US Army Corps of Engineers®

Huntington District Formerly Used Defense Sites Newsletter

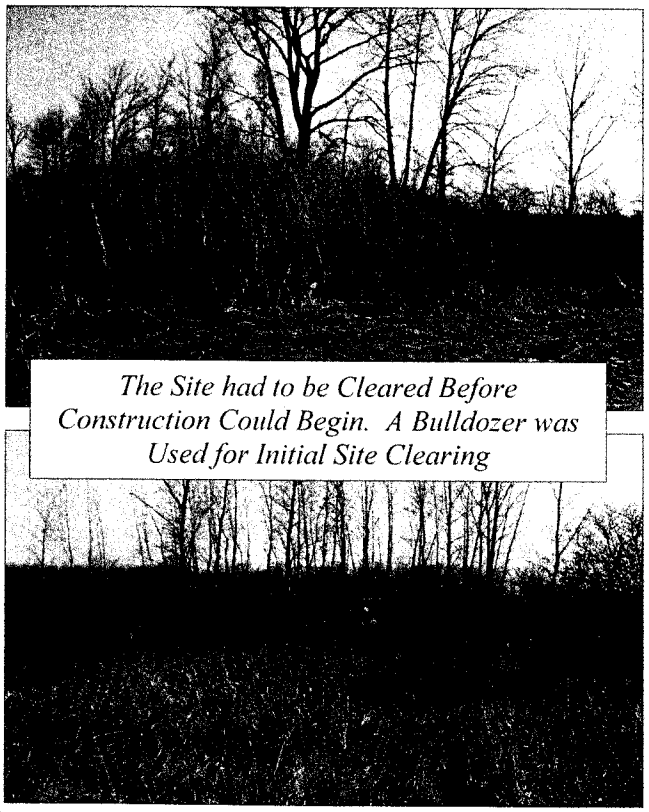
Summer 2009 Edition

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).



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

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

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 Haul Truck

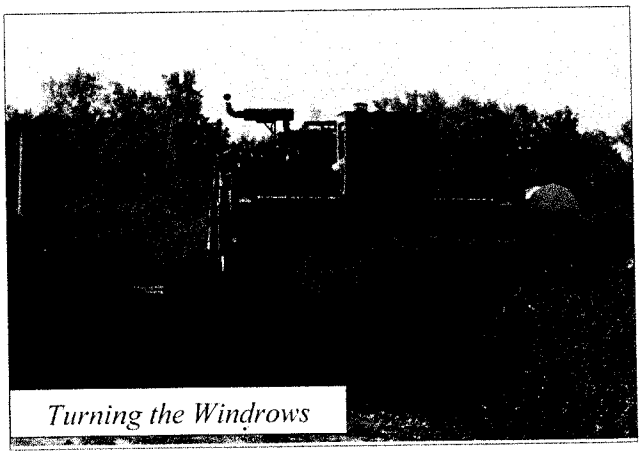
...continued on Page 2

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

Finding Operations and Maintenance Solutions with Native Plants

West Virginia is a beautiful place, with lands and waters with exceptional geographic and biological diversity. This diversity becomes apparent when visiting the former West Virginia Ordnance Works (WVOW) site located in Point Pleasant, Mason County, West Virginia. A mixture of ponds, wetlands, mixed hardwood forest, open fields and private lands have now replaced the former TNT manufacturing facility.

WVOW is intermingled with the state-operated Clifton F. McClintic Wildlife Management Area (WMA). While the original WVOW government-run facility totaled around 8300 acres, the McClintic WMA is about 3,700 acres; much of which was part of the former TNT facility.

