed a cross-section figure of the perchlorate contamination.

Mr. Gallagher told the group that contaminants at the Central Impact Area source area are RDX, TNT, HMX, and TNT breakdown products 2A-DNT and 4A-DNT. He also noted that these contaminants of concern (COCs) are generally the same as those at the CS-19 source area. Mr. Davis, mistakenly thinking that Mr. Gallagher was talking about groundwater, clarified that the only COC in the CS-19 plume is RDX, although low concentrations of perchlorate were detected for a number of years, with the last two years being nondetect for perchlorate.

Mr. Gallagher showed a figure of the Central Impact Area source area, noting that the most significant contaminant is RDX. He also noted that although perchlorate was also detected at the source area, it was not identified as a COC in the Remedial Investigation (RI) Report that was recently issued. He further noted that contamination at the source area, which is heterogeneously distributed, is the result of live fire activity – large particles of HE and breached unexploded ordnance (UXO). The highest concentrations are generally detected in shallow soils (0 to 3 feet) near the targets. Mr. Gallagher then noted that it's believed that residuals from high-order detonations have gone into solution, and the current source is likely larger particles (at least 1 millimeter in size) and breached or low-order UXO (with filler exposed to the environment). He also reported that the vast majority of UXO were found near ground surface, at no more than three feet in depth. In the areas that were intrusively investigated, field crew observed an average of 23 items per acre. Mr. Gallagher then noted that intact UXO take about 100 years, and in some cases hundreds of years, to corrode and expose their contents to the environment, depending on the wall thickness of the item.

Mr. Gallagher then reviewed the Central Impact Area FS groundwater alternatives: Alternative 1 – no action, a baseline alternative; Alternative 2 – long-term management, which is essentially the same as MNA, includes an institutional control (IC) component, and will be modeled two ways, assuming that a source action is conducted and assuming that one isn't conducted; Alternative 3 – hotspot treatment via an extraction well along Spruce Swamp Road and one reinjection well; Alternative 4 – containment at Spruce Swamp Road, designed to capture nearly all the RDX migrating from the Central Impact Area, and estimated to require about 10 extraction wells and six reinjection wells; Alternative 5 – hotspot treatment via an extraction well at Spruce Swamp Road, another at Burgoyne Road, and possibly a third extraction well (depending on modeling results), and three reinjection wells; Alternative 5a – which was requested by EPA and involves hotspot treatment via an extraction well at Spruce Swamp Road, another at Burgoyne Road, and another near Avery Road, with each extraction well paired with a reinjection well; Alternative 6 – a containment alternative with treatment at Spruce Swamp Road and Burgoyne Road, estimated to require about 16 extraction wells and 11 reinjection wells; Alternative 7 – ten-year treatment designed to collapse the entire plume to below risk-based levels (0.6 ppb for RDX) in ten years, and expected to require 38 extraction wells and 39 reinjection wells; and Alternative 8 – treatment to background (0.25 ppb, the RDX reporting limit) with total plume collapse, expected to require about 30 extraction wells and 20 reinjection wells, with a 30-year cleanup timeframe, although modeling needs to be done before any hard cleanup timeframe numbers can be estimated.

Mr. Gallagher reviewed a "Next Steps" slide: finalize the alternatives to be carried forward in the FS; model each of the alternatives; complete a cost estimate and comparative analysis for each of the alternatives; conduct a partial source area removal in summer 2009 (a four-acre area with the highest water table concentrations, the action is dependent on regulator concurrence); issue the FS report in summer 2009; and issue the Remedy Selection Plan (RSP) for public comment in fall 2009.

Mr. Goddard commented that the timeline to reach an RSP in the fall seems “pretty quick.” He also noted that the alternatives didn’t appear to include a design where the extraction wells are arranged down the spine of the plume, which could be more economical and reduce the amount of damage to the ecosystem, rather than having wells spread throughout the plume. Mr. Gallagher explained that this is because unlike how it appears in plan view, the Central Impact Area plume is really made up of multiple plumelets, which makes it more complicated. Mr. Goddard also asked whether some of the active treatment alternatives would treat CS-19 contamination and Mr. Gallagher replied that it’s likely that they would capture some, if not all, CS-19 contamination.

