IMFD–PWE 13 May 2015

MEMORANDUM FOR RECORD

SUBJECT: Fort Detrick Restoration Advisory Board (RAB) Meeting Summary, 04 FEBRUARY 2015

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 [ ] or footnotes has been added for clarification purposes.

2. Attendees

RAB Members Present:
Dr. Gary Pauly, Community RAB Member, Co-Chair
Mr. Joseph Gortva, Environmental Restoration Program Manager, Acting Army Co-Chair
Lt. Col. Brian Barthelme, Fort Detrick
Mr. Rolan Clark, Community RAB Member
Mr. Barry Glotfelty, Frederick County Health Department
Dr. Elisabeth Green, Maryland Department of the Environment
Ms. Jennifer Hahn, Community RAB Member
Ms. Karen Harbaugh, Community RAB Member
Mr. George Rudy, Community RAB Member

Others Present:
Mr. Larry Brown, US EPA Public Affairs
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. Randal Curtis, US Army Corps of Engineers
Mr. Nick Minecci, Fort Detrick Public Affairs Office
Mr. Jeff Samuels, Congressman John Delaney's Office
Mr. John Cherry, 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. Laurie Haines-Eklund, Army Environmental Command
Mr. Cliff Harbaugh, Community RAB Member
Mr. Barry Kissin, Community RAB Member
Mr. Rob Thomson, US Environmental Protection Agency

3. Meeting Opening / Remarks

Mr. Joseph Gortva called the meeting to order. He thanked everyone for attending and welcomed everyone to the meeting. Mr. Gortva advised that he is the Environmental Restoration Program Manager for Fort Detrick and will be filling in as the Army Co-Chair for Mr. Bob Craig who is out of town. Dr. Gary Pauly introduced himself as the community co-chair and welcomed everyone. Mr. Gortva invited the Board and audience members to introduce themselves.

Mr. Rudy noted that he was having trouble e-mailing Mr. Craig and asked Mr. Gortva to email him the e-mail address he should use. Mr. Gortva asked if there were any

opening comments from the co-chair, and he responded that he did not have any comments.

Mr. Gortva reminded the Board that he had sent out links to download the work plans for Site Inspection investigations at Area A and Area B. He asked the Board members to send him any comments in the next two weeks so they can be incorporated into a draft final version with a projected timeline of beginning the work this spring.

4. Purpose of RAB Meeting and Ground Rules presented by Mr. Joseph Gortva

Mr. Gortva suggested that the key ground rule for the evening be to focus on getting through the planned presentations. He said that if any Board members needed immediate clarification on a portion of a presentation, please raise their hand and ask; otherwise, he asked that all questions be held to the end of the presentation. He advised that there also would be time at the end of each presentation for any audience members to ask questions.

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

Mr. Gortva noted the minutes from the November 2014 meeting had been distributed to the Board members for review, and no comments had been received. He asked for any comments to be sent to him within the next week. Mr. George Rudy requested the minutes and any other documents sent by email be send as pdf's; Mr. Gortva agreed. Ms. Jennifer Hahn referred to a statement made by Mr. Cherry on page 8: "Mr. Cherry said it did not appear there was contamination at depth on the Waverley Property." She said "at depth" might not be clear. Mr. Gortva said "at depth" referred to wells drilled deeper than where first water was encountered; he said that this clarification could be added if appropriate but he would review that section of the minutes. Ms. Hahn said that it had been discussed at the meeting that the slide on page 33, referred to on page 12 of the minutes, which said there was no current risk on Waverley identified since no one was living there would be modified; Ms. Hahn asked if the slide had been changed. Ms. Hahn said that she wanted to be sure City representatives were clear that there could be a problem in the future and vapor intrusion testing might be warranted if there was development in certain areas of the Waverley property where contamination has been found in shallow groundwater. Mr. Gortva said that this information had been added to the summary slide for the Waverley property. Ms. Hahn said that she wanted to ensure the answer to Alderman Russell's question about the City working with the Army on any needed restrictions was a full and complete answer.

6. RAB Operating Procedures presented by Mr. Joseph Gortva, Fort Detrick

Mr. Gortva referred to the sample operating procedures for Forest Glen's Board which he had distributed at the last meeting, and his suggestion that the Board have a separate meeting to prepare something similar for Fort Detrick's Board. He advised that Fort Detrick had made significant changes regarding on-post access, including requiring a background check, so it was not feasible to have a meeting on-post. He said that he had been looking for a meeting place where there would not be a cost. Mr.

Rudy suggested Winchester Hall, and Mr. Gortva said he would check into that possibility. Ms. Karen Harbaugh offered her business as another option.

7. Archive Search Report presented by Randal Curtis, U.S. Army Corps of Engineers

Mr. Gortva noted that the Archive Search Reports are the basis for the work plans currently being reviewed for Site Inspections at Area A and Area B.

Mr. Curtis stated that he had started this presentation in August, so he would do a quick review of the information presented at the August meeting. Mr. Curtis reviewed an outline of his presentation. He encouraged those interested to read the report and then come back with questions that he will be glad to answer at a future meeting.

Mr. Curtis reminded the Board that this report is the second Archive Search Report [ASR 2] performed by the Archival Research & Analysis group at the U.S. Army Corps of Engineers[1]. He stated that the first report focused on herbicides only, and that those findings were reported about four years ago, with the final report issued in April 2012 [ASR 1]. Mr. Rudy asked about the availability of the presentation on the first report, and Mr. Gortva responded that both the presentation to the Board (February 2011) and the report itself are available on the Fort Detrick web site.

Mr. Curtis discussed the process of compiling the report. He stated that at one time there was a technical library on Fort Detrick which gathered reports being generated; however, when the post demilitarized from a biological warfare program, the technical library was discontinued. He said that some reports got shipped to other Army installations, some were destroyed, and some went to the Washington National Record Center or to College Park.

Mr. Curtis said that Fort Detrick was the center for the Biological Warfare Research, Development, Test and Evaluation Program. He explained that this program worked with anti-personnel, anti-animal and anti-crop bacteria, viruses, and toxins within a restricted footprint within Fort Detrick's Area A. He advised that the facilities inside the footprint included laboratories, enclosed test chambers, pilot plants, incinerators for treating the solid waste or air being vented off by these processes, sewage systems for treating sanitary and contaminated waste, and solid waste disposal and landfills. Mr. Curtis said that the Archive Search Report has a brief history, but there are other history documents that are also well done including Norm Covert's "Cutting Edge" and a World War II history by Rex Cochrane.

Mr. Curtis said that as information was being gathered, he was struck by the emphasis put on safety during the time of the biological warfare program. He advised that during World War II five colonels were on-post, with one of those being in charge of safety. He said that this high level of command, along with the number of personnel assigned to safety, was significant. He said that part of the reason was the newness of the program and the desire to not have any incidents, such as a release to the environment, to

[1] [Research and Technical Services Section of Environmental and Munitions Branch]

protect not only human health but also the viability of the research program. Mr. Curtis said that a very stringent system was in place to ensure what they needed to do was contained in a safe manner and that they were able to decontaminate.

Mr. Rudy commented that he agreed with some of Mr. Curtis' statements, but even with subject matter experts, he has yet to find the infrastructure, up through present time, that precludes release to the environment.

Mr. Curtis said that the documentation found included test plans and test reports (numbered sequentially), laboratory notebooks, published reports, and status reports. Mr. Curtis added that environmental investigations from the 1970s and forward were also reviewed, with the majority being part of the Administrative Record.

Mr. Curtis said that the potential for biological warfare material to be on post was examined. He said that the research showed no field or open-air anti-personnel or anti-animal tests with biological warfare agents; the open air or field tests were done with simulants that mimicked the pathogens. Mr. Curtis said that Area B existed as a circular open-air grid for testing of the simulants within the device being designed to see how it released. He stated that there were meters that sampled how the simulant progressed downwind. Mr. Curtis said that anti-crop tests were done in the open with biological pathogens such as Southern Blight, cereal grain rust and rice blast. Mr. Curtis said that the pathogens were released at such a time as to not contaminate any surrounding fields growing that type of crop. Ms. Hahn asked about how the pathogens were released, and Mr. Curtis said that a variety of methods were used. Mr. Rudy said individuals with neighboring farms have advised they have witnessed aerial sprayings. Mr. Curtis said that some of the aerial spraying [from aircraft] would be with the simulants but not with the anti-crop pathogens.

Mr. Rudy advised that he had information from Mrs. Grace Cole that a cow herd was killed by spraying. Mr. Gortva said that he believed this was from an incident when the fencelines were sprayed with herbicides which were arsenic-based. The cows died from eating the grass along the fence which was sprayed. [2] [3]

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[2] [The Installation Assessment of Fort Detrick, Maryland Record Evaluation Report No. 106 Volume I, JANUARY 1977, page II-11 provides that “In September 1951, eleven dairy cows died as a result of arsenical poisoning. A Fort Detrick investigation concluded that the cows apparently died as a result of eating grass which had been sprayed by a chemical weed killer containing sodium arsenite. Government employees sprayed weed killer along the Fort Detrick fences a week prior to the incident.” A copy of the report can be found in the Fort Detrick Installation Restoration Information Repository files located in the Maryland Room of the Frederick County Library.]

[3] [ASR 1, page 122, “On 31 August 1951, the Post Engineer personnel sprayed the fence line of the Grid Area (Area B) with an unspecified arsenic based weed killer, resulting in the killing of eight cows grazing on adjacent lands and the farmer sought compensation for his losses”. Based on 1951-11-08 Claim of Mr. Harry Free]

Mr. Curtis said that the search also looked for facilities on Fort Detrick that might have biological agents. He advised that when most of the former restricted area was turned over to the National Cancer Institute in the early 1970s, there was a strong decontamination process which occurred. He stated that most of the structures were certified to be able to be used for any purpose; four buildings were not able to be re-used [with unrestricted use] based on concerns about the potential for anthrax spores to be present within the concrete. He advised that these facilities are still in use. Mr. Curtis said that when it comes time to raze these buildings, there will be issues as to how the concrete is processed.[4]

Mr. Curtis said that there was sludge that went to the treatment plant that contained some anthrax spores; it was treated with a decontaminating agent [hypochlorite] and buried in Pit 12 at Area B.[5]

He stated that during the removal action at Pit 11 at Area B, there were some vials of viable biological material comingled with other hazardous waste. Mr. Gortva added that the Pit was capped and is being monitored.[6]

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[4] [ASR 2, page 47, "Four buildings (201, 263, 375 and 4**7**0) were not certified free of biological agent based on concerns that while *Bacillus anthracis* spores (anthrax) did not remain on building surfaces, allowing use, spores could possibly remain encased in the building foundation, cracks and pores.]

[5] [ASR 2 page 88

> *"Sludge from Structures 375 & 384. During the period of ceasing all Biological Warfare work (1969-1972), inorganic material from holding tanks in the Decontaminating Plant, Bldg. 375, was found to contain Bacillus Anthracis. Facility Engineering and Safety developed a procedure to sterilize the "sludge" prior to removing it. During the time that the material was removed (1971-1972), rigid control and testing procedures were used. All tests (for sterility) were negative (no growth)*."

ASR Page 89

"Pit 12 – contains 150 tons of liquid waste including approximately 25 tons of sludge which was buried in 1972 from holding tanks at decontamination plants (Bldgs. 384 and 375) located in area A. Hypochlorite was put on top of the sludge as it was removed from the holding tanks. Additional hypochlorite was put on top of the sludge prior to burial. Burial of…contaminated sludge has caused the area to be considered permanently contaminated with anthrax spores" as the sludge might not have been completely treated.]

[6] [ASR page 94, "During this removal action vials containing live pathogens in medical wastes at Area B-11 were found and all intrusive work was temporarily suspended at the disposal area until additional safety measures and testing procedures were in place. The interim removal action was completed in 2004."]

Mr. Curtis said that there was some rice blast in storage at Fort Detrick which began in 1966. He said that in the early 1970s, the Army got approval to demilitarize the rice blast by treating it with Carboxide gas; it was incinerated and the ash disked into soil in Area B.

Mr. Curtis discussed the general methods of decontamination. He stated that if there were any highly infectious agents or simulants being tested, equipment needed to be able to be sterilized so it could be used again. He advised that heat was the primary method used to sterilize and decontaminate with steam such as autoclaving. He said that if the material was something like paper or gloves, they would be incinerated. Mr. Curtis stated that there were several solid waste incinerators on-post.

Mr. Rudy asked if Maryland Department of the Environment regulates effluent cleanup from currently operating incinerators on-post; Mr. Rudy said that the community has a number of questions and he would send them in writing to Mr. Gortva.[7] Mr. Gortva reminded the Board that discussion of current operating incinerators is not within the scope of the Board and they do not fall under the Environmental Restoration Program, but he would forward questions to the appropriate persons at Fort Detrick.

Mr. Curtis explained that when there was equipment that high heat could damage, a variety of chemicals were used for sterilization. He listed the main chemicals used, including liquid bleach and formaldehyde [See ASR section 5.6].

Mr. Curtis advised that Fort Detrick followed Army practices for that time regarding solid waste disposal. He said that if there was burnable waste, it went to the incinerator; non-burnable waste went to a landfill. Mr. Curtis said that there were duplicate systems, and that waste within the restricted area was handled separately from waste within the barracks area.[8] Mr. Curtis stated that information from 1947 shows two-thirds of the waste from the restricted area was being incinerated on-post and that one-third was sent to the City of Frederick's incinerator, along with 1,500 pounds daily from the rest of the post. Mr. Curtis said that the material from the restricted area would have been sterilized before it was sent to the City's incinerator [or the post incinerator]. He stated that two loads of non-combustible material was sent to the City's dump daily.[9] Ms. Hahn asked where the City's incinerator and dump site were located, and Mr. Curtis said that he did not know where they were located at that time. Mr. Rudy said that he would look into the location of the City's incinerator and safety practices in placed at that

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[7] [The municipal and medical waste incinerators are regulated by State and Federal laws and regulations and are permitted under a Title V Air Permit.]

[8] [ASR 2 pages 74-75, “Detrick directed that size permitting, all potentially contaminated refuse, whether it was combustible or not, was to be autoclaved prior to being placed outside for removal. Items too large to be autoclaved, had to be cleared by the Safety Division.”]

[9] [In 1947, if potentially contaminated, this waste material would have been sterilized or decontaminated prior to disposal.]

time for the City incinerator. Mr. Curtis advised that in 1948, Fort Detrick built an incinerator [Building 1112] at the Monocacy River facility to incinerate non-contaminated rubbish[10]; this incinerator [1112] operated until it was replaced by the current incinerator [393] in 1975 in Area A. Mr. Gortva added that the Monocacy River facility is in Area C where Fort Detrick has just completed the additional sampling for the former ash disposal area associated with the former incinerator [1112].

