



**US Army Corps
of Engineers®**

Huntington District

Formerly Used Defense Sites Newsletter

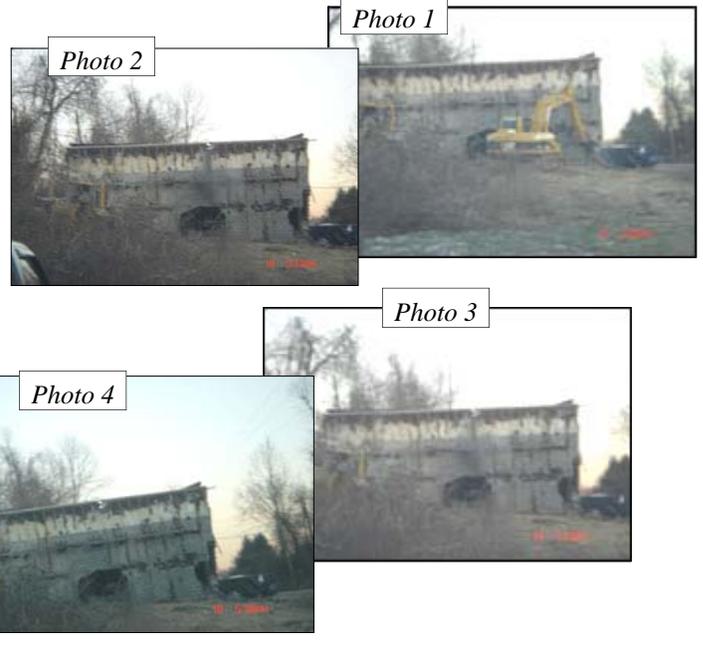
Summer 2005 Edition



Main Switch House Demolished at WVOW

The WVOW Main Switch House, located on the north side of Traffic Circle/Longdale Road, was demolished in January. The Main Switch House building measured approximately 27-feet wide X 43-feet long X 18-feet. The building's walls were constructed of concrete block overlain with corrugated (transite), asbestos containing siding.

Approximately 2,500 square feet of asbestos-containing transite siding was removed before demolition of the building commenced. The asbestos-containing material was contained and transported to a landfill off-site for proper disposal. During demo, the corners of the building were weakened by removal of blocks from the wall using a backhoe, and then a dozer and cable were used to finalize the collapse. The photographic sequence of the Main Switch House demolition shown occurred within a 12-minute period.



WVMA Project Wins Coveted 2005 Telly Award

For developing of an innovative animated flash video which educates the public about potential hazards associated with unexploded ordnance in the former West Virginia Maneuver Area (WVMA), S&C Advertising and Public Relations (San Antonio, Texas) and the U.S. Army Corps of Engineers, Huntington District, were honored in the Safety category of the 26th Annual Telly Awards competition. Founded in 1978, the Telly Awards honor outstanding local, regional and cable TV commercials and programs, as well as the finest video and film productions. The Telly Awards annually showcase the best work of the most respected advertising agencies, production companies, television stations, cable operators, and corporate video departments in the world. The Telly Awards is a widely known and highly respected national and international competition and receives over 10,000 entries annually from all 50 states and many foreign countries. The WVMA pro-

ject's award-winning video and other educational materials developed through the project team's public awareness program can be viewed online at:

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

2005 Telly Award Presented to the WVMA Team



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Plumbrook RAB and Community Members Committed to Restoration Progress

Imagine its early 1940s; you and your family live on a farm located in north central Ohio's prime agricultural area. You are taking a break on the porch after having plowed fields for planting crops for harvest in the fall. This year's harvest is expected to be bountiful, you are optimistic about your future and the future of your family. As the afternoon goes on and shadows are getting long, a vehicle from the Department of the Army comes up the lane to your house. Two men, dressed in their finery emerge from the car and greet you as you walk toward them. They identify themselves and tell you the reason for their visit. They hand you a notice that the Department of the Army is buying your land and you have 2 weeks to move out. The transaction is not negotiable. Your hopes and dreams from the afternoon fade with the sunset. The government is taking your land and building an explosives manufacturing plant to support the American troops in World War II.

The Department of the Army builds the explosives manufacturing plant on approximately 9,000 acres to support the war effort. The United States is successful in the war and PBOW is notified the war has come to an end. The employees of Trojan Powder Works, the Army's contractor, are facing unemployment and an uncertain future...again. The employees who remain behind to close down the ordnance manufacturing plant begin the shut-down and decontamination of equipment and destruction of buildings.



Buildings were demolished when news was received the war was over

In the early 1960s, the National Aeronautics and Space Administration (NASA) acquired the property and to this day, conduct research at the site. NASA conducts research to support space exploration and aeronautic technology.



Sign located at the entrance to PBOW

Throughout the years, areas or pockets of contamination have been identified, either through the efforts of the Army or NASA. Ultimately the responsibility to remediate and restore the former PBOW property remains with the Army. The US Army Corps of Engineers heads up the restoration for the Army.

To date, 16 areas of PBOW have been investigated and levels of contaminations found. Three of the areas require no further action and are ready for closure. Of the remaining 13, seven areas are active project areas, either in the early stages of investigation, undergoing interim removal actions, risk assessments or closeout. The restoration process requires time, money and a community who cares about what happens to the land.