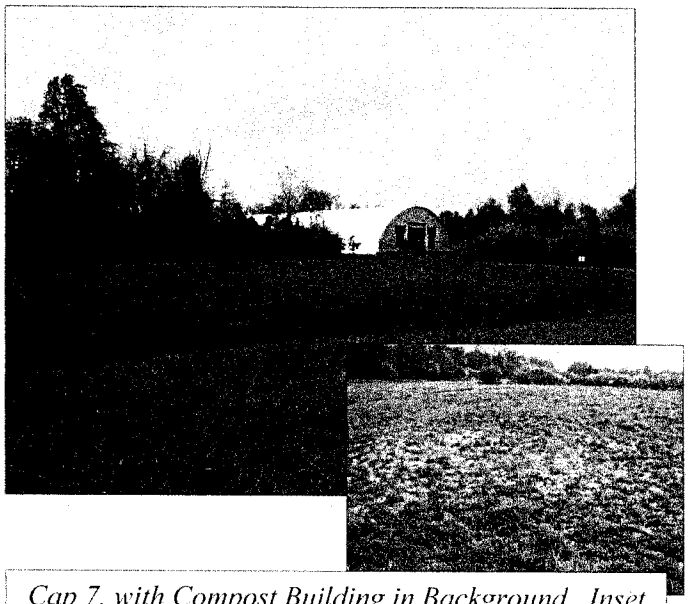
Remedial activities have been carried out continually by the Huntington District, US Army Corps of Engineers (USACE) from 1991 until present day. These remedial activities often require collaboration with the McClintic WMA officials and others to ensure the protection and improvement of the former WVOW property, property that may someday become an addition to the McClintic WMA.

On a quarterly basis, USACE inspects and maintains the remedial actions that are protective to humans and the environment. This includes maintaining the integrity of caps or soil covers which cover contaminated material, checking and maintaining drainage ditches, surface and groundwater, reservoirs, and treatment of groundwater through processing and filtering at two wastewater treatment plants. Any operations and maintenance (O&M) deficiencies are corrected each year through a maintenance contract.

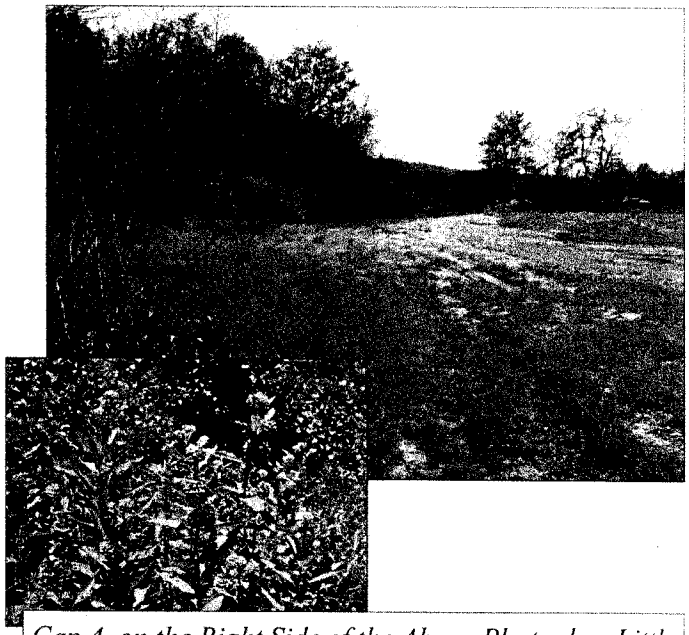
During the 2008 quarterly inspections two soil caps/covers that had undergone excavation and remedial activities previously in the past couple of years were identified for further restoration. The caps/covers were identified for the placement of additional soil due to settling and restoration of grass plantings to fill in bare soil areas where vegetation did not grow well. Because the caps would be disturbed during regular maintenance activities, USACE decided to re-evaluate the typical seed mix and try native prairie grasses that could enhance the wildlife habitat and reduce the mowing required for these caps each year once the grasses were established.

The Corps consulted with Dr. Kathy Patnode of the U. S. Fish and Wildlife Service (USFWS). Dr. Patnode provided input into the scope of work for the native grass plantings. The native seed mixture will include at least three grass species, one leguminous species, and two forbs. This diverse mix ensures that several species will be adapted to the site-specific conditions. The mixture will be planted between September 15 and October 1. Planting will be accomplished with either cleaned seeds with a native grass drill or debearded seeds using a conventional grass seed drill.

The native grasses will provide habitat for many species of wildlife and serve as a feeding, breeding, and nesting area. Mowing will be required during the establishment period so that the developing plants concentrate their energy toward developing and expanding their root systems. Once established, these plants should require only periodic maintenance and can tolerate seasonal drought and other severe environmental events because they thrive in the local climate, generally with less water, and are disease and pest resistant. Maintenance of the plantings will be performed in coordination with the McClintic WMA and USFWS. If successful, the Corps may expand the native grass plantings to other caps/covers that currently require regular seasonal mowing.



