

**Impact Area Review Team
1803 West Outer Road
Camp Edwards, MA
December 4, 2007
6:00 – 8:00 p.m.**

Meeting Minutes

<u>Members:</u>	<u>Organization:</u>	<u>Attendees:</u>	<u>Organization:</u>
Ben Gregson	IAGWSP	John McDonagh	IAGWSP
Mike Minior	AFCEE/MMR	Pam Richardson	IAGWSP
Lynne Jennings	US EPA	Kris Curley	IAGWSP
Len Pinaud	MassDEP	Bill Sullivan	E&RC
Ellie Grillo	MassDEP	Tim Conway	US EPA
Bob Mullennix	IART/Bourne	Mark DeSouza	US EPA
Tom Cambareri	IART/CCC	Mark Panni	MassDEP
		Mark Begley	EMC
		David Dow	Sierra Club
		Mark Hutson	Geo-Hydra, Inc.
		Jane Shea Gasper	Innovar Environmental
<u>Facilitator:</u>	<u>Organization:</u>		
Jim Murphy	US EPA		

Agenda Item #1. Welcome, Agenda Review

Mr. Murphy convened the meeting at 6:05 p.m. and reviewed the agenda.

**Agenda Item #2. Late-Breaking News, Responses to Action Items, Approval of 9/25/07
IART Meeting Minutes**

Mr. Murphy noted that he had forwarded to Impact Area Review Team (IART) members Dick Conron's letter of resignation from the team. He also said that he asked Mr. Conron to reconsider his resignation, but Mr. Conron, whose reasons for leaving the team include that "things weren't moving quite quick enough and they weren't really black-and-white enough," is sticking by his decision to resign.

Mr. Murphy then referred to the response to Action Item #1 from the September 25, 2007 IART meeting, a request for information on the status of the IART's Technical Outreach Services for Communities (TOSC) advisor. He then added to the written response that had been provided by noting that depending on the outcome of the upcoming team review, it's possible that the team could secure a Technical Assistance Grant (TAG), which is available to nonprofits at National Priority List (NPL) sites. He also reminded the group that the written response to the action item notes that a new program called Technical Assistance Services for Communities (TASC) will be available sometime in 2008.

Mr. Murphy asked if there were any comments on the September 25, 2007 IART meeting minutes. No comments were offered and the minutes were approved as written. Mr. Murphy also asked the IART members and meeting attendees to introduce themselves.

Agenda Item #3. Remediation & Investigation Update

Juliet Small Arms Range Results

Mr. Gregson reported that the Impact Area Groundwater Study Program (IAGWSP) is conducting site investigations at Juliet Range and Kilo Range, the two Small Arms Ranges (SARs) where the Massachusetts National Guard (the Guard) wants to resume training with lead ammunition next, now that training with lead at Tango Range has been approved and is ongoing.

Mr. Gregson noted that no contaminants that one would expect to see at the SARs have been detected in the four new groundwater monitoring wells that were installed last year – two at Juliet Range and two at Kilo Range. He also noted that the focus of his presentation would be the soil sampling conducted at Juliet Range. He showed a photo of Juliet Range, pointed out the target berm there, which was part of the berm maintenance project conducted in 1999, and also noted that additional removal work was done after tungsten-contaminated soil was identified at the base of the berm last year. Mr. Gregson further noted that soil sampling was conducted behind the berm, on the range floor, and at the firing line. He also reported that soil samples from the firing line and the range floor were analyzed for propellants, and samples from all four areas were analyzed for metals – lead, antimony, chromium, copper, arsenic, and tungsten.

Mr. Gregson displayed a figure showing propellants/explosives soil sampling results and noted that nitroglycerin detections at the firing line ranged from 31,000 parts per billion (ppb) to 42,000 ppb in replicate samples. He also noted that relatively high levels of nitroglycerin (from 16,000 to 19,000 ppb) were detected on the range floor, which was unexpected, and therefore the IAGWSP plans to divide the area into smaller decision units and conduct follow-up sampling there to better understand those contaminant concentrations, which might be due to prevailing winds or to firing lines that were situated there in the past.

Mr. Mullennix asked whether the nitroglycerin levels that were detected are of concern to the regulatory agencies. Mr. Gregson confirmed that they are and reported that the Tango Range Operation and Maintenance (O&M) Plan notes a nitroglycerin cleanup level of 8,000 ppb. He also noted, however, that nitroglycerin and 2,4-DNT fate & transport studies are being conducted in order to try to come up with a better Kd value and understanding of the leachability of nitroglycerin to groundwater, and possibly refine that cleanup number, which is thought to be low. He added that results from the studies are expected in spring 2008.

Mr. Mullennix inquired about the depth of the samples that were analyzed for nitroglycerin. Mr. Gregson replied that they were surface samples, from 0 to 3 inches, and added that because nitroglycerin is a component of the propellant that was used at the SARs, the expectation was that it would be found. Mr. Mullennix then asked if the IAGWSP had considered conducting deeper soil sampling for nitroglycerin. Ms. Jennings replied that, as was done at Tango Range, the plan was to conduct surficial sampling, and based on those results, decide whether to go deeper. Mr. Gregson added that concentrations dropped off significantly from the surface to the deeper samples at Tango Range.

