US ARMY CORPS OF ENGINEERS
HUNTINGTON DISTRICT

Public Meeting Transcript
Presentation of the Red Water Ponds Proposed Plan
Plum Brook Ordnance Works, Sandusky, Ohio
November 20, 2014

Meeting Facilitator – Rick Meadows, USACE PBOW Project Manager
Presentation of the Proposed Plan – Steve Downey, Project Manager, CB&I

Rick Meadows: Good evening, for anyone who doesn't know me, my name is Rick Meadows, I'll say that for the record for this meeting since it's an official public meeting for the Proposed Plan for the Red Water Pond Area Projects. It is being recorded and we will transcribe that word-for-word. So if you have a comment or questions please try to remember to state your name, so when this is transcribed we'll know who is speaking. Likewise, if you are answering a question try to remember to state your name. If you have a question or comment and you don't want to be recorded, Helen has some index cards and pens, we can pass those out, so you can write your questions down. We can then do one of two things: we can answer your question at the end of the meeting or if you just want to leave us the question and we'll follow-up with you. Of course, you will have to give us your name if you do that, so we can know who to follow-up with after the meeting.

So pretty well covered, with that I will turn the presentation right over to Steve, I may just say, which I know he will cover at the presentation, but this does start the public comment period as well. And that is scheduled to end, I think its 22 December. I understand we are approaching the holidays; if you need more time to review it please ask for an extension of the review. But that's what's on our schedule right now. And we kind of looked at it and thought we'd get it in before the holidays. But I doubt anyone's going to really review it between, after 12/22 till the first of the year, so with that Steve Downey of CBI will give our presentation tonight.

Steve Downey: Alright, good evening, I'm Steve Downey with CB&I Federal Services. The purpose for the proposed plan for the Red Water Pond Areas is to present the preferred alternative that is proposed for cleaning up contaminated soils. This recommendation is based on results from all of the remedial investigations that have been performed, feasibility studies and risk assessments. This action will prevent human exposure to soil containing chemicals of concern that are at levels that are above the remediation goals which are shown in Table 6 in the Proposed Plan. And this also provides for public comment on all the preferred alternatives.

As Rick mentioned, the Proposed Plan is made available for public comment for a minimum of thirty (30) day review. And right now we requested comments by 22 December. Any comments that are submitted will be included in the Responsiveness Summary in the Decision Document and will have also been documented in the Administrative Record and will be evaluated for consideration in the final selection of the

remedial alternative. The selected Response Action will be documented in the Decision Document.

There are two Red Water Pond Areas; the Pentolite Road Red Water Pond Area and the West Area Red Water Pond Area. The Groundwater underlying both of these areas has been addressed previously. The Groundwater Decision Document that includes these areas was signed in July of this year (2014) under FUDS project No. 1826.

This is a map showing the Plum Brook site. That's the Pentolite Road Red Water Pond Area; that's the West Area Red Water Pond Area. Just to give you kind of an advanced summary of the alternative that was selected as the preferred alternative, it includes excavation of approximately 28,000 cubic yards of soil. The upper 2 feet, about 7,000 cubic yards will be set aside and tested because it is believed to be clean. And then we will dispose of approximately 15,500 cubic yards of contaminated soil which is classified as nonhazardous; it will go to a nonhaz landfill and then we will treat another 5,600 cubic yards that is hazardous, using the Alkaline Hydrolysis process, which we have used before at the site. And then if the remedial goals are met for this treated material it will be used for backfill; if they're not met, it will be disposed of off-site as additional nonhazardous waste. The site will be backfilled with that top 2 feet that's been stockpiled, assuming that it is clean, of course. And any of the treated soil that comes back clean, as well as some imported clean fill to make up the difference.

A little history of the Red Water Pond Areas, the Pentolite Road Red Water Pond Area was a man-made, unlined pond that covered about 2 acres and received waste from Waste Water Treatment Plant 1 that originated from TNT A and TNT B. There was reddish-brown water that was observed in an adjacent ditch in 1977. Laboratory analyses showed that it did not contain explosives and about 60,000 gallons of this water was removed. The ditch was backfilled and regraded in 1977 to prevent pooling of water. This is a historic photo showing the construction of the pond. This (photo) is showing the ditch that had the red water in it. The West Area Red Water Pond Area actually consisted of 2 unlined ponds that covered a total of about 7 acres. They received waste from Waste Water Treatment Plant 2, which originated from TNT C. The East pond was breached and drained by NASA in the early 70's and the West pond and a small area of the east pond still contained water that covered about 3 ½ acres. As far as the remedial investigations, soil, subsurface soil, surface water and sediment samples were collected and analyzed for each of the areas. There was a Focused Remedial Investigation done by Dames & Moore in 1997 and a Risk Assessment with some additional Direct-Push Investigation by IT Corporation, predecessor to Shaw (now CB&I) in 2000. In the Pentolite Road Red Water Pond Area it was evident that there was an area of contamination that would require removal; so to be proactive and go ahead and get a jump start on that, a non-time critical removal action was conducted and then there was some additional delineation that I will get into a little bit later, after that removal.

