

**Impact Area Review Team  
Bourne Best Western  
March 27, 2007  
6:00 – 9:00 p.m.**

**Meeting Minutes**

<b><u>Members:</u></b>	<b><u>Organization:</u></b>	<b><u>Attendees (cont'd):</u></b>	<b><u>Organization:</u></b>
Hap Gonser	IAGWSP	Kris Curley	IAGWSP
Mike Minior	AFCEE/MMR	Dave Hill	IAGWSP
Len Pinaud	MassDEP	Paul Nixon	IAGWSP
Bryan Olson	US EPA	Bill Gallagher	IAGWSP
Ron Fein	US EPA	Shawn Cody	MA ARNG
Tom Cambareri	IART/CCC	COL Bill FitzPatrick	MA ARNG/E&RC
Richard Conron	IART/Bourne	Mark Panni	MassDEP
Jim Pierce	IART/Sandwich	Jane Dolan	US EPA
<b><u>Facilitator:</u></b>	<b><u>Organization:</u></b>	Desiree Moyer	US EPA
Angela Bonarrigo	US EPA	Mark Begley	EMC
<b><u>Attendees:</u></b>	<b><u>Organization:</u></b>	Kevin Hood	UCONN/TOSC
John McDonagh	IAGWSP	Claire Leduc	student
Pam Richardson	IAGWSP	David Dow	Sierra Club
		Jim Quin	Ellis Environmental
		Amanda Lehmert	Cape Cod Times
		Jane Shea Moran	e <sup>2</sup> M

**Agenda Item #1. Welcome, Agenda Review, Approval of 1/23/07 IART Meeting Minutes**

Ms. Bonarrigo convened the meeting at 6:10 p.m. and reviewed the agenda. She asked if there were any changes to the January 23, 2007 Impact Area Review Team (IART) meeting minutes. No changes were offered and the minutes were approved as written.

**Agenda Item #2. Late-Breaking News & Responses to Action Items**

Ms. Bonarrigo confirmed that there was no late-breaking news to report at this time. She also noted that the first presentation is being made in response to the action item from the January 23, 2007 IART meeting.

**Agenda Item #3. Perchlorate Plume Cleanup at Hyannis Fire-Fighting Training Area Update**

Mr. Cambareri displayed a map and pointed out the Barnstable County Fire Training Academy (BFTA) site, where perchlorate contamination was recently detected. He also noted that the site is located in Hyannis off of Independence Park, near Mary Dunn Road and Flint Rock Pond. He stated that the BFTA has been used for fire-fighter training since the mid 1950s, and then showed a layout of the site, where, he noted, he's been doing work since 1986. He also mentioned that the academy used diesel fuel (to simulate high-intensity flames) that was routed into the fire-training pits, the infrastructure for which at one time included a catch basin that was later upgraded to a tank. Mr. Cambareri then showed a figure depicting the site in the late 1970s and pointed out the location of nearby Flint Rock Pond, as well as the direction of groundwater flow. He also showed a figure of the site depicting hand-drawn groundwater contours spaced 50 feet apart.

Mr. Cambareri noted that a BTEX (benzene, toluene, ethyl benzene, xylenes) plume was mapped at the site in 1989, at which time traces of petroleum hydrocarbons were detected in one of the Mary Dunn wells identified as MD-3. A pump-and-treat system was installed and put into operation, after which, in 1995, notice was received of a deeper chloroform plume coming from the upgradient Cape Cod Potato Chips firm and traveling underneath Flint Rock Pond to the

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BFTA site, and the containment system was used to address the chloroform contamination as well. Mr. Cambareri also noted that the pump-and-treat system, which operated at the site from 1994 until about 2005, won an award for environmental engineering excellence in 1996. He further noted that with the addition of some new wells the containment system was used to address a methyl tertiary butyl ether (MTBE) plume at the site after the chloroform plume had been cleaned up.

Mr. Cambareri then showed a picture of the C-Sparge system installed at the site in 2006, which, he explained, puts compressed oxygen and ozone into the ground to treat contamination that remains a source of dissolved contaminants in the smear zone. He also noted that while the C-Sparge system was being installed he noticed a supply of flares at the site, which he found out were being used to ignite the straw used in training since the use of oil was stopped in 1986. Mr. Cambareri explained that boaters are required to keep three flares in their boats, but the flares expire after three years, are collected by local fire departments, and end up being integrated into the training activities at the academy. He also noted that based on his experience with the IART and therefore his familiarity with flares as a source of perchlorate, he informed the academy that it should cease using flares in its training, and the flares have since been contained in a trailer.