Mr. Cambareri inquired about the occurrence of nitroglycerin in groundwater at the Impact Area. Mr. Gregson replied that he doesn't think there have been any detections of nitroglycerin in groundwater base-wide; however, the question to answer is what kind of concentrations in soil could eventually affect the groundwater.

Mr. Pinaud noted that the 19,000 ppb nitroglycerin concentration at Juliet Range exceeds the threshold level for a focused reassessment at Tango Range, which is 10,000 ppb – therefore it's clear that some action needs to be taken, although at this point there's no definitive number for leaching.

Mr. Dow asked if the nitroglycerin appeared to be attached to cellulose. Mr. Gregson replied yes, and added that this was expected because a double-based propellant (a nitrocellulose and nitroglycerin mixture) was used at the base. He also said that this is thought to be part of the reason why the nitroglycerin doesn't seem to be leaching to groundwater. Mr. Dow mentioned the possibility that bacteria in the soil could eventually break down the cellulose component, allowing the nitroglycerin to become migratory. Mr. Gregson agreed that there are many aspects to be considered in addition to adsorption/desorption, such as biodegradation and photo-degradation. Mr. Dow suggested that bacteria from ruminants are another possibility.

Mr. Gregson continued with his presentation by noting that sampling results for metals were relatively low, although three separate samples at a location at the firing line came back at 168 parts per million (ppm), 201 ppm, and 9,000 ppm for lead, which the IAGWSP is investigating further. He also noted that any detections of lead in the berm were less than 100 ppm, while some lead concentrations behind the berm were in the 500 to 600 ppm range.

Mr. Dow inquired about the level of concern for lead in soil. Mr. Pinaud replied that in the Tango Range O&M Plan the number is 9,000 ppm. Ms. Jennings added that it's important to keep in mind that the action levels are calculated "very area-specific" and in this case, numbers for the firing line are roughly comparable because the firing lines at Juliet and Tango Ranges are roughly the same size. Mr. Dow noted that the estimated 9,010 ppm lead detection at the Juliet Range firing line would then be right around the action level. Ms. Jennings confirmed that it would. Mr. Gregson added that the IAGWSP wants to first confirm whether the 9,000 ppm detection is real and then start looking at how a specific action level could be calculated.

Mr. Mullennix asked how action levels are determined. Ms. Jennings explained that the process is to determine an acceptable concentration in groundwater and then back-calculate based on the mass in soil. She added that the calculation is essentially based on modeling. Mr. Mullennix asked who developed the model, and whether it's a national model. Ms. Jennings replied that U.S. Environmental Protection Agency (EPA) personnel in a Las Vegas laboratory performed the calculations using typical model equation that have been used for years. However, what was slightly different is that they did the calculations according to the size of the area and the fact that composite samples were collected. Mr. Mullennix also asked if the model has been validated. Ms. Jennings explained that the ongoing effort is to validate a parameter called the Kd value (dissolution) such that it is based on site-specific information. She further noted that there other factors to consider as well, such as biodegradation, and EPA is recommending that additional studies that look at such factors also be undertaken.

Mr. Dow then asked if the three sampling results at the firing line, for example, refer to three separate composites. Mr. Gregson replied that these are replicate samples, meaning that three 100-point composite samples were taken from the same area. Mr. Dow noted that it's surprising to see the variation from 200 ppm to 9,010 ppm in lead at the firing line. Mr. Gregson acknowledged that the repeatability in that particular sample was not good. He also said that it's thought that a speck of lead in that replicate sample may have caused that spike, and the IAGWSP is looking into that.

Mr. Dow also questioned why tungsten concentrations at the firing line are in the 0.4 ppm range, but then increase going from the range floor to behind the berm. Mr. Gregson replied that it's possible that a certain amount of bullets had tumbled over the berm. Mr. Pinaud mentioned the possibility of one round hitting another and pushing it over the berm. Mr. Dow noted that the area behind the berm is larger than the berm face itself. Ms. Jennings agreed and then reminded Mr. Dow that once the tungsten issue had been identified, the highest concentrations of tungsten in soil at the berm were removed and stockpiled at C Range.

Working Dog Pilot Study

Mr. Gregson stated that in August of this year five explosives-detecting dogs from the 67th Engineering Detachment from Fort Leonard Wood, Missouri were at Camp Edwards for a pilot study at the J-2 Extension Area and three gun positions. The goal of the effort was to evaluate the dogs' effectiveness in locating subsurface munitions and concentrations of explosives. The dogs surveyed the areas and the locations where they smelled something were marked so they could be investigated later, which is the current phase of the study. Mr. Gregson reported that so far 12 locations at Gun Position 6 (GP-6) and three locations at the J-2 Extension Area have been

examined, and initial results indicate that the dogs are very sensitive, having located very small items with only small amounts of explosives residue on them. At areas where no items were found, the soil samples that are being collected are used to determine whether the soil contains fine particulate contamination that the dogs identified.

