



**US Army Corps
of Engineers.**

Huntington District

Formerly Used Defense Sites Newsletter

Summer 2002 Edition

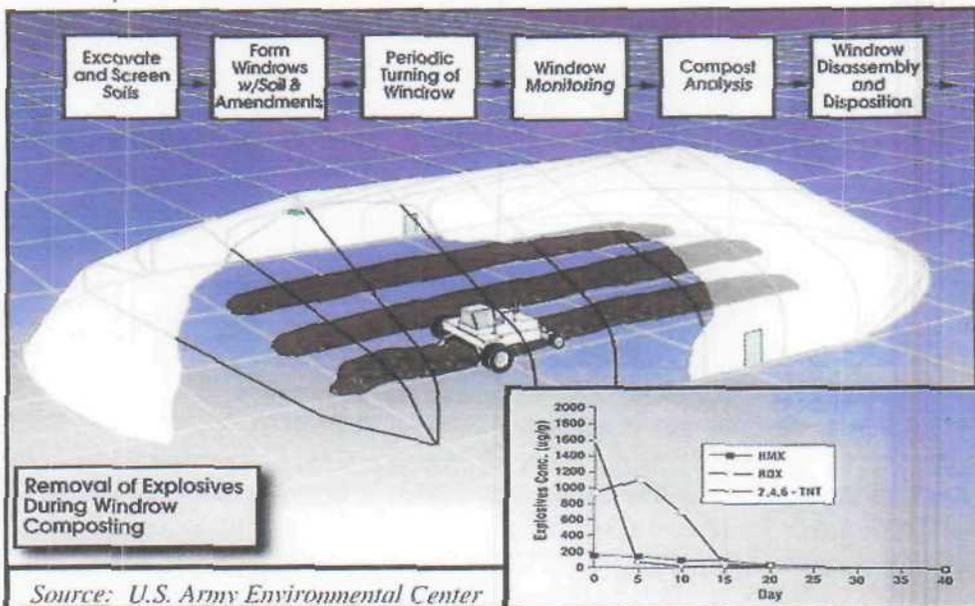


Recipe for Remediation: Corps Uses Nature to "Eat" Explosive Compounds

Last year, USACE, EPA, and DEP signed a consensus agreement to remove a "hot spot" of contaminated soil from the OU-5 Pond 13 and Wet Well Area. Rather than disposing of the soil in a landfill, the Corps researched the field of bioremediation of nitroaromatic compounds. Different types of bioremediation have been used at Department of Defense and other sites for several kinds of contaminants, including nitroaromatics and fuel. Windrow composting was selected by the Huntington District based on its success in treating nitroaromatics compounds such as TNT and DNT.

For windrow composting, the soil must first be excavated and transported to the treatment area. The soil is then mixed with amendments using a "recipe" that has been developed experimentally. The recipe is the type and proportion of amendments that have been found to best treat the soil to reduce and/or eliminate contamination. Some amendments used at other sites have included cow manure, wood chips, straw, chicken manure, alfalfa, and potato waste. The amendments selected should maximize treatment and minimize cost. Availability of the amendments is also important, so locally-available materials in sufficient quantity are preferred. The amendments provide nutrients for naturally-occurring microorganisms that will "eat" the nitroaromatic compounds and reduce them to non-toxic compounds.

After mixing, the material will be placed into windrows. The windrows will be turned regularly to ensure mixing and sampled periodically to determine how the process is working. When the contaminants are reduced below Record of Decision (ROD) levels, the soil can be disposed on-site, eliminating the cost of transportation to and disposal at a landfill. In fact, the final product will be very rich in organics. For OU-5, the West Virginia Division of Natural Resources' McClintic Wildlife Management Area office will utilize the soil on or around the WVOV site.



As an innovative demonstration project, some material previously capped in the TNT Manufacturing Area will also be windrow composted. Knowledge gained from that operation may be applied to other capped areas in the future.

Contents

- Page 2 -Plum Brook Ordnance Works Update
- Page 3 -Dolly Sods Ordnance Works Update
-Formerly Used Defense Site Web Pages
- Page 4 -West Virginia Ordnance Works Cap Installations
- Page 5 -West Virginia Ordnance Works NPL De-listing
- Page 6 -West Virginia Ordnance Works Groundwater Treatment Update
-West Virginia Ordnance Works Rifle Range Restoration
- Page 7 -West Virginia Ordnance Works Water Well Survey
-Eagles at Plum Brook Ordnance Works
- Page 8 -Huntington Corps District FUDS Projects
-Former Explosives Plant Update (Nitro, West Virginia)

USACE Huntington District Breaks Ground in Plum Brook Ordnance Works Clean-up

The former Plum Brook Ordnance Works (PBO) was the site where, during the 1940's, the Trojan Powder Company, under contract to the U.S. Army, manufactured 2,4,6 trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. During manufacturing processes, contamination of the environment occurred. Beginning in the 1980's, contamination assessments and site characterizations have been conducted across the site.

