Question for the Final Draft of the Feasibility Study Report

Comment: In section 4.2.4.7 Implementability (page 98 on my pdf reader), the second paragraph, lines 10 and 11 state ***"The water content observed on the site during the phase 2 geotechnical boring investigation ranged between 13.1 and 217.9 percent."*** I am having trouble understanding how a water content can be more than 100%. Is this a typo or is there some rather more technical explanation?

Response:

The range of soil moisture (i.e. water) content readings referenced in the FS text is correct. Soil moisture content can be reported on a volume, dry weight, or wet weight basis. The soil moisture content of the BoRit samples were obtained using ASTM Method 2216 D and reported on a dry weight basis. On a dry weight basis, values greater than 100% are possible.

To calculate moisture content on a dry weight basis, the following equation is used:

$$\text{Moisture Content on dry weight basis} = \frac{W_{mass\ of\ wet\ sample} - D_{mass\ of\ dry\ sample}}{D_{mass\ of\ dry\ sample}}$$

$$= \frac{MW_{mass\ of\ water}}{D_{mass\ of\ dry\ sample}}$$

In the equation above, it is possible that the mass of the water in a given sample may be greater than the mass of the dried soil in that sample, so you could end up with a value exceeding 100%. (It is not uncommon for soft clays, organic soils, or sediments to have moisture contents greater than 100%.) Additional text will be added to Section 4.2.4.7 to explain why soil moisture percentages greater than 100% are possible.

Comment: One observation of the report that I would make is that when considering the differing options, the report does not appear to acknowledge that perhaps the three separate parcels on the BoRit site may not all need the same remedial action. The report appears to apply each option to all three parcels equally without evaluating the option's suitability to each particular parcel of the site. As the three parcels are quite different to each other physically, this might be something that EPA may wish to consider further.

Response: EPA acknowledges this observation. This approach will be discussed with the technical team and EPA management when preparing the Proposed Plan and the preferred alternative.

Comment: Software used to develop the illustrations was the main tool used to estimate the quantities of ACM[1]. What are the details and how good are the estimates?

Mining Visualization Systems (MVS) software used to develop the fill/waste distributions and reservoir sediment distribution depicted in FS figures 2-2 through 2-5 calculated associated quantities for these distributions. As noted in the FS text, the distributions and volume estimates reflect information gathered from EPA Removal as-built drawings and EPA Removal Activity Reports, data collected during the RI, and assumptions made for the purposes of the FS Report. EPA is confident that this estimate is appropriate for the purpose of comparing alternatives in the FS.

Comment: What is 84J and 150J on page 1-18?

These concentrations are included in the last sentence in first paragraph under "SVOCs" on page 1-18 in the phrase "…while detections at downstream locations ranged from 84 J to 1,000 µg/kg in heavy deposition areas and 150 J to 990 µg/kg in normal deposition areas." The associated units for 84J and 150J are µg/kg (or parts per billion). The "J" associated with the concentrations is a data validation qualifier flag indicating that the concentration is an estimated value.

Comment: Several questions pertain to all of the options where the contaminants are not removed or decontaminated:

- If the RSL's change in the future, is there a way to monitor and respond so that there is no danger to human health or to the environment? Example of possible changes include:
  - Toxicity of asbestos fibers under 5 microns[2,3].
  - Establishment of an asbestos requirement for levels in soil.
  - Standards for organic and inorganic contaminants.
  - Changes in economic or engineering improvements making other options more attractive.

Cleanup options that contain or leave contaminated material in place include long-term inspection and monitoring on a regular basis as well as completion of five- year reviews to ensure that the remedy remains protective of human health and the environment after construction has been completed. A five-year review is required to answer three fundamental questions:

A. Is the remedy functioning as intended by the decision documents?
B. Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of remedy selection still valid?
C. Has any other information come to light that could call into question the protectiveness of the remedy?

The answer to question "B" specifically captures any changes to the RSLs established in the Record of Decision. Should the answers to these questions indicate that the implemented remedy is not protective, recommendations will be developed to address issues that relate to the remedy's protectiveness. Recommendations may include further investigation, additional response actions, improve operations and maintenance, or enforce institutional and access controls.

Comment: There is a constant competition for funds for superfund sites. How do we know budgetary concerns will not impede the timely maintenance of the cap and/or the Geo-tex membrane or corrective actions identified in a five year review?