Mr. Gregson then reported that findings at GP-6 included: one 5.65 cartridge case with some propellant residue, primer wrappers, expended primers, empty casings, ammo can seals, and a possible propellant bag. Items found at the J-2 Extension Area included cartridge cases, mortar pins, and the like. He stated that the plan is to continue the validation process as the first phase of the pilot study, and then look at the data and other upcoming work to determine how the dogs might best be used for future investigations. Mr. Gregson also noted that the presentation handout includes maps that show the locations where the dogs detected something and some of the magnetic anomalies.

Ms. Grillo asked how long the dogs were at the Massachusetts Military Reservation (MMR). Mr. Gregson replied that the dogs worked for about six weeks. Ms. Grillo also inquired about the nature of the subsequent phases of the pilot study. Mr. Gregson explained that right now the IAGWSP is trying to understand the capabilities of the dogs, after which those capabilities can be applied and the effort will become less a pilot study and more an investigation of certain areas. Ms. Grillo then asked if dogs have been used for this type of purpose before. Mr. Gregson replied that they've been used overseas, in Afghanistan and Iraq, to look for mines and munitions, and at airports to look for explosives in luggage. He also said that the work at MMR is a good opportunity for the troops and the dogs to get some real-world training in finding objects.

Mr. Mullennix asked if the IAGWSP has access to the dogs beyond a training convenience for those who manage them. Mr. Gregson replied that that remains to be seen; however, it is to the IAGWSP's advantage to be stateside and able to provide an opportunity for training. Mr. Mullennix noted that one of the long-time questions of the IART is what will be done about the munitions that are scattered throughout the Impact Area and whether it will be feasible to "dig everything up." He said that he assumes that the idea beyond the pilot study is to determine the capability of the dogs in terms of helping out with that cleanup, and he thinks the concept is quite innovative.

Ms. Grillo asked about effects of extreme weather on the dogs' sniffing capabilities. Mr. Gallagher replied that wind and frozen ground are limitations. Mr. Gregson added that the dogs also don't work well in extreme heat; therefore, they went out in early morning when they were at MMR.

Mr. Mullennix inquired about any effect of the age of the munitions. Mr. Gallagher replied that from what's been seen so far, he's very surprised at the dogs' sensitivity – not just in terms of the age of the munitions, but also in that they detected munitions debris with no visible munitions associated with them.

Mr. Cambareri referred to the figure entitled "Gun Position 6 EDD Pilot Study Area" and asked if the dogs found the surficial items (propellants and smoke grenades) noted on the figure. Mr. Gregson replied that those items were in an area where a Rapid Response Action (RRA) soil removal had been conducted. Ms. Jennings further explained that those items had been removed before the dogs arrived, and Mr. Gregson added that the dogs were brought in to see if they could detect anything that was left behind after the RRA.

Mr. Dow asked if the dogs detected anything in locations where magnetometer surveys hadn't indicated any metallic debris. Mr. Gregson replied that this did occur in the J-2 Extension Area, where the dogs also did not key in on certain areas where surveys indicated that metal exists. Ms. Jennings added that everything at GP-6 is essentially non-metallic. She also explained that the

IAGWSP is selecting certain areas that had a mixture of metal-associated detections and non-metal-associated detections to determine if there's something there that the dogs didn't sniff out, but should have found. Mr. Dow noted that using the dogs could lead to the identification of source areas not associated with magnetic detections. Mr. Gregson agreed and also mentioned that it may turn out the dogs are able to detect contaminant in soil below the lab's method detection limit.

Agenda Item #4. Field Evaluation of Release of Explosives from a Cracked UXO Item Using a Pan Lysimeter

Mr. Gallagher reported that over the past year the IAGWSP has been conducting an experiment in the Central Impact Area to evaluate releases of high-explosive compounds from a cracked unexploded ordnance (UXO) item. The releases occurred during rain events when precipitation came into contact with the high-explosive filler and infiltrated into the sampling apparatus. Mr. Gallagher reminded the group that the military training conducted at Camp Edwards, which began in the early 1900s, included the firing of mortars and projectiles at targets located in the Impact Area. Most of the munitions functioned as designed and resulted in high-order detonations; however, a small percentage of the items failed to detonate and remained in the Impact Area as UXO.

Mr. Gallagher then stated that the IAGWSP is trying to determine whether explosives present in these UXO represent a future threat to groundwater once their metallic casings have corroded. And in order to answer this question, the following must be determined: the spatial distribution of the UXO; the potential contaminants contained within the UXO items; the rate at which intact casings corrode and breach; the amount of contaminant that could be released to the environment once the casings corrode (which is the focus of the experiment); and the impacts to the aquifer that could result from potential future releases.

Mr. Gallagher showed a map of MMR and pointed out the Central Impact Area, where the experiment was conducted at a location known as a High Use Target Area. He also showed the conceptual site model (a simplified version of what's believed to be happening in the environment) and pointed out munitions, explosives residues around the targets, UXO – both intact and breached, and targets. He also explained that when precipitation falls on exposed filler material it slowly goes into solution, infiltrates into the water table, and flows downgradient with the groundwater. Mr. Cambareri inquired about the second item on the legend. Mr. Gallagher replied that it symbolizes fine particulate, which is representative of a high-order detonation. He also noted that larger particulates are representative of a low-order detonation, but that they are lumped together as explosives residue.

