

**Plume Cleanup Team/Impact Area Review Team Meeting**  
**Bourne Best Western**  
**June 11, 2008**  
**6:00 – 9:00 p.m.**

**Meeting Minutes**

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**Action Item:**

1. AFCEE will respond to Mr. Dow's request for estimated percentages of uncaptured mass in the southern portion of the Ashumet Valley plume that upwells into the Backus River versus that which naturally attenuates.

**Handouts Distributed at Meeting:**

1. Responses to Action Items from the May 14, 2008 PCT/IART Meeting
2. Presentation handout: Landfill-1/Chemical Spill-23 2007 Plume Update

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3. Maps/Figures to accompany LF-1/CS-23 Presentation
  4. Presentation handout: CS-10 Leading Edge Update
  5. Presentation handout: Ashumet Valley Update
  6. Presentation handout: Camp Edwards Small Arms Ranges Update – Tango and Juliet & Kilo Ranges
  7. Fact sheet/chart: Small Arms Ranges: Public Comment & Information
  8. Presentation handout: Southeast Ranges Plumes Update
  9. Figure: Southeast Range Groundwater RRA Treatment Systems and Monitoring Networks
  10. PCT/IART Meeting Evaluation Form
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### **Agenda Item #1. Introduction, Agenda Review, and Approval of 5/14/08 PCT/IART Meeting Minutes**

Mr. Field convened the meeting at 6:03 p.m. and reviewed the agenda. He also passed around to Plume Cleanup Team (PCT)/Impact Area Review Team (IART) members a form on which they were to indicate whether they prefer receiving PCT/IART materials by mail or by email, and a form on which they were to indicate their preferred dates/times for a base site tour. He also noted that the Remedial Project Managers (RPMs) had proposed holding future PCT/IART meetings on base and asked if there were any objections to this proposal. Mr. Goddard recommended having the July PCT/IART meeting on base and then checking in with team members as to whether they want to continue to meet at that location. Mr. Taylor asked if members of the public would be able to obtain access to the base to attend the meetings, and Mr. Gonser confirmed that they would.

Mr. Field asked if there were any changes or additions to May 14, 2008 PCT/IART meeting minutes. No changes were offered and the minutes were approved as written. Regarding having PCT/IART meetings on base, Mr. Karson noted that the Falmouth gate is closed in the evening. Mr. Minior added that although members of the public who show identification would be allowed unescorted access through the Sandwich gate and the main gate, members of the media would only be allowed escorted access.

Mr. Goddard thanked the Installation Restoration Program (IRP) for sending out his letter to the congressmen regarding his concerns about the status of the Massachusetts Military Reservation (MMR) Natural Resource Trustee Council (NRTC). He also noted that he had presented his letter at last month's Senior Management Board (SMB) meeting and that he is open to any ideas, suggestions, or comments on it.

### **Agenda Item #2. IRP Updates**

#### ***LF-1/CS-23 Update***

Ms. Forbes stated that her presentation is on the Landfill 1 (LF-1)/Chemical Spill 23 (CS-23) 2007 Plume Update Technical Memo. She showed a map of plumes being addressed by the IRP and pointed out the LF-1 and CS-23 plumes, in the southwest part of the base. She also showed a map of the LF-1 and CS-23 plumes and noted that the LF-1 plume is made up of a northern lobe and a southern lobe, and that the source of the plume is the main base landfill located off of Connery Road. Ms. Forbes also reported that the LF-1 plume is about three miles long, and about one mile wide, and that the CS-23 plume is located just south of the LF-1 southern lobe.

Ms. Forbes stated that the original LF-1 treatment system, which began operating in August 1999, included five extraction wells (extraction well 5 (EW-5), EW-4, EW-3, EW-1, and EW-2), a treatment plant where granular activated carbon (GAC) was used to remove the chlorinated solvents from the extracted water, and an infiltration gallery to return the treated water to the aquifer. She then noted that two infiltration trenches were installed due to capacity problems associated with the infiltration gallery, which eventually failed and was replaced with a reinjection well, which is working quite well. Ms. Forbes also mentioned that the Veterans Affairs (VA) cemetery at MMR is using treated water from LF-1 to irrigate the expanded part of the cemetery.

Ms. Forbes then noted that three additional extraction wells came on line in December 2006: EW-6 for the LF-1 plume, and EW-7 and EW-8 for the CS-23 plume. She also said that extracted water from EW-2, EW-6, EW-7, and EW-8 goes to the Hunter Avenue Treatment Plant where GAC is used to remove the chlorinated solvents, and the treated water is returned to the aquifer via two infiltration trenches – one on base, and one off base, on Crane Wildlife Management Area (Crane) property. She then reported that the other four extraction wells provide water to the LF-1 Treatment Plant, which processes close to 600 gallons per minute (gpm). Since system startup in August through March 2008, the LF-1 Treatment Plant has removed 331 pounds of contaminants of concern

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(COCs). And since system startup in December 2006 through March 2008, the Hunter Avenue Treatment Plant, processing 1,350 gpm from the four extraction wells, has removed 81 pounds of COCs.

Ms. Forbes then showed a figure entitled “Geographic Distribution and Relative Concentrations of the COCs and cis-1,2-dichloroethene (cis-1,2-DCE) at LF-1 and CS-23,” and explained that the colors and sizes of the pie charts on the figure indicate the higher contaminant concentrations and their locations. She noted, for example, that the northern lobe of LF-1 is mostly trichloroethylene (TCE), the CS-23 plume is mostly TCE, and the southern lobe of LF-1 is mostly perchloroethylene (PCE). She also noted that the cis-1,2-DCE (which is not a COC, but is a breakdown product) indicates that anaerobic biodegradation is occurring in the core of the southern lobe of LF-1. Ms. Forbes further noted that the biodegradation rate is strong enough that vinyl chloride (VC) is also seen in the core of the southern lobe.

Ms. Forbes also showed a slide entitled “Maximum Observed 2007 Concentrations of COCs,” which showed the maximum concentration for each of the COCs (PCE, TCE, carbon tetrachloride [CCl<sub>4</sub>], VC, 1,4-dichlorobenzene [1,4-DCB], 1,1,2,2-tetrachloroethane [1,1,2,2-TeCA], and ethylene dibromide [EDB]), the associated standard for each COC (the maximum contaminant level [MCL], the Massachusetts MCL [MMCL], or the Groundwater 1 [GW-1] standard), and the monitoring well where the concentration was detected. She noted that with the exception of monitoring well 568Z (MW-568Z), maximum concentrations for the LF-1 plume occurred in the core of the southern plume lobe. The slide also showed the maximum observed concentrations for the CS-23 plume COCs – TCE and CCl<sub>4</sub>.