The past year has been a busy one for USACE Huntington District at the former Plum Brook Ordnance Works (PBO). USACE is anxiously waiting to begin the first removal activities since project inception in the late 1980s. Removal of contaminated soil will be conducted in TNT Area B where trinitrotoluene (TNT) was produced during World War II.

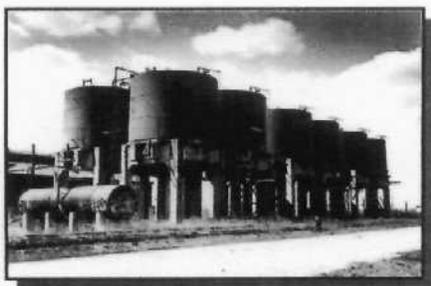
TNT Area B is situated over 48 acres in the southern portion of the former PBO site. During the production years, between December 1941 and September 1945, this manufacturing area contained three TNT production lines, consisting of six buildings in each line. Area B also included one manufacturing line, housed in a single building, for the production of dinitrotoluene (DNT).

Production of TNT was carried out in a three-stage process involving the nitration of toluene by the addition of nitric and sulfuric acid. The acids were combined in successive steps forming nitrotoluene, dinitrotoluene and finally the raw liquid 2,4,6-trinitrotoluene, or crude TNT. The crude TNT was purified with water and soda ash, which neutralized the free acid. The next step was to wash the crude TNT with sellite, a mixture of sodium sulfite and sodium hydrogen sulfite.

The sellite process removed unwanted isomers of TNT and various oxidation products resulting from the nitration process. Washing with sellite resulted in the generation of a "red water" waste stream. The purified



*Typical TNT manufacturing plant
At the PBO facility*



Acid Tanks in TNT Area B

TNT was transferred to the finishing process where it was dried and packaged for shipment or storage.

Over the course of the production years, approximately 925 million pounds of nitric acid, 63.5 million pounds of sulfuric acid and over 425 million pounds of toluene were used to manufacture TNT. Recent investigations in TNT Area B indicate elevated concentrations of metals and nitroaromatics, which are components and by-products of the manufacturing process.



TNT Area B during production

The Area B remedial investigation/feasibility study (RI/FS) was completed in late 2001. The results of the soil sampling indicated the areas of contamination. Since the manufacturing buildings no longer exist on the site, USACE

proceeded with the soil investigation using historic photos and maps, which depicted the approximate locations of structures and identified candidate sampling locations. Areas around the building footprints were sampled, and sampling continued in an outward direction until the levels of contamination were below regulatory limits required by Ohio EPA.

The RI/FS identified 30 "hot spots" from which contaminated soils will be removed. The total volume of soil to be removed is 3300 cubic yards contaminated with metals and nitroaromatics. The contaminated material will be treated and disposed of in an approved landfill licensed to accept the waste.

Currently, remedial activities are underway with the development of the project work plan. Field activities are expected to begin in August and completed by the end of October 2002. Completion of the removal activities, final sampling and closure report are expected by late 2002. With the successful completion of the remedial activities in TNT Area B, the USACE looks forward to moving on to the remaining two TNT processing sites, TNT Areas A and C.

Additional information on current FUDS activities can be obtained by contacting Richard Meadows, Project Manager, in the Huntington District Corps of Engineers office. Phone 304/529-5388, or call the FUDS information hotline at 1-800-822-8413.

Public Safety Main Concern at Dolly Sods

Dolly Sods is located within the Monongahela National Forest in Tucker, Grant, and Randolph counties in north-eastern West Virginia. The area was farmed and logged in the 1800's and early 1900's, and was purchased by the U.S. Forest Service in 1930. Military maneuvering and related training exercises were conducted in the area during World War II from 1943 to 1944. The land was later returned to the U.S. Forest Service in 1950. The Wilderness Area is currently allowed to remain undeveloped with the primary purpose recreational.