While it is not possible to foresee and plan for all potential funding limitations and restrictions that may occur, the cost estimate for carrying out a remedial design/remedial action (RD/RA) at the site assumes some level of annual repair to the cap components and include cost and schedule assumptions for carrying out those repairs. Including that information in the Remedial Action budget will help plan for and carry out maintenance within the confines of available funding.

BoRit is an EPA Fund Lead Site, which means that EPA will enter into a Superfund State Contract (SSC) with the Pennsylvania Department of Environmental Protection (PADEP). The SSC is a contract with PADEP which requires PADEP to fund 10% of the construction costs and 100% of the operations and maintenance costs for fund lead projects.

Comment: What plans exist to repair compromised Geo-textile membrane damages from plant growth, animal intrusion, or exceeding life expectancy?

The FS describes the completion of visual inspections on a quarterly basis and maintenance of cap cover, liners, and stabilized areas on an annual basis and as needed in response to significant weather events (e.g., hurricanes). Development of a detailed operations and maintenance plan (O&M) for carrying out inspections and assessing and repairing damage would be included in the remedial design/remedial action phase.

Comment: Several questions pertain to the options using thermal vitrification to detoxify the ACM:

- Each option states that a treatability and predesign investigation should be done as part of the program. Under these circumstances, where efficiency and program duration cannot be determined, how can a cost be estimated?

The cost estimates for the thermal-based treatment alternatives were developed on the assumption that the technology would be effective in converting ACM to an inert material. The

purpose of the treatability study and pre-design investigation are to support the development of detailed design specifications for the remedy; including its performance on heterogeneous materials, the need for off-gas collection and treatment, and treatment of non-asbestos contaminants.

- For these programs, very large capital costs are listed. What do these capital costs include?

Capital costs include the costs associated with construction and operation of the treatment system until the specified volume of material has been addressed, site monitoring during the treatment period, site restoration, and confirmation sampling. Because Alternative WSS5 (Ex situ TCCT) uses an ex situ treatment process, its capital costs also include costs associated with excavating contaminated material so that it can be treated. Appendix B of the FS contains Detailed Analysis Cost Estimates for Retained Remedial Alternatives.

- These programs cause an increase in density and require an unknown volume of backfill[4]. How much cost does this add? How much truck traffic does this entail?

For Alternative WSS4, it is assumed that a 30 percent reduction in volume would be achieved after treatment (see FS Section 4.2.4.5, pg. 4-16). For Alternative WSS5, a 70 percent reduction in volume after treatment is assumed (see FS Section 4.2.5.5, pg. 4-20). Using these assumptions, the total volume reductions (in cubic yards) for Alternatives WSS4 and WSS5 were calculated and information regarding the estimated backfill requirements, the estimated number of trucks to haul imported fill to the Site, and the related backfill costs will be added to the final FS.

- For these programs, why not fund a proof of concept trial so that more accurate estimates can be obtained and a better final solution be reached?

The information presented in the FS is meant to provide sufficient information to develop and evaluate a range of alternatives (including containment, removal and treatment) against EPA's nine evaluation criteria. Per RI/FS guidance, costs for those alternatives are developed to an accuracy of +50% to -30%. The information needed to develop design level cost estimates can be obtained via the completion of treatability and/or pilot studies and pre-design investigations. The cost of conducting a pilot study is not warranted at this stage of the Superfund process.

- In-situ Joule heating alters the hydrodynamic characteristics of the site and may impact flood zone-related ARAR's. How can the seriousness of this consequence be estimated? Does the treatment really have to go 30 ft deep[5]? If you do not vitrify the entire mass of contaminated soil but do enough to make a vitrified cap as some specified depth, would that not be adequate and

lower the cost? A vitrified cap should be more robust than the caps proposed in other options. This could be a way to reduce the cost of this option.

One of the objectives of the treatability study referenced in the alternative would be to determine that flood-zone related ARARs can be met. In regard to treatment depths, the excavation and treatment based alternatives developed for the FS were created to address the entire volume of contaminated material in order to allow a straightforward development and comparison of the capping (containment), excavation (removal) and treatment-based alternatives.

