

Plume Cleanup Team & Impact Area Review Team Meeting
Bourne Best Western
April 9, 2008
6:00 – 8:45 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
Paul Marchessault	US EPA	617-918-1388	Marchessault.paul@epa.gov
Lynne Jennings	US EPA	617-918-1210	Jennings.Lynne@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	Cape Cod Commission	508-362-3828	smichaud@capecodcommission.org
Steve Hurley	MDFW	508-759-3406	steve.hurley@state.ma.us
Chuck Gasior	PCT/Mashpee	508-539-8789	cegasior@aol.com
Phil Goddard	PCT/Bourne	508-759-3043	pgoddard@aol.com
Harold Foster	PCT/Falmouth	408-564-4818	
Diane Rielinger	PCT/Falmouth	508-563-7533	one-brain@verizon.net
Gary Bostwick	IART/Falmouth	508-495-6821	gary.bostwick@comcast.net
Charles LoGuidice	IART/Falmouth	508-563-7737	irextut@msn.com
<u>Facilitator:</u>	<u>Organization:</u>	<u>Telephone:</u>	<u>E-mail:</u>
Patrick Field	CBI	617-492-1414	pfield@cbuilding.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
Hap Gonser	IAGWSP	509-968-5107	kent.gonser@us.army.mil
Ben Gregson	IAGWSP	508-968-5821	Benjamin.p.gregson@us.army.mil
Kris Curley	IAGWSP	508-968-5626	Kristina.curley@us.army.mil
Pamela Richardson	IAGWSP	508-968-5630	Pamela.j.richardson@us.army.mil
Bill FitzPatrick	MANG/E&RC	508-968-5154	bill.f.fitzpatrick@us.army.mil
Jane Dolan	US EPA	617-918-1272	dolan.jane@epa.gov
Desiree Moyer	US EPA	617-918-1257	moyer.desiree@epa.gov
Elliott Jacobs	MassDEP	508-946-2786	elliott.jacobs@state.ma.us
Mike Morris	Jacobs	508-743-0214	mike.morris@jacobs.com
Anita Rigassio Smith	Jacobs	508-743-0214	anita.rigassio-smith@jacobs.com
Jane S. Gasper	Innovar	508-759-9114	jgasper@innovar-env.com

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Handouts Distributed at Meeting:

1. Responses to Action Items from the February 13, 2008 PCT Meeting
 2. Draft 3/26/08 PCT/IART/SMB Team Review Meeting Summary
 3. Presentation handout: IAGWSP Overview
 4. Presentation handout: Preliminary Alternatives Ashumet Valley Focused FS
 5. Presentation handout: Land Use Controls
 6. Presentation handout: Residential Wells, Ponds, and Harbors Sampling Update
 7. Presentation handout: CS-19 Soil Removal
 8. Presentation handout: Southwest Plumes Explanation of Significant Differences
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Agenda Item #1. Introduction, Agenda Review, and Approval of 2/13/08 PCT Meeting Minutes

Mr. Field convened the meeting at 6:07 p.m. and the Plume Cleanup Team (PCT) and Impact Area Review Team (IART) members introduced themselves. Mr. Field then reviewed the agenda, informed new team members that they should raise their name-tents to indicate when they want to speak, and noted that the “Responses to Action Items from the February 13, 2008 PCT Meeting” document was included in the handouts. He also asked if there were any changes or additions to the February 13, 2008 PCT meeting minutes. No changes were offered and the minutes were approved as written. Mr. Field then noted that any comments on the draft March 26, 2008 Team Review minutes should be sent to him over the next several days, after which that document can be finalized. He also asked team members to set aside May 14, 2008 as a potential date for the next combined PCT/IART meeting or possibly for a site tour/orientation.

Agenda Item #2. Debrief of March Team Review Discussion

Mr. Field stated that the general recommendation that came out of the March 26, 2008 Team Review meeting was to combine the PCT (which advises the Air Force Center for Engineering and the Environment [AFCEE] Installation Restoration Program [IRP]) with the IART (which advises the Impact Area Groundwater Study Program [IAGWSP]) and have the Senior Management Board (SMB) remain independent, but meet with the combined PCT/IART group once or more per year. Mr. Field also noted that the Team Review meeting was designed to gather input from the citizen team members, and then asked if the agencies had any comments they'd like to share.

Mr. Pinaud said that the Massachusetts Department of Environmental Protection (MassDEP) actually thought that it would be a good idea for the SMB, PCT, and IART to be combined into one group, in terms of efficiencies and in order to meld technical, policy, and community issues. He also stated that MassDEP respects the recommendation of the group, but also wants to encourage having the SMB meet with the PCT/IART several times a year and is hopeful that doing so will lead to a merger of the three groups. Mr. Goddard said that he believes the coming year will provide information that indicates what makes the most sense in terms of combining the groups. He also mentioned that he thinks the concern about combining all three teams has to do with the SMB's membership of elected officials, who “may have a different perspective and a more broad authority to speak for towns and such....”

Mr. Field noted that the IRP, the IAGWSP, and the regulatory agencies have discussed the Team Review recommendations, have scheduled an IAGWSP overview presentation on tonight's PCT agenda, and will likely schedule a similar IRP presentation for IART members. He also said that there's been discussion about arranging a site tour and orientation for the team members, and then asked if there was any opposition to holding the PCT/IART combined meetings on the second Wednesday of the month. None of the PCT or IART members present at the meeting expressed any objection to this schedule. Mr. Field also noted the following: at some point in the future a new name for the team will have to be decided; given that it would be less expensive, the possibility of holding the meetings on base is being explored to ensure that access would not be an issue; meeting minutes will continue to be provided by the contractor; meeting facilitation will continue at least throughout the transition period; and it might be necessary to meet once a month at first, but with the ultimate goal of meeting every other month.

Ms. Jennings noted that the project managers are interested in obtaining feedback on the best time (weekday or weekend day, etc.) for having a site visit/orientation event, and also on topics of particular interest to team members. She also said that she would expect the site tour alone to take several hours, and therefore imagines that along with presentations, the orientation would be a full-day event. Mr. Field mentioned the possibility of scheduling the event for an afternoon and evening. Mr. Karson said that based on tours conducted by the IRP, he thinks the site tour alone would take at least three hours in order to include visits to treatment plants and opportunities to observe activities such as drilling and sampling.

Ms. Rielinger noted that because it would be extremely difficult for her to participate in a weekday orientation event, she would prefer that it occur on a weekend day. Mr. Goddard said he would prefer a Saturday, but is flexible. Ms. Grillo suggested the idea of breaking the event into parts – with presentations occurring at one time and a site tour occurring at another. Mr. Gonser added that the IAGWSP is willing to be very flexible in terms of accommodating the team members' preferences, at least on a small-group basis. Mr. Field recommended developing some options to be emailed out to team members for response.