During military maneuvers, both live and inert 81 mm, 60 mm, and 4.2-inch mortars were fired. Since records concerning targets or firing points were either destroyed or never kept, the potential for ordnance exists throughout a large portion of the area. The actual amount of ordnance is undetermined but the risk is illustrated by the sporadic but continuous discovery.

The area is used by up to 76,000 people each year, including hunters, hikers, mountain bikers, fisherman, berry pickers, and spelunkers, to name a few. Over several years, various efforts have removed ordnance from multiple areas that see the most human interaction, particularly in Red Creek Valley, and the higher-density camp sites and trails.

Designated and maintained trails and associated known campsites were cleared of ordnance to the depth and width designated during removal activities conducted from May 1997 to November 1998. This remedial action was the most feasible based on the factors of cost, environmental impact, and reduction of public risk. These actions have significantly reduced the amount of ordnance posing a hazard to the public in the most widely-used areas, however, it cannot be said that Dolly Sods is

free from ordnance. Due to the extensive size of the area, the rugged terrain, and the overall usage of the land, among other factors, removal of all ordnance from Dolly Sods is not possible. A notification process has been enacted, in the event ordnance or suspicious items are discovered in the area, to quickly assess and remove ordnance components, minimizing public risk. If ordnance or suspicious materials are located, a report should immediately be made to one of the following authorities:

- Potomac Ranger District (304) 257-4488
- Seneca Rocks Visitor Center (304) 567-2827
- West Virginia State Police (304) 257-1411

Once a report has been made, the following actions are performed:

1. Forest Service is notified.
2. Forest Service verifies the find.
3. Permit obtained to detonate in place obtained.
4. U.S. Army Explosive Ordnance Disposal (EOD) contacted for ordnance removal.
5. State Fire Marshall's Office notified.
6. Disposal documented in Petersburg Forest Service Office
7. Complete Hazardous waste report to WVDEP.
8. Copies of permit and report provided to Army Corps of Engineers Huntington District and EOD.



Fin-stabilized mortars

For additional information on ordnance reporting and removal activities in the Dolly Sods area, contact Mr. Richard Meadows of the Army Corps of Engineers Huntington District at (304) 529-5388, or visit the Dolly Sods website at www.lrh.usace.mil/Projects/HTRW/DollySods.

Web Sites Provide Quick Link To Formerly Used Defense Sites

In an effort to provide the public with accurate and up to date information on formerly used defense sites, the U.S. Army Corps of Engineers developed internet web sites on three Formerly Used Defense Sites (FUDS) locations with ongoing activities. The West Virginia Ordnance Works, Plum Brook Ordnance Works, and the Dolly Sods Ordnance removal areas now have separate web sites available to anyone with internet access. Web addresses are as follows:

West Virginia Ordnance Works, Point Pleasant, WV
www.lrh.usace.army.mil/pm/wvow

Plum Brook Ordnance Works, Plum Brook, OH
www.lrh.usace.army.mil/pm/pbow

Dolly Sods Ordnance Removal Area, Dolly Sods, WV
www.lrh.usace.army.mil/projects/htrw/dollysods

Each web site is updated periodically to provide the public with relevant information and status of on-going and upcoming projects and activities. Historical facts, past and current photographs, and events, including public meeting notices and presentations, can be found with just a few clicks. Each of these web sites can also be accessed by visiting the homepage of the U.S. Army Corps of Engineers Huntington District web site, located at:

www.lrh.usace.army.mil

After accessing their home page, just click on the drop-down box for "active projects" to get to each of these ordnance sites. While you're there, be sure to check out the other on-going and upcoming projects, events and activities within the U.S. Army Corps of Engineers Huntington District.

WVOW Burning Grounds Cap Extensions Completed

Background

The West Virginia Ordnance Works (WVOW) is located approximately 6 miles north of Point Pleasant, West Virginia. This facility produced, among other compounds, trinitrotoluene, or TNT, from 1942 to 1945. As a result of the manufacturing processes used at the site, contamination of the environment occurred. The U.S. Army Corps of Engineers has been given the responsibility of remediating particular Department of Defense sites, including the WVOW site, with known or potential contamination. One of these areas is the WVOW Burning Grounds, an area approximately 1200 feet by 1800 feet and located approximately 500 feet west of the southern end of the TNT Manufacturing Area. The Burning Grounds area was used for the destruction of off-specification TNT. The Burning Grounds were designated part of Operable Unit One (OU-1), which includes a portion of the TNT Manufacturing Area, the former Waste Water Process Lines, and the former TNT Re-melt Facility.

