FORMER WV MANEUVER AREA/DOLLY SODS
GRANT, PRESTON, PENDLETON, TUCKER AND RANDOLPH COUNTIES, WEST VIRGINIA
FUDS Property Number G03WV0013

PRELIMINARY ASSESSMENT

VOLUME I
REPORT AND APPENDICES A - K

Final Version

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EXECUTIVE SUMMARY

The Environmental and Remediation Section of the U.S. Army Corps of Engineers, Huntington District (CELRH EC-CE) conducted a Preliminary Assessment (PA) at the former West Virginia Maneuver Area (WVMA) in Tucker, Grant, Pendleton, Preston, and Randolph Counties, WV, under the Defense Environmental Restoration Program – Formerly Used Defense Site (DERP-FUDS) program. The FUDS Management Information System (FUDSMIS) property number is G03WV0013. This PA was conducted under the authority of Executive Order 12580 and the Comprehensive Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). This PA was also conducted in accordance with the United States Environmental Protection Agency (USEPA) *Guidance for Performing Preliminary Assessments Under CERCLA* (USEPA, 1991) and the U.S. Army Corps of Engineers (USACE) *FUDS Program: Guidance to Performing Preliminary Assessments Under FUDS* (USACE, 2005).

The former WVMA consisted of approximately 2,180,367 acres of land covering portions of Grant, Pendleton, Preston, Randolph and Tucker counties in northeastern West Virginia generally near the Town of Davis. Maneuver rights, secured by the Rents and Claims Board, Fifth Service Command, secured 350,416 acres of public lands (all part of the Monongahela National Forest), 48,557 acres of leased property for inclusion in the Impact Area, and 1,781,394 acres so-called "lesser interests". According to a warning order notice dated 26 March 1945, these "lesser interests" were covered by "trespass agreements." The land owners had granted use of these lands to the Army verbally; there are no records that describe the "trespass agreements" or the areas that they covered (USACE, 1991). A letter dated 15 July 1943 from the Secretary of War to the Secretary of Agriculture requested that there is a military necessity for the use of portions of the Monongahela National Forest for Army Maneuver purposes. In a response letter dated 4 August 1943 from the Secretary of Agriculture to the Secretary of War, the Department of Agriculture grants permission for the Army to use all Monongahela National Forest land in Preston, Grant, Randolph, Tucker and Pendleton Counties in West Virginia, covering 341,266 acres.

The former WVMA was the scene of special low-altitude mountain training activities during World War II. Regiments and battalions of larger Infantry Divisions came to the area from maneuvers and installations in other parts of the country to introduce the troops to various aspects of mountain warfare. Based on preliminary reconnaissance of the area within the WVMA, it was found to be similar to that of the Apennines and lower ranges of the Alps in Italy. This allowed the troops to simulate conditions that would possibly be encountered during the invasion of Italy and other mountainous regions in the war-time theater.

Regiment exercises conducted at the WVMA emphasized physical conditioning, topography, map interpretation, bivouac establishment, stream crossing and military problems unique to mountainous areas. Training schedules for infantry division combat teams at the WVMA typically included the following:

- Marches over mountainous terrain including use of Yukon type pack-boards (transporting instruments, radios, light weapons, and other loads), visual signaling, mountain surveying and other regiment exercises.
- Specialized programs including training for engineers (improvised river crossing) and medics (including evacuation medicine, first aid and evacuation).
- Occupation of difficult positions by firing batteries.
- 3-day tactical problem for artillery, winding up with a "Shoot" involving live rounds.
- 2-day battalion combat team problems.
- Cliff-scaling training for limited officials and enlisted men.
- An Impact Area that served as a training facility for field artillery testing.
- Local security in rugged terrain including scouting and patrolling, use of trip wires, sign and countersign, and dropping of all rank in addressing officers.

Based on the findings of this report, the following MMRP projects are proposed:

MRA #1/MRS #1 – Dailey Infiltration Camp

Findings: Based on historical documentation, aerial photography interpretation and a site visit conducted on the property, it is determined that the Dailey Infiltration Camp was once used as a small arms range (and potential grenade range) and obstacle course training facility during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a portion of the Monongahela National Forest and is currently not developed. **Estimated Proposed Project Acreage:** 200 acres

Conclusions: A site inspection (SI) should be conducted to determine the presence of small arms and other possible MEC located on this property. Site sampling should be conducted to determine the presence of potential munitions constituents (MC) contamination located on this property.

MRA #2/MRS #2 – WVMA Ammunition Depot

Findings: Based on historical mapping, historical documentation, and a site visit it is determined that the WVMA Ammunition Depot served as the main ammunition storage area during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a vacant field previously used for growing crops. **Estimated Proposed Project Acreage:** 4 acres

Conclusions: A SI should be conducted to determine the presence of Discarded Military Munitions (DMM) located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #3/MRS #3 – Jenningston Training Area

Findings: Based on the canister find in the Otter Creek Wilderness, historical documentation, and aerial photography interpretation, it is determined that the area around the community of Jenningston, WV was once used as infantry division troop maneuver area used during the operational period of the WVMA. This site is generally bounded by the Otter Creek Wilderness Area to the west, Mozark Mountain to the north, Chimney Rock/community of Dryfork to the east and the community of Sully to the south. **Current Use:** The area encompassed in this proposed project is currently a combination of Monongahela National forest land and farmland with residences. **Estimated Proposed Project Acreage:** 40,000 acres

Conclusions: A SI should be conducted to determine the presence of possible MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #4/MRS #4 – Fore Knobs/Bear Rocks Firing Ranges

Findings: Based on UXO found in proximity to this site, historical mapping and documentation, interviews and aerial photography interpretation, it is determined that the Fore Knobs/Bear Rocks Firing Ranges was once used as firing points and target locations for 105-mm and 155-mm howitzer rounds used during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a combination of Monongahela National forest land, The Nature Conservancy's Bear Rocks Preserve, forested land and farmland with residences. **Estimated Proposed Project Acreage:** 42,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #5/MRS #5 – Bearden Knob Firing Range

Findings: It was determined that the area near Bearden Knob was once used as a 105-mm and 155-mm howitzer round firing point and possible anti-tank firing range used during the operational period of the WVMA. These determinations have been made based on rocket finds near Yellow Creek, a UXO find on Cabin Mountain (105-mm howitzer round), historical mapping, historical documentation, aerial photography, and interviews. **Current Use:** The area encompassed in this proposed project is currently a combination of private property (residences, agricultural land) and Canaan Valley national Wildlife Refuge property. **Estimated Proposed Project Acreage:** 8,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #6/MRS #6 – Brown/Cabin Mountain Firing Ranges

Findings: It was determined that the areas around Beaver and Yellow Creeks were once used as a firing point for a 155-mm howitzer rounds, firing points for 60-mm and 81-mm mortars, and possible rocket or firing range used during the operational period of the WVMA. Brown Mountain was used as target area for the 60-mm and 81-mm mortar rounds fired from Yellow Creek during the operational period of the WVMA. The Cabin Mountain Firing Range was used as a target location for 105-mm and 155-mm howitzer rounds used during the operational period of the WVMA. These determinations have been made based on historical mapping, historical documentation, aerial photography interpretation, and interviews with personnel familiar with the WVMA. A 105-mm howitzer round was found in 2006 on Cabin Mountain within the Canaan Valley National Wildlife Refuge. **Current Use:** The area encompassed in this proposed project is currently a combination of a preserve owned by Canaan Valley Institute, U.S. Fish and Wildlife's Canaan Valley National Wildlife Refuge. **Estimated Proposed Project Acreage:** 16,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #7/MRS #7 – Buena Small Arms Firing Range

Findings: Based on historical documentation, aerial photography interpretation and a site visit conducted on the property, it is determined that the Buena Small Arms Firing Range was once used as a small arms range (and possible grenade range) used during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a portion of the Canaan Valley National Wildlife Refuge. **Estimated Proposed Project Acreage:** 50 acres

Conclusions: A SI should be conducted to determine the presence of small arms and other possible MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

ACKNOWLEDGEMENTS

The Environmental and Remediation Section of the U.S. Army Corps of Engineers, Huntington, WV District (CELRH EC-CE) conducted a comprehensive site-wide Preliminary Assessment (PA) at the former West Virginia Maneuver Area (WVMA) in Grant, Pendleton, Preston, Randolph and Tucker Counties, West Virginia. CELRH team members associated with the completion of this PA include the following:

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1. INTRODUCTION

Under the authority of the Defense Environmental Restoration Program (10 USC §§ 2701 et seq.), and its policies and procedures relating to Formerly Used Defense Sites (DERP-FUDS), including Department of Defense (DoD) Management Guidance for the DERP dated September 28, 2001, and Engineering Regulation 200-3-1, Environmental Quality, FUDS Program Policy, the U.S. Army Corps of Engineers, Huntington District, Environmental and Remediation Section (CELRH-EC-CE) conducted a Preliminary Assessment (PA) at the former West Virginia Maneuver Area (WVMA) in Grant, Preston, Pendleton, Tucker and Randolph Counties, West Virginia.

