US Army Corps of Engineers®

Huntington District

Formerly Used Defense Sites Newsletter

Summer 2008 Edition

Churning Dirt and Feeding Bugs at West Virginia Ordnance Works

Production of trinitrotoluene (TNT) at the former West Virginia Ordnance Works (WVOW) in the 1940s led to contamination of soil and groundwater at various locations across the site. The TNT powder was produced in the TNT Manufacturing Area of WVOW. In the late 1980s, the foundations of the washer-flaker houses were covered by clay caps to prevent direct contact with contaminated soil and to keep the contamination from percolating into the groundwater below. When other areas of contamination were identified more recently, the U.S. Army Corps of Engineers (Corps) sought treatment options that removed the source areas rather than cap them, to eliminate the contamination and to provide additional protection to groundwater. The Corps also decided to treat soil beneath two of the caps that had been previously constructed.

The selected alternative for these areas was soil blending. The blending was performed in August and September 2007 by Polu Kai Services, LLC (PKS), a service-disabled veteran-owned small business and minority-owned business enterprise based in Falls Church, Virginia. PKS, with the Corps' concurrence, elected to use biodegradation at five of the sites with chemical oxidation used at the remaining site. Prior to blending, multiple soil samples were taken from each area. Each site was divided into cells for mixing purposes.

For the biodegradation sites, Anaerobic BioChem® (ABC), microscale zero-valent iron (ZVI), and soybean oil were blended into the soil to stimulate reproduction of bacteria that would degrade TNT and the other nitroaromatic compounds present in the soil. ZVI was applied directly to the soil surface in a dry powder form. The ABC was mixed with water to make a 10% solution that was sprayed on the ground surface. Additional water was added as needed to aid in the soil blending process.

Blending and Spraying of Water on Area with Potassium Permanganate

For the chemical oxidation site, dry, powdered potassium permanganate was applied directly to the soil. This resulted in a deep purple color in the soil. Water was then added to dissolve the permanganate, forming a liquid that looked like grape juice. Extra water was added to help blending.

The *in situ* blender was a 28-inch-diameter proprietary mixing drum with teeth, mounted on a large tracked excavator. For all of the areas except one, soil was treated to a depth of five feet below the ground surface to eliminate contaminant concerns in the surface soil. The other area was treated to a depth of 10 feet to further reduce the potential impacts of the soil to the groundwater beneath it.

Excavator with Soil Blending Mixer in Action (Inset Photo Shows Close-up of Mixer Blending Head)

Results thus far are promising, but biodegradation of this type is not a quick process. Complete treatment of the soil is expected to take about one year, to allow the bacteria population time to multiply and to degrade the contaminants into harmless compounds. To monitor treatment, samples of each area were taken immediately after blending and at two, four, six, and nine months after blending was completed. The final round of samples will be taken around September 2008.

Applying Zero-Valent Iron to Soil

—-Articles In This Issue on—-

West Virginia Ordnance Works
Plum Brook Ordnance Works
West Virginia Maneuver Area
Martinsburg Army General Hospital
South Charleston Naval Ordnance Facility

USACE Begins Composting Project at Plum Brook

Plum Brook Ordnance Works (PBOW) manufactured ordnance to support the World War II efforts in the 1940s. The manufacturing process resulted in contamination of soil in the production areas. The soil contamination may have been a result of material handling procedures or waste disposal practices. Whatever the source, the soil is contaminated with nitroaromatics, a by-product of explosives (trinitrotoluene or dinitrotoluene) manufacturing. The US Army Corps of Engineers (USACE) Huntington District continues their work to clean up the soil at PBOW using composting technology.

There were three explosives manufacturing plants on the approximately 6500-acre site designated as TNT Area A, TNT Area B and TNT Area C. In 2004 USACE conducted a composting project in TNT Area B. The project proved to be successful in numerous ways, including the reduction of hazardous constituents in the soil, beneficial reuse of soil, resource conservation and the reintroduction of native prairie grass.