As part of the restoration process, USACE is required to maintain a Restoration Advisory Board (RAB). The RAB consists of a small group of community members who volunteer their time to monitor the restoration activities of the PBOW site. The RAB also serves as the liaison between the community and the USACE. RAB activities are open to the public. RAB meetings are conducted on a regular schedule (usually quarterly) and annually we conduct a site visit at PBOW.

In the spring of 2005, there were a couple of notable events that took place with the RAB. One significant event was the RAB exercised their option to apply for the Technical Assistance Public Participation (TAPP) funding. The TAPP program is an opportunity for the RAB to secure an independent third-party review of PBOW restoration project activities. The TAPP contractor was selected from four qualified organizations. The TAPP contractor was selected based on technical qualifications, related experience, proximity to the project site, and cost.

A second event was the site visit conducted in May 2005. There were approximately 25 people in attendance, most of which were RAB members or community members. The RAB and PBOW Team met the new TAPP contractor. There were two couples of which the wives were sisters. The sisters lived on the land that is now PBOW, before it became PBOW. They were young children, 10-12 years of age. They requested we drive by the approximate location of their home that had been along Fox Road, just east of Taylor Road. The only thing they remembered was the slight incline in the road in front of their house.



John Blakeman, RAB member, shares some of the history of the project area with team members and guests

...Continued on page 3

We drove across the site to Fox Road. The one sister was directing the driver, and she recognized the incline in the road as the place of her childhood home. As she studied the property, there was no indication of a house being at the location. When PBOW acquired the property for the ordnance plant, most of the houses and barns were demolished. Today there are a couple of barns or buildings remaining from the family farming operations. There are mature trees but the trees that are there have been placed there since the days of PBOW and have matured over the past 60 years. However, there are small indications of life before PBOW, there are several small stands of pine trees that may have been planted by a farmer as a wind break, the Blue Spruce on Fox Road, the big red barn on Campbell Street, and in the spring there are the flowers that once bloomed in the farmer's yards; Iris's and daffodils blooming in their splendor.

It is great to have the support of the RAB and the community in the restoration project. USACE continues to involve the public through public meetings and poster sessions. At the fairs and festivals, USACE representatives are on the front lines meeting community members and homeowners of prop-

erties adjacent to the site, as well as individuals who are less than supportive of the restoration program. USACE is attentive and responsive to the public's inquiries and believe that maintaining the open dialog between the community and USACE is equal in importance to restoring the environment.



Linda Ingram and Lannae Long (USACE) discuss the findings of Reservoir No. 2 Burning Grounds Investigation

Plumbrook FUDS Projects Include Risk Assessments

The Formerly Used Defense Site (FUDS) project underway at Plum Brook Ordnance (PBOW) in Sandusky Ohio is focused on the environmental restoration of 16 areas of concern on the 6400 acre site. Under an agreement between NASA and the Department of the Army, the areas of concern (AOC) must be "clean enough" for residential development. How does one determine when a site is "clean enough?"

We are familiar with the term risk and we know what risk means to us. For example, driving in excess of the speed limit puts us at risk for a speeding ticket, or possibly an accident. Everyday we are faced with risk. However, there are ways to reduce the risk to ourselves. To reduce the risk in the example, we can choose to drive the speed limit or we can take public transportation or any number of options to prevent getting a ticket for speeding or avoiding an accident.

Environmental Risk as it relates to environmental restoration is determined by calculating the concentration of contaminants allowed to remain in the soil or other media for a particular land use, i.e. residential, commercial, recreation, etc. It's the Risk Assessors job to answer the age-old question, "How clean is clean enough?"

Risk Assessors seem to have their own language; they speak in acronyms as if they are speaking in a special code. I have come to an understanding of the role of Risk Assessment and appreciate Risk Assessors as an integral part in the environmental restoration project at PBOW.

In conducting a Risk Assessment, the assessor reviews all of the information and data developed from the Remedial Investigation and determines the acceptable risk to human health and the environment based on published values and risk models. The risk factor is based on exposure limits, consisting of duration of exposure and/or concentrations of contaminants. There are varying levels of acceptable risk associated with land use. For example, different land use restrictions

(residential, commercial, agriculture, etc.) allow varying levels of contamination, or risk, based on a calculated exposure rate.

Assume a shopping mall was built on land contaminated by industrial dumping. For the mall shopper, the risk of exposure to contaminants is highly unlikely because they are isolated from the soil and not likely to have direct contact with contaminants. However, the risk to the construction worker is increased since they are directly exposed to the contaminated soil, but the construction worker is only exposed for 10 hours per day. If the same contaminated property was developed for residential use, the risk to the construction worker still exists, but again he is only exposed for 10 hours per day. The homeowner represents the person with the greatest risk for exposure. A house built on contaminated land may represent significant risk to the occupants. The people live in the house and play in the yard 24 hours per day. The residents breathe the air which may contain dusts from soil exposed while gardening or mowing the yard. A family pet digs in the soil which may be a route of exposure for a family member through contact with the skin. Routes of exposure include direct contact with skin, inhalation, ingestion, and contact with mucous membranes (eyes, mouth, etc.).

At PBOW two Risk Assessments have been completed and two are ongoing. The Risk Assessment completed for TNT Area B established the allowable nitroaromatic concentrations in the soil excavations. The excavations expanded until the test results indicated nitroaromatic concentrations below the level established by the Risk Assessment.