Ms. Forbes then displayed a figure entitled “LF-1 Landfill Area Concentration Trends” and noted that the plume continues to be drawn as underneath the landfill because of the VC detections there, which are just slightly above the MCL of 2 micrograms per liter (µg/L). She said that the landfill is no longer a source of the plume, and the VC indicates that strong biodegradation is occurring. She also noted that it appears that the capping of three of the landfill cells in 1995 has successfully stopped the landfill from being a continuing source of contamination to the LF-1 plume. Ms. Forbes also showed a figure entitled “LF-1 Northern Lobe Concentration Trends,” and noted that TCE concentrations are generally decreasing. She then showed a figure entitled “LF-1 Upgradient Southern Lobe Concentration Trends,” pointed out MW-31A, located just downgradient of the landfill, and noted that that well had the highest COC concentration detected in the LF-1 plume – TCE at 150 µg/L, which has since gone down to less than 40 µg/L, an indication that the landfill is not a continuing source of the plume. She further noted that the increasing concentration seen downgradient is representative of that higher concentration migrating down, while the rest of the monitoring wells show concentrations that are decreasing or stabilized. Ms. Forbes also showed a figure entitled “LF-1 Downgradient Southern Lobe Concentration Trends,” remarked on the decreasing concentrations there, and noted that any increasing concentrations are again due to the migration of higher concentrations from upgradient.

Ms. Forbes then showed LF-1 PCE cross-section C-C', said that the cross-section for TCE looks very similar, and noted that the extraction wells at the base boundary are treating the contamination migrating from upgradient, while the contamination already downgradient of the wells is naturally attenuating, with an ultimate discharge point in Squeteague Harbor. She also displayed a figure showing the location of EDB detections and nondetects throughout the plume and explained that there aren't enough high concentrations of EDB in enough wells to draw an EDB plume map.

Ms. Forbes continued by showing a figure entitled “CS-23 Concentration Trends” and noting that most of the contaminant detections are TCE, with a little bit of CCl<sub>4</sub>, but at concentrations below its MCL of 5 µg/L. She also pointed out that MW-1706 is no longer included inside the plume outline because the 35 µg/L of TCE detected there in 2007 dropped to nondetect in 2008. She then showed the LF-1 TCE cross-section A-A' and pointed out that while the northern lobe appears contiguous in plan view, the cross section illustrates that it's really two distinct lobes – one shallower, and one deep. She further noted that the shallow lobe is being captured while the deeper lobe is being allowed to attenuate, with its ultimate discharge point in Red Brook Harbor. She also showed a figure depicting CCl<sub>4</sub> in the CS-23 plume and noted that there are no detections above its MCL of 5 µg/L.

Ms. Forbes showed a figure entitled “LF-1/CS-23 Concentration Trends at Extraction Wells” and noted that concentrations there hover right around the MCLs and are fairly steady due to the steady pumping rate on the aquifer. She then showed a north/south cross-section figure (LF-1/CS-23 PCE Cross-Section D-D'), pointed out

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the extraction wells and the water table, and noted that the wells that don't appear to be capturing any contamination are actually capturing TCE contamination, which isn't shown in the figure.

Ms. Forbes then reported that the 2005 combined LF-1/CS-23 flow model that was used for wellfield design was recalibrated using as-built information from the new extraction wells and infiltration trenches, new lithologic and hydraulic data from extraction wells, and hydraulic data from the 2007 shutdown/restart test. She showed the LF-1/CS-23 TCE plume "full" animation and reviewed the modeling results: separation of the northern and southern lobes of LF-1 800 feet downgradient of the base boundary is predicted to occur around 2013; the northern plume lobe is predicted to be cleaned up by 2023; the area between the base boundary and Route 28 is predicted to be clean by 2023; and the entire plume downgradient of the base boundary is predicted to be gone by 2031. She also noted that through system optimization, it's likely that only one or two extraction wells would be running in the out years. (CS-23 modeling results are: the plume will separate along the base boundary by around 2013, and virtually all of the plume will be gone by around 2023). Ms. Forbes also showed the "cut-off" LF-1/CS-23 TCE plume animation, which, she explained, removes all of the contamination downgradient of the base boundary so that the effectiveness of the extraction wells can be seen clearly.

Ms. Forbes then showed the full and cut-off animations for the LF-1 PCE plume, explained that PCE really isn't seen in the CS-23 plume, and reviewed the modeling results: plume separation is predicted to occur by around 2019; cleanup between the base boundary and Route 28 is predicted to occur by around 2029; and cleanup west of Route 28 is predicted to occur by around 2034.

Ms. Forbes also stated that the IRP routinely looks at system performance and changes in plumes over time in order to optimize systems so that they run as efficiently as possible, reduce cleanup timeframes, and save money. She then reported that system optimization modeling was conducted (with increased pumping rates at EW-2, EW-6, and EW-7) and it was determined that the LF-1/CS-23 system already is running in an optimized state. She also noted, however, that monitoring data will continue to be reviewed and the system will be optimized in the future as appropriate. Ms. Forbes then spoke about monitoring network optimization, which involves looking for and addressing any data gaps in the network, identifying monitoring wells that can be eliminated from the network or their monitoring frequency decreased, and looking at removing analytes. She noted that the IRP has recommended eliminating sampling for perchlorate at the three LF-1 wells where that has been occurring, and is still in discussion with the regulators about this and other recommendation regarding optimization of the monitoring network.

Mr. Goddard asked if monitoring is being done for RDX and HMX. Ms. Forbes replied that it is not, although some explosives monitoring was conducted a very long time ago, and no explosives were detected in the LF-1 plume. Mr. Goddard inquired about any explosives monitoring associated with the uncapped portions of the landfill. Ms. Forbes replied that a year's worth of monitoring data there showed no detections of perchlorate, explosives, and the like. Mr. Goddard also asked Ms. Forbes to confirm that breakdown goes from TCE to 1,2-DCE to VC, and that the treatment system captures VC, which she did. Mr. Goddard then asked if there are other indicators of natural attenuation occurring. Ms. Forbes replied that the IRP used to monitor for some inorganic parameters, which were detected, but no longer does that type of monitoring.

Ms. Forbes then continued with her presentation by reviewing a slide entitled "Simulated Hydraulic Impacts of the LF-1/CS-23 System on Nearby Surface Water Ecosystems", which noted the following: wellfield design modeling conducted for the additional LF-1 extraction well and the two CS-23 extraction wells indicated that the system would cause drawdown of Spectacle Wetland (1.8 foot) and of Vernal Pool #651 (1.4 foot) in excess of the Technical Review and Evaluation Team (TRET) guideline (0.2 foot); wellfield design modeling indicated combined hydraulic effects of the expanded LF-1/CS-23 system and preexisting nearby CS-10 system infiltration trenches would cause mounding at Edmunds Pond (1 foot), Osborn Pond (0.8 foot), and Spit Pond (0.4 foot) in excess of the TRET guideline (0.5 foot); and an investigation was conducted to evaluate the actual hydraulic effects on these ecosystems of the "as-built" LF-/CS-23 system and whether there were any consequent ecological impacts. Ms. Forbes then showed a figure depicting the modeled drawdown and mounding at the surface water bodies.