This is an aerial photo from Google Earth that was taken a few years ago and it shows the area where the non-time critical removal action was performed.

A summary of the original remedial investigation results, the subsurface soil nitroaromatics were generally low concentrations where detected except in one location with one hot spot where we had 12,000 milligrams per kilograms (mg/kg) at 3-5 feet of depth and about 340 (mg/kg) at 8-10 feet of depth. There were only three of the remaining 71 samples that had detections of TNT, they were all less than 1 mg/kg. Other nitroaromatics were detected but not nearly as elevated as this, and the subsurface soil nitroaromatics were detected in low concentrations less than 3 mg/kg and very infrequently detected. Surface water and sediment were sampled and there were no nitroaromatics detected.

For the West Area, the nitroaromatics were at low concentrations less than 3 mg/kg, that was total nitroaromatics, and TNT was not detected. In the surface soil, only 2,4-DNT was detected and at very low concentrations, and surface water, only low concentrations of about 0.8 micrograms per liter (ug/L) of DNT detected and there were no nitroaromatics detected in the sediment.

For the Pentolite Red Water Pond area the risk was analyzed for the future resident and the construction worker and there were exceedances. I will go through all the numbers there, but it indicated that clean-up of that one hot spot was required. Again this was also evaluated for the groundskeeper and the indoor worker. Exposure to sediment did not contribute significantly to the risk or hazard and there were no site-related contaminants detected in the surface water, so it was just in the soil (the surface soil and subsurface soil).

For the West Area there was no unacceptable risk identified for the future resident, construction worker or the groundskeeper in any of the soil or sediment.

For the Pentolite Road Red Water Pond Area, impacts to plants appear to be insubstantial, as far as ecological risks. And there was only a low potential for risk to exposure to contaminants for terrestrial receptors, and that was under the most conservative exposure assumptions. Those site-related chemicals of potential ecological concern were identified for surface water or sediment. Basically cleaning it up for human health would also alleviate any potential concerns for ecological. Likewise there were no concerns with the West Area Red Water Pond Area for ecological either.

The non-time critical removal action that was performed in, or started in 2003, was based on the Focused Feasibility Study. The only contaminant of concern identified at that time was TNT, which had a remedial goal of 13.8 mg/kg, which was the level that we needed to clean up to. During this removal action, a dark organic layer was found at about 4 feet below ground surface. It was highly contaminated with TNT and other nitroaromatics. This was interpreted as the original bottom of the pond. It was not noted on the soil borings that were done during the remedial investigation. It was a fairly thin layer and it gets disturbed when you are collecting the soil borings and it is really hard to see. Once you excavate the trench it is very evident, but it’s not as evident in the soil borings. When you’re sampling the soil borings, you’re selecting at various intervals and you may not sample at that vary interval where the dark layer happened to be.

Question - John Blakeman: The dark layer was found at that depth, how do they account for the fact that was covered over? Was that NASA that pulled that in there or was it just natural sedimentation since 1945?

Response - Steve Downey: It was where the site was re-graded and the pond was filled in.

Additional delineation and screening was performed and the excavation team stepped out every 10 to 20 feet and we used EnSys® test kits for field screening for some of the analytical samples. Ten-foot to twenty-foot step outs continued until the test kits indicated that the remedial goal was reached. The non-time critical removal boundaries results were verified by lab samples. And this original excavation area covered about 0.6 acres which was significantly larger than what was identified for this original hot spot. And at that point, we really, we thought we were done. We had met the original remedial goal for TNT and then following the process, going through and collecting samples around the perimeter of the excavation, the confirmatory samples, to go in and evaluate any residual risk that was left to show in the proposed plan that the site was clean…it wasn't clean. It didn't pass once everything was evaluated, looking at all the contaminants of concern around the perimeter of that excavation.

This is the photo, you can see the dark layer around through there. This was actually at the north end and there was also a drain tile there that had some nasty looking water in it.

After the non-time critical removal action, which was completed in 2008, as I mentioned, the samples were further evaluated and it was determined that there were still some unacceptable risks and additional test pitting was done and stepped out further delineate the site. Samples were collected and analyzed for nitroaromatics, test kits and laboratory analysis were used. The laboratory analyses results were compared to the remedial goals and iterative sampling and evaluation process was used until contamination was adequately delineated for the Feasibility Study. The Feasibility Study determined that an additional area of about 1.6 acres remains that requires remediation. This (photo) shows the area that was originally excavated as far as the non-time critical removal action and the darker area is the additional area that requires remediation.

There were four alternatives evaluated in the Feasibility Study: No Action; Excavation and Off-Site Treatment/Disposal; Excavation, Windrow Composting and Off-Site Disposal; and Excavation, Alkaline Hydrolysis and On-Site/Off-Site Disposal (the preferred alternative).

This table shows the comparison of the costs and the time to complete the remediation between the alternatives. The "No Further Action," of course, has no cost and no duration. The "Excavation and Off-Site Disposal," it has a little bit shorter time, but costs more than the preferred alternative. The Windrow Composting has about the same time requirement as the Alkaline Hydrolysis, but a little higher cost. And the Alkaline Hydrolysis has the lowest cost, other than the "No Action," and can be completed in about 30 months.