The role of the Risk Assessor is complicated, it's based on statistics and the reliability of data generated from previous investigations. The Risk Assessment is the heavyweight in determining how the risk to human health and the environment will be minimized or controlled and provides an answer to the question "How clean is clean enough?"

New Dolly Sods Trails Maps Available

The Dolly Sods Region (DSR) is located between Canaan Valley and Seneca Rocks within the Monongahela National Forest of West Virginia. High upon the Allegheny Plateau, with elevations ranging from 2,600 to 4,100 feet, the region of more than 18,600 acres is well known for its extensive rocky plains, upland bogs and sweeping vistas. The DSR is comprised of three distinct areas: Dolly Sods Wilderness (DSW), Dolly Sods North (DSN), and Dolly Sods Scenic Area (DSSA). The 10,215 acre DSW was created by an act of Congress in 1975 to preserve and protect the area with special opportunities for solitude, recreation and other scientific, educational, scenic and historical values. During 1992 and 1993, 6,168.5 acres located north of the DSW were purchased by the U.S. Forest Service; this area is known as DSN. To the immediate east of DSW and DSN, 2,268 acres along Forest Road 75 have the designation of National Scenic Area; this area is known as DSSA.

The DSR is today known to offer some of the best hiking opportunities in the eastern U.S. During 1943-44 however, the region was part of the West Virginia Maneuver Area, and at that time offered the U.S. Department of the Army (USDoA) an opportunity to conduct artillery and mortar practice as training for World War II. Although the USDoA conducted ordnance clearances immediately following the war, potential hazards still exist in the DSR, as illustrated by one injury caused by unexploded ordnance (UXO) detonation during 1951, and a sporadic but continuous discovery of UXO since then by recreational visitors. To further reduce the risk posed by UXO to the public, the U.S. Army Corps of Engineers (USACE) cleared all DSR designated trails and inventoried campsites of ordnance during 1997-98. Since 1998, no UXO have been discovered along designated trails or at inventoried campsites, and this indicates that the USACE removal action is functioning as intended. When enjoying the DSR, visitors should remain on designated trails and camp at established campsites. Visitors should not create new trails or campsites since it is possible that UXO could be encountered.

The USACE continues to implement a broad Public Awareness Program to educate the public on how to safely enjoy the DSR. One approach of the program is to provide visitors

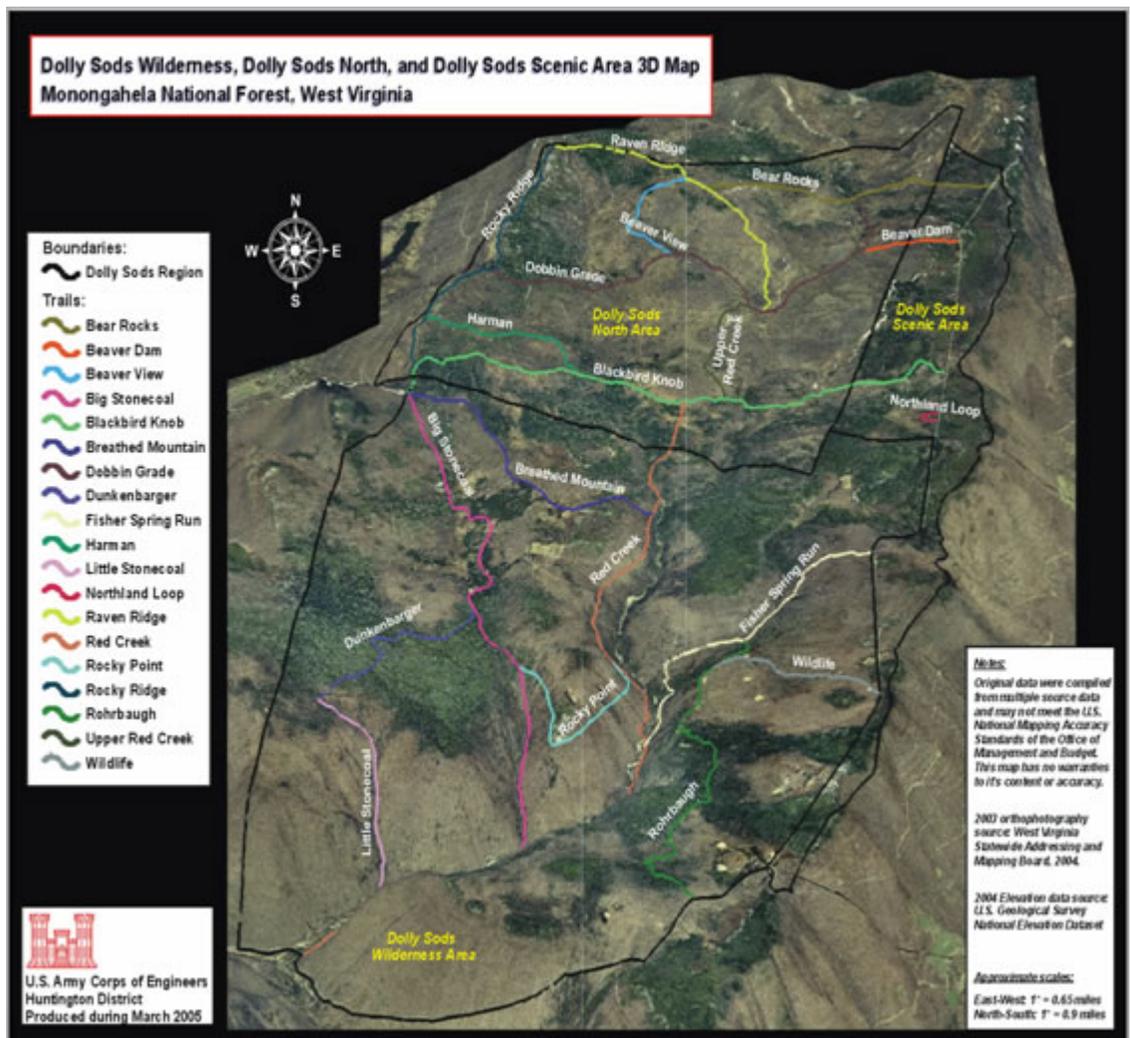
with accurate trails maps for the DSR, for the purpose of facilitating use of trails that have been cleared of ordnance. The 11x17 inch maps contain information on trail locations and distances, landmarks, regional boundaries, roads, and UTM NAD83 coordinate values. Nineteen trails which have been cleared for ordnance, and which total almost 50 miles in length, were plotted using global positioning system (GPS) data. Three different maps are available: a plan view with a topographic base, a plan view with a natural color aerial photography base, and a 3D view with a natural color aerial photography base. USACE has already begun distribution of 25,000 hard copies of the plan view topographic base version, and copies of all three map versions can be downloaded from the project website at:

<http://www.lrh.usace.army.mil/projects/current/derp-fuds/wvma>.

For additional information about the maps contact the USACE at 1-800-822-8413.

When enjoying the DSR, and in the unlikely event that you should spot UXO or something that you believe could possibly be UXO, please be sure to follow these steps: 1) do not touch, move, or dig near or around the item, 2) walk away in the direction that you came, 3) identify the area on a map or by a terrain feature, and 4) report the item immediately by calling:

1-888-283-0303.



Composting Pilot Project Completed

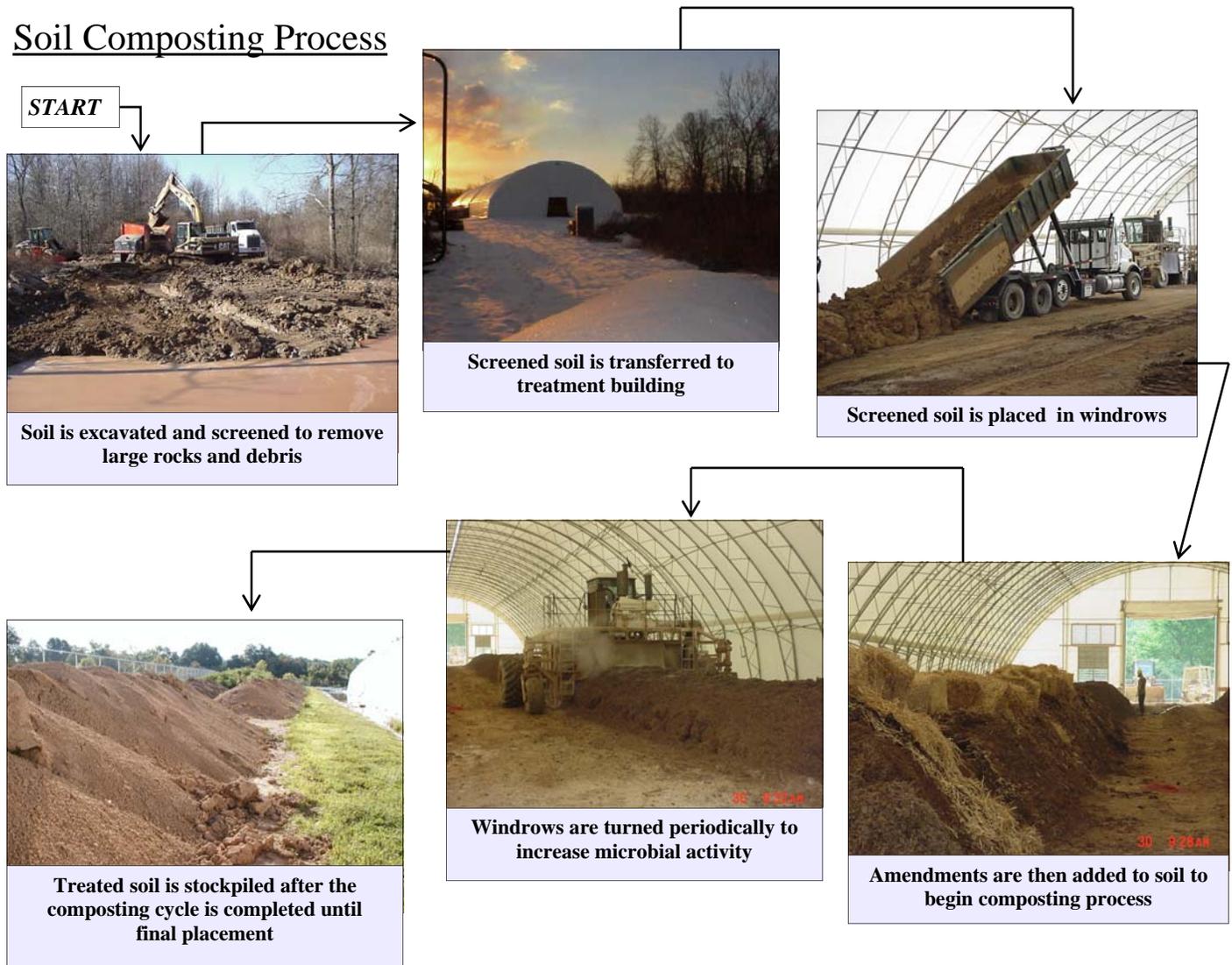
The windrow composting pilot project at WV Ordnance Works was completed in November 2004. Nearly 1,400 cubic yards of nitroaromatic-contaminated soil were excavated from the OU-5 Wet Well Area and 20 cubic yards from AOC-21. All of this soil was treated via windrow composting. Additionally, approximately 900 cubic yards of soil were excavated from beneath TNT Manufacturing Area Cap #7, in an effort to determine the effectiveness of treating capped material in the Manufacturing Area, the Burning Grounds, the Red Water Reservoir, and the Yellow Water Reservoir. However, much of the soil beneath Cap #7 was already below treatment goals and therefore was not composted.