This PA was conducted under the authority of Executive Order 12580 and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). This PA was conducted in accordance with the U.S. Environmental Protection Agency (USEPA) *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991) and the U.S. Army Corps of Engineers (USACE) *FUDS Program: Guidance to Performing Preliminary Assessments Under FUDS* (USACE, 2005).

The purpose of this investigation was to collect sufficient information concerning conditions at the site to assess the immediate or potential threats posed to human health and the environment. The information also will be used to support a decision regarding the need for further action under CERCLA/SARA. This PA included a review of available file information, collection and interpretation of historic aerial photographs, interviews, and site reconnaissance. This PA included only an assessment of possible environmental concerns associated with former DoD activities at the former WVMA.

Historic aerial photographs of the former WVMA were obtained from National Archives and Records Administration (NARA), National Resource Conservation Service (NRCS), and the Monongahela National Forest (MNF). Contact was made with the NARA in College Park, Maryland, Chicago, Illinois, and Philadelphia, Pennsylvania; the West Virginia Department of Environmental Protection; U.S. Environmental Protection Agency; local government offices; and other sources in an attempt to obtain sufficient historical site-specific information. All relevant information obtained is included in the appropriate sections of this report. A list of individuals and organizations contacted for information is included in Appendix A.

2. PREVIOUS INVESTIGATIONS

Response actions and investigations at the former WVMA began in 1946 at the conclusion of military maneuvers. The following is a brief summary of activities beginning with the first response action through the most recent investigation in 2004.

Initial Ordnance Response Actions

Following the 1943 to 1944 military maneuvers, and prior to returning the land to the public and U.S. Forest Service (USFS) in 1950, Engineer Bomb and Shell Disposal Team No. 6 conducted an ordnance clearance during May 1946 (USACE, 2004a). The team completed a "thorough reconnaissance of the entire WVMA." Records indicate that the team found and destroyed 189 4.2-inch Smoke Round (SR) mortars, one 155-mm High Explosive (HE) projectile, three 105-mm HE projectiles, two 40-mm projectiles, and 12-inch or 14" inert (sand-loaded) rounds in the Dolly Sods region; information concerning the locations of all of these found items is not available. All suspected impact areas (which were pointed out to the team by USFS personnel), with the exception of certain regions to the north and northeast of the Dolly Sods North (DSN) and Dolly Sods Scenic Area (DSSA) (which were too rough or overgrown to be searched), were thoroughly searched during the 1946 clearance effort. All lands except for the regions not searched were "recommended as safe for grazing, lumbering, or hunting" subsequent to the clearance (USACE, 2004a)

During May 1953, the 549th Ordnance Explosive Ordnance Disposal (EOD) from Baltimore, MD, conducted a follow-up reconnaissance and disposal mission of suspected impact areas, as noted above, in the Dolly Sods region. Six live rounds were located and destroyed during this mission, and from the field work it was determined that "previous clearance operations were good." Additional information concerning these clearance operations is not available. Records regarding military operations in the area are scarce because the majority of pertinent documents have been lost or destroyed over time (USACE, 2004a). Refer to Appendix I, Maps 3 and 4, for the locations of areas searched during the two reconnaissance missions.

Findings and Determination of Eligibility and Inventory Project Report – DERP-FUDS Program - 1984 - 1992

The Preliminary Assessment of Eligibility of the "Dolly Sods Wilderness Area (West Virginia Maneuver Area)", for eligibility under the DERP-FUDS program, was initiated by the CELRH with a site visit of the former maneuver area on 3 December 1984. The purpose of the site visit was to determine the presence of unsafe debris, hazardous or toxic waste, and unexploded ordnance at the site. The Findings and Determination of Eligibility (FDE), dated 21 May 1990, concluded that the property had been formerly owned or used by the Army for mountain training and maneuvering. See *Section 3.2 FUDS Eligible Property* for information regarding the 21 May 1990 FDE. The Inventory Project Report (INPR) proposed DERP-FUDS Project No. G03WV006500 to conduct a Remedial Investigation and Feasibility Study (RI/FS) to determine the types and extent of ordnance contamination at the site and develop alternatives to safeguard the public, due to public discovery of ordnance on the property on an annual basis (USACE, 1990).

The Huntington District USACE revised the FDE in 1991 to include information for FUDS-eligible property that had been omitted in the original FDE (21 May 1990). Specifically, the original FDE omitted the Blackbird Knob target area from the eligible DERP-FUDS property and thus, the recommended ordnance and explosives (OE) project.

See *Section 3.2 FUDS Eligible Property* for additional information regarding the FDE revision. The INPR was also revised in 1991 to correct the DERP-FUDS OE project number to G03WV006504 and to conduct a RI/FS of the maneuver area, to replace the erroneously numbered DERP-FUDS Project No. G03WV006500 (USACE, 1992).

In 2005, the Huntington District revised the DERP-FUDS property name for Property No. G03WV0013 from Dolly Sods Wilderness Area to WV Maneuver Area/Dolly Sods. A duplicate DERP-FUDS property, Property No. G03WV0065, West Virginia Maneuver Area, existed in the inventory of DERP-FUDS properties. The previous INPRs, FDEs, investigations and ordnance removal actions contained references to G03WV0065 in the documents, and in many instances, these documents also contained the combined name "Dolly Sods Wilderness Area (West Virginia Maneuver Area)", which was actually not the accurate DERP-FUDS property name. However, project funding for these investigations and removal actions had actually been programmed under DERP-FUDS Property No. G03WV0013, Dolly Sods Wilderness Area. Since the Dolly Sods Wilderness Area is contained within the former WVMA DERP-FUDS property, and no work other than INPR preparation had been funded under Property No. G03WV0065, the USACE declared No Defense Action Indicated (NDAI) for DERP-FUDS Property No. G03WV0065 on 7 April 2005 and revised the name of DERP-FUDS Property No. G03WV0013 to WV Maneuver Area/Dolly Sods. The name Dolly Sods was retained in the property name due to the name of the ordnance removal project G03WV001304 and the vast references to the Dolly Sods Wilderness in past documents. All current and future projects have and will be programmed under DERP-FUDS Property G03WV0013.

Site Visit for Preparation of the Work Plan for the Feasibility Study to Determine the Nature and Extent of Surface and Subsurface Ordnance Contamination - 1991

From 20-31 May, 1991, personnel from Metcalf & Eddy, Inc. (M&E) and UXB International, Inc. (the ordnance specialist subcontractor), conducted a site visit of the Dolly Sods area for the development of a work plan for the Feasibility Study (FS) for surface and subsurface investigation and disposal of OE (M&E, 1991). Based upon records search data obtained by M&E, personnel searched areas that were likely to contain OE. The results of the site visit would then be used to select areas for surface and subsurface OE clearing. Areas searched included the locations of ordnance which had been uncovered in recent years and areas close to Blackbird Knob, a primary target for artillery during the maneuvers. Other areas searched included the vicinity of the intersection of Fisher Spring Run and Red Creek, the area around Breathed Mountain where additional rounds of ordnance had been found in the recent past, portions of trails 514, 513, and 554, the area between the Red Creek and the Left Fork near the northern border of DSW, higher grounds and open areas likely to have been targets for mortar fire, the bogs at the head of Fisher Spring Run, and the high ground just north of Fisher Spring Run (M&E, 1991).

Gun emplacements were discovered approximately 120 feet to the west of Forest Service Road 75 in the vicinity of Bell Knob Tower; the gun emplacements were distinguishable by the distinctive pattern of their eroded, yet visible berms. Additionally, the ridge north

of Breathed Mountain and between the Red Creek and Stonecoal Run was searched, as well as the area where Red Creek meets the Left Fork. No unexploded ordnance was discovered during the site visit. Buried metal items were found at three locations, but due to their depth beneath the surface, these could not be confirmed as ordnance-related materials. Two of these finds were in the bog at the headwaters of Fisher Spring Run, while the third was found among the gun emplacements west of Forest Service Road 75. Ordnance fragments were found near the area where the Red Creek meets Fisher Spring Run. The locations where OE was considered likely to exist were recorded with a global positioning system (GPS) (M&E, 1991). Refer to Figure 2-3 below for locations of the gun emplacements found during the M&E site visit.