The PRRWP Area consists of approximately 9 acres in the north-central portion of the site, south of Pentolite Road. The wastewater produced by the purification of TNT within the manufacturing areas A and B was discharged through wooden flumes or ceramic pipes into settling ponds. From the settling ponds, the wastewater was transported to a wastewater treatment and incineration area. PRRWP area also received the effluent from the Wastewater Treatment Plant No. 1. The ponds were backfilled in 1977.

USACE began excavating soils in the PRRWP Area in 2006 as part of an Interim Soil Removal Action (ISRA). The excavations discovered a seam of "dark" soil thought to have been the original pond bed. Samples of the soil indicated elevated concentrations of nitroaromatics. In the 2006 field activities, and under the continuation of field activities in 2007, USACE identified the extent of contamination and excavated the material into designated stockpiles maintained in the PRRWP.

Above: Preconstruction View

Below: Site Clearing for Sump Area

In 2008, USACE and their contractor, McTech Corporation initiated field activities in the PRRWP area to continue remediating the contaminated soil excavated in 2007. In the spring of 2008, USACE began the preparation activities which included site grubbing and clearing, grading the area for drainage and building roads around the perimeter of the site and inside the composting area. Two sumps were constructed to capture storm water runoff.

Above: Construction of Composting Area Roads

Below: Completed Sump Area

Upon completion of the site prep phase, the soil from the stockpile area was hauled to the compost area and placed in rows that measured, on average, 250' long x 4' high x 12' wide. There are 10 rows, or windrows of the contaminated soil.

Above: Contaminated Soil Windrows

Below: Straw Being Added to Windrows

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USACE Begins Composting Project at Plum Brook (continued)

The composting process, for this application, includes the addition of straw, water and chicken manure. The straw was added to each windrow for bulking, aeration and to retain moisture. Water is added, as needed, to maintain a specific level of moisture in the windrows. Finally, chicken manure is added to introduce microbes (bacteria) to degrade the nitroaromatics in the soil. When all of the components (soil, straw, manure and water) are combined, the windrow is "mixed" using a composter. The process is continuous, and temperature and moisture are critical to the success of the process. Temperature is controlled by turning the row and water is applied while turning the row.

Composter in Position to Begin Soil Composting

The composting project is currently ongoing. At the end of the composting process, expected in late summer, the planned disposal for the soil is at the Erie County Landfill.

Close-up of "Wildcat" Composter Unit

Preliminary Assessment Underway at Former Army General Hospital

The Huntington District of the U. S. Army Corps of Engineers has begun work on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA) on the former Army General Hospital property just outside Martinsburg, WV. The PA process involves obtaining historic and current information about the formerly used defense site (FUDS) property to determine whether past Department of Defense activities at the site necessitate remedial action or if it can be removed from further consideration.

Information used to develop the PA is obtained through interviews, reviewing agency/current owner files, historical research at the National Archives and other repositories, reviewing regional geologic and hydrology reports, and conducting a site visit. The PA for the Army General Hospital site began in December of 2007 and is scheduled for completion in August 2008.

The former Army General Hospital (which officially became the Newton D. Baker Hospital) was constructed during World War II to care for injured soldiers returning from the battlefields of the European and Pacific Theaters. Construction of the facility started in 1943, and was completed in January 1944. The Army General Hospital was officially named the Newton D. Baker General Hospital, in honor of the Secretary of War under Woodrow Wilson. It is noted in several periodicals of the time, that the Newton Baker Hospital was renowned for its Ward 108, which specialized in spinal surgeries. The hospital was also instrumental in giving newly graduated nursing cadets experience in war-like injuries prior to being sent to hospitals overseas. The hospital was used by the Army until shortly after the end of World War II (1946), at which time it was handed over to the Veteran's Administration (VA) for use as a VA Hospital. The site is still used by the VA Hospital to this day, and is now known as the Martinsburg VA Medical Center.