Treatment of a smaller volume of contaminated soil designed to create a vitrified cap of some specified thickness could be accomplished at a lower cost than estimated for Alternatives WSS4 and WSS5. However, the implementability issues noted for Alternatives WSS4 and WSS5, along with some additional concerns would remain. For example, implementation of the treatment technologies to treat a targeted depth would still require the same utility infrastructure needed to treat the entire volume of contaminated material on-site. In addition, because contaminated material would remain onsite, like Alternative WSS2, this targeted treatment approach would include ICs and an O&M program (cap maintenance, LTM, FYRs). As is the case for Alternatives WSS4 and WSS5, the reduced filtration and storage capacity of the Site's historical fill and soil and potential impacts on floodplain hydraulics would need to be assessed in a treatability study.

For in situ joule heating, treatment would need to be targeted to a total depth that accounts for a 30% volume reduction of treated material. This means a minimum depth of three feet below the existing cap would need to be treated to achieve a vitrified cap thickness of two feet. Although the EPA Removal Program-installed soil cap would be left in place, melting operations would likely impact the existing capped areas and additional clean fill and top soil would be required. In addition, the in situ nature of the joule heating approach would prevent the installation of a geotextile layer to separate contaminated waste from clean material.

For ex situ TCCT, the soil cap implemented by EPA Removal Program would be removed and stockpiled for future use. Contaminated waste, soil, and sediment would be excavated in cells to a target depth that accounts for a 70% reduction in volume and then treated. This means a minimum depth of seven feet would be excavated to achieve a vitrified cap thickness of two feet. The ex situ nature of the TCCT approach would permit the installation of a geotextile layer to separate contaminated waste from clean material. However, each excavation cell would need to expose a large enough area to ensure geotextile placement meets design specifications. Larger excavation cells would likely generate sequencing concerns related to storing excavated and treated material. Finally, because TCCT would be implemented in batches ex situ, treated material would resemble large vitrified blocks. This means that placement of the treated material would not achieve a monolithic cap. Clean fill and topsoil would be required to fill spaces between treated material, establish a uniform cap, and meet design grade requirements.

Based on the considerations outlined above, the inclusion of an additional capping alternative that utilizes targeted treatment to create a vitrified cap would likely provide little benefit with respect to implementability, effectiveness, and cost relative to the existing capping alternative (WSS2).

• For the TCCT option, why not consider more local treatment sites? For a 20 year program, a plant can be built for thermal vitrification which would reduce transportation and overall cost. Calciner technology should not be that hard to find.

Note that the TCCT option retained in Section 4 assumes construction of TCCT treatment unit on-site.

Comment: Pilot test In-situ vitrification or TCCD? Why not?

EPA conducts pilot studies to collect information to assist in developing a remedial design, after an alternative has been chosen in a Record of Decision.

Comment: Is in-situ joule heating safe for people above the ground? Will they get electrocuted?

During the design phase, planners, engineers, and the EPA would work with vendors to ensure health and safety measures specific to the technology are properly identified and designed. Prior to implementation of any remedy, a Health and Safety Plan will be drafted to ensure the safety of workers and the community. Only trained personnel would be allowed in the work area and institutional controls and engineering controls would be implemented to ensure protectiveness of the surrounding community and workers on site. Electrical work required to construct and operate the remedy would only be performed by a licensed electrician. The remedy would be performed sequentially in small portions of the Site and lock-out tag-out procedures would be followed prior to any system maintenance. In addition, requirements for protective clothing and personal protective equipment for workers on site would be dictated by potential hazards associated with the presence of cables and piping to electrodes and other remedy components, the use of high power electricity, and the potential to come into contact with hot surfaces.

Comment: They lumped all 4 zones together throughout the Draft FS. Any thought to treating the orphan pile parcel alone with the WSS3 remedy? It has no possible future use as is post "Removal" as far as I can tell. Cap, Fence, and signage to scare the children.

EPA takes into consideration the future use of a site, or parcel of a site, when assessing the risk a site poses to human health and the environment. When developing cleanup alternatives, future use is also considered. EPA will develop institutional controls, and possibly develop use restrictions, to ensure that the protective remedy put into place will continue to be protective of human health and the environment. The property owner works with EPA to determine if and how a parcel will be reused to ensure it will remain protective of human health and the environment, but EPA does not choose what the reuse will be.

Comment: Effectiveness: "Alternative WSS2 would limit future land use" Can this be further described for each of the 4 Remediation Zones?

