US Army Corps of Engineers

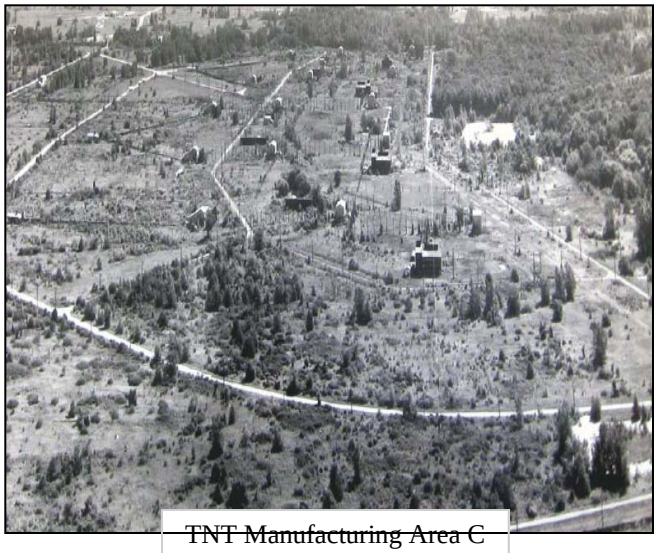
Huntington District

Formerly Used Defense Sites Newsletter

Summer 2011 Edition

2011 PROJECT UPDATE: TNT C Soil Remediation at PBOW

In the early 1940's the former Plum Brook Ordnance Works (PBOW), located near Sandusky, Ohio was constructed to manufacture TNT for use during World War II. Due to the standard handling and disposal practices used at that time compared to current day requirements, contamination has been left in the soil. When WWII came to a close in 1945, the Army "decommissioned" PBOW based on practices of that day, with buildings being demolished, burned and/or buried.



TNT Manufacturing Area C

Decommissioning practices of that time, (which are now called "remediation practices"), were quite different then than they are today. Today, the U.S. Army Corps of Engineers (USACE) is responsible for remediation efforts required from these types of military operations. Based on today's standards, the remaining soil does require remediation. Based on this need, USACE is currently conducting remediation activities at PBOW in TNT Area C, which was one of three manufacturing areas. Since the most recent Formerly Used Defense Sites (FUDS) Newsletter was published in July 2010, USACE has been in the field excavating, transporting and remediating soil in TNT C at the former PBOW.

The project has progressed significantly over the past year and is nearing the final phases. The TNT C remediation project began with surveying the 15 areas of concern (AOCs) identified in the Remedial Investigation (RI). The contaminants of concern (COCs) included lead, nitroaromatics, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The AOCs consisted primarily of areas around the former manufacturing building foundations. After the AOCs were staked to designate the excavation boundaries, soil excavation was initiated.

Prior to excavation efforts at each AOC, TMG Services, Inc., the prime contractor, cleared vegetation, taking care to keep clearing to a minimum. The cleared brush was used to construct wildlife habitats. With the AOC cleared, the crew was able to operate safely with unobstructed lines of sight. The field crew constructed a stockpile pad on which the excavated soil was placed. The stockpile pad consisted of 6-mil plastic placed on the ground to provide a barrier between the ground and the excavated soil. Erosion control was placed around the stockpile pad to prevent run-on and run-off of precipitation and to prevent surface migration of contaminants.

Excavation boundaries marked by survey stakes

2011 PROJECT UPDATE: TNT C Soil Remediation at PBOW (continued)

AOC before clearing (above)
Clearing for excavation (below)

Some of the excavations were irregular in shape and some were square or rectangular. The depths ranged from 2-12 feet, depending on where the contamination was located, as identified in the Remedial Investigation. Progress on the excavations was at times slowed or hindered due to the below-grade structures and building foundations, rebar, abandoned utilities, pipes, wooden beams and other building debris left behind from the post-WWII building "decommissioning" or demolition. As the soil was excavated, it was placed on the plastic-lined stockpile pad.

Placing soil on the stockpile pad

Excavating to a 10' depth, note debris along the wall

The total volume of soil excavated from the 15 AOCs was approximately 9200 cubic yards. The average time to complete an excavation was approximately 2 weeks (including the site clearing and stockpile pad preparation time). Excavation continued through the brutal winter months with the last excavation completed in February 2011.