View of Current Martinsburg VA Medical Center (photo provided by U.S. Department of Veterans Affairs

To get more information on restoration activities at Formerly Used Defense (FUDS) sites, 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

WVMA Team Prepares for Second Five-Year Recurring Review

Starting in October 2008, the U.S. Army Corps of Engineers (USACE), Huntington District will begin preparing the second Five-Year Ordnance and Explosives Recurring Review Report for the West Virginia Maneuver Area (WVMA)/ Dolly Sods FUDS Project. The initial Recurring Review was conducted by the Huntington District in 2004 and noted the need for increased public awareness, continued updating of the newly developed project-related GIS database, map development and distribution, and improvements to warning sign placement and maintenance.

These Recurring Review Reports are established to determine if the implemented response action continues to minimize explosives safety risks and continues to be protective of human health, safety and the environment. In 1997-98, an ordnance removal action was conducted along trails and campsites in the Dolly Sods Wilderness, Dolly Sods North, and Dolly Sods Scenic Areas of the former West Virginia Maneuver Area. The Recurring Review Reports are prepared in accordance with USACE Engineering Regulation (ER) 200-3-1 and Engineering Pamphlet (EP) 75-1-4 which provide specific procedures for developing and implementing five-year review requirements. The completion date for this second five-year recurring review is scheduled for September 2009.

USACE Personnel Placing UXO Warning Sign on Public Information Board Along Forest Road 75

USACE Personnel Conducting Information Meeting to Educate the Public Concerning Unexploded Ordnance at WVMA

USACE Plans for PBOW Investigations in 2009 and Beyond

Plum Brook Ordnance Works (PBOW) manufactured ordnance in World War II. There were three manufacturing areas on the 6500-acre site. In addition to the manufacturing areas, there were numerous support processes, necessary to the success of the facility. Of all the once-functional areas at PBOW, USACE has identified 16 Areas of Concern (AOC).

Much effort has been put into investigations to determine the extent of contamination. Investigation activities have been conducted in 8 of the AOCs. Progress is expected to continue into FY2009 and beyond. USACE has awarded contracts for Remedial Investigations (RI) and Risk Assessment (RA) at Waste Water Treatment Plants (WWTP) 1 & 3. The RI will identify the contaminants of concern and the extent of contamination. The RA will assess the risk to human health and the environment. The information gathered from both studies will be used to determine the remediation options. In addition to conducting the RI at the WWTPs, another investigation will be conducted on the wooden sewer lines which were used to move liquid wastes to the WWTP. Other activities planned at PBOW include:

- Treatability Study in TNT Areas A and C
- Remedial Investigation / Risk Assessment at Ash Pits 1 & 3
- Remedial Investigation in the Garage Maintenance Area
- Remedial Investigation at Powerhouse No. 2 Ash Pit

USACE Huntington District is moving forward with the environmental restoration process at PBOW. Results of the investigations are presented at Restoration Advisory Board (RAB) meetings, which are usually held quarterly. The public is welcome to attend the meetings. For additional information regarding RAB meetings, please contact the USACE Project Manager, Rick Meadows at (304) 399-5388.

Former PBOW Garage Maintenance Area (Locomotive Building Area) is Slated for Remedial Investigation Activities

Preliminary Assessment Ongoing at Former Naval Ordnance Plant

With the casting of the first ingot of steel for armor plate in 1918, the federal government departed from its custom of obtaining armor from private corporations and began the manufacture of its own steel. On August 29, 1916 Congress authorized the construction of the Naval Ordnance Plant (NOP) in South Charleston, WV along the Kanawha River. Groundbreaking at the facility, in a region that came to be known as the Chemical Valley, occurred in August 1917.

The NOP manufactured both armor plate and projectiles. During World War I, President Woodrow Wilson also authorized funds for the construction of a gun-forging plant in connection with the armor and projectile plants.

The naval facility was divided into the north and south units, the projectile plant was constructed at the north unit area and began operation in spring of 1918 and the armor and gun-forging plants were located in the south area. The projectile plant produced mainly six-inch gun forgings, six-inch armor piercing projectiles, and steel ingots weighing up to eighteen tons. The south plant consisted of the armor plate and gun-forging manufacturing area which was designed to produce armor plate of the heaviest type, completely finished and ready for attachment onto battleships. Major-caliber gun forgings, from 50 caliber up to 20-inch, were rough machined and shipped to the Washington navy yard where the machining was completed.