Ms. Hahn asked how long waste materials were taken to the City's incinerator. Mr. Curtis responded that complete data was not found. He said that Fort Detrick began working as a biological warfare center in 1943, and that there is not much information as to where the solid waste is going at that point. Mr. Curtis said that he has information for 1947. He said that there was also information that it took a few years to get the Monocacy River incinerator working properly so there was still some use of the City's incinerator [circa 1949-1950].

Mr. Curtis said that in 1948 the non-burnable trash pit was established in Area B; he said that it is uncertain if there was disposal in Area A before 1948. Mr. Curtis said that once the disposal area was established at Area B, it is unlikely that there would have still been a need to use the City's landfill. He noted that there was also a combustible burn pit (on the edge of Area A, near the current running track) and a rubble disposal pit (mostly construction rubble) underneath the helicopter pad. In response to Mr. Rudy's question about effluent control and cleanup, Mr. Gortva said that the cleanup program had looked at what types of materials were being burned and what was described was wood products and paper; investigations found no residual contamination from burn pit operations. Mr. Gortva said that when the nearby stormwater pond [near building 1546] was constructed, they did not find any materials of concern.

Mr. Curtis said that an early environmental assessment identified a potential landfill at a location in Area A. He said that his search did not find any evidence of a landfill, and the earlier assessment may have been referring to some debris in the area. Mr. Curtis said that an investigation by the environmental program also found no evidence, and a determination was made that no further action was needed.

Mr. Curtis discussed liquid waste disposal from the contaminated laboratory sewer system, noting that it was kept separate from the regular sewer system. He explained that piping would collect the liquid into holding tanks and then it would be treated by batches at plants where the liquid would be heated to a temperature that would kill any live biological agents. He said that the liquid would then be released into the regular sewer system after treatment. Mr. Curtis stated that the original 1940s decontamination treatment plants were replaced by the current single plant. Ms. Hahn asked if the treatment plants were located on Fort Detrick, and Mr. Curtis advised that they were on Fort Detrick. Mr. Curtis said that initially that the City of Frederick municipal system handled the sanitary sewage, but then it was switched to the Monocacy River plant in

[10] [Incinerator 523 in Area A continued to burn rubbish from within the Restricted Area]

the late 1940s.[11] He stated that the sludge from the sewage disposal plant was used as fertilizer on-post and off-post through the 1960s.[12] Mr. Curtis said that it was not very well documented, but decontamination chemicals would have gone into the contaminated sewage by way of the floor drains. He explained that the focus at the time was killing the biological agents and not necessarily focusing on the chemicals used to do so. Mr. Rudy asked if TCE or PCE could have gotten into the system. Mr. Gortva responded that TCE and PCE would not have been the decontaminating chemicals.

Mr. Curtis stated that by 1952 large quantities of acid, used cleaning solution, or contaminated flammable liquids were not poured down building drains but stored in carboys for removal and disposal. He said that it is unclear where that disposal location was, but later site plans indicate that disposal was in the Area B pits which have been part of environmental investigations.

Mr. Curtis discussed incinerators and noted that they were located in groups close to where there were laboratory facilities that would cumulatively vent their products [exhausts or waste materials] to be burnt by the air incinerator or a solid waste incinerator. He stated there were the 200 [building] series incinerators, the 300 series incinerators, and the 500 series incinerators. Mr. Curtis advised that the ash disposal procedures during the World War II era are unclear; however, it is clear later on that ash is going to the ash disposal locations at Area B and near the former Monocacy Incinerator. He noted that these disposal areas have been investigated by the environmental program.

Mr. Rudy said that in January boxes showed up on his porch with information related to Fort Detrick including a 1959 map showing everything buried in Area B up to that point. He advised that he did not have the map with him but would share it, and it could be discussed at the next meeting. Mr. Rudy said that based on his review of the map, there could be other disposal areas that should be discussed in addition to the emphasis on B-11. Mr. Curtis said that there are many maps included in the Archives Search Report, but without seeing Mr. Rudy's map, he could not say if it has already been included. Mr. Rudy said that he would get a copy of the map to Mr. Gortva.

Mr. Curtis next discussed TCE use at Fort Detrick. He stated that TCE is an industrial solvent used for degreasing parts and has been used at Fort Detrick for that purpose. He noted that it was also used at Fort Detrick as a refrigerant in sizable quantities, with at least one storage tank being more than 400 gallons. Mr. Curtis said that TCE-based refrigeration systems were identified in Buildings 376, 470, 568, and 1412. He stated

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[11] [ASR2 page 70, “On 1 November 1948, the Post Engineer activated the Monocacy Sewage Treatment Plant.”].

[12] [Sludge was used into the early 1970s. Later use thorough the late 1980s is uncertain (verbal account). Written accounts indicate that “From the mid-1970s until 1997, Detrick disposed of the dried sewage sludge from the wastewater treatment process at the post landfill in Area B.]

that the TCE spill near Building 568 was apparently from leaking drums stored outside or a refrigerant system inside which leaked. Mr. Curtis advised that there is a record of drums of TCE being disposed of in Area B, Pit 11.

Mr. Curtis said that PCE use at Fort Detrick seems to have been very limited; it was used as a solvent and degreaser, but there were no dry cleaning plant on Fort Detrick (just a storefront where items were received and then taken to another location).

Mr. Rudy asked if there was still monitoring at the Building 568 spill site. Mr. Gortva said yes, and there are quite a few monitoring wells that have been sampled for a number of years. Mr. Gortva said that because the current occupant of Building 568 has been extracting groundwater, cleaning it to remove the TCE, and using it for aquaculture studies, it has reduced TCE concentrations from about 1,000 parts per billion to near the drinking water standards.

Mr. Gortva said that the work plan for Area A which he had mentioned earlier, includes looking at Buildings 376, 470 and 1412 to determine if there is potential groundwater contamination. The work plan proposes installing some wells around these buildings.

Mr. Curtis reviewed the research on radioactive activities at Fort Detrick Buildings, noting that use began in 1948. He said that only snippets of information are available on how it is used--as a calibration agent with instrumentation and as a tracer particle so when something was dispersed it was detectable. Mr. Curtis said that these uses were under Atomic Energy Commission/Nuclear Regulatory Commission licenses. Mr. Curtis displayed a list of building where radiological activities occurred, noting that most of the buildings are on the National Cancer Institute campus. He advised that in the 2002 decommissioning plan only four buildings were noted.

Mr. Rudy stated that he had a deathbed confession by a resident of Frederick whose husband was killed on Fort Detrick by polonium, placed in a lead casket, and buried in Area B. Mr. Rudy said he will provide this information to the Army.[13]

Mr. Curtis discussed radioactive material disposal noting that it begins in 1951 in a trench in Area B, involving both solid and liquid radioactive wastes. He stated that the locations moved over time in Area B. He advised that on-post burial ends in 1957 with opening of a Radioactive Material Disposal Facility at Edgewood Arsenal for Army installations east of the Mississippi.

Mr. Curtis advised that radioactive material was stored and packaged for shipment off-post in Building 261. He said that there was also another process for treating liquid waste which was to allow it to naturally decay as the half-life of some of the radiologicals was a very short period of time; it could then be disposed of through the

[13] [No records substantiating this this claim was found during the ASR research. In 1992, Fort Detrick's Byproduct Material License was amended to allow use of Polonium 210 (half-life of about 138 days) to be used in a sealed source.]

sanitary sewer system. Mr. Curtis said that another process used through December 1999 was to dilute it to the level allowed by the regulations at that time.

Mr. Curtis stated that sludge from the sewage disposal was used as a fertilizer from approximately 1948 through the 1960s. He continued explaining that from at least 1975 until 1997, sludge containing radioisotopes was disposed of at the post landfill in Area B. He advised that from 1998 until 2004 the sludge was sent to a low-level radioactive waste facility in Utah.

Mr. Curtis next discussed the search for aboveground storage tanks and underground storage tanks containing gasoline, diesel and fuel oil which had not yet been identified under the environmental program, and noted a handful were found.

Mr. Curtis reviewed the results of the search for potential munition or explosive hazards. He said that the Army had previously identified four Munition Response Sites for inclusion into the Military Munitions Response Program. He said that other grids do not warrant inclusion into the Program because there is not an explosive hazard potential, for example, a temporary grid area established in Area A before Area B was ready. He noted that two small arms ranges were excluded and a former skeet range has been remediated.

Mr. Curtis said that the Archives Search Report also looked at whether Fort Detrick conducted any activities off-post [in the surrounding community]. He advised that in July 1953 there was a dissemination test using zinc cadmium sulfide (florescent particles) mixed with lycopodium spores (a flash powder) to act as a simulant for dry biological agent. He said that the test was done along the Potomac River. Mr. Rudy asked if the City of Frederick was notified in advance, and Mr. Curtis said that he did not know. Mr. Curtis said that there were a number of trials conducted in the 1950s with zinc cadmium sulfide particles for large-scale dispersion efforts; some of those tests have been made public in the past. He stated that the tests occurred in a number of locations in the United States.

Mr. Curtis next discussed pest control activities at Fort Detrick. He explained that the search's focus was on whether there were any exotic pesticides being used and there were not; however, there was a greater awareness of pest control than at most other installations so there was a more vigorous program. He further explained that the concern was that pests would contaminate ongoing tests or potentially carry out whatever agent they had been in contact with to post personnel or the public. Mr. Curtis said that the conclusion was that pesticide use may have been higher at Fort Detrick than other Army posts. Mr. Gortva said that all the Area B disposal areas were examined for pesticides in the soil and groundwater, and he believes that it has been thoroughly documented that there is not a pesticide issue in groundwater at Area B.

Mr. Rudy asked if there were an incident and a contaminated animal got loose in the community, what procedures or programs are in place to protect the community. Mr. Gary Zolyak responded that there are National Environmental Policy Act (NEPA)

documentation for the new buildings, and the documentation talks about the likelihood of such an incident and what would happen.[14]

Mr. Curtis said that both archive search reports are available on Fort Detrick's web site: [ASR 1] http://www.detrick.army.mil/responsible/repository/asr16June2014.pdf ; and, [ASR 2] http://www.detrick.army.mil/responsible/ArchivalReport2012.pdf.

Mr. Rolan Clark asked how much work Mr. Curtis himself did on the search and report. Mr. Curtis said that there were about a dozen people from his office who worked on the report, but he wrote most of the two reports. Mr. Clark commented that he appreciated the tremendous amount of work put into the report.

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

Mr. John Cherry reviewed the topics he would be covering starting with an overview of Area B and a snapshot summary of new analytical results and observations since the last Board meeting. He said that he also would be discussing the deep drilling on-post and off-post, and new groundwater sampling results at the Waverley property, County property, and Area B.

Mr. Cherry displayed an aerial photograph of the Area B Study Area showing the Study Area divided into nine areas labeled A through I. He reminded everyone that there were a lot of investigations going on simultaneously and not all of them would be discussed during his presentation this evening. He advised that the areas highlighted in green would be the ones where there is new information being presented.

Mr. Cherry next gave a Snapshot Update on activities since the last Board meeting. He advised that the deep drilling phase has been completed, with eight permanent monitoring wells installed with depths ranging from 86 feet to 443 feet deep. Mr. Cherry said that the deep boring at Area B Monitoring Well 79 was completed at 443 feet; he advised that PCE was detected at this location at the same general concentrations seen at adjacent points. Mr. Cherry said that at the last meeting he discussed the preliminary screening level data from Packer test results from off-post deep borings on the Waverley property. He said that the analytical data had been received from sampling of the permanent monitoring wells which is considered more reliable than the Packer test data. He said that the sampling showed concentrations at shallow depths along the fenceline; sampling of the deeper well installed about 100 feet from the fenceline, across from B-11, at a depth of 145 to 155 (Waverley-1) found detections of TCE at 340 parts per billion, PCE at 12 parts per billion, chloroform at 160 parts per billion, and 1,1-DCE at 14 parts per billion. Mr. Cherry advised that these detections exceed the EPA

[14] [Discussions on this topic of current procedures and programs is outside the scope of the Installation Restoration Program. For further information or questions, please contact the Fort Detrick Public Affairs Office at 301-619-2018]

standards. He said that there were no exceedances in wells further south on the Waverley property.

Mr. Cherry next gave the detailed update on the deep drilling. He displayed an aerial photograph showing three areas marked with red stars and discussing the reasons why deep drilling was being conducted in these three areas. He stated that he would discuss all three areas.

Mr. Cherry displayed a slide recapping the deep drilling work, including the depths drilled to and where the permanent wells were screened. He noted that the new information is the deep well installed at Area B which was screened at 433 to 443 feet deep.

Mr. Cherry discussed the new deep groundwater results for the Waverley property. He displayed an aerial photograph showing only analysis of deep groundwater samples for PCE and TCE at the four borings on the Waverley property. He noted that the EPA standard for PCE and TCE is 5 parts per billion; the detection of PCE at Waverley-1 (on the fenceline, across from B-11) was 12 parts per billion, and the detection of TCE at this location was 340 parts per billion. Mr. Cherry advised that the sampling of the other three deep borings on the Waverley property did not have any PCE or TCE detections above the EPA standard and most were non-detects. Mr. Cherry displayed a chart showing a summary of all the compounds detected at the deep wells on the Waverley property. He noted the compounds at Waverley-1 that exceeded the EPA standards were outlined in red and were TCE, PCE, chloroform, and 1,1-dichloroethene.

Mr. Rudy asked what the plan is to look at the current status of all the Area B burial sites. Mr. Gortva responded that part of the capping remedy is to have long-term monitoring of the caps, and that the Army is currently working with EPA and Maryland Department of the Environment to have an approved monitoring plan in place to monitor the groundwater at each of the disposal areas to ensure the capping remedy is working. Mr. Gortva said that a contract had been issued to ARCADIS for this work, and ARCADIS will be providing a draft plan soon that will be shared with the Board and regulators to review and provide comments. Mr. Rudy asked if the caps were being monitored. Mr. Gortva said that the physical caps are monitored, and that there are groundwater monitoring wells around all the caps. He said that the plan ARCADIS is developing will be approved by EPA and Maryland Department of the Environment to ensure they agree with the number and location of wells included in the long-term monitoring plan. Mr. Rudy asked what would happen if monitoring showed an increase in a reading. Mr. Gortva said that groundwater monitoring has been occurring around the landfill caps for a number of years; if something increased, the current monitoring program should have detected the increase. Mr. Cherry added that ARCADIS had done

extensive sampling of the Area B groundwater wells, including those around the capped areas, as part of the remedial investigation of the groundwater.[15]

Mr. Cherry summarized the meaning of the most recent well sampling results. He stated that this is the first round of data from the wells, and that additional sampling will be done in the future. He said that the data confirms there are exceedances of EPA standards close to the fenceline, with low impacts or non-detections in wells on the Waverley property further south. Mr. Cherry said that there is no current or anticipated future potable use of the groundwater on the Waverley property so there is no risk from groundwater ingestion; future human health and ecological risk assessments are necessary to evaluate all potential routes of exposure. Mr. Cherry noted that assessment of remedial alternatives for Area B groundwater will have to account for off-post groundwater contamination in this area.