As an excavation was completed, it was necessary to determine if all of the contamination was removed. Soil samples were collected from the walls and floor of the excavation and submitted to a USACE-certified laboratory for analysis. If the analytical results and subsequent statistical evaluation (risk calculations) indicated the excavation was "clean" or did not pose a risk to human health and the environment, the excavation was secured and scheduled for backfill.

Below grade structures existed in most excavations

2011 PROJECT UPDATE: TNT C Soil Remediation at PBOW (continued)

The compost turner mixing the soil.

However, if the walls didn't meet the criteria for "clean", the excavation was secured with fencing and scheduled for expanded excavation to remove more contaminated soil to achieve "clean" closure. There are currently 6 AOCs that require further excavation. This work is planned for fall 2011.

Samples were collected from the stockpiled soil and submitted to the USACE-certified laboratory to determine if it was hazardous or non-hazardous. The non-hazardous soil was approved for use as daily cover at the Erie County Landfill by Ohio EPA and Erie County officials. The volume of daily cover to the landfill is approaching approximately 6600 cubic yards. Using the non-hazardous soil as daily cover is mutually beneficial to Erie County and USACE. The county doesn't have to locate a source for daily cover which then eliminates hauling expenses. Since the soil is used as daily cover, a reduced disposal rate is applied, thereby, freeing up funds to be used for additional remediation efforts.

The hazardous soil remains on-site where it is currently undergoing remediation to reduce the concentrations of hazardous and risk-based contaminants of concern. The volume of hazardous soil excavated from the AOCs is approximately 2600 cubic yards. The hazardous soil is being remediated using alkaline hydrolysis (AH) technology (Final Decision Document for TNT Area C, 2009). The AH process has been used successfully at other military remediation projects to treat nitroaromatic-contaminated soil; however, this is the first time it has been used to treat contaminated soils at PBOW.

In the past, PBOW hazardous soil remediation (TNT B, Pentolite Road Red Water Ponds) utilized composting soil with chicken manure and straw. Although successful, the process was labor-intensive and took approximately 1-2 weeks to get the composting process operating at optimum conditions and another 8-10 weeks for completion. Alkaline hydrolysis consists of applying caustic material to the soil to achieve a high pH. The specific application of sodium hydroxide (NaOH) and an iron catalyst were determined based on a pilot study designed specifically for the TNT C soil. Sodium hydroxide (NaOH) (beads and pellets) was applied along with an iron catalyst to complete the reaction. The hazardous soil was constructed into nine windrows. Each windrow was approximately 200' long and 4-5' high. The chemicals were "turned-in" or mixed with the soil using a compost turner. Water was critical to the process and was added using a water truck or the compost turner itself.

Soil configured into windrows

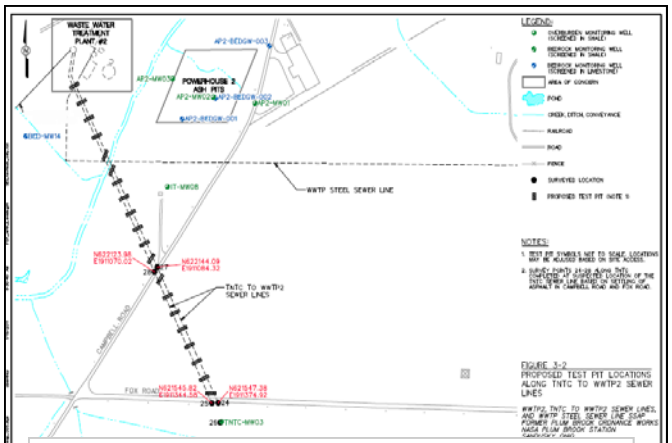
Applying chemical to a windrow

2011 PROJECT UPDATE: TNT C SOIL REMEDIATION AT PBOW (continued)

Prior to applying the chemicals, sampling was conducted to determine the baseline concentrations of contaminants in the windrowed soil. Approximately one week after the NaOH/iron catalyst application, samples of the treated soil were collected and the results indicated the concentrations of contaminants were reduced. However, they were not quite where they needed to be. Maintenance of the rows continued and soil samples were collected at regular intervals to monitor the AH process and reduction of contaminants. To date, the alkaline hydrolysis remediation continues, with seven of the nine rows sampled for disposal. USACE is awaiting results. Two rows required additional chemical application, which was applied in mid-July and sampling is planned for late July. This would eliminate the need/cost for disposal off-site as well as purchase of backfill material.