Mr. Gallagher then reviewed the objectives of the experiment: to collect/sample all water in the form of precipitation that comes into contact with a cracked UXO item (a 155mm artillery shell) with exposed Composition B filler, which is approximately 60% RDX and 39% TNT; to record precipitation rates and the quantity of water collected by the apparatus; to quantify the mass release rate of explosives over a typical seasonal cycle (one complete water year); and to identify the key controls on the mass release rate (such as rainfall amounts, rainfall intensity, and temperature); and to provide a foundation for future studies of other UXO item types and conditions. Mr. Gallagher mentioned that to the IAGWSP's knowledge, this is the first experiment of its kind ever to be conducted.

Mr. Gallagher then showed a photograph of the 155mm UXO item as it was discovered in the field and pointed out the Comp B filler and a metallic booster charge. He also showed a schematic drawing of the pan lysimeter sampling apparatus and pointed out the collection vessel and the UXO item (oriented similarly to how it was discovered in the field). He also made a point of noting that the sampling apparatus is fully self-contained and therefore no explosives

compounds were released to the environment during the course of the experiment. Mr. Gallagher then showed a photo of the field crew collecting a sample from the apparatus after a rainfall event.

Ms. Grillo asked if it's truly safe for the field crew to be around the UXO item, and whether there was no fuze associated with it. Mr. Gallagher confirmed that there was no fuze. He also noted that the item was determined to be safe-to-move by explosives ordnance disposal (EOD) personnel. Ms. Grillo indicated that she thought the item hadn't been moved for the experiment. However, Mr. Gallagher clarified that it had in fact been moved, with the approval of EOD personnel. Mr. DeSouza inquired about the original location of the item. Mr. Gregson replied that it was located at the Central Impact Area, where there's a fair amount of ordnance and a great deal of investigation has been done, as have some removal actions. Ms. Grillo asked if the item didn't have the potential to leak prior to the experiment. Mr. Gallagher clarified that it had, and noted that before moving the item, lysimeters were installed beneath it for a couple of cycles, but because a lysimeter's radius of influence is so small it was unclear whether everything dissolving from the item was being collected. Therefore the decision was made to move the item and set up the sampling apparatus to make for a more controlled experiment.

Ms. Jennings asked if any soil samples were collected from the item's location. Mr. Gallagher replied that he doesn't recall, but will look into obtaining the answer to that question. Mr. Dow asked whether pH measurements of the rainwater were taken. Mr. Gallagher said that he believes they were, but would have to check to be certain. He also said that pH could affect the amount of high-explosives that dissolved during the experiment.

Mr. Gallagher then reviewed the methods used for the experiment: rainfall amounts were recorded with an on-site rain gauge and from a nearby weather station; sampling frequency was based on rain events; the samples were analyzed for RDX, TNT, HMX, and 16 other explosive compounds; rinsate samples were collected prior to emplacement of the 155mm item to ensure that no cross-contamination was occurring; the volume of the test cell drainage was recorded at the time of sampling; and the collection was rinsed and reset after each sampling event.

Mr. Gallagher displayed a graph showing sample concentrations over time and noted that, as expected, based on the formulation of Comp B (60% RDX, 39% TNT, and some impurity of HMX as part of the RDX), the three main contaminants detected were RDX, TNT, and HMX. Other explosive compounds were periodically detected, but at much lower concentrations. These other compounds are believed to be breakdown products or impurities of the main explosive compounds.

Mr. Gallagher stated that RDX concentrations ranged from 400 ppb to 8,900 ppb, TNT concentrations ranged from 130 ppb to 11,000 ppb, and HMX concentrations ranged from 200 ppb to 600 ppb. He also noted that during the course of the experiment the booster charge was removed in order to try to get an accurate measurement of the amount of exposed surface area. Unfortunately, once the booster charge was removed, all the loose Comp B material around it crumbled, exposing a significant increase in the surface area and also fresh, un-weathered filler. Mr. Gallagher noted that removal of the booster charge corresponds to the significant increase in concentrations of all three main compounds detected, as illustrated by the graph. He also said that the loose filler chips eventually were removed and the concentrations started to go down, but they have not returned to the relatively low levels of the first three sampling events.

Mr. Gallagher then showed a graph entitled "Explosives Mass Release" and reported that 436 milligrams (mg) of RDX, 32 mg of HMX, and 393 mg of HMX were released to the collection vessel during the first 293 days of the experiment. He also pointed out the significant increase in the amount of mass released after the booster charge was removed.