Mr. Cambareri then displayed a slide listing the regulatory standards associated with perchlorate. He also noted that he has been working closely with the Hyannis Water Division, which complies with the 1 part per billion (ppb) trigger level for public water suppliers to report perchlorate detections and conduct additional sampling. Mr. Cambareri then stated that the Massachusetts Contingency Plan (MCP) process is being followed with respect to the perchlorate contamination detected at the BFTA site. He also displayed a slide showing the chronology of events that led up to the start of the perchlorate investigation in mid-December 2006, the findings of which resulted in the appropriation of emergency funds to conduct the cleanup, and involvement of the Town of Barnstable's new water board. He further noted that additional field investigation is ongoing, as is groundwater modeling, and that the costs for the project (noted on the slide as \$106,000 as of February 21, 2007) include county salaries, drilling, and laboratory analysis. He also mentioned that the laboratory conducting the analysis of the groundwater samples is the certified laboratory at the Barnstable County Health & Environment Department, which provides a one-day turnaround time on the sampling results.

Mr. Cambareri showed a map depicting the perchlorate contamination and noted that 26 monitoring wells had been installed, and that the investigation also made use of the existing array of wells at the site. He also pointed out the 2 ppb contour, the location of the highest concentration detected (50 ppb), a supply well where 0.55 ppb of perchlorate was detected, and another well where perchlorate was detected at 0.2 ppb. Mr. Cambareri noted that there's a dispersed area of perchlorate in advance of the higher levels, which required explanation. He also showed a cross-section figure and noted that the depths to groundwater are about 15 to 26 feet to the water table, which is nowhere near what they are at the Massachusetts Military Reservation (MMR). He also said that the clay layers were mapped quite extensively in the 1990s, and then pointed out a clay layer about 20 feet thick as well as the supply well that "enters the collapsed stratigraphy zone of Mary Dunn Pond."

Mr. Cambareri then showed a more recent map depicting the perchlorate contamination at the site and pointed out the various detections at less than 1 ppb and a 2 ppb detection that brought about extending the plan in order to contain that area. He also explained that flares were used at the site for about nine years during which time the pump-and-treat system was operating, bringing the extracted water back to the treatment plant's air stripper, which is not designed to remove perchlorate, and then returning the water to the aquifer via leaching galleries on both sides of the site. In reference to the dispersed area of perchlorate contamination and the higher-concentration area, Mr. Cambareri said that it appears that the pump-and-treat system diluted the more

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concentrated source of perchlorate, and then the system shutdown in 2005 allowed for the migration of the more concentrated plume.

Mr. Cambareri also displayed a figure that included a particle track that appears to be heading toward MD-2 and noted that the estimated time of travel to the well is 940 days. He then showed several figures depicting various scenarios involving the zones of contribution for the Mary Dunn wells and noted that the idea was to see how those scenarios might influence the location of recovery wells. He said that the likely cleanup scenario will be with MD-2 turned off and MD-1 and MD-3 running, and then he pointed out on a figure where the recovery wells would be located.

Mr. Cambareri noted that drilling of the recovery wells is scheduled to begin over the next couple of weeks, and the system, which will utilize ion exchange to treat the perchlorate, should be up and running in April, once NStar provides the electricity to operate it. He also showed a layout of the treatment facility and pointed out the equalization tank, the booster pump, the filter, and the already-existing leaching galleries.

Mr. Gonser said that he's impressed with the speed at which the perchlorate contamination is being addressed. He also asked if any kind of flare recycling program had been initiated, although it would be good too if the flares are continuing to be collected by the fire departments and disposed of properly. Mr. Cambareri replied that the flares are still being collected by the fire departments and ending up at the training academy where they're being stored in 55-gallon drums. He noted that he would be working with the academy on their removal, however, as it's inappropriate for them to be stored in a wellhead protection area. He further mentioned having spoken to the Massachusetts Department of Environmental Protection (MassDEP) about the situation and looking into a U.S. Environmental Protection Agency (EPA) grant for toxic reductions in the community.

