US Army Corps of Engineers

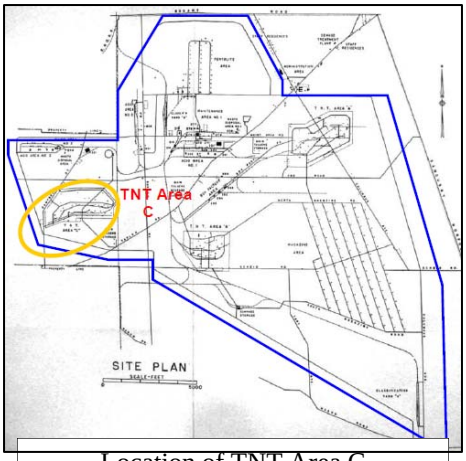
Huntington District

Formerly Used Defense Sites Newsletter

Summer 2010 Edition

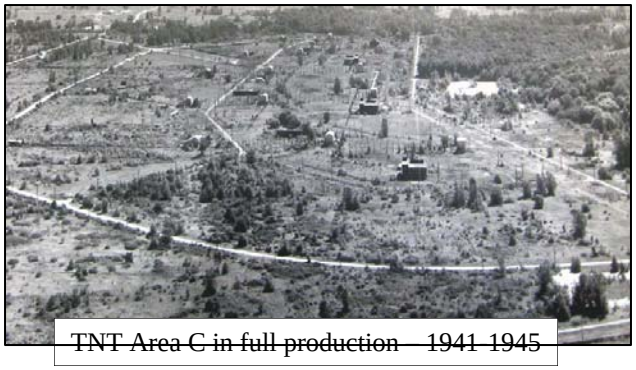
USACE Utilizes Alkaline Hydrolysis to Reduce Contaminants in Soil at PBOW

USACE Huntington District is making preparations for a third remedial action at PBOW. The remedial action will be implemented in TNT Area C which is located in the western portion of the site, and is expected to begin in mid-summer 2010.



Location of TNT Area C

The plan for TNT Area C is to remediate soil contaminated with residuals from the manufacture of trinitrotoluene (TNT) and Dinitrotoluene (DNT) during World War II. TNT Area C was one of three manufacturing areas at Plum Brook Ordnance Works (PBOW).



TNT Area C in full production 1941-1945

The article entitled "USACE Huntington District Progresses to a Remedial Action in TNT Area C" outlines the steps to get to the remedial action phase, including the Remedial Investigation, Risk Assessment, Feasibility Study, Proposed Plan and the Decision Document. After all of the investigations have been completed, the documents finalized and the contractor secured, its time to mobilize into the field and implement the planned action.

Implementing the planned action starts with developing a Plan of Operations (PoO), Accident Prevention Plan (APP) / Site Safety and Health Plan (SSHP) and a Quality Control Plan (QCP). The PoO is the overall plan that details the implementation of the action. The APP details the safety procedures to be followed and the QCP details how the contractor will monitor and verify the quality of the work being done and that the work being done meets the requirements outlined in the Scope of Work (SOW) from the government.

The planned action in TNT Area C will include surveying, excavation, sampling and analysis, treatment of contaminated soil, lead (Pb) stabilization in soil, off-site disposal or on-site placement of soil, residuals management, restoration of excavated areas, and treatment area maintenance.

Before the excavation can take place, the areas planned for excavation needed to be surveyed and the coordinates of the excavations staked. Due to the heavy vegetation present in the TNT Area C, surveying the coordinates was completed in the spring of 2010. Limited clearing in the areas was necessary to accommodate utilizing GPS technology. The coordinates were staked, and prior to digging, an outline of the excavation will be marked on the ground to assist the equipment operator in making the excavation. Care will be taken to excavate only the volume of soil outlined in the SOW. There are 15 areas to be excavated, with a total volume of soil around 9,200 cubic yards.

Staked locations in TNT Area C at the location of former Building 626

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USACE Utilizes Alkaline Hydrolysis to Reduce Contaminants in Soil at PBOW (continued)

Clearing was done to facilitate the surveying

The excavated soil will be stockpiled immediately adjacent to the pit. Once the excavation is complete, the stockpile will be sampled and analyzed for the contaminants of concern. Based on the analytical results, the excavated soil will either be disposed off-site in the Erie County landfill where it will be used as daily cover or it may be treated on-site then disposed off-site or used for on-site placement (depending on the final levels achieved during treatment).

If the excavated soil is hazardous for nitroaromatics or lead, it will be moved to the treatment area for alkaline hydrolysis treatment and lead stabilization. If the soil contains polychlorinated biphenyls (PCBs) in concentrations exceeding threshold concentrations, it will be disposed in a Toxic Substances Control Act (TSCA)-regulated landfill; the USACE does not anticipate having to dispose of PCB-containing soil in a TSCA landfill because the PCB concentrations observed in the RI phase were well below the threshold limits.

Following the excavation of soil from the designated pits, the walls and floor of the excavation pits will be sampled to make sure all of the contamination above the remedial goal objectives was removed and clean soil is all that remains in the pit. In the event the analytical results from the wall and floor samples indicate the soil is not clean, further excavation may be required to get to clean soil. Excavation of additional soil will not be performed under this SOW. If excavation is necessary to get to clean soil, the pit will be secured, and the government will issue a modification to the contract to expand the excavation.