Ms. Forbes reported that the investigation at Spectacle Wetland and Vernal Pool #651 showed an observed maximum water level drawdown of 1.3 feet, which exceeded TRET guidelines, but vegetation and wildlife habitat studies indicated that there were no impacts from that drawdown from 2006 to 2007. She also noted, however, that because it's uncertain whether the observed water level changes will impact the future health of the

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two ecosystems, the IRP's recommendations are to continue taking biweekly and monthly water level measurements, and to continue conducting annual vegetation and wildlife surveys and talk with the Falmouth Conservation Commission and the Massachusetts Division of Fisheries and Wildlife (MDFW). Ms. Forbes also reported that rather than mounding (as predicted by the model) field data pertaining to Edmunds, Osborn, and Spit Ponds suggested minor drawdown (0.4 foot), which does not exceed TRET guidelines. She further noted that there was no evidence that pond vegetation and wildlife habitat were affected between 2006 and 2007; therefore, no further hydraulic or ecological monitoring of the three ponds is recommended.

Ms. Forbes also reported that in response to a request from MDFW (due to its concerns about plume treatment construction areas in the Crane), the IRP asked the Camp Edwards Natural Resources Office to conduct an invasive species study. The inspection, which was conducted in July 2007, indicated that no invasive plant species had been introduced. However, annual inspections will continue for the next two years, after which the IRP, in conjunction with the MDFW, will reassess the need for additional future inspections. Ms. Forbes also showed an aerial photograph of the areas that were the focus of the invasive species investigation.

Ms. Forbes ended her presentation with a review of the following conclusions and recommendations: modeling and monitoring data indicate that the combined LF-1/CS-23 system is capturing both plumes at the base boundary; the LF-1/CS-23 system should be operating under the current operating conditions (it's already in an optimized state); the optimized System Performance and Ecological Impact Monitoring (SPEIM) chemical monitoring program presented in the Tech Memo (but still under discussion with the regulators) should be implemented; annual vegetation and wildlife surveys at Spectacle Wetland and Vernal Pool #651 should continue; continued monitoring at Edmunds, Osborn and Spit Ponds is not necessary and should be discontinued; and invasive species inspections will be conducted annually for the next two years, after which the continued need for them will be assessed.

Mr. Goddard noted that Ms. Forbes had discussed a concern about mounding in excess of TRET guidelines at the ponds, but later talked about drawdown there. Ms. Forbes explained that that is due to the difference between wellfield design modeling and actual field measurements. Mr. Goddard asked if the model had been recalibrated. Ms. Forbes confirmed that it had. Mr. Goddard then inquired about the timeframe for conducting the vegetation surveys. Ms. Forbes replied that a baseline vegetation survey was conducted in August, but added that the goal is to do the vegetation and wildlife habitat surveys annually in April, when it's the right time to look for amphibians and egg masses in vernal pools.

Mr. Bostwick asked Ms. Forbes to talk more about why the LF-1 infiltration gallery was abandoned and replaced with a reinjection well. Ms. Forbes replied that flooding occurred at the infiltration gallery (which was expected to handle 700 gpm) very shortly after system startup in 1999. Believing it to be a capacity problem, the IRP added two infiltration trenches, which worked fine for a number of years, but over time, flooding at the infiltration gallery began to occur again and worsened over time until the system could handle only 430 gpm. Ms. Forbes noted that a number of investigations were conducted to try to figure out the problem, all of which were inconclusive. And so, rather than spend more money on investigating the problem, the IRP decided to instead go forward with the installation of a reinjection well. She further stated that the plan is to let the infiltration gallery dry out for about six months and then try putting water back in to see if perhaps the problem had been a bio-growth mat of some kind that was being fed by the moisture, but no longer causes an issue after the gallery is completely dried out.

Mr. Bostwick then asked if there are any ongoing eco-studies in the harbors to see if they are being affected by the plume discharge. Ms. Forbes replied that the contaminant concentrations upwelling into the harbors are below ambient water quality criteria, and therefore are not expected to affect any of the ecosystems there. She also noted that in the past the Massachusetts Department of Public Health (MDPH) conducted two rounds of shellfish studies, which found no plume contaminants in the tissues of the shellfish. She added that there's really no impact from the discharge to the harbors.

Mr. Taylor inquired about the flow rate and depth of reinjection at the reinjection well. Ms. Forbes replied that the current flow rate is 540 gpm, the depth is more than 100 feet, and the well screen is very long, perhaps about 89 feet. She also noted that it is an 8-inch diameter well, so can handle a great deal of water.

Mr. Dow asked what type of wildlife surveys were conducted at the vernal pools. Ms. Forbes deferred the question to Ryan Loveridge from CH2M Hill, the contractor who conducted the surveys. Mr. Loveridge said that

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he looked at amphibians and vertebrates at the vernal pools and did vegetation transects on the slope bordering the pools. Mr. Dow asked if there was an effort to look for state-listed dragonflies that are found in some of vernal pools. Mr. Loveridge replied that he did look for the state-listed dragonflies at the vernal pools but did not observe them. Mr. Dow then said that he thought Ms. Forbes had mentioned that the vernal pool surveys were conducted in August. Ms. Forbes clarified that the amphibian survey was done in April and the baseline vegetation survey was done in August. Mr. Dow then asked when the wildlife and vegetation surveys were conducted at the ponds. Mr. Loveridge replied that they were done at the same time as the vernal pools, in August 2006 and April 2007. Mr. Dow then asked if any state-listed plant species were identified at the ponds, and Mr. Loveridge replied that none were.

Mr. Field asked if any PCT/IART members want to offer feedback on the length or amount of detail of the LF-1/CS-23 presentation. Mr. Goddard said that he thought it was “a good level of detail.” He also asked if a final Record of Decision (ROD) had been issued for these plumes, and Ms. Forbes confirmed that it had.

### ***CS-10 Leading Edge Update***

Ms. Forbes showed an IRP plume map and pointed out the plume lobes that make up the leading edge of the CS-10 plume. She then reminded the group that the IRP is looking to award a construction contract in August for work at the CS-10 Southern Trench area and at the Ashumet Valley plume. She also noted that the IRP has been gathering additional data at two locations to help make a final remedy decision on the CS-10 North-Central Lobe and the CS-10 plume as a whole. She further noted that the RPMS had a comment-resolution meeting today regarding the draft CS-10 Feasibility Study (FS), that a presentation on the CS-10 FS is planned for a near future PCT/IART meeting, that the CS-10 Proposed Plan is scheduled for the September/October 2008 timeframe with a 30-day public comment period, and that the CS-10 ROD is scheduled to be issued in the June/July 2009 timeframe.

