US Army Corps of Engineers ®

Huntington District

Formerly Used Defense Sites Newsletter

Summer 2013 Edition

REMEDIATION CONTINUES IN TNT AREA A AT THE FORMER PLUM BROOK ORDNANCE WORKS IN SANDUSKY, OHIO

The US Army Corps of Engineers (USACE) Huntington District is continuing the environmental restoration at the former Plum Brook Ordnance Works located in Sandusky, Ohio. The remediation is conducted under the Formerly Used Defense Site (FUDS) Program.

USACE initiated remediation in TNT Area A in 2012 under Phase I. The scope of the project required the excavation of 18 areas of concern (AOCs), characterization of the excavated material to determine if the soil was hazardous, soil sampling for confirmation and closure of the excavations, backfill and reseeding the closed excavation. At the completion of Phase I, there were six AOCs that could not be closed due to exceedances of risk criteria. These areas are the subject of Phase II (Figure 1).

Phase II was initiated in mid-May 2013 and is currently on-going. Phase II includes expanding the areas of the six AOCs to identify the extent of contamination, and confirmation sampling to "confirm" the soil is clean, identify the boundaries of the clean soil by surveying the excavation coordinates, and excavation and remediation of the contaminated soil.

Once the soil was excavated (Figure 2), it was characterized to determine if it was hazardous or non-hazardous. To date, the hazardous soil has been transported to the on-site remediation pad (Figure 3) where it will undergo remediation using an alkaline hydrolysis (AH) process.

Once the AH process is complete, the remediated soil will be used as backfill in the six open excavations. The non-hazardous soil will be transported to the Erie County Landfill where it will be used for daily cover.

During the course of a project of this size and scope, the focus is on the big picture of excavating the soil followed by remediation of the contaminated soil. As with every project there are other smaller activities that are an integral part of the overall success of the project. For example, water management is always an issue during remediation activities at PBOW. Fortunately there are systems in place that manage rainfall and snow melt waters.

The water is removed before excavation activities can continue (Figure 4) and is transported to the sump ponds at the treatment pad (Figure 5). Also at the treatment pad are two 21,000-gallon frac tanks (Figure 6) used as extra capacity during heavy rain events. The water from the water management system is then used to wet the soil undergoing remediation.

Figure 1. AOC 143 prior to test pitting and excavation under Phase II

Figure 2. Soil excavated from AOC 143 and stockpiled during test pitting efforts

Figure 3. Constructing windrows on the remediation pad

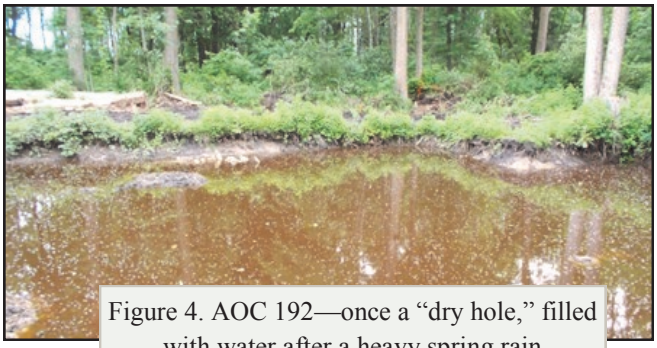

Figure 4. AOC 192—once a "dry hole," filled with water after a heavy spring rain

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REMEDIATION CONTINUES IN TNT AREA A AT THE FORMER PLUM BROOK ORDNANCE WORKS IN SANDUSKY, OHIO (CONTINUED)

Figure 5. One of two sumps with a total capacity of approximately 280,000 gallons. The sumps collect the runoff from remediation pad as well as water removed from the excavations

Figure 6. Two frac tanks provide extra capacity during heavy rains

Every turn of the excavator bucket can uncover something different, a wooden structure, a building foundation or in this case, wooden pipes that were once used to transport explosive materials to the next step in the process or to convey waste to the on-site treatment operations (Figure 7).