Once the stockpiled soil has been characterized, it will either be disposed off-site (if non-hazardous) or moved to the treatment area for alkaline hydrolysis treatment to reduce the nitroaromatic concentrations or to stabilize the lead, or both. The treatment area was constructed in 2008 to facilitate composting soil from the Pentolite Road Red Water Ponds Area. The treatment area is depicted in the following photos showing the soil configured in windrows and as it appeared after the treated soil was removed.

Above: Treatment area without windrows
Below: Treatment area with windrows

Approximately 3,000 cubic yards of contaminated stockpiled soil may require ex-situ treatment to reduce the 2,4-DNT to below hazardous levels prior to off-site disposal at a non-hazardous landfill or on-site placement. Windrow alkaline hydrolysis will be accomplished by mixing contaminated soil and amendments to destroy the nitroaromatic compounds. The amendments will consist of caustic soda, metal ion catalysts, and water. Prior to treatment, a treatability study will be conducted on the first "batch" to determine the design quantities (or recipe) required for treatment.

Windrows will be used for the alkaline hydrolysis treatment. Each windrow shall be approximately 12 feet wide and 6 feet high. A windrow turner will be used to mix the treatment chemicals with the soil. It is expected that each windrow will be turned at least once daily.

Compost Turner

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USACE Utilizes Alkaline Hydrolysis to Reduce Contaminants in Soil at PBOW (continued)

Soil contaminated with lead will be stabilized using ex-situ treatment to reduce the lead to below hazardous levels prior to off-site disposal at a non-hazardous landfill. A windrow composting approach will be utilized for the lead treatment by mixing contaminated soil and amendments to immobilize the lead. The amendments will consist of a slow -release organic compost and sulfur salts. Prior to treatment, a treatability study on the first "batch" will be conducted to determine the design quantities required for treatment.

Windrows will also be used for the lead stabilization. For lead treatment, each windrow will be turned a minimum of four times after application of the amendments.

The figures below demonstrate how the chemicals were supplied and the caustic material was mixed at a different facility using alkaline hydrolysis and lead stabilization for soils treatment. For the TNT Area C soils treatment process, the chemicals will be added in a similar manner, but the compost turner will be used to turn (or mix) the amendments (treatment chemicals) into the soil.

Example of how chemicals are introduced to the soil

Upon completion of the alkaline hydrolysis treatment the soils will be placed on-site as backfill. All soils contaminated with lead that require stabilization will be disposed off-site at a non-hazardous landfill.

Application of caustic soda to soil in the AH Process

This article is a "broad-brush" of the activities and considerations associated with implementing the remedial action in TNT Area C. But it gives the reader an idea of how USACE is remediating the contamination from years ago.

A project of this magnitude involves many players from USACE and their contractor to the subcontractors and local suppliers. Over the years USACE has developed relationships with many local suppliers and continues to use those suppliers during the TNT Area C remedial action. Supporting the local economy through the use of local companies is one way USACE is giving back to the community.

If you would like additional information on the TNT Area C remedial action, please contact Lisa Humphreys, USACE Huntington District, Project Technical Coordinator at (304) 399-5953 or lisa.a.humphreys@usace.army.mil.

Updated WVMA/Dolly Sods Project Website Provides Public with Most Current Project Information

The Huntington District, U.S. Army Corps of Engineers (USACE) has updated the West Virginia Maneuver Area (WVMA)/Dolly Sods Formerly Used Defense Site (FUDS) Project website. With assistance from Marshall University, the website has been updated to bring the most current project related information available to the public. Everyone interested in the project can access the WVMA/Dolly Sods website at http://www.lrh.usace.army.mil/projects/current/derp-fuds/wvma.