Mr. Goddard said that, like with CS-19, he would recommend the installation of sentinel wells so the Town of Bourne knows what might be heading its way. He also noted that the Central Impact Area figures shown tonight did not depict plume concentration contours, which he thinks are helpful in terms of understanding what’s being discussed. Mr. Gallagher acknowledged that a certain amount of plume definition may have been sacrificed in order to clearly show the location of wells and piping runs. He also referred to one of the figures and pointed out the higher concentration areas.

Mr. Goddard remarked on the overland piping depicted on some of the active treatment alternative figures. Mr. Gallagher noted that overland piping has been considered, but he would recommend waiting until the FS has progressed further until it’s understood how the piping runs will be installed. He also explained that the figures were taken from an older report and updated to reflect the current plume configuration. Mr. Gonser confirmed that the figures are notional, and added that because it would be very costly to install pipelines in the Impact Area, an active system may end up involving a number of small treatment plants in order to minimize the need for piping. Mr. Goddard said that he assumes that mobile treatment units (MTUs) are being considered, and Mr. Gallagher replied “absolutely.” Mr. Goddard indicated that prior to the RSP in the fall he’d like to see another presentation on Central Impact Area alternatives to learn more about the piping runs, as well as an update on cleanup of the source area.

Ms. Grillo noted that the “Next Steps” slide is unclear as to whether the RSP will be for both groundwater and the source area. Mr. Gallagher confirmed that it will be a combined RSP. Ms. Grillo then said that a concise fact sheet will be developed for when the RSP is issued. She also said that it’s anticipated that the source area discussion “will be one of great debate” and then asked if the IAGWSP has a target date for implementing an RSP for active treatment. Mr. Gonser replied that source area removal at the four acres will occur first, after which it will be determined whether more removal work is needed. He also said that he thinks that construction of the groundwater remedy would begin in late 2009/early 2010, assuming a decision is made this fall.

Ms. Rielinger asked when system startup might be expected, given that timeline. Mr. Gonser replied that it would depend on the remedy – for a hotspot remedy, startup might be as early as summer 2011, while construction of a larger system would take longer. Ms. Rielinger noted that the active treatment alternative for CS-19, which costs \$4.4 million, isn’t expected to achieve cleanup until 2030. She then said that if the Central Impact Area plume can’t be cleaned up by that time, there would be a pocket of clean water in an area that still has contamination surrounding it, which, she indicated, would defeat the goal of restoring the groundwater to its beneficial uses. Ms. Rielinger also said that it seems that until more modeling is conducted, the only Central Impact Area alternative with an associated estimated cleanup timeframe is the ten-year alternative. Mr. Gallagher confirmed that modeling and evaluation will have to be done before cleanup timeframes can be estimated for other alternatives. Mr. Gonser added that it’s important to keep in mind that the Central Impact Area plume, most of which is north of CS-19, is made up of multiple plumelets that will clean up on totally different timelines, depending on where the location of the extraction well, how hard it’s pumping, whether there’s active treatment, and so forth. He also agreed that much of the aquifer would not be available regardless of what happens at CS-19, and further noted that directly downgradient of the Impact Area is not a resource that’s likely to be developed. Ms. Rielinger mentioned the Bourne landfill “at the end,” and

Mr. Goddard stated that the Town of Bourne has a bylaw that prohibits public water supply wells downgradient of the landfill.