All four zones of the BoRit Site have been assessed as recreational use properties. EPA has not developed specific institutional controls at this stage of the process. The type of controls which may be implemented for the WSS2 Capping alternative may include, but are not limited to:

- Do not disturb the two foot cap.
- Only plant vegetation with a shallow root system (no trees)
- Maintain vegetative cover on the streambank slopes

Comment: Implementability: "Alternative WSS2 has already been implemented by the EPA Removal Program for Stream Banks, the Asbestos Pile, and portions of the Reservoir berm and bottom. The remainder of capping would be readily implementable at the Park parcel and the remaining portions of the Reservoir berm and bottom, as it requires typical construction equipment and techniques. Regulatory approval for capping of contaminated waste, soil, and Reservoir sediment and monitoring should be obtainable."

That statement claims the Remediation was categorically taken care of by the Removal (Eduardo's discretion for many aspects), and we skipped the process. What if it is decided that a thicker cap or more expensive work is required to enable longer term remedies or future land use, especially for the orphan pile parcel??

The cap that has been implemented by EPA Removal meets the requirements for capping an asbestos disposal site detailed in the National Emissions Standards for Hazardous Air Pollutants. Pennsylvania Air Quality regulations (25 PA Code Chapter 124) or National Emissions Standards for Hazardous Air Pollutants were adopted verbatim from the federal regulation, (40 C.F.R. Sections 61 et seq., standards for asbestos) http://www.epa.gov/ttn/atw/eparules.html. According to the requirements for inactive asbestos disposal sites, property owners have three options for maintaining compliance:

1. Cover the pile with six inches of compacted, non-asbestos containing material and vegetate;

2. Cover the pile with two feet compacted, non-asbestos containing material; or
3. Fence off the perimeter, post warning signs, and ensure there be no discharge of visible emissions to the outside air from the inactive waste disposal site. A natural barrier that deters access can be used in lieu of a fence and signs.

The Removal Action meets the second requirement. The capping that Removal has implemented at the BoRit Site is equivalent to a cap that Remedial would construct at the Site. If alternative WSS2 is selected by EPA as the final remedy, Remedial will develop and implement institutional controls, develop a long-term monitoring plan, and develop an operations and maintenance plan to complete all the elements of the remedial alternative to meet the remedial action objectives developed for the Site.

Comment: Cost: The screening-level order of magnitude present value cost for Alternative WSS2 is estimated at $23 million (M). The EPA Removal Program has incurred $18.4M for capping work completed through August 2014; $3M is estimated for the EPA Removal Program work to be completed between August 2014 and September 2015; and $1.5M is estimated for tasks required to complete Alternative WSS2

I think they need to better define "complete", as $1.5M from SEP2015 to handover to Owner seems to be a silly estimate, and again assumes Removal equaled Remediation.

A more detailed discussion of costs for WSS2 will be included in the Proposed Plan. The WSS2 capping alternative is the cap implemented by the Removal Program. See response above.

Comment: They used the current landfill (90 miles away) for all of their WSS3 cost estimates, making the transportation cost per CY almost double that of the actual disposal fee per CY. Can't they find a closer landfill than YORK PA? Seems like a worst case estimate.

Not all landfills accept asbestos waste classified as hazardous waste. The Removal Program sent the waste generated during the capping process to the landfill designated in the WSS3 alternative. There are closer landfills that accept asbestos from construction projects, but the quantity of waste generated in WSS3 would require a landfill that can handle the volume of asbestos hazardous waste that would be generated at BoRit.

1 Section 2.2.3, p. 2.6
2 Danuelle J. Carlin, Theodore C. Larson, Jean C. Pfau, Stephen H. Gavett, Arti Shukla, Aubrey Miller, Ronald Hines,

"Current Research and Opportunitiesd to Address Environmental Asbestos Exposures", Environmental Health
Perspectives, 123(8), August 2015.
3 Guillaume Boulanger, Pascal Andujar, Jean-Claude Pairon, Marie-Annick Billon-Galland, Chantal Dion, Pascal
Dumortier, Patrick Brochard, Annie Sobaszek, Pierre Bartsch, Christophe Paris, and Marie-Claude Jaurand,
"Quantification of short and Long Asbestos Fibers to Assess Asbestos Exposure: A Review of Fiber Size Toxicity",
Environmental Health, 13(59),2014.
4 Section 4.2.4.3, p. 4-15.
5 Section 4.2.4.7, p 4-18.