Mr. Field then asked about any particular topics that team members want included in the presentations. Mr. Goddard said that he'd like to have a very brief summary of the major differences in the IRP's and the IAGWSP's investigation/cleanup processes. Ms. Jennings noted that she thinks it would be beneficial to include the topic of munitions contamination, as it is very different from solvent contamination. She also said that for the benefit of new team members, the presentations should include a lot of information about the groundwater cleanup process. Mr. Foster suggested including the topic of monitoring – what a monitoring well is, how monitoring locations are selected, what information is being monitored, how samples are collected, analyzed, and so forth. Mr. Goddard added that he'd like to see included the topic of cleanup standards for the various contaminants and the different remediation technologies used to address them.

Agenda Item #3. Impact Area Groundwater Study Program Overview

Mr. Gregson displayed a map of the Massachusetts Military Reservation (MMR) and pointed out the IRP groundwater plumes emanating from the southern part of the base, including the Chemical Spill 10 (CS-10), Landfill 1 (LF-1), Fuel Spill 12 (FS-12), and Ashumet Valley plumes. He then noted the IAGWSP deals with plumes in the northern part of the base, an area that's historically been used for Army or Army National Guard military training.

Mr. Gregson briefly reviewed the history of the northern part of the base, noting that it has been used for military training since 1911. Training included the firing of artillery rounds, but that activity ended about 10 years ago with a U.S. Environmental Protection Agency (EPA) Administrative Order (AO). The northern part of the base has also been used for small arms training, for activities involving the use of pyrotechnics (smoke grenades, flares), and for demolition training. The Southeast Ranges area was used for defense contractor weapons testing and disposal. In 1996 the IAGWSP began its investigations; in 1997 EPA issued its first AO under the Safe Drinking Water Act (SDWA), requiring that the investigations continue; and while some investigations are still ongoing, much of the investigation work was completed within the timeframe of 1996 to 2004. More than 1,000 groundwater monitoring wells were installed as part of the investigations, and more than 60,000 soil samples were collected. From 2004 to 2008 the focus of the IAGWSP has been transitioning from investigation to cleanup, including the installation of groundwater treatment systems and source area soil removal and treatment.

Mr. Gregson also pointed out on the map that while the IRP plumes generally flow to the south/southeast/southwest, the IAGWSP plumes are located at the top of the groundwater mound, causing a radial flow pattern that complicates the investigation and treatment of plumes in that area. He further noted that the depth of groundwater in the IAGWSP plume area is approximately the same as in the IRP plume area – about 100 feet to groundwater, with bedrock at about 300 feet below ground surface.

Mr. Gregson then stated that the contaminants of concern (COCs) in the northern part of the base are typically deposited as solids rather than liquids, and therefore must go through a dissolution step before leaching through the soil into the aquifer. The primary COCs are RDX and other explosives in groundwater, and explosives, propellants, perchlorate, and metals in soil. While the IRP generally works with maximum contaminant levels (MCLs) as its cleanup standards, the IAGWSP works with similar numbers – for groundwater, a Massachusetts MCL (MMCL) of 2 parts per billion (ppb) for perchlorate, a 1 ppb standard for RDX, and a 200 ppb standard for HMX. From a risk standpoint, the cleanup number for RDX is 10^{-6} , a risk level of 0.6.

Mr. Gregson reported that the IAGWSP currently has pump-and-treat systems in place at four of its groundwater plumes: the Demolition Area 1 (Demo 1) plume, which contains perchlorate and RDX; the J-2 North plume, which contains perchlorate and RDX and is located upgradient of the base Upper Cape Water Cooperative supply wells; the J-3 Range Plume, which contains perchlorate and RDX and is located close to the IRP's FS-12 plume such that the IAGWSP's treatment equipment is housed in the FS-12 treatment plant building; and the J-1 South plume, an RDX plume currently being treated with one extraction well at the base boundary. Also, a system is presently under construction to treat the J-2 Range plume, located near the base/Sandwich boundary. Mr. Gregson also reported that several years ago when the thermal desorption treatment unit was on site, the IAGWSP treated approximately 40,000 tons of soil and removed what is hoped to be all of the source areas for the Demo 1, Demo 2, J-2 Range, and J-3 Range plumes, and most of the source area for the J-2 East plume.

Mr. Gregson then noted that although the IAGWSP cleanup is not being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as the IRP cleanup is, the overall processes are the same, including remedial investigations, feasibility studies, and Rapid Response Actions

(RRAs), which are similar to CERCLA's Time Critical Removal Actions. Most of the plume treatment systems that the IAGWSP has in place were installed as RRAs. Mr. Gregson also said that like the IRP does for its solvent plumes, the IAGWSP uses granular activated carbon (GAC) to treat RDX, but also uses ion exchange resin to treat perchlorate. He explained that in all cases the general approach is the same – the water is pumped out of the aquifer, treated, and then reinjected.

Mr. Gregson stated that the IAGWSP functions under EPA AOs issued under the SDWA. The program is managed by the U.S. Army Environmental Command (AEC) and the U.S. Army Corps of Engineers (USACE), which acts as the program's contracting agency (managing contractors such as Jacobs, AMEC, and the Environmental Chemical Corporation [ECC]), and oversees much of the field work. Funding for the IAGWSP comes from National Guard Bureau (NGB) operations funds (an operations line-item), while the IRP gets its funding from the Defense Environmental Restoration Program (DERP) (an environmental cleanup line-item). Mr. Gregson noted that unlike the IRP, which operates under CERCLA, the SDWA does not allow for many exemptions and streamlining of permitting activities. He also mentioned that the northern part of the base, which is one of the largest undeveloped pieces of land remaining on Cape Cod, includes a great deal of high-value scrub oak habitat, which always needs to be taken into consideration when conducting investigations and cleanup. Another complicating factor for the IAGWSP investigation and cleanup is unexploded ordnance (UXO), which not only poses a safety risk to workers, but also can contain explosives and propellants that could potentially leach to groundwater.

Mr. Gasior inquired about the IAGWSP's annual budget. Mr. Gonser replied that the annual budget is presently in the \$20 to \$30 million range. Mr. Field confirmed with Mr. Davis that the IRP's annual budget is presently approximately \$19 million.