At this point, USACE is hopeful that the AH process is successful in treating the PBOW soils. There have been "lessons-learned" with the new remediation process and the success of the program will continue to develop as it is used. The overall goal of the project is to remediate the hazardous soil so 1) it is not hazardous, 2) is below risk concentrations, and 3) able to be used as backfill into the open excavations at TNT Area C. Additional information on TNT Area C may be found in the Remedial Investigation (2001), Feasibility Study (2003), Proposed Plan (2009) and the Decision Document (2009) at USACE's FUDS website. The address is: http://www.lrh.usace.army.mil/projects/current/derp-fuds/pbow/

USACE Begins Investigation of Process Wastewater Sewer Line at Plum Brook Ordnance Works (PBOW)



Schematic of the proposed test pits along sewer lines

U.S. Army Corps of Engineers (USACE) Nashville District in coordination with the Huntington District initiated an investigation of the sewer lines associated with Wastewater Treatment Plant No. 2 (WWTP2), TNT C Wastewater Sewer Line, and Wastewater Treatment Steel Sewer Line. The purpose is to investigate the impact of the waste treatment operations on the soil and groundwater, identify potential contaminant sources and evaluate the potential impact on human health and the environment. At the former Plum Brook Ordnance Works, there were three Waste Water Treatment Plants (WWTP1, WWTP2, and WWTP 3), that received wastewater from TNT manufacturing operations.

The waste treatment sites originated from the transfer, treatment, and discharge of wastewater associated with the manufacture of TNT. USACE began an investigation in the area of WWTP2 in spring 2011. The investigation began with clearing and locating the sewer lines. Test pits were dug along the TNT C sewer line and soil samples were collected to evaluate the impact of potential leaks from the sewer lines on the soil and groundwater. Presently, the installation of the groundwater monitoring wells along the TNT C sewer line is underway. Groundwater monitoring wells are planned for installation at WWTP2.

An excavation/test pit along the steel sewer line

2011 UPDATE: USING NATIVE PLANTS TO REDUCE O&M COSTS

Native plants have become increasingly more visible and important on a federal, state, and local level. They are being integrated into restoration projects, roadsides, gardens, parks, constructed wetlands, and a variety of other areas and uses.

Geologists Jason Smithson and Dr. Kathy Patnode of the U.S. Fish and Wildlife Service discuss the scope of work for native grass plantings

So what exactly is a native plant? There are a wide variety of definitions for a native plant but in essence, native plants are those plants indigenous to a particular region, ecosystem, or a habitat that naturally occur without any human action, either accidentally or otherwise. The very definition of a native plant also indicates the reason for their increased use. Native plants are easy to care for, are accustomed to the soil and climate where they grow naturally and offer wildlife a food source, cover and nesting area. Much of the interest in natives resulted from a reaction to the non-native invasive plants that are displacing both plant and animal species. Growing, propagating, and landscaping using native plants has spurred much work from researchers, seed producers, plant breeders and others interested in developing and expanding uses for native plants. For the USACE, Huntington District, native plants are being considered to assist with lowering the operations and maintenance costs on a Formerly Used Defense Site (FUDS) known as West Virginia Ordnance Works (WVOW) located in Point Pleasant, Mason County, West Virginia.

The Huntington District manages the operation of a remedial pump and treat system on the former facility and maintains areas previously remediated under an operations and maintenance (O&M) plan. The O&M Plan consists of mowing and other maintenance of areas where work is taking place, where monitoring and extraction wells are positioned and where access roads and caps are located.

Native plants are reliable to the place they grow naturally and can offer solutions to erosion and sediment control, improvement of water quality and aid in the return of disturbed natural areas to some semblance of its original state. Some or all of the native plant species planted could become an important source population allowing them to spread from the planting location.

The idea of converting current orchard/fescue grass vegetation into native plantings could reduce the mowing requirements. Once established, native plantings would require a mowing of every three to four years compared to the current annual mowings. The idea of converting current orchard/fescue grass vegetation into native plantings could reduce the mowing requirements. Once established, native plantings would require a mowing of every three to four years compared to the current annual mowings. Periodic mowing, as opposed to using a burn regimen (typically used with native grasses), would help keep invasives and other non-native plants and weeds from moving in and out-competing the native plantings.