Cap 7, with Compost Building in Background. Inset Photo Shows Sparse Vegetative Cover on Cap 7. Native Prairie Grass Plantings are Being Scheduled

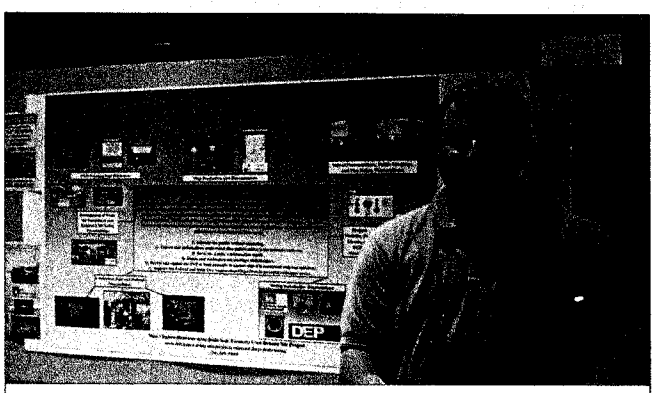


Cap 4, on the Right Side of the Above Photo, has Little or no Vegetation after Remedial Activities. Inset Photo is the Common Milkweed, a Native Plant, and a Host Plant for the Butterfly Population

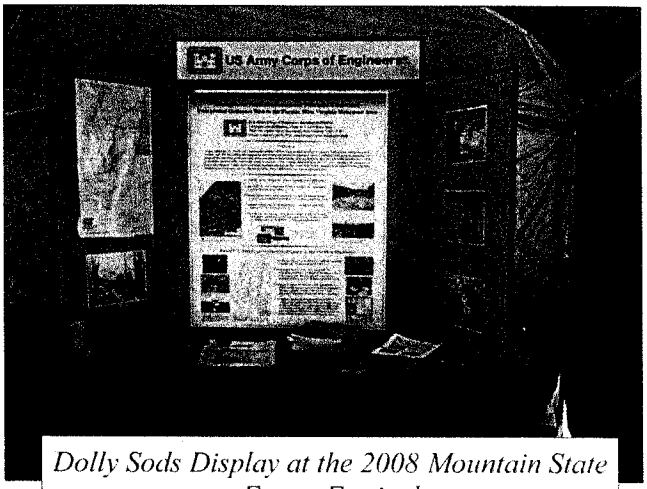
Dolly Sods FUDS Project on Display at National and Regional Events

The Huntington District of the U.S. Army Corps of Engineers (USACE) was invited to present a poster at this year's U.S. Environmental Protection Agency's (USEPA) Community Involvement Conference. The poster represents the efforts the USACE, and other project team members, have made in increasing public knowledge of the unexploded ordnance (UXO) issue at the Dolly Sods Wilderness Area of the Monongahela National Forest. The poster shows the different avenues for which the project team goes about increasing community awareness and increasing public education on the topic. Some of the ways the team increases public awareness are depicted in the poster. They include placing warning signs at Dolly Sods trailheads, the development of the Wally the Woodchuck project mascot, presentations at local festivals and fairs, developing the project's website, presentations to schools, public meetings and fire departments, and the production and dissemination of Dolly Sods Maps which help keep visitors to the area on UXO cleared trails. The conference was held in mid-August in Seattle, WA.

For the fourth year in a row, the Huntington District of the U.S. Army Corps of Engineers (USACE) will host a booth at the Mountain State Forest Festival in Elkins, WV. The dates for the booth at this year's Forest Festival are October 1-3, 2009 in the Elkins City Park. The booth will showcase the USACE's West Virginia Maneuver Area/Dolly Sods FUDS Project and provide USACE officials with an opportunity to interact with the public and educate them on the unexploded ordnance (UXO) issue in Dolly Sods. Hope to see you at this year's booth!



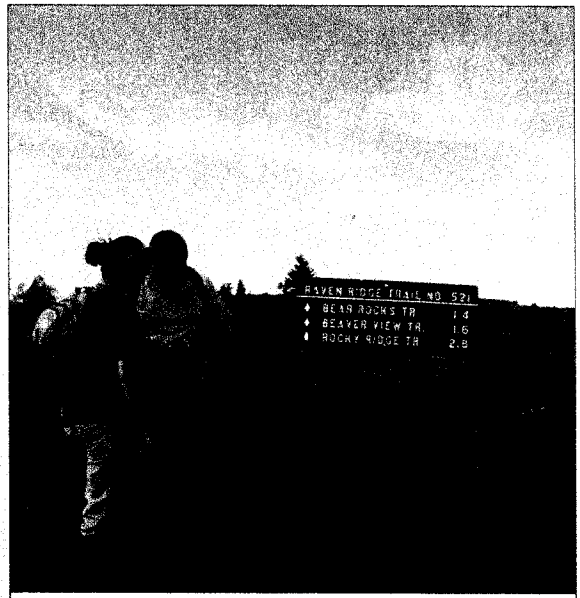
Nick McHenry of USACE with the Dolly Sods Poster Presented at the 2009 USEPA Community Involvement Conference in Seattle, WA