Above and Below are Aerial Historical Photos of Former Naval Ordnance Plant in South Charleston, WV

The government operated the NOP facility on and off during both World Wars, with the plant's active role ending in 1945. The government maintained ownership of the facility from 1917 until 1961 when it was sold to the Food Machinery Chemical Corporation, now known as FMC Corporation.

Shortly after purchase in 1961, FMC Corporation constructed their Spring Hill plant on the former navy site. The FMC Spring Hill Plant is still in operation today although FMC had sold the remainder of the south unit to the Park Corporation and the north unit is currently owned and operated by the Clearon Corporation. At the height of production during World War II, the three plants employed as many as 7000 workers and occupied an area of approximately 210 acres.

The Huntington District of the U. S. Army Corps of Engineers began a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment (PA) on the NOP property in December 2007. The PA process involves obtaining historic and current information about a formerly used defense site (FUDS) to determine whether past Department of Defense activities on the property necessitate further remedial action at the site or if the site can be removed from further consideration for response. The information used to develop the PA can be obtained through interviews, reviewing agency files, regional geologic and hydrology reports, and conducting a site visit. The PA completion for the NOP site is scheduled for August 2008.

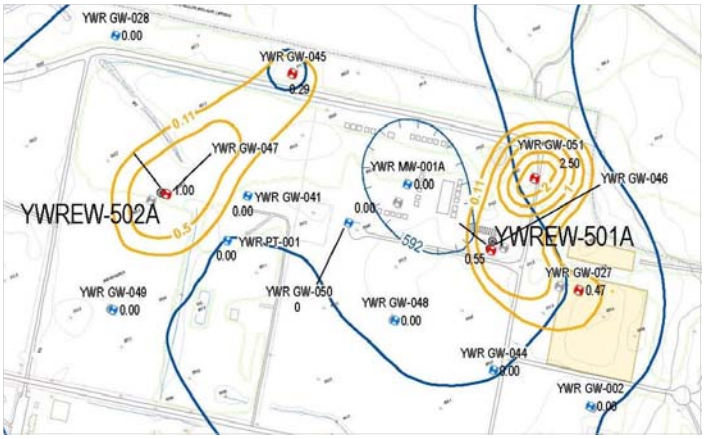
Above and Below Photos are Current Views of Former Naval Ordnance Plant in South Charleston, WV

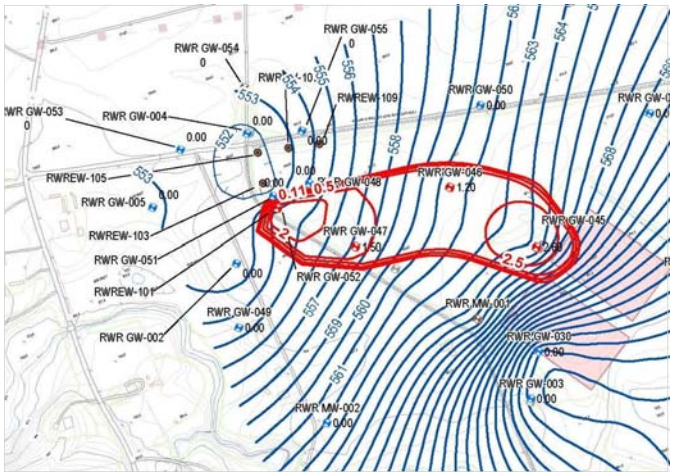
In-Situ Enhanced Bioremediation Treatability Study Contracts Awarded

The Nashville and Huntington District Corps of Engineers teamed up in May 2008 to prepare two contracts for In-situ Enhanced Bioremediation (ISEB) groundwater treatability studies at three areas within Operable Unit 4 (OU-4) at the former WV Ordnance Works (WVOW). ISEB is a technology where a carbon source is injected into the groundwater aquifer to expedite, through bio-remediation (degradation), the reduction of TNT contaminant levels. Shaw Environmental had conducted an ISEB study in the TNT Manufacturing Area in 2004 which showed promising results at degrading TNT contaminants to innocuous levels.