Mr. Goddard noted that it would be helpful if future presentations for the combined IART/PCT included figures showing both IRP and IAGWSP plumes (for example, in the vicinity of the FS-12 and J-3 Range plumes). He also mentioned that it would be helpful to have more information about AEC at a future meeting. Mr. Gregson agreed that having information on both programs' plumes is particularly important for areas such as the FS-12 and J-3 Range plumes, which share facilities and injection wells. Ms. Grillo said that she believes that base-wide plume maps are available on the handout table.

Mr. Gregson continued by briefing the group on each of the individual IAGWSP sites. He noted that the Demo 1 source area is an approximately four-acre area contained in a cleared space of about seven or eight acres. From the mid-1970s through the mid-1990s troops used the area to conduct explosives operations and for disposal of munitions and fireworks. Over time, compounds leached into the groundwater and created an RDX and a perchlorate plume. The IAGWSP removed about 28,000 tons of contaminated soil from the Demo 1 source area, treated it in the thermal desorption unit (i.e. "cooked" the soil at about 900°F), and returned the treated soil to the site. In addition, about 70,000 separate magnetic anomalies (including scrap metal and UXO) were removed from the site as part of this work. In 2004 the first Demo 1 treatment system, which involved modular treatment units contained in Conex boxes, was installed to treat the approximately 9,000-foot long plume. The final treatment system began operating in summer 2007 and is currently pumping about 900 gallons per minute (gpm) from five extraction wells, treating the water, and returning it to the aquifer via four injection wells. Maximum contaminant concentrations in the plume are currently about 140 ppb for RDX and about 100 ppb for perchlorate. The system is expected to achieve risk-based levels by the year 2018.

Mr. Gregson showed an aerial photograph of the J-1 Range and pointed out nearby Snake Pond and the Forestdale School. He also pointed out the berms on this test range, which he noted was used from the 1940s until the 1990s, and reported that the IAGWSP found explosives and propellants in the soil at concentrations up to 65 parts per million (ppm), and that investigations of the source area are ongoing. Two areas of groundwater contamination from the J-1 Range have been identified: the J-1 North plume, which originates from the inter-berm area and flows northwest toward the Impact Area; and the J-1 South plume, which originates from the range's firing point and flows southeast, with some RDX contamination having been detected in off-base wells in the Forestdale neighborhood of Sandwich. Maximum perchlorate and RDX concentrations in the J-1 North plume are about 30 ppb, and maximum RDX concentrations in the J-1 South plume, which doesn't contain any perchlorate, are also about 30 ppb. A modular treatment system is currently in place at the J-1 South plume, with one extraction well pumping at about 75 gpm to address the upgradient portion of the plume. The IAGWSP is conducting additional investigation of the off-base portion of the plume in order to determine what cleanup alternatives might make sense there.

Mr. Gregson showed an aerial photograph of the J-2 Range (located north of the J-1 Range) and pointed out the nearby Forestdale School and the firing points on the range. He also noted that a lot of disposal activities occurred at the J-2 Range, and he pointed out an area on the range know as Disposal Area 2, the source of the J-2 North plume. The IAGWSP removed about 8,000 tons of soil from the source area and investigation of additional source areas is ongoing. As noted earlier, a pump-and-treat system is in place at the J-2 North plume. The system, which involves two modular treatment units in the south-central part of the plume and a small treatment plant near the toe of the plume, pumps 375 gpm from three extraction wells and is expected to achieve risk-based cleanup levels in about 20 years. The J-2 East plume treatment system, which is currently under construction, will operate at a 425-gpm pumping rate and involve four modular treatment units.

Mr. Gregson then showed an aerial photograph of the J-3 Range, the most recently used contractor-operated range where Textron Corporation conducted the bulk of its work. He noted that 3,500 tons of contaminated soil from the J-3 Range source area was excavated and treated at the thermal desorption treatment unit when it was on base. He also reported that contaminants have been detected in groundwater at concentrations up to 35 ppb for RDX and up to 770 ppb for perchlorate. The plume extends south toward Snake Pond and the RRA treatment system includes three extraction wells pumping at 175 gpm. The equipment used to treat the J-3 Range plume is housed in the FS-12 treatment plant, which was a cost savings for the IAGWSP.

Mr. Gregson then discussed L Range, located between the J-3 Range and J-1 South plumes. He noted that there are some small areas of RDX and perchlorate contamination in groundwater coming from L Range, which was primarily used for military training rather than contractor activities. Grenades containing RDX were used at this site, and the RDX that's being seen is from the grenades. Mr. Gregson also said that although there are very few explosives detections in L Range soil, a number of high-explosive grenades remain at the site, which pose a serious safety hazard and have the potential to cause groundwater contamination. He then mentioned that a group from the Air Force robotics lab is currently at L Range trying out some robotics technologies. Activities have included mowing down vegetation with a robotic brush-cutter, and different types of equipment are going to be used to collect the UXO on the range. Mr. Gregson also noted that the small RDX and perchlorate plumes coming from L Range appear to be detached from their source, contain relatively low levels of contamination, and are expected to attenuate naturally.

Mr. Gregson showed an aerial photograph of the Central Impact Area (about 330 acres in size) and pointed out the scrub oak habitat, which he noted is located throughout much of the Impact Area (about 2,200 acres in size). He noted that the Central Impact Area, where munitions were fired, is believed to be the primary source area for the Central Impact Area plumes, which contain both RDX and perchlorate. The source appears to be ongoing as contaminants continue to be detected at the water table near the source area, which has not been removed. The IAGWSP is in the process of conducting a feasibility study to look at potential alternatives for addressing the Central Impact Area plumes, and it's possible that the Air Force robotics group will be taking a look at some UXO removal technologies that might work in the Impact Area. Mr. Gregson also noted that the IAGWSP has conducted some small soil removal actions at the site, including one of the first RRAs, conducted in 2000, and subsequent small RRAs to remove soil around targets. He further noted that the IAGWSP has undertaken many investigations, not only of soil contamination, but also of UXO and munitions to determine their condition and density.

Mr. Gregson then discussed the Northwest Corner plume, which, he noted, contains mostly perchlorate, but with a small finger of RDX contamination. He noted that both the perchlorate and RDX are migrating to the Cape Cod Canal, and that the RDX is likely from a source in the Impact Area, while the perchlorate is thought to be primarily from fireworks displays in Bourne, but perhaps also in part from training activities on the base. He reported that the fireworks displays ceased in 2003 and the perchlorate plume appears to be detaching and working its way toward the canal. The IAGWSP is in the process of completing a feasibility study for the Northwest Corner and it seems likely that the ultimate remedy will be natural attenuation of the plume.

Mr. Gregson also spoke about Demolition Area 2 (Demo 2), noting that it is like Demo 1, only smaller, and was used primarily for training with explosives and not so much for disposal. He noted that the Demo 2 plume contains only RDX, with a maximum concentration of about 6 ppb. An RRA soil removal was conducted at the source area, which is believed to have been completely removed, and a remedy selection plan for the site is planned probably for this year.