Nitroaromatics were detected in soils and groundwater during investigations in the mid-1980s. A Record of Decision (ROD) was signed in 1987 that required flaming of TNT residue, installation of a 2-foot soil cover over the identified burning grounds, and removal and disposal of asbestos and asbestos-laden soil. Construction began in 1988. There are three soil covers in this area, identified as:

East Burning Ground cap, West Burning Ground cap, and the Y-cap.

Long-term monitoring of this area began in 1993. A corrective action was performed in 1994 to ensure that the

integrity of the caps is maintained and to extend one cap to cover an asbestos-contaminated area outside the existing caps. The caps are monitored quarterly as part of the site-wide operation and maintenance program. The five-year review revealed that the caps did not cover all nitroaromatic contamination, leading to the need for further investigation and additional corrective actions.

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Pond 23 area being cleared to begin soil excavation for borrow material for cap constructions

Corrective Action Plan

The WVOW Tier 1 team, consisting of project managers and working-level staff from the U.S. Environmental Protection Agency Region III, the West Virginia Department of Environmental Protection, the U.S. Army Corps of Engineers' Huntington and Nashville Districts, and IT Corporation, reached a consensus in April 2001 to perform corrective actions to extend existing caps to cover these relatively small areas. This plan was presented to the Restoration Advisory Board and other concerned citizens during a public meeting in June of 2001, followed by a 30-day public comment period.

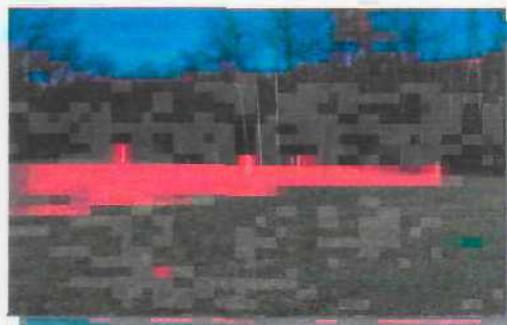
Corrective Action Completion

There were no significant changes to the plan resulting from the 30-day public comment period. Following this public comment period, the Corps awarded a contract for the cap extensions.

The cap extensions were identical in construction to the existing caps, as required by the signed ROD. Clay capping material came from the Pond 23 borrow area, used during previous capping activities. This work was completed in December of 2001. Newly capped areas included extensions of existing caps and construction of minor small caps, including the foundations of the former Acid Fume Recovery Houses at lines two through four. All capped areas are currently inspected on a quarterly basis and appropriately maintained to ensure cap integrity.