Dolly Sods Display at the 2008 Mountain State Forest Festival

Dolly Sods GIS Database Updated

As part of this year's ongoing effort to conduct the second Five-Year Recurring Review on the Dolly Sods Region of the former WVMA, the Huntington District of the U.S. Army Corps of Engineers (USACE) has contracted West Virginia University's Water Research Institute to update the USACE's Dolly Sods FUDS Project GIS database. The original GIS database for the WVMA/Dolly Sods FUDS Project was developed during the original Five-Year Recurring Review in 2003-04. The updated GIS database will add historical project mapping, updated trail routes and campground locations, historical areas of interest, and recent unexploded ordnance (UXO) discoveries to the existing project database. The updated database will allow the USACE to produce new trail maps for the Dolly Sods Wilderness Area, which will include updated trail locations and updated Wilderness Area boundaries. The database allows the USACE to manage the Dolly Sods Project for such things as UXO encounters, un-cleared campsite usage, trail locations and other pertinent project information. To see maps produced for public viewing, as a result of this database, please visit the following page on the Dolly Sods project's website located at: www.lrh.usace.army.mil/current/projects/derp-fuds/wvma/dolly_sods_information.



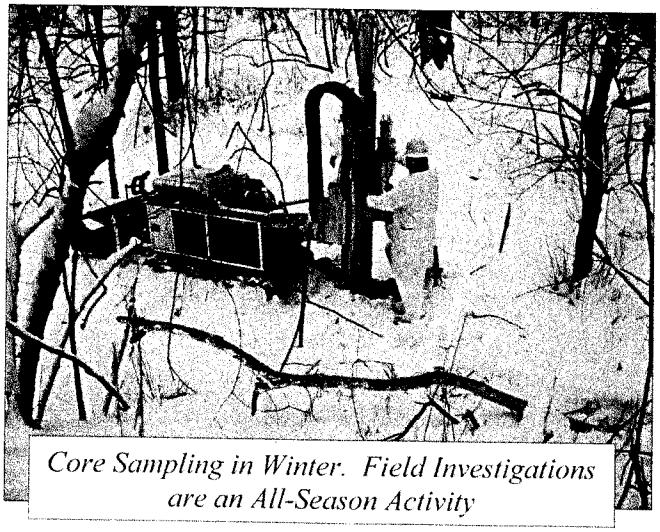
USACE and West Virginia University Officials Examining Trail Conditions During Second Five-Year Recurring Review of WVMA / Dolly Sods

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

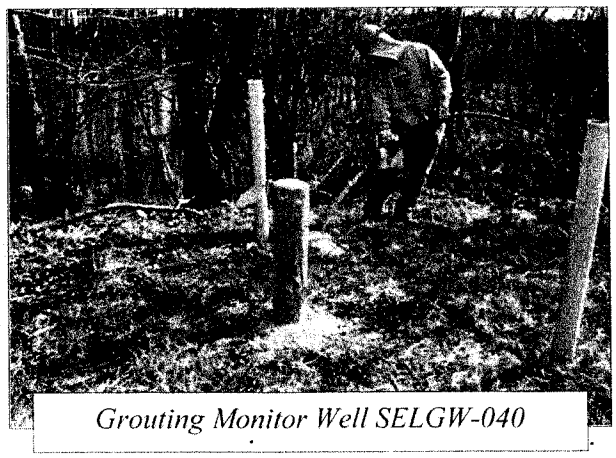
Monitoring and Extraction Well Closures at WVOW

Since 1981, over 250 monitoring wells have been installed at the former West Virginia Ordnance Works (WVOW) government operated trinitrotoluene (TNT) manufacturing facility. Monitoring of site groundwater and implementation of institutional controls was underway after the 1981 red water discovery. Wells were installed during various investigations and to support ongoing groundwater cleanup and monitoring. Two groundwater treatment plants were constructed to cleanup groundwater on a larger scale. Extraction wells throughout the former Department of Defense facility were installed as part of the treatment systems.