Updated Information/Features

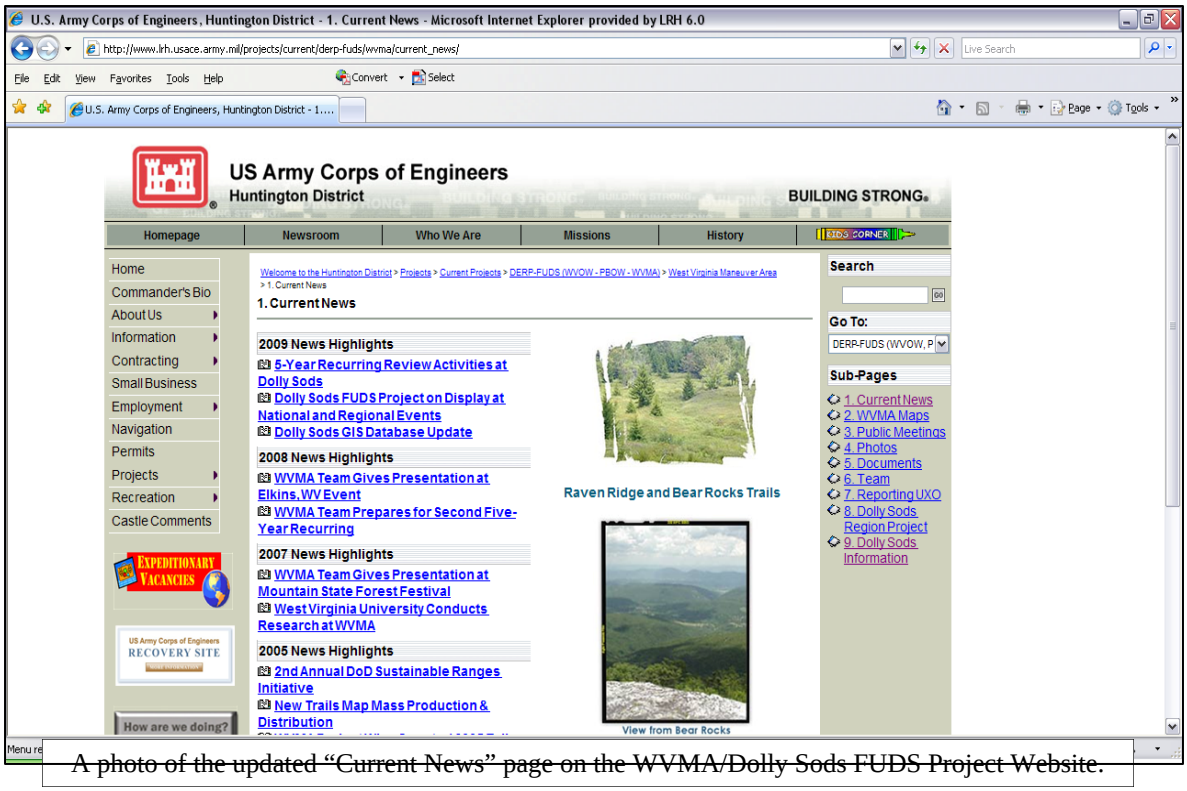
Significant sub-pages within the website have been revised to provide more current information than what had been provided there in the past. Specific potions of the website that were updated as part of this past year's effort include:

- The "Current News" page. This page now provides project related news from the last several years. The reader can now see the progression of project related items and read about what activities had been occurring with the project over the last several years.
- A complete overhaul to the view of the "Photos" page has taken place. This page now includes new photos of the various aspects of the project, located in representative folders.
- The "Team" page was updated to reflect new stakeholders that have been added to the project, as well as new team members from all of the various stakeholder organizations.

In a partnership amongst stakeholders, the USACE and the U.S. Forest Service have linked their respective Dolly Sods pages. The USACE webpage link to the USFS Dolly Sods website was added to the bottom on the main Dolly Sods Project webpage.

One of the best additions to the website was the inclusion of the project's new interactive trail map feature. This feature, created in collaboration with West Virginia University, allows visitors to the website to view Dolly Sods through an interactive map/GIS system. This grants the visitor the ability to turn on/off different attributes depending on what they're interested in. For example the visitor has the ability to view the base mapping as either a topographical map, road map, or an aerial photo. The visitor also has the ability to view newly mapped trails within Dolly Sods on any of the aforementioned base layer views. The interactive mapping also has icons which show the campsites that have been previously cleared by USACE.

This mapping ensures that visitors to Dolly Sods will have the ability to stay on cleared trails and stay within campsites that have been cleared of unexploded ordnance (UXO). The interactive Dolly Sods Trail Map can be found on the "WVMA Maps" page, as well as the "Dolly Sods Information" page, on the project's website.



A photo of the updated "Current News" page on the WVMA/Dolly Sods FUDS Project Website.

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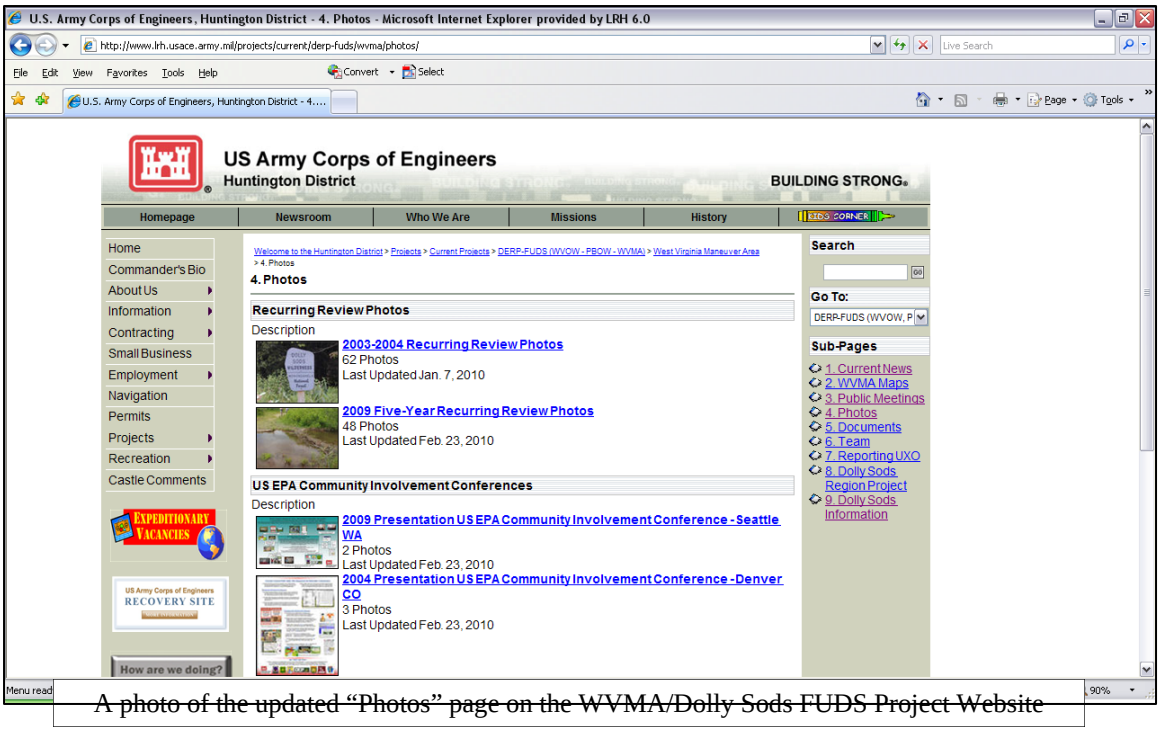
Updated WVMA/Dolly Sods Project Website Provides Public with Most Current Project Information (continued)