Ms. Forbes stated that the additional data points are located in Mashpee along Hooppole Road and along Algonquin Road. She then reported that the drive-point at Hooppole Road yielded nondetect results in the first (ten or so) sampling intervals, followed by detections of TCE (at 17.9 and 7.3 µg/L). She reminded the group that the MCL for TCE is 5 µg/L, and also noted that well screens were set at the intervals where TCE was detected. Ms. Forbes then showed “CS-10 Leading Edge Cross-Section A-A” and pointed out the Northern Lobe, the North-Central Lobe, and the new drive-point location, the results from which fit the conceptual model very well, such that the plume depiction did not have to be changed based on that data. She also reported that the second data point, located on Algonquin Road between Algonquin Pond and Martha’s Pond (in the area east of Johns Pond), yielded all nondetect results. She noted that this was expected and said that the well was really installed more for vertical analysis, as part of a focused synoptic event.

Mr. Dow referred to cross-section A-A' and asked if the 17.9 µg/L detection in the upper part of the North-Central Lobe and the 17.8 µg/L detection in the lower part of the North-Central Lobe suggest that there are two different plumelets – one deep and one shallow. Ms. Forbes replied that some parts of the plume are heterogeneous. She also mentioned the (6.1 µg/L) detection between the 17.9 and the 17.8 and said that it makes sense to continue to map the North-Central Lobe as one continuous lobe. She also explained that mapping isn’t done based on just new data; rather, all other existing data are also taken into account.

Mr. Dow then questioned whether the low-conductivity units, shown in the cross-section figure, would cause pump-and-treat technology to be ineffective in achieving below-MCL concentrations at the leading edge of the plume. Ms. Forbes replied that there’s enough transmissivity through that aquifer to be able to pull up the contamination; since it was possible to pull the sample that yielded the 17.9 µg/L result, it would be possible to pump that section of the aquifer. Mr. Dow then remarked that the depictions in the cross-section figure seem to show that the 17.8 µg/L and 17.9 µg/L detections come from “drastically different transmissivities.” Ms. O’Reilly of CH2M Hill noted that no lithological data were collected when the drive-point boring was being done – only groundwater screening data. She explained that some of the lithology shown on the figure might be inferred from one location to the next, and reminded Mr. Dow that, as Ms. Forbes had mentioned, there is some heterogeneity there. Ms. O’Reilly stated that the lithology in the cross-section was not updated based on the drive-point.

### ***Ashumet Valley Feasibility Study Alternatives Update***

Mr. Minior reminded the group that because the Air Force Center for Engineering and the Environment (AFCEE) and the regulatory agencies had been unable to come to an agreement on a remedy for the Ashumet Valley

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Proposed Plan, last summer they released for public comment both the Proposed Plan document, which put forth AFCEE's preferred remedy, Alternative 6, and an Explanation of Concerns (EOC) document from the U.S. Environmental Protection Agency (EPA) in consultation with the Massachusetts Department of Environmental Protection (MassDEP), which put forth Alternative 7 as a preferred remedy. After having reviewed the comments submitted during the public comment period, AFCEE and the regulators were still unable to reach consensus. Rather than take the step of dispute resolution as outlined in the Federal Facilities Agreement (FFA), the decision was made to collect some additional data over the winter in order to try to answer the question of whether there is a more cost-effective option that includes active removal (in the southern part of the Ashumet Valley plume).

Mr. Minior noted that Alternative 6 involved continuing to run the one operating extraction well in the existing Ashumet Valley treatment system and letting the southern portion of the plume go uncaptured, while Alternative 7 involved an additional two extraction wells in the southern part of the plume, to be piped back to the existing treatment plant. He also said that the additional data that were collected (and presented to the PCT in February) identified the location of the higher concentration areas, and it was found that the mass distribution, based on the concentration data, was different than previously thought. Mr. Minior showed a figure entitled "Ashumet Valley Leading Edge Area" and pointed out areas of PCE contamination in the 50 µg/L range, Old Barnstable Road, Hayway Road, the cranberry bogs, and Mill Pond.

Mr. Minior also reported that a number of additional cleanup alternatives were developed and then reviewed at the February PCT meeting. And after additional discussion with the agencies, AFCEE narrowed that group of alternatives down to one that looks like it will achieve some cleanup at a reasonable cost. The alternative involves a mobile treatment unit (MTU) – and therefore a shorter pipeline run, one additional extraction well located toward the leading edge of the higher concentrations in the southern part of the plume, pumping at 175 gpm, and discharge of the treated water into the Backus River.

Mr. Minior then showed a modeling animation of Alternative 6, using the updated plume depiction, and noted that cleanup between Route 151 and Hayway Road is predicted to occur around 2019, and cleanup south of Hayway Road around 2023. With the old plume depiction, however, Alternative 6 was predicted to clean up the plume south of Hayway Road around 2035. He also showed the animation for the new alternative, what he called "Alternative 8/Modified Alternative 7," and noted that cleanup between Route 151 and Hayway Road is again predicted to occur around 2019, while cleanup south of Hayway Road is predicted to occur around 2021. He noted that the additional well in the southern part of the plume is expected to save two years of cleanup time and capture almost 30 more pounds of contaminant mass.

Mr. Minior also reviewed next steps: a briefing to the Falmouth Board of Selectmen at their meeting on July 7, 2008; a neighborhood meeting on July 8, 2008 at the Unitarian Universalist Fellowship on Sandwich Road in Falmouth; awarding of a contract to do the construction work, ideally in late August/early September; and construction of the system in the southern part of the plume, which would occur in advance of the formal ROD. Mr. Minior explained that AFCEE has some additional funds this fiscal year that it would like to get under contract, and let the formal paperwork "catch up" later on.

Ms. Jennings confirmed that EPA is endorsing Modified Alternative 7, and she said that she would provide the rationale for that endorsement. She then reviewed the reasons EPA had listed for preferring Alternative 7 in the EOC fact sheet that was issued with the Ashumet Valley Proposed Plan last summer: the alternative provided active restoration in the southern portion of the plume; Alternative 7 was expected to capture more mass (174 pounds more) than Alternative 6; Alternative 7 was expected to achieve cleanup 11 years sooner than Alternative 6; an extraction system in the southern part of the plume would alleviate concerns regarding uncertainty about the direction the plume would actually migrate and regarding uncertainties in the model; active treatment in the southern part of the plume would make the decision more consistent with other plume decisions at MMR; and EPA believed that Alternative 7 better met the nine cleanup criteria in the National Contingency Plan (NCP).