Mr. Gallagher also displayed a graph entitled “Explosives Mass Ratios” and explained that it shows the ratio of RDX mass released relative to TNT and HMX. He noted that the RDX/TNT ratio was highly variable throughout the course of the experiment. Initially the RDX was quite high, but after the booster charge was removed and the un-weathered material was exposed, the ratio went way down, meaning the TNT concentrations went way up – which is not “intuitively obvious” since one would think it would be 60% RDX/39% TNT. Mr. Gallagher then explained that because TNT is much more soluble than RDX, once the un-weathered material came into contact with rainwater, the TNT quickly went into solution, resulting in much higher TNT concentrations initially after the booster charge was removed. The surface of exposed filler became depleted in TNT but enriched in RDX – in other words, the TNT went into solution and there’s much more RDX on the surface area of the filler material. Mr. Gallagher further noted that in contrast, the RDX/HMX ratio remained relatively constant throughout the course of the experiment (although the concentrations of both fluctuated fairly significantly over time), as one would expect since HMX is an impurity of RDX.

Ms. Jennings questioned the relevance of the ratio information. Mr. Gallagher explained that the point is that because HMX is an impurity in RDX, the RDX/HMX ratio, regardless of the fluctuation in concentration, should remain the same – while the TNT, which is much more soluble than the RDX, goes into solution more rapidly than the RDX once the un-weathered Comp B is exposed. Ms. Jennings suggested that if HMX is an impurity, it would seem that the RDX/HMX ratios would show a direct correlation based on that impurity. Mr. Gallagher agreed that the correlation is imperfect, but suggested that the ratio has remained relatively constant.

Mr. Mullennix noted that his understanding is that the assumption is that at the beginning of the study, it’s likely that the TNT that had been exposed to precipitation had already leached and migrated into the soil, so the surface area was “heavier in RDX.” Mr. Gallagher agreed. Mr. Mullennix added that after the item was disturbed, surface area that still had TNT in it was exposed – and because the TNT is more soluble, a large spike was seen relative to where it had been.

Mr. Dow asked if the RDX/TNT ratio, which increases over time, is believed to be real or an artifact. Mr. Gallagher replied that the increase would be expected as the surface area becomes enriched in RDX, which is essentially controlling the release of TNT at that point – because the surface area is primarily RDX and there’s TNT below the surface area, the TNT cannot escape until that RDX had gone into solution.

Mr. DeSouza asked if either of the ratio levels is considered a threat level. Mr. Gallagher replied that the health advisory for RDX is 2 ppb and for HMX is 400 ppb; however, the experiment was fully self-contained.

Mr. Gallagher then continued with his presentation by displaying a slide that showed the amount of RDX mass released during the course of the experiment compared to theoretical release rates calculated using an equation developed by Praxis Environmental Technologies, Inc. He noted that: the cumulative observed release over the first 293 days of the experiment was 0.44 grams; the projected average annual release rate (based on 44 inches of precipitation) is 0.48 grams; the cumulative observed release during the undisturbed period was 0.28 grams; and the projected average annual release rate (based on the undisturbed period only) is 0.42 grams. Mr. Gallagher said that in his opinion these figures correspond quite well with the theoretical release rate calculated using the Praxis equation from a bare lump (15% exposed, 40% roughness), which is 0.30 grams.

Mr. Gallagher completed his presentation by reviewing the following conclusions: RDX, HMX, and TNT were the principal explosive compounds released, which is consistent with the formulation of Comp B; explosive releases spiked and subsequently declined in response to the

booster charge removal and apparent exposure of fresh, un-weathered filler material and the significant increase in the amount of exposed surface area; the subsequent decrease in mass release and increasing trend in RDX/TNT mass ratio may reflect weathering of the exposed filler surface resulting from rapid depletion of TNT and enrichment of RDX, which limits further dissolution of the TNT; observed rates are generally consistent with the theoretical predictions, and the principal uncertainty lies in the estimate of exposed surface area of Comp B filler (which was “pretty much impossible” to measure with the booster charge in, and so it was removed); and RDX is the rate-limiting compound. Mr. Gallagher also noted that the IAGWSP is continuing to run the experiment.

Mr. Mullennix inquired about the basis of the 0.48 grams per year mass release rate. Mr. Gallagher replied that that figure pertains to the entire experiment – both pre- and post-disturbance. Mr. Mullennix noted that the projected average annual release rate of 0.42 grams, which is based on the undisturbed period only, is not very different. Mr. Gallagher agreed and added that he would have expected it to be significantly different. Mr. Mullennix then referred to the “Explosives Mass Release” graph and suggested that without having disturbed the experiment, the undisturbed RDX release of about 0.3 grams might have continued to “just chug along,” but that can’t be known. He also mentioned the flaw in the experiment. Mr. Gallagher noted that the flaw was that it wasn’t possible to measure the surface area, and so the booster charge had to be removed, thereby exposing un-weathered surface area. Mr. Mullennix said that his point is that he doesn’t think there are enough data to determine the projected average annual release rate of 0.42 grams. Mr. Gallagher replied that the projection was made based on the available data, but it’s not known whether that accurately reflects the amount of surface area once it’s weathered or the long-term conditions – which is partly why the IAGWSP is continuing to run the experiment.