In April 2009, the USACE Huntington District completed abandonment of 45 monitoring wells and five extraction wells. A task group comprised of the USACE, U.S. Environmental Protection Agency (USEPA), West Virginia Department of Environmental Protection (WVDEP), and contractor team members compiled a list of wells that would be abandoned based on cumulative environmental sampling data and investigations of those areas. Data and other pertinent site specific information including sampling and monitoring plans and results from those activities provided the final determination for well abandonment.

Abandonment of the monitoring wells involved removing the upper protective casing and concrete pad with a backhoe. The inner casing of the well was cut approximately 30 inches below the ground surface after removal of the concrete pad. The remaining inner casing was sealed with bentonite grout using a tremie pipe. Grout was pumped into the well until the grout topped the casing.

Beginning Well Abandonment Procedures at Well SAAGW-004

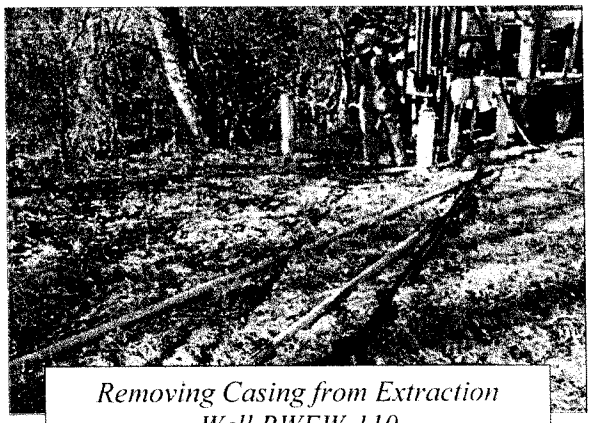


Grouting Monitor Well SELGW-040

Grouting Monitor Well SELMW-001

Abandonment of extraction wells involved removing the upper casing, the piping, and the pitless adapter. Prior to excavation of the concrete pad and removal of bollards, the electricity was turned off to all extraction wells slated for abandonment. The discharge lines that ran underground from the wells were capped with a metal seal. After the well head was removed the inner casing, which was at least 30 inches below ground, was grouted shut by adding bentonite chips to the wells and then filling the remainder using the tremie pipe and pumping grout into the well.

Over the years, over 1500 acres of the former WVOW have been removed from the National Priorities List (NPL site boundary), and the USACE continues to pursue site deletions. The Huntington District USACE continues the cleanup process at the former WVOW under the Formerly Used Defense Site (FUDS) program.



Removing Casing from Extraction Well RWEW-110

To get additional information on restoration activities at West Virginia Ordnance Works, call the FUDS Information Hotline at:

1-800-822-8413

OR

visit the FUDS website at:

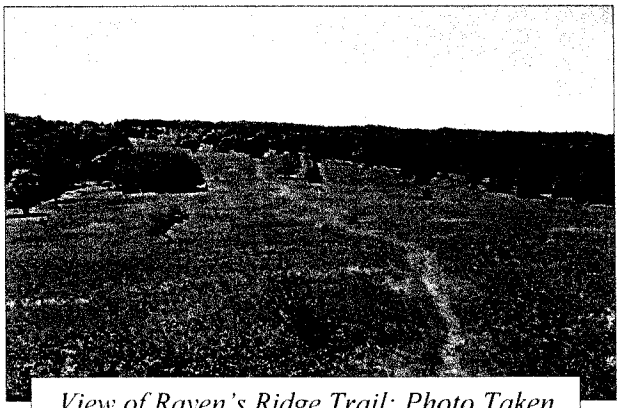
www.lrh.usace.army.mil/projects/current/derp-fuds

5-Year Recurring ReviewActivities at Dolly Sods

The Dolly Sods Region of the former West Virginia Maneuver Area (WVMA) is widely renowned as an outdoor paradise. The Army utilized this area, part of the larger WVMA, in 1943-44 as an artillery and mortar practice firing range. Although the Army conducted decontamination efforts for unexploded ordnance (UXO) in the years following the region's use as an impact area, UXO was still being discovered in the decades following the Army's use. In 1997-98, the U.S. Army Corps of Engineers conducted a UXO removal project to remove ordnance that was still present along trails and campsites located in the Dolly Sods Region. The purpose of the 1997-98 removal project was to minimize explosives risks and provide increased protection to human health and the environment. The removal project included clearing 55.79 miles of trails (the trail itself and 20 feet off center line to each side of the trail) and 178 campsites in the Dolly Sods Region.