Mr. Cherry displayed an aerial photograph showing both deep and shallow groundwater sampling results. He reminded the Board of the TCE/PCE detections in the shallow groundwater which exceed the EPA standard along the fenceline.

Mr. Rudy asked if the data is provided to the developer of the Waverley property. Mr. Gortva said that the right of entry agreement calls for the Army to provide the developer with all the information collected, including validated sampling results; he noted that the Army went a step further and also provided the preliminary Packer test data. Mr. Rudy asked if the sampling information is provided to the City planning commission, and Mr. Gortva said that the data is not automatically sent to the City but would be provided if requested.

Mr. Zolyak stated that the right of entry for the Waverley property expired in November 2014 so the Army is currently not able to get onto the property. He said that there is ongoing litigation and for a variety of reasons, including the litigation, the Waverley property owner has decided not to extend the right of entry, and that there is nothing the Army can do at this time. Mr. Zolyak stated that the Waverley property owner had filed a lawsuit against the Army for $37 million in 2014. He said that there was an oral argument before US District Court Judge Blake in December 2014 because the Federal government wanted to dismiss the lawsuit. He advised that Judge Blake agreed with the Federal government and issued an order in mid-January dismissing the $37 million claim in the US District Court. Mr. Zolyak said that he expects the property owner to appeal to the Fourth Circuit Judge. Mr. Zolyak said that a second lawsuit was filed in the US Federal Claims Court in Washington, D.C. at the end of July 2014 and alleged that the installation of wells on the property constitutes the Federal government taking his property. Mr. Zolyak said that this lawsuit is still pending and has not yet been heard by the judge. Mr. Zolyak reminded the Board that the Army does not have the authority to go into court to force access onto this property, but the EPA does have authority. He

[15] [The landfill cap monitoring program has reviews every six months and a more extensive review every five years. These reviews evaluate site conditions that may trigger additional testing or actions that may be required to ensure that the caps are functioning as intended.]

stated that EPA's attorney is in the process of sending a letter to the property owner strongly encouraging him to sign another right of entry and allow the Army access.

Mr. Gortva said that the data collected to date from the Waverley wells provides a pretty good picture and confirms what the Army and ARCADIS thought was happening with the groundwater. He said that the Army would like to collect additional rounds to ensure the results are the same and to have access for the implementation of any remedy. He said that access is not needed immediately.

Mr. Zolyak said that he believes EPA is having discussions with the property owner, and EPA that is going to require that should be homes be built on this parcel, all potential buyers will sign a document acknowledging they are buying property adjacent to a Superfund site. Ms. Hahn expressed concern about the current environmental statement for the Waverley property. Mr. Rudy stated that he thinks the Maryland Department of the Environment should update their letter about the Waverley property. Ms. Green said that the Waverley property did not get an all clean response from the State; the State has prohibited use of the groundwater on the Waverley property because of potential concerns.

Mr. Cherry next discussed deep drilling on the County property; he said that the location is at the opposite end of Area B along Montevue Lane. He stated that a deep boring was installed down to 400 feet, Packer sampling was done, and two permanent monitoring wells were installed at 99 to 109 feet deep and 382 to 397 feet deep. Mr. Cherry said that the shallower well was sampled, and analysis found PCE at non-detect and TCE at 0.1 part per billion with a "J" qualification which means an estimated detection from the laboratory. Mr. Cherry reminded the Board that this deep well was installed on the County property to see to what extent, if at all, groundwater was migrating beyond the primary discharge area. He advised that additional work is planned including additional sampling and re-evaluating seeps and springs. Mr. Gortva added that the 0.1 detection does not indicate a concern for vapor intrusion, but the slides note there are other shallower detections in the vicinity that are still under investigation.

Mr. Cherry said that another observation from the deep drilling is that fewer fractures are seen as they drill deeper, and these fractures are not producing much water; therefore, not much contamination would be expected to be seen at deeper levels.

Mr. Cherry discussed the new deep well installed at Area B to 500 feet deep. Mr. Cherry advised that a Packer test sample was only able to be collected at 340 to 350 feet deep. He said that four deeper intervals were assessed down to 470 feet, but water flow was so minimal at these depths, no Packer test samples could be collected. He noted that a zone was found at 433 to 443 feet where a well was installed and will be sampled in March.

Mr. Cherry reviewed the schedule of upcoming work, including a work plan to address some data gaps and some sampling. He reviewed the overall Area B schedule and noted potential groundwater pilot treatability studies are being discussed.

Ms. Harbaugh asked when the next round of vapor intrusion testing would be conducted; Mr. John Buck responded that the target date is the end of March, pending receipt of rights of entry.

9. RAB Member Open Discussion and General Community Comments

Mr. Rudy asked if it would be possible to receive the minutes sooner. Mr. Gortva said that he would do his best to send them out within a week of receiving them.

Mr. Gortva invited Board members to send him any other topics for future meetings by e-mail.

10. Future Meeting Dates

Mr. Gortva advised that Mr. Rob Thomson of EPA had apologized for not being able to attend tonight's meeting and had asked if it was possible for the May meeting to be moved to May 13; all agreed with this date. Mr. Gortva said that the future meeting dates are August 5, 2015 and November 4, 2015 (subject to room availability).

The meeting adjourned at approximately 9:03 p.m.

Reviewed by:

Approved/Disapproved

Enclosures:
Archives Search Report Presentation
Area B Groundwater Investigation Progress Report Presentation
Meeting Sign-In Sheet

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

FORT DETRICK RESTORATION ADVISORY BOARD
LIST OF TOPICS FOR FUTURE MEETINGS

Proposed Topics

- City road proposed to go through Area B – Nov 2014
- Surface water detections – Nov 2014

Completed presentations

- Archive search report presentation – Feb 2015

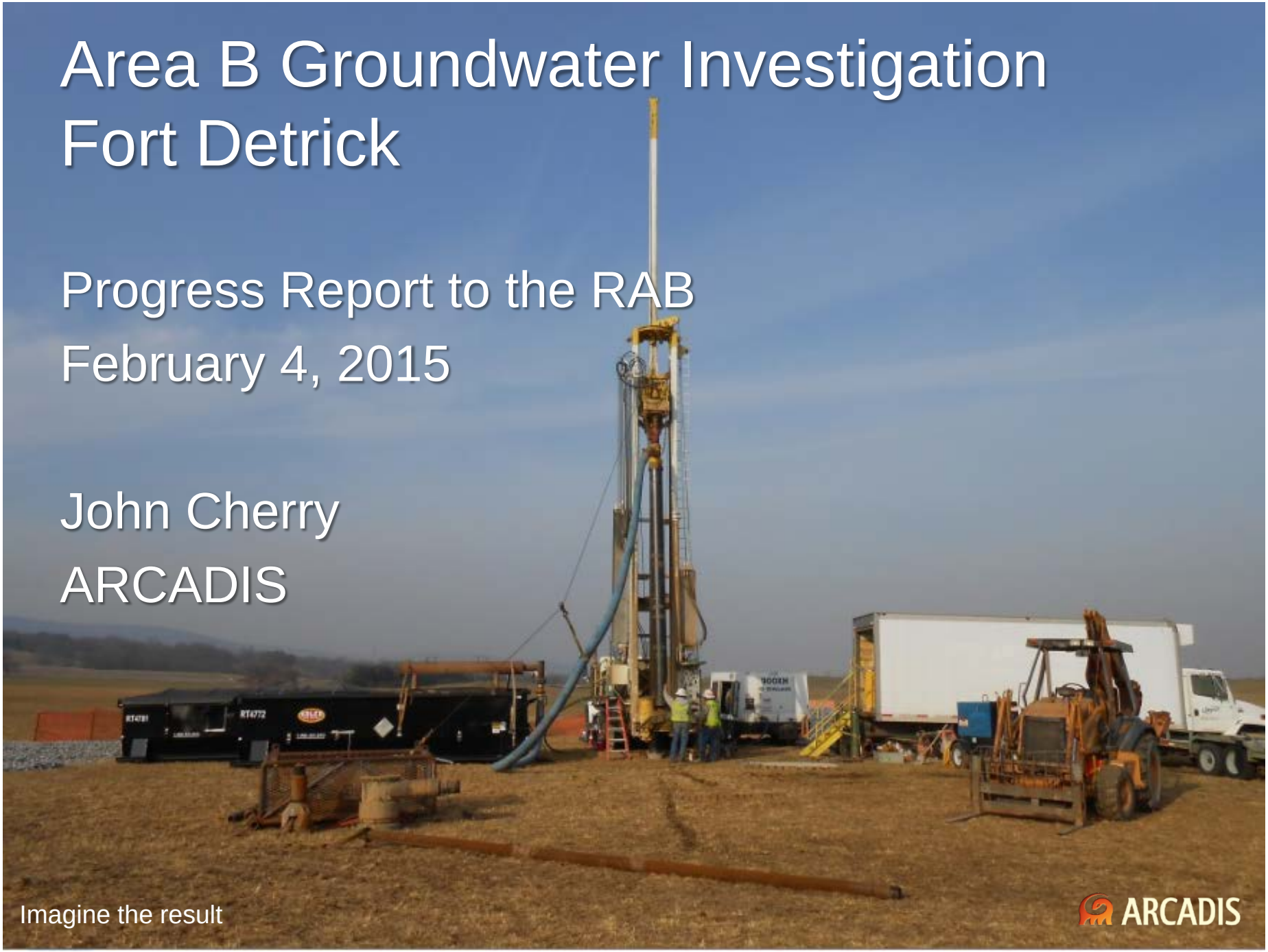
Area B Groundwater Investigation Fort Detrick

Progress Report to the RAB

February 4, 2015

John Cherry

ARCADIS



Overview of Topics

- Area B Overview and Snapshot summary of new analytical results and observations since the November 2014 RAB
- Deep Drilling Update (On- and Off-Post Deep Drilling):
- New Groundwater Results
  - Waverley Property
  - County Property
  - Area B
- Schedule and Next Steps

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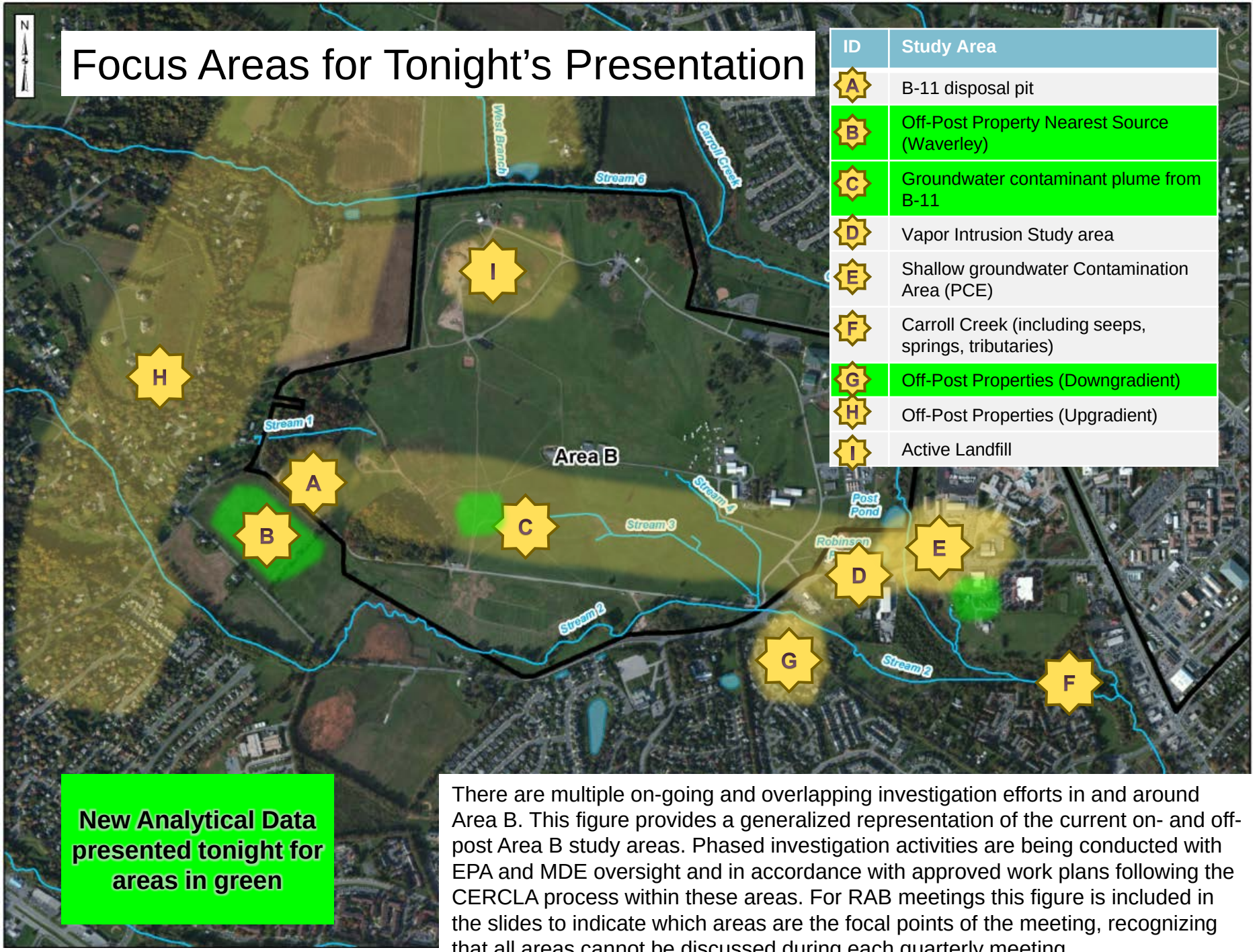
Focus Areas for Tonight's Presentation



ID	Study Area
A	B-11 disposal pit
B	Off-Post Property Nearest Source (Waverley)
C	Groundwater contaminant plume from B-11
D	Vapor Intrusion Study area
E	Shallow groundwater Contamination Area (PCE)
F	Carroll Creek (including seeps, springs, tributaries)
G	Off-Post Properties (Downgradient)
H	Off-Post Properties (Upgradient)
I	Active Landfill

New Analytical Data presented tonight for areas in green

There are multiple on-going and overlapping investigation efforts in and around Area B. This figure provides a generalized representation of the current on- and off-post Area B study areas. Phased investigation activities are being conducted with EPA and MDE oversight and in accordance with approved work plans following the CERCLA process within these areas. For RAB meetings this figure is included in the slides to indicate which areas are the focal points of the meeting, recognizing that all areas cannot be discussed during each quarterly meeting.