Ms. Jennings went on to state that once AFCEE and the regulators reached an impasse after the public comment period on the Ashumet Valley Proposed Plan, AFCEE had suggested that going forward with Alternative 7 would involve a design investigation to determine exactly where the additional wells would be placed. That investigation was a very important step in the process because it ended up demonstrating that the mass distribution was very different from what it was believed to be, which allowed for consideration of other alternatives that weren't obvious last fall. Ms. Jennings then said that EPA considers the alternative currently being put forth by AFCEE to be a modified version of last year's Alternative 7, utilizing one new extraction well

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rather than two, but achieving the same objectives. She noted that EPA supports Modified Alternative 7 because: it's predicted to remove 91 pounds of contaminant mass versus Alternative 6 (new), which is predicted to remove 64 pounds of mass; EPA believes that even more mass will be captured than what the model is predicting; Modified Alternative 7 is predicted to achieve cleanup two years sooner than Alternative 6 (new) plus AFCEE agreed to move very quickly to get the system in place, which will shave a couple more years off the restoration time; EPA still sees considerable uncertainty in the model predictions and therefore is particularly in favor of active restoration in the southern part of the plume; EPA believes that Modified Alternative 7 is consistent with other MMR plume decisions; and the alternative is the best selection based on the nine NCP criteria.

Ms. Jennings also said that the RPMs want to hear any concerns, comments, questions that the PCT/IART has, and she noted that the plan is to respond to all the comments that were received during the public comment period in a responsiveness summary that will be part of the ROD. She also mentioned meeting with the Town of Falmouth, which had vocalized many concerns that she believes can be addressed.

Mr. Pinaud said that he's sure everyone is aware that MassDEP has had many issues with AFCEE's modeling of the Ashumet Valley plume, and after many month of discussing these concerns with AFCEE, the regulatory agencies were ready to enter into a dispute resolution process that probably would have taken years to conclude. He also noted, however, that MassDEP has looked at the alternative put forth by AFCEE a few weeks ago (Modified Alternative 7) and believes that it would be in the public's best interest to move forward with this option. He said that the alternative is consistent with MassDEP's position regarding extraction in the southern portion of the plume and the speed at which AFCEE plans to install the well "will shave a few years off the beginning of pumping and create additional mass capture in the restoration timeframe." Mr. Pinaud also said that although MassDEP normally waits to hear from the public before articulating its position, in this case MassDEP thinks it's important to verbalize its agreement with AFCEE's proposal to move forward with Modified Alternative 7. He further noted, however, that before making a final endorsement – other than hearing public feedback, MassDEP also wants to touch base with the Falmouth selectmen (at their meeting on July 7) to answer any questions there might be with respect to the town's future plans for wastewater treatment and to make certain that the town does not object to the idea. Mr. Pinaud reiterated that MassDEP believes that Modified Alternative 7 is in the public's interest and would like to have the PCT/IART's support.

Ms. Rielinger asked if AFCEE had considered locating the new extraction well a littler farther north, into the higher concentration areas. Mr. Minior replied that AFCEE's primary concern when selecting the location was ease of access, given the projection of where the mass would be traveling. Ms. Jennings added that while access probably was the primary reason for selecting the well location, a number of earlier alternatives that included additional wells farther north showed that it wouldn't have made "much of a difference in terms of shaving off time..." Mr. Field added that the program's experience with constructing the Southwest Plumes treatment systems was instructive in terms of how much access problems can slow down a cleanup project. So in order for AFCEE to achieve its goal of installing this system quickly, access "has to be really accessible."

Ms. Rielinger also asked about any drawdown concerns associated with Modified Alternative 7. Mr. Minior replied that although potential drawdown hasn't yet actually been determined, preliminary indications are that drawdown will not be an issue. Ms. Rielinger also asked if the "drastic change" in the cleanup timeframe for the area north of Route 151 was the result of new data. Mr. Minior replied yes, the contamination goes away sooner because there isn't as much mass as previously thought.

Mr. Goddard asked if it's correct that the treated water from the new extraction well would be discharged to the Backus River. Mr. Minior confirmed that the water would be discharged through a bubbler system in the river. Mr. Goddard then asked if this method of discharging the treated water would alleviate Falmouth's concerns about the possibility of the cleanup system affecting the planned wastewater treatment system. Mr. Pinaud confirmed that that was one of the Town of Falmouth's concerns, and added that he's hopeful that the town will not have concerns with Modified Alternative 7. Mr. Goddard said that he too hopes that Modified Alternative 7 satisfies the town's concerns about its future plans for wastewater treatment.

Mr. Goddard also remarked that he found the "difference in the data" to be a bit surprising and asked if there was a simple answer to explain that. Mr. Tindall of CH2M Hill replied that it was really a question of data density – that is deciding how extensive elevated concentrations might be between monitoring points. Mr. Goddard further noted how pleased he is that AFCEE is using an MTU for the southern plume system. He indicated that he thinks this approach provides flexibility to the cleanup program for future consideration, "gets things done quicker," and



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“bodes well for the synergies between the two programs.” He also said that he is wholeheartedly in favor of moving forward as quickly as possible.

Mr. Dow inquired about the estimated percentages of uncaptured mass in the southern portion of the Ashumet Valley plume that upwells into the Backus River versus that which naturally attenuates. Mr. Minior replied that he does not have that breakout, but would get back to Mr. Dow and the team with that information. Ms. Jennings noted that it’s important to remember that a lot of the contaminant mass is well below the drinking water standard in a very large volume of water, and what’s being targeted is that part of the plume that’s above the drinking water standard. She further stated that the mass differential is complicated, and she thinks it would be worthwhile to try to do a better job of characterizing that before the July PCT/IART meeting. Mr. Minior agreed to see that that was done.

Ms. Rielinger asked if the 24% mass removal under Modified Alternative 7 (noted in the summary chart contained in the presentation handout) represents the percentage of mass that will be removed by the new alternative compared to the original plume mass. Mr. Minior replied that approximately 376 pounds of mass currently remains in the plume, and it’s predicted that Modified Alternative 7 will result in the removal of 91 pounds of mass, which is basically 24% of that 376 pounds. He also noted that based on the old (2005) plume shell there were about 470 pounds of mass remaining. Mr. Goddard said that he thinks it’s important to clarify and be very specific about what the old data indicated versus the new data.

Mr. Karson said that he wanted to clarify that AFCEE is on the Falmouth selectmen’s July 7, 2008 meeting agenda at 7:30 p.m., and the neighborhood meeting on July 8, 2008 at the Unitarian Universalist Fellowship on Sandwich Road in Falmouth will begin with a 6:00 p.m. posterboard session to be followed by a presentation at 6:30 p.m., and will cover both the Ashumet Valley plume construction and the CS-10 extraction well installation by the boat ramp on Currier Road. Mr. Karson also noted that there would be a news release and paid advertisement regarding the neighborhood meeting, and that he would be sending out postcard invitations to targeted mailing lists and a reminder email to PCT/IART members later this month.

### **Agenda Item #3. Small Arms Ranges Update**

COL FitzPatrick reported that since August 2007 nearly 42,000 rounds have been fired at Tango Range, by the Massachusetts Army National Guard (the Guard), the Massachusetts Air National Guard, the U.S. Army Reserve, and the U.S. Coast Guard. He also noted that Tango Range is a 25-meter bermed range with a STAPP bullet catcher system, which is essentially a “rubber sandwich” with a self-sealing membrane on top that closes back on itself after a bullet passes through.