Dr. Patnode analyzing native grass plantings

The WVOW covers approximately 8323 acres and is intermingled with the state-operated Clifton F. McClintic Wildlife Management Area (WMA). The McClintic WMA consists of around 3655 acres, and contains the greatest variety of wildlife habitats found at any West Virginia WMA. Those habitats include 180 acres of wetland, thirty-one ponds, and 1,100 acres of brushland. Additional native vegetation provided on the WVOW property would complement the existing habitats of the McClintic WMA. As reported in previous newsletters, the native plantings were seeded in the fall of 2009 on Caps 4 and 7 located in the former TNT manufacturing area as a pilot project to

2011 UPDATE: USING NATIVE PLANTS TO REDUCE O&M COSTS (continued)

observe former TNT manufacturing area as a pilot project to observe the planting and establishment of the native plants specific to the location of WVOW. The Corps had initially consulted with Dr. Kathy Patnode of the U. S. Fish and Wildlife Service (USFWS). Dr. Patnode provided input into the scope of work for the native grass plantings which spelled out the native seed mixture that included three grass species, one leguminous species, and two forbs (native, nongrass, herbaceous plant). This diverse mix was to ensure that several plant species would be adapted to the site-specific conditions. This diverse mix was to ensure that several plant species would be adapted to the site-specific conditions. The existing orchard/fescue vegetation was treated with an herbicide prior to preparation of the two areas. Due to the small size of the pilot areas, seeding was accomplished with a hand seeder rather than a seed drill.

The contractor that was already working under an O&M contract for minor maintenance repairs at WVOW also prepared and sowed the native plantings. In spring of 2010, the native plantings came up nicely; the legumes were in abundance and bloomed profusely. During a trip to the site that July, a rafter of wild turkey was spotted feeding at the Cap 4 planting. A few weeds were visible intermittently within the planting but not in overabundance. The native grasses were small yet were beginning to surface. Initially in 2009, the orchard/fescue mix on both caps or pilot areas was treated with an herbicide prior to seeding. Elimination of the former grass mix would give the native plants a chance to establish themselves enough to outcompete the former grasses and any other weeds. Mowing would need to occur to control the unwanted grasses and provide the continued opportunity for native plant growth and establishment. An issue at the Cap 4 pilot area was the surrounding landscape. The area had been disturbed during remediation activities both on the cap and surrounding the cap. The surrounding area was a mix of weeds, grasses, and non-native vegetation which was gradually moving onto Cap 4. Weed control could require a more aggressive approach initially. Cap 7 was surrounded by wooded areas and some grassy areas that had already established native plants like the common milkweed and butterfly weed.

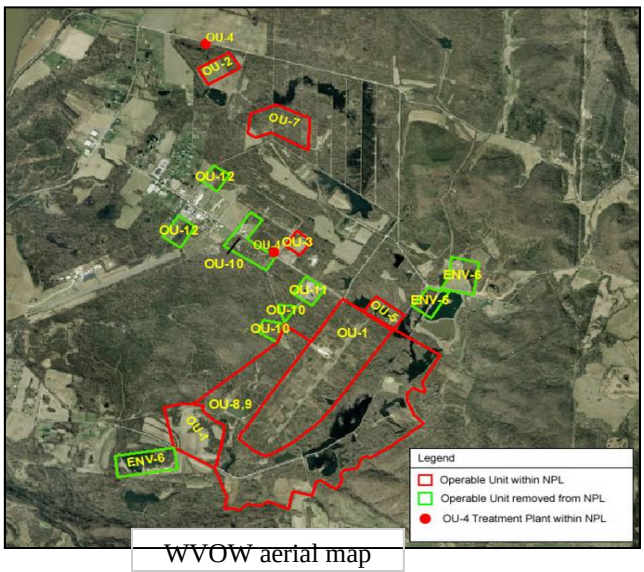
Flowered cap located at WVOW

Legumes in full bloom at the WVOW site in Point Pleasant

In June 2011, Dr. Patnode visited the WVOW native planting pilot locations to determine the condition of the native plantings and suggest adjustments or options for future native plantings. The pilot study found significant increases in native species cover at the outer edges of the caps where natives were not competing with former orchard/fescue grasses and weeds. Native plants decreased within the cap areas due to re-submergence of orchard/fescue grass that had been present on the caps prior to seeding the natives in 2009. With the assistance of Dr. Patnode, an aggressive plan would need to be established for active control of these former grasses and weeds until the native plants could outcompete the weeds.