A photo of the updated "Photos" page on the WVMA/Dolly Sods FUDS Project Website

Upcoming Additional Improvements to the Website

Over the next several months, the USACE will continue to work to revamp the mapping and safety messages that are also displayed throughout the current version of the website. As part of the Project's recently completed Fiver Year Recurring Review, new, more accurate mapping has been developed of the trail system within Dolly Sods. State-of-the-art GPS systems were used by West Virginia University to map each trail within the Dolly Sods Wilderness Area to a sub-foot accuracy. The GPS' sub-foot detection capability is one of the highest levels of detection currently available. The new mapping that was developed will continue to ensure that the public has the most up-to-date and accurate mapping available to keep visitors to Dolly Sods safe and on trails that have been cleared for UXO.

With regards to the safety message update, the Army has developed a universal 3R's campaign for UXO education and safety. The 3 R's stand for: Recognize, Retreat, and Report. A brief description of each, as it relates to Dolly Sods, is as follows:

1) **Recognize** – Recognize that you may have encountered a UXO and the potential danger inherent to that encounter.
2) **Retreat** – Do not touch, move or disturb the UXO. Walk back the way you entered that location.
3) **Report** – Notify officials of what you saw and where you saw it. In the Dolly Sods Wilderness Area there is a special U.S. Forest Service phone number that has been established to report such ordnance encounters (24 hours a day). That phone number is **1-888-283-0303**. In the event that you are off Forest Service property and encounter a potential UXO, please report it to the nearest law enforcement authority.

Currently, the website contains the original safety message, developed by the Dolly Sods Team, of: Spot, Walk Away and Call. This message will be changed to fall in line with the Army's 3R program. Wally the Woodchuck, the project's adopted mascot, will be kept to promote the new 3R message. Promotional materials shown on the website, also containing the "Spot, Walk Away, Call" theme, will be revised to reflect the new 3R's slogan.

As noted above, the revised website will be able to provide up-to-date news and information about the project, as well as, continue to deliver educational material to the public in an efficient manner. The combination of accessibility and quality of information, means the revised WVMA website will continue to be a valuable asset to the project team's efforts to carry out their mission of keeping the public safe and informed.

For more information on the WVMA/Dolly Sods FUDS Project website, or any of the information presented within this article, please contact Nick McHenry at (304) 399-5909 (Nickolas.L.McHenry@usace.army.mil) or Rick Meadows at (304) 399-5388 (Richard.L.Meadows@usace.army.mil) for additional details.

Public Awareness Presentation of UXO at Dolly Sods Given to Potomac Valley Audubon Society

Nick McHenry, of the Huntington District, U.S. Army Corps of Engineers (USACE), gave a presentation to the Potomac Valley Audubon Society on June 4, 2010. The topic of the presentation, held at Cacapon State Park in Berkeley County, WV, was the West Virginia Maneuver Area (WVMA)/Dolly Sods Formerly Used Defense Site (FUDS) Project. The presentation highlighted the history of the WVMA, the USACE FUDS Project at Dolly Sods, and "Avoiding the Danger Zone at Dolly Sods". Audubon Society members regularly visit the Dolly Sods Wilderness Area, located in the Monongahela National Forest, with several of their members participating in yearly bird banding trips at Dolly Sods. The main goal of the talk was to increase the society members' knowledge of the history of the site and increase their awareness of what to do in the event they encounter unexploded ordnance (UXO) while visiting Dolly Sods.