View of TNT Burning Grounds East Cap Prior to Cap Extension

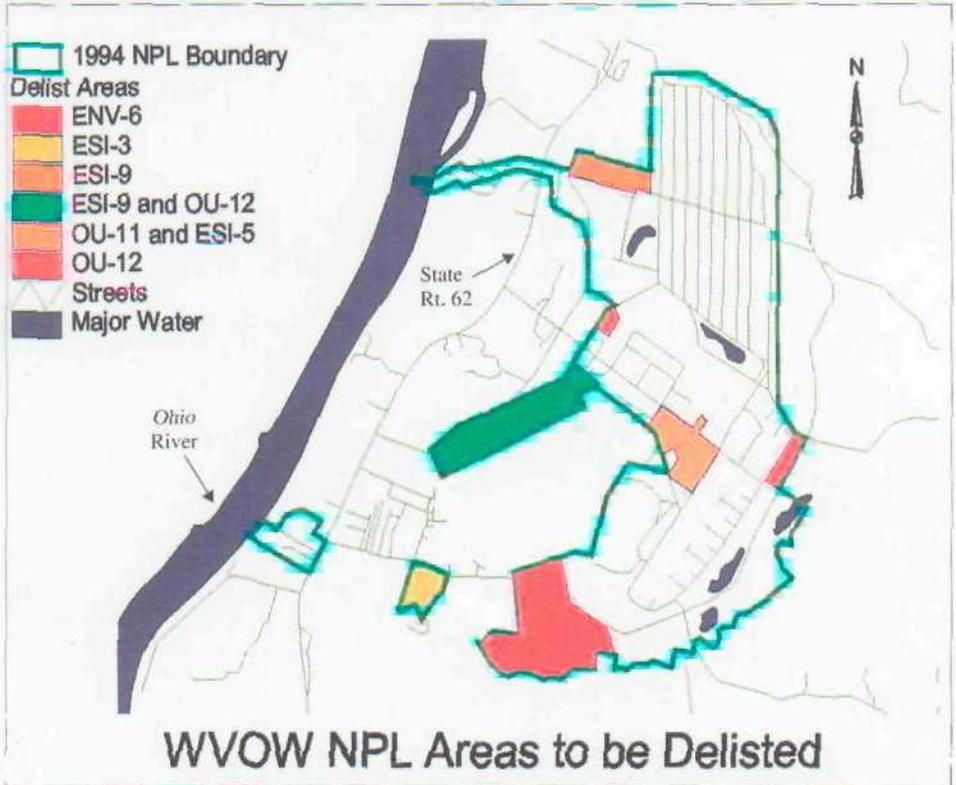


View of Burning Grounds area after additional cap installation completion

NPL Boundary Reductions in Final Stages at West Virginia Ordnance Works

The National Priorities List (NPL) was established by the U.S. Environmental Protection Agency (EPA) to clean up the most environmentally contaminated sites in the country. Although the hazard ranking system alone did not earn West Virginia Ordnance Works (WVOW) a high ranking, it was nominated by the state for inclusion on the NPL in 1983. The original WVOW NPL site covered about 8300 acres. In 1994, the area was reduced to about 2800 remaining acres where the possibility of contamination was thought to exist. The West Virginia Division of Natural Resources (WVDNR) manages most of this land as the Clinton F. McClintic Wildlife Management Area (MWMA). The federal government and private land-owners hold the remaining portions of the site.

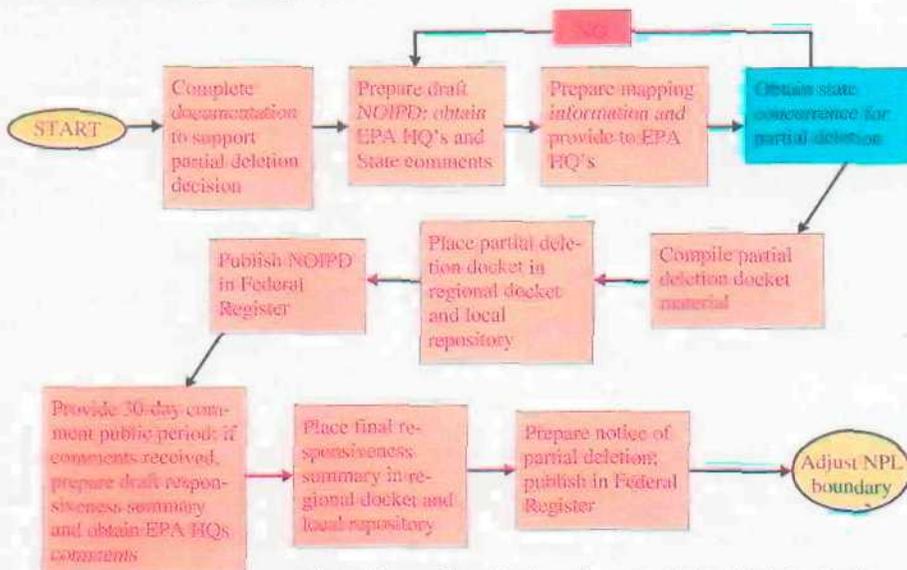
Prior to 1995, EPA policy required that an entire site be remediated before it could be removed from the NPL. Due to the size and complexity of the WVOW site, this could have tied up the 2800 acres for many more years. Now, EPA encourages removal of portions of sites or media from the NPL boundary in order to make them available for productive use. Six WVOW areas are in the final stages for deletion from the NPL boundary, identified as: ENV-6 Wetlands Mitigation



- OU-11 Sellite Plant
- OU-12 North and South Powerhouses
- ESI-3 Tract 21
- ESI-5 Refueling Depot
- ESI-9 Classification Yards

The accompanying WVOW site map displays the current NPL boundary, and includes the areas scheduled for NPL de-listing.

Any required remedial actions have been completed, and Decision Documents signed by the EPA, the West Virginia Department of Environmental Protection (WVDEP) and the U.S. Army Corps of Engineers (USACE), declaring that no further action is necessary. The table provided illustrates the procedures for partial deletions from the NPL boundary.