Mr. Gregson stated that the Western Boundary site came to be identified in 2002 when low levels of perchlorate began to be detected in the vicinity of Bourne's Monument Beach water supply wells, and actually in a couple of the wells. The IAGWSP conducted an extensive upgradient monitoring program to try to find the source of the contamination but really didn't find much. Perchlorate concentrations off base were all less than 1 ppb, and on base were all less than the MMCL of 2 ppb, with one exception. A source area has never really been identified, but the best guess is that the perchlorate was the result of historic munitions training, and a remedy selection plan for the site is expected later this year.

Mr. Gregson then discussed some soil investigation sites that do not have groundwater plumes associated with them at this time. He noted that the IAGWSP has been investigating the 24 current and former Small Arms Ranges (SARs), the concern being whether there could be a potential risk to groundwater from components of the bullets that were fired there (such as lead, antimony, copper) and whether propellants used in small arms cartridges could release compounds such as nitroglycerin and 2,4-DNT into the environment, and if so, whether they could be released at levels that would ultimately pose a risk to human health or to groundwater. Mr. Gregson stated that at this point in the investigation it's thought that the levels of lead are not going to pose a risk to groundwater, and additional studies are under way to determine if nitroglycerin and 2,4-DNT could be potential risks to groundwater. He also noted that to date, none of these components have been detected in the groundwater at the SARs.

Mr. Gregson reported that the IAGWSP is investigating the 37 Gun & Mortar Positions, where troops set up artillery pieces and mortars to fire on targets in the Impact Area. The Gun & Mortar Positions, which were used from the 1930s until 1997, also sometimes served as sites where propellant bags were burned. The primary COC at the Gun & Mortar Positions is 2,4-DNT, which has been detected at 16 of the sites, and the IAGWSP is conducting studies to better understand how 2,4-DNT leaches to groundwater, although the contaminant has not been detected in the groundwater. Mr. Gregson also mentioned that the CS-18 site, which is being investigated by the IRP, is one of the Gun & Mortar Positions.

Mr. Gregson then informed the group about the BA-4 Disposal Area, a small area on the western part of the base where an RRA soil removal was conducted to address lead-contaminated soil and where no groundwater impacts have been seen. He noted that a Decision Document (closure document) for the BA-4 Disposal Area is expected to be issued in the next few months. He also spoke about Former A Range (located at the toe of the Central Impact Area plume), where troops were trained to hit moving targets by aiming at targets that were mounted on railroad tracks and allowed to roll down a hill. Both high-explosive rounds and 50-caliber machine guns were used at the range, and metals, explosives, and propellants have been detected in the soil there. The Air Force's robotic equipment is also being used at this range to test different UXO removal methods. Mr. Gregson noted that although no mappable groundwater plumes are associated with Former A Range at this time, some low-level detections of TNT-breakdown products have occasionally been seen in the wells at the site. He also reported that some explosives have been detected in the soil at Former K Range (a grenade launcher and rocket range), but nothing much has been seen in the groundwater. He noted that Former K Range could be dangerous from a UXO standpoint, and so is another focus of the Air Force robotics group. Mr. Gregson concluded his presentation by noting that while a number of additional sites have been investigated over the years, the ones that he discussed tonight are those found to have contamination in either the soil or the groundwater.

Mr. Goddard inquired about the status of the Bourne Water District's proposed public water supply well in the Western Boundary area. Mr. Gregson replied that it was in the permitting process, and perchlorate has not been detected in any of the monitoring between the plume and proposed supply well. Mr. Goddard asked if the proposed supply well is far enough away from the perchlorate contamination. Mr. Gregson said that he believes it is, and added that levels are low enough that he doesn't think detectable concentrations would be seen in the well. Mr. Minior reported that MassDEP gave its conditional approval of the proposed well and the Bourne Water District this morning decided to move forward with preliminary engineering and design for development of the site.

Mr. Goddard noted that he's particularly interested in access issues, and although the IAGWSP is dealing mostly with plumes that are contained within the base, some of the contamination has traveled beyond the base boundary and he'd like to hear more about that at future meetings. Mr. Gregson acknowledged that while many of the IRP plumes exist in neighborhoods south of the base, the IAGWSP has been fortunate in that most of the contamination its addressing remains on base, with the exception of a few areas, such as the J-1 South, J-3 Range, and Northwest Corner plumes.

Ms. Rielinger asked if the disjointed or separated nature of many of the IAGWSP plumes is a function of the sources or of the behavior of the contaminants themselves. She also said that she thinks it would be very helpful to bring PCT members up to speed on the behavior and chemistry of the munitions. Mr. Gregson replied that it's really a function of the chemistry of the compound along with a very complicated release history. He noted, for example, that the destruction of a load of munitions or fireworks at Demo 1 was a one-time event, the likes of which wouldn't occur again for a certain period of time, and this type of release history has caused pulses of contaminants to be coming from the source area. He also noted that perchlorate seems to move faster through soil and into the groundwater than RDX does, which is another complicating factor that can be discussed more at future meetings.

Ms. Jennings said that she'd like to take a moment to discuss the difference between the status of the IRP and the IAGWSP. She explained that on the IRP side there's an important point in the investigation process called a Record of Decision (ROD), which on the IAGWSP side is called a Decision Document, but is essentially the same thing. She then stated that most of the RODs already have been issued, while only one Decision Document (Demo 1) has been issued. She also noted, however, that to the IAGWSP's credit a number of groundwater treatment systems have been installed as interim actions, or RRAs, in order to try to keep the plumes on base. Ms. Jennings then stated that the one issue that has prevented the issuance of additional Decision Documents relates to UXO. The IAGWSP and the regulatory agencies have been able to come to agreement on the extent of the groundwater plumes and what needs to be done to clean them up, but have not been able to agree on how much source area cleanup is needed for each of the sites. And although a great deal of soil treatment and munitions removal has been done already, much still remains. Ms. Jennings stated that there has been a lot of discussion about this issue, and there will be much more discussion about how much UXO is okay to leave behind in terms of safety and future impacts to groundwater. She further noted that the UXO issue is very important, very complicated, and will require a great deal of public involvement. She described it as perhaps the most important decision to be made for the northern part of the base.