Mr. Taylor asked if the IAGWSP had been able to obtain soil information from the approximately 40 monitoring wells in the area “from Spruce Swamp Road out.” Mr. Gallagher responded to this question by talking about how groundwater profile samples are taken from the water table down to bedrock when a well is being drilled, and how the conceptual model indicates that the plume is a result of live fire – particulates, chunks of explosives, and breached low-order rounds that landed “in this general area,” outside of which soil contamination wouldn’t be expected. Mr. Taylor clarified that he’s trying to determine if the soils information below ground surface is of a quality that allows the IAGWSP to “put the parameters on the model to make it worth anything.” Mr. Gallagher replied that wells drilled with a sonic rig outside the Central Impact Area provide a fantastic lithological log – a complete core from ground surface to bedrock. Because of potential detonation of ordnance, however, sonic drilling is not allowed inside the Central Impact Area, so the lithological data there are not as good as outside the area. Mr. Taylor said that information about how the water moves through the soil is key. Mr. Gallagher informed him that the IAGWSP did conduct some long-term pumping tests that determined many hydraulic and hydrogeologic parameters in the Impact Area. He also noted that the tests, which involved pumping an extraction well at 500 gpm for 72 hours, provided data that were very consistent with data from pump tests conducted at other areas in Camp Edwards.

Ms. Jennings stated that although there’s a fair amount of uncertainty in terms of characterization of the plume, she thinks that enough information is available to move forward with the next step. She also noted that the Central Impact Area plume and source area are complex problems, presenting the most difficult of all remedies for any of the plumes. She then said that she expects that the Central Impact Area decision will be somewhat phased, and what needs to be addressed in the short term is the current source, the extent of which is still fairly questionable. Intermediate- and long-term sources involve the UXO, and a phased approach for remediation of the UXO problem is envisioned. Regarding groundwater, the desire is to see something happen sooner rather than later, which, in part, is why there’s such an aggressive schedule. Ms. Jennings also noted that Alternative 5a, which she considers a spine alternative, is a highly likely option, consistent with many other plume remedies. She further stated that it might be possible, under Alternative 5a, to extend another well down into the CS-19 plume. The difference between shaving seven years off the cleanup timeframe or allowing the plume to clean up by natural attenuation, uncertainty, and mass capture will all go into the decision-making. Ms. Jennings said that the proposal for MNA at CS-19 has been put forth, but she wanted to lay out in a more comprehensive way “how we see CS-19 going with Central Impact Area.”

Mr. Dow inquired about the relative ratio of RDX, perchlorate, and other minor contaminants in groundwater to what’s found in the soil source area. Mr. Gallagher first replied that high concentrations of perchlorate are not being seen in the source area (which is a function of the high solubility of perchlorate), and as far as the other contaminants, none of them are nearly as widely dispersed as the RDX plume. There are TNT and DNT concentrations, but they are very low, less than 1 ppb, and HMX, although slightly more extensive, is still contained within the RDX plume. Mr. Gallagher stated that he believes that the modeling exercises will bear out that any system designed to capture the RDX plume would effectively capture the other contaminants as well.

Mr. Dow clarified that his point is that contamination in the soil had to go through the non-saturated zone to the saturated zone, and there’s a question of how effectively it’s transported from the surface source area to the groundwater. He also said that another issue is whether RDX and perchlorate travel at the same within the groundwater plume, and it seems to him that both the major and minor contaminants need to be considered when developing a conceptual model, and it doesn’t appear to him that this has been done. Mr. Gallagher explained that TNT breaks down aerobically, before it hits the water table, which is why the relatively high TNT concentrations in the source area are not seen in groundwater. He then said that they behave differently than RDX, which is a more recalcitrant

compound, and does not degrade aerobically. He added that low levels of TNT and its breakdown products are seen in the aquifer. Mr. Dow noted that both TNT and the two DNT isomers are found in groundwater and at the surface, which is why he was inquiring about the ratio. Mr. Gallagher replied that he can't provide the exact ratio, but there are more high concentrations of RDX than of TNT or amino-DNTs, and this is due to the constituents and how they degrade in the environment. He added that perchlorate is a conservative tracer, does not break down, won't become retarded in aquifer sediments, and will move as fast, if not faster, than RDX. He further noted that the highest concentration of perchlorate in soil was 69 ppb (the current Massachusetts Contingency Plan [MCP] Method 1 standard is 100 ppb) and it's generally not seen in groundwater in any significant concentrations.