Adopted from: Close Out Procedures for National Priority List Sites EPA 540-R-98-016, January 2000, Exhibit 6-1, Partial Deletion Process

The Notice of Intent to Partially Delete (NOIPD) document has been placed in the regional public docket and local repository, it will soon to be placed in the Federal Register. The public comment period for the NOIPD is from July 10th through August 2nd, 2002. Once comments from the public notice period have been significantly addressed, a final NOIPD document will be prepared and placed in the Federal Register, followed by NPL boundary adjustments. As additional No Further Action decision documents are signed or remedial actions are completed, additional areas will go through the same de-listing process.

Groundwater Treatment Using Wetlands Successful at WVOW

The groundwater extraction and treatment system at Operable Unit 4, within the West Virginia Ordnance Works (WVOW), has successfully operated since September 2000. Initially, following construction in February 1997, the system operated for six months, but had difficulty meeting the state of West Virginia water quality discharge standards for metals. The metals were naturally occurring in the groundwater, but the OU-4 system was not designed to treat for metals. The WV State Office of Water Resources therefore directed the Corps to shut down the system until modifications were made to bring it into compliance.

The Corps initiated studies in 1998, and issued an Alternatives Analysis Report that stated the most cost effective alternative to meet discharge criteria would be system adjustments, if possible. Petitioning for site-specific water quality discharge was the next choice, and discharge to the Ohio River was the contingency plan if the first two alternatives were unsuccessful.



Red Water Extraction Wells

Following completion of the Alternatives Analysis, the Corps developed a small-scale wetlands treatment alternative, with discharge to a small tributary to Mill Run for the Yellow Water Reservoir treatment plant, and discharge to the Sedimentation below the former Red Water Reservoir for the Red Water Reservoir treatment plant. This alternative was a partnering effort between the Corps, West Virginia University, the WV Department of Environmental Protection, and the WV Division of Natu-

ral Resources. The Office of Water Resources accepted the Corps' proposal in August 1999.

Extensive work was required to repair and replace defective parts because the system had sat idle since July 1997. The Corps awarded an Operation and Maintenance contract in March 1999, and following several months of system diagnosis and repair, the Red Water Reservoir treatment plant was re-started in September 2000. Following a successful 14-week pilot discharge to the wetlands, the OWR granted the Corps approval to begin monthly sampling of the treated water. The Yellow Water Reservoir plant did not begin operation until December 5, 2000, while the Corps' contractor diagnosed the Red Water Reservoir treatment plant. The Yellow Water Reservoir treatment plant's pilot discharge to wetlands was also determined to be successful.

Since the commencement of operations in September 2000, the treatment facilities have consistently met water quality discharge criteria. System shutdown has been minimal, only due to infrequent, but severe thunder-



Interior View of Yellow Water Treatment Building

storms and subsequent power outages. Groundwater modeling indicate that the extraction systems are successfully capturing the contaminant plumes. During this period, the Red Water Reservoir treatment plant has treated and discharged 77,730,820 gallons of water, while the Yellow Water Reservoir treatment plant has treated and discharged 89,328,609 gallons.

Pre-World War II Firing Range Area to be Restored at WVOW

Area of Concern 18 (AOC-18) is a suspected pre-WWII West Virginia National Guard small arms firing range that is currently located on private property. AOC-18 was investigated along with 6 other AOCs in 1997 and 1999, to determine the presence of contamination, and then to delineate the extent of contamination, respectively. Lead fragments and brass shell casings were observed on the ground surface, but no other source(s) of contamination were identified.

The Final Report for the Investigation of Various Areas of Concern, West Virginia Ordnance Works, Mason County, West Virginia, April 2001, IT Corporation, stated that lead-contaminated soil was spread over an approximate 15,000 SF area, with an estimated quantity of 556 CY, and a maximum detected lead concentration of 6,690 mg/kg.

The Corps of Engineers, EPA, and the West Virginia Department of Environmental Protection signed a formal Decision Document in 2001 regarding a removal action at AOC-18. The action will prevent human and ecological exposure to harmful levels of lead contamination, and the action completes all requirements for investigation and restoration at AOC-18.

The Corps awarded the removal action contract in June 2002, and expects the action to be completed within the next few months. A proprietary chemical will be mixed with the lead-contaminated soil on-site to render it non-hazardous for disposal purposes. The process, referred to as *ex-situ chemical fixation*, chemically bonds the lead to the soil so that it passes the Toxicity Characteristic Leaching Procedure (TCLP) Method 6010A for lead-contaminated wastes. The TCLP test is an analysis that a waste must pass to be disposed in a non-hazardous waste landfill. There are no hazardous waste landfills within a reasonable distance of the WVOW site; therefore, off-site disposal as a hazardous waste would be much more expensive. The process being used by the Corps is a proven technology, and is approved by the EPA.

