IMFD–SEE 06 AUGUST 2014

MEMORANDUM FOR RECORD

SUBJECT: Fort Detrick Restoration Advisory Board (RAB) Meeting Summary,
06 AUGUST 2014

1. Summary Contents

Items addressed at the meeting are listed below, with corresponding section numbers indicated in the column on the right.

Please note: PowerPoint presentations were utilized during the RAB meeting. A copy of the presentations is attached to these minutes and is incorporated into these minutes by this reference.

Text contained within brackets [] has been added for clarification purposes.

2. Attendees

Members Present:
Mr. Robert Craig, Fort Detrick, Acting Co-Chair
Dr. Gary Pauly, Community RAB Member, Co-Chair
Mr. Rolan Clark, Community RAB Member
Mr. Joseph Gortva, Environmental Restoration Program Manager
Dr. Elisabeth Green, Maryland Department of the Environment
Ms. Jennifer Hahn, Community RAB Member
Mr. Cliff Harbaugh, Community RAB Member
Ms. Karen Harbaugh, Community RAB Member
Mr. Barry Kissin, Community RAB Member
Mr. George Rudy, Community RAB Member
Mr. James St. Angelo, Community RAB Member
Mr. Robert Thomson, U.S. Environmental Protection Agency
Lt. Col. Brian Barthelme, Fort Detrick

Others Present:
Mr. John Buck, US Army Corps of Engineers
Mr. Gareth Buckland, Fort Detrick Environmental Office
Mr. Gary Zolyak, Fort Detrick Office of the Staff Judge Advocate
Mr. Keith Hoddinott, US Army Public Health Command
Mr. Paul Gordon, Frederick citizen
Mr. Bob Fitzsimmons, citizen
Ms Violet Rice, citizen
Mr. Randall Curtis, US Army Corps of Engineers
Mr. Wayne Rinehart, citizen
Ms. Lorraine Hoffman, citizen
Mr. James Kramer, citizen
Ms. Sylvia Carignan, Frederick News-Post
Mr. Jeff Samuels, Representative Delaney's Office
Mr. John Cherry, ARCADIS
Mr. Tim Llewellyn, ARCADIS
Ms. Shelly Morris, ARCADIS
Ms. Katrina Harris, Bridge Consulting Corp.

Members Absent:
Mr. Eli DePaula, Community RAB Member
Dr. Henry Erbes, Community RAB Member
Ms. Alicia Evangelista, Frederick County Health Department
Ms. Laurie Haines-Eklund, Army Environmental Command

3. Meeting Opening / Remarks

Mr. Robert Craig called the meeting to order. He thanked everyone for attending and welcomed everyone to the meeting. He introduced himself as the Environmental Compliance Chief for the Garrison and stated that he would be acting Army co-chair for this meeting. Dr. Gary Pauly

introduced himself as the community co-chair. Mr. Craig introduced COL Brian Barthelme and noted he would be representing the Garrison Commander and taking any comments back to the command staff.

Mr. Craig said that it was with deep sadness that he wanted to advise the members of the passing of Board member Helen Miller-Scott. Mr. Craig noted that Ms. Miller-Scott was a founding member of the Board, and he had just learned of her passing.

Mr. Craig advised that this meeting would be the last meeting for Col. James St. Angelo as he would be moving to Florida.

Mr. Craig welcomed Mr. George Rudy as a new community member.

Mr. Craig invited the Board and audience members to introduce themselves.

Mr. Gortva said that the Board has a charter in place but also needs to develop operating procedures. He advised that he had distributed a sample from Fort Monmouth and encouraged Board members to review the operating procedures for discussion at the November meeting.

4. Purpose of RAB Meetings presented by Dr. Gary Pauly, Board Community Co-Chair

Dr. Pauly summarized the purpose of the Board and meetings. He noted that a Restoration Advisory Board is put together whenever a Department of Defense facility sees it has to deal with significant environmental issues. Mr. Pauly stated that the Board is jointly chaired by the Army and a community member. He stated that the Board acts as a conduit between the Army, its contractors, regulators like the U.S. Environmental Protection Agency and the Maryland Department of the Environment, and the public by holding meetings to exchange information among all parties. He advised that the Board is not a decision-making body; it is a forum for discussion and provides an opportunity for members and the public to find out what is going on and to better understand the process. Dr. Pauly noted that the meetings are open to the public, and issues raised by the public are addressed. He stated that the Board does have ground rules and is limited by its charter to discuss only issues relevant to environmental restoration at Fort Detrick.

Dr. Pauly said that the Board tries to limit discussion to the set agenda. He advised that were several presentations planned, and that there would be time at the end of the presentations for discussion by Board members and then a time for open comments or questions from the general public. Dr. Pauly said that the meeting would adjourn around 9 p.m.

Dr. Pauly reviewed the meeting ground rules, noting that discussion is limited to environmental restoration program issues. He advised that that to facilitate communication, there is no video recording at the meetings. He stated that the public is certainly encouraged to participate, but he would ask their assistance in conducting the meeting in an orderly manner.

Dr. Pauly stated that the meetings are jointly chaired by the Army and the community, with himself being the community co-chair. Mr. Robert Craig stated that he would be the acting

Army co-chair. Mr. Craig explained that there is reorganization underway, and Col. Barthelme would probably not continue as the Army's co-chair. Mr. Craig said that a new Army co-chair will be appointed by the Garrison Commander.

5. Meeting Minutes presented by Mr. Joseph Gortva, Fort Detrick

Mr. Gortva noted that the minutes from the March 5 meeting had been distributed to the Board members for review. He apologized for sending them out late and said that he will send them out in the future within three weeks after getting the draft minutes. He asked Board members to send him any changes or comments by the end of the following week.

6. Area B Groundwater Investigation Update presented by Mr. John Cherry, ARCADIS

Mr. John Cherry reviewed the topics that he would be covering including an overview of US Army Corps of Engineers (USACE) shallow drilling at the Waverley property and an update on on-post and off-post deep drilling.

Mr. Cherry displayed a summary of work completed since the last Board meeting. He advised that two new deep monitoring wells had been drilled for a total of 5 intermediate or deep wells completed since December when the latest phase of drilling began. He stated that the two newest wells were on the County's Montevue campus (to the east of Area B) with one of the wells being about 400 feet deep. Mr. Cherry stated that the USACE had installed 11 shallow sampling points on the Waverley property. Mr. Cherry noted that all the work being performed is done in coordination with EPA and Maryland Department of the Environment, with seven decision-making calls having occurred with the regulators during this time period. He said that the constant communication with the regulatory agencies allows discussion of recent findings and next steps. Mr. Cherry said that he would also be discussing some of the drilling challenges faced recently.

Mr. Barry Kissin asked Mr. Cherry to start his presentation with the bad news. Mr. Kissin said that a monitoring well had been finally installed at depth on the Waverley property and a sampling result obtained. Mr. Cherry said that these results had been presented at the last Board meeting and would be reviewed later in his presentation. Mr. Cherry said that a well had been installed 150 feet from the fence line and concentrations were detected in the 200 parts per billion range which exceeds the Maximum Contaminant Level of 5 parts per billion but is significantly lower than what has been detected on Fort Detrick's side of the fence. Mr. Cherry said that other wells on the Waverley property are showing very low or non-detect concentrations.

Mr. Kissin stated that the Maximum Contaminant Level is a level set by EPA and levels above these standards are a threat to public health. He said that the amount detected on the Waverley property is 40 times the EPA standard.

Mr. Cherry said that the Maximum Contaminant Level is a drinking water standard, and fortunately there is no one drinking the groundwater containing trichloroethylene (TCE) or

tetrachloroethylene (PCE). He said that there are private wells in the area that have been tested, and a presentation on those wells would be given later in the evening.

Mr. Kissin asked EPA and Maryland Department of the Environment staff for their comments on the finding on the Waverley property and whether it is a threat to public health. Mr. Rob Thomson said that the detection shows migration offsite which is very important and the reason why more wells are being installed. He noted that the geology is complicated in this area, and EPA's geologist, Kathy Davies, was present at the meeting. Mr. Thomson said that one of the reasons why additional work is being done at Waverley is because contamination was detected.

Mr. Cherry reviewed a summary of the current phase of remedial investigation work which started in early 2011. He stated that in early 2011 all the groundwater monitoring wells within Area B were assessed. He noted that there are 80 to 100 wells in the study area, 2 or 4 inch diameter wells that provide points groundwater elevation measurements can be taken and water samples collected for laboratory analysis to see what contaminants may or may not be in the water. Mr. Cherry noted that the next step in the work was to install new monitoring wells throughout the study area, with many of those at deeper depths (300 to 325 feet range). He stated that the direct push investigation was completed on-post and off post. Mr. Cherry said that extensive stream and seep surveys were completed, walking miles of streams to look for springs where groundwater is seeping out of the ground and into the stream and eventually Carroll Creek. He said that locations where this was occurring were identified, and groundwater and spring samples were collected. Mr. Cherry advised that several rounds of surface water and groundwater sampling, along with elevation measurements, had been completed across the entire study area. He noted that two rounds of vapor intrusion sampling were completed at specified buildings off-post and on-post. Mr. Cherry said that an eight-month groundwater tracer study was completed where a tracer was introduced into the groundwater at depth (300 feet) in the known source area, B-11, which is the part of Area B where groundwater contamination concentrations are the highest. He explained that the tracer was then tracked at numerous points over an eight-month period to see the migration of the tracer which would be similar to the movement of groundwater contamination. Mr. Cherry said that the main objective of the tracer study was to see if there was movement of groundwater and groundwater contamination in a direction which had not yet been observed. Mr. Cherry said that each step in the process is one piece of the puzzle to reduce uncertainty and build a better and clearer understanding of the nature and extent of contamination. He noted that all the data, along with data from the ongoing on-post and off-post drilling, would be included in the Remedial Investigation Report and submitted for regulatory and public review and input.

Mr. George Rudy stated that the Board had been advised that this meeting had been postponed due to problems with the Waverley wells. He asked if the problems were related to the drilling process or was it connected to the lawsuit filed by the property developer. Mr. Cherry responded that the delay was related to the geology and encountering challenging conditions drilling the deep wells. He explained that the wells are very deep wells which generate large volumes of sediment and water while drilling and in the karst environment there is risk of creating or causing sinkholes. Mr. Gary Zolyak stated that the delay had nothing to do with the lawsuit or the Army's response.

Mr. Cherry displayed an aerial photograph showing Fort Meade's Area B boundary and the Waverley property. Mr. Kissin asked for confirmation that the contamination on Fort Detrick's boundary was 3,000 times the Maximum Contaminant Level. Mr. Cherry stated the detection was at 15,000 parts per billion at about 150 feet below the ground at the fence line. He said this is why there was a network of wells installed at different depths and what has triggered work on the Waverley property. He noted that it took some time to obtain access to the Waverley property for the drilling, and that part of his presentation tonight was to talk about that work and the extent of the contamination. Mr. Cherry said that a well at about 150 feet was installed just over the fence line on the Waverley property which showed concentrations at around 200 parts per billion. He said that there were other wells installed on the Waverley property at depths greater than 100 feet where the concentrations were below the drinking water standards or there were no detections of TCE or PCE.

Mr. Cherry advised that the work done by the Army Corps of Engineers was a first-water investigation. He explained that it was acknowledged there was a need for shallow, first-water groundwater data. He continued explaining that if volatile organic compounds were present at elevated concentrations in the shallow groundwater, there could be a need to investigate from a vapor intrusion perspective. Mr. Cherry said that a plan was developed to address this data gap and approved by the regulators. He advised that in July, 11 drilling locations were completed at fairly shallow depths, in the 40-foot range. Mr. Rolan Clark questioned the use of the word "gap" if no work of this type had been conducted previously. Mr. Cherry said that most of the drilling and sampling had been done at deeper levels, but perhaps a better term might be data "need." Mr. Cherry said that the 11 locations had been sampled, and that the samples are being analyzed at the laboratory with results to be discussed at the next Board meeting.