Snapshot Updates Since the Last RAB

- Deep drilling phase completed.
  (The last of 8 additional permanent points completed in January 2015 with depths ranging from 86 to 443 ft deep)

- Packer test data results received from one depth interval in on-post deep boring BMW-79 near the center of Area B. C
  (Results presented tonight show concentrations consistent with other adjacent points. Deep point constructed here at 433-443 ft to be sampled in March)

- Monitoring point data received from 6 completed permanent monitoring points on off-post Waverley and County properties. B G
  (Results presented tonight show concentrations in the new deep off-post points all below MCLs, except for TCE at 340 ug/L, PCE at 12 ug/L, Chloroform at 160 ug/L, and 1,1-DCE at 14 ug/L in Wvly-1 closest to the Area B property line. As a reminder, MCL exceedances in shallow wells along the property boundary were discussed during the November 2014 RAB meeting.)

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Overview of Topics

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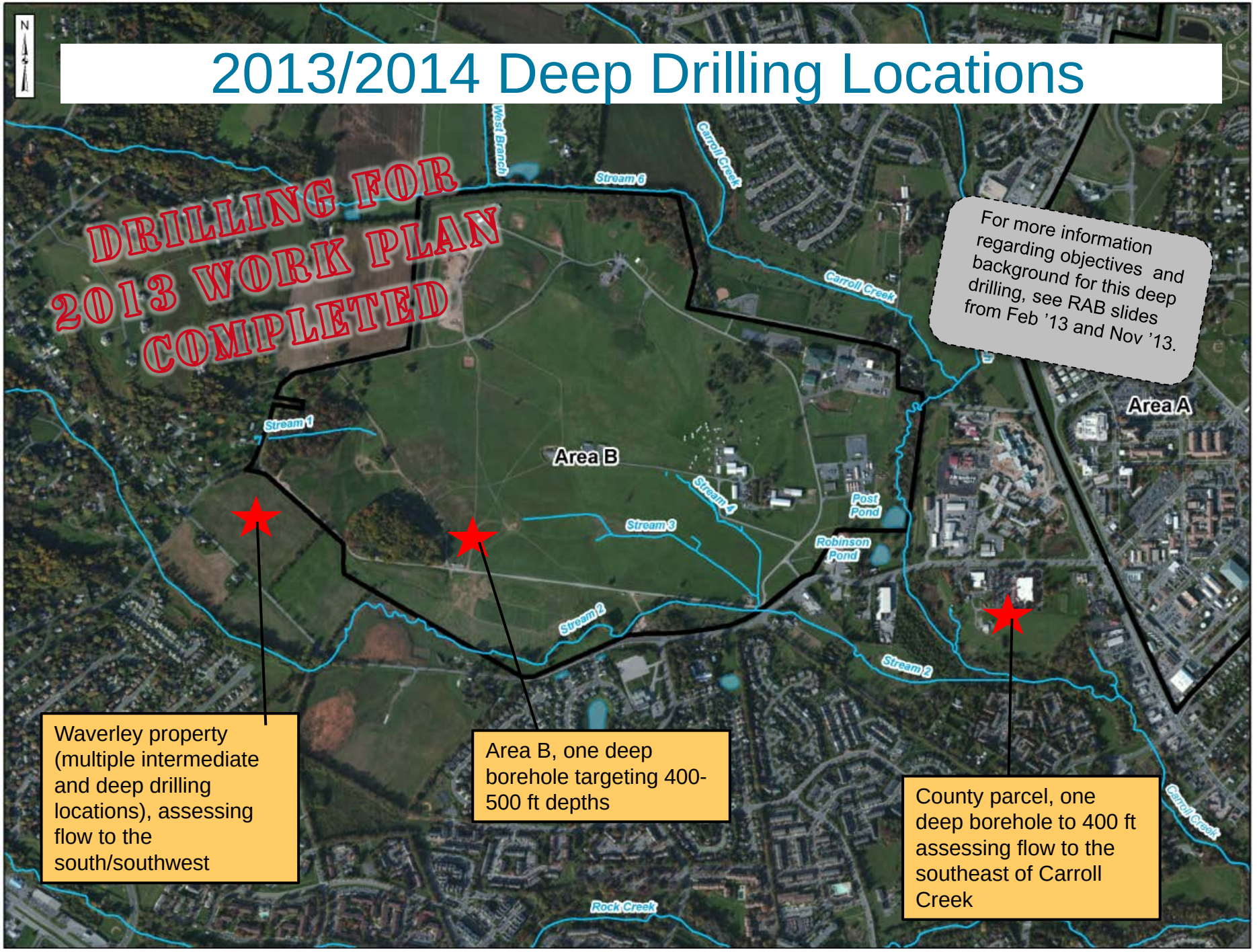
2013/2014 Deep Drilling Locations

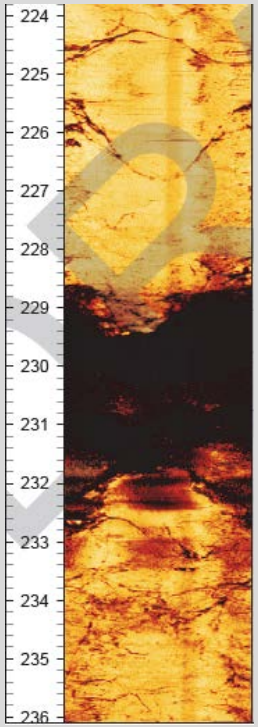


Deep Drilling Recap (2013/2014)

Methodology Reminders!

Packer sample intervals are selected in collaboration with EPA and MDE, based on:

- Geophysical testing of the borehole to identify fractures using calipers, imagery of the borehole walls, and other tools.



For more information, about the drilling and sampling approach, see RAB slides from June 2011, February 2013, & March 2014.

- Waverley B
  - 4 boring locations at Waverley Property to assess deep impacts south/southwest of Area B.

Wvly-1	Drilled to 175 ft. Screened 145-155 ft
Wvly-2	Drilled to 142 ft Screened 86-91 ft
Wvly-3	Drilled to 161 ft Screened 100-115 ft
Wvly-5	Drilled to 400 ft Screened 225-235 ft and 347-377 ft

- County G
  - 1 boring location completed to 400 ft deep to assess deep groundwater quality east of Area B and Carroll Creek.

Cnty-1s & -1d	Drilled to 400 ft. Screened 99-109 ft (Cnty-1s) and 382-397 ft (Cnty-1d)

- Area B C
  - 1 boring drilled to 500 ft deep to assess deep impacts downgradient of B-11.

BMW-79	Drilled to 500 ft. Screened 433-443 ft

New: Permanent Sampling Point Construction Completed Since Last RAB

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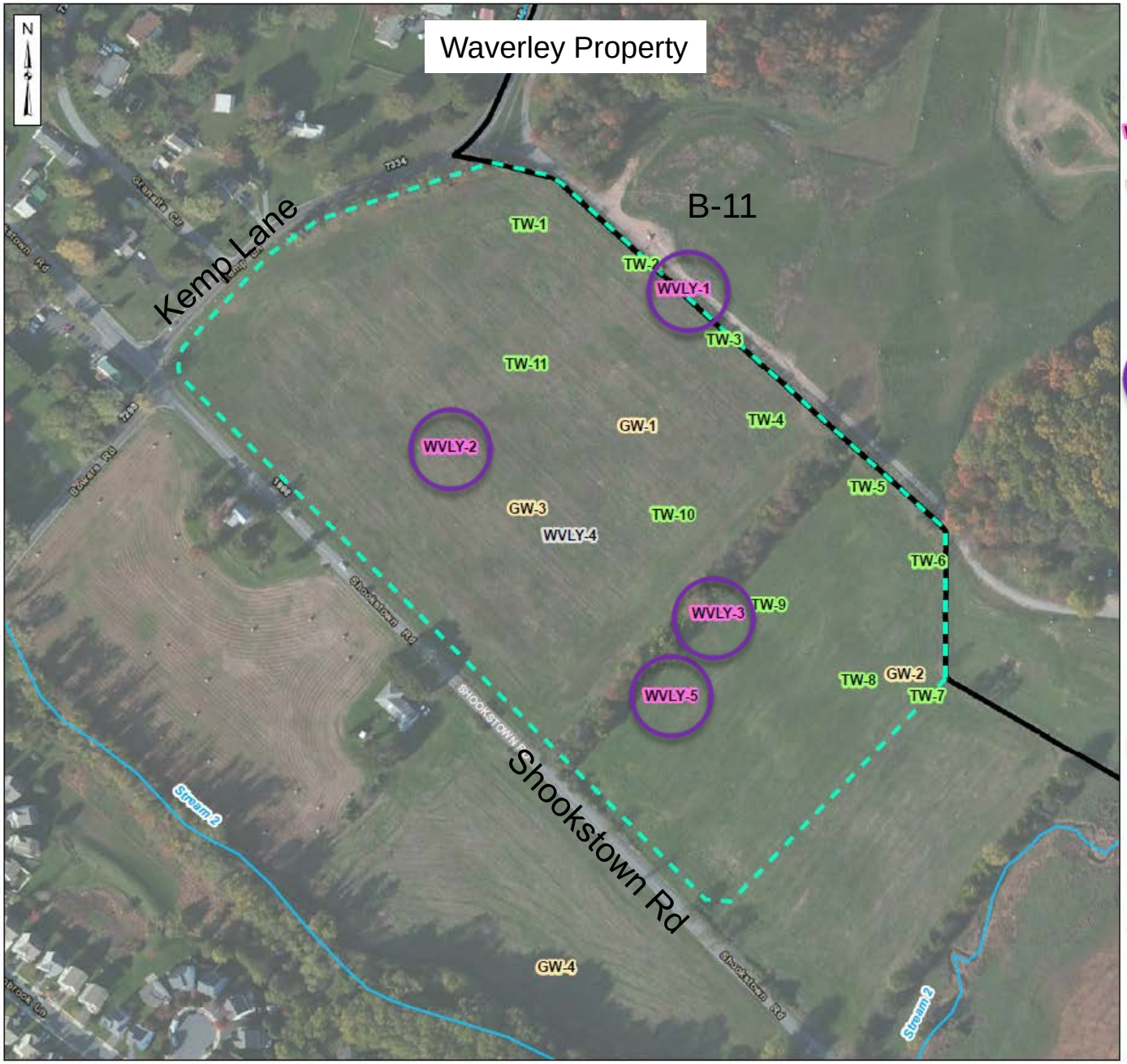
New Deep Groundwater Data Presented Tonight



Legend

- Fort Detrick Boundary
- Approximate ROE Boundary
- Stream
- WVLY-2 Waverley Monitoring Point (2014)
- TW-1 USACE Temp Sampling Point
- WVLY-4 Abandoned Boring Location
- GW-1 Waverley Monitoring Point (2004)

Four deep borings ranging in depth from 140 to 400 ft with packer samples. Permanent sampling completed and sampled at each boring.

See RAB slides from Nov '14 for a summary of the data from the shallow USACE temporary sampling points.

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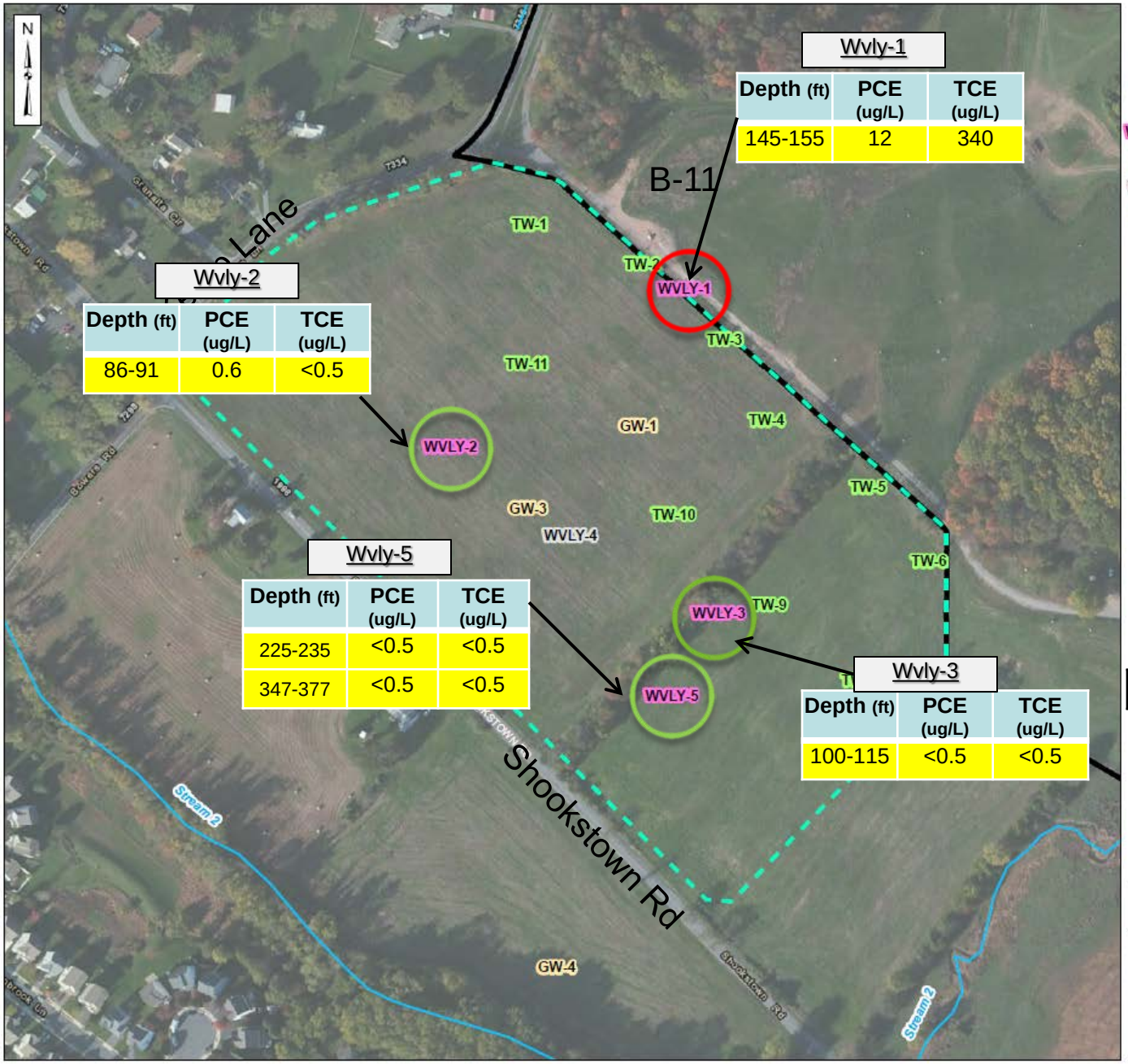
Waverley Property

Area B Groundwater Investigation
Fort Detrick
Frederick, MD

B

Summary of Results from Deep Monitoring Points



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- GW-1 Waverley Monitoring Point (2004)

TCE and/or PCE exceeds MCL at this location in deep groundwater.