Figure 7. Abandoned sewer pipes constructed of wood were uncovered during an excavation. The pipes may have been used to convey explosive material to the next step in the process or to convey wastes to the on-site treatment operations

The TNT A Phase II field activities are underway at PBOW. The project schedule requires all of the fieldwork to be completed by the end of December 2013. The draft report is required to be submitted by the end of January 2014 and the final report issued by May 31, 2014.

USACE conducts quarterly public meetings to discuss the progress of the various projects and at least one time per year, they will host a site tour of the active USACE project area at PBOW. This year a site tour is planned for late August 2013. If you are interested in attending a public meeting or coming to the site visit, please contact USACE Huntington District at 800.822.8413.

NEW MONITORING WELLS INSTALLED AT WEST VIRGINIA ORDNANCE WORKS

After reviewing current and historic data and recommendations included in several recent Mapping & Data Analysis Reports (MDARs) for the Operable Unit 4 (OU-4) Groundwater Extraction and Treatment system at West Virginia Ordnance Works (WVOW), it became increasingly apparent that new monitoring wells were required in several areas. In order to better comprehend the current remediation conditions and potential future cleanup times, a more thorough delineation of the nitroaromatic plume extents in the intermediate water bearing zone needed to be located. Novel Geo-Environmental, LLC (NGE), along with the assistance of McLane Environmental, was tasked to determine the optimal locations for the additional monitoring wells as part of their contract to analyze the OU-4 Extraction and Treatment system data.

Through the use of multiple uncertainty analysis software packages, NGE was able to establish four potential well locations in the Pond 13/Wet Well Area (P13WWA) and three potential well locations in the Yellow Water Reservoir Area (YWR). The software analyzed hydrogeologic (water level data, aquifer transport properties) and water quality (nitroaromatic concentration) data in both the YWR and the P13WWA to quantify the uncertainty associated with current interpolated nitroaromatic concentration values within and surrounding the existing monitoring well networks. Areas of highest uncertainty were then targeted as optimal locations for the installation of additional monitoring wells. Analyses were performed using C Tech's Environmental Visualization System (EVS), a general commercial three-dimensional kriging and data visualization software with a specialized Drill Guide well data uncertainty module, and Optimal Well Locator (OWL), a software tool developed by the United States Environmental Protection Agency (USEPA) to evaluate existing monitoring well networks and assist in the selection of new monitoring well locations. Figure 1 illustrates an example of the results from these analyses.

NEW MONITORING WELLS INSTALLED AT WEST VIRGINIA ORDNANCE WORKS (CONTINUED)

Following the approximate location of monitoring well sites, Rhea Engineers and Consultants, Inc. (Rhea) was contracted by the US Army Corps of Engineers (USACE) to plan, oversee the installation, and develop seven new wells. Lori Smith-Hall of Rhea was chosen to be the onsite geologist to conduct continuous oversight and logging of all borings during the drilling process. Ms. Smith-Hall was also in charge of keeping the official field notebook and preparing the well development records. Double J Drilling of West Virginia, Inc. was subcontracted by Rhea for site clearing, drilling and installation of the wells, and restoration services. Phillip M. Roberts of PMR, Inc. was subcontracted for surveying purposes. Before the drilling could begin, some clearing and grubbing of very dense vegetation needed to take place in most of the well sites. The cleared trees and brush were then placed on site, outside of the work limits, as "Wildlife Habitat Brush Piles." The clearing and grubbing process began the week of 13 May 2013 and lasted two days.