Ms. Jennifer Hahn referenced Mr. Cherry's slide which stated that data was being collected to assess the risk for potential vapor intrusion and that the next statement indicating there is currently no data to suggest there is an issue, and his verbal statement that no results have been received yet. She stated that this could be very confusing to someone looking at the Power Point presentation as it seems to indicate there is not a problem, however, the recent sampling data has not yet been received. She stated that the Power Point presentation should be changed.

Ms. Hahn asked if soil sampling would be conducted on the Waverley property. Mr. Cherry said that there are no plans to conduct soil sampling, as the issue is contamination in the groundwater. Ms. Hahn asked if soil sampling would be conducted if contaminants were detected in the shallow groundwater. Mr. Cherry responded that he could not foresee a scenario where soil sampling would be needed based on the shallow groundwater results. Mr. Gortva said that the investigation is looking at the migration of contaminants in groundwater to the Waverley property. He said the contaminants migrated from the soil [from the B-11 disposal area] into the groundwater; and that the contaminants are not moving from the groundwater up into the soil [causing soil contamination]. He said that if the first-water (shallow) sampling showed detections of volatile organic compounds above the Maximum Contaminant Levels, then the possibility exists for vapor intrusion if a home was built in that area. Mr. Gortva said that the soils do not have to be sampled; the groundwater needs to be sampled to see if there is a potential source for the vapor intrusion possibility.

Mr. Rudy asked if a source is found in groundwater would there be a potential for uptake in vegetation. Mr. Gortva responded that everything he has seen on uptake in vegetation states that volatile organic compounds [TCE, PCE and Chloroform] are not bioaccumlating in vegetation. Mr. Rudy asked about salmon in the Northwest where intake could be traced up through trees. Mr. Gortva responded if Mr. Rudy was referring to compounds that might bioaccumulate, such as PCBs which are semi-volatile, those types of compounds are bioaccumulating where volatile organic compounds [TCE, PCE and Chloroform] are not.

Mr. Gortva advised that once all the deep wells had been drilled and all the wells had returned to a steady state, samples would be collected and analyzed, so there would be a good, complete data set. Mr. Clark asked how long it took for newly installed wells to return to a steady state, and Mr. Gortva responded it took a couple weeks.

Ms. Hahn asked if the new wells had to be moved further away from the fence line than originally planned. Mr. Gortva said the wells were kept in the same area [as coordinated with EPA and MDE].

Mr. Cherry said that he would next be providing an update on the on-post and off-post deep drilling. He began by reviewing the scope of work. Mr. Cherry showed a map with arrows depicting the general groundwater flow through Area B. He said that based on the extensive network of monitoring wells, surface water gauging locations, and the dye trace study, groundwater flows from west to east and discharges along Carroll Creek, meaning it flows underground and them comes up into Carroll Creek. He noted on the other side of Carroll Creek, groundwater flows in the opposite direction. He pointed out the three data needs that had been identified for additional deep wells and were shown as A, B and C on the map.

Mr. Cherry said that the Waverley property is labeled A on the map. He stated that there were high concentrations on the fence line and concern where that contamination was going--was it possibly flowing off in a southwesterly direction, was it putting other properties at risk, was it going somewhere that no one was aware of, and at what depth was it moving since the nature of the contamination here is that it is denser than water and tends to sink and thus it is appropriate to drill deep to see if it is there.

Mr. Cherry said that the area marked B on the map is on Area B where there are many existing wells, but there was a need to install a deeper well for the same purposes previously mentioned related to the Waverley property.

Mr. Cherry said that the area to the east labeled C on the map is an area where there are quite a few monitoring wells on the property boundary, lots of shallow points in the stream area, but the question is whether contamination is migrating off and flowing at depth beneath Carroll Creek and perhaps in a more easterly direction.

Mr. Clark asked for an explanation of nested points. Mr. Cherry explained that one borehole would be drilled, but two screened monitoring wells would be installed at different depths in the one borehole, yielding two sampling intervals and allows for vertical profiling within the formation.

Mr. Cherry said that the scope of work called for seven borings and the drilling began December 6, 2013. He advised that one deep well and four shallower points (140 to 150 foot range) have been completed. Mr. Cherry stated that the objective on the Waverley property has been to install two monitoring wells to depths in the 400 foot range. He stated that the drilling team had run into issues, and that the deepest they have been able to drill to is 218 feet. He said that some fractured zones were encountered which require different equipment, generate large quantities of water and sediment, and created a potential risk to crew and the risk of losing equipment down the hole [due to drilling rods and tooling getting stuck in the borehole]. Mr. Cherry advised in late March it was agreed [by the Army, EPA and MDE] that the current approach was not going to get to 400 feet so some time was taken to re-evaluate the drilling method. He stated that drill crews will be back on site the following week to resume a follow-on effort to get to depth [using a modified drilling approach].

Mr. Kissin asked, if more money was spent on the work, would the drilling have been completed to 400 feet already. Mr. Kissin said that the Army was notified of a strong potential for there to be contamination off-post in 1977, and the investigation is just now getting underway.

Mr. Gortva stated that as the drilling has been proceeding, the Army has been in constant contact with EPA and Maryland Department of the Environment and looked at different alternatives to determine how to proceed. He said that various drilling methods were looked at and nothing was off the table because of cost as far as he was concerned. Mr. Gortva said that the Army's contractors looked at the best technologies available to get through this geology and as a result of the discussions, completely different drill rigs were brought in. Mr. Gortva stated that the issue was not money but getting the best technology to drill through this very specific geology.

Mr. Kissin said that EPA tried to get the Army to do this off-post work for ten years, and the Army refused. He stated that it is probably why the base was put on the National Priorities List. Mr. Kissin said that the same thing was going on at Fort Meade; both sites were put on the National Priorities List at the same time. Mr. Kissin said that questions about contamination at Fort Detrick and the possibility of it moving off-post were raised back in the 1960s. Mr. Kissin said that the investigations are taking too long, and that the Army needs to find a way to do the work faster and spend whatever it takes to do the work faster.

Mr. Gortva said that the information being presented was to advise the Board and the community what actions the Army is taking to address the concerns about off-post migration.

Mr. Cherry stated that five monitoring wells were built into completed boreholes, and Packer sampling completed. He explained that Waverley-1 was drilled 100 feet from the property boundary, and that TCE was detected during the preliminary sampling above the Maximum Contaminant Level at around 200 parts per billion. Mr. Cherry said that this detection is above the drinking water standard, but no one is drinking this water. He said that the concentrations on the Fort Detrick side of the fence are at 15,000 parts per billion. Mr. Cherry noted that the detection confirms what was expected after the detection on Fort Detrick's side during the work conducted in 2011. He reminded the Board that it had taken some time to get access to the Waverley property to conduct the drilling.

Mr. Cherry advised that sampling of Waverley-2 found no detections, and sampling of Waverley-3 found detections below the Maximum Contaminant Level which were "J" qualified by the laboratory meaning they were below the limits of the analysis equipment.

Mr. Cherry stated that the preliminary results for County-1 at the shallower well (99 to 109 feet below ground surface) was at 0.1 for TCE and that the deeper well (382 - 397 feet below ground surface) was non-detect. Mr. Cherry said that these results would be confirmed when the monitoring wells are sampled.

Mr. Rudy asked for confirmation that the results for the well on the County are not yet final. Mr. Cherry explained that all the data from the new deep wells was obtained through Packer testing which is preliminary but usually correlates to the data from sampling the completed monitoring wells.

Ms. Hahn asked about the detection of PCE in the County parking lot which may or may not be related to Fort Detrick. Mr. Gortva agreed that the source of the PCE has not been confirmed. Mr. Gortva stated that Mr. Cherry was only presenting preliminary screening data on the new deeper wells. Mr. Gortva stated that the information Ms. Hahn was referring to older data from the direct push wells collected about two years ago where there was one detection of PCE. Mr. Gortva said that this detection is still part of the data being assessed to see if it is associated with Area A or Area B. He stated that the location was monitored as part of the dye trace study, and that the tracer was not detected at this location so it may not be connected with Area B; more information needs to be obtained. Mr. Gortva said that the information being presented at this meeting is on deeper wells installed on the County property to see if contaminated groundwater is flowing under Carroll Creek. Mr. Gortva said that the initial screening data shows no detection of TCE or PCE at the deeper levels, and that at a depth of 99 to 109 feet there was just trace detection TCE at 0.1; there was no PCE detected in the new well.

Mr. Rudy commented that the Power Point slide could be confusing as it draws conclusions that do not reflect all the data and open issues. He noted that the slides end up being referenced at public hearings and the slide indicates there are no problems. He suggested footnotes be added to reference other data such as that just mentioned by Ms. Hahn so it is clear there are still open issues. Ms. Hahn said that she has received calls from friends that say things look pretty clear, and when she asks the source of their information, she finds that they are looking at information from one meeting and she needs to point them back to information from several months earlier so they have the complete picture. She said that it is very confusing for the public to understand the information from the Board meetings. She agreed with Mr. Rudy that there should be footnotes added or a statement that references what was found in the past.

Mr. Cherry showed an aerial photograph with TCE data from one of the comprehensive sampling rounds conducted in 2012 with more recent data from the interim Packer testing over the last six months. He explained that all the dots on the map are monitoring wells and explained the color-coded legend. He stated that the highest concentrations of TCE are found in the groundwater near B-11. He said that the new locations on the Waverley property are helpful in providing a better understanding of what is happening in that direction, and that it appears there

are not significant issues migrating towards that property beyond the immediate area near the fence. Mr. Cherry said that the data matches the data obtained from the dye trace study. He noted that water at nearby homes has been sampled, and that the homes' water also sampled during the dye trace study and the tracer was not detected. Mr. Cherry stated that the tracer was introduced into the groundwater at B-11 and monitored throughout the area displayed on the photograph and beyond.

Mr. Kissin asked the depth of the Waverley wells. Mr. Cherry said Waverley-1 is at about 170 feet and Waverley-2 and 3 are at about 140 feet. Mr. Cherry said that the depth of Waverley-1 was selected in coordination with EPA and Maryland Department of the Environment to be the same depth as the monitoring well on Fort Detrick where the highest detections of TCE have been found. Mr. Kissin asked if there were plans to go deeper near Waverley-1, and Mr. Cherry said that there were no current plans to go deeper at that location. Mr. Gortva added that the concern being expressed by Mr. Kissin about contamination being deeper was addressed by the Waverley-2 and 3 wells.

Mr. Kissin asked the depths of the four wells on Fort Detrick showing contamination in excess of 1,000 parts per billion. Mr. Cherry responded that the deepest of those wells is about 329 feet. Mr. Kissin questioned why wells at the same depth were not being installed on the Waverley property. Mr. Gortva said that the objective of the current work is to look at where the contamination is and the potential remedies down the road. Mr. Cherry said that the deep drilling currently being conducted is to address the same concerns that Mr. Kissin is expressing.

Mr. Cherry reviewed the schedule of upcoming activities. He advised that deep drilling will continue the following week at the Waverley property and the Area B location. He said that the revised approach had been discussed with EPA and Maryland Department of the Environment and looks promising. Mr. Cherry said that he hoped to have results by the next meeting. Mr. Cherry said that once the monitoring well was completed at Waverley, the deep well would be drilled at B-11 to the 400 to 500 foot range. He noted that the deep drilling would continue to be coordinated with EPA and Maryland Department of the Environment. Mr. Cherry stated that all the data from the field work he had discussed earlier had been put into a conceptual site model report which is publicly available and was distributed to the Board. He said that the next step is the Remedial Investigation Report which is a key step at any Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site. He said that all the work being conducted under EPA and Maryland Department of the Environment oversight is directed at defining the nature and extent of the problem and developing the Remedial Investigation Report which will include a human health risk assessment. Mr. Cherry said that the report developed after the Remedial Investigation Report is a Feasibility Study which is used to assess options to address the problem. Mr. Cherry said that the Feasibility Study step cannot be reached until the crucial step of identifying the nature and extent of contamination is completed. He said that the Board will continue to be informed.