No MCL exceedances at this location in deep groundwater.

NEW Monitoring Point Results*

* See full list of detections on following slide.

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Waverley Property

Area B Groundwater Investigation
Fort Detrick
Frederick, MD

B

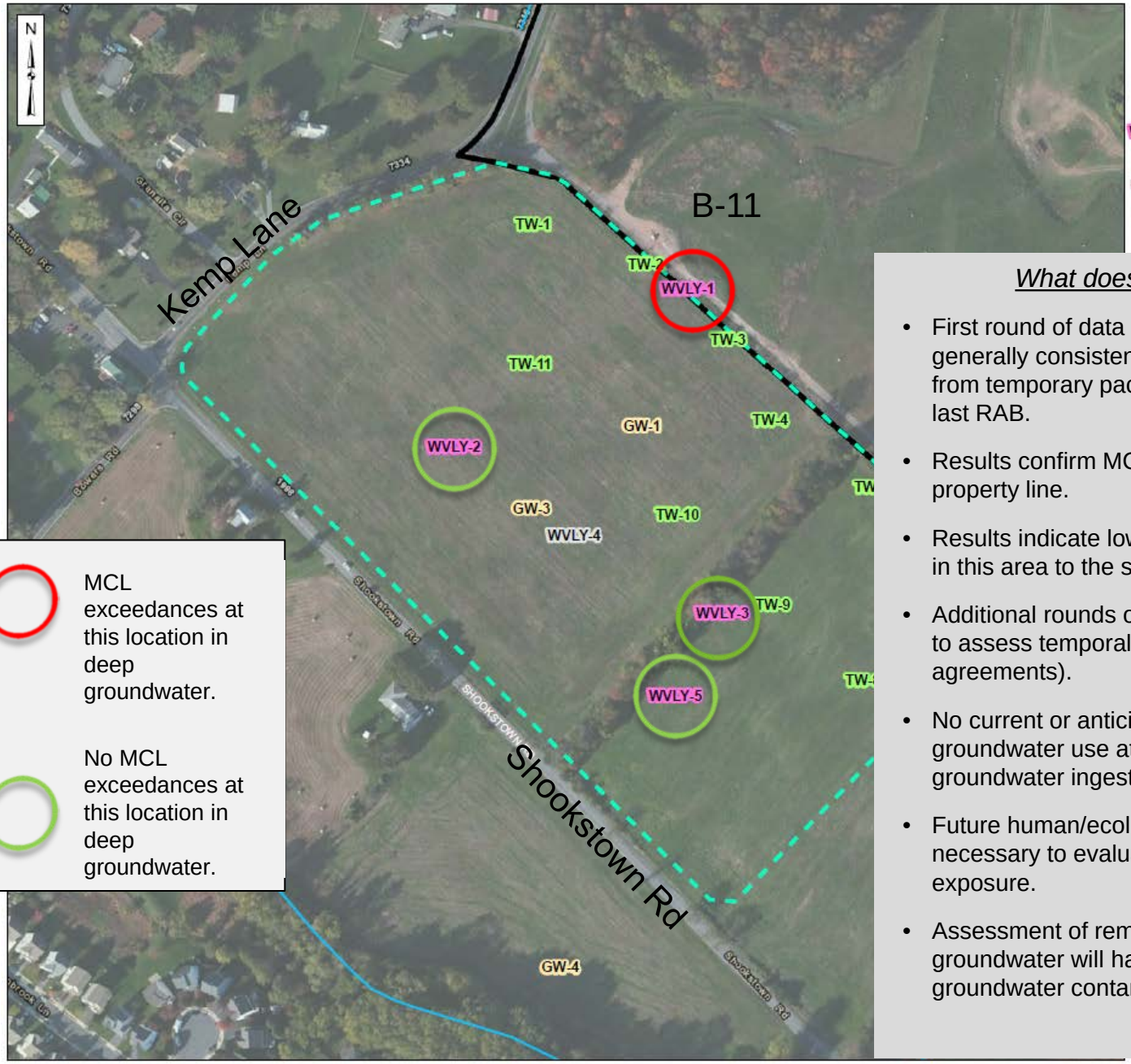
Summary of Detections in Permanent Monitoring Points at Waverley Property (November 2014 Sampling Event)

Location (sample date)	WVLY-1 (111014)	WVLY-2 (111014)	WVLY-3 (111114)	WVLY5s (111214)	WVLY5d (111214)
Screen Depth (ft bgs)	(145-155)	(86-91)	(100-115)	(225-235)	(347-377)
Detected VOCs	Result (ug/L)				
Tetrachloroethene (PCE)	**12**	**0.6**	N.D.	N.D.	N.D.
Trichloroethene (TCE)	**340**	N.D.	N.D.	N.D.	N.D.
cis-1,2-Dichloroethene	**7.4**	N.D.	N.D.	N.D.	N.D.
Trichlorofluoromethane	**130**	N.D.	N.D.	N.D.	N.D.
Freon 113	**1.9 J**	N.D.	N.D.	N.D.	N.D.
Chloroform	**160**	N.D.	N.D.	**1.2**	**1.3**
Acetone	N.D.	**4.9 J**	N.D.	N.D.	**3.6 J**
Bromodichloromethane	N.D.	N.D.	N.D.	**0.1 J**	**0.1 J**
Dichlorodifluoromethane	**0.6 J**	N.D.	N.D.	N.D.	N.D.
1,1-Dichloroethane	**0.7 J**	N.D.	N.D.	N.D.	N.D.
1,2-Dichloroethane	**1.6 J**	N.D.	N.D.	N.D.	N.D.
1,1-Dichloroethene (1,1-DCE)	**14**	N.D.	N.D.	N.D.	N.D.
1,1,1-Trichloroethane	**3.8**	N.D.	N.D.	N.D.	N.D.
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	N.D.	N.D.	N.D.	N.D.	**0.2 J**
m+p-Xylene	N.D.	N.D.	**0.2 J**	N.D.	N.D.
o-Xylene	N.D.	N.D.	N.D.	N.D.	N.D.

MCL exceedances marked in red.

PCE 5 ug/L
TCE 5 ug/L
Chloroform 70 ug/L
1,1-DCE 7 ug/L

Summary of Results from Deep Borings/Monitoring Points



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- GW-1 Waverley Monitoring Point (2004)

MCL exceedances at this location in deep groundwater.

No MCL exceedances at this location in deep groundwater.

What does this data mean?

- First round of data from permanent points generally consistent with preliminary results from temporary packer samples discussed at last RAB.
- Results confirm MCL exceedances close to property line.
- Results indicate low or non-detect deep impacts in this area to the south/southwest of B-11.
- Additional rounds of monitoring recommended to assess temporal trends (pending access agreements).
- No current or anticipated future potable groundwater use at the property so no risk from groundwater ingestion.
- Future human/ecological risk assessment is necessary to evaluate all potential routes of exposure.
- Assessment of remedial alternatives for Area B groundwater will have to account for off-post groundwater contamination in this area.

B

Combined Summary of Deep & Shallow Test Results

Legend

- Fort Detrick Boundary
- Approximate ROE Boundary
- Stream
- WVLY-2 Waverley Monitoring Point (2014)
- TW-1 USACE Temp Sampling Point
- WVLY-4 Abandoned Boring Location
- GW-1 Waverley Monitoring Point (2004)

TCE and/or PCE exceeds MCL at this location in groundwater.

No MCL exceedances at this location in groundwater.

No MCL exceedances in previous data provided by property owner.

The Army's preliminary observations to date are consistent with the original conceptual site model :

- **Groundwater impacts south of the Detrick property line do not extend far beyond the property line and concentrations drop off quickly in this direction by orders of magnitude. Additional rounds of monitoring are recommended.**

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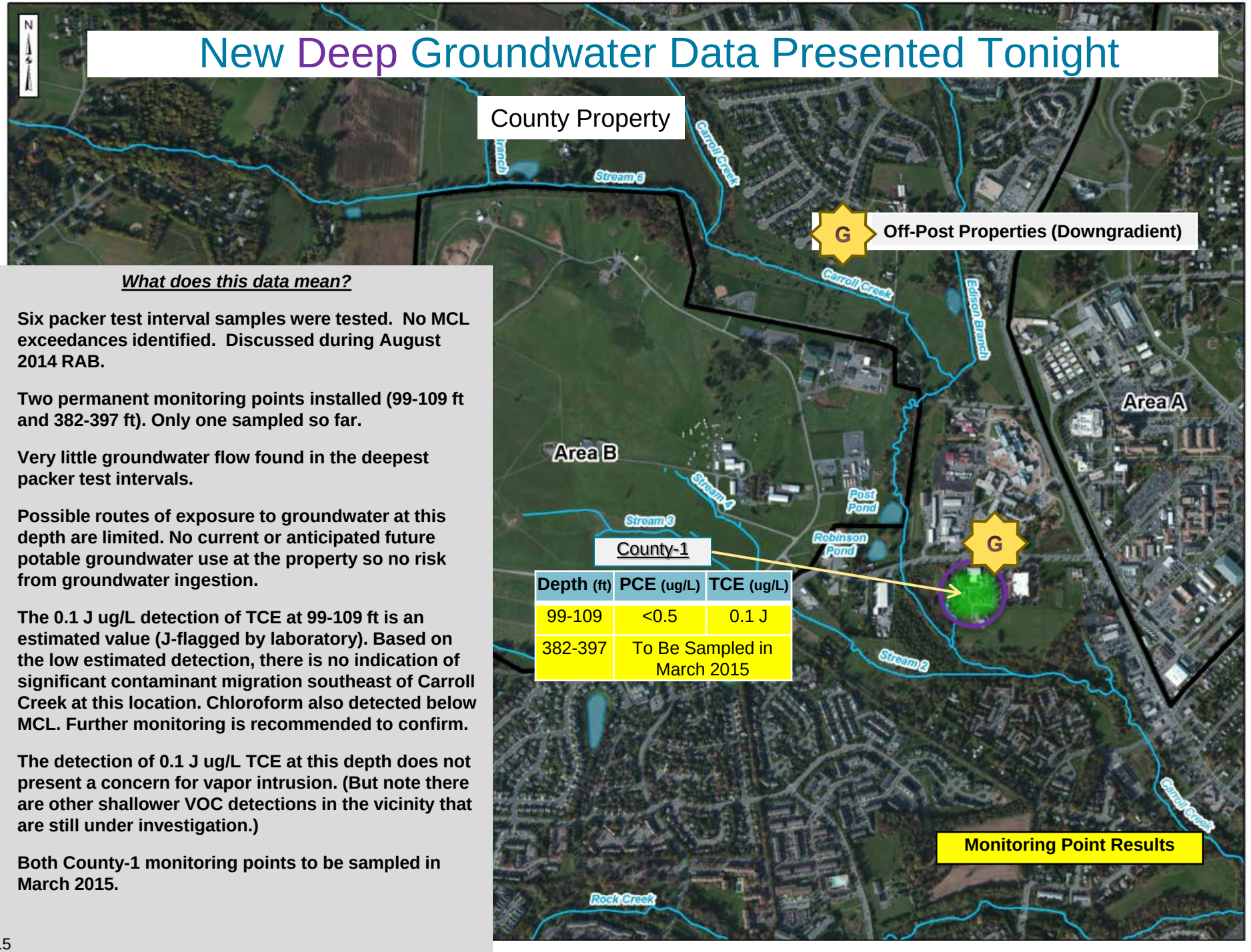
New Deep Groundwater Data Presented Tonight



Depth (ft)	PCE (ug/L)	TCE (ug/L)
99-109	<0.5	0.1 J
382-397	To Be Sampled in March 2015	

What does this data mean?

