



US Army Corps of Engineers®

Huntington District

Plumbrook Ordnance Works News Brief

Summer 2009 Edition



USACE Achieves Success with Composting Project at PBOW

In April 2008, US Army Corps of Engineers initiated a composting project in the Pentolite Road Red Water Ponds (PRRWP) area at the former Plum Brook Ordnance Works. The composting effort was the final stage of a non-time critical removal action (NTCRA).

In 2007 USACE excavated soil that had been designated a risk to human health and the environment for certain levels of nitroaromatic contamination. Based on laboratory testing results, a portion of the soil was considered hazardous. The non-hazardous soil was transported to Erie County Landfill where it was used as daily cover for the working face of the landfill. The hazardous soil was stockpiled and covered, waiting additional funding to proceed with the composting effort.

In the spring of 2008 the composting effort was initiated. The composting project began with preparing the compost pad. The entire site where the composting would take place had to be cleared of vegetation and overgrowth, graded for runoff collection and sump construction, and roads had to be constructed that would allow heavy equipment to move around the site and between the rows of composted soil (windrows).



Above Photo Shows Construction of Perimeter Road; Photo Below Shows East Sump Construction



The Site had to be Cleared Before Construction Could Begin. A Bulldozer was Used for Initial Site Clearing



Once the site was prepared, stockpiled hazardous soil from the PRRWP area was moved onto the compost pad. An excavator loaded the soil into two 20-ton haul trucks that moved 4100 cubic yards of contaminated soil onto the compost pad. The contaminated soil was dumped and formed into rows or windrows. Moving the soil and constructing the windrows were accomplished over a period of approximately 2 weeks. The size of the windrows averaged 185' long, 10' wide, and 6' high. There were 10 windrows on the compost pad.



Soil Transported onto Compost pad with a haul truck

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USACE Achieves Success with Composting Project at PBOW (continued)



Windrows 1-3, with Stockpile Area in Background

The PRRWP composting process used a recipe of chicken manure, straw and water, called amendments. The recipe, or ratio of amendments, was specific to the types and levels of contamination to achieve the desired outcome (reduction of the nitroaromatic compounds). For this project, the recipe was approximately 70% straw, 25% soil and 5% manure. At the beginning of the process, there were approximately 10,000 cubic yards of hazardous soil and amendments (straw and manure). At the end of the process the 10,000 cubic yards were reduced in volume to approximately 5,100 cubic yards, slightly more than the original volume hazardous soil treated.

The composting process took approximately 8 weeks. During the weeks on-site, the windrows were monitored daily for temperature and moisture. The bacteria in the compost required optimum temperature, moisture, carbon and nitrogen content for the process to be successful. The temperature was controlled by turning the windrows, as needed, with a turner. This process added air (oxygen) to the rows to cool / reduce the temperature. The moisture (water) was added, either by direct spraying or from the turner, as needed. Carbon was supplied by the straw, and nitrogen was supplied by the chicken manure. The combination of straw (carbon/nitrogen) and manure (bacteria) to the contaminated soil began the composting process and the breakdown / degradation of the nitroaromatic compounds. Additional straw, water and manure was added as needed based on the daily monitoring results.



Turning the Windrows

The windrows were sampled weekly to verify the TNT and DNT concentrations were decreasing. A composite sample was collected from each windrow and submitted to the laboratory for TNT analysis using EPA SW-846 Method 8330 and DNT analysis for Total Characteristic Leaching Procedures (TCLP for landfill disposal criteria to show it's no longer hazardous). Over the course of the 8 week period, there were incidents of elevated, or spikes in the early weeks of sampling for TNT and DNT concentration, but the lab results for the final 3 weeks showed not only that the nitroaromatic concentrations were below risk levels but also that the soil was no longer hazardous.

In the end 5,100 cubic yards of soil had been composted. How does one dispose of 5,100 cubic yards of soil? The original plan was to transport the soil to Erie County Landfill where it would be used for daily cover, just as the non-hazardous soil was disposed at the beginning of the project in 2007. Since the nitroaromatic levels were no longer a risk for human health and environment and not hazardous, the soil remained on site, thereby, eliminating the cost for off-site disposal. NASA, current property owner, is currently using the soil as top cover for various projects.



Composted Soil has Been Moved off the Compost Pad to a NASA-designated stockpile

USACE continues to maintain the compost pad on the NASA property. For future investigations on other projects, if the Feasibility Study finds that composting is the selected alternative, the pad is available for use by USACE. This would greatly reduce costs associated with constructing another compost pad. The USACE realized the successes of this project through the reduction in disposal costs and reuse of a natural resource. The composting process has been extensively utilized and evaluated by the USACE, and it is expected they will continue to use composting as a viable alternative to remediating soil contaminated with nitroaromatics.