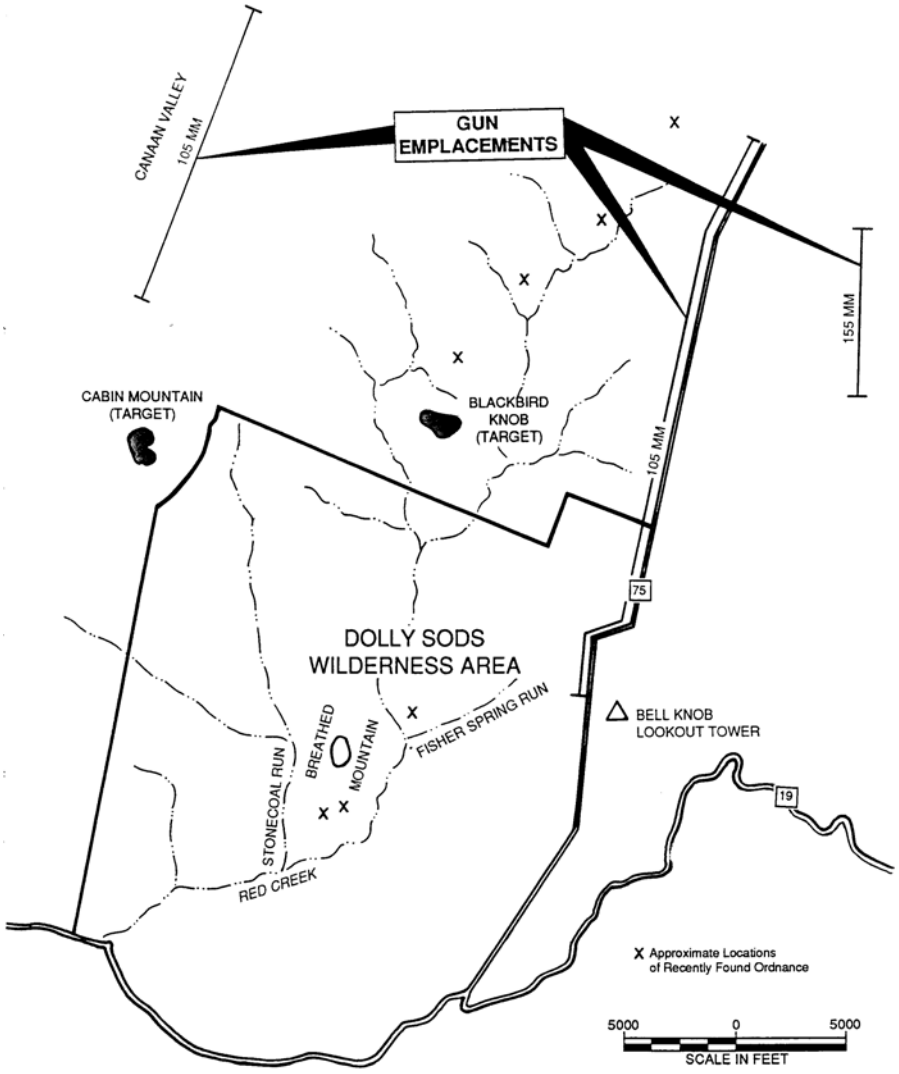

FIGURE 2-3. FIRING LOCATIONS AND TARGETS AT DOLLY SODS

Source: Metcalf & Eddy, Inc., 1991, Feasibility Study Dolly Sods Wilderness: Final Work Plan for Surface and Subsurface Investigation and On-Site Disposal of Ordnance. Prepared for USACE, Huntsville District, Huntsville, AL.

Site Visit for the Feasibility Study to Determine the Nature and Extent of Surface and Subsurface Ordnance Contamination - 1991

M&E conducted a FS to characterize the nature and extent of ordnance and explosive waste (OEW) contamination in the DSW and to determine cost-effective remedial actions to reduce the dangers of OEW contamination that would be protective of the wilderness area and provide public safety. The conclusions and recommendations from the FS are presented in *Feasibility Study Dolly Sods Wilderness: Engineering Report for Extent of OEW Contamination and Evaluation of Remedial Action Alternatives*, January 21, 1992 (M&E, 1992).

M&E and Baltimore UXO Safety personnel conducted the surface investigation for the FS from July 29 through August 29, 1991. The investigation was performed in accordance with the *Final Work Plan, Surface and Subsurface Investigation and Onsite Disposal of Ordnance* (M&E, 1991). Clearance protocol was defined for fifty, five-acre sites within the DSW. These sites were distributed into sixteen areas. Two additional areas were added during the course of the surface investigation. The areas were chosen as those that would most likely contain ordnance based upon topography and information obtained during the records search and site investigation (M&E, 1991). Areas that were chosen were often hill tops because these were most likely to have been used as targets. In addition, locations which likely contained under-shots or over-shots from the artillery firing at Blackbird Knob were investigated. Several other areas where then chosen to distribute the investigation throughout the wilderness area. A total of forty-eight surface sweep areas were investigated, covering approximately 281 acres in the DSW. Forty-eight areas were investigated instead of fifty because several adjacent five-acre areas were combined into ten-acre sweep areas. Non-OEW materials (railroad spikes, horseshoes, logging chains, tin cans, tent stakes, and other miscellaneous scrap metals) were found in areas from past human activities (logging railroads and logging camps) and present human activities (hiking and camping). Isolated discoveries of non-OEW materials were made throughout the DSW. Ordnance was found in northern Dolly Sods, in the Breathed Mountain region and in the Red Creek floodplain adjacent to Breathed Mountain. Summaries of OEW and Non-OEW wastes from the surface investigation are compiled in the FS Engineering Report (M&E, 1992). Refer to Figure 1-4 below for areas searched during the M&E site visit for the Feasibility Study.

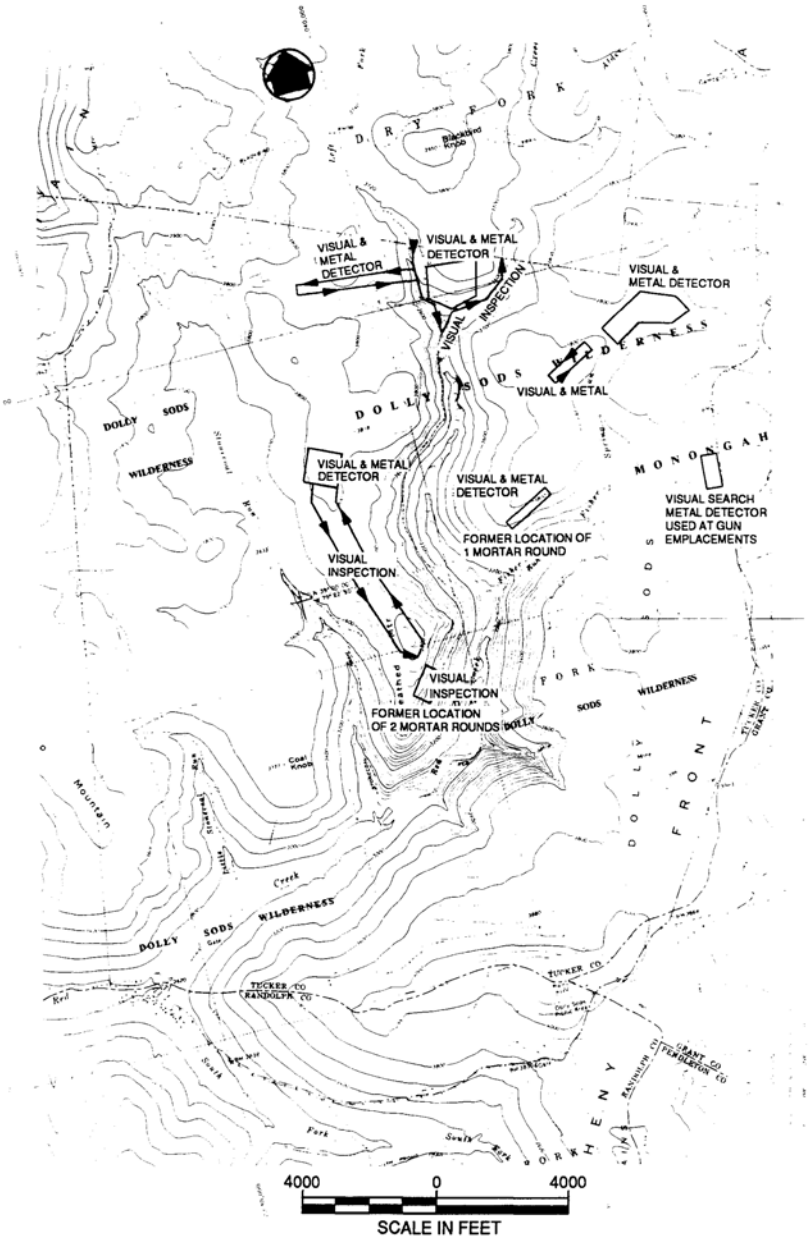

FIGURE 1-4. AREAS SEARCHED DURING DOLLY SODS SITE VISIT

Source: Metcalf & Eddy, Inc., 1992, Feasibility Study Dolly Sods Wilderness: Engineering Report for Extent of OEW Contamination and Evaluation of Remedial Action Alternatives. Prepared for USACE, Huntsville District, Huntsville, AL.

M&E and UXB personnel conducted the subsurface investigation immediately following the surface investigation, from 3 September to 3 October, 1991. This investigation was also performed in accordance with the *Final Work Plan, Surface and Subsurface Investigation and Onsite Disposal of Ordnance*, (M&E, 1991). Clearance protocol was defined for ten, one-acre sites within the DSW, with the areas selected based upon the results of the surface investigation. M&E and UXB decided to sweep twenty, 1/2-acre sites to allow concentrated coverage in areas where mortars had been found while

maintaining an equitable distribution of subsurface search areas. The subsurface investigation covered a total of 10.5 acres. Non-OEW discoveries were similar to the materials that were found during the surface investigation. Ordnance was found in northern Dolly Sods and in the Red Creek flood plain near Breathed Mountain. Summaries of OEW and Non-OEW wastes from the subsurface investigation are compiled in the FS Engineering Report (M&E, 1992). Appendix D of the FS Engineering Report contains the ordnance clearance and disposal documentation.