- **Six packer test interval samples were tested. No MCL exceedances identified. Discussed during August 2014 RAB.**
- **Two permanent monitoring points installed (99-109 ft and 382-397 ft). Only one sampled so far.**
- **Very little groundwater flow found in the deepest packer test intervals.**
- **Possible routes of exposure to groundwater at this depth are limited. No current or anticipated future potable groundwater use at the property so no risk from groundwater ingestion.**
- **The 0.1 J ug/L detection of TCE at 99-109 ft is an estimated value (J-flagged by laboratory). Based on the low estimated detection, there is no indication of significant contaminant migration southeast of Carroll Creek at this location. Chloroform also detected below MCL. Further monitoring is recommended to confirm.**
- **The detection of 0.1 J ug/L TCE at this depth does not present a concern for vapor intrusion. (But note there are other shallower VOC detections in the vicinity that are still under investigation.)**
- **Both County-1 monitoring points to be sampled in March 2015.**

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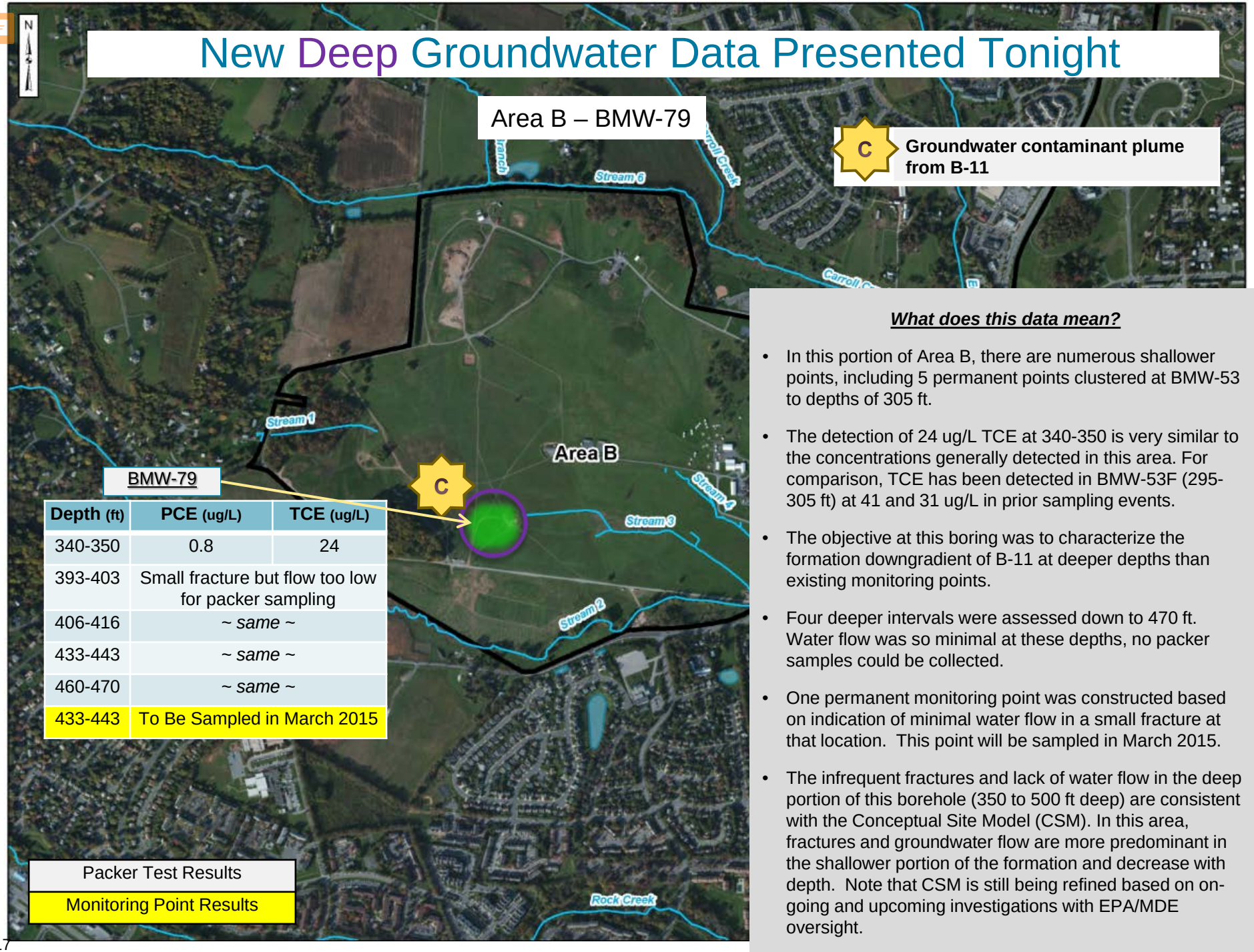
ARCADIS

New Deep Groundwater Data Presented Tonight



Depth (ft)	PCE (ug/L)	TCE (ug/L)
340-350	0.8	24
393-403	Small fracture but flow too low for packer sampling	
406-416	~ *same* ~	
433-443	~ *same* ~	
460-470	~ *same* ~	
433-443	To Be Sampled in March 2015	

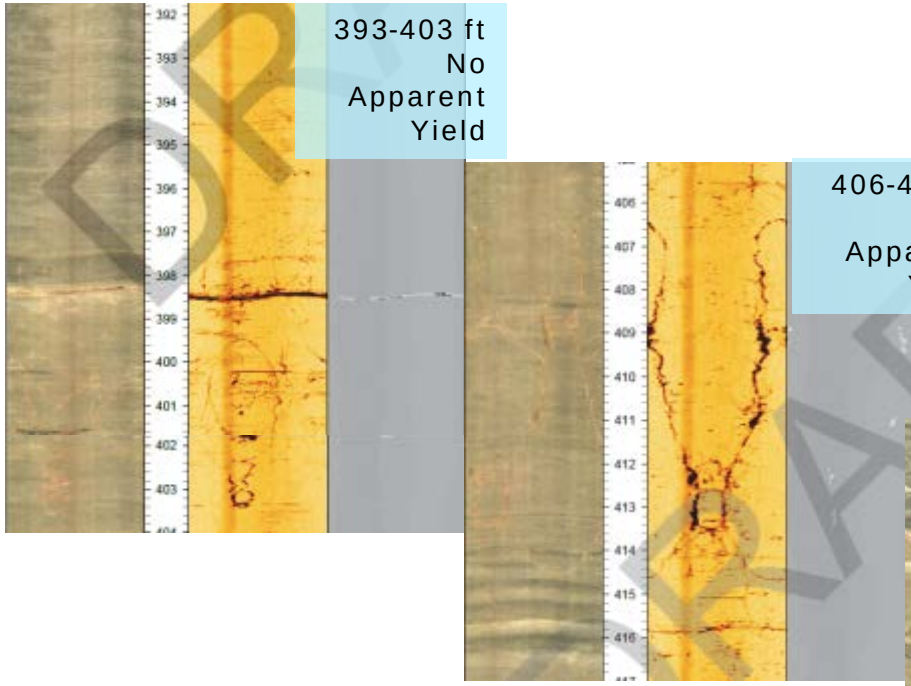
Packer Test Results

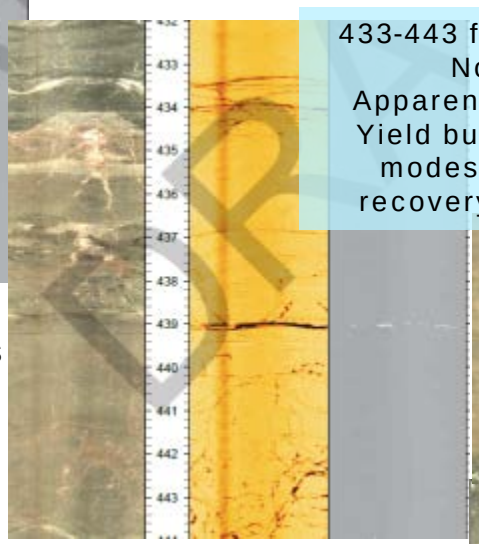
Monitoring Point Results

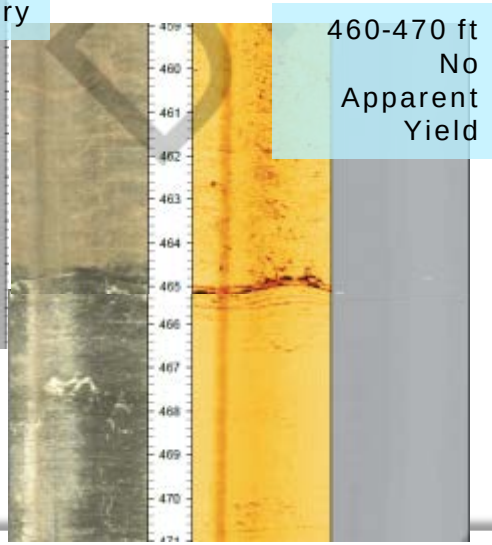
What does this data mean?

- In this portion of Area B, there are numerous shallower points, including 5 permanent points clustered at BMW-53 to depths of 305 ft.
- The detection of 24 ug/L TCE at 340-350 is very similar to the concentrations generally detected in this area. For comparison, TCE has been detected in BMW-53F (295-305 ft) at 41 and 31 ug/L in prior sampling events.
- The objective at this boring was to characterize the formation downgradient of B-11 at deeper depths than existing monitoring points.
- Four deeper intervals were assessed down to 470 ft. Water flow was so minimal at these depths, no packer samples could be collected.
- One permanent monitoring point was constructed based on indication of minimal water flow in a small fracture at that location. This point will be sampled in March 2015.
- The infrequent fractures and lack of water flow in the deep portion of this borehole (350 to 500 ft deep) are consistent with the Conceptual Site Model (CSM). In this area, fractures and groundwater flow are more predominant in the shallower portion of the formation and decrease with depth. Note that CSM is still being refined based on on-going and upcoming investigations with EPA/MDE oversight.

BMW-79 Packer Tests (Deeper Intervals)

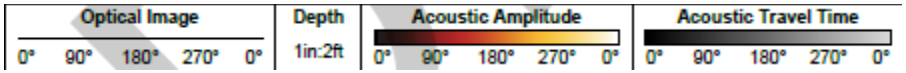






See RAB slides from June 2011, February 2013, & March 2014 for detailed review of drilling & logging approach

- Review of logs identified four small features deeper than 350 ft that were considered possible water-bearing fractures worth packer testing.
- However, all 4 deep test intervals produced insufficient water to sample via pumping packer tests
- Also monitored for water level recovery in these intervals and found one zone (433-433 ft) produced approximately 55 ml/min (very low flow rate). Well constructed at this zone. Will be sampled in March.



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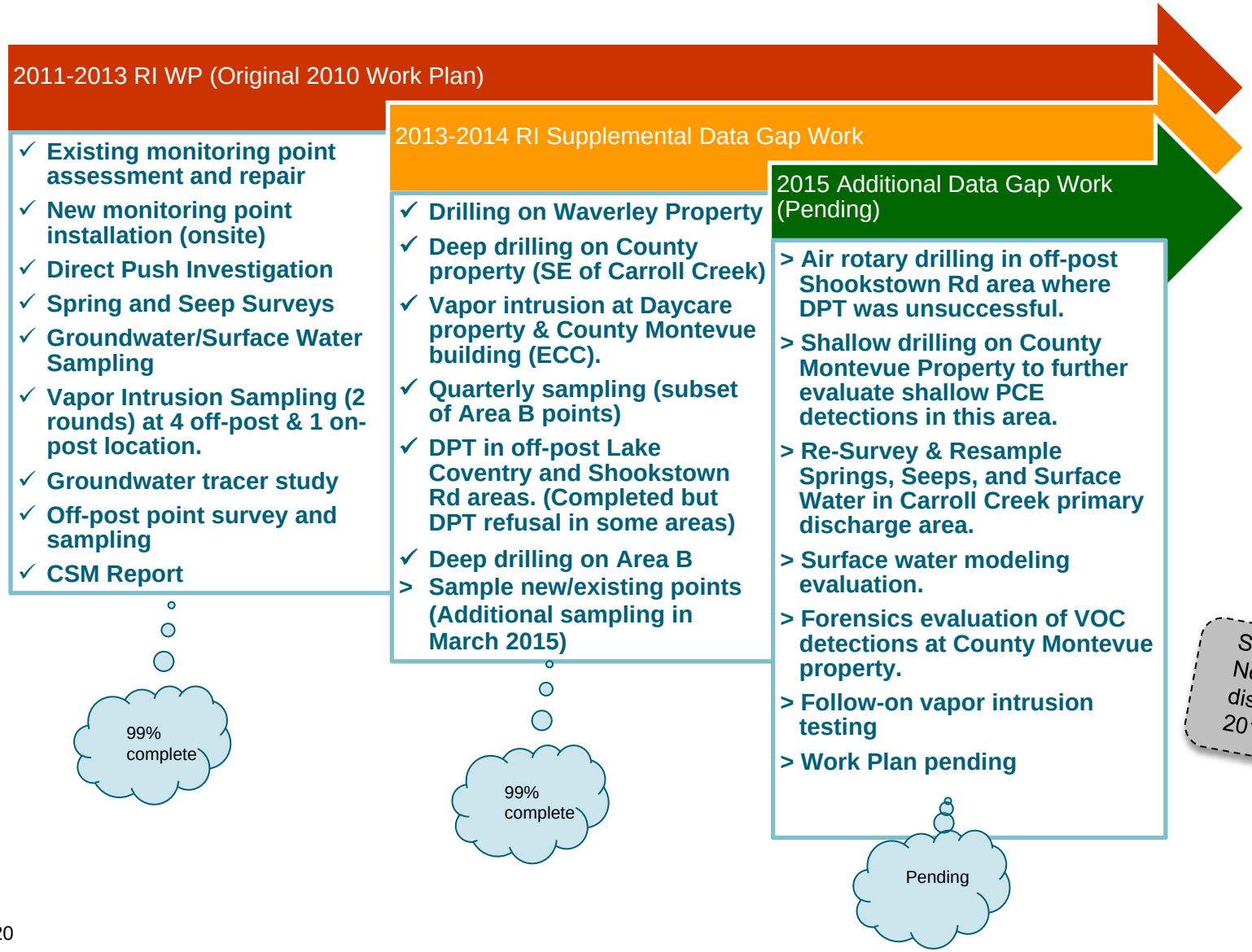
Status of On-going Area B RI Activities



Remedial Investigation Report

- Updated CSM
- Human health & ecological risk assessment
- Spring 2016 to EPA & MDE