Ms. Jennings told Mr. Dow that, as included in the RI and FS Reports, the extent of the compounds in groundwater has been mapped – and perchlorate, while not nonexistent, is not as widely distributed as RDX, nor are TNT or the DNTs. She said that perchlorate is seen in only a few wells, which are very close to the source. Mr. Dow remarked that perchlorate obviously moves faster than RDX and HMX, but the question is whether TNT and its breakdown products move at the same speed as RDX and HMX. Mr. Gallagher stated that the answer is no; they are sorbed to organic matter and break down aerobically. He also noted that the existence of perchlorate in the Impact Area is believed to be the result of LITR rounds, which contain a relatively small amount of perchlorate; therefore significant formation of a perchlorate plume in the Central Impact Area wouldn't be expected.

Mr. Dow stated that he's concerned about the cumulative toxicity of the contaminants (RDX, HMX, TNT, and perchlorate), and wonders whether there's a technique for calculating cumulative toxicity that's similar to the toxics equivalency factor for contaminants degraded by the P450 enzyme in people's livers. Ms. Jennings replied that although only RDX and perchlorate are used for the purposes of mapping and modeling the alternatives, the risk assessment, which includes information about the cumulative risk from all the compounds, is considered to justify an action. Mr. Dow said that this "sounds excellent."

Mr. Field asked if an action item should be noted to address Mr. Dow's concern about the conceptual model. Mr. Dow requested that future Central Impact Area updates include a conceptual model that shows how specific compounds move from soil to the groundwater surface and from the groundwater surface out to the extent of the plume. Mr. Field recommended noting this an action item to be addressed as part of the next Central Impact Area presentation.

Agenda Item #5. MMRCT Comments on CS-19 Proposed Plan

Regarding the CS-19 Proposed Plan, Mr. Field said that he'd noted two comments: that anything done at CS-19 should not preclude the Central Impact Area and vice versa, and that downgradient monitoring is a concern to ensure that any contamination isn't detected first in Bourne landfill's sentinel wells.

Mr. Goddard clarified that his remark was that one of the Central Impact Area options, such as Alternative 5a, might be an opportunity for treatment at CS-19 to "piggyback" onto that system, and he wants to ensure that there's nothing in the CS-19 decision to prevent that from being evaluated and "maybe amended as the Central Impact Area system comes on line." Mr. LoGuidice said he concurs with Mr. Goddard's comments. Mr. Taylor spoke in support of Alternative 3 because it removes toxic contamination from the aquifer, and doesn't cost "much money in the whole realm of everything that's been done in the last 20 years..." Mr. Michaud said that he has no comment at this time. Ms. Rielinger said that she needs to more time to consider the options before she could feel comfortable making a recommendation. Mr. Foster said that he has no comment at this time.

The MMRCT decided against trying to develop a team recommendation on the CS-19 Proposed Plan and instead submit individual comments during the 30-day public comment period, which begins April

9, 2009. Ms. Grillo noted that the regulators would be available to answer any additional clarifying questions team members might have.

Agenda Item #6. Demolition Area 1 Decision Document Addendum

Mr. Lim showed a map, pointed out the Demolition Area 1 (Demo 1) source area and groundwater plume, and then showed an aerial photograph of the source area prior to cleanup. He also noted that the Demo 1 Decision Document (DD) for Groundwater, which was signed in November 2006, was a decision for an expanded cleanup system for the Demo 1 plume. That system is currently operating at about 900 gpm, and has been operational since 2007. The DD did not, however, include the source area because the source area cleanup report hadn't been finalized.

Mr. Lim explained that the Source Area Completion of Work Report is a summarization of all the Rapid Response Action (RRA) work conducted from 2002 to 2005, the 2002 Post Screening Investigation, and the 2003 Supplemental Post Screening Investigation. He also reminded the group that the Demo 1 source area, which was roughly 7.4 acres in size, was used from the 1970s to 1997. The primary contaminants of concern at the source area were RDX and perchlorate, with some other contaminants also detected. Mr. Lim also noted that the source area RRA included anomaly removal; soil excavation, treatment, and disposal; excavation and off-site disposal of burn pit soils; and on-base thermal treatment of soils that met cleanup criteria, which were used as backfill at the Demo 1 site.