Based upon the results from the surface and subsurface investigations, several ordnance remediation options to varying extents and depths were evaluated for the FS as well as a No-Action alternative. The DoD evaluated the results from the FS and determined that it was an unacceptable risk to allow the areas to remain as potentially dangerous sites. The USACE attempted to determine the level of remediation which was appropriate for the ordnance contamination and to identify the locations where this remediation would be of the greatest benefit. In coordination with the USFS, the following alternatives were eventually developed from the FS:

- Alternative 1 – No-Action. This alternative involved no search for ordnance; if users of DSN found ordnance, they would contact appropriate personnel who would dispose of the ordnance when it was found. This was the practice that was currently being followed.

- Alternative 2 - Clearing trails only. This alternative involved a search to 20 feet on each side of 23 miles of USFS designated hiking trails, old roads, and travel-ways, to a depth of one foot and detonating in-place any ordnance that was found. The Blackbird Knob, campsites, the three hunting cabins, and the trailer dump site would not be searched. This alternative would involve 114.3 acres.

- Alternative 3 - Clearing publicly used areas. This alternative involved a search to 20 feet of each side of 23 miles of USFS designated hiking trails, old roads, and travel ways, to a depth of one foot, and detonating in-place any ordnance that was found (114.3 acres); a search of the area around Blackbird Knob to a depth of 1 foot and detonating in-place any ordnance that was found (98.9 acres); a search of 75 USFS inventoried campsites to a depth of four feet and detonating in-place any ordnance that was found (1.1 acres); a search of the area around three hunting cabins to a depth of four feet and detonating in-place any ordnance that was found (1.5 acres); and a search of an old trailer dump site to a depth of four feet and detonating in-place any ordnance that was found (0.5 acre). This alternative would involve searching approximately 216.3 acres.

Other alternatives had been considered in the very early stages of the FS project, such as searching and clearing the entire area, but these were deemed too aggressive and environmentally-damaging. The three alternatives were considered to be the most appropriate for the area, with Alternative 3 being selected.

Archives Search Report – September 1995

The Rock Island District, USACE, prepared an Archives Search Report (ASR) for the Dolly Sods Area (specifically Dolly Sods North) in September 1995 under DERP-FUDS Project Number G03WV006504. The findings and conclusions and recommendations of the ASR are presented in two documents: *Archives Search Report: Findings for the Former Dolly Sods North, Tucker County, West Virginia, Project Number G03WV006504* and *Archives Search Report: Conclusions and Recommendations, for the Former Dolly Sods North, Tucker County, West Virginia, Project Number G03WV006504* (USACE, 1995a and b). The ASR consisted of a search of historical documents and a field visit for OE concerns at the former DSN. The research area consisted of 6,168 acres of land with a prominent knob called Blackbird Knob, 670 acres, which was used as an artillery target. The entire 6,168 acres were noted as part of the Monongahela National Forest and were used for hiking and camping. The ASR confirmed that OE contamination was present at the Blackbird Knob target area and recommended an Interim Removal Action (IRA). The ASR noted that the area was covered with rocks and foliage, making it very difficult to see the ground, and also stated that any clearance of the ground would ruin the areas' value as a wilderness area. Signs were observed at the entrance to the forest to warn visitors of the presence of ordnance. The ASR recommended that if an ordnance removal action was not performed (to retain the wilderness), that additional OE warning signs should be posted throughout the area as an IRA. The ASR concluded that the other 5,498 acres of the Dolly Sods North area had potential OE contamination and recommended that an Engineering Evaluation/Cost Analysis (EE/CA) be performed to determine the need for additional investigation or response actions. The ASR found no hazardous, toxic or radioactive waste (HTRW) or demolition or debris concerns in the DSN (USACE, 1995a and b).

Environmental Assessment of Ordnance Removal Action in the Dolly Sods Wilderness Area - September 1995

In 1995, the USACE determined that removal of unexploded ordnance from DSW was necessary. To comply with National Environmental Policy Act (NEPA) requirements, USACE contracted New Bold Enterprises (NBE) to conduct an Environmental Assessment (EA) of the three proposed alternatives (two action and one no-action alternative) and presented the results in *Dolly Sods Wilderness Ordnance Removal Project Environmental Assessment*, September 1995 (NBE, 1995). The EA concluded that no significant effects on human health and the environment would result from the recommended OE removal action, Alternative 1, as presented in the FS (M&E, 1992). On 15 September 1995, the Commander, CELRH, signed, with concurrence from the U.S. Department of Agriculture on 22 September 1995, a Findings of No Significant Impact (FONSI) for the Dolly Sods Wilderness Area Ordnance Removal Action EA (NBE, 1995).

Environmental Assessment of Ordnance Removal Action in the Dolly Sods North Area - September 1997

Additional funding became available to USACE to perform an ordnance removal activity in the DSN and the decision was made to conduct the removal action concurrent with the DSW OE removal action, following the same work plan that was developed for DSW. Information that was presented in the *Dolly Sods Wilderness Ordnance Removal Project Environmental Assessment-Final* (NBE, 1995) was applied to the EA that NBE prepared for DSN OE removal action. The results and conclusions of the EA were presented in *Dolly Sods North Ordnance Removal Project Environmental Assessment*, September 1997 (NBE, 1997). The EA determined that since the DSW and DSN areas were similar in climate and somewhat similar in terrain and ecosystems, and that the environmental consequences and mitigation activities for the DSN OE removal action would be similar. On 23 September 1997, the Commander, CELRH, signed, with concurrence from the U.S. Department of Agriculture on 25 September 1997, a FONSI for the Dolly Sods North Ordnance Removal Action EA (NBE, 1997).

Action Memoranda for Ordnance and Explosives Removal Actions – 1996 – 1997

In May 1996, the USACE signed an Action Memorandum to document the proposed OE removal action for the DSW area. The memorandum explained that the removal action was a non-time-critical removal action to minimize the threat to the public due to the presence of OE, stating that the risk of exposure to OE would be reduced by a projected 58.9% for the selected alternative, Alternative 3 (USACE, 1996).

In July 1997, the USACE revised the Action Memorandum to include the adjacent DSN area in the Purpose Statement and Site Conditions and Background sections of the memorandum. The revised memorandum noted that the USFS and USACE had jointly prepared more detailed instructions to protect the endangered Cheat Mountain Salamander. The memorandum also stated “It was further concluded by the Forest Service and the Corps that Dolly Sods North has almost identical conditions as the Wilderness and that the alternatives considered and conclusions of the Wilderness's EA and Risk Analysis are also applicable to it. Subsequently the Wilderness's EA, Risk Analysis, and operational instructions were adopted for the entire site” (USACE, 1997).

Additionally, since the DSW was a Congressionally-designated “Wilderness”, to protect the environment for both OE removal actions, a new paragraph was added to stress that all activities would conform to “Wilderness” guidelines. Further, Management Prescription 5, from U.S. Department of Agriculture (USDA), USFS, Land and Resource Management Plan for the Monongahela National Forest was attached, which contained the wilderness preservation standards and guidelines to follow during the OE removal actions. Finally, the three alternatives that had been developed for the DSN OE removal action were added, listing Alternative 3 as the selected action, with similar projected risk reductions as for the DSW OE removal action (USACE, 1997).

Ordnance Removal Actions – Dolly Sods Wilderness, Dolly Sods North, and Dolly Sods Scenic Areas – 1997 – 1998

Ordnance removal activities in the DSW occurred between 4 June 1997 and 17 October 1997. Using hand-held magnetometers, Human Factors Applications, Inc. (HFA) cleared 26.14 miles of designated and maintained trails and 20 feet on each side of the trail (126.7 total acres), to a depth of one foot. Inventoried campsites (112 campsites; 8.83 total acres) were cleared to a depth of four feet. Magnetic anomalies resulted in 32,594 digs. Most anomalies resulted from railroad debris and spikes, artifacts such as axes, hammers, picks, and stove parts, and magnetic rocks; such items were returned to their original location. A total of 14 live mortars, including 60-mm HE and 81-mm HE, were found and destroyed by detonation. OE-related scrap (a total of 108 pounds) was recovered in DSW, inspected, and certified then turned over to ENVIRCO Inc. of Baker, WV. This removal action is documented in *Final Removal Report: Ordnance and Explosives Removal Action Dolly Sods Wilderness, Monongahela National Forest*, (HFA, 1998).