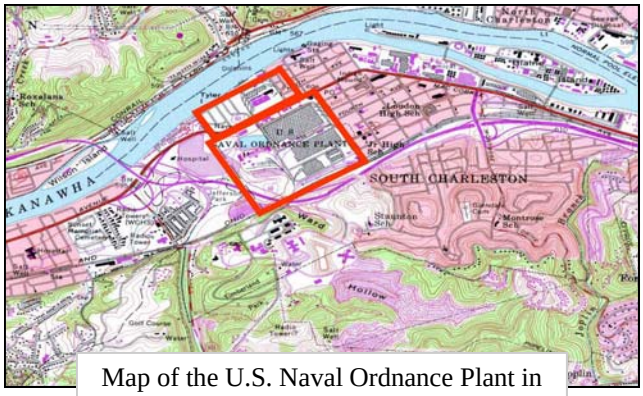
Consideration would also be given to the rate at which the natives may establish on the site. If the establishment rate is too slow, the natives may not be able to outcompete the weeds and a more aggressive weed control plan would be needed until the natives are established. This season's greatest challenge has been keeping weeds at bay. Lessons learned for drawing up a control plan included noting characteristics of the surrounding landscape when choosing a restoration location, initially having an aggressive weed control plan in place until the native plants become established; considering the frequency of herbicide treatments for existing non-native species prior to seeding; and determining the establishment rate of the native plantings versus weed establishment. control plan would be needed until the natives are established. This season's greatest challenge has been keeping weeds at bay. Lessons learned for drawing up a control plan included noting characteristics of the surrounding landscape when choosing a restoration location, initially having an aggressive weed control plan in place until the native plants become established; considering the frequency of herbicide treatments for existing non-native species prior to seeding; and determining the establishment rate of the native plantings versus weed establishment.

STATEWIDE FUDS PLANS DISCUSSED AT CANAAN VALLEY CONFERENCE

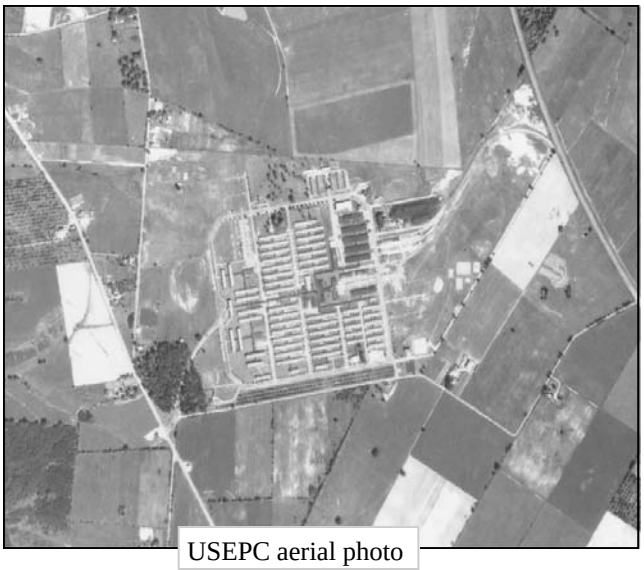


WVOW aerial map

For two days during the last week of April 2011, representatives of the State of WV and the federal government met at the Canaan Valley State Park to describe, discuss and define recent and future actions at former Defense sites in West Virginia. The WV Department of Environmental Protection sent representatives, as did US Forest Service and the US Army Corps of Engineers, who had employees from Huntington District, Louisville District, and Ohio River & Great Lakes Division in attendance. Presentations were given on the following former Defense sites: West Virginia Ordnance Works near Point Pleasant; the WV Maneuver Area in the general vicinity of Canaan Valley from Elkins to Dolly Sods; the Naval Ordnance Plant in South Charleston; the Ashford Army Hospital on the Greenbrier property; the Newton Baker General Hospital in Martinsburg; the Morgantown Ordnance Works; and the US Explosive Plant near Nitro. The WV Statewide Management Action Plan (SMAP), the draft of which had been distributed for review a month earlier, was discussed in light of the information from the briefings and fact-sheets presented.