Mr. Lim then showed a figure entitled "Demo 1 Final Excavation Status Map" and pointed out the areas that were excavated to a depth of one foot, to a depth of two feet, and to an average depth of eight feet. He also noted that the 2002 Post-Screening Investigation was a geophysical survey of the area and that the 2003 Supplemental Post-Screening Investigation involved collecting 73 soil samples from 22 grids outside the perimeter road. The samples, which were collected from several depths, yielded a couple detections of explosives at concentrations near the cleanup standard, some low-level detections of perchlorate, and some low-level detections of semi-volatile organic compounds (SVOCs); and it was concluded that sampling results were too low to necessitate any further action.

Mr. Lim then reported that the DD Addendum modifies the original DD to add the source area. He also explained that the IAGWSP's work is being conducted under the Safe Drinking Water Act (SDWA) and the process differs from the Installation Restoration Program (IRP) process in that EPA signs off on a DD, while the Air Force signs off on a Record of Decision (ROD), the equivalent document. Mr. Lim also stated that the reasons for No-Further-Action at the Demo 1 source area are: the RRA removed the majority of the contaminants; the COCs don't present a significant threat; the continued operation of the treatment system would capture anything that might mobilize; and the ongoing groundwater monitoring would detect anything coming out of the source area.

Mr. Lim then showed a fairly recent photo of the Demo 1 source area site and pointed out that it's been re-vegetated. He also announced that the Demo 1 DD Addendum will be issued informally later this month, as will a fact sheet and news release. He further noted that the hope is to finalize the document sometime in June, to be signed by EPA's Acting Regional Administrator.

Agenda Item #7. BA-4 Decision Document

Mr. Lim explained that the BA-4 DD relates to the BA-4 Disposal site, a smaller component of a wider area known as BA-4, in the northern portion of the base. The site was identified through a program conducted in 2001/2002 to identify possible munitions burials sites, but the wider BA-4 is still under investigation. Mr. Lim noted that the 2001/2002 investigation found five areas (A through E), of which two were key disposal sites: Area A was found to contain 242 expended jet engine cartridges and igniter tubes and Area E was found to contain a crushed 55-gallon drum with various components in it. Soil sampling at these areas indicated a need for some removal actions.

Mr. Lim then spoke about the groundwater investigation conducted at the site, noting that lead was detected in a pumping well there. He also reported that a replacement well, which tested nondetect for lead, was installed, and it was determined that the lead was probably from construction materials of the original well. He further noted that some lead was detected in a downgradient drive-point, but the permanent monitoring well tested nondetect for lead. Also, no explosives or perchlorate were detected in downgradient monitoring wells.

Mr. Lim reported that as part of the BA-4 RRA, in August 2006 about 85 tons of soil was removed from Area A, and in May 2007 about 10.5 tons of soil was removed from Area B. Also, in May/June 2007 an additional geophysical survey was conducted and about 38 anomalies were removed. Post-excavation sampling determined there were no detections above any standards, it was concluded that the RRA was effective, and an RRA Completion of Work report was issued in February 2009.

Mr. Lim summarized by noting the following: the BA-4 DD calls for no further action, based on the groundwater investigations and the RRAs; an informal public comment period on the document is scheduled from April 20 through May 29, 2009 and a fact sheet and news release will be issued; and the hope is the document will be finalized in June and signed by EPA's Acting Regional Administrator.

Ms. Rielinger asked if it's correct that the BA-4 DD pertains only to Areas A and E. Mr. Lim clarified that the document pertains to all five disposal areas identified (A through E), but soil contamination was found only in Areas A and E. Ms. Rielinger asked if anything at all was removed from the other three areas. Mr. Lim said that he's not certain, and Mr. Gallagher added that he thinks just some scrap metal was removed from the other areas. He also said that there was no soil contamination associated with the scrap and therefore no monitoring wells were installed downgradient. Ms. Rielinger clarified that the metal was not munitions or UXO, and Mr. Gallagher confirmed that was correct.