Mr. Rudy suggested that the presentation be updated to note that on the County-1 location in the past some contamination has been identified at that location even though the current results are different.

Mr. Rudy stated that the Waverley property has been planted with corn which creates a situation where a person has invested money to plant a field, on a piece of property that is contaminated. Mr. Rudy said that the Army has stated it has no obligation to inform that person so it is incumbent on the community members on this Board to advise the person who can then come back to the Army for clarification. Ms. Hahn asked if the planting of the corn would impact the results of the testing of the groundwater; she stated that an EPA document indicates it will have an impact and asked for clarification. Mr. Keith Hoddinott introduced himself as a risk assessor from the Army Public Health Command. Mr. Hoddinott said that a garden plant will set down roots between 18 and 24 inches; the contamination found on this property is between 40 and 300 feet. He said that corn roots are not going to go down that deep. Mr. Hoddinott referenced a site at Aberdeen Proving Ground, J-Field, where trees were planted to remediate the groundwater; however, the groundwater was at depth of only 20 feet and thus the tree roots could reach that groundwater.

Mr. Gortva gave an example of a factory being on a piece of property, TCE being spilled on the soil, and corn being planted in that contaminated soil; it would possible for the corn to uptake that contamination. Mr. Gortva said that if the groundwater was so shallow that the roots of the plant could intercept the groundwater, there could be uptake. Mr. Gortva said that the groundwater at the Waverly property is 40 feet deep [much deeper than corn roots]. Ms. Hahn asked if the shallow wells were full monitoring wells and not direct push, and Mr. Cherry confirmed that they were augured wells.

Mr. Clark asked for clarification that "first water" means where groundwater is first encountered, and Mr. Gortva confirmed that was the meaning of the term.

Ms. Hahn referenced a 36-page EPA article she had found that discussed the planting of corn and groundwater. Ms. Hahn agreed to distribute the article to the Board. She stated that it was her opinion that it is unethical for the farmer to sell this corn. She questioned whether the Army had a responsibility to advise the farmer of the groundwater issues at the property. Mr. Gary Zolyak responded that the Army does not privity of contract between the landlord and the tenant. Mr. Zolyak said that the tenant should have been aware of the property status as there had been much publicity in newspaper articles, and that the farmer should have been aware of the potential for the public to be concerned about the quality of the corn. [Based on the depth of groundwater being approximately 40 feet below the ground surface, corn roots could not be directly impacted by potentially contaminated groundwater. In addition, preliminary sampling results for recently installed shallow groundwater wells shows that only wells directly adjacent to the fence line abutting area B-11 have TCE or PCE detections above drinking water standards and is confined to this portion of the property. The sampling data results and the approximately 40 foot depth to groundwater confirm that there is not widespread contamination or high levels of contamination that could be impacting the crops.]

Mr. Rudy said two issues at hand are whether the planting of corn in any way disturbs the contamination, which he doubts that it would, and secondly, what is the impact on the crop. Mr. Rudy said that another issue is the professional recommendation on the use of that crop. He said he thinks the Army owes the community answers on these issues. Mr. Gortva said the Army that would read the article Ms. Hahn is referencing and how it pertains to the current situation and

present information at the next meeting, as well as putting clarification in the meeting minutes. Mr. Rudy noted that the crop would be harvested before the next meeting, and that the planting farmer should have the information before that time. Mr. Gortva responded that if the Army determined there was an issue, the information would be provided to EPA and Maryland Department of Environment and other appropriate parties. [Documentation provided a member of the RAB was

7. Off-Post Private Well Investigation presented by Ms. Shelly Morris of ARCADIS

Ms. Morris said that she would be reviewing the basis of the project, the steps taken, and a summary of the results.

Ms. Morris advised that the basis of the project was to document known or previously unknown drinking water wells in the community around Area B and put all the information into one report; to expand Fort Detrick's tap water sampling program which has been going on for decades and compile all the data into a comprehensive data set; and, to further verify whether volatile organic compounds emanating from Area B have impacted drinking water wells in the surrounding community.

Ms. Morris advised that the study area for the project was approximately 1,300 acres around Area B. She said that there were approximately 2,522 tax parcels, and approximately 149 parcels not serviced by public water. Ms. Morris explained that part of what was done to identify the parcels was to look at where the City of Frederick is supplying water. Ms. Morris displayed a map of areas with public water and areas where public water is being phased in. She noted that the majority of the study area is covered by public water service

Ms. Morris reviewed the steps taken during the project starting with determining who had a private well. She noted that they had worked with the City of Frederick to identify parcels that had water and by process of elimination which had private wells. Ms. Morris said that public outreach was done including newspaper announcements, mailings offering sampling, and a public meeting. She noted that staff also went door to door to 135 residences. Ms. Morris advised that certified letters were sent to parcels in the County area which does not have connection to public water as a last ditch effort to offer well sampling. Ms. Morris said that 93 wells were sampled on 91 properties, the results reported to the property owners, and the final meeting on the project held through the presentation at the Board meeting.

Ms. Morris summarized the sampling results. She stated that there were no volatile organic compound detections at or near the Federal drinking water standards, and that no volatile organic compounds were detected in 66 of the 93 wells sampled. Ms. Morris advised that 27 wells had very low-level volatile organic compound detections; 26 wells had a single chemical detected and 1 well had two chemicals detected. Ms. Morris stated that there was one very low-level detection of TCE at 0.1 part per billion and one low-level detection of PCE at 0.1 part per billion; she explained that both detections were given a J flag by the laboratory indicating the detection was at or near the laboratory's analysis limit and below the limit where the laboratory could confidently [accurately] report a detection.

Ms. Morris displayed a chart of results. She referenced the one detection of TCE and the one detection of PCE of 0.1 part per billion compared to the drinking water standard of 5 parts per billion. She said that chloroform was detected in eight wells is also a drinking water disinfectant; those detections ranged from 0.1 part per billion to 0.3 parts per billion. Ms. Morris advised that MTBE, a gasoline additive, was detected in 14 wells from 0.1 parts per billion to 0.4 parts per billion. She stated that 1,2-dichlorobenzene was detected in one well which is a paint or insecticide additive. Ms. Morris advised that 2-butanone was detected in one well at 2.7 parts per billion which is a component of car exhaust or cleaning agents. She said that there was one detection of benzene which is a gasoline component at 0.3 parts per billion, and one detection of styrene at 0.4 parts per billion. She explained that the only detection not having a J flag was the detection of 1,2-dichlorobenzene. Ms. Morris pointed out the drinking water standards on the chart and noted that none of the detections came close to the standards.

Ms. Kathy Davies of EPA asked Ms. Morris to explain why there would be a drinking water disinfectant byproduct in a private well. Ms. Morris said that there could be a number of explanations; she said bleach used in washing machines reacts to the organic materials perhaps coming from the septic system and thus impacts the well water. Ms. Davies said that she still did not understand the description of chloroform as a drinking water disinfectant in a private well; she said while it potentially could be from a disinfectant, it is also a chemical of concern on Area B. Mr. Gortva said that some people shock their wells by periodically putting bleach down the well to disinfect the well; in addition, if they have treatment systems like water softeners, the systems can build up a layer of slime and periodically a well owner may add bleach to clean it out. Mr. Gortva said that the slide will be modified to address Ms. Davies' concern. Ms. Morris said that an upcoming slide would show the distribution of the chloroform and might help explain why it could be believed to be a disinfectant.

Mr. Rudy asked if there was investigation done to go back and find out if the things Mr. Gortva had mentioned were done to these wells. Mr. Gortva said that upcoming slides would talk to this issue.

Mr. Clark asked if the tap water was sampled or if the sample taken from the well. Mr. Gortva said that the samples were collected before the water went through any water treatment systems [where possible]. Ms. Morris said that they had the homeowner show the sampling team the well, and where possible, a sample was collected from the well; most of the time it was collected from after the pump.

Ms. Morris displayed a map showing a summary of the sampling results. She noted the area had been divided into quadrants as reference points to protect the privacy of individual property owners. She stated that in quadrant 1 there were 9 wells sampled, with detections of chloroform in three wells, and six wells with no detections of volatile organic compounds. Ms. Morris advised that in quadrant 2, 28 wells were sampled, with three wells showing detections of MTBE, 1 well showing a detection of chloroform, one well showing styrene, and one detection of 2-butanone; there were no detections in the remaining wells. Ms. Morris explained that in quadrant 3, 35 wells were sampled, with 10 showing detections of MTBE, two detections of chloroform, one detection of TCE, one detection of PCE, and 23 wells with no detections of volatile organic compounds. She stated that in quadrant 4, 21 wells were sampled, with one well

showing MTBE, two chloroform detections, one 1,2-dichlorobenzene detection, and one benzene detection; 16 wells had no detections of volatile organic compounds. Ms. Morris pointed out that a few wells outside the study area where homeowners had requested their wells be sampled; she noted that these wells had been sampled. Ms. Morris stated that the chloroform was widely distributed across the whole study area, and based on groundwater flow direction; it would not be expected to see any impact from B-11 in that area. [Based on the wide distribution of detections there were no discernible patterns that would indicate a plume from Area B is impacting the residential wells that were tested. In addition, based on all groundwater elevations and monitoring to date indicate that the wells with detections are hydraulically upgradient (uphill) or side gradient from Area B and are not being impacted by the Area B groundwater site.]

A member of the public asked about Carroll Creek. Mr. Gortva responded that the purpose of the work Ms. Morris was presenting was to look at private drinking water wells and that there were no wells identified near Carroll Creek. Dr. Pauly added that there has been testing of Carroll Creek throughout the investigation, but it was not part of this study.

Dr. Green from Maryland Department of the Environment asked if any work had been done to locate properties on the public water system but which might have old private wells. Ms. Morris said that letters had been sent, but there had been no response. Mr. Gortva said that they had hoped to have any older wells identified so they would have another data point. He said that there has been a lot of new development and that the homes were put in with municipal water supplies; he said that the old homes were torn down and that the old wells probably destroyed. Ms. Morris said that at some point in time the City of Frederick put in a requirement to close private wells when a homeowner connected to the public water supply.

Ms. Morris continued summarizing the sampling results. She noted that the detections from the sampling do not seem to be related to contamination on Area B because of groundwater flow direction being in an easterly direction away from the properties with private wells. She added that the private wells are topographically higher than Area B and hydraulically upgradient. She said that the pattern of detections were one-time hits which were scattered so there was no pattern indicating migration. Mr. Clark asked for clarification on the statement of the detections being one-time hit; he asked if there had been additional samples collected after the first detection. Ms. Morris responded that the two locations where TCE and PCE were detected were re-sampled. She said that the second round of sampling showed the TCE as almost exactly the same J flagged concentration, and that the PCE was not detected in the second round of sampling.

Ms. Morris stated that chloroform and MTBE are common chemicals in the environment, and with wide distribution and low concentrations, there does not appear to be a single point source. She said that the work also involved looking back at the groundwater data from Area B, and four of the volatile organic compounds detected in the drinking water wells have been infrequently detected (less than three times in decades of sampling).

Mr. Rudy said that the statement on the slide which says chloroform and MTBE are common chemicals is misleading. He said that the only source of MTBE is gasoline. Mr. Gortva said that the minutes will note they are not natural products; the intent was to say if you look at

environmental sampling done across the nation, anyplace where there are gasoline stations from the 1970s up until recently when they stopped use of MTBE (when ethanol was added to the gasoline), MTBE is commonly found in the groundwater.