This presentation was given as part of the Long Term Monitoring (LTM) phase of the WVMA/Dolly Sods FUDS Project. Under this phase of the project, public presentations are given to increase the public's knowledge of the popular Dolly Sods Wilderness Area (and surrounding properties). The presentations also inform the public on what to do in the event they encounter UXO while visiting Dolly Sods. Aside from public presentations, the WVMA FUDS Project Team also increases public awareness of UXO through placing warning signs at Dolly Sods trailheads, the development of the Wally the Woodchuck project mascot, hosting a booth at the Mountain State Forest Festival (held yearly in Elkins, WV), hosting and continually updating a project website, periodically hosting public meetings, and the production and dissemination of Dolly Sods Maps which help keep visitors to the area on UXO cleared trails.

If your organization is interested in hosting a free presentation concerning the WVMA/Dolly Sods FUDS Project, such as the one given to the Potomac Valley Audubon Society, please contact Nick McHenry at (304) 399-5909 (Nickolas.L.McHenry@usace.army.mil) or Rick Meadows at (304) 399-5388 (Richard.L.Meadows@usace.army.mil) for additional details.

RAB Member Documents History of Plum Brook Ordnance Works

Mr. John Blakeman, retired Perkins Township (Ohio) schoolteacher, Plum Brook Ordnance Works (PBOW) Restoration Advisory Board (RAB) Member, biologist and prairie grass expert has assembled historical information on the life and times of the former Plum Brook Ordnance Works. John is driven to document the history of the PBOW through his passion and interest in prairie grass, local history, and the need to "tell the story" so we know where we have been. The following "story" has been excerpted from John's presentation.

"Long before the PBOW, native prairie grasses thrived on the land dotted with family farms. In the 1940s the world that existed outside of Erie County touched the residents not only through service to their country, but by building an ordnance manufacturing plant on their family farms.

Following World War I, the War Department realized there was an inadequate supply of ordnance (explosives) in the United States without purchasing the material from other countries. With the US's focus on the manufacturing of automobiles, ice boxes and other peacetime goods, the ability to manufacture ordnance, or munitions, decreased significantly.

In the early 1940's, in preparation for World War II, the War Department created over 75 ordnance manufacturing plants, with the largest ordnance works located in the Midwest. Resources to support ordnance manufacture were more plentiful in the Midwest than any other location nationwide. From transportation to cooling water to cloud cover, all the conditions were right for making explosives. Hence, Plum Brook Ordnance Works was born.

In 1941, farm families were told to relocate because their properties were being taken by eminent domain as the ordnance works was being built in the shadows of the family farm. TNT production began just 22 days before the bombing of Pearl Harbor. During full production, PBOW produced thousands of pounds of TNT each day.

The rest is history….the Americans were victorious in World War II, due in part to the sacrifices of the American people, from the farm families to the soldiers to the efficient and successful operations at PBOW."

Mr. Blakeman brought the days of Plum Brook to life in his private and personal accounting of the history of Plum Brook Ordnance Works. John wanted the story to be told to those of us who have reaped the benefits from the sacrifices of others.

John's "story" is his personal presentation and does not represent an official position of the US Army Corps of Engineers (USACE) or NASA. Person's interested in talking with Mr. Blakeman about PBOW may contact him at jblakeman @aol.com.

John Blakeman presenting at the June 2010 PBOW RAB meeting. Inset photo shows Mr. Blakeman with an explosives box from Plum Brook Ordnance Works.

Dolly Sods Article Published in Environmental Organization's Publications

As part of the West Virginia Maneuver Area (WVMA)/ Dolly Sods Formerly Used Defense Site (FUDS) Project Public Awareness Plan (PAP), the Huntington District of the U.S. Army Corps of Engineers (USACE) has reached out to several environmental organizations to increase public awareness of the unexploded ordnance (UXO) issue at Dolly Sods. These environmental organizations' members make up some of the most frequent visitors to Dolly Sods, and are some of the individuals who would benefit most from hearing the WVMA/Dolly Sods FUDS Project safety message

One such recent effort to include local environmental organizations involved USACE personnel writing an article on UXO at Dolly Sods and providing it to these environmental organizations for use in their individual publications. Currently, three organizations have published the article: the West Virginia State Trails Association in their publication "Whoop 'n Holler", the Brooks Bird Club in their publication "Redstart", and the West Virginia Highlands Conservancy in their publication "The Voice". The Huntington District would like to publicly thank these organizations for publishing this article in their publications and their efforts to get the word out on the UXO issue at Dolly Sods. The article also appeared in an internal Huntington District publication "Castle Comments".

For those who may not have been able to see the article, it is included below:

Following the 3R's to Stay Safe in the Dolly Sods Wilderness Area

Nick McHenry, Environmental Engineer

U.S. Army Corps of Engineers, Huntington District

The whistling of a cool Fall wind. A song bird noting the arrival of spring. The snow-fed rush of Red Creek through the valley. These are all sounds that visitors of the Dolly Sods Wilderness Area have come to cherish about the remote haven, located just west of Petersburg, WV in the Monongahela National Forest. Had a visitor to Dolly Sods been there sixty-seven years prior, the sounds they would have encountered would have been much different than the serenity encountered today.

In 1943 and 1944, visitors to the Dolly Sods Area would have been welcomed with the boom of artillery cannons, the crack of mortars being fired, or the pop of rifles echoing over the bogs and through the valley as U.S. troops prepared for World War II. During that time, regiments from all over the eastern United States were coming to train in an Army installation known as the West Virginia Maneuver Area (WVMA).