COL FitzPatrick then discussed the Tango Range management plan, noting that the primary method of management is visual. He noted that this involves visual inspections of the STAPP system’s components, including the boxes at the base of the system (to protect the frame), the self-sealing membrane, the water collection, and the plywood wall at the top of the system. He also noted that actual training activities have been observed and followed up with visual inspections. The secondary aspect of Tango Range management is scientific – soil sampling (annual), monitoring well sampling (annual), and soil pore water sampling (quarterly). COL FitzPatrick stated that so far the management methods “are going well” and the Guard is quite confident with the system.

COL FitzPatrick also reported that sampling of the three lysimeters initially installed at the base of the STAPP system (before firing was resumed) showed a high value of lead, which prompted the installation of some additional lysimeters. He then informed the group that there have been some problems with the seams due to improper handling of the glue when the system was first built, and consequently the system had collected more water than anticipated. He noted that a port was built into the system in order to easily check on the status of water collection on a weekly or bi-weekly basis and pump out the water if needed. COL FitzPatrick also said that although the seam problems have been resolved, the system is still collecting some water, which is being managed. He further noted that the plywood at the top of the STAPP system was added in May of this year in order to determine how many rounds might be going further downrange, beyond the system. He reported that 33 holes have been found in the plywood, which is about 0.2% of the 30,000 rounds that were fired since the plywood was added. He also mentioned that the mounds at the firing line have been knocked down so that the firers have a more level angle from which to fire and fewer rounds end up being shot over the system.

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COL FitzPatrick then reviewed a slide entitled “Tango Range Report Status”: quarterly reports, as required by EPA and the Environmental Management Commission (EMC) as part of their conditional approval to resume firing lead at Tango Range, were submitted in September and December 2007 and March 2008; the Tango Range Operation, Maintenance, and Monitoring Plan (OMMP), a living document that addresses how the range is being managed, was updated in December 2007 and distributed in January 2008; a Periodic Review Report, which looked at the first five months of Tango Range operation and improvements, was completed in February 2008; and an Interim Pilot Program Report/Lessons Learned Report, to which EPA and the EMC will refer when considering approval for firing lead at Juliet & Kilo Ranges, was completed in May 2008.

COL FitzPatrick also reviewed a slide entitled “Tango Range Best Management Practices: OMMMP Performance Assessment,” which included the following statements: the Tango Range OMMP is an effective living document to manage the training activities on Tango Range with STAPP; the Massachusetts National Guard is satisfied with the performance of STAPP on Tango Range; based on the experience gained from July 2006 through July 2007 and the observed training from August 2007 through today, May 2008, the STAPP bullet catcher system is a positive environmental tool; and STAPP is an effective system for Tango, Juliet & Kilo Ranges. COL FitzPatrick also mentioned the ongoing nitroglycerin studies (batch and column tests) being undertaken to determine how nitroglycerin could potentially be managed on the ranges.

Mr. Dow asked if any of the six dinitrotoluene (DNT) isomers had been detected at the firing line. COL FitzPatrick replied that for the Guard’s sampling, no, but he doesn’t know what the Impact Area Groundwater Study Program (IAGWSP) is doing. Ms. Jennings stated that currently sampling is being done for just two of the six isomers, 2,4-DNT and 2,6-DNT. Mr. Dow noted that all six isomers had been detected at the Badger Army Ammunition Plant in Wisconsin and the risk assessment conducted by the state’s department of public health (DPH) determined that the preliminary target level of concern for all six isomers would be 0.5 parts per billion (ppb), which he believes is about hundred times less than the COCs being measured at the ranges. Mr. Dow said that he thinks it would be useful to contact the Wisconsin DPH on this issue.

Ms. Jennings replied that EPA is in the process of doing so. She noted that EPA risk assessor Sarah Levinson is coordinating with EPA Headquarters on a suggested standard or information by which a risk-based standard could be calculated, and is also looking into the information that the state of Wisconsin utilized to establish the 0.5 ppb standard. Mr. Dow mentioned that he had also raised this subject at the May SMB meeting, and MassDEP’s Millie Garcia-Serrano said that the state is looking at this issue. He encouraged EPA and MassDEP to coordinate their efforts in this regard. Mr. Pinaud told Mr. Dow that Ms. Garcia-Serrano had contacted Carol Rowan-West, the chief of MassDEP’s Office of Research & Standards regarding this issue, although he has no feedback to share as yet. He also assured Mr. Dow that MassDEP and EPA always work together on these types of issues.

Mr. Dow then asked about soil and soil pore water sampling being done at the firing line. COL FitzPatrick replied that there are currently three lysimeters along the firing line, which have been sampled at least three times; the filtered samples all came back nondetect. Mr. Dow then asked if the groundwater monitoring well is downgradient of the firing line. COL FitzPatrick clarified that there are two groundwater monitoring wells at Tango Range – one on the north side of the berm, and another “near the tower itself” – both of which have come back nondetect. He also referred to the soil sampling locations and said that the soil values were very low, much lower than the action levels the Guard is using.

Mr. Dow noted that a report about Tango Range that the Guard submitted to EPA and DEP mentioned some problems associated with the lysimeter sampling and he asked if that pertained to the lysimeters at the STAPP system or the ones at the firing line. COL FitzPatrick reiterated that one of the first-installed lysimeters (at the STAPP system) had a high detection of lead and so several additional lysimeters were installed and some soil sampling was conducted. However, the soil sampling never provided any indication as to why that lead value was seen in the lysimeter. He also noted that sampling of the additional lysimeters that were installed came back nondetect, and that it hadn’t been possible to get enough water out of one of the lysimeters at the firing line to get a true sample. COL FitzPatrick further noted that the Guard is probably going to install a couple more lysimeters on the range floor, where the mounds were knocked down.

Mr. Dow said that the Sierra Club has always supported multiple-layer monitoring programs, and then asked if the Guard has some kind of management actions in place should there be detections of COCs in lysimeters that would indicate the contaminant has moved from the surface soil into the soil pore water. COL FitzPatrick replied

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yes, and noted that the Tango Range OMMP includes tables for soil, soil pore water, and groundwater sampling, which identify various action levels. He also assured Mr. Dow that the last place the Guard wants to see contaminant is in a groundwater well, and is therefore engaged in management activities to “catch anything at that point before it ever becomes a problem.”

Mr. Dow then said that he presumes that the fate & transport model provides some idea of the transit time from surface soil to soil pore water, and that a calculation was done with regard to lead values in soil. COL FitzPatrick replied that the number calculated for lead in soil is near 10,000 parts per million (ppm), but soil results showed values of less than 100 ppm.