Mr. Mullennix said that intuitively it seems to him that, based on the solubility of the compounds, disturbing the UXO and exposing more surface area leads to more leaching; whereas leaving it in a stable “steady state,” allows for the establishment of an “RDX barrier” to increased leaching. He noted that a release rate of an undisturbed piece of ordnance “would just go straight across” and Mr. Cambareri added, “But it’s still a release rate.” Mr. Mullennix agreed, but suggested that it would be more like 0.20 or 0.15 grams per year, rather than 0.42 grams. He also said that this begs the question of whether or not the UXO should be disturbed – as disturbing a lot of UXO without removing it may in fact just accelerate the release. Mr. Cambareri suggested that precipitation events may provide just as much of a disturbance.

Mr. Mullennix noted that artificially precipitating on the UXO item in a true laboratory environment might have made for a more controlled experiment. Mr. Gallagher remarked that the really important factor is to know the surface area, and at some point determine a release rate per surface area exposed. He also said that, unfortunately, the experiment was disturbed so that a steady state doesn’t exist – but it’s hoped that continuing to run the experiment will mean reaching a steady state again, along with an understanding of the surface area exposed. Mr. Gallagher also stated that he thinks the experiment was useful, but should probably be run quite a bit longer.

Mr. Minior asked if shouldn’t be assumed, since there hasn’t been any live fire at MMR since 1997, that the ordnance that’s been sitting there for ten years has reached an equilibrium point. Mr. Gallagher agreed that that would be the case for ordnance other than the item used in the experiment.

Ms. Jennings said that she has concerns about the experiment because she isn’t certain how the results are going to be used. She noted that she doesn’t see how the experiment can answer questions such as why it was run, how it might indicate what needs to be done to address UXO in

the Central Impact Area, and whether or not cleanup is necessary. She further stated that she thinks the results could be viewed in any way, and the regulators don't know yet how the IAGSWP is going to interpret the results. She also expressed concern about one item representing all of the items in the Impact Area – whether the indication is that it represents a steady state, or whether the indication is that disturbing items exacerbates the problem. Ms. Jennings also said that there are clearly releases that are well above the health advisory, and she would look at the experiment with extreme caution. She further stated that she doesn't think this study alone is helpful in one way or another in terms of making a decision, and it's important to determine how best to deal with the UXO, from which contaminants will continue to be released, and at this point it can't be correctly predicted what will happen in the future.

Mr. Mullennix said that he appreciates Ms. Jennings' comments, but thinks it's also important to note that this was the first time anyone tried to do an in situ field evaluation of this kind. He added that he thinks much was learned, including perhaps how to run a different experiment the next time. Mr. Gallagher agreed with Mr. Mullennix and said that he also agrees with Ms. Jennings that the experiment is not answering every question that needs to be answered, but instead does provide interesting and useful information that can be used to inform future experiments as deemed necessary. He mentioned that the IAGWSP has been putting forth ideas about different experiments to conduct, such as looking at corrosion and releases from a controlled pit.

Mr. Cambareri said that it's possible by doing the math to determine the amount of groundwater that could be contaminated, based on the release rate. Mr. Gallagher said that he thinks it goes beyond the simple math, and mentioned UXO density and mixing. He also noted that the vast majority of UXO are intact, while some are impaired, and the surface area exposed to rainwater is unknown. Mr. Gallagher added, "Hopefully it could be used to help us understand the problem, but I don't think it's solving the problem." Mr. Cambareri said that to him the message is "you don't leave the stuff out there."

Mr. Dow said that he has a vague recollection of a technique for measuring surface area particles, which involves dipping an item into silver nitrate, doing a precipitation reaction with sulfide, and then determining how much silver nitrate is there. Mr. Gallagher noted that the IAGWSP's effort, which wasn't that sophisticated, involved taking pictures, measuring, and assuming some surface roughness to come up with a percentage of exposure.

Agenda Item #5. Open Discussion

Mr. Murphy referred to the background document prepared by the Consensus Building Institute (CBI) after the recent meeting of EPA, the Massachusetts Department of Environmental Protection (MassDEP), the Air Force Center for Engineering and the Environment (AFCEE), the IAGWSP, and the Environmental & Readiness Center (E&RC) to discuss the different options for community involvement base-wide. He noted that the document lists the agencies' interests and said that the next step in the process is to determine the public's interests. He further noted that the document includes some potential options for the advisory teams, and that the plan is to have discussions at each of the team meetings, to be followed up by a team workshop sometime in February.

Mr. Cambareri inquired about the role that team meetings play in fulfilling the agencies' community involvement requirements, and how changing the current team/meeting structure might affect that. Mr. Murphy replied that the EPA Administrative Order that established the IART calls for a community advisory team that advises EPA, the Department of Defense (DoD), and the state, but the order is not specific in terms of how often the team meets or its exact structure. He also said that, as noted in the background document, DoD has issued Restoration Advisory Board (RAB) guidance; therefore he cannot imagine going from multiple teams (as has

been the case at MMR) down to none, but instead he sees some kind of reconstituted team that would serve the purposes of a RAB.

Mr. Pinaud told Mr. Cambareri that if the teams were to be eliminated or take a different form, meetings to kick off public comment periods on decision documents and the like would still be held. Mr. Minior added that it's possible that such meetings would be combined with regular team meetings – an approach that the IAGWSP has employed on some of its documents and one that AFCEE recently started to employ.