Mr. Minior inquired about the pumping rates of the extraction wells. Mr. Cambareri replied that the upgradient well will probably be pumped at 50 gallons per minute (gpm) and the other at 60 to 70 gpm. He also said that this would create a 200-foot capture zone and added that the plume is about 150 to 160 feet wide. Mr. Minior also asked to be provided with a copy of Mr. Cambareri's presentation slides, and Mr. Cambareri suggested that Mr. Minior contact him and he would provide the copy.

Mr. Gonser expressed an interest in the source of the Cape Cod Potato Chips chloroform plume, as the Impact Area Groundwater Study Program (IAGWSP) is looking into obtaining that company's waste to develop compost for restoration purposes. Mr. Cambareri said that he thinks the chloroform was being used for some kind of cleaning arrangement, and it's his understanding that the company, which had a septic system at the time, spilled about 2 to 4 gallons of chloroform, which resulted in the plume. He also noted that the MTBE plume had been the result of a ruptured gas tank in an old car that was on the site, and he believes that those two incidents point to the importance of stringent regulations and controls for containing hazardous materials and protecting the water supply.

Mr. Begley mentioned having been working for MassDEP at the time of the chloroform release and explained that at that time chloroform was used as a reagent in the testing that was done on each batch of cooking oil. He said that each time a test was conducted, a small quantity of chloroform was poured down the drain. Mr. Cambareri noted that Mr. Begley had been instrumental in turning the chloroform plume treatment system into a joint project between the county and Anheuser Busch, which owned Cape Cod Potato Chips at the time.

Mr. Dow asked if wellhead treatment is planned for the downgradient public water supply well. Mr. Cambareri replied that it is not because the plume will be cleaned up before that would have

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to happen, probably within a time period of about 18 months. He also noted that the Hyannis Water Division has other supply wells it can use while the cleanup is taking place. Mr. Dow spoke of the upgradient 2 ppb contamination reaching the public water supply well. Mr. Cambareri noted that the well is currently off line as a precaution, but even if it were pumping it probably wouldn't see concentrations as high as 1 ppb. He also said that the plan was extended to include that 2 ppb contamination area, however, and added that the Hyannis Water Division is very concerned about even the 1 ppb trigger level.

Mr. Gonser said that, as Mr. Cambareri's slides indicated, which production wells are running or not running could significantly impact the extraction system. Mr. Cambareri agreed and noted that the strategy is to run two of the wells to prevent offsetting the plume on one side or the other, and keep the third one off until the system has finished operating.

#### **Agenda Item #4. Massachusetts Army National Guard Small Arms Ranges Update**

COL FitzPatrick displayed a slide entitled "Who's Doing What," which showed the various ongoing processes undertaken by the Massachusetts Army National Guard (Mass Guard) to obtain approval to improve training at the Small Arms Ranges (SARs) through the use of lead ammunition. He noted that all of the components dovetail together (the Massachusetts Environmental Policy Act [MEPA] and the Acts of 2002 regarding how the state provides oversight at the northern 15,000 acres at MMR, the National Environmental Policy Act [NEPA], the Environmental Management Commission [EMC] and Environmental Performance Standard [EPSs], and EPA and the Administrative Orders [AOs]), such that there's a multitude of ways that the Mass Guard has to demonstrate how it will manage the ranges in the future in order to be able to return to using lead. He also noted, however, that EPA and the EMC are the two entities that will have to provide the formal permission to return to firing lead on the ranges, on a range-by-range basis.

COL FitzPatrick then noted that the range activities would be managed by Camp Edwards' and Mass Guard's senior leadership, Camp Edwards' Range Officers and Range Control, and the EMC, which was created in 2001 to provide additional oversight of the northern 15,000 acres of MMR. He said that Mr. Begley, the EMC's environmental officer, whom he described as an "embedded regulator," works on MMR every day and visits the training areas frequently. He further noted that MassDEP and EPA will also monitor range activities, and that the Mass Guard will continue to make presentations at various public meetings and open itself up to questions. COL FitzPatrick also noted that the goal is to develop "green" training areas with activities that are compatible with and protective of the Upper Cape water supply reserve.