Going through the details for each alternative, the “No Action” is required by the NCP; it does not reduce human health risks at levels considered acceptable; does not employ removal of the contaminants or treatment actions that mitigate impacted source areas on receptors and thus that action was not recommended.

Alternative 2: Excavation and Off-Site Disposal includes excavation of about 28,000 cubic yards; upper 2 feet again would be set aside and tested, assumed that it’s clean. Disposal of approximately 15,500 cubic yards at a non-haz landfill and then another 5,600 cubic yards at a RCRA Subtitle C Treatment and Disposal Facility. Then the site would be backfilled with clean soil from the top 2 feet, supplemented with imported fill.

Alternative 3: Windrow Composting alternative involves the same excavation, the only difference is the hazardous soil of about 5,600 cubic yards would be treated with Windrow Composting and then that would be disposed of as non-hazardous at that point and then the site again would be backfilled.

Alternative 4: Excavation, Alkaline Hydrolysis and On-Site/Off-Site Disposal, the “Preferred Alternative” again includes the excavation of the 28,000 cubic yards, setting aside the top 2 feet. Disposal of about 15,500 cubic yards of contaminated soil as nonhazardous; Alkaline Hydrolysis treatment of the 5,600 cubic yards; and then if the remedial goals are met after the treatment, it would be used as clean backfill. If the remedial goals are not met to use it for backfill on the site, it would still be non-hazardous and would be disposed of at a non-hazardous landfill. Then the site would be backfilled with the clean stockpiled soil set aside, the treated soil if it meets the remedial goals, and imported clean fill.

This is an aerial photo from about 2012 that shows the current treatment pad that’s out there and then the area just to the north of that is the Red Water Pond Area.

Remedial Performance of the Proposed Action - Alternative 4 is protective of human health and the environment; it complies with applicable or relevant and appropriate requirements. It permanently removes contaminants of concern from the Red Water Pond Area soil at concentrations above remedial goals. It permanently reduces toxicity and mobility of contaminants; introduces no risks to the community or environment during implementation; it is technically and administratively implementable. There are no engineering or regulatory restrictions that prevent implementation and amendments and equipment required are readily available.

The general schedule for completing this within the 30 month timeframe, the major activities include work plan development, mobilization and excavation of the 28,000 cubic yards of soil, stockpiling and testing the upper 2 feet, pre-compliance testing, Alkaline Hydrolysis treatment of contaminated soil, neutralization as required, confirmatory sampling, off-site disposal of untreated non-hazardous soil, on-site placement or off-site disposal of treated soil, backfill with clean soil, treated, stockpile and imported, site restoration and demobilization.

And this is the breakdown of the costs of that alternative.

Any questions?

Question - John Blakeman: I'll speak as Environmental Specialist, part-time at NASA and very, very familiar with all of the vegetation out there. I absolutely concur with all that you've described will have no adverse ecological effects on any of the vegetation. I do wish to ask about item number eight there, on what is involved in site restoration? Are we talking about restoration of topography, hydrology, plants, or could you outline very quickly, what site restoration means?
Response – Steve Downey: I'll speak generally then I'll defer to Lisa (Humphreys) to go into a little more detail. Basically that would be regrading the site then restoring some type of vegetation. I'll let Lisa expand on what that might be.

Response – Lisa Humphreys: John we would work with you on what type of plants you want us to put back there. I know you don't like the phragmites, they are a nuisance. We would work with you, but as Steve said, we would do the regrading. I know it was a pond but we would try to get it not to pond in certain areas because that might create a wetlands or something. So we will work with you before we modify the scope.

Comment - John Blakeman: I can speak as the Environmental Specialist for NASA, we are very interested in getting the right vegetation back as this whole project gets done each other place too. It's not a matter of concern as long as we are pointed in that direction.

Response – Lisa Humphreys: There may be something better than Indiangrass as we have used in the past, but we would work with you prior to the scope.

Steve Downey – Any other questions?

Question - Richard Pitsinger: My question is about the non-hazardous soil which would possibly go to the landfill, are you talking Erie County Landfill?

Response - Lisa Humphreys: I'm sorry, what did he say? (Steve Downey repeated Mr. Pitsinger's question) The soil would go to Erie County, there is a flow control where we have to go to them otherwise we would have to get a waiver from the township to use another landfill and since we do have the agreement in-place, they can still use this as daily cover. It makes sense to go there, but at this point in time, we would go to the Erie County Landfill.

Question - Richard Pitsinger: The second part of my question, does the landfill take that soil based on the tests that you have on that particular soil?

Response – Steve Downey: Yes.

Response – Lisa Humphreys: They take the soil based on our disposal tests. After we excavate it, we put it in the 500 ton stockpiles and we sample each one of those stockpiles to make sure where it needs to go or if it needs to be treated.

Question - Richard Pitsinger: Do they take your word for it? That's what I'm getting at.