For composting, the soil was excavated one batch at a time, screened to remove rocks and other debris, and transported to the treatment building located in the TNT Manufacturing Area. This 70-foot by 300-foot building was underlain by a high-density polyethylene liner and at least one foot of compacted clay, to prevent leaching of contamination into the groundwater. After placement of the soil into windrows, straw and chicken manure were added as amendments to promote the breaking down of nitroaromatic compounds into harmless chemicals. Each windrow was composed of approximately 154 tons of soil, 25 tons of straw, and 11 tons of chicken manure. The temperature and moisture levels of the windrows were monitored daily. Also, the windrows were turned daily to ensure an ample supply of oxygen for the bacteria breaking down the compounds. On average, nitroaromatic compounds were reduced to acceptable levels for on-site disposal in approximately four weeks. The soil was removed from the building then placed in areas selected by the WV Division of Natural Resources to improve habitat quality, thanks to the organically-rich compost product.

Additional information on the composting pilot project will be available in the *Remedial Action and Treatment Evaluation Report* when it is completed by WTI later this year. This report will be included in the site Administrative Record and posted on the Restoration Advisory Board web site, located at:

<http://www.lrh.usace.army.mil/projects/current/derp-fuds/wvow/>.

Soil Composting Process



WVOW Groundwater Treatment Continued Successful Operation

The Red Water Reservoir and Yellow Water Reservoir groundwater treatment facilities (Operable Unit 4, OU-4) were constructed to remove and treat groundwater that had become contaminated from the former TNT manufacturing operations. Groundwater contaminated with nitroaromatic compounds (e.g. TNT and DNT) is passed through granular activated carbon filters to absorb organic compounds then discharged into existing wetlands for treatment of metals. These metals are naturally-occurring in the groundwater, but must be treated so that they do not impact the environment when the treated water is discharged.

Both plants have essentially operated non-stop since the Fall/Winter 2000, and neither plant has experienced a water quality discharge violation. The Red Water plant extracts and treats approximately 5.2 million gallons of groundwater monthly, while the Yellow water plants treats 4.7 million gallons, on average.



Additional work was recently completed at the OU-4 system to improve system performance and help evaluate cleanup effectiveness. In the Summer of 2004, the Corps awarded a

work order to WTI for the installation of twelve new groundwater monitoring wells around the RWR and YWR treatment plants. These wells were recommended by USEPA Region 3 and the Corps' Hazardous, Toxic, and Radioactive Waste Center of Expertise to better define the capture zone that had been generated by the groundwater extraction wells to help determine the system's cleanup effectiveness.

In Winter/Spring 2005, the Corps awarded a work order to WTI to install two new groundwater extraction wells in the vicinity of Pond 13/Wet Well Area. The two extraction wells that were originally installed at this area only operated for the Feb-July



1997 time period, and were determined to be ineffective at removing contaminated water in this area. Prior to the installation of these new groundwater extraction wells, WTI removed nitroaromatic-contaminated soil at the Wet Well Area in the Summer of 2004 to eliminate the source for the localized groundwater contamination. This contaminated soil was treated at the onsite compost treatment facility. The two new extraction wells were subsequently installed in the source removal area to remove the residual contaminated groundwater.

Web Sites for Formerly Used Defense Sites Available on the Internet

Interested in getting more information on Formerly Used Defense Sites (FUDS) within in the Huntington District of the U.S. Army Corps of Engineers? Then check out the FUDS website, located at:

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

This website contains a wide variety of news and information on currently active FUDS projects. Currently active projects include:

Plum Brook Ordnance Works
West Virginia Ordnance Works
West Virginia Maneuver Area

Each FUDS web site contains information on current site activities, upcoming events of interest, photos, historical information, and related news. New to each of the FUDS websites is the addition of all Administrative Record documents in a searchable format. This database of documents can be searched based on the area or category of interest, year, document author or recipient, or document format or title. As new work is performed, additional documents will be added.