COL FitzPatrick stated that the Supplemental Environmental Impact Report (EIR) still needs to be completed and is scheduled to be available for public comment in the May timeframe. Also, public comments on the Environmental Assessment are currently being addressed, after which they'll be forwarded to the National Guard Bureau. The Mass Guard is awaiting regulator comments on the Range-Specific Pollution Prevention Plan for Tango Range, after which those comments will be addressed and the document will be posted on the Environmental & Readiness Center (E&RC) website and forwarded to the EMC's Science Advisory Council (SAC) and Community Advisory Council (CAC), and to the IART for review. COL FitzPatrick also noted: that IAGWSP investigations at the SARs are ongoing; that an EPS pertaining to management of the ranges is being developed and will be published in the April 11, 2007 edition of the *Environmental Monitor* for a 35-day public comment period; and that the Mass Guard will petition EPA to allow it to go back to using lead based on having completed the aforementioned documents.

COL FitzPatrick reminded the group that the Mass Guard is focused on ensuring that rounds fired at the SARs are contained and managed such that they never present a problem below the range

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floor and head toward the aquifer. He also noted that the lead research effort include assessing the IAGWSP's SAR investigation, installing additional groundwater monitoring wells, and conducting a lead assessment study that reviews and evaluates existing information on lead mobility, which will also be made available to IART members and posted on the website.

COL FitzPatrick noted that prior to last summer, the only groundwater monitoring wells at the SARs were one at the Bravo Range and another at Former Delta Range. Since that time additional wells were installed and sampled at Sierra Range, Tango Range, Bravo Range, Echo Range, Former Bravo Range, Golf Range, Juliet, and Kilo Range, all of which tested nondetect for lead. He also noted, however, that during the initial sampling for tungsten, lead was detected at a low level in the Bravo Range well, but that detection hasn't been repeated.

COL FitzPatrick reported the following lead research findings: no plumes have been identified; only sporadic one-time detections of lead in existing monitoring wells were seen; lead has not threatened the groundwater; and the geochemistry of the soil precludes fast leaching of lead. COL FitzPatrick then noted that because the potential for lead to leach to groundwater does exist, the Mass Guard will manage for that potential. He further noted that at various public meetings EPA and the EMC have agreed that lead is not threatening the groundwater, but that range activities do need to be managed.

COL FitzPatrick showed a schedule chart for the process to return to using lead ammunition and noted that the immediate goal is to have Tango Range – if not also Echo Range – approved for operational use by the July timeframe. He noted that although the plan is so aggressive that some of the products have fallen behind schedule (the lead assessment and the range-specific plans for Tango Range and Echo Range), the Mass Guard still thinks it can still reach its target date and get the right products to the regulators for review, comment, and eventually concurrence.

COL FitzPatrick then showed a slide listing upcoming comment periods: on the supplemental EIR, a comment period in May; on the Environmental Assessment, a second 30-day comment period in the May/June timeframe; on the EPS, to be published in the *Environmental Monitor*, a 35-day comment period beginning April 11, 2007; and on the Tango Range Operational & Maintenance plan, a comment period in the March/April timeframe. COL FitzPatrick also noted that the type of public process associated with petitioning EPA to modify its AO hasn't yet been determined. He then showed a slide of the E&RC website page where the various documents for public comment can be found.

COL FitzPatrick also updated the group on the Tango Range STAPP bullet-trap system that, in concurrence with the regulators, was tested today. He noted that 200 rounds were fired into the trap system and then he showed a series of photographs documenting the event, including a photo of the bullets recovered from the system. He also had with him some of the bullets, which he distributed to the IART members and audience for them to examine.

Mr. Conron said that he was unable to find on the schedule when the range-specific plans would be completed. COL FitzPatrick pointed out that area on the schedule, where it was noted that the Tango Range and Echo Range plans were due to be finalized at the end of June.

Mr. Conron mentioned his concern about the level of detail and said that he thinks the range-specific plans should include information about who has the authority to shut down a range. COL FitzPatrick replied that anyone who observes an unsafe act could shut down a range at any time. For example, if Mr. Begley observed someone using a pistol on a range where only M-16s are allowed to be used, he could shut down that activity immediately. Mr. Conron then asked if a range would be shut down, and who would have the authority to do so, in the event that an inadequate number of rounds are recovered from the berm. COL FitzPatrick replied that the Mass Guard would shut down the range in order to account for the rounds. Mr. Conron then said that he

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needs a “decision tree” of some kind to satisfy his comfort level – something that shows “this is what the performance standard is, this is how much lead we’re gonna pull out, this is who’s going to do it, this is who’s going to check it, and this is the frequency that it’s going to be done.” COL FitzPatrick replied that the Mass Guard is currently working with the regulators to determine the particular triggers and action levels, which will be included in the range-specific plans. Mr. Conron told the regulators that he would like to see that kind of detail included in some kind of preliminary plan.