The DSN and DSSA ordnance removal activities occurred between 20 October 1997 and 18 August 1998, immediately following the DSW OE removal action. Due to inclement weather, no field work occurred between November 1997 and May 1998. Using hand-held magnetometers, HFA cleared 29.65 miles of designated and maintained trails to 20 feet each side to a depth of one foot (143.76 total acres) and 66 campsites and 6 cabins to a depth of four feet (2.18 total acres). A total of eight live mortars, including 60-mm HE and 4.2-inch SR and HE, were found and destroyed by detonation. Nineteen inert 4.2-inch mortar rounds were also located during the clearance and properly disposed of. OE-related scrap (a total of 1043.5 pounds) was recovered in DSN and DSSA, inspected, and certified then turned over to Champs Salvage of Petersburg, WV. This removal action is documented in *Final Removal Report: Ordnance and Explosives Removal Action Dolly Sods North, Monongahela National Forest* (HFA, 1999).

Ordnance and Explosives Recurring Review – June – August 2004

CELRH, with technical support provided by the U.S. Army Engineering and Support Center (USAESC), Ordnance and Explosives Center of Expertise, Huntsville, conducted the first OE Recurring Review of the Dolly Sods region of the former WVMA in 2004. This review is comparable to a five-year review that is conducted for operable units on National Priority List hazardous waste sites, in that it was conducted five years following the 1997-98 ordnance removal actions at the Dolly Sods Wilderness and Dolly Sods North areas, and subsequent OE Recurring Reviews will be conducted at five-year intervals. The results, conclusions and recommendations are documented in *Ordnance and Explosives Recurring Review, Dolly Sods Project, Former West Virginia Maneuver Area, Monongahela National Forest, West Virginia, Draft Final Report,* (USACE, 2004c).

The OE Recurring Review was conducted to ensure that the 1997 and 1998 ordnance removal actions continued to minimize explosives' safety risks and remained protective

of human health, safety, and the environment. The OE Recurring Review consisted of the following activities: the notification and involvement of stakeholders, the review of existing and relevant documentation and data, the identification and review of recent and new information, a community survey and public interviews, and an assessment of site conditions (USACE, 2004c).

The OE Recurring Review concluded that the 1997 to 1998 ordnance removal actions that were completed in the DSW, DSN, and DSSA areas (referred to as the Dolly Sods region) of the former WVMA were functioning as intended and were still protective of human health, safety, and the environment. No UXO or OE-related scrap were identified during the Recurring Review site assessment, nor were any OE concerns due to erosion, storm damage, changes in land-use, or recreational use found. Prior to the 1997-98 ordnance removal actions, there had been an average of ten reports per year, during one ten-year period, in which UXO had been found along designated trails and at inventoried campsites. However, since 1998, the OE Recurring Review found that there had only been seven cases of encountered UXO by recreational visitors. In each case, UXO had been found in an area that had not been cleared during 1997-98 (USACE, 2004c).

The review stated that although institutional controls (ordnance warning signs) were in place, the controls required improvement, and additional measures were recommended to increase public awareness and ensure continued safety. Warning signs did not exist in some highly-used areas. Certain trails were well-marked and maintained, whereas some designated trails were not making it difficult for visitors to remain in areas that had been previously cleared. Community survey results found that many visitors had not seen the ordnance warning signs, did not know of the potential to find hazardous ordnance items, were not aware of the proper locations to hike and/or camp, and did not know the procedures to report an ordnance-related incident. The review provided several recommendations to improve the institutional controls and educate the public on the ordnance hazards of the region (USACE, 2004c). It is noted that CELRH has implemented some of the recommendations and is working towards fully implementing all of the recommendations from the first OE Recurring Review.

3. PROPERTY DESCRIPTION, ACREAGE, AND LAND USE

3.1 Location

The former WVMA consisted of approximately 2,180,367 acres of land covering portions of Grant, Pendleton, Preston, Randolph and Tucker counties in northeastern West Virginia generally near the Town of Davis. The property is centrally located at latitude and longitude coordinates North 39^0 07’ 08”, West 79^0 27’ 09”, in Congressional District 1 and USEPA Region III (see Appendix I, Map 1).

Access to the former WVMA Impact Area from the Town of Elkins, WV is via U.S. Route 33 east, approximately 25 miles to the intersection with WV SR 32 near Harman, WV. From this intersection, take WV SR 32 north, approximately 10 miles to the

intersection with WV SR 45. From this intersection, take WV SR 45 east, for approximately 8 miles to the intersection of FR 75. FR 75 north then enters into the Dolly Sods Wilderness Area the current location of a pre-existing FUDS Project (FUDS Project #G03WV001304).

3.2 FUDS-Eligible Property

The FDE, dated 21 May 1990, that was prepared for the Dolly Sods Wilderness Area (West Virginia Maneuver Area) INPR, determined that the property had been formerly used by the DoD and was an eligible DERP-FUDS property. The FDE stated "The West Virginia Maneuver Area was used by the Army for military exercises, including mountain training and maneuvering, during World War II. The exercises included firing artillery into a designated area. No permanent facilities were constructed in the maneuver area. There is no evidence that the area was under other than DOD control during the period of DOD interest". The FDE identified the property in the former maneuver as having consisted of a total of 2,180,742.37 acres of land: 350,416.37 acres of public lands (all part of the Monongahela National Forest); 48,557.00 acres that were leased; and 1,781,769 acres that were so-called "lesser interests". The "lesser interests" were covered by "trespass agreements." The owners of these 'lesser interests" had apparently given the Army verbal approval to use these lands because no records were found that described the "trespass agreements" or the areas they covered (USACE, 1990).

The Huntington District revised the FDE in 1991 (signed 7 January 1992) to include information regarding FUDS-eligible property that had been omitted in the original 21 May 1990 FDE. Specifically, the original FDE omitted the Blackbird Knob target area from the eligible DERP-FUDS property and thus, this property was omitted from the recommended OE project area. The revised FDE also noted a revised total acreage of the former WVMA which reduced the FUDS-eligible property by approximately 375 acres; from 2,180,742.37 acres down to 2,180,367 acres, the major difference being a reduction in the acreage of leased land. Paragraph 1 of the revised FDE noted the public, leased and "lesser interest" lands as 350,531 acres public land (all part of the Monongahela National Forest), 48,067 acres leased and 1,781,769 acres as so-called "lesser interests" (USACE, 1992).

Paragraph 2 of the 21 May 1990 FDE stated that "All lands where work is recommended are those covered by the permits from the U.S. Department of Agriculture" (USACE, 1991). Paragraph 1 of the 7 January 1992 FDE provided the following clarification: "Most of the lands where work is recommended are those covered by the permits from U.S. Department of Agriculture. The remainder is an area called Blackbird Knob. Blackbird Knob is included in the leased lands then designated as Tracts Nos. A076A: 17,515.54 acres; A-76B: 2107.74 acres; and A-76C: 3512 acres, all of which were leased 6 August 1943 from the West Virginia Central and Pittsburg [sic] Railroad Company and The Davis Coal & Coke Company. The Lease No. was W33-017, ENG 1403. Blackbird Knob, a target area, was included in these lands, and work is recommended for that area". (USACE, 1992).

3.3 Land Use and Ownership History

Prior to the WVMA, the area was largely forest, mainly being used for logging and agriculture (farming, grazing) purposes. Extensive logging began during the late 1800s and slowed considerably in the late 1910's to early 1920's although logging is still prevalent in the area today. Several large forest fires, as a result of logging activities, occurred in what would become a portion of the WVMA's Impact Area, dramatically changing the regions' soil structure, exposing bedrock. Local family farms and grazing fields dotted the landscape prior to, during, and following the maneuver area, occupying most open areas including valley floors and bare mountaintops. Once logging in the area slowed, the land's primarily use shifted to agricultural and recreational uses. Farming, grazing, hunting and fishing were all activities that flourished prior to and following World War II. Today the area is well known in the eastern United States for the wide variety of outdoor activities available. Two popular state parks (Canaan Valley and Blackwater Falls) were developed in Tucker County in the years following the WVMA operations. Hiking, skiing, rock climbing, rafting, hunting, and fishing are also extremely popular activities, and attract thousands of visitors annually to the area.

As previously stated, the area that made up the WVMA was comprised of 2,180,367 total acres of land stretching into five West Virginia counties including Grant, Pendleton, Preston, Randolph and Tucker. Maneuver rights, secured by the Rents and Claims Board, Fifth Service Command, secured 350,416 acres of public lands (all part of the Monongahela National Forest), 48,557 acres of leased property for inclusion in the Impact Area, and 1,781,394 acres were so-called "lesser interests". According to a warning order notice dated 26 March 1945; these "lesser interests" were covered by "trespass agreements." Apparently, the land owners had given use of these lands to the Army verbally; there are no records that describe the "trespass agreements" or the area that they covered (USACE, 1991).