Ms. Grillo said that her understanding is that in terms of community involvement the AO called for a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-like process. She also said that she thinks the most important piece is to talk to people who have already indicated an interest in the process to find out what they think is working, what they think isn't working, whether they're aware of all the existing forums, what they think about meeting frequency, and so forth. She said that the idea is “a customized process for the people that want to continue to provide input.”

Mr. Cambareri said that it seems that the IART is clearly going through a transition as the IAGWSP's focus turns to cleanup. He said that IART meetings are now less controversial and more predictable, which might be seen as a reason for a lack of public interest. He also said that he has mixed feelings about going back to holding IART meetings on the base, which seems “contrary to having public meetings” and where the meetings seem more “informal.” Mr. Cambareri further noted that in terms of meeting attendance he tends to be an agenda watcher, only coming to meetings when the agenda includes a topic on which he can provide input or that he thinks is controversial. He then said that he thinks there's potential to have a joint team, but he doesn't know how frequently it should meet.

Ms. Jennings referred to the AO and said that she doesn't think the IART forum is working anymore – basically because of the lack of participants. She also said that she didn't support the idea of merging the IART and Plume Cleanup Team (PCT) when it was first mentioned, because the teams were at different points and because the IART still had a lot more work to do. Now, however, her bigger concern is the lack of public involvement. She noted that there are some big decisions to make about the Impact Area and she wants to ensure that the right people are at the table when those decisions are made. Ms. Jennings further stated that she doesn't think the general public is aware that there are only two citizen members left on the IART, and she finds that problematic – therefore, she is a proponent of looking at a team merger, as well as at other venues to ensure that the public is engaged. She also said that she doesn't want to move forward with significant decisions only to hear later that the public didn't know about them. Ms. Jennings said that she thinks it's possible to come up with a solution that addresses all the reasons for a lack of public participation (fragmentation, too many teams, etc.) and once all the decisions have been made she'd like to be able to say with a straight face that there truly was a community involvement process.

Ms. Grillo asked Mr. Cambareri about his membership on MMR teams. Mr. Cambareri replied that he remains active only on the IART, but in name is still a member of the PCT, although Scott Michaud from the Cape Cod Commission does attend those meetings. Ms. Grillo asked if Mr. Cambareri is a member of the Science Advisory Council (SAC) or the Community Advisory Council (CAC) to the Environmental Management Commission (EMC). Mr. Cambareri replied that he is not. Ms. Grillo noted that some people think that updates on the environmental cleanup programs can also be heard at SAC or CAC meetings. Mr. Cambareri then stated that if the PCT and IART are combined, staff will need to do a better job of publicizing when meetings occur. He noted, for example, that he doesn't receive notification of EMC meetings. Ms. Grillo said that as

a member of the IART, Mr. Cambareri should be receiving the monthly calendar, and she will look into assuring that he does in the future.

Ms. Jennings encouraged Mr. Cambareri and Mr. Mullennix to attend the team summit/workshop in February as their input would be very helpful.

Mr. Gregson agreed that some significant decisions are coming up (the Central Impact Area, the Northwest Corner, Demolition Area 2, and the J Ranges) and in addition to the IAGWSP and EPA, they should be of concern to the community. He also recommended thinking outside the box in terms of community involvement and mentioned the idea of forming temporary teams that focus on one specific area, such as the Northwest Corner. Mr. Cambareri said that while he sees some benefit to such an approach, he has some issues with it as well.

Mr. DeSouza asked Mr. Cambareri what he thinks would be the best way for the agencies to reach community members – such as email or knocking door to door. Mr. Cambareri replied that many things have been done to try to improve meeting attendance, but perhaps sessions in targeted areas would be good.

Mr. Mullennix said that he thinks that this meeting's presentations were excellent and contained the type of information that should be more broadly shared than it was tonight. He also said that he doesn't think he needs to attend the team summit in February as he already knows what he would like to happen – that is for the PCT, which by reputation is an active team with experience and knowledge of the southern part of the base, to “take over” the northern part of the base in terms of public participation. Also, IART members would be invited to join the team if they desired. Mr. Mullennix then indicated that he thinks that the Senior Management Board (SMB), which is primarily made up of local elected officials, should continue to meet every other month as that forum provides the mechanism for the selectmen (or a larger audience) to become informed about “hot items,” late-breaking news, and brief summary updates.

Mr. Cambareri noted that he is in favor of a similar idea, but would rather a recast team, which would leave open the opportunity to bring in new members. He also mentioned the PCT's work, including important remedy decisions and optimizations, which he noted would be relevant to the IART's work as well. Mr. Cambareri then reiterated that he'd like to see a recast team, but one that meets on a less frequent, as-needed basis.

Mr. Mullennix said that he thinks it would be important for a recast team, with a role that covers a larger area, to meet on a monthly basis. He explained that with less frequent meetings, the lack of continuity would tend to make him forget and lose interest. Mr. Cambareri remarked that that is a good point.