Response – Lisa Humphreys: No, we actually have the analytical from the lab and they have to see that profile and then we give them that paperwork and they look it over, bless it and then they get back with us. No it's not just a "hey Mr. Landfill, it's good", it's not like that at all. You have to have that paper trail to show that the stockpile can actually go there.

Comment - Richard Pitsinger: That's what I wanted to know, thanks.

Question - John Blakeman: What might be the source of the imported fill, should there be any. Do we know that yet and how many cubic yards might that be?
Response – Lisa Humphreys: I think it was like 15,000 (cubic yards). We would get that backfill, there are different sources in the area, but when we do go for backfill we have to sample it to make sure it's clean before we can bring it over to our site. So depending on where we get it, recently we've been getting it from a location near Barnes Nursery, but there are several we've had in the past in the area. It's all sampled before it comes over and its actually sampled for a lot more than just the nitroaromatics, the full suite, so we don't bring other contaminants over that we don't know about.

Steve Downey – Any other questions?

Question – Dave Speer: You were saying these ponds when they were originally excavated there was no liner installed.

Response – Steve Downey: Correct.

Question – Dave Speer (Continuation):Has there been testing beyond that perimeter and further out to determine if there is any leaching in the soil or possibly field tile or something like that where it could have leached from or into?
Response – Steve Downey: Yes, there has. There have been excavations outside of the area as well as groundwater samples.

Question – Dave Speer: So that covers quite an area outside that perimeter in Red Water Ponds?

Response – Steve Downey: Yes.

Comment – Dave Speer: Thank you.

Steve Downey – Any other questions?

Comment – Jim Beaujon: Would you put up slide 26, it's relative to the last question. It has the former extent of the pond based on historical drawings. The hardcopy (page 26) will show the sample locations outside the perimeter.

Comment – Lisa Humphreys: I believe we went down deep to 10 feet.

Comment – Steve Downey: There were other broader general samples farther out.

Rick Meadows: If there are no other questions, that'll conclude the formal presentation. Again to remind everybody, the public comment period is scheduled to end 22 December (2014). You do have the right to request an extension if you need more time, so please do that. If you think of anything, you can submit comments formally, you can send as an email, everybody knows how to get hold of us. You can get back through Helen, she has most of your emails. Information is in the Proposed Plan (as Lisa was pointing out).

Appreciate everyone coming out, it's a chilly night, braved the cold.

Steve Downey: You might also want to remind everyone of the next RAB Meeting.

Rick Meadows: Good point, that's scheduled for December 11, Thursday night. And is that in this room Helen?

Helen Owens: It'll be in this room or the one next door.

Rick Meadows: See everybody in a few weeks and thank you for your participation. The meeting was adjourned.

Proposed Plan for the Red Water Pond Areas
Former Plum Brook Ordnance Works
Sandusky, Ohio

Public Meeting
20 November 2014

Presented by

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Purpose of the Red Water Pond (RWP) Areas Proposed Plan

- Present the Preferred Alternative proposed for cleanup of contaminated soils
  - Based on results of remedial investigation/feasibility study (RI/FS) completed for the RWP Areas and on evaluation of delineation samples collected after completion of the non-time-critical removal action (NTCRA)
  - Prevents human exposure to soil containing chemicals of concern (COC) at levels above remediation goals (RGs; Table 6 of Proposed Plan)
- Provide for public comment