In preparation for full scale war in Europe, the Department of Army found it necessary to look for a rugged mountainous area that would replicate the conditions soldiers would encounter during an invasion of Italy. They found that place in the rugged mountainous region of north-central West Virginia. The WVMA was a vast expanse of nearly 2-million acres that stretched from Elkins in the west to Petersburg in the east, from Franklin in the south to the West Virginia-Maryland border in the north.

Within the WVMA, the Army focused on training soldiers in various aspects of low altitude mountain warfare. Activities located within the WVMA included a rock climbing school at Seneca Rocks, teaching pack mule techniques at a mule school near the community of Gladwyn, teaching mountaineering skills to soldiers involved with large scale tactical problems, or conducting a firing range for artillery and mortars.

This firing range is where Dolly Sods' role in World War II comes into focus. During the selection process for the site of the WVMA, land was needed that was sparsely populated and provided advantageous sight lines for firing artillery and mortars. The land they agreed upon was a stretch of land from State Route 32 in present day Canaan Valley to Jordan Run Road on the Petersburg side of Dolly Sods. Artillery and mortar firing occurred within and around this area, generally resulting of the firing of artillery shells or mortars into what is now the Dolly Sods Wilderness Area or at surrounding mountains.

Remnants of this World War II training camp at Dolly Sods, and the surrounding land, can still be found to this day. Unexploded ordnance (UXO) still exists throughout the Dolly Sods Region, and potentially on neighboring properties. UXO is military munitions that were fired, but failed to detonate as intended once fired. The exact amount of ordnance remaining in the Dolly Sods region is undetermined. However, ordnance-related risk is illustrated by a sporadic but continuous discovery of UXO by recreational visitors.

To address ordnance-related concerns in the Dolly Sods Area, an ordnance removal project was authorized under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). Such projects are established for sites that were contaminated while under the control of the Department of Defense (DoD), but were transferred out of DoD control prior to 1986. The U.S. Army Corps of Engineers (USACE), Huntington, WV District, is the USACE District with responsibility for overseeing this project.

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Dolly Sods Article Published in Environmental Organization's Publications (continued)

In the mid-1990's an ordnance removal action was selected to reduce public risk when visiting the Dolly Sods Area. In 1997-98 ordnance removal activities in the Dolly Sods Wilderness, Dolly Sods North and Dolly Sods Scenic Areas occurred. Contractors for the USACE cleared trails (plus 20' on each side of the trail) and campsites within these three areas. The 1997 to 1998 ordnance removal action was the most feasible alternative based on the influencing factors of cost, environmental impact, and reduction of public risk. The removal/disposal of 22 live mortars, 19 inert mortars, and 1151.5 pounds of OE-related scrap, significantly reduced the quantity of items posing a hazard to the public in the most widely used areas of the Dolly Sods Region.

Following the completion of the ordnance removal action, the WVMA/Dolly Sods FUDS Project went into what is termed "Long Term Management (LTM)". During this phase, the USACE's main efforts have been placed on making the public aware of the UXO issue at Dolly Sods and ensuring they know what to do in the event that a UXO is encountered while visiting the area. The USACE has pursued the following public awareness items in an attempt to increase public knowledge of the UXO issue at Dolly Sods:

- Website – The USACE, Huntington District has set up and maintains a project website that highlights the Dolly Sods Region while also promoting UXO safety tips. The website can be found at www.lrh.usace.army.mil/projects/current/derp-fuds/wvma.
- Presentations – Every year the USACE conducts several presentations at local schools, organizations, government agencies, local fire departments, etc. which focus on increasing the public's awareness of the history of Dolly Sods, the UXO present there, and how to enjoy Dolly Sods safely.
- Informational Booths – Every year the USACE hosts an informational booth at the Mountain State Forest Festival held every October in Elkins, WV. This booth allows USACE employees the opportunity to talk with the public, pass out informational materials and increase public knowledge.
- Publications – Yearly the USACE publishes a FUDS Newsletter which highlights activities that have occurred at the District's FUDS Projects. One of the projects highlighted in this newsletter is the WVMA/Dolly Sods FUDS Project.

In the event that you are at Dolly Sods, or a property surrounding Dolly Sods, and believe you have encountered a UXO, you should consider it extremely dangerous. It is important that you familiarize the **3R's of Explosives Safety**:

1) Recognize – Recognize that you may have encountered a UXO and the potential danger inherent to that encounter.
2) Retreat – Do not touch, move or disturb the UXO. Walk back the way you entered that location.
3) Report – Notify officials of what you saw and where you saw it. In the Dolly Sods Wilderness Area there is a special U.S. Forest Service phone number that has been established to report such ordnance encounters (24 hours a day). That phone number is **1-888-283-0303**. In the event that you are off Forest Service property and encounter a potential UXO, please report it to the nearest law enforcement authority.

For more information on the Army's General 3R Program, please visit:

www.denix.osd.mil/portal/page/portal/UXOSafety.

The Dolly Sods Wilderness is a beautiful, natural treasure. It is not the intention of this project to dissuade anyone from using the Dolly Sods area. It is, however, the intention of this project to educate the public on how to enjoy the Dolly Sods safely, with respects to UXO.