Ms. Morris advised that the wells with the possible PCE and TCE detections were added to the dye tracer study to determine if there was any direct correlation between those wells and Area B. She noted that the property owner whose well had a possible PCE detection agreed to participate; no dye was detected in this well. Ms. Morris said that the property owner whose well had a possible TCE detection did not agree to participate. She noted that both wells are southwest of Area B and that the just completed groundwater tracer study confirmed what had already been determined that the groundwater is flowing in an easterly direction away from these properties.

Ms. Davies commented that some of Ms. Morris' comments may be misleading. She said that they need to be clarified such as specifying the dye being put in at a particular location and found in subsequent locations downgradient. She continued that those areas are hydraulically connected, but that is just from that one location where the dye was put in the groundwater, and it does not necessarily represent anyplace where any of the contamination may have been put into the ground. Ms. Davies suggested that the presentation contain more specifics such as the dye was introduced at this location and was not detected at these locations. [This information will be added to the slide as a clarification]

Ms. Hahn said it had been repeatedly said that this plume is moving eastward; however, Ms. Davies stated at a previous meeting that the contamination is heavy and if there is a fracture that goes west, that contamination will go west and not flow with the groundwater. She stated that none of the slides have reminded anyone of this possibility.

Mr. James St. Angelo commented that even if there is a fracture, it is only a short distance before the contamination begins to follow the easterly groundwater flow direction. Mr. Gortva stated that the dissolved phase of the contamination follows the groundwater flow. He said that the pure phase TCE or PCE can move into fractures and may go to west and that is why the current studies are looking at the geology and fractures and helping us to determine if there are any other areas we have to look at in terms of the geology. Mr. Gortva said that it is also part of the reason why the Army is placing the additional deep wells in certain locations in order to look at the geology and potential pathways, and if the Army determines additional information is needed to address concerns that Ms. Davies and Dr. Green may have, there may be additional wells installed or additional information that has to be collected. Mr. Gortva said that the Army is allowing the information as it is collected to drive what investigations and actions have to be completed.

Ms. Hahn stated that she had a city or county attorney state that the groundwater flow direction was confirmed, and she was concerned that there could be some misconceptions how the chemicals can move so she just wanted the issue clarified for the record.

Mr. Rudy noted that previous presentations indicated the Army is providing some homes with bottled water; he asked how water used by these homeowners for showering and laundry is handled. Mr. Gortva responded that this issue was not part of this meeting's presentations; he

stated the restoration program at Area B and associated activities is very large and complex and it is impossible to put everything into one presentation. He said in brief that there are four or five homes along Kemp Lane that have been sampled quarterly since 2006, and some since 2000. He explained that there was a one-time detection of TCE at five parts per billion at one of the groundwater monitoring wells along Fort Deterick's boundary and a one-time detection of TCE at 1.2 parts per billion, J flagged, across the street. Mr. Gortva said that the Army offered individuals bottled water and continues to monitor on a quarterly basis. He advised that the City of Frederick recently put in public water in this area, and that the Army is close to finalizing the documentation necessary to connect these homes to the public water system.

8. Off-Post Private Well Investigation presented by Mr. Randall Curtis of US Army Corps of Engineers

Mr. Curtis stated that his team had created a report entitled "Operational History for Potential Environmental Releases" for Fort Detrick, and the report is available on Fort Detrick's web site. He said that this is the second archive search report prepared for Fort Detrick, and he had discussed the first report on herbicides some years ago.

Mr. Curtis reviewed a list of topics he would be covering in his presentation, including a review of the purpose, scope and process, documentation looked at and how the safety program worked at Fort Detrick, specifics on the different types of releases which might be of most concern, biological agent potential, agents used to decontaminate those biological agents, operations on-post that dealt with TCE and PCE, radioactive materials used on-post, petroleum/oil/lubricants used on post and not previously addressed in the environmental program, munition activities, and pest control activities.

Mr. Curtis described the purpose of the archive search report as taking a look at past operations performed on-post to identify potential environmental impacts from those operations. He stated that the first activity performed was looking at issues associated with 2,4,5,- T compounds used in making Agent Orange and trying to identify the scope and nature of what had been done, how much, and where at Fort Detrick. Mr. Curtis said that a preliminary report was prepared in 2011 on 2,4,5-T and herbicides and finalized in 2012. Mr. Curtis said that he would refer to this report as Archive Search Report 1, while Archive Search Report 2 is a companion volume reviewing non-herbicide operations on Fort Detrick.

Mr. Curtis said that the records on the anti-crop agent program at Fort Detrick showed two parts to the program--a chemical side that did the herbicide work and a biological side that worked with pathogens, such Southern Blight, and other agents which would destroy crops.

Mr. Curtis said that the scope for the archive search report was not limited and included any on-post activities in Areas A, B or C.

Mr. Kissin asked that before Mr. Curtis continued with his presentation could he tell the Board if any of his findings indicated there were any impacts on the environment. Mr. Curtis said yes, the search had indicated the potential for environmental impacts, and he would be providing more details in his presentation.

Mr. Curtis said that most of the archival records are no longer at Fort Detrick. He advised that at one time there was a technical library at Fort Detrick which housed documents such as notebooks with technical information; when the installation got out of the bioweapons business in the early 1970s, records were disseminated to other technical libraries such as Aberdeen Proving Ground or Dugway and elsewhere such as the National Archive or Records Center.

Mr. Curtis said that when Fort Detrick was established its purpose was to be the head of research, development, testing and evaluation (RDT&E) of biological agents that could be used as weapons, and the nature of that mission focused what kinds of things happened at Fort Detrick; however, it was part of a larger facility and was not the only activity that occurred at Fort Detrick.

Mr. Curtis said that different agents were used to attack agricultural animals or crops, and a number of items were evaluated for the potential to be weaponized. He said that this mission impacted how Fort Detrick was laid out, and he displayed a diagram of the installation during World War II. He said that the footprint was fairly small, with buildings congregated in Area A. He said that there was a restricted area or limited area where active agents were being used. He noted that in addition to the facilities that are part of most Army bases, there were specific facilities associated with the research and development mission such as laboratories; enclosed test chambers where agents were tested in a controlled environment, decontamination done, and then another test performed; pilot plants where agents were produced in batch quantities; incinerators to incinerate solid materials and to incinerate the air being vetted off from other experiments; and, controlled sewage systems and disposal practices.

Mr. Curtis advised that there is a brief history of Fort Detrick in the report. He said two significant points about Fort Detrick's history were the importance of the safety program, which was different from other installations where he has done hundreds of these types of reports, and the type of documentation seen here at a RDT&E facility as opposed to a regular Army post.

Mr. Curtis said that a significant fact about the historic safety program was the number of people in the Safety Division which was 86 or one of every 25 people on the post. He said that there were five Colonels on-post, and one of the Colonels was in charge of the Safety Division. Mr. Kissin state that he did not see the relevance of discussing the safety program from the 1940s in light of environmental issues at Area B. Mr. Rudy agreed that the discussion should be more focused on today and not the past.

Mr. Craig said that the purpose of the Board is to address environmental issues, and the purpose of the archive search research is to find out if anything was missed and needs to be addressed.

Mr. Curtis said that the historic documentation at Detrick is science-oriented. He said that the PhDs working at Fort Detrick at the time would start with handwritten notebooks, develop test plans and reports, conduct experiments, and then publish reports. He advised that his team had reviewed the notebooks and the resulting reports. He said that his team tried to reassemble all the information to get a clear picture of what was done at Fort Detrick.

Mr. Curtis next discussed the results of the archive search report. He said that there was no open air or field tests of anti-personnel or anti-animal agents on-post; those were limited to interior laboratories and enclosed test facilities. He said that when open-air or field tests were done on-post, they would use simulants, SM and BG, with one simulating bacteria and the other simulated spores or anthrax. He explained that they might use a simulant in one of their gadgets and see how it would disperse or to check whether a recently constructed test chamber would leak. Mr. Curtis said the test would be done repeatedly until the live agent was used.

Mr. Curtis said that field tests with anti-crop agents were done on Fort Detrick with Southern Blight, cereal grain rust, and rice blast. He noted that these tests would typically be done when there was the least potential to impact any crops in the surrounding area, such as after the growing season. Mr. St. Angelo said that there were some questions in the past about how the field tests were done and asked Mr. Curtis if the agents were sprayed, if helicopters were used, or was it done in a more controlled environment. Mr. Curtis responded that it depended on the specific test. He explained that there were tests with helicopters using simulants or color as live agent would not necessarily have been visible. Mr. Gortva said that there was concern about helicopters dispersing herbicides on Fort Detrick and asked Mr. Curtis to confirm there was no such tests done on Fort Detrick; Mr. Curtis concurred.

Mr. Curtis next discussed the potential for there to be agents in the RDT&E facilities (laboratories, test chambers, incinerators). He said that during the demilitarization process the buildings were decontaminated, and all but four of the buildings were certified for any reuse. He noted that one of the four buildings has since been razed, while the other three are still in use by the Department of Public Works.

Mr. Curtis said that there was an incident where sludge containing anthrax spores was identified in the bottom of sewage plant holding tanks and that after putting a decontaminant of hypochlorite on the material [hypochlorite was mixed in with the sludge and testing for sterility], the material was buried in pit 12 of Area B.

Mr. Curtis next discussed the potential for there to be agents in landfills. He stated that during a removal action workers came across some material of a biological nature. Mr. Kissin said that what was found was live anthrax which resulted in the shut-down of the removal action. Mr. Gortva stated that what was found during the B-11 removal project was heat sealed vials, and that some of the vials that were tested came back as the non-pathogenic form of anthrax which was reported to everyone. Mr. Gortva said that the pathogenic form of anthrax had never been found. Mr. Gortva said that the removal action was temporarily shut down until safety procedures could be put in place, and then the action was completed as originally scoped to see if there were any more drums of TCE or PCE and to remove the material that was found. Mr. Kissin said that the report stated the interim removal action was terminated because of the discovery of live germs, the project was not completed as planned, and that a cap was put on the site. Mr. Gortva said that the removal action was completed as originally scoped for the chemical waste pits in 2004. Dr. Pauly said he was a member of the Board at that time and agreed with Mr. Gortva.

Mr. Kissin said that he would like to have a statement included in the record that because of the potential of finding live biological material in other disposal areas, a prohibition on future intrusive activities in waste areas was instituted. Dr. Pauly said that there was a plan in the beginning to excavate four pits; during the excavation of what he believes was the first of the four pits, biological agents were identified so the Army had to significantly re-engineer the system, but the four pits were excavated. Dr. Pauly said that when the four pits were finished, the Army said they were not going to do any more excavation.

Mr. Gordon, an audience member, said that in talking to workers who did the cleanup, there is no question that they were under pressure to speed up the process, and that they went through laboratories and swept everything with their arms into a bag and buried it in Area B which was not according to protocol. [Mr. Gordon is referring to the program closure when offensive research ended in 1969] Mr. Gordon said a lot of that material leaked out in rainstorms and there is no way to re-produce what was done during that period.

Due to the lateness of the evening, the Board agreed to defer completion of Mr. Curtis' presentation until the next meeting. Mr. Craig reminded everyone that the report is now available on the Fort Detrick's Web site at:
http://www.detrick.army.mil/responsible/repository/asr16June2014.pdf

Mr. Gortva advised that the Army is moving forward to investigate sites based on the archive search report. He said that a work plan for a site investigation is in the process of being finalized and will be sent out in the next few weeks to regulators and Board members to review and make comments.