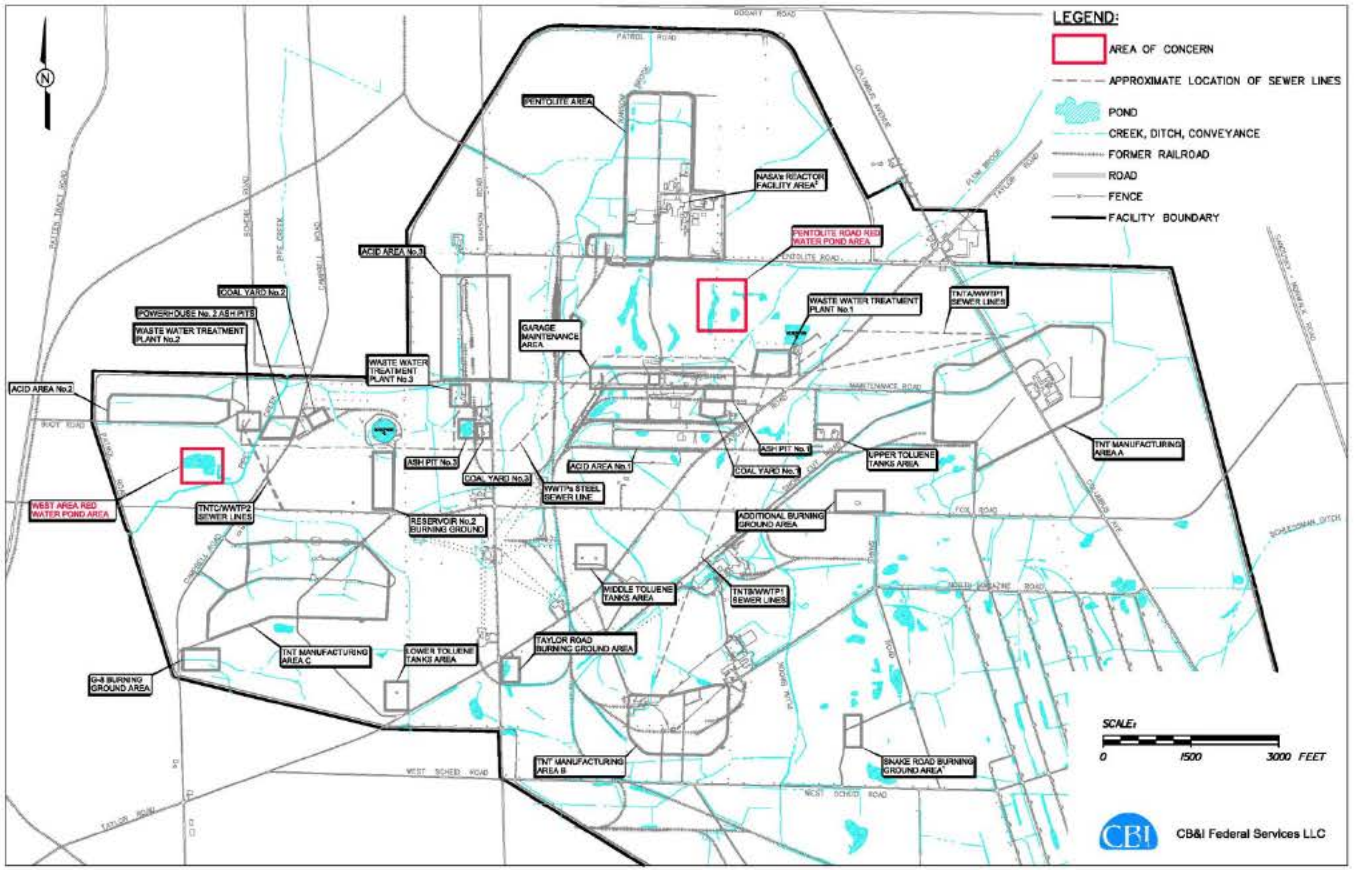
Community Involvement

- The Proposed Plan is made available to the public for a review and comment period
- At the end of the review and comment period (22 December 2014), all comments will be:
  - Included in the Responsiveness Summary of the RWP Areas Decision Document
  - Documented in the Administrative Record (AR)
  - Evaluated for consideration in final selection of remedial alternative
- Selected response action will be documented in the RWP Areas Decision Document

Two Red Water Pond Areas

- Pentolite Road Red Water Pond (PRRWP) Area
  - ► Soil remediation is required
- West Area Red Water Pond (WARWP) Area
  - ► No remediation is required
- Groundwater underlying the RWP Areas was addressed previously
  - ► Groundwater Decision Document that includes RWP Areas was signed in July 2014 under FUDS Project No. G05OH001826

RWP Area Locations



Summary of Preferred Remedial Alternative for PRRWP Area

- USACE to complete remedial action consisting of:
  - Excavation of approx. 28,195 CY of PRRWP Area soils
    - Upper 2 feet (7,049 CY) is assumed to be clean; will be tested/stockpiled
  - Disposal of approx. 15,507 CY of contaminated, nonhazardous soil at nonhazardous waste landfill
  - Alkaline Hydrolysis treatment of approx. 5,639 CY hazardous soil
  - If RGs are met for treated material, backfill with treated soil and stockpiled soil, supplemented with imported clean fill
  - If RGs are not met, dispose of treated material at a nonhazardous waste landfill
    - Backfill excavation with stockpiled clean soil, supplemented with imported clean fill
- The selected response action will be documented by the USACE in a Decision Document for the RWP Areas

History of RWP Areas

- PRRWP Area
  - Man-made, unlined pond covered ~ 2 acres
  - Received waste water from WWTP1, originating from TNTA and TNTB
  - Reddish-brown water was observed in an adjacent ditch in 1977
    - Lab analyses showed that this water did not contain explosives
    - ~ 60,000 gallons of reddish-brown water was removed
  - Backfilled/regraded in 1977 to prevent pooling of water

History of RWP Areas

PRRWP Construction - circa 1941

History of RWP Areas

PRRWP Red Water - 1977

History of RWP Areas (cont'd)

- WARWP Area
  - 2 man-made, unlined ponds covered ~ 7 acres
  - Received waste water from WWTP2, originating from TNTC
  - East pond breached/drained by NASA in early 1970s
  - Western pond and small area of east pond still contain water covering ~ 3.5 acres

Summary of RWP Areas Investigations

- Remedial Investigation (RI)
  - Surface soil, subsurface soil, surface water, and sediment samples were collected/analyzed for each RWP Area
    - Focused RI (Dames & Moore, 1997)
    - Risk Assessment and Direct-Push Investigation (IT Corporation, 2000)
- Non-Time Critical Removal Action (NTCRA)
  - PRRWP Area only
  - TNT contamination found far beyond original estimated NTCRA boundary
- Post-NTCRA Delineation
  - Further delineation, especially of non-TNT explosives