The following table details the ownership of all leased property at the time of the WVMA, the date in which the lease was signed and the termination date (reference Appendix R, Plates 1-2):

Leased Properties within Maneuver Area						
Tract No.	Land Owner	Acreage		Remarks		
		Leased	Transfer	Lease Contract No.	Effective Date	Cancellation Date
A	Department of Agriculture		341266.00	Use Permit	8-4-1943	8-10-1950
B	Department of Agriculture		9150.37	Use Permit	11-10-1943	8-10-1950
1	Western Maryland R.R. Co.	4.26		W33-017 Eng 437	10-5-1943	7-1-1946
3	J.V. Lough & Citizens National Bank	22.70		W33-017 Eng 197	8-1-1943	8-7-1944
4	City of Elkins	1.05		W33-017 Eng 1170	1-1-1944	2-2-1946
5	J.H. Fitzwater	1.00		W33-017 Eng 248	7-1-1943	6-5-1944
6	Earl Scott	7.00		W33-017 Eng 137	8-1-1943	4-10-1944
7	Trs. Of the Valley Improvement Co.	14.00		W33-017 Eng 158	8-1-1943	9-15-1944
8	Randolph Co. Board of Education	1.17		W33-017 Eng 161	8-2-1943	9-15-1944
9	Carl Degler & Richard Degler	0.60		W33-017 Eng 909	4-1-1944	5-27-1944
10	Victor Del Sordo	4.00		W33-017 Eng 330	9-14-1943	4-10-1944
11	Edna F. Hartman	17.00		W33-017 Eng 326	10-5-1943	6-5-1944
12	I.N. Vanscoy	10.00		W33-017 Eng 450	10-16-1943	4-10-1944
13	Wilbert Kisamore	14.80		W33-017 Eng 160	7-26-1943	8-7-1944
14	Mrs. Monna Bond	5.30		W33-017 Eng 212	7-26-1943	8-7-1944
15	J.R. Teter	6.50		W33-017 Eng 321	10-13-1943	4-10-1944
16	D.D. Canfield	18.72		W33-017 Eng 355	10-10-1943	6-5-1944
			Lesser Interest			
2L	The Western Maryland R.R. Co.		No Area	Lic. Agreement for Underground Steam Line	12-17-1943	11-27-1950

Table 3.1 – Table showing ownership of all areas within the WVMA not associated with the Impact Area.

Currently, the properties that made up the "other" leased properties within the WVMA, those not associated with the Impact Area, are utilized as follows. (Tract numbers listed correspond with the tract number on the WVMA Real Estate Map located in Appendix I.)

- Tract 1 & 2L – The tract that previously made up the station hospital has been demolished and now has a physician's building on the site with a large asphalt parking lot encompassing a majority of the site. (Reference Appendix R, Plate 3 and Appendix M, Pictures M59-M60)
- Tract 3 – The tract that previously had the encampment of the 94th Signal Battalion and 281st Pigeon Co. and pigeon roost area is now a residential area. (Reference Appendix R, Plate 33 and Appendix M, Pictures M46)

- Tract 4 – The tract that was listed as being for a general use "maneuver area" is now a combination of residential area/small business location. It appears as though none of the buildings shown in the 1945-46 aerial photos are present at the site at this time. (Reference Appendix R, Plate 3)
- Tract 5 – The tract that previously was used athletics and recreation for WVMA personnel is now used as a hotel and adjacent gas station. (Reference Appendix R, Plate 3 and Appendix M, Pictures M48)
- Tract 6 – The tract that previously was used as an athletics and recreation for WVMA personnel is now used as a hotel and adjacent gas station. (Reference Appendix R, Plate 3 and Appendix M, Pictures M45)
- Tract 7 – The tract that previously was used as a tent encampment for WVMA personnel is now a residential area. (Reference Appendix R, Plate 4 and Appendix M, Pictures M1-M5)
- Tract 8 – The tract that previously was used as a tent encampment site for WVMA personnel is now a residential area. (Reference Appendix R, Plate 4 and Appendix M, Pictures M3-M5)
- Tract 9 – The tract that previously was used as an ordnance base shop for use at the WVMA is currently used as a small motor repair shop. Prior to and following the WVMA use of the property, the site was used as an auto maintenance shop. (Reference Appendix R, Plate 5 and Appendix M, Pictures M80-M82)
- Tract 10 – The tract that previously was used as an ammunition depot for the WVMA and is believed to now just be a vacant field. (Reference Appendix R, Plate 6 and Appendix M, Pictures M35-M39)
- Tract 11 – The tract that previously was used as the tent encampment for the 150th Engineering Combat Battalion is now a farm field. (Reference Appendix R, Plate 7)
- Tract 12 – The tract that previously was used as a camp site for the WVMA is now a farm field. (Reference Appendix R, Plate 7 and Appendix M, Pictures M20-M24)
- Tract 13 – The tract that previously was used as a camp site for the WVMA is now a farm field. (Reference Appendix M, Pictures M25-M28)
- Tract 14 – The tract that previously was used as a laundry unit site for the WVMA is now the Bowden National Fish Hatchery. (Reference Appendix R, Plate 9 and Appendix M, Pictures M55-M58)
- Tract 15 – The tract that previously was used as a tent encampment for the 448th Engineering Depot Co. in the WVMA is now a farm field. (Reference Appendix R, Plate 10)
- Tract 16 – The tract that previously was used as a camp site for the WVMA is now a farm field. (Reference Appendix R, Plate 7 and Appendix M, Pictures M67-M70)

The following table details the ownership of all leased property within the Impact Area at the time of the WVMA, the date in which the lease was signed and the termination date:

Leased Areas within WVMA Impact Area					
Tract No.	Land Owner	Acres Leased	Remarks		
			Lease Contract No.	Effective Date	Cancellation Date
A-67	Virgil F. Stonestreet	158.80	W33-017 Eng 351	10-1-1943	6-30-1946
A-75	Harry B. Herr, et. al.	3830.00	W33-017 Eng 1322	11-1-1943	6-30-1946
A-76A	The W.VA. Central & Pittsburg R.R. Co. and the Davis Coal & Coke Co.	17515.54	W33-017 Eng 1403	8-6-1943	2-28-1946
A-76B	The W.VA. Central & Pittsburg R.R. Co. and the Davis Coal & Coke Co.	2107.74	W33-017 Eng 1403	8-6-1943	2-28-1946
A-76C	The W.VA. Central & Pittsburg R.R. Co. and the Davis Coal & Coke Co.	3512.00	W33-017 Eng 1403	8-6-1943	2-28-1946
A-77	W.VA. Power & Transmission Co.	9523.37	W33-017 Eng 439	11-1-1943	9-30-1946
A-78	Tacy A. Carwell	1082.00	W33-017 Eng 347	10-1-1943	2-28-1946
A-79	Willie J. Trout & John R. Harper	875.50	W33-017 Eng 457	11-15-1943	2-15-1946
A-80	Alice Coffman	553.60	W33-017 Eng 364	10-1-1943	2-5-1946
A-81	Roscoe C. Beall, et. ux.	368.00	W33-017 Eng 352	10-1-1943	2-28-1946
A-82	Jason Harmon Estate	939.20	W33-017 Eng 918	10-1-1943	2-28-1946
A-86	West Virginia Pulp & Paper Co.	474.71	W33-017 Eng 2257	11-1-1943	4-30-1945
A-87A	The W.VA. Central & Pittsburg R.R. Co. and the Davis Coal & Coke Co.	290.00	W33-017 Eng 1403	8-6-1943	6-30-1946
A-87B	The W.VA. Central & Pittsburg R.R. Co. and the Davis Coal & Coke Co.	134.00	W33-017 Eng 1403	8-6-1943	6-30-1946
A-89	George Ervin Rohrbaugh	291.20	W33-017 Eng 350	10-1-1943	6-30-1946
A-90	John A. Rohrbaugh & Claudia A. Rohrbaugh	140.00	W33-017 Eng 349	10-1-1943	6-30-1946
A-91	W.VA. Power & Transmission Co.	412.27	W33-017 Eng 439	11-1-1943	9-30-1946
A-92	W.VA. Power & Transmission Co.	6.64	W33-017 Eng 439	11-1-1943	9-30-1946
A-93	W.VA. Power & Transmission Co.	35.27	W33-017 Eng 439	11-1-1943	9-30-1946
A-94A	Parsons Realty & Machinery Co.	309.00	W33-017 Eng 409	11-15-1943	6-30-1946
A-94B	Parsons Realty & Machinery Co.	258.50	W33-017 Eng 409	11-15-1943	6-30-1946
C-8	T.G. Smith	505.00	W33-017 Eng 348	10-1-1943	6-30-1946
C-25	W.C. Halterman Estate	103.00	W33-017 Eng 365	10-1-1943	6-30-1946
C-26	Margaret Hall & Jeff Hall	101.00	W33-017 Eng 346	10-1-1943	6-30-1946
C-30	Carroll B. Tyson	240.00	W33-017 Eng 455	11-1-1943	6-30-1946
C-32	C.J. Burgess	112.00	W33-017 Eng 366	11-1-1943	6-30-1946
C-35	Lillian Stockton Klein	464.00	W33-017 Eng 463	11-1-1943	6-30-1946
C-37	O.J. Weimer Estate	230.00	W33-017 Eng 373	10-1-1943	6-30-1946
C-38	Bessie Weimer Berg	198.00	W33-017 Eng 368	10-1-1943	6-30-1946
C-39	Carl E. Weimer & John B. Weimer	208.00	W33-017 Eng 370	10-1-1943	6-30-1946
C-41	A.J. Welton Estate	118.00	W33-017 Eng 344	10-1-1943	6-30-1946
C-42	J. Evers Evans, et. Ux.	128.00	W33-017 Eng 369	10-1-1943	6-30-1946
C-54	Willie Burgess & Arthur Barger	78.75	W33-017 Eng 363	10-1-1943	6-30-1946
C-56	Harrison Evans	150.00	W33-017 Eng 361	10-1-1943	6-30-1946