Agenda Item #8. Notice of Violation

Ms. Jennings informed the group that EPA issued a Notice of Violation (NOV) to the IAGWSP on March 24, 2009. She then explained that at the end of last year when EPA was in the process of reviewing the Western Boundary RI/FS, it came to light that the report was missing some groundwater data. This prompted EPA to do a comprehensive evaluation of all of the IAGWSP's groundwater monitoring programs, comparing the data collected over time to plans approved by EPA over the past few years. Through this evaluation, EPA discovered that the IAGWSP was not following approved long-term monitoring plans for two operable units – Western Boundary and Gun & Mortar Positions. No issues with any of the other operable units or plumes were discovered.

Ms. Jennings noted that EPA considers this to be a serious matter and therefore felt that, at a minimum, an NOV had to be issued. In response to the NOV, the IAGWSP has agreed to resume monitoring according to the approved plans. To prevent this type of violation from happening again in the future, EPA has instituted a more formalized requirement for the submittal of annual reports (with monitoring data) as well as formal presentations of the data – similar to IRP processes. Ms. Jennings also stated that EPA has decided not to seek penalties for the violations at this time, but has reserved the right to do so in the future. She further noted that EPA does not expect violations in the future, but would consider the current violation if that were to occur.

Mr. LoGuidice asked Ms. Jennings to more specifically describe the violations. Ms. Jennings replied that the monitoring plans for the two operable units, which were approved in 2005 and 2006, require sampling a collection of wells at a certain frequency. However, it was found that not all of the wells were being sampled and analyzed, and in some cases wells weren't being sampled at the required frequency. Mr. LoGuidice asked if this oversight was thought to be intentional. Ms. Jennings turned to Mr. Gonser to answer this question.

Mr. Gonser stated that the IAGWSP has 15 or more sites with monitoring plans that are updated every year and sent to the regulators for review and comment, with responses to those comments provided. He then explained that he thinks that with the focus on getting treatment systems in place, the IAGWSP probably wasn't watching as carefully as it should have been "what was the last approved plan in writing." He also said that the value of the NOV is that it tells the IAGWSP that it must be sure to keep track of the details and be certain that the latest approved plans are being followed. He further noted that this year the IAGWSP will be redoing all the monitoring plans, submitting them for approval, and getting them documented. In addition, the IAGWSP today provided EPA with a schedule pertaining to sampling, reports, and briefings at technical meetings. Mr. Gonser said that increased organization should ensure that nothing "slips through the cracks." Mr. LoGuidice said that he assumes that a violation won't happen again.

Agenda Item #9. Textron Work at J-3 Range

Mr. Gregson reminded the group that Textron Systems was one of the defense contractors that operated in the Southeast Ranges (between the Impact Area and the Forestdale neighborhood of Sandwich). A company called AVCO, which subsequently became a division of Textron Systems Corporation, began its work at the J-3 Range in 1968. The lease to conduct this work was terminated in 1999, and since then Textron and the Army negotiated the closure of J-3 Range, which occurred in 2003, and a consent decree was filed in February 2008.

Mr. Gregson stated that Textron agreed to remove and/or demolish all buildings and other infrastructure associated with its operations. He then showed a slide listing the items demolished and/or removed by Textron prior to the IAGWSP's 2003 soil response action at the J-3 Range: wellheads and pumps from the two former water supply wells located on J-3 Range; concrete Target Walls 1 and 2; the melt/pour building; a former burn box concrete pad; a drop tower and associated concrete pads; concrete target blocks located on the surface and buried in the hillside immediately north of Target Wall 1; gun-position concrete pads; and other miscellaneous concrete pipes and debris located within the central area of the J-3 Range. Mr. Gregson noted that all of these items were taken out so that the IAGWSP could excavate soil from the site. He also said that in 2007 the IAGWSP requested that Textron remove the concrete rubble from the northeast side of the range.