COL FitzPatrick continued his presentation by discussing the Guard’s effort to obtain approval to fire lead at Juliet & Kilo Ranges. He noted that last year’s Department of the Army/National Guard Bureau mission change for deploying soldiers for shorter time periods (12 months, rather than 18 months) caused the Guard to decide not to immediately pursue approval for firing at Echo Range (a combat pistol course) and instead focus on Juliet & Kilo Ranges (25-meter ranges) because all soldiers have a rifle, but not every soldier has a pistol. Based on the success that’s been seen at Tango Range, the Guard’s plan is to also use STAPP systems at Juliet & Kilo Ranges.

COL FitzPatrick showed an aerial view of Juliet & Kilo Ranges and noted that the Guard had gotten approval to move the berm at Kilo Range to be in line with the berm at Juliet Range so that the ranges could be operated more safely side-by-side. He also noted that the STAPP systems at these ranges would be built so that base of the system is below the range floor; therefore, boxes like those used to protect the base of Tango Range STAPP system may not be necessary. He further noted that soil and soil pore water sampling will be conducted at these ranges, and that groundwater monitoring wells are already in place.

COL FitzPatrick informed the group that the Guard filed another Notice of Project Change (NPC) after deciding to go after Juliet & Kilo Ranges at this time, rather than Echo Range. He also mentioned a number of past and future events for information outreach associated with the process to obtain approval to fire lead at Juliet & Kilo Ranges, including Command Group Meetings, EMC meetings, SMB meetings, EMC’s Community Advisory Council meetings, Small Arms Range Update public meetings, EMC’s Science Advisory Council meetings, PCT/IART meetings, Tango Small Arms Range tours, and various articles published in the Cape Cod Times and Enterprise newspapers. He also noted that the Guard’s petition requests to EPA and the EMC will be out later this summer, and that the IAGWSP’s investigation/potential remediation of Juliet & Kilo Ranges is about 90% complete. COL FitzPatrick further noted that there are still some tungsten and nitroglycerin issues associated with the two ranges, and the Guard will probably conduct removal actions to address some of the tungsten on Juliet Range and some of the nitroglycerin on Kilo Range.

COL FitzPatrick concluded his presentation by reviewing a slide entitled “Juliet & Kilo Range Construction/Operational Timeline,” which noted the following: EMC vote on May 28, 2008; investigation and remediation completed in June 2008; berm construction and STAPP installation in July 2008; petitions to EPA and EMC for approval to fire in July/August 2008; EPA conducts public comment period on the Guard’s request to modify the Administrative Order #2, including public meeting, in August 2008; #2, and approved use to train with lead ammunition on Juliet & Kilo ranges with installed capture systems in September 2008.

Mr. Goddard asked if MMR is the first base in the country to utilize the STAPP system for firing lead ammunition. COL FitzPatrick informed him that the Department of Defense (DoD) has been looking at a variety of containment systems for small arms ranges for a number of years. He also mentioned that the Tango Range system originally came to MMR as part of a Department of the Army demonstration & validation for tungsten/nylon ammunition. COL FitzPatrick said that a variety of capture systems exist (including rubber block and concrete block systems) and each installation has to assess on its own what the best methods of management are for their sites. He also noted that the STAPP system is a Swedish-based system that’s been used on small arms ranges there for about 15 years and has also been used successfully at Fort A.P. Hill in Virginia, at Fort Drum, New York, and in Yuma, Arizona. Mr. Goddard suggested that use of the STAPP at MMR could have implications for other bases. COL FitzPatrick agreed and also mentioned police force and private ranges as well.

Mr. Goddard also inquired about the purpose of lysimeters. COL FitzPatrick explained that lysimeters are used to measure the water that’s traveling through the soil. He also noted that the lysimeters at Tango Range go down five to eight feet deep.

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Because the meeting was running late, the group agreed to postpone the remaining agenda items until the July meeting, with the exception of the J-3 Range Plume update.

#### **Agenda Item #4. IAGWSP Remediation & Investigation Updates – J-3 Range**

Mr. Gregson showed a map of MMR and pointed out the Central Impact Area (CIA), the Southeast Ranges, and the base boundary with Sandwich's Forestdale neighborhood. He noted that the Southeast Ranges were used for certain types of military training in the 1940s and 1950s, and then transitioned into contractor testing ranges used by companies such as Avco, Hesse Eastern, and Textron, which were under contract to test munitions. Mr. Gregson stated that the IAGWSP has found a number of disposal and burn pits at the Southeast Ranges, which are suspected source areas for groundwater plumes. A number of the source areas were removed four years ago and the excavated soil treated in a thermal treatment system, and now the IAGWSP is conducting additional investigations to see if additional source areas can be identified.

Mr. Gregson referred to an 11" x 17" map entitled "Southeast Ranges Groundwater Rapid Response Action Treatment Systems and Monitoring Networks," advised team members to save this map and bring it to future meetings, and pointed out Snake Pond, the IRP's Fuel Spill 12 (FS-12) plume on the northern side of Snake Pond, and the radial groundwater flow pattern due to the location of the Southeast Ranges at the top of the groundwater mound. He noted that the J-1 North plume heads northwest, the J-2 North plume heads more to the north, the J-2 East plume heads northeast, the J-1 South plume heads southeast, and the J-3 Range plume heads south. Mr. Gregson also pointed out that the existing treatment systems at the Southeast Range plumes are generally laid out such that the extraction wells run down the center of the plume, with reinjection wells off to the side of the plume. He also noted that RDX contamination (an explosives compound) is depicted in gold/brown colors, and perchlorate contamination (an oxidizer found in propellants) is depicted in pink/red colors.

Mr. Gregson stated that RDX and perchlorate are the two main COCs at the Southeast Range plumes, although low levels of other explosives such as DNT breakdown products are also seen sometimes. He also noted that there is no MCL for RDX, but the IAGWSP uses a risk-based level of 0.6 ppb (the  $10^{-6}$  risk level) to evaluate its treatment systems and plume contaminants. He further noted that the state recently came out with a Method 1 Standard groundwater cleanup number of 1 ppb for RDX, and has a risk-based number that would be around 6 ppb. In addition, Mr. Gregson reported that although there is no federal MCL for perchlorate, the MMCL for perchlorate in drinking water is 2 ppb.

Ms. Jennings remarked that although she thinks that the 11" x 17" map is a "great figure," she would recommend improving it by finding a way to better distinguish the extraction well symbols, which in some cases seem to be buried by the symbols representing monitoring wells. Mr. Gregson agreed to see that that improvement is made.

Mr. Gregson continued with his presentation by noting that the J-3 Range plume is the most southerly of the Southeast Ranges plumes, and its source was in the center of the J-3 Range, an area where disposal pits, burn pits, and targets were located. He also said that the J-3 Range plume source area was removed as part of Rapid Response Actions (RRAs) conducted at this range, which is about 300 feet wide and about 3,000 feet long.