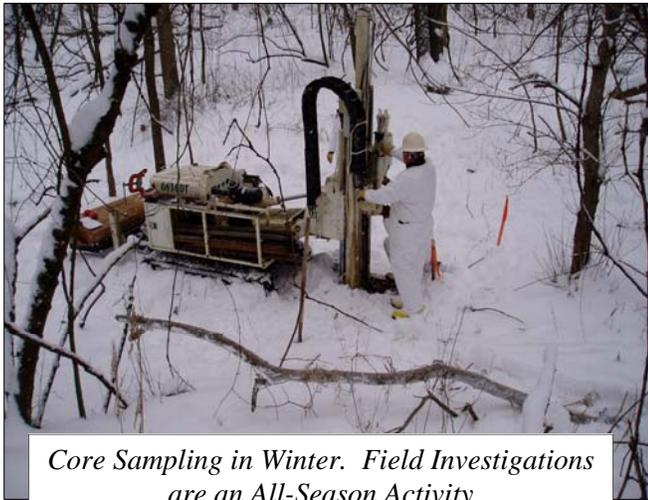
To get additional information on restoration activities at Plum Brook Ordnance Works, call the FUDS Information Hotline at:
1-800-822-8413
OR
visit the FUDS website at:
www.lrh.usace.army.mil/projects/current/derp-fuds

Investigation Update - USACE Begins New Investigations at PBOW

Waste Water Treatment Plants 1 & 3 and Ash Pits 1 & 3

During its operational period, PBOW operated three steam generating plants to supply steam to space heaters, compressors, and to generate electric power to buildings and equipment in the manufacturing areas. Each power station consisted of a main powerhouse, coal storage area, and fuel storage tanks and a wastewater treatment plant. The powerhouse building consisted of the boiler house, compressor room, and electrical room. The buildings also contained coal-fired boilers, a turbo-electric generator, feedwater treatment system, and air compressors. Fly ash was generated from the boilers and collected in pits. Water was added to the ash to form a slurry which flowed to an ash sump, and then through a pipeline to a surface impoundment near the plant.

A Limited Site Investigation (LSI) was performed in 2000 for the Waste Water Treatment Plants 1 and 3, and Ash Pits 1 and 3. In June 2008 work was initiated to conduct a Remedial Investigation, a Human Health Risk Assessment and Ecological Risk Screening. Collection of field data began in winter 2008-2009. Data collection included groundwater sampling, soil sampling, ecological evaluation, and well installation. A draft report on the site characterization is expected in early 2010.



Core Sampling in Winter. Field Investigations are an All-Season Activity

Ash Pit 2

Ash Pit 2 operations were similar to the operations described earlier in WWTP 1 and 3, and Ash Pits 1 and 3. Work was initiated in September 2008 to conduct a Remedial Investigation, Human Health Risk Assessment and Ecological Risk Screening at Ash Pit No. 2. Draft work plans were submitted in October 2008. Field data collection was initiated in the winter 2008-2009 and the draft report is expected in early 2010.

Waste Water Treatment Plant 1—Wooden Sewer Lines

During World War II, PBOW housed operations for manufacture of TNT, DNT, and Pentolite. There were three areas used for the manufacturing process, TNT Area A (eastern area of site, along Columbus Avenue), TNT Area B (middle of site, off

of Scheid Road), and TNT Area C (western area of site, south of Fox Road). The process wastewater disposal systems for each of the manufacturing areas were comprised of above- and below-ground wooden flumes. The wooden flumes were used to carry liquid and solid waste that accumulated in catch basins located at the wash houses in each of the areas. Wastes flowed by gravity to wooden settling tanks before being pumped to one of the red water ponds areas. The process wastewaters from TNT Area A flowed through the wooden flumes toward Wastewater Treatment Plant No. 1 and ultimately to the Pentolite Road Red Water Ponds.

Several thousand feet of the sewer line remains intact along the line extending from the TNT Area A pump house toward Waste Water Treatment Plant No 1. In June 2008 work was initiated to conduct a Remedial Investigation to delineate the traces of the sewer lines and to investigate potential nitroaromatic contamination which may have affected soil and groundwater along these traces. The data will be utilized in a baseline human health risk assessment and a screening level ecological risk assessment. Collection of field data began in winter 2008-2009. Data collection included groundwater sampling, soil sampling, ecological evaluation, and well installation. A draft report on the site characterization is expected in early 2009.