The OU-4 groundwater extraction and treatment system has been operating since 2000, pumping and treating the contaminated groundwater from the Red and Yellow Water Reservoir Areas, and since 2005 at the Pond 13/Wet Well Area. It has been estimated that the system may have to operate for 20 years or more before the contaminated groundwater has been sufficiently treated to meet the OU-2 Record of Decision cleanup goals. The OU-4 treatment system does not reduce the contaminant levels in the groundwater, but rather, it removes the groundwater via pumping and then treats the extracted water with activated carbon at two treatment plants. ISEB is an newer groundwater technology, which, when combined with the OU-4 treatment system, could help to further reduce the contaminant levels, which in turn could expedite the groundwater cleanup, leading to shutting down the OU-4 system and deleting the OU-4 property from the National Priorities List boundary.

Two contracts were negotiated and awarded in June 2008, with fieldwork anticipated to begin August-September 2008. The work includes installation of temporary groundwater monitoring wells and injection of the carbon source, followed by four rounds of quarterly samples to evaluate the effectiveness of the treatment. Two different types of carbon sources will be injected and evaluated. A report will be published when all fieldwork has been completed, which will detail the results of the ISEB studies and provide an estimated estimate for the cleanup of the remaining contaminated groundwater plumes. The USACE hopes that these studies prove ISEB is effective at reducing the contaminant levels and will provide great cost savings by shortening the remaining time that the OU-4 system has to operate.





Views of Yellow Water (left) and Red Water (right) 2,4-Dinitrotoluene Concentration Isocontours

WVMA Team Gives Presentation at Elkins, WV Events

This year the U.S. Army Corps of Engineers (USACE), Huntington District presented a booth at the Mountain State Forest Festival, in Elkins, WV, and gave a presentation to students at Davis and Elkins (D&E) College, also in Elkins. The booth at the Forest Festival and presentation to D&E students allowed FUDS Team Members the opportunity to speak with local citizens about the past usage of the West Virginia Maneuver Area and extending the message of following safety procedures while visiting the Dolly Sods Wilderness Area. Promotional items prominently featuring the Dolly Sods safety message were passed out to attendees. The promotional items featured the Monongahela National Forest's UXO (Unexploded Ordnance) Hotline Phone Number for use in the event that they had a UXO find while utilizing the Dolly Sods Area. Overall the presentations were deemed a success, since the Dolly Sods safety message was presented to a large number of people, and potential users of the Dolly Sods Area were made aware of the potential dangers at the site.

WVMA Display booth at Mountain State Forest Festival

PBOW Restoration Advisory Board Members Acknowledged for Public Service

Restoration Advisory Board (RAB) members are regular folks with a concern for the environment. A RAB member is from the local community and donates his or her time to attend the meetings, to review reports generated from investigations, and play an active role in moving the project forward. The PBOW RAB is fortunate to have members dedicated to the cause and willing to serve the community in these way.

In recent years, two of the RAB Members, George Parker and Starr Truscott, passed away. To recognize their contributions to the RAB, the Commander's Award for Public Service was presented to the families of Mr. Parker and Mr. Truscott. The award was presented to the families by USACE Huntington District and is given by the United States Department of the Army to recognize service or achievements that contribute significantly to the accomplishment of the mission of an Army activity, command or staff agency. The Commander's Award for Public Service is the fourth highest honor the United States Department of the Army can bestow upon a civilian, ranking directly below the Outstanding Civilian Service Award. It consists of a bronze medal, lapel button and certificate.