Corps Of Engineers Busy with WVOW FUDS Presentations

The Huntington District of the U.S. Army Corps of Engineers has been busy in recent months making several presentations on successful environmental restoration efforts at West Virginia Ordnance Works (WVOW). Presentations performed this spring include:

Environmental Technology Symposium & Workshop
Portland, Oregon March 14 - 17, 2005
Topic: Composting and OU-9 Enhanced
Bioremediation - Pilot Study

Joint Services Environmental Remediation Conference
Tampa, Florida April 11 - 14, 2005
Topic: Partnering Efforts

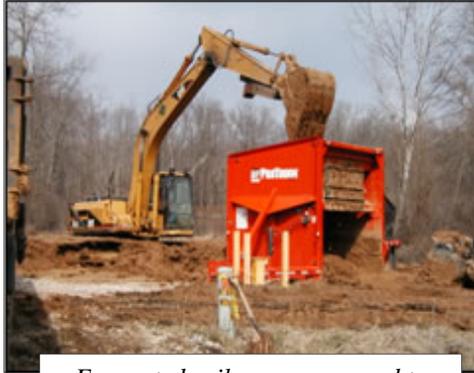
Shaw Environmental & Infrastructure Conference
Orlando, Florida April 15 - 16, 2005
Topic: Partnering Efforts and Long-Term Monitoring
Optimization

Some of the projects performed and lessons learned at WVOW may be used as a basis for restoration at other Department of Defense or related installations.

OU-2 Record of Decision Amended at WVOW - Field Work Completed

The Operable Unit 2 (OU-2) Record of Decision (ROD) (ESE, 1988) was signed on September 30, 1988. This Explanation of Significant Differences for the OU-2 ROD affects the soil cover that the OU-2 ROD called for installing over the Wet Well and seep area, adjacent to Pond 13.

The soil cover was later determined to be infeasible due to the high groundwater table in that area. Investigations performed after signing of the ROD showed that contamination was confined to a small area in the subsurface soil. It was determined that this area could be more effectively and economically addressed by excavating and treating contaminated soil onsite, instead of constructing and maintaining a cap in the same area. Furthermore, this change will also more effectively protect groundwater since the source of contamination would be removed.



Excavated soils were screened to remove larger rocks and debris prior to bio-treatment

This remedial action will continue to meet the ROD's remedial alternative objectives:

- removing soil contaminants to protective levels;
- minimizing leaching of contamination into groundwater; and
- treatment of groundwater to protective levels.

The West Virginia Ordnance Works Tier 1 team, which includes US Army Corps of Engineers, US Environmental Protection Agency, and WV Department of Environmental Protection project managers and technical support personnel, agreed to this approach as described in Consensus Agreement #1, which was signed on March 8, 2001. Excavation and treatment of soil from this area was completed in August 2004. The Explanation of Significant Differences was signed in June 2005.



View of soils being excavated from OU-2 for bio-treatment

Five-Year Review Completed at WVOW

The third Five-Year Review (FYR) for WV Ordnance Works was completed in June 2005 with the signing of the FYR by the USACE Huntington District Engineer and submission to USEPA Region III. USACE Huntington District prepared the FYR, with technical support provided by the USACE Nashville District and the USACE Hazardous, Toxic, and Radioactive Waste Center of Expertise.

The purpose of this FYR was to evaluate whether the response actions undertaken at OU-1, OU-2, OU-3, OU-4, and OU-5 are functioning as intended and remain protective of human health and the environment. The review process consisted of the notification and involvement of stakeholders, the review of existing and relevant documentation and data, the identification and review of recent and new information, and an assessment of site conditions. The public was invited to participate and interviews were conducted with people involved with the site. This report documents employed review process methodologies, and presents findings, conclusions, and recommendations. Environmental regulations (CERCLA and SARA) mandate that remedial actions be reviewed no less often than every

five years after initiation of the remedial action at sites where hazardous substances, pollutants, or contaminants remain at levels above those that allow for unlimited use and unrestricted exposure.

This is the third FYR for the WVOW site; the first FYR report was finalized during 1995, and the second FYR report was finalized during June 2000. Numerous recommendations were made in the FYR, and will be evaluated by the Tier 1 team in the near future.

To get more information on restoration activities at WVOW or other 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

PBOW Acid Areas - Historical Review and Present Day Investigation

The former Plum Brook Ordnance Works (PBOW) manufactured ordnance or explosives (TNT, DNT and Pentolite) during World War II. There were numerous components required to manufacture the ordnance materials and some of the compo-



View of Acid Area 2

nents were manufactured at the PBOW site and transferred to the adjacent manufacturing areas. One of the components of ordnance was acid (sulfuric and nitric). The acids were manufactured on the PBOW property in one of three areas designated as Acid Area 1, Acid Area 2 and Acid Area 3. In the fall of 2004 and into spring of 2005, the U.S. Army Corps of Engineers (USACE) Huntington District and Nashville District initiated Remedial Investigations (RI) in Acid Areas 2 and 3. The history of the acid areas locations is as important as the present day activities.



View of Acid Area 3

The History

During the operational days of the ordnance manufacturing plant, acids, components of the ordnance materials, were manufactured in areas designated as "Acid Areas". The acid components included oleum, sulfuric acid, and nitric acid. Within each acid area, there were approximately 8-10 buildings that housed the manufacturing, maintenance and warehousing activities. Although no documentation of the acid area activities



View of Acid Area Storage

specific to PBOW was found in the research of the site investigations, there were similar sites located in the US, so it is assumed the PBOW operations were similar to the other TNT manufacturing sites across the country.