Mr. Gregson then showed a slide summarizing Textron activities completed in 2007 and 2008, which noted that the following items were demolished and/or removed: water supply wells; a septic tank (closed in place); a drywell; storage tanks; administration/workshop building and flammable storage building; an instrumentation trailer; three explosive storage bunkers; an ordnance assembly/x-ray and environmental test assembly building; M-60 Tank/Shroud test area concrete; miscellaneous concrete and metal debris; manhole, cable, utility pole, and conduit; and the melt/pour building foundation walls. Mr. Gregson noted that demolition materials were removed from the J-3 Range and properly disposed of off site.

Mr. Gregson informed the group that Textron recently issued its closure report, entitled "Final Summary Report Range Closure Activities at J-Range Camp Edwards, Massachusetts," which was prepared by Textron's consultant MACTEC in January 2009. The Army is currently reviewing the report and will issue a Certificate of Completion if it's determined that Textron has complied with all the obligations of its lease. Mr. Gregson added that he believes that EPA would issue a concurrence with that finding, after which Textron's obligations for removal of its infrastructure would be complete.

Mr. Goddard inquired about plans for restoring the site. Mr. Gregson replied that that is yet to be determined as work at the site is still ongoing – a groundwater treatment system is in place, but some UXO investigations and other work is still occurring. Later, the National Guard will look at whether it wants to pursue use of the range or restore it and allow it to go back to its natural state.

Mr. Dow asked how much money Textron spent to meet the closure activity standards. Mr. Gonser said that he doesn't know; the requirement was just part of the settlement and the IAGWSP had no part in any of the contracting or oversight. Mr. Field observed that that aspect of the settlement pertained to action, not dollars, and Mr. Gonser agreed. Mr. Dow asked if this is the same settlement in which Textron agreed to pay \$1.2 million in natural resource damages, a part of which went to the Air Force. Mr. Gonser clarified that a number of parties (including the state, NOAA, Fish & Wildlife) received portions of that settlement, with the Department of Defense (DoD) receiving about \$175 thousand for restoration activities, without taking any overhead costs. He also noted that the trustees will soon be reviewing a number of project proposals submitted by towns and other various groups in the state and will then decide which to fund with the money from the settlement. He further noted that he thinks it is DoD's intent to add the \$175 thousand to pick up some projects that aren't selected as part of the review.

Mr. Field said that he thinks that any costs for restoration of the J-3 Range site would come out of a different pool of money than the Textron settlement funds. Mr. Gonser agreed, adding that the site "just isn't ripe" for restoration at this time, given the work left to be done. He also said that there's not really much of a natural resource impact at the site, as no roads were paved and the concrete foundations have been removed. He further noted that the Textron settlement was focused on groundwater impacts, so most of the projects will have to do with injuries to groundwater.

Mr. Dow said that he wants to make the point that beside the "general magnitude that Textron had to put out," he thinks that Textron is a minor player compared to the Air Force and the Army with respect to injury to the groundwater. He also said that the Air Force and Army are Natural Resource Trustees, but they are also responsible parties, and he believes that they should "settle up, just like Textron had to." Mr. Taylor told Mr. Dow that Textron makes six to nine million dollars a year, so the money spent at MMR was "next to nothing to them."

Mr. Goddard reminded the group that he had written a letter to Congressman Delahunt regarding the MMR Natural Resource Trustee Council (NRTC) and the natural resource damages assessment (NRDA) process, and was advised to hold off because of the recent administration change and to see how the Textron model unfolded. Mr. Goddard then said that he thinks it's a great model because it allows for a settlement with which to "get things done." He also said, however, that he thinks the problem with the NRTC process is that it's gotten bogged down in legalistic arguments about which constituent comes under which program. He further noted that it's been ten years, but now there's a model to move forward and make some progress. Mr. Goddard stated that he's looking to Mr. Gonser and others to start moving the process forward and would like to see this as a future MMRCT agenda item.