Garage Maintenance (Locomotive Building) Area

The Locomotive Building is nestled in the Garage Maintenance Area along Maintenance Road. During the operational days of PBOW, equipment maintenance was conducted in the area and locomotive maintenance was conducted in the locomotive building. Due to the nature of materials transported in the railcars during the active days of PBOW, the area is being evaluated for contamination resulting from maintenance activities.

Work began in October 2008 on conducting a Remedial Investigation, Human Health Risk Assessment and Ecological Risk Screening for the Locomotive Building in the Garage Maintenance Area. Field data collection began in early 2009 and the draft characterization report is expected in early 2010.



Core Sampling Using a Geo-Probe™ Unit

USACE Conducts "Eco-Walk" Through to Support Ecological Risk Assessments at PBOW

An ecological risk assessment is the process for evaluating how likely it is that the environment may be impacted as a result of exposure to one or more environmental stressors such as chemicals, land change, disease, invasive species and climate change (<http://www.epa.gov/risk/ecological-risk.htm>).

The ecological risk assessment includes three phases.

Phase 1 Information: Information is gathered to help determine what, in terms of plants and animals, is at risk and what needs to be protected.

Phase 2 Determination: This is the determination of what plants and animals are exposed and to what degree they are exposed, and if that level of exposure is likely or not to cause harmful ecological effects.

Phase 3 Characterization: Risk characterization includes two major components: risk estimation and risk description. "Risk estimation" combines exposure profiles and exposure-effects. "Risk description" provides information important for interpreting the risk results and identifies a level for harmful effects on the plants and animals of concern.

At Plum Brook Ordnance Works, Ecological Risk Assessments are performed at each area of concern as part of the Remedial Investigation process. Prior to each ecological risk assessment the USACE conducts an "eco-walk through" as an ecological reconnaissance activity. Experts in flora (plants) and fauna (animals) take to the field to gather information on the ecosystem in the area where the Remedial Investigation is planned.

The purpose of the walkthrough is to develop an ecological site description, identify plant and animal species in the area, identify the habitat, evaluate ecosystems, and document the types of vegetation in the area. In the spring of 2009 USACE conducted an eco-walk through at each of the 8 areas of concern: WWTP 1 and 3, Ash Pits 1, 2, and 3, Locomotive Building, and sewer lines (TNT Area A and TNT Area B). The walk through team identified several types of habitats and observed numerous species of flora (plants) and fauna (animals).

USACE is responsible for remediating the contamination from the former ordnance works. Part of the remedial activities includes not only protecting human health, but also protecting the ecosystem present at PBOW. Through the eco-walk through process, USACE obtains data to support development of remedial goals and better evaluate alternatives for clean up.

What is FUDS?

It has nothing to do with the Elmer Fud character on the old Bugs Bunny Cartoons. FUDS is an acronym for Formerly Used Defense Sites. The FUDS Program seeks to identify hazardous-materials-contaminated properties formerly owned, leased, possessed, or operated by the Department of Defense (DOD) or its contractors prior to 1986. The properties are evaluated for risk, and then cleaned up or otherwise cleared.

The Department of Defense corrects environmental damage through the Defense Environmental Restoration Program (DERP). Under DERP, the US Army Corps of Engineers manages the FUDS Program. The FUDS Program is not the EPA Superfund Program, FUDS only cleans up sites impacted by contamination generated by DoD activities.

The FUDS Program is a three-phase cleanup process and many of the program processes are consistent with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The three phases are:

Phase I – Determination if the property was formerly used by DoD and if contamination is a result of DoD activity.

Phase II – An investigation is conducted to determine the nature and extent of the contamination.

Phase III – The property is cleaned up to reduce the risk to human health and the environment and to improve public safety.

Plum Brook Ordnance Works (PBOW), West Virginia Ordnance Works (WVOW) and West Virginia Maneuver Area (WVMA) all fall under the FUDS Program and are managed by the US Army Corps of Engineers – Huntington District Office. All of these projects are in varying stages of clean up with WVOW having made the most progress because it has been an active project for a longer period of time. Some aspects of these projects may be ongoing for several years after a remediation activity is implemented. USACE will continue to monitor the effectiveness of the remedial action under Long-Term Monitoring programs.

Additional information on the Formerly Used Defense Site Program may be obtained by visiting the fuds website, located at: https://environment.usace.army.mil/what_we_do/fuds.