Post-NTCRA PRRWP Area

Summary of RI Results

- PRRWP Area
  - ► Subsurface soil: Nitroaromatics were generally at low concentrations where detected, except for one location:
    - TNT was detected at this location at 12,000 mg/kg at 3-5 ft bgs
    - TNT was detected at this location at 340 mg/kg at 8-10 ft bgs
    - Only 3 of the remaining 71 RI samples had detections of TNT, all at less than 1 mg/kg
    - Other nitroaromatics not nearly as elevated at this or any other location
  - ► Surface soil: Nitroaromatics were at low concentrations (<3 mg/kg) and infrequently detected.
  - ► Surface water and sediment: No nitroaromatics detected

Summary of RI Results (cont'd)

- WARWP Area
  - Subsurface soil:
    - Nitroaromatics were at low concentrations (≤ 3 mg/kg)
    - TNT was not detected
  - Surface soil:
    - Only 2,4-DNT was detected and at a very low concentration (≤ 0.4 mg/kg)
  - Surface water:
    - Only low concentrations (≤ 0.8 μg/L) of DNTs detected
  - Sediment: No nitroaromatics detected

Summary of RI BHHRA Results

- PRRWP Area
  - Future resident
    - Site-related ILCR of 9 x 10^{-4} exceeds the NCP risk management range of 1 x 10^{-6} to 1 x 10^{-4} and the PBOW ILCR goal of 1 x 10^{-5}
    - Site-related HI of 358 exceeds the acceptable HI target of 1
    - The ILCR and HI exceedances are almost entirely associated with TNT in subsurface soil at one location
  - Construction worker:
    - Site-related ILCR of 1 x 10^{-5} is within the NCP risk management range of 1 x 10^{-6} to 1 x 10^{-4} and meets PBOW target goal of 1 x 10^{-5}
    - Site-related HI of 104 exceeds the acceptable HI target of 1
    - The HI exceedance is almost entirely associated with TNT in subsurface soil at one location

Summary of RI BHHRA Results (cont'd)

- PRRWP Area (cont'd)
  - Groundskeeper
    - Site-related ILCR of 6×10^{-7} is regarded as de minimis
    - Site-related HI of 0.06 meets the acceptable HI target of 1
  - Indoor worker
    - Site-related ILCR of 3×10^{-7} is regarded as de minimis
    - Site-related HI of 0.03 meets the acceptable HI target of 1
  - Exposure to sediment did not contribute significantly to risk/hazard
  - No site-related contaminants were detected in surface water

Summary of RI BHHRA Results

- WARWP Area
  - Future resident
    - Site-related ILCR of 1.5 x 10^{-5} in BHHRA is within the NCP risk management range of 1 x 10^{-6} to 1 x 10^{-4} and marginally exceeds the PBOW ILCR goal of 1 x 10^{-5}
      - This value is mostly associated with PAHs that do not appear to be related to former site activities
      - PBOW ILCR goal is met for site-related contaminants
    - Site-related HI of 0.6 meets the acceptable HI target of 1
  - Construction worker:
    - Site-related ILCR of 8 x 10^{-7} is regarded as de minimis
    - Site-related HI of 0.4 meets the acceptable HI target of 1
  - Groundskeeper
    - Site-related ILCR of 7 x 10^{-6} is within the NCP risk management range of 1 x 10^{-6} to 1 x 10^{-4} and meets the PBOW ILCR goal of 1 x 10^{-5}
    - Site-related HI of 0.01 meets the acceptable HI target of 1

Summary of RI BHHRA Results (cont'd)

- WARWP Area (cont'd)
  - Indoor worker
    - Site-related ILCR of 4×10^{-8} is regarded as de minimis
    - Site-related HI of 0.03 meets the acceptable HI target of 1
  - Exposure to sediment did not contribute significantly to risk/hazard
  - No site-related contaminants were detected in surface water

Summary of RI Ecological Risk Assessment Results

- PRRWP Area
  - Impacts to plants appear to insubstantial
  - Only a low potential for risk from exposure to contaminants was found for terrestrial receptors under the most conservative exposure assumptions
  - No site-related chemicals of potential ecological concern (COPEC) were identified for surface water or sediment

Summary of RI Ecological Risk Assessment Results (Cont'd)

- WARWP Area
  - Impacts to plants appear to insubstantial
  - Given the weight of evidence, it is unlikely that WARWP Area soils represent an unacceptable concern to ecological populations
    - PAHs were specifically evaluated for toxicity and found to have low toxicity for earthworms; however, the PAHs do not appear to be related to former PBOW acitivites
  - No site-related chemicals were identified as posing potential ecological impacts to environmental receptors

Non-Time-Critical Removal Action

- NTCRA was implemented at PRRWP Area in 2003 as an interim action for a “hot spot”
  - Based on the Focused Feasibility Study (FFS)
  - Only COC was TNT, which had an RG of 13.8 mg/kg
  - During NTCRA, a dark organic layer was found at ~4 ft bgs
    - Highly contaminated with TNT and other nitroaromatics
    - Interpreted as original pond bottom
    - Not noted on RI boring logs
- Additional delineation and screening were performed
  - Excavation team stepped out every ~10’ to 20’
  - EnSys® test kits used with a few analytical samples