In Honor of George Parker, his son Michael Parker was presented with the Commander's award for Public Service from Patricia Bertsch of USACE

George Parker was retired from Continental Insurance Company and was an Oxford Township Trustee from 1963 to 2005. He was a well-respected and active member of the community, enjoyed spending time with family and friends, and mentoring others in the community. George served on the RAB since its inception in the late 1990's. He was interested in the RAB, not just because he owned property adjacent to the PBOW, but mainly because he was concerned for the community. George's son, Mike Parker, continues his father's legacy by serving on the RAB.

Starr Truscott was retired from PBOW and NASA. Starr was an accomplished scientist and well-respected in the local community. He was a quiet-mannered individual but was extremely knowledgeable about past practices at the former ordnance works and openly shared his knowledge.

In Honor of Starr Truscott, the Truscott Family was presented with the Commander's Award for Public Service

As dedicated members of the PBOW RAB, George Parker and Starr Truscott diligently worked with the RAB, and were instrumental in the successful exchange of information between the U.S. Army Corps of Engineers and the local community regarding the environmental remediation of the Formerly Used Defense Sites projects at PBOW.

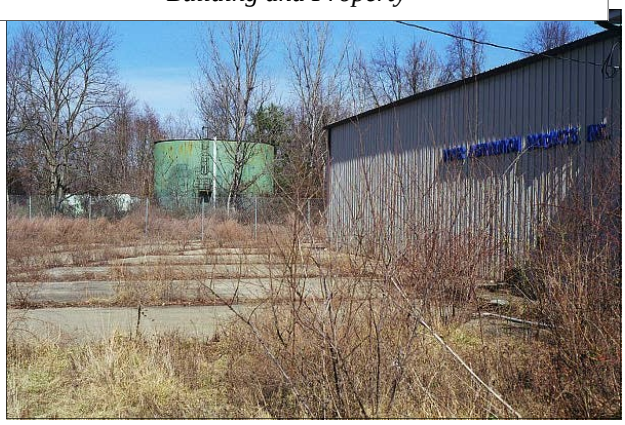
"Findings of Suitability to Transfer" Signed for the Former PDP Property at WVOW

The Commander of the Baltimore District Corps of Engineers signed the Findings of Suitability to Transfer (FOST) for the former Power Distribution Products (PDP) property in June 2008. This signing now paves the way for the deed to be finalized and provided to the Mason County Development Authority (MCDA) in the summer of 2008. Once the deed has been reviewed, approved and signed by the MCDA, it will be sent to Corps Headquarters for signature and the property will be transferred to the MCDA. The property transfer will conclude a process which began in 1996 when the Point Pleasant Ordnance Works Coalition sent a letter to the EPA requesting that the property be transferred to the MCDA, rather than the State of West Virginia, so the MCDA could utilize the property as an economic incubator for small businesses.

Aerial View of Former PDP Building Property

The Army had to purchase the former PDP property in 1988 due to the presence of TNT-contaminated groundwater near the property boundary. Following completion of the groundwater cleanup, the property was to be incorporated into the McClintic Wildlife Management Area. The EPA concurred with the Coalition's request and asked the State and the Corps to consider a change to the property transfer agreement. The State and the Corps agreed with the request. The Corps then prepared an Explanation of Significant Differences to the OU-2 Record of Decision, noting the revision to the property transfer agreement. Later, the Corps demonstrated to the EPA that the OU-4 treatment remedy was *Operating Properly and Successfully*, so that the property could be transferred prior to completion of the groundwater cleanup, which is allowable under CERCLA statute. The EPA concurred on the Corps' demonstration report in January 2007. Finally, the Baltimore and Huntington Districts and the EPA worked together to prepare, review and finalize the FOST, which the EPA concurred with in March 2008. The Corps hopes that the deed signature process goes smoothly so that the property transfer can be completed by the end of September 2008.

Above and Below Photos Show Views of Former PDP Building and Property



To get more information on restoration activities at WVOW, call the FUDS information hotline at:
1-800-822-8413

If you're interested in reviewing documents, submitting information, and/or looking at current and historical photos related to WVOW, visit the FUDS website at:

www.lrh.usace.army.mil/projects/current/derp-fuds

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