For additional information on the Dolly Sods FUDS Project or to inquire about conducting a presentation to your organization, please contact Nick McHenry, USACE, Huntington, WV District at 304-399-5909 or via email at Nickolas.L.McHenry@usace.army.mil.

View of 105-mm howitzer UXO found on tract adjacent to Dolly Sods.

(Photo courtesy of the Canaan Valley National Wildlife Refuge.)

apnel marks and
n crater created
mm howitzer was
etonated.

*courtesy of the
ey National Wildlife
Refuge.)*

Nick McHenry, USACE Huntington District, passing out the USACE's Dolly Sods Trail Map to visitors of the Sods. The Trail map shows trails that have been cleared of UXO.

Going Native:
Finding Operations and Maintenance Solutions with Native Plants
Part II

This article is a continuation of the article entitled "Finding Operations and Maintenance Solutions with Native Plants" originally published in the 2009 FUDS Newsletter. The 2009 FUDS Newsletter is available on the FUDS website located at http://www.lrh.usace.army.mil/projects/current/derp-fuds

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Native plants are those plants that are indigenous to a particular region and have become accustomed to the local climate and soil conditions where they occur naturally. Native plants help create beautiful landscapes that provide wildlife habitat and reduce maintenance costs such as mowing and weeding. Once established, the plants provide shelter, seeds, nectar, pollen and much more to a wide variety of wildlife. Many native grasses and wildflowers help in protecting soil and preventing erosion.

An article published in the 2009 FUDS newsletter focused on the use of native plantings at the West Virginia Ordnance Works (WVOW) Site located in Point Pleasant, Mason County, West Virginia. The Huntington District, U.S. Army Corps of Engineers (USACE) has been involved with remedial activities at WVOW since 1991. Native plantings were introduced in 2009 and have helped reduce annual operations and maintenance activities and the progress of those native plantings continues to be monitored. The Corps had consulted with Dr. Kathy Patnode, PhD, of the U. S. Fish and Wildlife Service (USFWS) who has provided input into the scope of work for the native plantings. The native seed mixture included three grass species, one leguminous species, and two forbs. This diverse mixture ensures that several plant species will be adapted to the site-specific conditions.

The native plantings were distributed on two soil caps/covers that had undergone excavation and remedial activities in previous years and required further restoration. Caps 4 and 7 were identified for the placement of additional soil due to settling and for restoration of new grass mixes to fill in bare soil areas where vegetation did not grow well. Because the caps would be disturbed during regular maintenance activities, the USACE decided to re-evaluate the seed mixes typically used on the site and try native plantings that could enhance the wildlife habitat and reduce the number of mowings required for these caps each year once the plants were established.

Cap 4 in June 2010, wildlife was abundant at this location. Inset photo shows Cap 4 prior to planting of native vegetation.

In the fall of 2009, the existing vegetation on Caps 4 and 7 was mowed to a shorter height and sprayed with glyphosate. The existing vegetation, a sparse mix of grass and clover, was eliminated and the caps were left undisturbed for two weeks following the spraying. After the two weeks were up, the top four to six inches of soil on the caps was disked and mixed with organic compost provided by a local dairy farmer. The compost was tilled into the soil and allowed to stabilize for two weeks. After stabilization, the soil cover pH and temperature were tested. The soil temperature needed to be below 65 degrees Fahrenheit so the native plant seed would not germinate and possibly be damaged in the approaching winter months. The pH needed to be between 4.5 and 6.0. The day seeding was to take place, the caps were tilled again. The native seeds were mixed with sand to help distribute the seed over the planting area. The broadcast seeder was adjusted to apply 0.3 lb/1000sf. The native seed was applied in two passes perpendicular to each other for a total of 0.6 lb/1000 sf per the specifications of 15 lb/acre. Winter oat seed was broadcast to apply 0.46 lb/1000sf to meet specifications of 20 lb/acre. The winter oats would act as a cover crop over the winter to protect the seed and soil. After seeding, a spike toothed harrow, with tines lying flat, was used over the seeded areas to cover the seeds. The caps were then rolled with a lawn roller to increase seed-to-soil contact. Both caps were then mulched with clean straw.

In the spring of 2010, the native plantings were checked for growth. The winter oats dominated the seeded areas with small plantings making their way between the oats.

Cap 4 in Spring 2010, winter oats predominate.

During a site visit in June 2010, the native plantings were visibly emerging and had reached a height of about G three feet. When approaching Cap 4 during the site visit, a flock of wild turkey flew out from within the native plantings. Butterflies, dragonflies and bees were abundant at both locations.

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Going Native:
Finding Operations and Maintenance Solutions with Native Plants
Part II (continued)

Cap 7 in June 2010, common milkweed can be seen in the foreground which was an already existing plant in the surrounding area. The native plantings on Cap 7 are in the background.

The native plantings 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 can concentrate their energy toward expanding their root systems. Once established, these plants should require only periodic maintenance and will be able to 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. After discussions with Dr. Patnode of USFWS, it was determined that the native plantings would not be mowed during the regular summer maintenance activities. Caps 4 and 7 will be re-evaluated in the fall when it may be necessary to remove any undesirable invasive plants that may have become established in the native plantings. Invasive plants grow quickly and aggressively, spreading and displacing native plants.