Mr. Dow asked for an update on the lead assessment study. COL FitzPatrick replied that the Mass Guard’s response to the regulators’ comments has been submitted, and once finalized, that document will be issued to the public, probably during the first week of April. Mr. Dow then noted that the Massachusetts Chapter of the Sierra Club is interested in the Mass Guard’s policy regarding lead that’s already on the ranges, whether it poses a danger to groundwater, and whether that would be addressed in any of the documents associated with returning to using lead. COL FitzPatrick replied that results from the IAGWSP’s investigation at the SARs will provide the baseline information that’s needed to determine what does or does not need to be done about existing lead, which will have to satisfy EPA before the Mass Guard could even ask for a range to become operational.

Mr. Dow asked if the regulators could comment on this issue. Mr. Olson said that the evaluation is under way to determine whether or not cleanup of the lead on Tango Range and Echo Range is required, and it’s his understanding that that evaluation is showing that “the current lead on the ranges doesn’t cause a problem for the groundwater.” He also noted, however, that that may not be the case for other ranges, and added that whether or not nitroglycerin at the firing points is a problem is still being evaluated, and if so, that would be remediated through the current process.

#### **Agenda Item #5. Remediation & Investigation Update**

Mr. Hill showed a map of the Demolition Area 1 (Demo 1) plume and noted that a Rapid Response Action (RRA) extraction/treatment/reinjection system has been operating there since 2004. The system pumps a total of 430 gpm between two separate arrangements – 100 gpm at Pew Road and 330 gpm at Frank Perkins Road, with the water being treated at three modular treatment units. Mr. Hill then showed a series of photographs of the ongoing construction of the treatment plant for the comprehensive Demo 1 plume remedy and noted that the treatment facility is designed to handle 800 gpm and will utilize a treatment train of granular activated carbon (GAC), ion exchange, and GAC. He also noted that the treatment plant is on schedule to become operational in early May 2007, after which the modular treatment units will become available for use in other areas.

Mr. Hill also discussed the J-1 Range Southeast investigation. He reminded the group that some drive-point data gap work along the MMR/Sandwich fence-line in 2005 led to the discovery of a 300 ppb RDX detection. In response, the IAGWSP worked with the Town of Sandwich to install three monitoring wells on Little Acorn Lane, all of which tested nondetect for RDX in profiling and in four subsequent sampling rounds since fall of 2005. Because the contamination was not detected that far downgradient, the IAGWSP pursued access on Windsong Road, closer to the base boundary, to install additional wells. Windsong Road was a private road at that time, but the town became involved in a taking of that road, despite a moratorium on that kind of action. It took more than a year to obtain access to drill on Windsong Road, but three monitoring wells were recently installed there, as was another well along the base boundary.

Mr. Hill reviewed the profile data from the recently installed monitoring wells: MW-483 (drilled near an unsuccessful drive-point location at the base boundary) – 0.33 ppb RDX at 144 to 149 feet below ground surface (bgs); MW-481 – 13 ppb RDX at 150 feet bgs and 1.1 ppb at 160 feet bgs; MW-180 – 0.89 ppb at 145 feet bgs and 1.3 ppb at 155 feet bgs; and MW-482 – 0.26 ppb at

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160 to 165 feet bgs, 0.31 ppb at 170 to 175 feet bgs, and 0.78 ppb at 180 to 185 feet bgs. Mr. Hill also mentioned a perchlorate detection of about 0.49 ppb at the water table in MW-482. He noted that it was a bit surprising that the RDX concentrations in the off-base wells weren't stronger; however, the data are consistent with the interpreted flow trajectory.

Mr. Hill stated that the next drilling location will be along the fence-line. That well will also serve as a hydraulic monitoring well associated with the RRA system to address the J-1 Range Southeast groundwater contamination, for which startup is anticipated to occur in the June/July timeframe. He noted that the RRA system will consist of one extraction well situated in the area of the highest detection at the fence-line, and will utilize one of the modular treatment units from the Demo 1 site. He further noted that monitoring well samples will be collected from the Windsong Road wells and the IAGWSP, along with the regulators, will use those data to help determine next steps. In the meantime, the IAGWSP is confident that the downgradient well fence at Little Acorn Lane is screened appropriately to detect anything that might reach that far.