Following the removal action, local soil borrow will be placed back into the excavated voids, and the area seeded and mulched. The field activities will be documented in a Construction Completion report that will be placed in the Administrative Record and the Public Repository.

Water Well Survey in Progress at WVOW

A multi-phased water well survey is currently being conducted in the area of the former West Virginia Ordnance Works (WVOW). The primary purpose of the survey is to make certain that no water wells in the study area have been impacted by constituents associated with former WVOW activities. This facility produced trinitrotoluene, better known as TNT, during World War II.

The first phase of the water well survey, which began in April of 2002, was to get an estimation on the number of wells in the study area, and their general location, followed by assessing current water usage from these wells. Other information, like well depth and property owner comments, was also recorded. The survey area included the entire WVOW original boundary, and properties in close proximity to the site.

Over 300 surveys were mailed out or hand delivered to residences and businesses in the study area, which includes parts of the Point Pleasant, West Columbia, and Letart, West Virginia zip codes. Each survey included a survey form, survey informational letter, tracking number, and a postage-paid envelope for survey returns.

As part of the survey efforts, a public informational meeting was held in Point Pleasant on July 9, 2002, as part of a combined public and Restoration Advisory Board meeting. This meeting provided the public with the opportunity

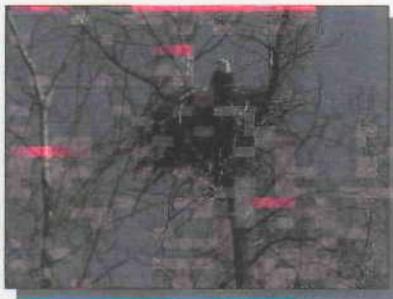
to review the purpose of the water well study area and ask questions to officials from the Huntington District of the U.S. Army Corps of Engineers (USACE) and from Region III of the U.S. Environmental Protection Agency (EPA). The public meeting was also used as a means to get more responses to the water well survey being conducted.

Once all surveys are returned and compiled, the next phase of the well survey will be initiated. This phase will include performing follow-up surveys of entities with wells to collect additional applicable information, like well location and construction details. Steps will then be taken to determine which wells should be tested for WVOW-related compounds, nitroaromatics. Water well sampling will then be performed and samples analyzed from specified well locations. Analytical results will be provided to the property owner, and reviewed by USACE and EPA to see if additional sampling and assessments are warranted for the area.

To get more information and/or participate in the well survey, contact Mr. Kenneth Woodard, Technical Coordinator, in the Huntington District of the Corps of Engineers office, Phone 304/529-5322, or Email Kenneth.L.Woodard@usace.army.mil.

Bald Eagles Fly High Over Former Plum Brook Ordnance Works

In the wintry days of 2002, Mark Shieldcastle of Ohio Department of Natural Resources (ODNR), Division of Wildlife was notified that Bald Eagles were sighted soaring over the former ordnance works property. Mark promptly set out to locate the exact area at Plum Brook Ordnance Works where the couple was nesting.



There are approximately 6 pairs of nesting Bald Eagles in Erie County. Local residents volunteer to monitor the activities of the birds and noticed that this particular pair had relocated to PBOW. The happy couple established their place of residence in an abandoned hawk's nest. As of spring 2002, the couple added one eaglet. Robert Lallier, Environmental Engineer at the site conducts routine visits to the nesting area, making sure to maintain enough distance between he and the birds.

The birds were most likely attracted to the PBOW site because of the availability of large trees and seclusion. The Bald Eagles are fish eaters but it is unknown whether or not the birds are feeding on the PBOW site. As the largest bird of prey, the Bald Eagle also feeds on small mammals and carrion.