Since the WVOW is intermingled with the state-operated Clifton F. McClintic Wildlife Management Area (WMA), maintenance of the native plantings will be performed in coordination with the McClintic WMA and USFWS. While the original WVOW government-run facility totaled around 8300 acres, the McClintic WMA is about 3,700 acres of that original facility and is abundant with wildlife. Local birding clubs frequent the area due to the diverse bird populations.

If successful, the Corps may expand the native plantings to other caps/covers on the WVOW site that currently require regular seasonal mowing. The total acreage of all the caps/covers at WVOW is approximately 35 acres. While a mixture of ponds, wetlands, mixed hardwood forest, open fields and private lands have now replaced the former TNT manufacturing facility, the addition of native plantings will further enhance the diversity of this former government operated facility.

Cap 7 in June 2010, native plantings

US Army Corps of Engineers®

USACE Nashville and Huntington Districts Progress to Remedial Action at TNT Area C

The US Army Corps of Engineers (USACE) is gearing up for another remedial action at the former Plum Brook Ordnance Works (PBOW). TNT Area C was one of three TNT manufacturing operations at PBOW and is located in the eastern portion of the 6400-acre site currently owned by NASA. USACE Huntington District will undertake remedial activities in the TNT Area C in mid-summer 2010. USACE Nashville District conducted the investigative activities leading up to the remedial action.

In 1941, production of explosives began at PBOW to support the efforts of World War II. In 1945, after victory was declared in Japan, production of TNT at PBOW stopped and the entire facility was declared surplus. NASA acquired the facility in the mid-1970s.

There are several areas that were contaminated during the manufacturing of explosives. In TNT Area C, where USACE will be implementing the remedial action, the contaminants of concern (CoC) include nitroaromatics, polynuclear aromatic hydrocarbons (PAHs), lead, and polychlorinated biphenyls (PCBs).

USACE Nashville District conducted the Remedial Investigation (RI) in 2001. During the investigation, samples of surface soil, subsurface soil, and sediment were collected and analyzed to determine the CoC.

The contaminants of concern are determined based on a person's risk of exposure to contaminated soil. A Risk Assessment (RA) was conducted using the data from the investigation, and using statistical evaluations, risk-based concentrations for remedial goals were established. Soils with contaminant concentrations exceeding the risk-based concentrations must be remediated. If the soils were to remain in the ground, there would be a potential risk of exposure to individuals living or working on the property.

Upon completion of the RI, USACE Nashville District conducted a Feasibility Study (FS) in 2003 to determine the most effective alternative for remediating the soils in TNT Area C, and ultimately meet the remedial goals. The FS evaluated five alternatives and each alternative considered the following criteria:

- Capital cost
- Annual operation and maintenance costs
- Present worth cost
- Time to implement
- Time to achieve Remedial Action Objectives (RAOs)

The selected alternative for the TNT Area C remedial action includes excavation, alkaline hydrolysis and/or windrow composting, chemical stabilization (if necessary), and off-site disposal or on-site placement.

Upon completion of the RI/FS, USACE Nashville District prepared the TNT Area C Proposed Plan. The Proposed Plan (PP) provided basic background information about the site, identified the Preferred Alternative and explained the reasoning for the preference, described other remedial alternatives that were considered, solicited public review and comment on the alternatives considered, and provided information how the public can be involved in the remedy selection process. Subsequently, the remedy selection was approved and documented in the TNT Area C Decision Document (DD).

With all of the investigations completed, the preferred alternative selected, and the plan presented to, and agreed to by the stakeholders (community and regulators), USACE Huntington District is preparing to move forward with another remedial action. The remedial action is planned to take at least a year to complete with the Final Construction Closure Report due early Spring 2012.

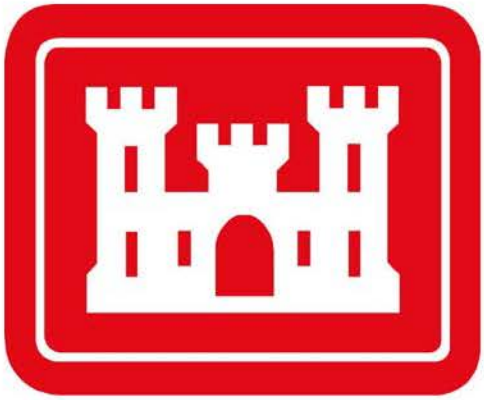
USACE Continues Work on the FUDS Website

USACE Huntington District maintains a website on all of the Formerly Used Defense Sites (FUDS) projects discussed in this newsletter. The website contains information about each site, including the location, the history, and the current day use of the properties, and has a plethora of project-related documents that are available for download. Please take a moment to visit the website and learn more about the USACE Huntington District and these FUDS projects.

The website address is:

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

From here you can navigate to the Plum Brook Ordnance Works site, the West Virginia Ordnance Works site or the West Virginia Maneuver Area (aka Dolly Sods) site. Enjoy your visit!



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