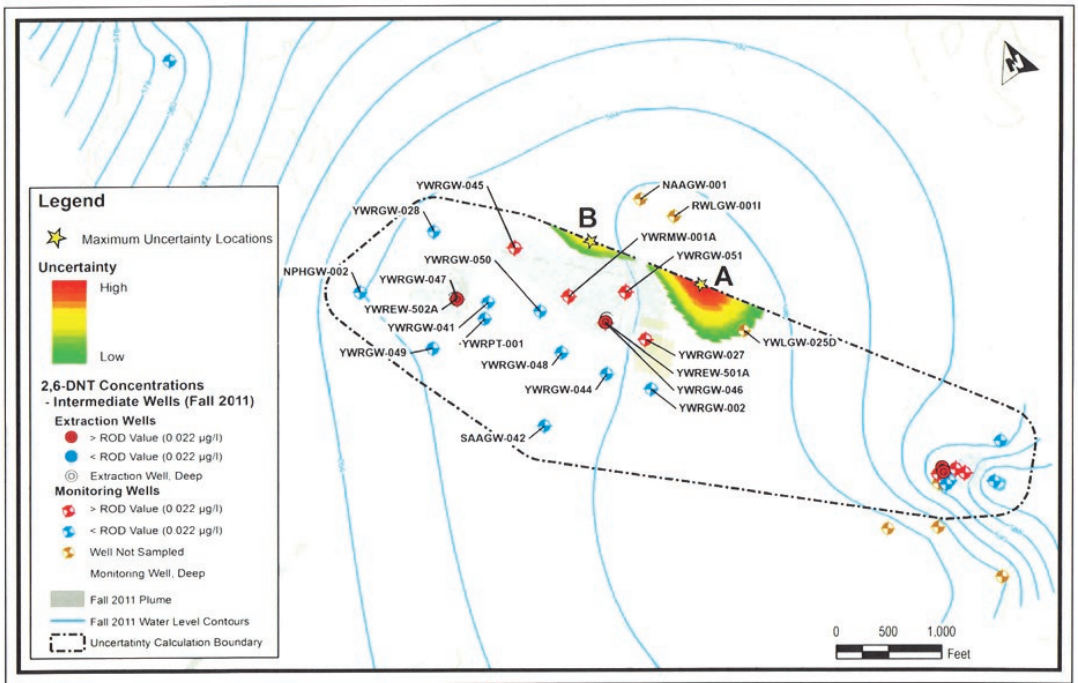

Figure 1. Suggested monitoring well location in YWR area

In order to reduce the amount of wastes generated and expedite well installation versus conventional drilling methods, it was decided to utilize sonic drilling methods for the new wells. The TSi 150cc Compact Crawler Sonic Drill Rig, contracted thru Southern Sonic Solutions, was mobilized to the site on 20 May 2013 and began drilling quickly (Figure 2).

Figure 2. Sonic drill and crew at work

All soil generated from drilling was required to be laid out on plastic sheeting as seen in Figure 3 and then containerized in 55-gallon drums until it could be sampled, analyzed, and characterized for proper disposal off site.

Figure 3. Soil from drilling laid on plastic sheeting

By 22 May 2013, each of the seven wells had been installed and well development began the next day. The new wells were painted and labeled to match the existing wells at the site (Figure 4).

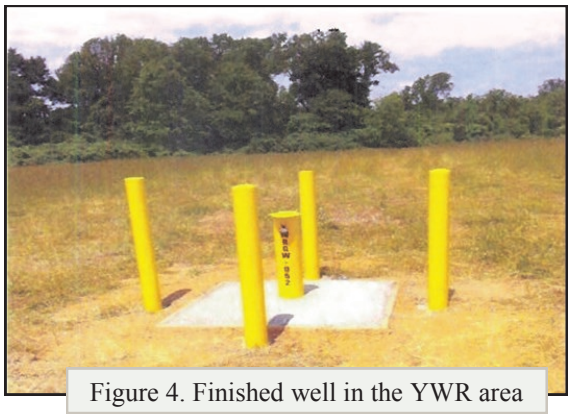

Figure 4. Finished well in the YWR area

USACE BEGINS CLOSURE PROCESS ON TNT AREA C

The 2011 and 2012 editions of the Formerly Used Defense Site (FUDS) Newsletter highlighted the TNT Area C Remedial Action-Construction (RA-C) project that the US Army Corps of Engineers – Huntington District implemented at the former Plum Brook Ordnance Works in Sandusky, Ohio.

In 2013, USACE successfully completed the RA-C project and is moving forward with preparing the Project Closeout (PCO) Report. The TNT C project is the second manufacturing area where soil remediation has been completed. A similar project was completed at TNT Area B with the PCO signed in March 2010.