9. RAB Member Open Discussion and General Community Comments

Mr. Gordon stated that he recalled receiving calls from five or six residents of Shookstown Road when he was Mayor saying that there were problems with the smell and taste of their well water. Mr. Gordon said that crews were sent out and agreed there was a problem, but it was beyond their abilities because something was seeping into the wells. Mr. Gordon said that he called the Commander of Fort Detrick at the time to report what could be leakage off Fort Detrick's property; the Commander said that it was not possible and that there was no money in the budget to investigate. Mr. Gordon stated that the cooperation between the Army and the City at that point disappeared because City offered as it did digging for water mains, etc., to monitor what was happening and to report if there were any pollutants and that the Commander was not interested. Mr. Gordon asked if as the archive search report was being prepared was any attempt made to talk to City employees about what was occurring at that time or were those records ignored. Mr. Gordon said that if the City and County employees had been talked to, perhaps it would not have taken 30 years to reach this point. Mr. Gordon said that it is not possible to test 30 years of run-off and it may be that run-off which has sunk into the ground. Mr. Gordon said that he asked about Carroll Creek because it is a key water body that runs through the City, and he has read in the newspaper that the Army did find pollutants as far as College Avenue. Mr. Gordon said that his concern is that the Army did not make use of information that was available that might have sped up the process. Mr. Gordon stated that he had not seen any information that

evening that accounted for what happened to the run-off over the past 30 or 40 years and wanted to know if it is creating a problem today.

Mr. Gortva thanked Mr. Gordon for his comments. Mr. Gortva responded to Mr. Gordon's concern about contamination getting into the soil by advising that as part of the restoration program the soils were investigated around the disposal sites, as well as testing of the sediment in Carroll Creek. Mr. Gortva said that all those results were reported to the Board. Mr. Gortva said that Mr. Gordon's concern of possible exposure pathways is something that is investigated as part of the restoration program and that as part of the Remedial Investigation Report, the soils and pathways will be assessed. Mr. Gortva agreed with Mr. Gordon that it is vital to make sure that the run-off from these different areas has been tested and will be evaluated as part of health risk assessment in the Remedial Investigation Report.

Mr. Kramer stated that he was a neighbor to Area B. He noted that the Army took their farm in 1944 and it became Area B. He said that his family grew up here, and most of the people in his family have cancer. He stated that if the Army would have asked him, his cousin or his cousin's son who farmed that land for 30 years, they would have been able to suggest places to drill or test. Mr. Kramer said that a couple million dollars has been spent testing everywhere around Fort Detrick except where the problem is and even now the testing is west of where most of the contaminants are located. He stated that the Army is not testing in front of where the contaminants are but have put hundreds of tons of stones on top of rusted barrels which are pushing these contaminants into the ground. Mr. Kramer said that former employees of Fort Detrick were not talked to who could have provided valuable background information.

Mr. Fitzsimmons said he lives off Shookstown Road, and this is the first meeting he has attended and will probably be his last. He said he cannot relay facts but can relay perceptions. Mr. Fitzsimmons said that the first thing he heard tonight was that the last meeting was in March and the meeting notes were not finalized yet. Mr. Fitzsimmons said that if this was an industrial site they would be told to put well points all the way around the perimeter and pump water out into a tank and clean and filter it and put back in the Creek. Mr. Fitzsimmons said that he did not know what alternatives would be proposed in the future, but it seems as if the site is being studied to death and that some alternatives could be started now. He advised that he had a well that goes down to 350 and did not have any problem having it drilled to that depth. Mr. Fitzsimmons said that some of the things he had heard at the meeting do not give the Army much credibility. Mr. Fitzsimmons said that he would like to see action in the near future and not more studying and testing.

Ms. Hoffman said that she wondered about the safety of animals from farms drinking water from Carroll Creek and humans then eating that meat.

Mr. Gortva responded the Army did test the water in Carroll Creek and very low levels of primarily volatile organic compounds were found that do not bioaccumulate in animals and that the levels detected in the water were below drinking water standards for humans. Mr. Gortva stated that the Remedial Investigation Report will have both a human health and an ecological risk assessment. Ms. Hahn stated that higher levels of volatile organic compounds (5 and 9 parts

per billion) were found in seeps and springs and that is where kids are playing and animals are drinking the water.

Dr. Pauly said that it was his understanding that the regulators were not in favor of moving forward with any type of action until all the studies and drilling were completed. Dr. Pauly asked that since there seems to be agreement that B-11 is the problem, could something be done to lessen the impact from B-11.

Mr. Thomson responded that EPA's concern is related to the source of the dense non-aqueous phase liquid (DNAPL); he said that he does not think pump and treat is going to be effective in the karst geology that exists at Area B. Ms. Davies added that EPA's approach to a site is to determine what contamination is there and where it is going. She said that sufficient understanding is needed so that when remediation is done, it is done effectively. She noted that questions need to be addressed about what materials were disposed of and where in the aquifer did the contamination move to and does it act as another source. She said that there needs to be an understanding of where the contamination is and where it is going and does it affect people currently and can it in the future. She noted that the drilling has to be done carefully so it does not move the contamination. Ms. Davies said that information in gathered so the process moves forward in a stepwise manner. She said that this investigation is moving along compared to some other sites, and that people are working together to figure out the best thing to do. Ms. Davies stated that the most appropriate remedy will come out of a comprehensive remedial investigation.

Mr. Fitzsimmons asked for the timeline for taking action. Mr. Gortva said that the timeline is being driven by the information as it is received; if the information calls for more deep wells, then more drilling will take place. He said that if it is determined by the regulators that there is enough information to complete the Remedial Investigation Report, the Army will then move onto the Feasibility Study which looks at alternatives. Mr. Fitzsimmons asked what are the potential fixes or alternatives and why can they not be started. Mr. Gortva said that the Army has have had some discussion with the regulators to see if any interim steps could be taken to address concerns. He said that Ms. Davies had some reservations because of the contaminant migration and wanted to collect appropriate information. Mr. Gortva advised that if the Army and regulators believe interim action is appropriate at some point, the Army will try to implement it as quickly as possible; if it is decided the Remedial Investigation and Feasibility Study need to be completed first before taking any action, the Army will do so. Mr. Gortva noted it is a collective decision among the regulators and the Army.

Ms. Hahn said that while she would like to see the process speed up, she wants the work done right and wants the right solution implemented. She stated that she would like to hear EPA's opinions more often and regrets they were unable to attend the last several meetings.

4. Next Meeting

Mr. Gortva noted that the next meeting was tentatively scheduled for November 5 and all agreed to this date. He proposed future meeting dates of February 4, 2015, May 6, 2015 and August 5, 2015.

The meeting adjourned at approximately 9:16 p.m.

Reviewed by:

Approved/Disapproved

Enclosures:
Fort Detrick Installation Restoration Program Area B Drilling Update
Off-Post Private Well Investigation Study Basis
Archive Search Report
Meeting Sign-In Sheet

DISTRIBUTION:
Each RAB Member (w/o enclosure)
Each Meeting Attendee (w/o enclosure)

Fort Detrick

Archive Search Report (ASR)

Operational History for Potential Environmental Releases

(non-herbicides or ASR "2")

Randal S. Curtis, P.E., Archival Research & Analysis

Outline

- ASR – Purpose, Scope and Process
- History / Documentation / Safety Program
- BW Potential
- Decontamination methods and chemicals used
- Operations with TCE and PCE
- Radioactive materials
- Petroleum, oil and lubricants (POL) facilities
- Munition Potential (storage, training ranges (conventional munitions) and exterior test grids / ranges)
- Pest control activities

ASR – Purpose and Scope

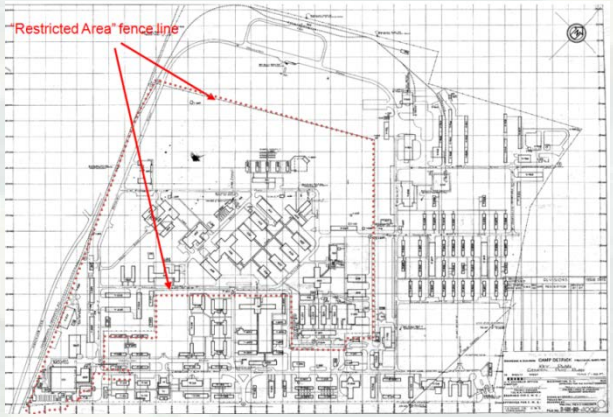
- **Identify potential environmental impacts of past operations based on archival material**
- **August 2010** – USAEC requested archive search focusing on:
  - use and testing of 2,4,5-T compounds (half of Agent Orange) due to concern of dioxin (TCDD), a manufacturing byproduct of 2,4,5-T.
  - broader potential sources of environmental contamination based on past RDT&E activities besides herbicides
- **ASR "1" Findings 2,4,5-T & Herbicides –** preliminary findings based on previously identified reports presented to RAB in February 2011. Final report following more complete research – April 2012
- **ASR "2"** - a companion volume reviewing non-herbicide operations on base
- **Scope** Fence to fence evaluation for Areas A (main post), Area B and Area C Water & Waste Water Treatment Plants.

ASR - Process

- Compiles information from historical materials stored at various off-site record storage facilities and analyzes it to determine the location and scope of past activities
- Reviewed thousands of boxes of records - most of which are located in archives and not at Detrick.

Detrick & BW RDT&E Program

- Biological Warfare (BW) Research, Development, Test and Evaluation (RDT&E) Program
- Agents used (anti-personnel, anti-animal and anti-crop)
  - pathogenic bacteria, rickettsia, viruses, fungi and toxins derived from living organisms
- Restricted Area – buildings and locations where agents in use separate from rest of post
- Facilities including
  - Laboratories
  - enclosed test chambers (e.g. “8-ball”)
  - pilot plants
  - incinerators
  - sanitary and contaminated sewage systems
  - solid waste disposal and landfills

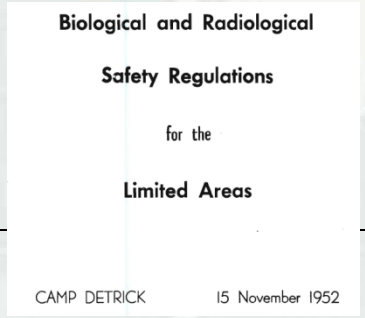


History of Fort Detrick

- ASR includes a short history complementing: *Cutting Edge,* Cochrane's 1947 WWII BW history & others
- Significant points potentially not appreciated:
  - Importance of Safety Program
  - Documentation of RDT&E facility

Safety Program

- Sept. 1943 - Safety Division activated
- Responsible for developing, testing, and implementation of safety requirements for all aspects of military BW operations
- Aug. 1944 - 86 people in Safety Division (1 of every 25 people on post); 1 of 3 Divisions commanded by Colonel, 1 of 5 Colonels on post including commander
- Personnel reduced post war but in 1950s to ~40
- Controlled removal of all equipment and material from potentially contaminated area


Biological and Radiological

Safety Regulations

for the

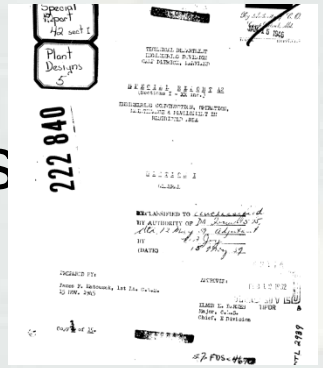
Limited Areas

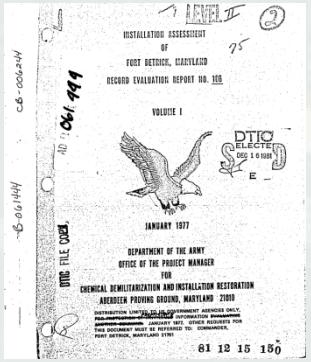
CAMP DETRICK 15 November 1952

Detrick Documentation

(beyond correspondence, orders and regulations)