Ms. Rielinger asked if there's an estimate of the number of UXO items that remain. Ms. Jennings said that there are an estimated 7,419 UXO items at the Central Impact Area, and Mr. Gregson agreed that there are thought to be roughly 10,000, give or take a few thousand. Ms. Rielinger asked if the estimate pertains just to the Central Impact Area. Mr. Gregson replied that is does, and explained that that is probably where most of the UXO are located, and it's certainly where the bulk of explosives would be located. He also noted that each artillery shell probably contains about 10 pounds of explosives, which is why, as Ms. Jennings indicated, UXO are a potential future source that requires serious consideration. Mr. Gregson also said that he can't even venture a guess as to how many 40mm grenades remain at other areas such as the L, K, and A Ranges, but it's probably hundreds or thousands.

Mr. LoGuidice inquired about the number of Air Force staff conducting the robotics work. Mr. Gonser replied that that there are two separate teams of two people each, and two control centers that can operate up to two pieces of equipment at a time. Mr. LoGuidice asked if the teams are able to move fairly quickly. Mr. Gonser replied that for the clearance work they were able to clear about one-and-a-quarter acres per day.

Ms. Jennings turned the group's attention back to Ms. Rielinger's inquiry about remaining UXO and noted that at the one site for which a Decision Document has been issued (Demo 1), the IAGWSP removed every piece of metal in the area, which is why it was easy for EPA to say that enough had been removed. For other sites, that is not the case, and trying to predict UXO density is a complicated challenge. She explained that the IAGWSP has determined certain numbers of UXO items in specific areas and from that information tried to estimate how many items might remain in a larger area, such as the Central Impact Area. There, the estimate was about 7,000 – which might be accurate, but might be very inaccurate. Ms. Jennings said that the effort is ongoing to complete the source area investigations, try to estimate the mass of UXO contamination that's there, and then try to model it (because it doesn't move to groundwater the same way traditional soil contamination does) and determine what the long-term impacts to groundwater might be.

Mr. Bostwick asked what methods, other than robotics, have been or will be used to remove UXO. Mr. Gregson replied that the big advantage offered by robotics is in not having to send in UXO technicians with metal detectors and hand equipment to find the items and remove them or blow them up if they're deemed unsafe to move. He said that other than robotics or having individuals deal with the items on a case-by-case basis, there really aren't a lot of options for dealing with UXO.

Mr. Goddard said that at future meetings he'd be interested to learn more about habitat/natural resource issues and about the contained detonation chamber (CDC) that's used to destroy UXO.

Agenda Item #4. Ashumet Valley Plume Shell Update and Preliminary Feasibility Study Alternatives

Mr. Minior stated that Dr. Morris of Jacobs Engineering would be giving the presentation on Ashumet Valley plume alternatives, the purpose of which is not to solicit opinions on the alternatives but to update team members on the current status of the study. Mr. Marchessault reminded the group that last year the IRP issued and put out for public comment an Ashumet Valley Proposed Plan that was distributed along with an EPA-issued document that explained why the agency didn't agree with the IRP's recommended alternative. In order to avoid going to dispute, EPA has been working with the IRP, which has conducted a Focused Feasibility Study (FS) to look at additional alternatives.

Dr. Morris noted that two months ago Mr. Minior presented the new Ashumet Valley plume shell to be evaluated in the Focused FS. He then showed a figure depicting Alternatives 6 and 7 from the Ashumet Valley FS Addendum that came out last summer, which was based on the old plume shell. He reminded the group that Alternative 6, IRP's preference, involved optimizing the existing treatment system by turning off the two northern extraction wells and boosting the rate at the remaining extraction well. Alternative 7, EPA's preference, consisted of the one operating extraction well in the northern part of the plume plus two extraction wells in the southern part of the plume, pumping at about 350 gpm each, with extracted water being piped back to the existing treatment system.

Dr. Morris stated that the Focused FS alternatives were evaluated using the existing Ashumet Valley steady-state flow model run under non-flooded bog conditions. The new plume shell was developed based on data from the triennial System Performance and Ecological Impact Monitoring (SPEIM) sampling event that occurred in October/November/December 2007 and data from additional drive-points installed in the southern portion of the plume. Dr. Morris noted that the primary difference between the FS Addendum and the Focused FS is the plume shell. He then showed the FS Addendum plume shell and the Focused FS plume shell, pointing out that the higher concentrations are now located in a more southerly position, concentrations have decreased upgradient of the existing system, and the contamination that was located northwest of Ashumet Pond is now gone. He also said that while the footprint of the plume is not very different, the major difference between the two plume shells is in the interior concentrations – and the purpose of the Focused FS was to develop alternatives to address the contamination in the new plume shell. Dr. Morris also displayed a bar-graph depicting total PCE mass in the original FS plume shell (2003), the FS Addendum plume shell (2005), and the Focused FS plume shell (2007), noting that the 2007 plume shell has significantly less PCE mass than the 2003 plume shell (about 200 pounds less), which is primarily due to the decrease in interior concentrations in the plume itself.

Dr. Morris continued his presentation by showing animation modeling runs for each of the Focused FS alternatives, beginning with Alternative 6, which he noted is the same as in the FS Addendum, but with the existing extraction well (EW-703) pumping at a reduced rate (350 gpm rather than 375 gpm). Dr. Morris ran the animation and noted the following: most of the higher concentrations are captured by about 2011; separation of the southern portion of the plume from the existing northern portion starts to occur around 2014; the remaining contamination that exists by 2019 is located mostly in the southern portion of the Backus River/Mill Pond area.

Dr. Morris noted that there is no longer an Alternative 7, which was evaluated in the FS Addendum, because it was designed to address the older plume shell. He then referred to Alternative 8, which involves EW-703 pumping at 350 gpm and a leading edge extraction well pumping at 175 gpm (initialized in January 2010) and utilizing a modular (skid-mounted) treatment unit with a capacity of about 200 gpm. He ran the Alternative 8 animation and noted the following: the leading extraction well is designed to tackle the hotspot at the leading edge of the plume; the hotspot starts to be captured and separation of the southern portion of the plume from the existing northern portion starts to occur around 2014, and some mass gets by the leading edge well; at about 2019 significantly less mass is going into the Backus River/Mill Pond than with Alternative 6, and a certain amount of mass is still getting by the well; by 2021 all of the concentrations in the Ashumet Valley plume are expected to fall below the MCL of 5 ppb.

Dr. Morris then referred to Alternative 9, which involves EW-703 pumping at 350 gpm and a leading edge extraction well pumping at 350 gpm (initialized in January 2010). He ran the Alternative 9 animation and noted the following: separation of the southern portion of the plume from the existing northern portion starts to occur

around 2014 and the two hotspots coalesce; EW-703 would probably be shut off around 2018 because most of the remaining contamination would be outside the well's capture zone; and by 2019 all of the concentrations in the Ashumet Valley plume will have fallen below the MCL.