Mr. Conron inquired about the distance between Little Acorn Lane and the detections. Mr. Hill replied that the distance is about 400 to 500 feet. He also referred to the map, pointed out where the nondetect contour line would be, and noted that plume depictions would be included in the J-1 Range Groundwater/Soil Remedial Investigation/Feasibility Study (RI/FS) scheduled to be issued in draft form later this summer.

Mr. Cambareri inquired about travel time. Mr. Hill replied that the rule-of-thumb is about one foot per day. He also noted, however, that the plume is near the apex of the aquifer, where there's a slightly more vertical component to the flow. He then said that based on the depth below water table, the top of the plume is estimated to be 20 to 30 years deep in the aquifer. Mr. Cambareri also asked Mr. Hill to repeat what the detection was at MW-481. Mr. Hill noted that 13 ppb was detected in a profile sample, and the validated result from the well screen, which just became available, was 12 ppb.

Mr. Cambareri mentioned that the extraction well would be located at the base boundary rather than at the 12 ppb detection. Mr. Hill confirmed that it would and noted that the well is expected to pump at 50 gpm. Mr. Cambareri asked if the well will capture that width of contamination. Mr. Hill replied that full containment will not be achieved, and added that 50 gpm is the startup pumping rate, and it will capture the strongest portion of the plume. Mr. Cambareri suggested that more assessment may be needed. Mr. Hill clarified that the investigation is ongoing. He then pointed out a candidate drilling location to see if the investigation is "on target for the core of the plume" and also mentioned looking at data from MW-390A and "the well screens here" in order to project where to go in the downgradient area. Mr. Cambareri mentioned the spacing of the wells there. Mr. Hill said that the spacing is fairly tight. He also said that the plume is probably not a "needle" plume, but exactly what needs to be done to completely delineate the plume remains to be seen. Mr. Cambareri remarked that it seems that closer-spaced wells could provide a little more information. He then asked if the contamination is in a wellhead protection area. Mr. Hill replied that it is not, and noted that the entire neighborhood is on town water.

Mr. Fein asked if the IAGWSP's current understanding of the Demo 1 plume's behavior and trajectory is consistent with what was predicted eight months ago, particularly with respect to the contingency remedy. Mr. Hill called on Mr. Nixon, the Demo 1 plume project manager, to answer this question. Mr. Nixon stated that the short answer is "yes," and added that the plume depiction shown this evening is based on April 2006 data. Two partial sampling rounds have been conducted since that time and another complete round will be conducted this April, after which the plume will be re-delineated. Sampling results since April 2006 have not changed the current delineation, and the modeling indicates that what's being seen is consistent with what was expected.

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Mr. Dow asked if the perchlorate detection in MW-482 is assumed to be from some local source, rather than from the base. Mr. Hill replied that it's difficult to say; however the detection was very close to the water table, as was the case in a well near Peters Pond where the perchlorate was clearly not attributable to anything from the base. He further noted that the next step is to sample the water table well screen that was set at that well and see what kind of information that yields.

Mr. Dow referred to MW-482 and asked if the RDX detected at the 160 to 165 foot interval and the RDX detected at the 180 to 185 foot interval track back to the same source at the J-1 Range. Mr. Hill said that he's not certain if particle tracks have been run from that specific location; however, the IAGWSP has been following the higher detections and they do track right back to the general vicinity of the southern end of the J-1 Range, as would the detections at MW-482. He also said that an obvious point source in that area has not been found through the investigation that's been done there. Mr. Dow asked if it's possible that two separate plumelets are responsible for the contamination at the 160 to 160 foot interval and the 180 to 185 foot interval. Mr. Hill said that this is what's being seen at the other J Range plumes, which tend to be a collection of different point sources from which little plumelets merge, but which are mapped as a contiguous plume.

Mr. Dow suggested that tracking back from the plumelets would be useful in terms of determining whether there's any remaining contamination at the source area. Mr. Hill said that geophysical investigations at the J Ranges have shown concentrations of metal and many disposal pits, including quite a few at J-2 North. He also said that the IAGWSP's theory regarding the J-2 East Plumes is that the primary sources are the open burning/open detonation (OB/OD) areas and disposal pits. Mr. Hill then noted that the J-1 Southeast plume is unusual in that, outside of the one water table detection, perchlorate is not found commingled with the RDX contamination. He also mentioned that it's believed that bulk explosives were cut using a water saw in "this general vicinity" of the J-1 Range, and the contamination that's being detected does support that allegation, although the exact location of that activity hasn't been determined.