Non-Time-Critical Removal Action (cont'd)

- 10'-to-20' step-outs continued until test kit results indicated that RG was reached
  - NTCRA boundary results were verified by lab samples
  - NTCRA area covered approx. 0.6 acre
- Windrow composting was used to treat hazardous soils during NTCRA
- Dark organic layer proved to be associated with contamination
  - Both within and below dark layer
  - Contamination extended laterally beyond the dark layer

Non-Time-Critical Removal Action (cont'd)

Dark Organic Layer

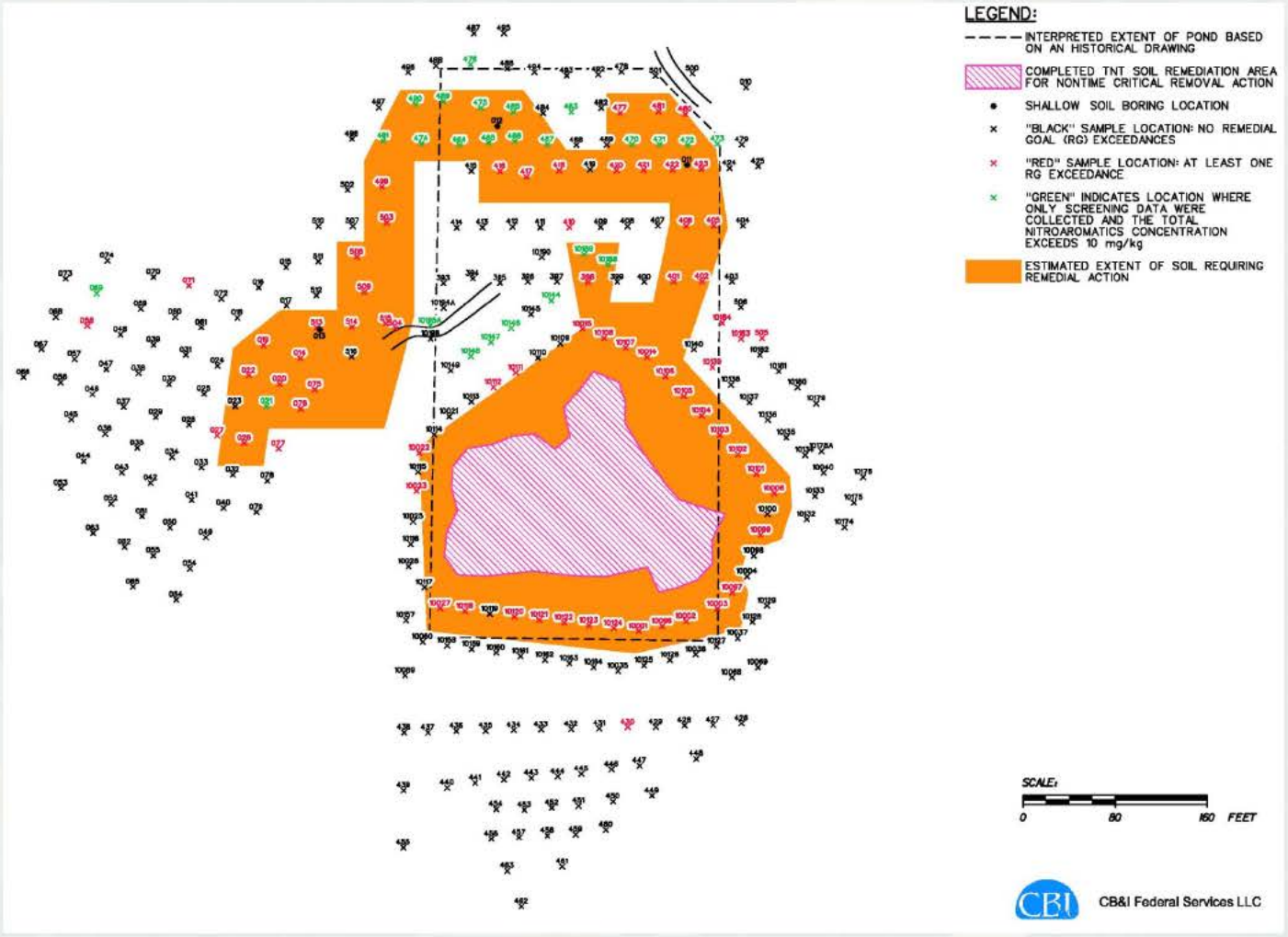
Post-NTCRA Investigation

- NTCRA completed in 2008, meeting cleanup objective for TNT
- Results of the NTCRA boundary samples were further evaluated
  - ► Non-TNT nitroaromatics represented a potential human health risk/hazard
- Post-NTCRA RGs were derived for all nitroaromatics (Table 6 of PP)
- Test pits were dug at ~20 to 40-foot distances outward from NTCRA boundary