- Test Plans and Test Reports
- Laboratory Notebooks - ~6,150 notebooks used 1943-1971 with ¾ remaining
- Published Reports
  - ► 1943-58 Special Reports Nos. 1-289 and Interim Reports 1-168
  - ► 1957- 71 Technical Memo, Study, Manual, Notes & Manuscripts
- Status Reports (Monthly, Quarterly Annual)
- **Environmental Investigations**



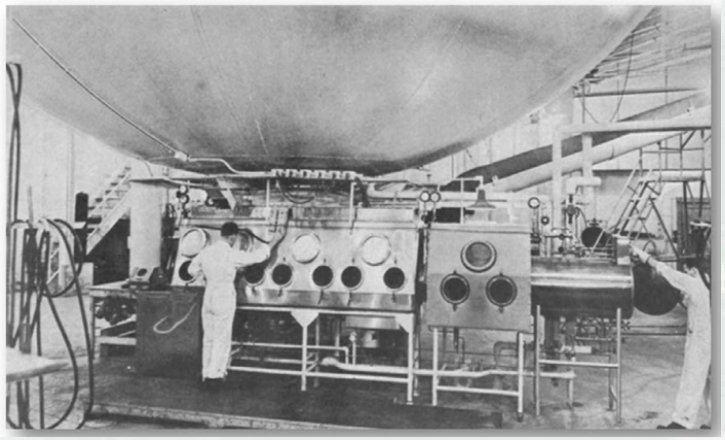


BW Agents Potential - General

- **No field or open air anti-personnel or anti-animal tests** with BW agents; limited to enclosed facilities
- open air or **field tests with simulants (SM & BG*) that mimicked pathogens** (Area B)
- **field tests with anti-crops biological pathogens** in Area A (e.g. Southern Blight, cereal grain rust & rice blast)

**Serratia marcescens (SM) & Bacillus globigii (BG),*

BW Agents Potential - Buildings



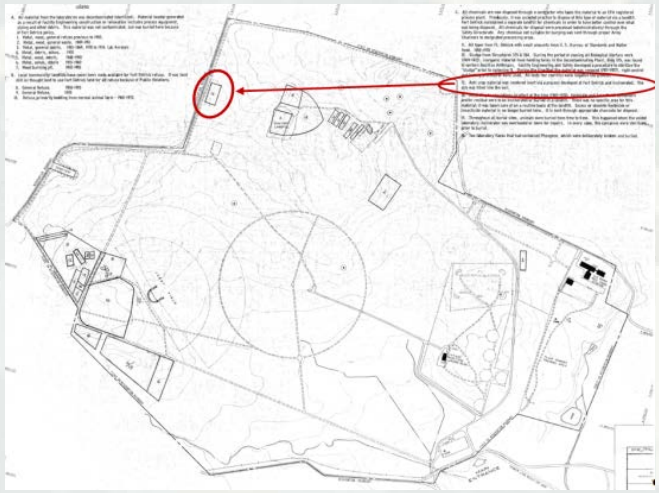
- RDT&E facilities including
  - laboratories
  - enclosed test chambers
  - pilot plants
  - incinerators
- 79 structures demilitarized in 1971-73 (decontamination of building & equipment); all certified for reuse except four (1 razed & 3 in use) due to concerns with *Bacillus anthracis* spores
- ~25 tons sludge in the bottom of the sewage plant holding tanks that showed the presence of *Bacillus anthracis* spores; buried in Pit 12 of Area B after being treated with hypochlorite

BW Agents Potential - Landfill

- Viable biological material in vials of medical waste comingled with other hazardous waste in the excavation at Area B-11 during a 2001-2004 interim removal action. IRP FTD 49 Long Term Monitoring (LTM)

Demilitarization of Rice Blast

- Beginning in 1966, anti-crop agent *Pircularia oryzae*, causal agent of Rice Blast, in cold storage
- Spores inactivated with Carboxide gas, incinerated and ash disked into soil early 1970s



Decontamination

- methods of sterilizing personnel, facilities and equipment was central to operations, whether working involves highly infectious biological agents or simulants
- Heat is primary method; typically steam applied directly to the surface, or enclosing the item within steam chamber (i.e. autoclaving). If the material is no longer required, incineration is an option.

Decontamination - Chemicals

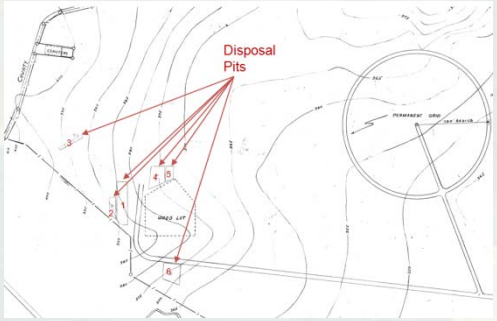
- When high heat could destroy delicate and valuable items decontamination primarily used chemicals for sterilization:
  - Beta (β)-propiolactone (BPL)
  - Calcium hypochlorite (as HTH (high-test hypochlorite) and bleaching powder)
  - Ethylene imine
  - Ethylene oxide as Carboxide gas (10% ethylene oxide and 90% co_2) and as 19% ethylene oxide and 81% Freon 12)
  - Formaldehyde (formalin, a 37% solution of formaldehyde in water and paraformaldehyde)
  - Sodium hypochlorite (aka. Liquid bleach or “Clorox”)
- Plus ~20 more used to a lesser extent

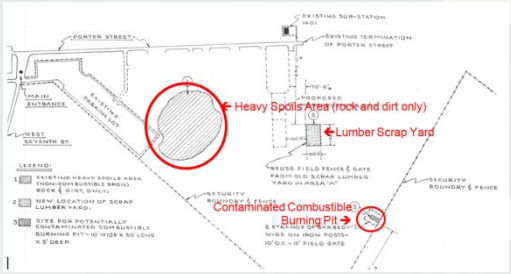
Solid Waste Disposal

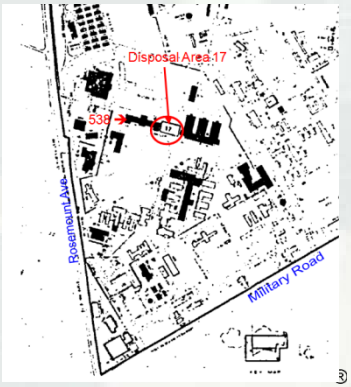
- Initially followed Army SOP of time regarding separating non-salvageable material:
  - burnable waste ➔ incinerator
  - non-burnable waste ➔ landfill
- In 1947, ~3,000 pounds of refuse a day from within the Restricted Area: 2/3 ➔ incinerated & 1/3 ➔ City of Frederick incinerator + additional 1,500 pounds daily from rest of post. Two loads of non-combustible material ➔ city dump daily
- In Jan. 1948, opened Incinerator at the Monocacy to incinerate noncontaminated rubbish. Operated until replaced by current Incinerator in 1975

Solid Waste Disposal (cont)

- 1948 - non-burnable trash pit established in Area B, various Disposal Areas over time, including current landfill (lots of maps in ASR)
- ~1957 thru 1960s - contaminated combustible Burn Pit & rubble disposal pit operated - previously investigated under DERP (IRP FTD 09 & 11 NFA)
- no clear evidence of a disposal, or landfill operation, relating “Disposal Area 17” in Area A used until 1947 (IRP FTD 08 NFA)







Liquid Waste Disposal – Contaminated Sewer

- effluent from within the Restricted Area where infectious agents work occurred contained in contaminated sewer system **separate** from regular sanitary sewer system
- piped effluent to holding tanks, regulating the flow rate to run treatment plants in batch mode that used heat to kill any live biological agents
- Original 1940s Decontamination treatment plants replaced by current one (IRP FTD 01 NFA)

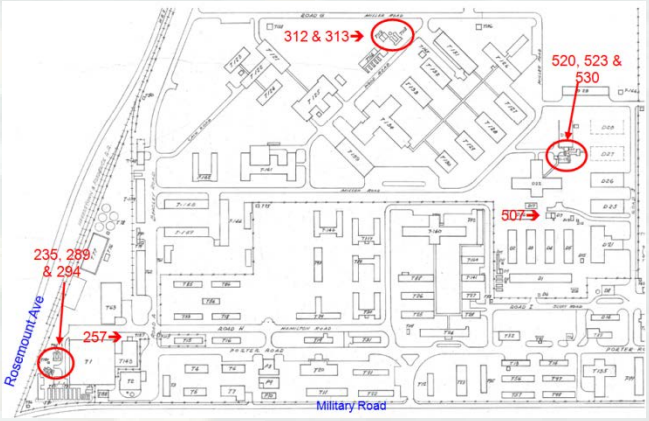
Liquid Waste Disposal – Contaminated Sewer (cont)

- Treatment and sterility ensured ➔ regular sanitary sewer system
- City of Frederick municipal system for handled sanitary sewage, but switched to Monocacy River plant.
- Sludge from the sewage disposal plant used as fertilizer on-post and off by the 1960s
- Not well documented but appears decontamination chemicals ➔ contaminated sewer via floor drains

Liquid Waste Disposal

- By 1952, large quantities of acid, used cleaning solution or contaminated flammable liquids were not to be poured down building drains but rather stored in carboys for removal and disposal
- Unclear how final disposal made, though later site plans indicated that disposal pits in Area B were used and have been investigated under DERP (IRP FTD 49, 50, 51, 69, 70 & 71 LTM)

Incinerators



- used for:
  - ► disposal of solid combustible waste included 1940s era incinerators on post, the one at the Monocacy River, and the current one. Frederick City Incinerator used in the past too.
  - ► decontaminate vent or exhaust gases
- Ash disposal procedures for the WWII era unclear, Later ash disposal locations (e.g. burial pits in Area B and near former Incinerator 1112) previously investigated under DERP (IRP FTD 49, 50, 51, 54, 69, 70 & 71 LTM) .

TCE potential

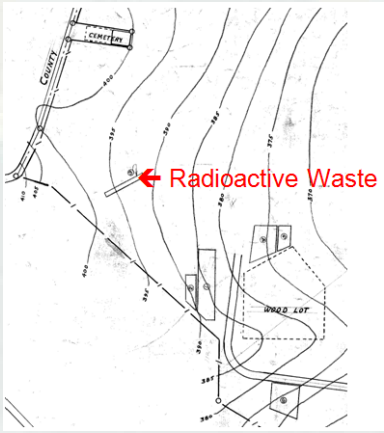
- TCE use at Detrick
  - ► industrial solvent for degreasing parts
  - ► refrigerant in the freeze-drying process & as a brine or secondary refrigerant for test chambers
- Refrigeration volume over 400 gallons in one storage tank location
- TCE based refrigeration systems in Bldgs 376, 470, 568, and 1412
- TCE near 568 apparent result of leaking drums stored outside
- Disposal of eight 55-gallon drums of TCE in Area B, apparently Pit 11
- PCE - limited amounts used as a solvent and degreaser and not as a dry cleaning fluid

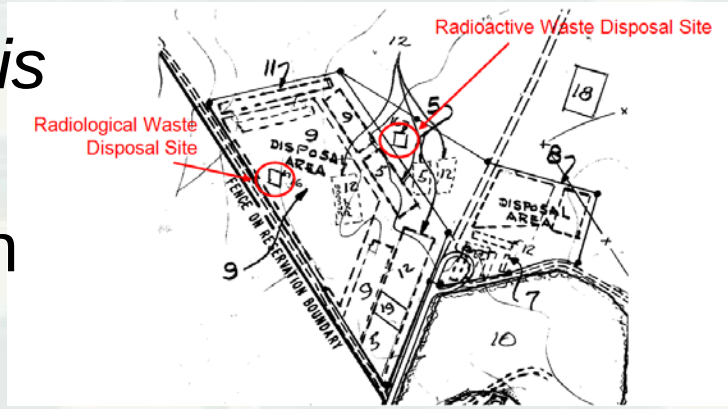
Radioactive Activities in Buildings

- Use began in 1948, amounts and location uncertain
- Radiological activities under licenses 19-01151-01 and 19-01151-02 occurred in Buildings:
  - 201, 236, 321, 427, 432, 433, 459, 467, 470, 524, 525, 538, 539, 550, 560, 567, 568, 600, 601, 605, 607, 1301 and 1412.
  - Only Buildings 201, 459, 568, and 1301 indentified in the 2002 decommissioning plan.