Leased Areas within WVMA Impact Area					
Tract No.	Land Owner	Acres Leased	Remarks		
			Lease Contract No.	Effective Date	Cancellation Date
C-59	Aaron C. Goldizen	200.00	W33-017 Eng 354	10-1-1943	6-30-1946
C-60	Arlie Goldizen	101.00	W33-017 Eng 362	10-1-1943	6-30-1946
C-61	Delphia Berg & Ben Berg	47.50	W33-017 Eng 367	10-1-1943	6-30-1946
C-65	Adam H. Evans	40.00	W33-017 Eng 360	10-1-1943	6-30-1946
C-66	Earl H. Rohrbaugh, et. ux.	88.00	W33-017 Eng 371	10-1-1943	6-30-1946
C-68	M.E. Goldizen	104.00	W33-017 Eng 358	10-1-1943	6-30-1946
C-69	M.K. Barger	16.00	W33-017 Eng 359	10-1-1943	6-30-1946
C-71	Central Tie and Lumber Co.	592.00	W33-017 Eng 345	10-1-1943	6-30-1946
C-72	Abijah Rohrbaugh	323.00	W33-017 Eng 353	10-1-1943	6-30-1946
C-73	T.J. & J.B. Grove Estate	784.00	W33-017 Eng 372	10-1-1943	6-30-1946
C-29	Unknown Owner	128.00	Civil Action No. 1919	8-6-1943	6-30-1946
C-31	Unknown Owner	62.00	Civil Action No. 1919	8-6-1943	6-30-1946
C-34	Unknown Owner	96.00	Civil Action No. 1919	8-6-1943	6-30-1946
C-37A	Unknown Owner	298.00	Civil Action No. 1919	8-6-1943	6-30-1946
C-40	Unknown Owner	96.00	Civil Action No. 1919	8-6-1943	6-30-1946

Table 3.2 – Table showing ownership of all areas within the WVMA Impact Area.

Currently, the majority of the former WVMA Impact Area is owned by entities including the Monongahela National Forest, The Nature Conservancy, Canaan Valley Institute, U.S. Fish and Wildlife Service, hunting clubs, and private residents. The Monongahela National Forest owns what is now the DSW (including the DSN and DSSA) which consists of 18,651.5 acres of the former WVMA Impact Area. This property was established as a wilderness area to minimize environmental impact and allow hiking and camping within the region. The Nature Conservancy owns the Bear Rocks Preserve which comprises 477 acres adjacent to the DSN and DSSA. This preserve was established to preserve the Bear Rocks area. The Canaan Valley Institute owns and maintains 3,208 acres of property that made-up a portion of the northern boundary of the former WVMA Impact Area. This property is just east of Davis, WV, and is used for environmental preservation, wildlife, and stream study. The U.S. Fish and Wildlife Service operate the Canaan Valley National Wildlife Refuge (CVNWR) consisting of 15,245 acres of land that generally runs from the western face of Cabin Mountain into central Canaan Valley. This property was established to preserve the habitat of several endangered species that inhabit the Canaan Valley area. The remaining property that comprised the former WVMA Impact Area is owned by private entities, hunting clubs, or other businesses. (Refer to Appendix R, Plate 20)

3.4 Physical Property Characteristics

The 2,180,367 acre WVMA is located in the Allegheny Mountain Province of the Potomac Highlands Region and includes parts of Preston, Tucker, Grant, Randolph, and Pendleton Counties of West Virginia. The Allegheny Front, a prominent geological feature bordering the western edge of the WVMA boundary, runs northeast-southwest across the State, separates the Allegheny Plateau Province to the west and the Valley and Ridge Province to the east. The Allegheny Front is an almost unbroken wall of mountains rising more than 4,000 feet. The Front follows the trend of the Appalachian Mountains northwest to southeast for more than 160 miles (WV Geologic and Economic Survey, 2004). The more than 40 mountains that make up this wall of mountains induce heavy precipitation in the area (See Figure 1.1 for regional orientation of the site location).

Spruce Knob is West Virginia's highest elevation at 4,861 feet, and the tallest mountain in the Alleghenies (WV Geologic and Economic Survey, 2004). Spruce Knob is located in Pendleton County, WV, and is within the Spruce Knob-Seneca Rocks National Recreation Area administered by the USFS Monongahela National Forest (MNF). Portions of the Recreation Area are located in the most southern portion of the WVMA project boundary.

Northeast of the Spruce Knob-Seneca Rocks National Recreation Area the landscape includes several adjoining plateaus: Dolly Sods (Bear Rocks), Flatrock Plains, Red Creek Plains, and Roaring Plains, which culminates in the 4,770-foot summit of Mount Porte Crayon. Canaan Valley, which lies to the west of Cabin Mountain and the Dolly Sods area, is the highest large valley in the eastern United States. Canaan Valley contains the largest freshwater wetland area in West Virginia (approximately 8,475 acres), of which, approximately 5,662 acres are public lands managed by the CVNWR (USFWS, 2007). DSW, DSSA and DSN consist of approximately 18,415 acres located in Tucker, Grant, and Randolph Counties.

Total populations in each of the affected counties according to the U. S. Census Bureau for 2000:

- Randolph County (City of Elkins, county seat) -- 28,262
- Tucker County (City of Parsons, county seat) -- 7,321
- Grant County (City of Petersburg, county seat) -- 11,299
- Pendleton County (City of Franklin, county seat) -- 8,196
- Preston County (City of Kingwood, county seat) – 29,334

The Allegheny Front divides waters that flow to the Atlantic Ocean from those flowing to the Gulf of Mexico. The Allegheny Plateau covers the western two-thirds of West Virginia and coincides with the Ohio River Basin. The eastern edge of the state and the eastern panhandle comprise most of the Potomac River Basin. The pattern of drainage east of the Allegheny Front features a short, trellised drainage system flowing toward the northeast and ultimately draining into the Potomac. The western portions drain across an

inclined plane by a longer system that flows generally northwest into the Ohio River. Waters from within the WVMA boundary primarily drain with the Ohio River Basin except for the North Branch and South Branch of the Potomac.

The Allegheny Mountain Province has distinct seasons of approximate equal length. It has a humid continental climate except for a marine modification in the lower panhandle. Average annual temperatures range from below 50°F (10°C) in the north to about 64° F (18° C) in the south to about 48° F (9° C) in areas of high altitude. Average annual precipitation varies from more than 80 inches in the high mountain areas to 35 inches in the valleys (NCDA, 2004). Annual precipitation is plentiful and evenly distributed with short, infrequent periods of water deficit. The climate of the Dolly Sods area is more severe than that of the Canaan Valley.

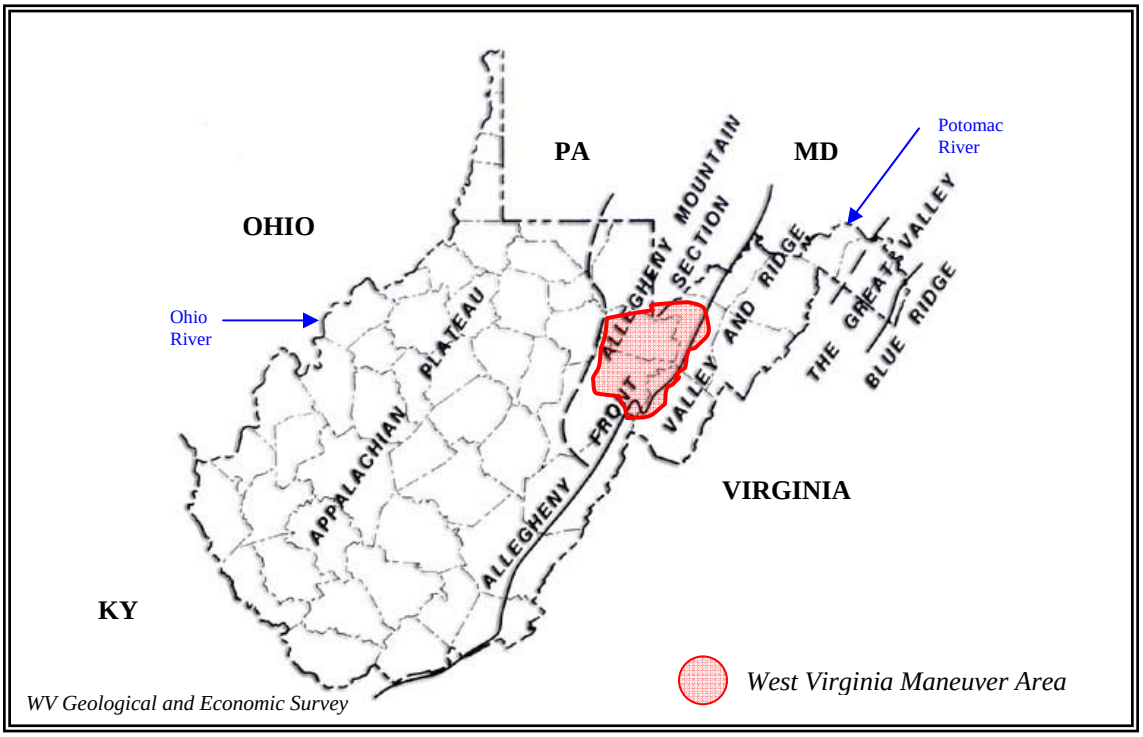

Figure 1.1
WVMA Site Location within the Physiographic Provinces of West Virginia