Post-NTCRA Investigation

- Samples were collected and analyzed for nitroaromatics
  - Both test kits and laboratory analyses were used
- Laboratory results were compared to RGs
- Iterative sample and evaluation process used until contamination was adequately delineated for the Feasibility Study (FS)
- FS determined an additional area of approx. 1.6 acres requires remediation

Approximate Remediation Area



Summary of Evaluated Alternatives

- Alternative 1 – No Action
- Alternative 2 – Excavation and Off-Site Treatment/ Disposal
- Alternative 3 – Excavation, Windrow Composting, and Off-Site Disposal
- Alternative 4 – Excavation, Alkaline Hydrolysis, and On-Site/Off-Site Disposal (*Preferred Alternative*)

Summary of Evaluated Alternatives: Costs and Durations

Alternative No.	Description	Cost	Duration (Months)
1	No Further Action	$0	0
2	Excavation and Off-Site Treatment/Disposal	$8,600,000	25
3	Excavation, Windrow Composting, and Off-Site Disposal	$9,400,000	30
4	Excavation, Alkaline Hydrolysis, and On-Site/Off-Site Disposal	$8,100,000	30

Alternative 1 Details

- No Action
  - Required for development by NCP
  - Does not reduce human health risks to levels considered acceptable by US EPA (threshold criterion)
  - Does not employ removal, containment, or treatment actions that mitigate impact of source areas on receptors or other media
  - Thus, No Action was not recommended

Alternative 2 Details

- Excavation and Off-Site Treatment/Disposal
  - ► Excavate approx. 28,195 CY of contaminated soil
    - Upper 2 ft (7,049 CY) is assumed to be clean; will be tested/stockpiled
  - ► Disposal of approx. 15,507 CY of contaminated, nonhazardous soil at nonhazardous waste landfill
  - ► Off-site disposal of approx. 5,639 cy soil classified as hazardous in a RCRA Subtitle C TSDF
  - ► Backfill with stockpiled clean soil, supplemented with imported clean fill

Alternative 3 Details

- Excavation, Windrow Composting and Off-Site Disposal
  - ► Excavate approx. 28,195 CY of contaminated soil
    - Upper 2 ft (7,049 CY) is assumed to be clean; will be tested/stockpiled
  - ► Disposal of approx. 15,507 CY of contaminated, nonhazardous soil at nonhazardous waste landfill
  - ► Windrow composting treatment of approx. 5,639 CY hazardous soil
  - ► Dispose of treated material at a nonhazardous waste landfill
  - ► Backfill excavation with stockpiled clean soil, supplemented with imported clean fill

Alternative 4 Details
(*Preferred Alternative*)

- Excavation, Alkaline Hydrolysis, and On-Site/Off-Site Disposal
  - ► Excavation of approx. 28,195 CY of PRRWP Area soils
    - Upper 2 feet (7,049 CY) is assumed to be clean; will be tested/stockpiled
  - ► Disposal of approx. 15,507 CY of contaminated, nonhazardous soil at nonhazardous waste landfill
  - ► Alkaline Hydrolysis treatment of approx. 5,639 CY hazardous soil
  - ► If RGs are met for treated material, backfill excavation with treated soil and stockpiled clean soil, supplemented with imported clean fill
  - ► If RGs are not met, dispose of treated material at a nonhazardous waste landfill
    - Backfill excavation with stockpiled clean soil, supplemented with imported clean fill

2012 Photo of PRRWP Area and Treatment Facility

Remedial Performance of Proposed Action

- Alternative 4 is protective of human health and the environment
- Complies with Applicable or Relevant and Appropriate Requirements (ARARs)
- Permanently removes COCs from PRRWP Area soil at concentrations above RGs
- Permanently reduces toxicity and mobility of contaminants
- Introduces no risk to the community or environment during implementation
- Is technically & administratively implementable
  - ► No engineering or regulatory restrictions prevent implementation
  - ► Amendments and equipment required are readily available

Proposed Action Schedule

- Alternative 4 can be implemented in approx. 30 months
  - Work plan development
  - Mobilization and excavation of 28,195 CY of soil
  - Stockpile/test upper 2 feet (7,049 CY)
  - Pre-compliance testing
  - Alkaline Hydrolysis treatment of contaminated soil
  - Neutralization as required
  - Confirmatory sampling
  - Off-site disposal of untreated nonhazardous soil
  - On-site Placement/Off-site disposal of treated soil
  - Backfill with clean soil (treated, stockpiled, and imported)
  - Site restoration
  - Demobilization

Proposed Action Costs

Item	Cost
1. Treatability Study, Work Plans, Reports, and Procurement	$150,000
2. Mobilization/Demobilization	$6,000
3. Site Preparation	$133,538
4. Excavation of Contaminated Soil	$1,269,609
5. Alkaline Hydrolysis and Neutralization	$2,114,763
6. Off-Site Disposal	$1,757,357
7. On-Site Disposal	$80,264
8. Site Restoration	$711,814
Subtotal	$6,223,300
Contingency (25%)	$1,555,800
Contractor Oversight (5%)	$311,200
Total Cost	**$8,090,300**