Mr. Dow noted that the Sierra Club's position has always been that source areas, as well as plumes, need to be addressed in order to avoid "pumping and treating forever." Mr. Hill agreed, but also noted that if the source area was a liquid disposal it's unlikely there'd be anything residual in the soils.

Ms. Dolan referred to the J-1 Southeast Groundwater RRA plan and EPA's comments regarding the RDX detections in surface soil "in this general area" that are above the proposed state cleanup standard. She then asked if the IAGWSP has taken a look at this in the RI/FS. Mr. Hill replied that it has and noted that all of that information would be summarized and documented in the RI/FS, due to be issued later this year.

#### **Agenda Item #6. Gun & Mortar Firing Positions Investigation Update**

Mr. Gallagher stated that investigations have been conducted at all 24 gun positions and 13 mortar positions, which are located south, west, and northwest of the Impact Area. The sites are generally flat areas cleared of vegetation. The artillery was primarily 105mm and 155mm projectiles and the mortars were primarily 60mm and 81mm projectiles. Mr. Gallagher noted that artillery and mortar rounds are generally propelled by a charge loaded in a gun barrel or mortar tube. Single- and double-base smokeless powders were the propellant mixtures used at Camp Edward. Propellant that was not consumed during the firing of a weapon was expelled out of the gun barrel and onto the ground. Single-base propellants contained nitrocellulose (a fibrous cotton-like material) and dinitrotoluene (DNT), a stabilizer to prevent degradation of the propellant. Double-base propellants contained nitrocellulose and approximately 40% nitroglycerin.



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Mr. Gallagher then explained that the amount of propellant used during firing is proportional to the distance of the target. That is, the maximum amount of propellant was supplied with the mortar or projectile to fire it the maximum distance; however, not all of the propellant was always needed and sometimes the excess was burned at the location. This, along with the propellant that was expelled onto the ground from the gun, might have resulted in propellant-related contamination at some of the gun and mortar positions. Mr. Gallagher also noted that a couple of witnesses have indicated that excess propellant bags may also have been buried at some of the gun and mortar positions.

Mr. Gallagher then reviewed previous investigations and studies pertaining to the gun and mortar positions: the Archive Search Report from 1997 to 2002; the Phase I investigation, which included soil sampling at three gun positions and four mortar positions, representing high, medium, and low-use positions; the Phase II investigation, which included soil sampling at the remaining positions and the installation of monitoring wells at the four most highly-used gun positions and the four most highly-used mortar positions; and the Munitions Survey Project, which looked at 17 positions, six of which were intrusively investigated. Mr. Gallagher noted that all of this information is summarized in Technical Memo 01-14, the Gun & Mortar Firing Positions report. He also spoke of two related studies that were done: a laboratory fate & transport study in 2002 conducted by the University of Texas and Texas A&M on behalf of the IAGWSP, to determine transport characteristics of certain contaminants through soil and groundwater; and a 2,4-DNT leaching evaluation using soil from Gun Position 11 (GP-11), the results of which indicated that 2,4-DNT does not readily leach from soil to groundwater (probably because the contaminant is bound up in the nitrocellulose). Mr. Gallagher noted that both studies remain under review by the regulators.

Mr. Gallagher then reported that previous investigations show that the contamination varies widely from position to position. He also noted that 2,4-DNT was most commonly detected at the positions, eight of which had 2,4-DNT concentrations below 700 ppb and eight of which had concentrations above 700 ppb. He explained that 700 ppb is significant because it is both the Massachusetts Military Reservation (MMR) preliminary remediation goal (PRG) and the MCP's RCS-1 soil reporting criterion. He also noted that 21 of the positions had no detections of 2,4-DNT or other propellants. Other contaminants detected at some of the sites were propellant-related compounds 2,6-DNT, n-nitrosodiphenylamine, and nitroglycerin. Metals were also detected at almost all the positions, some of which are likely naturally occurring while others may be related to munitions debris. Dieldrin was also detected at some of the sites and is believed to be related to pesticide applications.