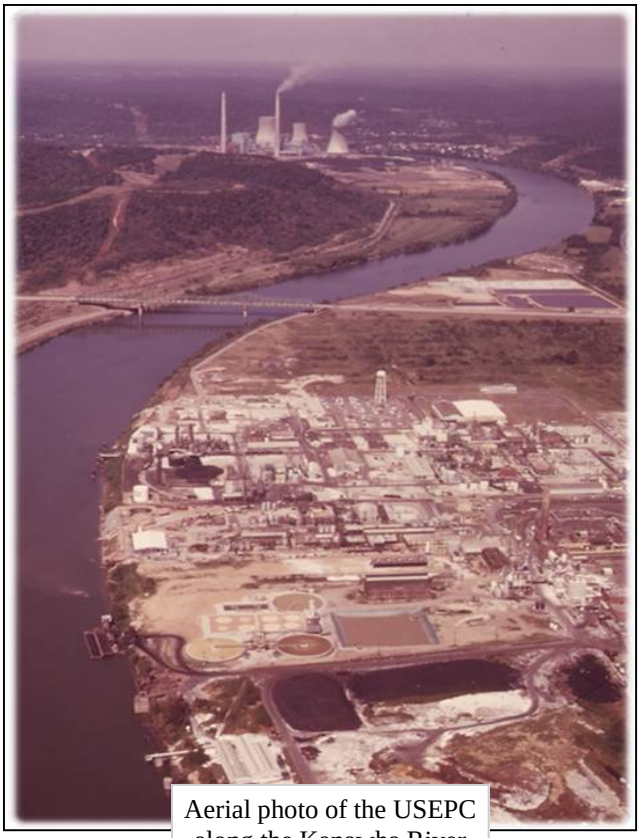


Map of the U.S. Naval Ordnance Plant in South Charleston



USEPC aerial photo

Detailed and general information was exchanged, points of view were aired out, priorities were decided and modifications to the plan were recommended with the end goal of improving and protecting the environment of WV and its citizens. Goals were established for both short- and long-term actions, and the whole effort will be captured with the publication of the updated 2011 WV SMAP in the summer of 2011.



Aerial photo of the USEPC along the Kanawha River

WEST VIRGINIA MANEUVER AREA GETS INCREASED ENVIRONMENTAL EMPHASIS

WVMA Infantry Area

During 2011, the US Army Corps of Engineers has taken the next steps toward preserving and improving the environment of an immense area used for Army training during World War II, from Elkins to Dolly Sods and throughout the Canaan Valley area. This area, termed the West Virginia Maneuver Area (WVMA), was used to train infantry and artillerymen to operate in mountainous terrain like that they would see when fighting in Europe. There were numerous bivouac areas, artillery ranges, and maneuver ranges spread throughout the extended area, which also included support areas such as motor pools, storage areas, and firing ranges.

After an exhaustive search of records archived in Washington and locally, and interviews with surviving local residents and servicemen who lived and served in the WVMA, it was determined that further study of 7 specific locales were required. There is one firing range in the Canaan Valley area, an ammo staging area near Elkins, two remote infantry maneuver/bivouac areas, and three mortar/artillery ranges around Dolly Sods that will be sampled and studied in the next 2 years.

In order to insure the effort by ECO is aligned with the needs of the taxpayers and their regulatory agencies, a meeting was held and site visits conducted in early April 2011. The contractor presented a proposed plan of action for the Site Investigations (SI), while representatives of the Huntington District Corps of Engineers, WV Department of Environmental Protection, Canaan Valley Institute, US Fish & Wildlife and US Forest Service provided comments, recommendations, and advice on executing the plan.

The action plan has been revised and the contractor is expected to start work in the summer of 2011. Prior to the workers coming to the sites, there will be letters sent to current property owners and “rights of entry” (ROE) requested. A report on the findings of ECO, Inc. will be filed with the Corps of Engineers in late 2012.

WVMA UXO Find in 2011

During the snow-free months of 2011 and 2012, ECO and their subcontractor Shaw will be driving and hiking to the areas concerned to collect samples of soil, water, and the occasional remnant left behind by soldiers in the 1940’s. These rights of entry are mostly for passing through adjacent properties to get to the areas that need to be examined and sampled. Anyone who receives an ROE should carefully read it and feel free to seek clarification of the intent of the government’s contractors as they proceed with the study. No gaping holes or scars will be left behind at the end of this effort, as the contractors are required to recover any damage to public lands and the private properties where an ROE is granted.

With the report recommendations, the government agencies will be able to decide whether further action is warranted at the individual sites/areas, or if any given site is determined to be clean. Maintaining and improving the environment for wildlife, native plants, and the citizens of the State of WV is important to each of the agencies involved, and with this latest effort, the old-time methods of disposal will be one step closer to being erased in the communities and wilderness areas of the WVMA.