See RAB slides from November 2014 for discussion of pending 2015 Data Gap Work

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Area B Schedule

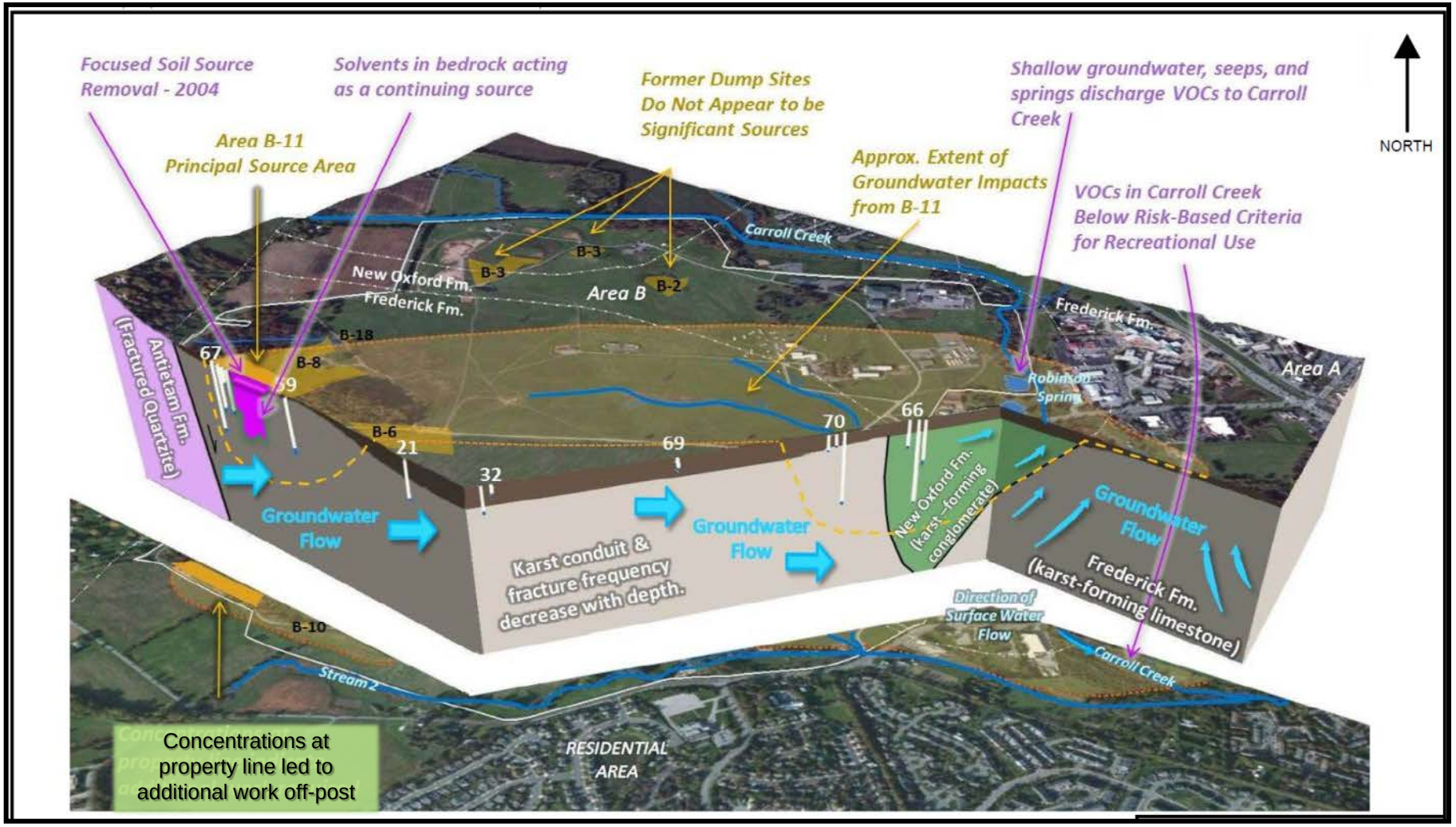
On-Going	RI and HHRA Work Plan Preparation & Right-of-Entry negotiations
Spring 2015	EPA/MDE Work Plan Review/Approval Mobilization, Utility Clearance, Site Prep
Summer 2015	Shallow drilling & additional RI tasks
Fall 2015	RI tasks completed & RI report preparation/ Army review
Spring 2016	RI report submittal to EPA/MDE
Summer/Fall 2016	Feasibility Study to EPA/MDE to assess remedial alternatives (note that potential groundwater pilot treatability studies are being discussed with EPA and MDE)

Questions and Discussion

Area B 360° Overview Slides

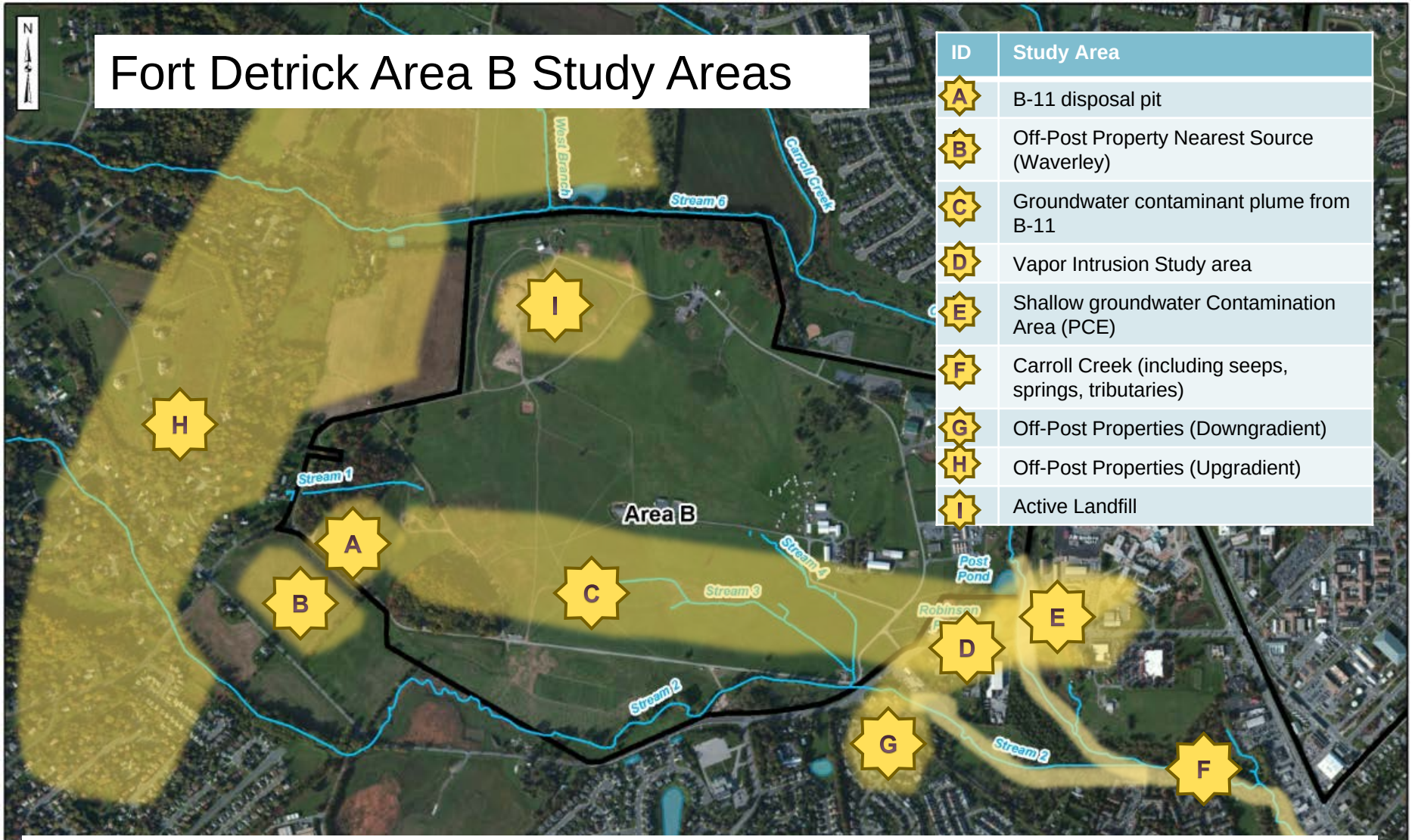
ARCADIS

Area B Conceptual Site Model Review



ARCADIS

Fort Detrick Area B Study Areas



ID	Study Area
A	B-11 disposal pit
B	Off-Post Property Nearest Source (Waverley)
C	Groundwater contaminant plume from B-11
D	Vapor Intrusion Study area
E	Shallow groundwater Contamination Area (PCE)
F	Carroll Creek (including seeps, springs, tributaries)
G	Off-Post Properties (Downgradient)
H	Off-Post Properties (Upgradient)
I	Active Landfill

There are multiple on-going and overlapping investigation efforts in and around Area B. This figure provides a generalized representation of the current on- and off-post Area B study areas. Phased investigation activities are being conducted with EPA and MDE oversight and in accordance with approved work plans following the CERCLA process within these areas. For RAB meetings this figure is included in the slides to indicate which areas are the focal points of the meeting, recognizing that all areas cannot be discussed during each quarterly meeting. Moving forward, the Army will develop and maintain summary slides for each area to keep stakeholders updated on the work in these areas as well as next steps. These slides will be included at the end of the presentation.

Area B 360° Overview Slides

Map ID	Study Area	Previous RAB Presentations for Additional Information	Status of 360° Overview Slides
A	B-11 disposal pit	See “C” for RAB presentations discussing groundwater contamination originating from B-11 area.	*Pending*
B	Off-Post Property Nearest Source (Waverley)	Nov ’13, Mar ‘14, Nov ’14, Feb ‘15 (drilling updates with data)	Updated January 2015
C	Groundwater contaminant plume from B-11	Nov ’12 (April 2012 data summary) Feb ’13 (Sept 2012 data summary; vertical contaminant distribution discussion; karst drilling, geophysical logging, permanent point construction decisions) Mar ‘14 (dye trace study recap)	*Pending*
D	Vapor Intrusion Study area	May ’13 (VI overview)	*Pending*
E	Shallow groundwater Contamination Area (PCE)	Aug ’13 (direct push study summary)	*Pending*
F	Carroll Creek (including seeps, springs, tributaries)	Mar ‘14 (dye trace study recap)	*Pending*
G	Off-Post Properties (Downgradient)	Aug ’13, Nov ‘13 (direct push study summary), Feb ‘15 (deep monitoring point east of Carroll Creek)	*Pending*
H	Off-Post Properties (Upgradient)	Feb ’13 through Aug ’14 Mar ‘14 (dye trace study recap)	*Pending*
I	Active Landfill	See Nov ’12, Feb ‘13 groundwater data near landfill, but not discussed directly.	*Pending*

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Off-Post Property Nearest Source (Waverley Property)

Description

- Undeveloped privately-owned property across property line from former B-11 disposal pit (See Map ID A)
- Currently used for agriculture (corn, soybeans)
- Future residential development considered likely.
- Depth to first water is approx. 25-50 ft bgs.

Relevant Investigation Work Completed

- 2004: seven monitoring points installed to depths up to 100 ft bgs (installed by property owner)
- 2013/2014: eleven monitoring points to ~50 ft bgs installed along the property line; five intermediate/deeper points to 91, 115, 155, 235, and 377 ft bgs (installed by Army)
- Points on property monitored during Area B tracer study.
- The 5 intermediate/deeper points sampled in November 2014.

Investigation Highlights

- TCE detected above MCL (5 ppb) in four shallow groundwater sample points closest to the across from B-11. Highest concentration was 61.9 ppb.
- Boring Wvly-1 to 170 ft bgs, located ~100 ft from property boundary found TCE at 70 to 210 ppb in four screening packer samples collected during drilling. TCE detected at 340 ug/L in a permanent monitoring point.
- During tracer study, no tracer introduced at B-11 was detected in any monitoring points on this property or other areas to the south and west.
- Data from the five permanent intermediate/deep points indicate low or non-detect deep impacts in this area to the south/southwest of B-11. Additional sampling rounds recommended.

Risk & Potential Receptors

- No current risks identified but future risks need to be considered.
- Current and future groundwater use is prohibited, so no potential exposure to contaminated groundwater.
- Groundwater contamination migrates onto the property at depth, so no soil contamination.
- Corn, soybeans not at risk due to depth of groundwater.
- No current vapor intrusion issues, but future development along the property boundary next to B-11 should consider monitoring, vapor barriers, vapor removal systems, or similar approaches to prevent potential exposure.

Data Gaps & Next Steps

- 4 of the shallow temporary points with MCL exceedances near property boundary may be converted to permanent points.
- Currently, no other drilling or investigation on this off-post property is planned or recommended (pending EPA/MDE review)
- Draft human health risk assessment & Area B RI report slated for Summer 2016 (pending completion of work in other areas).
- Draft Feasibility Study report to assess remedial alternatives for Area B anticipated in late 2016. Pilot treatability studies may be considered too. Path forward decisions require EPA and MDE concurrence.

Fort Detrick

Archive Search Report (ASR)

Operational History for Potential Environmental Releases

(non-herbicides or ASR "2")

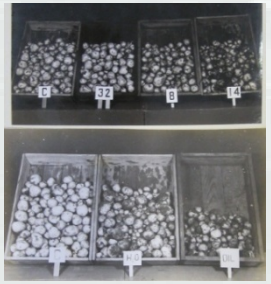
Randal S. Curtis, P.E., Archival Research & Analysis

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.

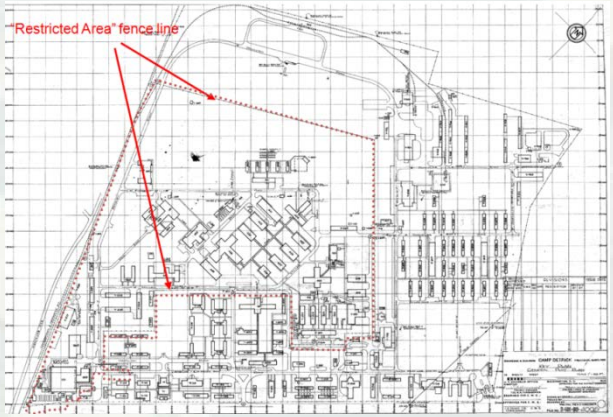


ASR - Process

- 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

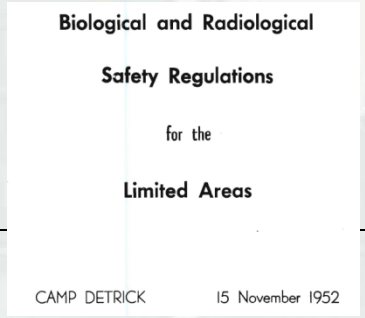


History of Fort Detrick

- 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

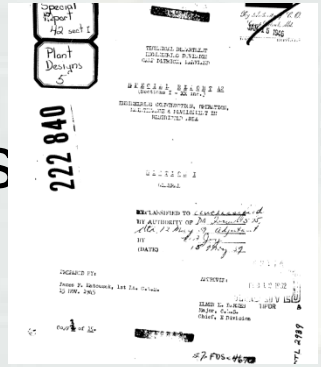
Limited Areas

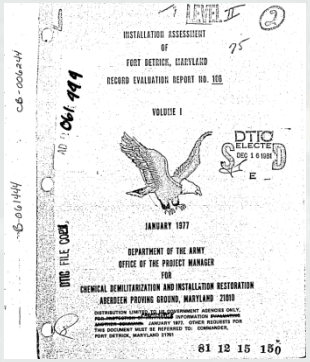
CAMP DETRICK 15 November 1952

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**



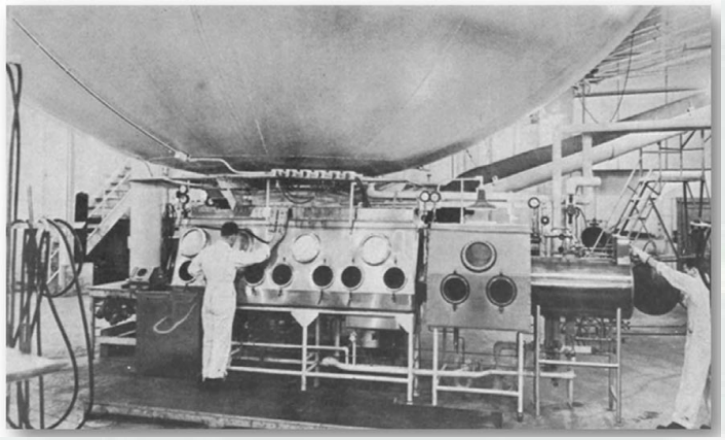


BW Agents Potential - General

- **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



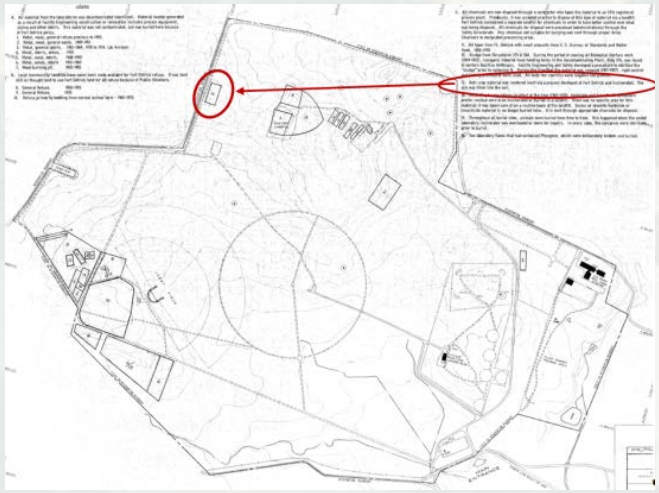
- RDT&E facilities including
  - laboratories
  - enclosed test chambers
  - pilot plants
  - incinerators
- 79 structures demilitarized in 1971-73 (decontamination of building & equipment); all certified for reuse except four (1 razed & 3 in use) due to concerns with *Bacillus anthracis* spores
- ~25 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