Mr. Gallagher stated that to date propellant-related contamination has not been detected in any of the wells that were installed to monitor groundwater from the positions. However, because the wells were installed based on past site use history and not based on soil contamination locations, they may not be ideally situated to detect groundwater contamination from the positions, which is in part why additional investigation work is planned. Mr. Gallagher also mentioned that some low-level detections of perchlorate and RDX were detected in some of the monitoring wells, but are not believed to be related to the firing positions as those contaminants are not typical constituents of propellants. He noted that the source of those detections is still being investigated.

Mr. Gallagher reported that RRAs were conducted at two sites: in 2000, at GP-7, where 57 tons of soil was removed and treated in a soil-washing unit; and in 2004, at GP-6, where 750 tons of soil was removed and treated in a low-temperature thermal desorption unit.

Mr. Gallagher noted that the purpose of the proposed work plan is to determine potential groundwater impacts from propellant-related compounds at the gun and mortar positions. The groundwater investigation will be conducted at two sites, GP-10 and GP-11, where the highest

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levels of propellant-related compounds were detected in soil. The findings from this part of the investigation will be used in conjunction with previous data to determine if other sites have the potential to impact groundwater. The first phase of the investigation will involve the installation of up to five drive-points (profiled beginning at the water table and at five-foot intervals to a depth of 15 feet below the water table) at each of the positions. The second phase will involve the installation of conventional groundwater monitoring wells where contamination was detected in the drive-points. In the event of the absence of detections in the drive-points, the proposal is to install monitoring wells along the forward particle track of the highest concentrations of propellant-related contamination in soil. Investigation results from these “worst-case scenario” sites, along with previously collected data, will be used in assessing the need for further groundwater characterization at the other gun and mortar positions. Mr. Gallagher further noted that the IAGWSP will be conducting additional soil sampling using a multi-point composite sampling technique. This work will include sampling at three sites that have not shown any detections, three that had detections below 700 ppb, and two that had detections above 700 ppb.

Mr. Gallagher stated that the RI workplan was submitted in February 2007 and the work is scheduled to be completed by May. If necessary, an RRA will be conducted at select positions, based on the results of the investigation. The workplan for that RRA would be prepared in summer 2007 and made available for public comment, with the goal of obtaining approval of the plan so that work could begin in fall 2007. Mr. Gallagher also noted that the Final Soil & Groundwater Investigation Report is due August 2008, but it could be issued earlier in the event that no RRA is necessary.

Mr. Conron mentioned his experience of firing at MMR in the 1960s when, as he recalls, about 60% of the propellant powder was burned. Mr. Gallagher noted that up until 1989 excess propellant was burned on the ground, and after that it was burned in steel chutes typically used for cement trucks.

Mr. Dow spoke of having been told that the military trains as it fights, and inquired as to the prescribed military procedure for the disposal of excess propellant bags. Mr. Gallagher agreed that the military trains as it fights, and noted that in order to prevent leaving propellant for the enemy, the procedure was to burn the excess at the positions. However, as he’d mentioned, after 1989 that burning took place on steel chutes at the positions rather than on the ground. Mr. Dow remarked on the apparent danger of having a pile of unused propellant at the firing positions as that pile might be hit by unfriendly forces. Mr. Cambareri said that his recollection is that use of all five propellant bags included in each cartridge would have exceeded the limits of MMR’s Impact Area. Mr. Gallagher replied that the Impact Area at MMR is fairly small. COL FitzPatrick clarified that excess powder that was burned at the end of the training day was not left right next to the gun but dropped into a small pit that was dug at the beginning of the day and offered some protection.

**Agenda Item #7. Adjourn**

Ms. Bonarrigo stated that the IART would meet next on Tuesday, April 24, 2007 at the Bourne Best Western. She then adjourned the meeting at 8:08 p.m.



**Future Agenda Topics:**

***April 24, 2007 – Bourne Best Western:***

- Remediation & Investigation Update
- Massachusetts Army National Guard Small Arms Range Update

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**Handouts Distributed at the Meeting:**

1. Presentation handout: Camp Edwards Small Arms Ranges Update
2. Presentation handout: Remediation & Investigation Update
3. Presentation handout: Gun & Mortar Firing Positions Update
4. UXO Discoveries/Dispositions Since Last IART (Ending 3/23/07) All Awaiting CDC
5. News Releases, Neighborhood Notices, and Media Coverage 1/20/07 – 3/23/07