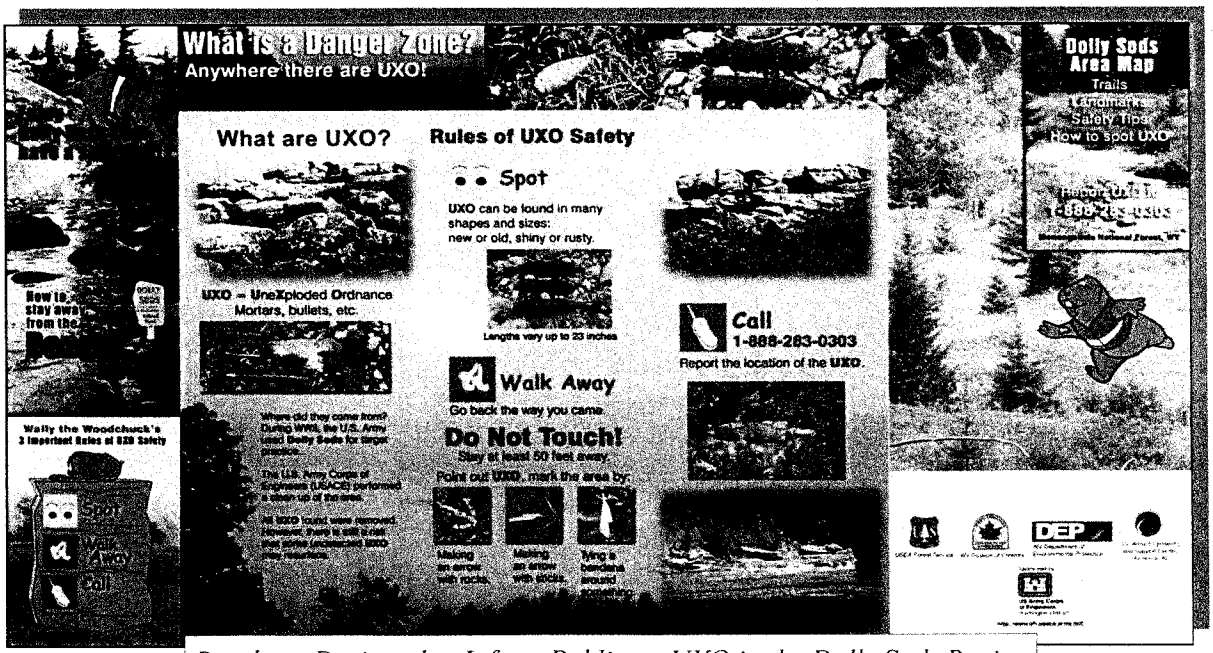
Over the past year the Huntington District of the U.S. Army Corps of Engineers has been conducting the second five-year Ordnance and Explosives (OE) Recurring Review study on the Dolly Sods Region. This study is to determine the effectiveness of an implemented ordnance removal project that occurred during 1997-98 and determine the effectiveness of the original five -year recurring review's recommendations. The original five-year recurring review on the Dolly Sods removal project was conducted by the Huntington District in 2003-04. The recommendation highlights of the first five year recurring review were the development of a project website (www.lrh.usace.army.mil/projects/current/derp-fuds/wvma), development of a project public awareness and education campaign (brochure image provided below), development of Dolly Sods hiking maps, and development of a project GIS database. These items have been very successful in increasing the public's knowledge of the UXO hazards at Dolly Sods, without causing alarm.

Site Visit Conducted During Second Five-Year Recurring Review



View of Raven's Ridge Trail; Photo Taken During Second Five-Year Recurring Review

As noted above, this year's five-year recurring review will examine the recommendations of the first five-year recurring review, as well as, whether the initial removal action is still protective of human health and the environment. The draft version of the report will be completed in September 2009. Following review by different entities, the document will be available for public review. It is expected that the document will be available for public review in approximately November or December 2009. Prior to the public review period, a public meeting will be held to present the recommendations of the report and officially kick off the public review period.



Brochure Designed to Inform Public on UXO in the Dolly Sods Region

USACE Conducts "Eco-Walk" as Part of Ecological Risk Assessment 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.

US Army Corps of Engineers®