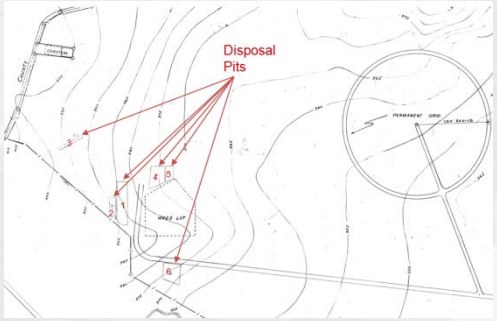
- When high heat could destroy delicate and valuable items decontamination primarily used chemicals for sterilization:
  - Beta (β)-propiolactone (BPL)
  - Calcium hypochlorite (as HTH (high-test hypochlorite) and bleaching powder)
  - Ethylene imine
  - Ethylene oxide as Carboxide gas (10% ethylene 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

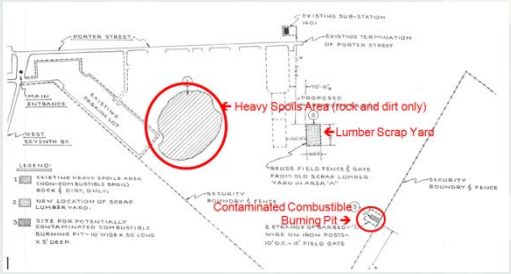
Solid Waste Disposal

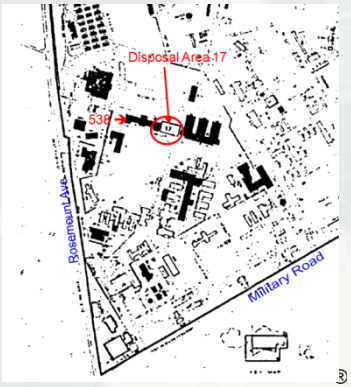
- Initially followed Army SOP of time regarding separating non-salvageable material:
  - burnable waste ➔ incinerator
  - non-burnable waste ➔ landfill
- In 1947, ~3,000 pounds of refuse a day from within the Restricted Area: 2/3 ➔ incinerated & 1/3 ➔ City of Frederick incinerator + additional 1,500 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)

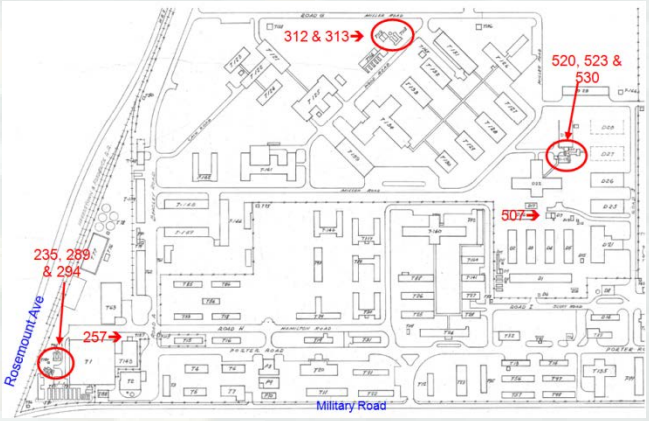
Liquid Waste Disposal – Contaminated Sewer (cont)

- 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

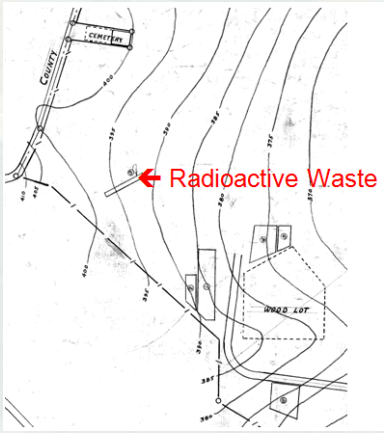
- TCE use at Detrick
  - ► industrial solvent for degreasing parts
  - ► refrigerant in the freeze-drying process & as a brine or secondary refrigerant for test chambers
- Refrigeration volume over 400 gallons in one storage tank location
- TCE based refrigeration systems in Bldgs 376, 470, 568, and 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

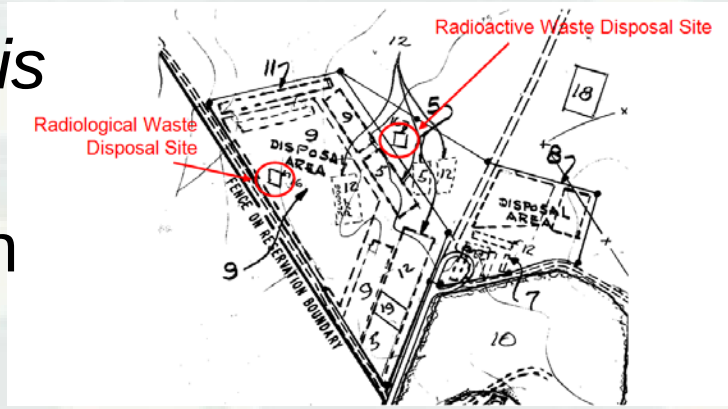
Radioactive Activities in Buildings

- 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

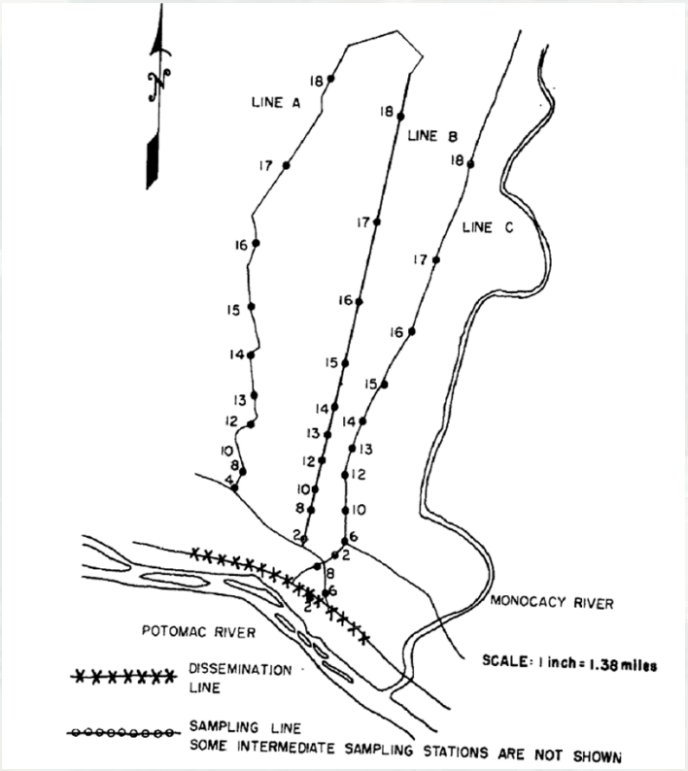
- potential additional ASTs and USTs containing gasoline, diesel, and No. 6 Fuel Oil not yet investigated under DERP:
  - Original “Gas” fuel tanks / Fuel Oil Storage (271)
  - vehicle gas dispensing station (705) north of Porter Street
  - former oil drum storage (513)
  - oil storage Building (365)

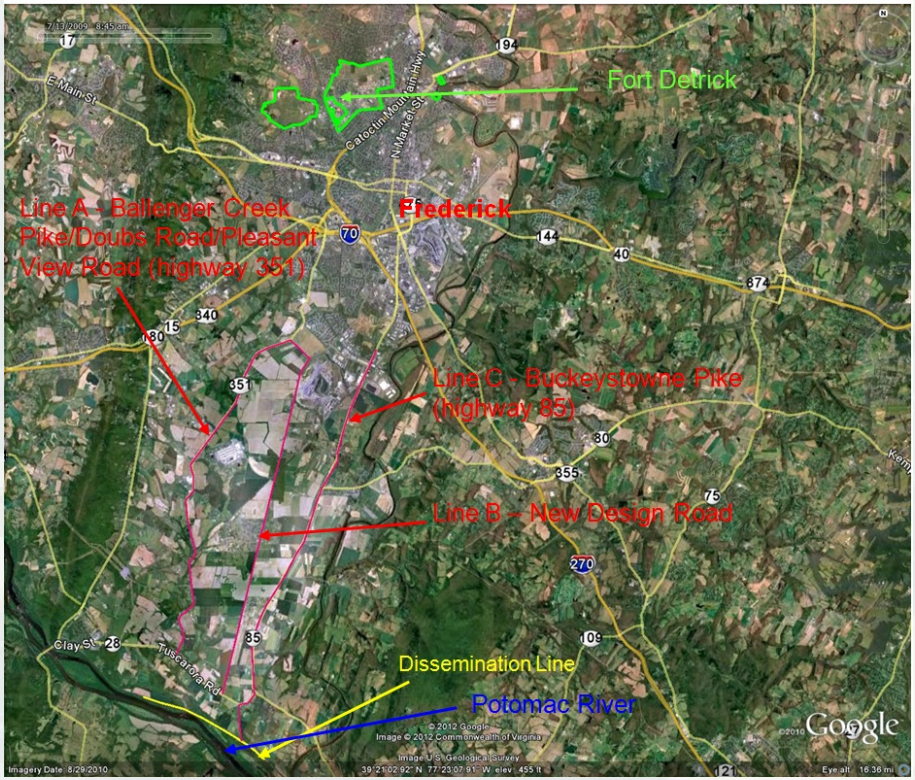
Military Munitions Response Program (MMRP) MRS

- 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

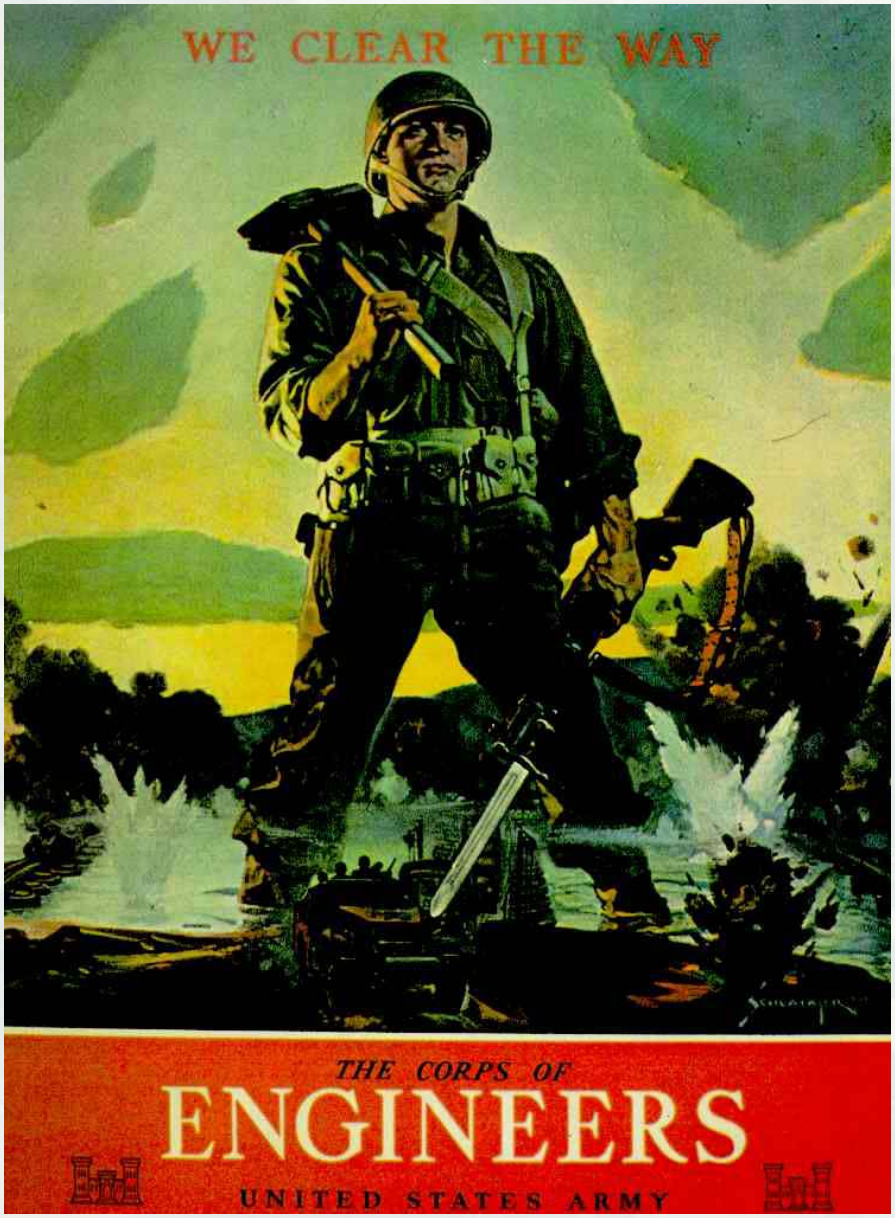
  "…*The usual consideration of property damage and loss, while important, are secondary to the BW hazard which is two- fold. Vermin gaining entrance to laboratories, animal buildings, and such facilities can destroy laboratory control by bringing in contamination. Conversely, if permitted to go out again 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/responsible/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?