Mr. Goddard asked why the leading edge well wasn't situated more to the south. Dr. Morris replied that the well is situated to maximize capture of the hotspot, and if it were located more to the south, the hotspot might bypass it. Mr. Field asked about access issues associated with placement of the well, and mentioned that he believes that it is a densely-populated area. Dr. Morris agreed but noted that access wasn't taken into consideration when developing the alternatives. Mr. Field suggested that access issues are one of the reasons why mobile treatment units were being considered.

Dr. Morris referred to Alternative 10, which is the same as the previous alternatives but with a pumping rate of 500 gpm at the leading edge extraction well. He ran the Alternative 10 animation and noted the following: much more separation of the southern portion of the plume from the existing northern portion and more capture are seen by about 2014; the amount of mass getting by the well is less, as seen around 2017; and plume cleanup is achieved by about 2019, the same as with Alternative 9.

Dr. Morris stated that, as expected, Alternatives 9, 10, and 11 showed that increasing the pumping rate in the leading edge well increases the amount of mass capture. What wasn't expected, however, was that there wouldn't be a significant difference in the cleanup timeframes. Therefore the decision was made to look at an alternative that included some upgradient mass capture to see whether that would decrease the restoration timeframe. He then referred to Alternative 11, which involves EW-703 pumping at 350 gpm, and one leading edge extraction well and two in-plume extraction wells pumping at 200 gpm each (initialized in January 2010). He then ran the Alternative 11 animation and noted the following: at 2014 there seems to be a little bit more detachment, but about the same amount of mass getting by the well as with Alternative 8; plume cleanup is achieved by 2019; and this alternative captures the most mass but doesn't really decrease the restoration time required to remediate the plume.

Ms. Grillo asked why that is so. Dr. Morris replied that primarily it has to do with the influence of the Backus River. He explained that so much mass is going into the river, "and it take such extensive pumping in order to counteract the hydraulic gradient between the location of the plume and the location of the river" that a lot of the mass appears to be "just kind of attenuating in place, not even reaching some of these extraction wells." He also referred to the mass that's bypassing the wells and heading in the direction of the river, noting that "the river is kind of the limiting factor here as far as restoration timeframe..."

Dr. Morris then referred to Alternative 12, which involves EW-703 pumping at 350 gpm, and one leading edge extraction well and one in-plume extraction well pumping at 175 gpm each (initialized in January 2010), both utilizing modular (skid-mounted) treatment units. He then ran the Alternative 12 animation and noted the following: detachment is seen around 2014 and cleanup of the hotspots is a little better compared to Alternative 8, for example; around 2017 there's mass bypassing the wells, which could probably be turned off around this time because they aren't achieving much in terms of capture; and cleanup would be achieved around 2019.

Dr. Morris displayed a summary chart showing total flow rates, time to cleanup, and predicted PCE mass removal amounts for the Focused FS alternatives plus the old Alternative 6, with the higher pumping rate of 375 gpm at EW-703. He then noted the following: cleanup timeframes for the upgradient portions of the plume (North of Route 151, and Between Route 151 and Hayway Road) are fairly consistent across all the Alternatives, whether or not they include treatment in the southern portion, South of Hayway Road; on a percentage basis there is more discharge to the river with Alternative 6 (new) than with Alternative 6 (old); and the percentage of mass capture is similar, but more mass is captured with Alternative 6 (old) than Alternative 6 (new) because there was more mass in the old plume shell.

With respect to the performance of Alternatives 8 through 12, Dr. Morris noted the following: in terms of cleanup timeframes, little is gained by active treatment in the southern portion of the plume (cleanup year 2021 for Alternative 8, and cleanup year 2019 for Alternatives 9 through 12) compared to Alternative 6 (new) (cleanup year 2023); the general trend is the greater the pumping rate, the more mass capture is achieved; and Alternative 9 (a single-well system in the southern part of the plume pumping at 350 gpm) achieves almost identical mass capture results as Alternative 12 (a two-well system in the southern part of the plume pumping at 350 gpm).

Mr. Minior reminded the group that last summer the Ashumet Valley plume discussion centered on AFCEE's preference, Alternative 6, versus the regulatory agencies' preference, Alternative 7, which was predicted to clean up the plume 10 years sooner, but at an additional cost of \$9 million. The new Alternative 6, however, has only a two- to four-year difference in cleanup time compared to Alternatives 8 through 12, and cost estimates will be calculated once a decision is made as to which of the alternatives to carry forward. Mr. Minior also said that the information indicates that no matter how much the pumping rate is increased, the cleanup timeframe remains 2019, with the difference being the amount of mass that's removed rather than allowed to naturally attenuate or upwell into the river and dissipate.

Ms. Rielinger asked if impacts on the wetlands and rivers have been evaluated, especially for the alternatives with higher pumping rates. Dr. Morris replied that such impacts have not been evaluated, acknowledged that Alternative 11 seems to have the potential to cause drawdown at the Backus River and Mill Pond, and said that the other alternatives with more similar pumping rates probably would be below the drawdown threshold. Ms. Rielinger asked if there is a plan to evaluate these impacts, and Dr. Morris replied that there is. Mr. Field then clarified that the goal is to select one of the alternatives from Alternatives 8 through 12 before conducting more detailed evaluation and analysis.

Mr. Goddard stated that the IRP's use of modular treatment units like the ones used by the IAGWSP, which he discussed with Mr. Gregson on his local television show, illustrates the benefit of bringing the two programs together by joining the PCT and IART. Mr. Goddard then inquired about the maximum flow rate that a modular treatment unit can handle. Dr. Morris replied that he believes that the maximum capacity is 200 gpm. Mr. Goddard asked if modular treatment units could be used for an extraction well with a higher pumping rate. Dr. Morris said that he thinks it would be possible to spilt the flow from one well among two or three different modular treatment units, which are essentially contained in Conex boxes. Mr. Goddard then remarked that he was surprised to see the 12-year difference in cleanup time between Alternative 6 (old) and Alternative 6 (new), and he asked, "Where did the stuff go?" Dr. Morris replied that the mass has primarily been going to the river, as well as naturally attenuating. Mr. Goddard then noted that because Alternatives 10 and 11 are predicted to remove twice the amount of mass than Alternative 6 (new) is, and in four years less time, he would be interested in seeing them carried forward.