The acid areas produced various concentrations of acids for use in the explosive materials batch processing lines. There were five main operations in each acid area:

1. Weak nitric acid production
2. Strong nitric acid production
3. Reprocessing of spent sulfuric acid to produce strong sulfuric acid
4. Oleum production – sulfuric acid saturated with sulfur trioxide
5. Mixed acid production – strong nitric acid and oleum

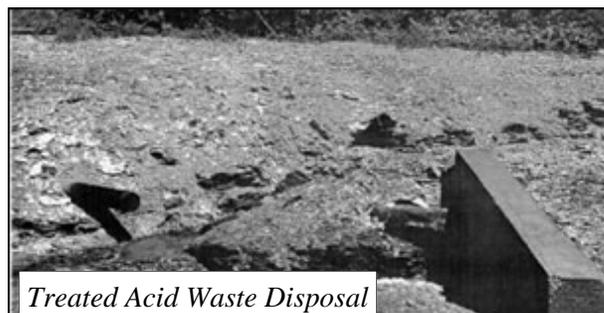
Anhydrous ammonia was used for the production of weak nitric acid which was stored in aboveground storage tank farms then routed to the ordnances production process and Nitric Acid Concentrator facilities. Routing of the material was either through underground piping or tank truck.

Strong nitric acid was produced at the Nitric Acid Concentrator facility. At the concentrator facility, weak nitric acid was mixed with strong sulfuric acid to make strong nitric acid. The strong nitric acid was mixed with oleum to produce the mixed acid. Oleum was used in an intermediate step in the ordnance production. The mixed acid product was approximately one-half nitric acid and one-half sulfuric acid.

The Sulfuric Acid Concentrator recycled the sulfuric acid recovered from ordnances production and the nitric acid concentrating process to make strong sulfuric acid (78% and 93%). The concentrated sulfuric acid was used in the production of oleum, strong nitric acid or sold on the open market.

Oleum was used in the production of mixed acid or routed directly to the ordnances production lines. The Oleum plant included a process to melt sulfur and storage of the molten sulfur in a lined pit. From the molten sulfur, sulfur dioxide was formed by burning the sulfur. The sulfur dioxide was oxidized using a catalyst to produce sulfur trioxide.

As with most manufacturing processes, there are waste streams that must be disposed of. The waste stream from the acid area



Treated Acid Waste Disposal

processes consisted of acid waste that may have included low pH rinse waters from batch tanks or off-spec liquid materials. Neutralized acid waste was discharged into an acid neutralizing pit, transferred to a holding pond and eventually discharged to a ditch.

Present Day Investigations

In 1998, historical information from the PBOW was reviewed as part of a site investigation conducted by the US Army Corps of Engineers. The information indicated that Acid Area 2 consisted of eight buildings, maintenance shop and warehouse building, 24 aboveground storage tanks and a rail line. Acid Area 3 consisted of 10 buildings, 46 aboveground storage tanks and a rail line.



Present Day Acid Area 3

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During the initial investigation in 1998, soil sampling was conducted in Acid Areas 2 and 3 to determine the presence of potential contaminants, and to identify Contaminants of Concern (COC). The Site Investigation identified surface and subsurface contamination which included:

- Polynuclear aromatic hydrocarbons (PAH)
 - Benzo(a)pyrene, Benzo(a)anthracene,
 - Benzo(b)fluoranthene, Dibenzo(a,h)anthracene
 - Indeno(1,2,3-cd)pyrene
- Semivolatile Organic Compounds (SVOC) – (Acid Area 3)
 - 3,3 Dichlorobenzidine
- Polychlorinated biphenyls (PCB)
 - Aroclor 1260

Handling of acid materials as described from similar ordnance production facilities, contamination of the soils was common occurrence. In the days of production at the ordnance plant, the industrial practices, with regard to waste handling and disposal fail in comparison to present day requirements. Understandably, with the war in full swing, prevention of environmental contamination was not a high priority. It is likely that handling of the materials used in the manufacture of the explosive was performed carefully to prevent spillage and waste of the valuable resources and to prevent worker injury.

In snowy, late 2004 and the chill of early 2005, USACE began the field work phase of the Remedial Investigation (RI) of Acid Areas 2 and 3 (AA2 and AA3). This investigation focused on the Contaminants of Concern (COC) indicated in the 1998 investigation. The RI is a comprehensive investigation which includes project planning, implementation of project activities, data validation, report preparation, report review and comment, and presentation of the final report.

During the field work phase of the RI, soil samples were collected from designated locations at both AA2 and AA3. The location of the sample boreholes were based on the knowledge of the site and the location of buildings identified in historical photographs. Although the buildings no longer exist, the investigators were able to identify the footprints of the building from photographs and designate sample locations in areas with a high probability of contamination.

Soil was collected from each borehole at 0-1.5 feet, 2-3 feet and 4-6 feet using direct push technology. The sample portions were homogenized and placed in glass sample containers, placed on ice and transported overnight to the laboratory.

In addition to soil investigations, USACE began groundwater investigations in late December 2004 and into February 2005. The groundwater began with the installation of piezometers (shallow holes to locate and monitor groundwater) and the location of monitoring wells, both shallow overburden wells and deep bedrock wells. Although the weather was sub-zero with



Monitor well installation in winter



Groundwater monitoring during Spring in Ohio

30 mile per hour winds, the project continued. April 2005 completed the RI for soils and groundwater in Acid Areas 2 and 3.

To date, US Army Corps of Engineers has completed the field work phase of the Remedial Investigation in AA2 and AA3. The analytical results of the laboratory analysis are currently under review. A draft report which details the findings will be prepared and the results presented to the PBOW Restoration Advisory Board.