Radioactive Material Disposal - Landfill

- In 1951, trench in Area B with solid and liquid radioactive wastes
- Rad disposal locations moved over time in Area B
- In 1956 *"two separate holes 15x15x15 feet…in an area that is fenced"*
- On post burial ends in 1957 with activation Radioactive Material Disposal Facility (RMDF) at Edgewood Arsenal





Radioactive Material – Temporary Holding

- Stored and packaged waste for shipment elsewhere in Building 261
- By 1952, four 100 gallon tanks in Bldg 270 used to store liquid waste until natural decay (i.e. half life aging-out) allowing disposal in the sanitary sewer system, or allowed it to be diluted to the radiation level allowed by regulations of the time, continued through December 1999 when ceased.

Radioactive Material Disposal - Sludge

- By mid-1950s, sludge from sewage disposal plants as fertilizer on-post (@1948 start?) continued through the 1960s.
- From at least 1975 until 1997, sludge containing radioisotopes disposed at the post landfill in Area B.
- Subsequently, sludge sent low-level radioactive waste facility in Utah between 1998 and 2004.

POL Potential

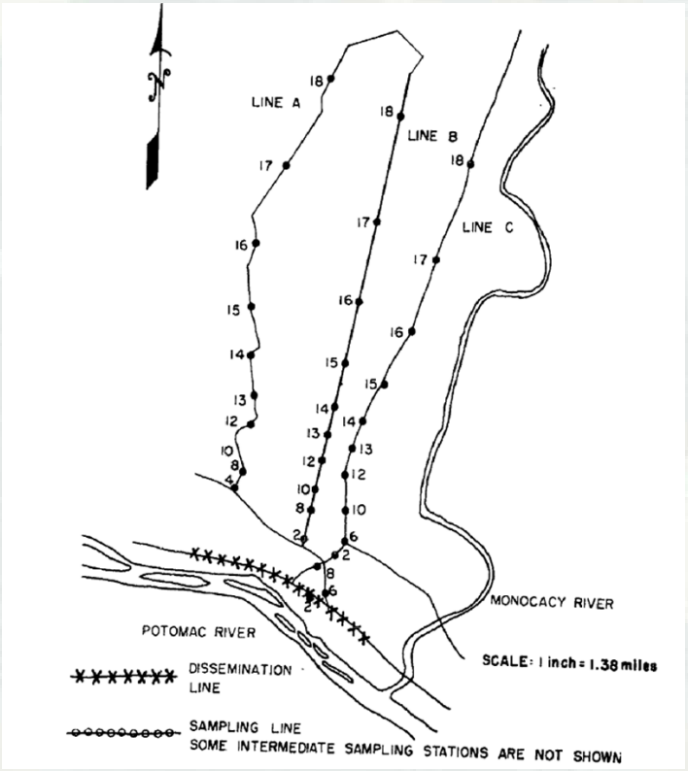
- potential additional ASTs and USTs containing gasoline, diesel, and No. 6 Fuel Oil not yet investigated under DERP:
  - Original “Gas” fuel tanks / Fuel Oil Storage (271)
  - vehicle gas dispensing station (705) north of Porter Street
  - former oil drum storage (513)
  - oil storage Building (365)

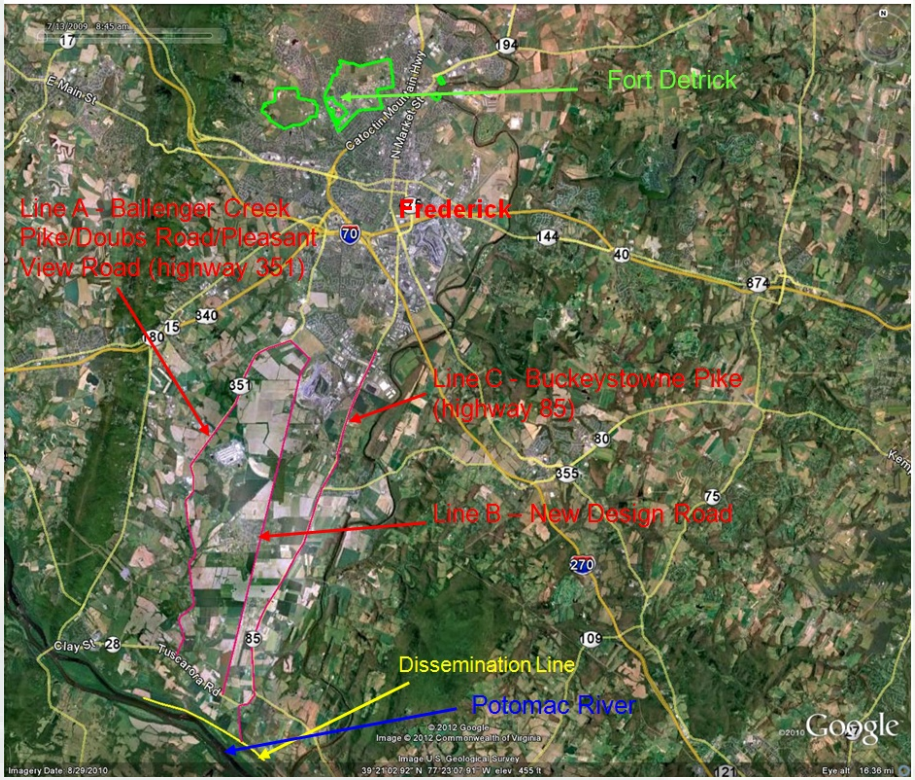
Military Munitions Response Program (MMRP) MRS

- Army previously Identified 4 Munition Response Site (MRS)
  - Permanent Circular Test Grid
  - Gun Emplacement, Building 1222
  - Demolition Pit
  - Ammunition Storage Area
- Other exterior grids do not warrant inclusion into MMRP as they are included 4 MRS or do not have ordnance & explosive hazard potential (e.g. temporary grid in Area A).
- Former interior small arms ranges (2) excluded and skeet range remediated (IRP FTD 29, NFA DD).

Monocacy Valley Simulant Tests

- July 1953 - dissemination tests using zinc cadmium sulfide (florescent particles) mixed with lycopodium spores (a flash powder), as a simulant for dry biological agent.





Pest Control Activities

- No indication Detrick used or developed exotic pesticides but rather depended on the use of those pesticides developed by others groups elsewhere

  "…*The usual consideration of property damage and loss, while important, are secondary to the BW hazard which is two- fold. Vermin gaining entrance to laboratories, animal buildings, and such facilities can destroy laboratory control by bringing in contamination. Conversely, if permitted to go out again alive, in their natural migrations they could carry whatever BW agent they had been in contact with to non-immunized post personnel and to the public*."

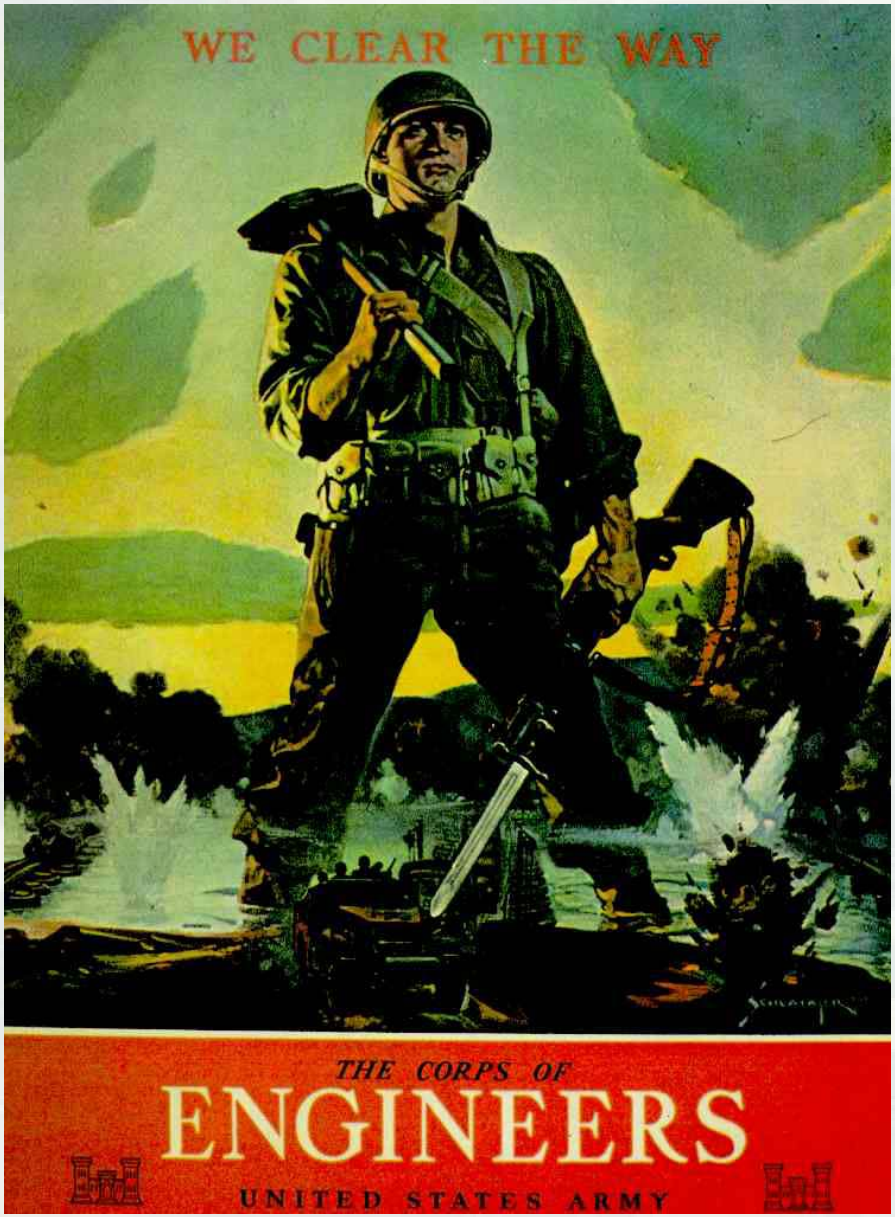
- Disposal in Area B Pit 14

Copies of ASR “2” & “1”

ASR Operational History for Potential Environmental Releases, 16 June 2014: **http://www.detrick.army.mil/responcible/repository/asr16June2014.pdf**

Companion volume: **ASR Findings for Field Testing of 2,4,5-T and Other Herbicides, 4 April 2012**

http://www.detrick.army.mil/responsible/ArchivalReport2012.pdf



Questions?