Ms. Jennings stated that other federal facilities have one RAB that includes both elected officials and other community members, which is why the idea of combining the PCT, IART, and SMB into one team is being contemplated. She also noted that in addition to SMB meetings, community involvement staffs from the cleanup programs provide individual updates to the towns' Boards of Selectmen and Boards of Health. She also noted, however, that she thinks the team summit is the place to start to discuss options and then move forward with trying one.

Ms. Jennings also inquired about other current citizen members of the IART. Mr. Murphy noted that there are two other members beside Mr. Mullennix and Mr. Cambareri – Earl Lantery, who hasn't attended a meeting in some time but indicated that he's ready to come back and is interested in discussing the team review, and Jim Pierce, who noted that he's interested in continuing his membership on the team but tends to attend meetings based on the agenda topics. Ms. Jennings then asked Mr. Mullennix and Mr. Cambareri, as the two members who regularly attend meetings, whether they wanted to continue monthly IART meetings or drop back to quarterly meetings until the team merger concept has been decided.

Mr. Mullennix said that his view is that with so much happening over the next six months he thinks it's critical to optimize the public participation process; however, IART meetings are not making that happen. Therefore, he recommends finding a way to expedite combining the teams and engage that larger group.

Mr. Pinaud noted that one option mentioned in the background paper prepared by CBI is to have the teams meet jointly on an informal basis, before making a final decision to combine them. Mr. Mullennix asked if Mr. Pinaud is referring to an IART/PCT combination or an IART/PCT/SMB combination. Mr. Pinaud replied that the idea really hasn't been discussed with the SMB yet. Mr. Mullennix said that he is willing to have the next meeting be a joint meeting to which agenda items pertaining to the northern part of the base are added. Mr. Murphy noted that the next PCT meeting is scheduled for February, and Ms. Jennings said that the PCT members should not be blindsided with IART members showing up at their meeting to discuss Impact Area issues. Mr. Mullennix agreed that the PCT members should have an opportunity to weigh in on the idea of meeting jointly.

Mr. Cambareri expressed concern about getting "bogged down" in "remedial lessons" for the PCT on Impact Area issues. Mr. Pinaud noted that there definitely will be a learning curve. Mr. Minior suggested that it might make sense to have special primer type sessions for each of the teams. Mr. Pinaud mentioned that the PCT has been receiving information on Chemical Spill 19 (CS-19) over the past two months. Mr. Mullennix added that the community outreach publications that were issued recently are of good quality and could be helpful in terms of self study to bring team members up to speed.

Ms. Jennings recommended having this type of discussion with the PCT at the February meeting and then possibly having a joint meeting in March. She also asked if anyone feels a need to have an IART meeting in January or February. She then said that she thinks it would be overkill to have three separate meetings right now, and noted that EPA's preference would be to combine all three teams and meet on a less frequent basis, but "make it meaningful." Then, if issues of special interest to a particular town should arise, that issue could be brought to the selectmen's meetings.

Mr. Mullennix said that with regard to the question of whether the IART should meet in January, he would be satisfied to see a document that outlines all the significant decisions that need to be made over the next six months, and would recommend providing that document to the PCT and SMB as well. He said that he thinks such a document could galvanize public interest.

Mr. Murphy indicated agreement in moving forward with Mr. Mullennix's suggestion, and skipping the January IART meeting. He also noted that both the PCT and the SMB will have met by early February, after which the focus will be on a team summit in late February, which can serve as the IART's February meeting. Mr. Mullennix encouraged the project managers to ensure that future IAGWSP presentations do not become too "diluted" in a joint team atmosphere, as he wouldn't want to lose the type of information and discussion that takes place at IART meetings.

Ms. Grillo suggested paying attention to the frequency of meetings when the teams first combine, due to different orientation curves and whether the meetings are more IART- or PCT-intensive. Mr. Minior recommended building agendas around "what's hot" according to schedules, and Ms. Grillo noted that in that case a meeting could be more focused on one program over the other. Mr. Mullennix added that if the teams are combined, meeting frequency could remain as it's been, but with the project managers having to attend only one meeting rather than three.

Agenda Item #6. Adjourn

Mr. Murphy adjourned the meeting at 8:10 p.m.



Action Items:

1. The IAGWSP will respond to requests for information on soil sampling and pH measurements associated with the 155mm item that was the focus of the cracked UXO item experiment.
2. CI staff will check to make sure that Tom Cambareri's name is on the mailing list for the monthly calendar.
3. IART members asked to be provided with an IAGWSP look-ahead schedule. Also, EPA recommended cancelling the January IART meeting.

Future Agenda Topics:

- Remediation & Investigation Update
- L Range Investigation/Feasibility Study

Handouts Distributed at the Meeting:

1. Responses to Action Items from the September 25, 2007 IART Meeting
2. Presentation handout: Remediation & Investigation Update
3. Presentation handout: Field Evaluation of Release of Explosives Compounds from a Cracked UXO Item Using a Pan Lysimeter
4. UXO Discoveries/Dispositions Since Last IART (Ending 11/30/07) All Awaiting CDC
5. News Releases, Neighborhood Notices, and Media Coverage 9/24/07 – 11/30/07