The next step in the AA2 and AA3 restoration process is to conduct a Risk Assessment (RA) to determine the extent to which the areas must be restored. Following the RA, a Feasibility Study (FS) will be conducted to evaluate the existing remedial technologies that will achieve the “clean” levels established by the RA. Possibilities that may be considered include complete excavation of the contaminated soil, composting the contaminated soil, use of an undisclosed innovative technology, or other remedial technology. The selection of the remedial technology is based on economics, efficiency, ease of application and other factors.

Plum Brook Ordnance Works has traveled a long journey from the time of the family farm to ordnances manufacturing to environmental restoration. The journey continues to strive toward the goal of complete restoration of the site associated with the manufacturing of ordnance material. The road into the future is a long road with many obstacles. The history of PBOW impacted the lives of our ancestors and our lives today, but has certainly played an important role in shaping our country and an active role in preserving our environment for generations into the future.



Winter sunset over Acid Area 1

To get more information on restoration activities at PBOW or other 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

New WVMA Website will be Useful to All

The West Virginia Maneuver Area (WVMA) team will have a new tool to provide project-specific information to the public this summer. Everyone interested in the project will be able to access a new West Virginia Maneuver Area Web Site at <http://www.lrh.usace.army.mil/projects/current/derp-fuds/wvma>. Previous efforts to increase public awareness of the project include project related merchandise such as key chains and water bottles (with project and contact information on them), public meetings, and an administrative record located at the Elkins Library and the U.S. Forest Service Office located in Elkins, West Virginia. The administrative record contains all technical documents, official correspondence, and newspaper articles relating to the project. Due to the increased interest in using Dolly Sods (a site within the WVMA Project) for a wide variety of outdoor activities, this website will allow the WVMA team to provide more information to more people with the click of a button. Pertinent project information that could only previously be distributed during visits to the area by team members is now accessible to everyone with an internet connection.

The main page of the new website includes safety information such as brochures, an educational video for children teaching them about the history of the site and some of the possible dangers still present at the site, and PowerPoint presentations for adults. Aside from the main page, the website will consist of multiple sub-pages including such topics as current news and activities at the site, downloadable WVMA maps in Adobe Acrobat Reader format, information from previously held public meetings, photos of the project area, contact infor-

mation for key people within the team, and a digital administrative record that will allow visitors to the website to search the contents of the record by title, download, and view them in Adobe Acrobat. Because of the convenience and ease of accessibility to the content of the website, a higher percentage of the public will gain more knowledge of the project, creating a better understanding of the ongoing effort to ensure visitor safety and enjoyment of the area.

The new website, designed by S&C Advertising and Public Relations, San Antonio, TX, will be able to provide up-to-date news and information about the project, as well as, to deliver educational material to the public in an efficient manner. Another benefit of the website is the ability to exchange between members within the project team and the public. This is especially true when documents in the administrative record are needed by a member of the team that is in a location where the administrative record is not physically accessible. With the combination of accessibility and quality of information, the new West Virginia Maneuver Area website will make a valuable addition to the project team's efforts to carry out their mission of keeping the public both safe and informed.

Wally the Woodchuck examines his new home on the web



WVMA Project Showcased at USEPA and DoD Conferences

During World War II, the Dolly Sods Region (DSR) of the West Virginia Maneuver Area (WVMA) was used for military maneuver exercises and artillery/mortar practice, which led to unexploded ordnance (UXO) contamination. Today, the remoteness and scenic qualities of the DSR attract up to 76,000 visitors annually. Previous remedial actions were conducted by the U.S. Army Corps of Engineers (USACE), and have significantly reduced the amount of UXO posing a hazard in the most widely used areas of the DSR. However, previous removals could not, and were not expected to reduce ordnance-related risk to zero due to environmental damage, cost, and technology limitations. To manage remaining risk without scaring the public to the point that they are afraid to enjoy the land for its intended uses, an innovative public awareness and education program has been developed by the WVMA project team, and it continues to be implemented in the DSR.



WVMA Project Booth at the USEPA Community Involvement Conference

Over the past year, the WVMA team has been selected to give presentations at two national conferences, in order to share advances that the team has made in the area of UXO-related community awareness and education. The presentations demonstrate the importance of effective agency partnering in such projects, provide examples of DSR outreach tools, and promote an exchange of ideas regarding ways to educate the public about UXO-related risk. During 2004, the USACE gave a presentation titled "Strategies for Public Awareness and Education Concerning Unexploded Ordnance Risk in the Former WVMA" at the U.S. Environmental Protection Agency (USEPA) Community Involvement Conference in Denver, Colorado. The conference was attended by over 500 people representing federal, state, local, and tribal partners, and proved to be an excellent opportunity to share lessons learned regarding public participation, community involvement, partnership building, and outreach and education related to all aspects of environmental protection. During the 2005 summer, USACE and S&C Advertising & Public Relations will give a presentation titled "UXO Safety and Education Promotion with Wally the Woodchuck at an Active FUDS Site in WV" at the Department of Defense (DoD) Sustainable Ranges Initiative Conference in San Antonio, Texas. This conference is scheduled to feature approximately 100 organizations representing government and industry, and it will provide a venue for the exchange of information and ideas in order to benefit all stakeholders involved in the military range domain.