Agenda Item #10. L Range Update

Mr. Gregson showed a figure depicting L Range, a 40mm grenade range, and pointed out the firing line, the targets in the middle of the range, and the downrange area. He reminded the team that the Air Force Research Laboratory robotics group conducted a UXO removal demonstration at the range last year. When that was completed, the IAGWSP conducted soil sampling at rectangular grids and some circular grids around targets and found relatively high levels of RDX, HMX and TNT. Mr. Gregson noted that the grids shown in the figure that are a color other than green had various combinations of the contaminants. He also said that because contaminant levels were well above state cleanup standards, the IAGWSP thought it important to move forward with evaluating cleanup alternatives, as discussed at last month's MMRCT meeting.

Mr. Gregson stated that since that time (on March 26, 2009), the IAGWSP submitted to the regulatory agencies a Project Note for a bench scale test pertaining to the soil amendment technologies, including DARAMend (a zero valent iron and carbon source), lime amendments, and another soil amendment

called Muni-Rem. Approximately eight cubic feet of soil will need to be collected for the tests, with April 27, 2009 being the target date to begin testing. Mr. Gregson also noted that the IAGWSP received quite a number of comments from the agencies on the Project Note, including recommendations to collect additional soil, perhaps do an additional test for a composting alternative, and to pay close attention to the particle sizes that might be found for explosive contaminants.

Mr. Gregson also informed the group that a pilot scale action, based on results of the bench tests, will be conducted at L Range. The IAGWSP will produce a Project Note describing the excavation, sifting, and stockpiling of L Range soils for the pilot test, and will then work with the agencies to come to agreement on a remedy or remedies to test on a pilot scale. Mr. Gregson further noted that a presentation on the resolution of comments and the final pilot scale Project Note will be occur at the May MMRCT meeting. The fieldwork for the pilot scale is expected to occur this summer, and information gained from it will be used to evaluate the applicability of the alternatives at other sites.

Ms. Grillo reminded the team that L Range is one of the locations where robotics work was conducted.

Agenda Item #11. MMRCT Annual Check-in

Mr. Field announced that MMRCT members soon will be receiving an Internet survey, results of which will be compiled anonymously and sent out to members for review prior to the team discussion at the May MMRCT meeting. He also noted that team members would be receiving information about past meeting attendance, and that the discussion at the May meeting will pertain to how the team is doing generally, about the possibility of combining with the SMB, and any other issues that might be of concern. Mr. Field then stated that the SMB is going through its own review process and asked if any of the SMB members present at the meeting would like to speak.

Ms. Valiela, the SMB representative from Falmouth, noted that Steve Mealy of Bourne and Chuckie Green of Mashpee were also in attendance at tonight's meeting. She then said that as an ongoing process the SMB is evaluating the frequency and contents of its meetings, including whether it makes sense to just have briefings on specific remediation sites or whether the board should take up broader issues, such as the question of "how clean is clean?" She said that these topics will be discussed again at the SMB's May meeting. Ms. Valiela also invited Mr. Mealy and Mr. Green to add to her comments, but they declined to do so.

Mr. Goddard thanked Ms. Valiela for the update and recommended having a joint MMRCT/SMB meeting in September. He also requested that program managers consider the use of MTUs for Central Impact Area groundwater treatment systems and include that information in the next presentation on this topic. Mr. Goddard then asked about the status of joint community involvement products such as a Community Involvement Plan, fact sheets, and the Plume Booklet. Mr. Field replied that a status update on these items will be provided at the May MMRCT meeting. Mr. Goddard then inquired about any events at the base this summer, such as an air show. Ms. Grillo suggested that Mr. Goddard direct this question to the E&RC, which coordinates all of those types of events. However, Mr. Davis did note that there's no air show scheduled for this summer. He also mentioned that he's heard some talk about an open house, and that an environmental fair for students has been scheduled. He further noted that the IRP will not be participating in the Barnstable County Fair this summer, nor has it done so for several years, due to an inability to staff a booth for full-time coverage. Mr. Field added that there will also be some sort of event to acknowledge the IRP's new wind turbine this fall, if all goes well.

Agenda Item #12. Next Meeting Schedule and Adjourn

Mr. Field stated that the MMRCT would meet next on Wednesday, May 13, 2009, and then adjourned the meeting at 8:21 p.m.