Mr. Gregson also pointed out on the map the location of Former H Range, a mortar firing position on the northern part of Snake Pond, from which mortars were fired into the J-3 Range area. He said that as result, some unexploded ordnance (UXO) and other munitions from the history of range use as a military training area are found at the J-3 Range. He also noted that when the thermal treatment unit was on base and the IAGWSP took that opportunity to remove known source areas, about 3,500 tons of soil from the J-3 Range was removed and treated, which is thought to be the majority of the source area.

Mr. Gregson continued by noting that the J-3 Range plume is about 4,000 feet long, 1,000 feet wide, and is at depth of about 135 feet in the aquifer. Contaminant concentrations are relatively high, with the highest-ever perchlorate concentration in the program (770 ppb) having been detected in the J-3 Range plume, although the maximum perchlorate detection in the plume is now about 229 ppb. He also reported that RDX concentrations are somewhat lower, with a current and historic maximum of around 35 ppb.

Mr. Gregson stated that because the toe of the J-3 Range plume is right at the edge of Snake Pond, over the years the IAGWSP has been taking water samples from the pond, but test results have never yielded any detections of explosives or perchlorate. In addition, the IAGWSP has conducted a good deal of drive-point work and well

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installation at the toe of the plume and beneath the pond, but the plume has not been seen to be discharging into the pond in any detectable concentrations.

Mr. Gregson then noted that the existing J-3 Range plume treatment system was installed as part of an RRA, which is an interim action, in fall of 2006. The RRA system involves three extraction wells pumping at a combined rate of 175 gpm (one in the center of the plume, and two by the toe of the plume, one of which was originally installed but never used by the IRP as part of the FS-12 treatment system), an IAGWSP treatment system (ion exchange to remove perchlorate and GAC to remove RDX) located in a corner of the IRP's FS-12 treatment plant, and reinjection of the treated water through FS-12 system reinjection wells. Mr. Gregson also displayed a J-3 Range plume cross-section for perchlorate and one for RDX and pointed out the source area and the extraction wells.

Mr. Gregson modeling animations, noting that RDX contours are 0.6 ppb, 2, ppb, 6 ppb, 20 ppb, and 35 ppb, and perchlorate contours are 2 ppb, 10, ppb, 20 ppb, 50 ppb, and 100 ppb up to the higher concentrations. He ran the animations and noted that with the existing system, cleanup of the RDX is predicted to be achieved around 2024 and cleanup of the perchlorate is predicted to be achieved around 2029/2030. He also stated that the treatment system has only been running for a little more than one year, but is estimated to have removed about one pound of RDX and two pounds of perchlorate. He also showed photographs of some of the treatment system components, including some influent piping for the extraction wells, the treatment vessels, and a monitoring panel in the treatment plant.

Mr. Bostwick asked if the IAGWSP is going to be installing a permanent system for the J-3 Range plume. Mr. Gregson replied that the program is working through finalizing the feasibility study for the plume and has looked at a number of different alternatives, one of which involves just increasing the pumping rate of the center extraction well. He added that it turns out that everyone is in agreement that that should be final remedy, and the pumping rate of that well already has been increased. Mr. Bostwick asked why the perchlorate contamination took so much longer to clean up in the animation. Mr. Gregson replied that he thinks it's really a function of the plume mass, with the concentrations of perchlorate being so much higher than the RDX concentrations.

Mr. Goddard asked if the FS-12 treatment plant facility could be expanded further, should the IAGWSP decide to tie part of a J-1 South plume treatment system into it. Mr. Gregson replied that there's already an MTU on the J-1 South plume, which turned out to be more cost-effective than piping the extracted water over to the treatment plant.

Ms. Jennings informed the group that there are still UXO remaining on the J-3 Range and the agencies are trying to evaluate what that means for a final remedy, which is why a final decision document hasn't been issued yet. She also noted that the UXO issue is complicated and involves many uncertainties, and she expects it will take many "senior managers within all of our organizations" to reconcile the UXO issue. She also said that the agencies will be reporting to the PCT/IART on the UXO issue as progress is made. Mr. Goddard questioned whether the problem is that the UXO can't be removed, and he mentioned the use of robotics technology. Ms. Jennings replied that it's a matter of cost to remove, and added that it hasn't been determined yet whether robotics will do everything efficiently in terms of UXO removal. She also said that while she doesn't think it's possible to ever remove everything, the agencies are trying to determine whether it makes more sense to go after high-density areas, try to do footprint reduction, go after the UXO that are scattered about, and so forth – and agreement has not been reached.

Mr. Dow asked why, if the perchlorate and RDX plumes come from the same source, the toes of both plumes are just north of Snake Pond when perchlorate moves to groundwater faster than RDX does. Mr. Gregson replied that although he doesn't know for certain, he thinks a possible explanation would be the timing of the releases – with the RDX plume having been created before the perchlorate plume. Mr. Dow asked if perchlorate-contaminated soil was observed to be deeper than RDX-contaminated soil during the source area removal. Mr. Gregson said that he thinks they were "pretty much co-located and pretty much fairly shallow." Mr. Gonser added that the likelihood is that once the perchlorate was released it went through the soil column quite quickly and down into the aquifer. He also said that he doesn't think the IAGWSP did any statistical analysis during the soil removal action, but instead just dug until reaching nondetect, which wasn't very deep.

Mr. Dow explained that his reason for asking is that it occurred to him that there's a possibility that the RDX and perchlorate sources weren't co-located, which would explain why the RDX is farther downgradient than one

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would expect. Mr. Gregson said that he thinks that the soil investigation data and the historic records do not point to two distinct source areas, just the one area in the center of the range where disposal activities occurred. Ms. Dolan said that the hypothesis that there might have been different source areas is actually being tested, but they wouldn't have been a great distance apart ("maybe from here to the wall") and that soil sampling will be occurring within the next month or two. Mr. Field said that if the hypothesis turns out to be true, it wouldn't necessarily change the groundwater remedy.

Mr. Goddard asked if there's a groundwater plume associated with the L Range. Mr. Gregson replied that, as noted at the last PCT/IART meeting, the L Range is a subject of the robotics demonstration, using that technology to remove primarily 40-mm grenades that might be a potential future source. He also noted that the IAGWSP hasn't found much soil contamination at the L Range, but has detected some low levels of perchlorate and RDX in groundwater coming from the range.

**Agenda Item #5. Adjourn**

Mr. Field stated that the PCT/IART would meet next at 6:00 p.m. on Wednesday, July 9, 2008, at the base (1805 West Outer Road, Camp Edwards). He also reminded everyone that the Falmouth gate would be closed at that time.

Mr. Goddard mentioned the AFCEE wind turbine project and Mr. Field noted that construction for the foundation of the turbine will begin this summer, and the turbine itself will be delivered next summer. Mr. Goddard then asked if AFCEE is aware of the pending state legislation that would allow for virtual net-metering, under which the Air Force could receive kilowatt hour credits against its utility bills. Mr. Minior confirmed that AFCEE is aware of this pending legislation.

Mr. Field thanked everyone for attending and the meeting adjourned at 8:40 p.m.