Ms. Jennings clarified that last summer EPA's reasons for preferring Alternative 7 over Alternative 6 had to do with mass, time, and uncertainty; the agency felt that "those three things balanced against the difference in price, which was \$9 million." She also said that, looking at the Focused FS alternatives, she would not compare just time, given that placing extraction wells at the very leading edge of the plume means that it takes time for the contamination to reach those wells. She explained that she doesn't see the time factor as critical since it's the travel time that's affecting the cleanup year. Ms. Jennings stated that she thinks mass removal and the uncertainty associated with letting contamination go uncaptured remains "a relevant and important factor" to consider, and EPA has not yet made a decision or recommendations. She noted again that EPA's concerns last summer did not have to do just with cleanup time and money.

Ms. Rielinger asked if 376 pounds of PCE is the total for the entire Ashumet Valley plume. Dr. Morris replied that it is, and clarified that it's the mass from the plume shell when inserted into the transport model – dissolved mass plus adsorbed mass. Ms. Rielinger asked if the percentages of mass removal on the summary chart also pertain to the entire plume, and Dr. Morris confirmed that they do. Ms. Rielinger then asked if numbers concerning mass have been broken out by the sections of plume north of and south of the current extraction well. Dr. Morris replied that the numbers have not been broken out that way. He also noted, however, that the plume mass has been broken out into mass that's above the MCL and mass that's to nondetect. Ms. Rielinger referred to the 64 pounds of mass estimated to be removed under Alternative 6 (new) and said that she'd be curious to know what percentage that would leave in the southern section of the plume. Dr. Morris said that the lower flow rate should be taken into consideration, and added, "But how much of that is based on the pumping or how much of it is the plume shell" is the question. Ms. Rielinger asked if it's correct that cleanup of the northern portion of the plume isn't going to be affected by which alternative is selected. Dr. Morris confirmed that that's correct. Ms. Rielinger then asked if it's correct that that amount is not actually known. Dr. Morris confirmed that those numbers north of Carriage Shop Road are not known.

Mr. Gasior requested to hear MassDEP's opinion on the alternatives. Mr. Pinaud said that MassDEP just recently received and is still reviewing the information, but noted that Mr. Jacobs of MassDEP may want to comment. Mr. Jacobs asked Dr. Morris if mass discharges into the river in the model, and Dr. Morris replied that it does. Mr.

Jacobs then asked if the discharge occurs up and down the whole course of the river, or just in the northern part. In response, Dr. Morris showed the Alternative 6 animation, referred to the cross-section views, and pointed out the discharge to the river. He also said that he believes that discharge is occurring up and down the course of the river, and added that over time as the plume moves south, the discharge increases. Mr. Jacobs noted that the U.S. Geological Survey (USGS) study a couple years ago found the plume to be discharging in the northern three bogs (Bogs 13, 14, and 15), but not south of there. He also said that the plume was found “quite deep underneath the river going south,” with wells installed right along the river showing the plume to be deep and not upwelling there.

Mr. Davis noted that the cross-section view to the west shows the extent of river upwelling, according to the animation. Dr. Morris ran the animation again and Mr. Davis said that it shows where the river upwelling “pretty much stops” and then the upwelling is primarily located in the Mill Pond area. He added that it seems that the upwelling in the bogs is going to end in about two years, according to the model, and then, as the cross-section view to the north shows, upwelling will later start to occur in the Mill Pond/Green Pond area. Mr. Davis also said that there would be some traditional cross-section figures at the next meeting that should prove helpful. Dr. Morris added that the model shows upwelling starting to begin at the southern edge of the bogs/Mill Pond area around 2016. Mr. Jacobs noted that the book, Cape Cod Geology, describes a phenomenon called spring sapping, where the strongest groundwater discharge occurs at the headwaters of most of the rivers in this area. He said that this is seen with respect to the FS-28 and FS-1 plumes in that all the discharge occurs at the headwaters of the river, with very little occurring beyond that point. Mr. Jacobs said that he thinks the same phenomenon would hold true with respect to the Ashumet Valley plume area.

Mr. Goddard inquired about the next step in the process with regard to the Ashumet Valley plume decision. Mr. Davis replied that one of the active alternatives will be selected and carried forward for further design. He also explained that the goal is to secure a tentative property agreement before issuing a Proposed Plan, such that it’s known in advance whether the remedy is “buildable.” He said that he wants to avoid a situation like the one that occurred with the Southwest Plumes, where access issues after the ROD was signed delayed completion of construction for a couple of years. Mr. Goddard asked if EPA and MassDEP would be weighing in on which of the five alternatives with active treatment in the southern part of the plume is selected. Mr. Davis replied that they would. He also said that the IART/PCT would be receiving updated information on the Ashumet Valley plume decision process early this summer.

Agenda Item #5. Land Use Controls

Mr. Karson stated that Land Use Controls (LUCs) are restrictions or controls needed to protect human health and the environment. LUCs limit the use of and/or exposure to contaminated soil or groundwater, and also prevent interference with in-place remedies (e.g., fencing around a treatment plant). Mr. Karson noted that LUCs are also known as Institutional Controls (ICs) or Activity and Use Limitations (AULs).

Mr. Karson reported that MMR is involved with the following types of LUCs: fencing and signage, such as at treatment plants and the landfill; on-base well-drilling prohibitions for new wells (although there is one existing municipal water supply well on base, the J Well, which has carbon treatment on it); well-drilling prohibitions and testing requirements in the four towns that surround the base (Bourne, Falmouth, Mashpee, and Sandwich) that involve an application process and board of health approval for drilling of new wells; monitoring of daily Dig Safe notices for any indication of digging activity near wells or treatment systems; and the verification of the status of existing private and irrigation wells located on parcels in the footprint or in the future path of a groundwater plume – which will be the focus of his presentation.

Mr. Karson noted that the verification of the status of private and irrigation wells was written into the LF-1/CS-23 ROD that was signed last September. However, the requirement applies to all RODs that have been issued to date and will also apply to the CS-10 and Ashumet Valley RODs, which have not yet been issued. He further noted that AFCEE is not going to wait for those final RODs to go forward with its research. Mr. Karson stated that the steps of identifying, testing, preparing a risk assessment (if necessary), and offering decommissioning of the wells must occur within three years of signing a ROD. He also explained that decommissioning of a well involves filling in the casing with grout and disconnecting the piping of a well that’s been identified as posing a potential risk.

Mr. Karson reported that Ashumet Valley was chosen as the first plume to investigate, as nearly 600 parcels exist within the current plume boundaries. He also mentioned that the LF-1 plume, which has 200 to 250 parcels associated with it, will likely be the next one to be investigated. Mr. Karson then reviewed the initial steps taken or to be taken to contact and obtain information from homeowners: a mailing was sent on March 13, 2008 to 582 property owners (some with multiple parcels) and to date 180 responses (31%) have been returned; a follow-up mailing – perhaps a certified mailing, if needed – will be sent; phone calls will be made to non-respondents (either before or after a certified mailing); and as a final step AFCEE will undertake a door-to-door canvassing effort to obtain information from non-respondents.