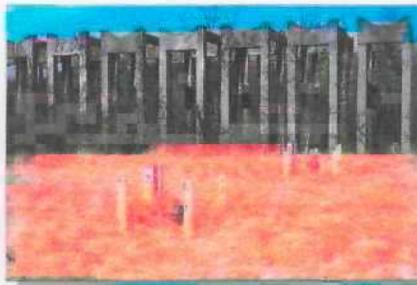
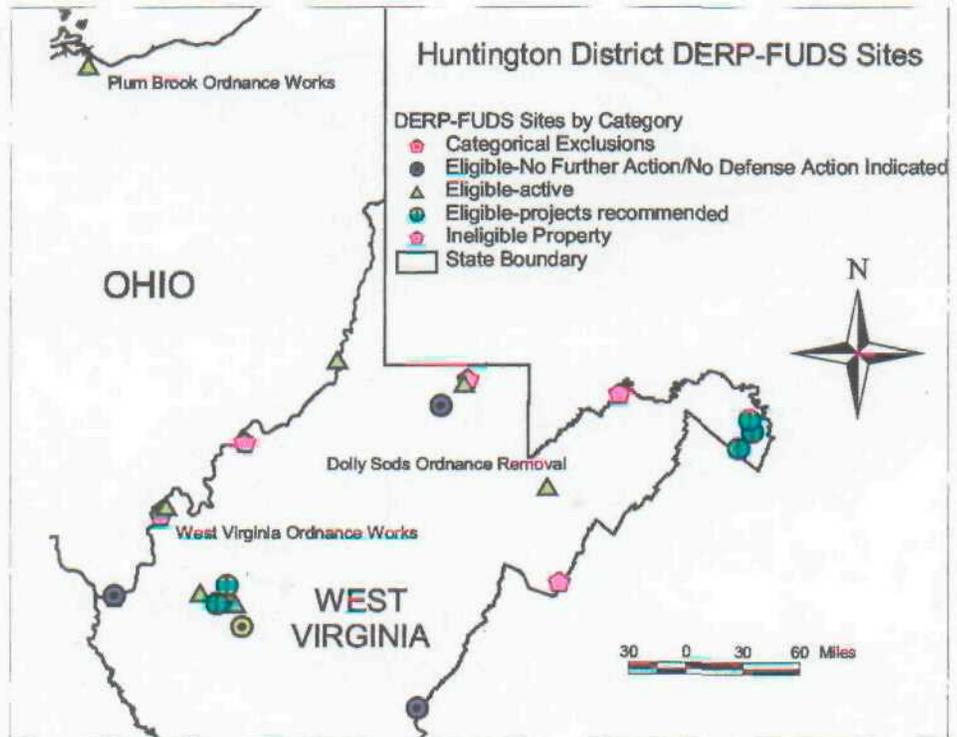
There are currently 78 pairs of Bald Eagles in Ohio.

Hopefully the eagles at PBOW will continue to nest on the site and increase the presence of the magnificent bird of prey in the state. Questions concerning the activities of the Bald Eagle population may be directed to Mark Shieldcastle at the Division of Wildlife, (419) 898-0960, extension 25.



Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP - FUDS) with the Huntington District of the U.S. Army Corps of Engineers include the following active projects:

- Dolly Sods Wilderness and West Virginia Maneuver Area, Davis, WV
- Fike/Artel Chemical Facility, Nitro, WV
- Marshall Army Chemical Plant, New Martinsville, WV
- Morgantown Ordnance Works, Morgantown, WV
- Plum Brook Ordnance Works, Sandusky, OH
- West Virginia Ordnance Works, Point Pleasant, WV
- Yeager Air National Guard, Charleston, WV



For more information on any of these projects, contact:
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No Ordnance or Explosives Found at Former U.S. Explosives Plant

The Rock Island District of the U.S. Army Corps of Engineers completed a draft Archives Search Report (ASR) for ordnance and explosives at the former U.S. Explosives Plant C, located in Nitro, West Virginia. This site falls under the jurisdiction of the Huntington District of the Corps, but Rock Island District has the expertise in preparing ASRs for the Corps. The 1,772-acre propellant plant produced nitrocellulose in 1917 and 1918 to support the World War I effort. The site consisted of an Industrial Plant, a Magazine Area, a Proving Ground, and a Housing Area. The first two areas are currently occupied by an industrial park. The former Proving Ground is now a residential area, and the former Housing Area is currently owned by the city of Nitro, WV. The former Industrial Plant includes the Artel Chemical Facility/Fike Chemicals, Inc. site, currently on the National Priority List.

As part of the ASR, the Corps reviewed numerous records at the National Archives, the Center of Military History, the Library of Congress, the Corps' Office of History, and the Washington National Records Center. The Corps also interviewed long-time area residents and Corps personnel familiar with the site and conducted a visual site walkover and inspection. The draft ASR was completed in October of 2001. Results of this investigation indicated that no part of the site was considered to have any ordnance or explosives (OE) present. A hazardous, toxic, and radiological waste (HTRW) study, however, may be warranted for the former Industrial Plant area. The ASR findings will be presented to the public later this year to allow for comments. After comments have been addressed, the ASR will be finalized.