Fort Detrick, Maryland

Off-Post Private Well Investigation and Associated Activities

Final Results Presentation

Restoration Advisory Board

6 August 2014

Shelly Morris, ARCADIS

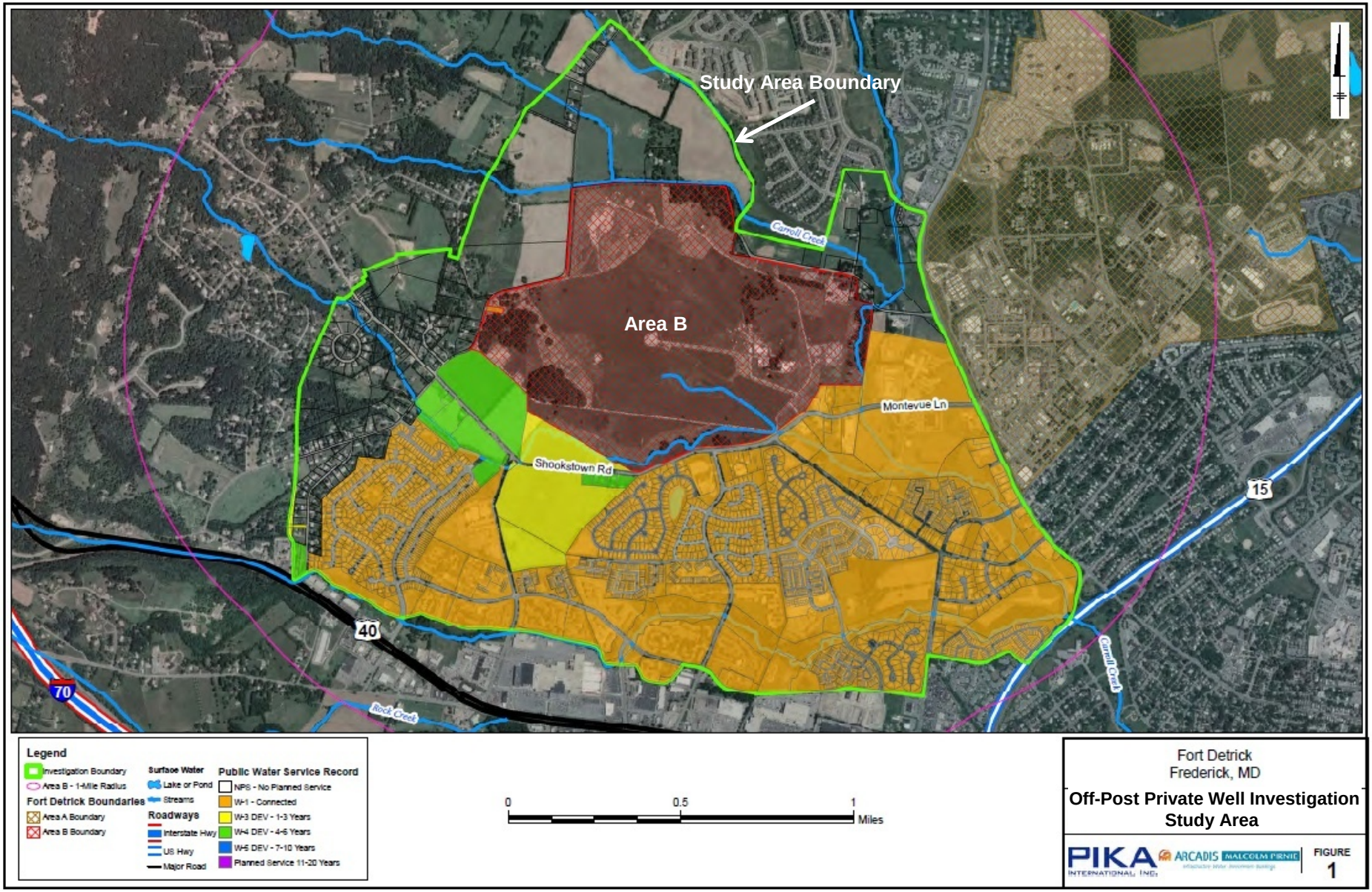
Off-Post Private Well Investigation Study Basis

- To document known and potentially unknown drinking-water wells in use surrounding Fort Detrick's Area B in a comprehensive report.
- To expand Fort Detrick's current drinking-water well sampling program and to compile all data into a comprehensive data set.
- To further verify that the volatile organic compounds emanating from Area B have not affected drinking-water wells in the surrounding community.

Off-Post Private Well Investigation Study Area

- Approximately 1,368 acres surrounding Area B.
- Approximately 2,522 parcels identified in the Study Area.
  - Approximately 149 parcels outside of public water service area.

Study Area


Study Area Boundary
Area B
Carroll Creek
Montevue Ln
Shookstown Rd
15
40
70
Rock Creek
Carroll Creek
Legend
Investigation Boundary
Area B - 1-Mile Radius
Fort Detrick Boundaries
Area A Boundary
Area B Boundary
Surface Water
Lake or Pond
Streams
Roadways
Interstate Hwy
US Hwy
Major Road
Public Water Service Record
NPS - No Planned Service
W-1 - Connected
W-3 DEV - 1-3 Years
W-4 DEV - 4-6 Years
W-5 DEV - 7-10 Years
Planned Service 11-20 Years
0
0.5
1
Miles
Fort Detrick
Frederick, MD
Off-Post Private Well Investigation
Study Area
PIKA INTERNATIONAL, INC.
ARCADIS
MALCOLM PIRNIE
FIGURE
1

Off-Post Private Well Investigation Status of Project Activities

Ø Identify/verify drinking water wells through research	Sept-Oct 2012
Ø Public Outreach (Mailings, Newspaper, Public Meeting)	Sept-Oct 2012
Ø Private Well Survey: 135 Residences Visited	November 2012
Ø Certified Letters (Third Mailing)	January 2013
Ø Private Well Sampling: 93 Wells/91 Properties	Nov 2012 – May 2013
Ø Reporting Results	July 2013
Ø Final Results RAB Meeting Presentation	August 2014

Off-Post Private Well Investigation Summary of Sampling Results

- No VOC detections at or near federal drinking water standards
- No VOCs detected in 66 of 93 wells sampled
- A total of 27 wells with very low level VOC detections
  - 26 wells with 1 VOC detected
  - 1 well with 2 VOCs detected
- One very low level detection of TCE (0.1 ppb)
- One very low level detection of PCE (0.1 ppb)

Off-Post Private Well Investigation Summary of Sampling Results

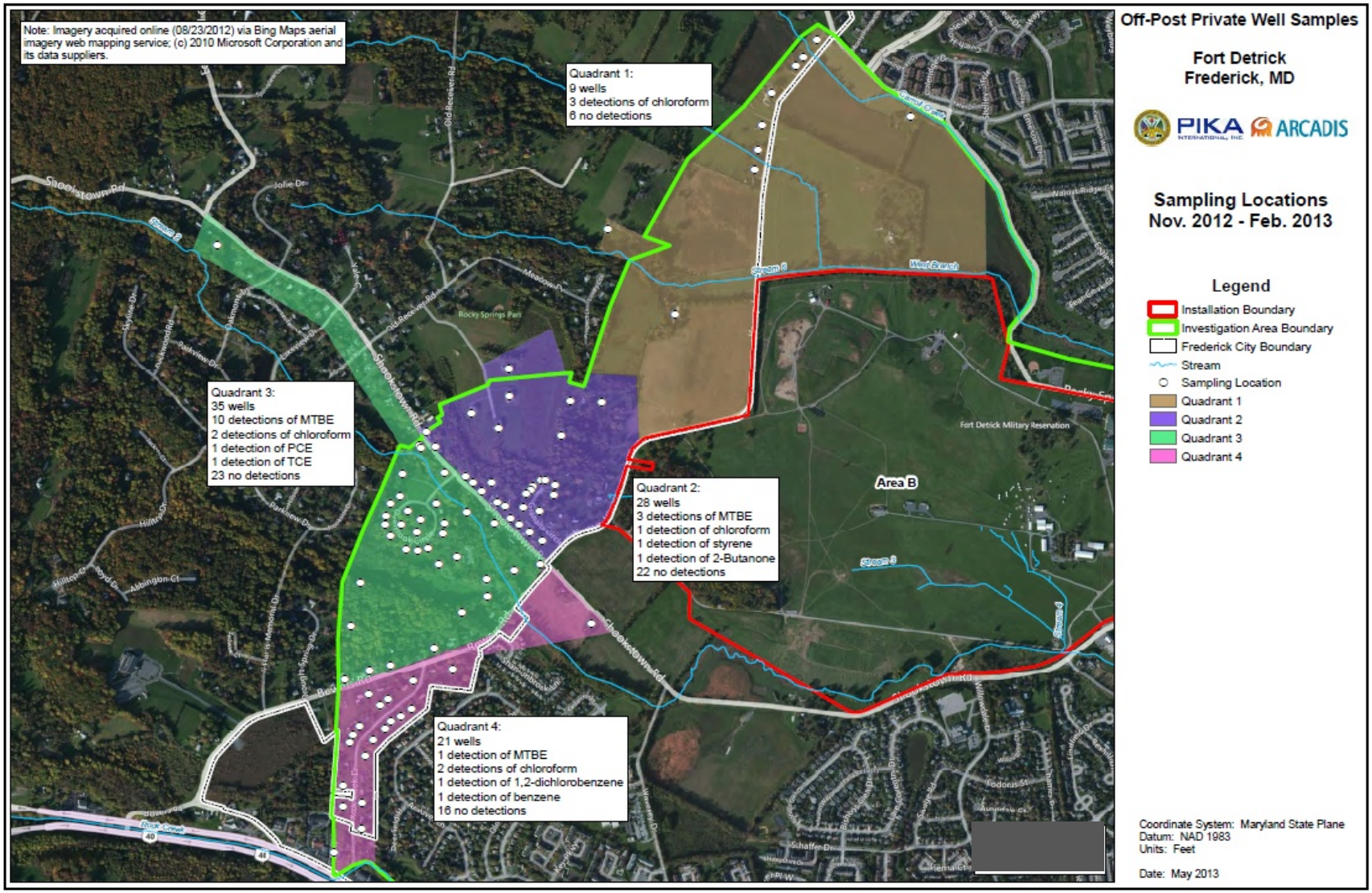
Chemical	Description/Use	Number of Detections	Range of Detections (ppb)	Drinking Water Standard (ppb)[a]
TCE	Solvent	1	0.1 J	5
PCE	Solvent	1	0.1 J	5
Chloroform	Drinking water disinfectant byproduct	8	0.1J-0.3 J	70[b]
MTBE	Gasoline additive	14	0.1J-0.4 J	12[c]
1,2-Dichlorobenzene	Paint and insecticide additive	1	0.9	600
2-Butanone	Car exhaust component, cleaning agent	1	2.7 J	4,900
Benzene	Gasoline component	1	0.3 J	5
Styrene	Car exhaust component, plastics component	1	0.4 J	100
No VOCs Detected in 66 wells				

ppb: parts per billion = µg/L
J: estimated concentration, near/at laboratory detection limits below reporting limits

[a] *Drinking Water Standard: US Environmental Protection Agency (USEPA) Maximum Contaminant Level*
[b] *Drinking Water Standard for Chloroform: Maximum Contaminant Level Goal (MCLG)*
[c] *Drinking Water Standard for MTBE: USEPA Risk Based Limit (RBC)*

PIKA INTERNATIONAL, INC. ARCADIS

Off-Post Private Well Investigation Summary of Sampling Results



Off-Post Private Well Investigation Summary of Sampling Results

- Detections unlikely associated with Area B groundwater based on:
  - Groundwater flow direction (eastward away from private wells sampled)
  - Private wells topographically "higher" than Area B and hydraulically upgradient
  - Distribution of detections across study area and in relation to Area B.
  - All VOCs detected, except chloroform and MtBE, were one-time detections.
  - Chloroform (disinfection byproduct) and MtBE (gasoline additive) are common chemical in the environment. Given wide distribution & low concentrations, no single point source believed
  - Four of the VOCs detected in drinking water wells (styrene, 2-butanone, 1,2-dichlorobenzene, and MtBE) have been infrequently detected (less than three detections) in Area B groundwater

Off-Post Private Well Investigation Summary of Sampling Results

- Wells with low level TCE and PCE detections were added to the groundwater tracer study conducted between April 2013 and January 2014
  - The two homes are located southwest of Area B
  - Groundwater was found to move eastward towards Carroll Creek, consistent with past investigations
- Based on concentrations detected, no immediate public health concern indicated.