Mr. Karson then showed a map of the Ashumet Valley plume depicting the plume boundary and the potential areas of concern where AFCEE will be verifying well status. He noted that coverage was extended down to Route 28 and he also pointed out a potential area of concern to the north, near the base boundary, where the wastewater treatment plant had been discharging over a number of years.

Mr. Karson then reported that the following steps will be taken: AFCEE will offer free decommissioning of existing wells; property owners who want to keep their wells will be offered testing of the well along with an evaluation (risk assessment) of the safety of the well; and if a well is found to pose an unacceptable risk and decommissioning is not accepted, AFCEE will pursue all available options to have the well condemned and required to be decommissioned, and may offer bottled water and/or a treatment system on the well in the meantime. He also noted that homeowners will not be responsible for any costs associated with the program.

Mr. Karson further noted that AFCEE will share information with EPA, MassDEP, the Massachusetts Department of Public Health (MDPH), and the local boards of health. He also mentioned that of the 180 response-forms that have come in, 35 private wells have been identified. He added that information on the residential wells will be updated by an annual review of well permit applications filed with boards of health and through daily monitoring of the Dig Safe program. In addition, AFCEE will conduct a full review of the private and irrigation well information as part of the Five-Year Review process.

Mr. Goddard asked what would happen if a homeowner hired a driller to drill an un-permitted well. Mr. Davis replied that he has spoken to several drillers, all of whom have confirmed that they would never drill without filing with Dig Safe and risk losing their license. Mr. Goddard said that he thought Dig Safe was for notifying utility companies, and Mr. Davis clarified that the IRP is one of the utility companies that Dig Safe notifies.

Mr. Bostwick inquired about the depth of the residential wells. He also questioned why AFCEE is contacting homeowners in areas where contaminant concentrations are below the MCL. Mr. Karson replied that on average private wells are about 15 feet into the water table, although a few are known to be deeper. He also explained that the potential area of concern was extended beyond the MCL plume outline because the Ashumet Valley plume decision hasn't been made yet. It's hoped that that decision will be made next year, when it'll be known whether a treatment system is going to be installed in the southern part of the plume. He also said that the text of the LUC includes language about "the future travel path of the plume," and that the plumes generally travel one to two feet per day.

Mr. Bostwick inquired about the separate area north of the plume outline, near the base boundary. Mr. Karson explained that discharge beds for the old wastewater treatment plant are located in that area, and that an old fire-fighter training area was also located nearby. Mr. Davis further explained that the COCs in that area are thallium and manganese. Mr. Karson added that the black rocks along the inner shoreline of Ashumet Pond are evidence of the manganese that's been entering the pond over past years.

Agenda Item #6. Brief Updates

Residential Wells, Ponds, and Harbors Sampling Update

Mr. Karson showed a map entitled "Private Well and Recreational Beach Sampling Locations" and reported that as in past years, AFCEE will be sampling Snake Pond in Sandwich, Johns Pond and Ashumet Pond in Mashpee and Falmouth, and Coonamessett Pond, Jenkins Pond, Deep Pond, and Round Pond in Falmouth. He also noted that surface water sampling and seep sampling will be conducted at Red Brook Harbor and Squeteague Harbor in Cataumet (a village of Bourne). In addition, Mr. Karson pointed out the approximately 40 residential well sampling locations, noting that about 25 of those residences continue to take advantage of AFCEE's sampling program. He then noted that the sampling effort is scheduled to take place in the late April/May timeframe and he

expects to be able to share results with the team at the June or July IART/PCT meeting. He further stated that historically there have been no issues with any of those areas.

Mr. Goddard asked if MDPH is still issuing its annual “Recreational Ponds On or Near MMR” fact sheet. Ms. Grillo noted that she was going to ask the same question, and added that summer community members and real estate professionals appreciated receiving that fact sheet, which contained information about which ponds were safe for swimming. Mr. Karson said that the most recent version of the MDPH ponds fact sheet he’s seen was 2006. Mr. Davis noted that he would ask the MDPH representative about the status of the fact sheet at the next SMB meeting, but it’s his understanding that MDPH is “resource-constrained” at this time.

CS-10 Soil Removal

Mr. Davis informed the group that the contract for CS-19 soil removal work was awarded this week to ECC, the contractor that built the Southwest Plumes system and the new well at FS-28 and has done all of AFCEE’s source area removal work over the past six years. ECC is going to be removing stockpiles amounting to about 2,000 tons of soil (about 67 truckloads) and excavating four grids (about another 80 truckloads). Disposal of the soil is planned to be done at an EPA-approved landfill facility, and post-excavation sampling will be conducted. Mr. Davis then showed figure of the CS-19 source area and pointed out the bunker area, the stockpiles, and the four grids that are going to be excavated. He also said that the work is expected to begin within the next couple of weeks.

Southwest Plumes Explanation of Significant Differences

Mr. Davis reported that AFCEE will be issuing an Explanation of Significant Differences (ESD) to document changes to the Southwest Plumes (CS-4, CS-20, CS-21, and FS-29) remedies that came after the RODs were issued. He explained that the RODs called for full containment, but the IRP was unable to achieve full containment at all of the plumes due to access issues. He then showed maps of the Southwest Plumes and reminded the group of the access issues that prevent achieving full containment of the CS-4, CS-20, and FS-29 plumes. He also explained that having this documented in an ESD is part of the CERCLA process. He further noted that the ESD is also going to include the integration of updated language for the three-step process for achieving site closure, and for the new LUC that was the subject of Mr. Karson’s presentation earlier this evening. Mr. Davis reported that the ESD is being worked through the final signature process, and when completed a news release will be issued and the document will be available in the Administrative Record.

Agenda Item #7. Public Comment

Mr. LoGuidice said that the IAGWSP maps seem to be much clearer than the ones Mr. Davis showed, and he would appreciate it if they could be made larger.

Mr. Field again welcomed the new members to the team and said that he thinks it’s terrific that they participated from the start.

Mr. Foster asked how the Hunter Avenue treatment facility is coming along. Mr. Davis replied that it is working fine. He also reported that influent concentrations there are around 4 or 5 ppb and there hasn’t been a need for a carbon change in a year and a half.

Mr. Marchessault confirmed that team members would be notified as to whether there would be an IART/PCT meeting on May 14, 2008, as soon as that decision is made.

Mr. Goddard suggested “Joint Program Cleanup Team” as the name for the new combined team.

Agenda Item #8. Adjourn

Mr. Field adjourned the meeting at 8:46 p.m.