The TNT C RA-C began in July 2010 with the excavation of the 15 Areas of Concern (AOCs) identified in the Remedial Investigation (RI) conducted in 2000. Soil remediation was completed in October 2011. A total of 9,192 cy was excavated during the initial excavation effort. Of that, approximately 10,734 tons of non-hazardous soil were transported and disposed at the landfill and used as daily cover. There were 2,254 cy (surveyed) of hazardous soil staged on the remediation pad that was remediated using an alkaline hydrolysis process.

There were six AOCs from the first phase of the project that could not be backfilled due to residual contamination resulting in an exceedance of risk criteria. Excavation and remediation of these six areas was completed under a continuation effort. The TNT C Continuation was initiated in late November 2011 and the field work was completed in late November 2012. A total of 2,657 cy (surveyed) was excavated from the six AOCs and remediated using alkaline hydrolysis. Approximately 1,010 cy was used as backfill and the remaining soil was disposed off-site at the landfill and used as daily cover.

At the conclusion of the TNT C RA-C and TNT C RA-C Continuation the soil contamination in TNT Area C was remediated/removed using a combination of alkaline hydrolysis and off-site disposal.

Site restoration activities were completed in November 2012. All project tasks including excavation, stockpiling, and backfilling were fully implemented. The AOCs were graded and seeded with native prairie grasses. The TNT C soil remediation project was successfully completed in late 2012 with the final report issued in late March 2013. USACE is currently drafting the TNT C Project Closeout Report.

USACE HUNTINGTON DISTRICT PROGRESSING WITH ENVIRONMENTAL RESTORATION AT PLUM BROOK ORDNANCE WORKS IN SANDUSKY, OHIO

The US Army Corps of Engineers (USACE) continues to make progress with the environmental restoration at Plum Brook Ordnance Works located in Sandusky, Ohio. To date the USACE has completed soil remediation activities in two manufacturing areas at PBOW, and soil remediation in the third area is currently underway. In March 2013 USACE presented the Proposed Plans for Acid Area 2 (AA2) and Acid Area 3 (AA3).

The Proposed Plans identified the Preferred Alternative for cleanup of contaminated soil associated with the former acid areas and presents the rationale for the preference. The preferred alternative is required to address the human health risks associated with potential soil exposure.

The acid areas were used to produce oleum, sulfuric acid, nitric acid and mixed acids for the manufacture of TNT. These areas contained numerous process buildings, above-ground storage tanks and rail lines to transport material to manufacturing processes (Figure 1). Today, the buildings are gone, the tanks are gone and the rails have been removed. Vegetation has overgrown the once thriving production lines.

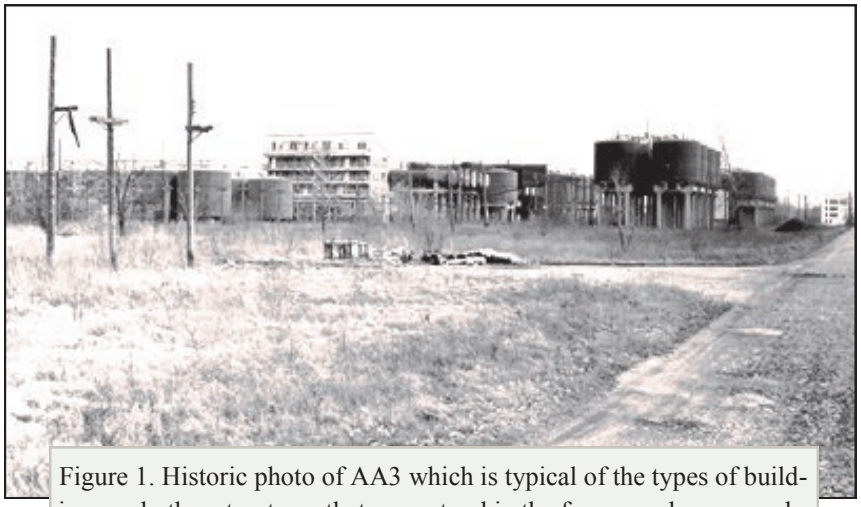

Figure 1. Historic photo of AA3 which is typical of the types of buildings and other structures that once stood in the former ordnance works

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