Prominent features and locations within the WVMA's 2,180,367 acre area include the MNF (Dolly Sods, Spruce Knob-Seneca Rocks National Recreation Area, Blackbird Knob, Otter Creek Wilderness Area; Stuart Recreation Area); Towns of Sully, Kerens, Bowden, Jenningston, Gladwin, and Dailey; Cities of Elkins, Davis, and Parsons; the CVNWR; former Stony River Reservoir; Seneca Rocks; Mount Storm Lake; Canaan Valley State Park; Blackwater Falls State Park; Blackbird Knob; Cabin Mountain; Shavers Mountain; Rich Mountain; Bearden Knob; Canaan Mountain and Canaan Valley wetlands; Blackwater River, Shavers River, Cheat River, Tygart Valley River and their tributaries. The Bear Rocks Preserve, located north of Dolly Sods, is managed by the Nature Conservancy (TNC, 2007). Two sites, the ordnance base shop and infiltration

camp, are located south of the City of Elkins and are just outside the WVMA boundary. The tract of land used for the ordnance base shop was leased from a private landowner and is located along Highway 219 south of the City of Elkins. The former Dailey Infiltration Camp is located within Forest Service property near the Town of Dailey.

3.4.1 Threatened and Endangered Species and Sensitive Environments

In 1995, Robert C. Bailey, with the USDA Forest Service, compiled the "Ecoregions and Subregions of the United States" to provide a general description of the ecosystem geography of the Nation. The WVMA is located within the Central Appalachian Broadleaf Forest-Coniferous Forest-Meadow Province Ecoregion of the United States and within the Allegheny Mountains Section. The Allegheny Mountains Section is further broken into the ecoregion subsections of the Monongahela National Forest, Northern High Allegheny Mountains, Western Allegheny Mountains, Southern High Allegheny Mountains, Southern High Allegheny Mountains, Eastern Allegheny Mountain and Valley, and the Allegheny Mountain Plateau. The Allegheny Mountains Section has a maturely dissected plateau characterized by high, sharp ridges, low mountains, and narrow valleys.

Sensitive environments have been identified within the boundary of WVMA per 40 CFR, Part 300, Appendix A, Table 4-23. Wilderness areas are designated per the Wilderness Act of 1964, Eastern Wilderness Act of 1975, the Monongahela National Forest Wilderness Act of 1983, and are as follows:

- Dolly Sods Wilderness Area (federal, administered by the MNF)
- Dolly Sods North (federal, administered by the MNF)
- Dolly Sods Scenic Area (federal, administered by the MNF)
- Blackwater Falls State Park (State of West Virginia)
- Canaan Valley State Park (State of West Virginia)
- CVNWR (federal, U. S. Fish and Wildlife Service, National Wildlife Refuge System)
- Spruce Knob-Seneca Rocks National Recreation Area (federal, administered by the MNF)
- Otter Creek Wilderness Area (federal, administered by the MNF)
- Bear Rocks Preserve (non-profit, administered by TNC)
- Fernow Experimental Forest (federal, administered by the MNF)
- North Fork Mountain, old growth forest, located in Pendleton and Grant Counties. The MNF has designated 10 acres of red pine as old growth forest on the mountain as the North Fork Mountain Red Pine Botanical Area.
- North Spruce Mountain, old growth forest, approximately 17 acres.

The federally-designated endangered (or threatened) species that are listed for this region are running buffalo clover (*Trifolium stoloniferum*), shale barren rock cress (*Arabis serotina*), small whorled pogonia (*Isotria medeoloides*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), Indiana bat (*Myotis sodalis*), and the West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*). Federally-threatened

species include the bald eagle (*Haliaeetus leucocephalus*) and the Cheat Mountain salamander (*Plethodon nettingi*). Globally rare and imperiled species include an isopod (*Caecidotea sinuncus*), tall larkspur (*Delphinium exaltatum*), eastern small-footed bat (*Myotis lebii*), Allegheny woodrat (*Neotoma magister*), Timber Ridge cave beetle (*Pseudanophthlmus hadenoecus*), and the South Branch Valley cave millipede (*Pseudotremia princeps*). Two other endangered species, the gray wolf (*Canis lupus*) and the eastern cougar (*Puma concolor couguar*), are believed to be extirpated from the region during the late 1800's or early 1900's (USDA, 2006).

Bald Eagle nests have been located in the Potomac River drainage in Grant, Hampshire, Hardy, Jefferson, Mineral and Pendleton counties (West Virginia Department of Natural Resources (WVDNR), 2006). The South Branch Valley cave millipede occurs in surface and cave locals and has been found in only six sites in Pendleton County (Lewis, 2001). The Timber Ridge cave beetle is an extremely rare ground beetle that has been reported from a single cave in Pendleton County (Lewis, 2001). West of the Otter Creek Wilderness area, and within the MNF, is a federally-designated critical habitat and hibernacula for the endangered Virginia big-eared bat. The Cheat Mountain salamanders, according to Marshall University Herpetology Lab, are "endemic to West Virginia and typically inhabit red spruce and yellow birch forests in higher elevations of Grant, Pendleton, Pocahontas, Randolph, and Tucker counties (Marshall University, 2002)."

The current list of threatened or endangered species (TES) specific to the interior WVMA boundary was obtained from the CVNWR, the WVDNR field office (in Elkins, WV), and the MNF. The TES list provided in Appendix U is presented in a different format by each agency. In addition to TES, a list of Resources of Concern, which are species of concern specific to the Canaan Valley area, was provided by the CVNWR. The MNF's Regional Forester's Sensitive Species list is included in the Appendix U as well. The Forest's Sensitive Species, as indicated by Kent Karriker, wildlife biologist for the MNF, are species that are not federally listed as threatened or endangered, but are considered to be at some risk of loss of viability on the National Forest. The list is an administrative designation that is made by the U. S. Forest Service. This designation carries protective power only on National Forest land (ref. Karriker interview).

The following information is provided for the Otter Creek Wilderness area, Dolly Sods Area, and Canaan Valley.

3.4.2 TES – Otter Creek Wilderness Area (USFS)

The Otter Creek area was designated as wilderness by the Eastern Wilderness Act, passed by Congress in 1975. Spruce dominates the higher elevations of Otter Creek and gradually gives way to hardwood trees such as black cherry and yellow birch on the middle and lower slopes. There are three high plateau fens: Moore Run, Devil's Gulch, and Shavers Lick (MNF, 2007). Otter Creek Wilderness is suitable habitat for federally threatened and endangered West Virginia northern flying squirrel, Virginia big-eared bat, Indiana bat, Cheat Mountain salamander, and possibly other species, particularly listed cave species and plants.

During a field outing conducted by MNF personnel for the USFS Shavers Mountain Karst Survey Project, an ordnance trash pit was located approximately 4,000 feet west of the Otter Creek Wilderness boundary and west of Glady Fork in the Three Springs area. According to the Forest Service trip report, the cave is a 10-foot deep dead bottom pit that is approximately three feet x four feet on the pit floor. Discarded mortar shipping or transport containers were found. There was no evidence of unexploded ordnance within the pit (MNF, 2006).

Due to the karst geology of Otter Creek area and Shavers Mountain, the area consists of irregular topography, sinkholes, abrupt ridges, caverns, abundant springs, and a surface drainage system of tributaries and streams. To the east of the Town of Gladwin and the west of the Otter Creek Wilderness area is the Cave Hollow/Arbogast Cave, federally-designated critical habitat and hibernacula for the endangered Virginia big-eared bat. Total population of the endangered Virginia big-eared bat was reported to be less than 20,000 in 1997. Five colony sites in West Virginia are federally-designated critical habitat, including Cave Hollow/Arbogast Cave per the Federal Register 1979 (USDA, 2006). Because of the rugged terrain of this area, access is limited.

3.4.3 TES – Dolly Sods Areas (USFS)

The Dolly Sods area is made up of three sections: the DSW, the DSSA, and DSN with a total acreage of approximately 18,415 acres. To the most northern border of Dolly Sods North is the adjacent property managed by TNC known as the Bear Rocks Preserve.

Dolly Sods is suitable habitat for the federally endangered West Virginia northern flying squirrel and the federally threatened Cheat Mountain salamander. According to Dan Arling, Wildlife Biologist for the MNF, no federally-designated critical habitat exists within Dolly Sods. DSW (~10,215 acres) was designated into the National Wilderness Preservation System in 1975 with the passage of the “Eastern Wilderness Act”. It is now managed under that law and the Wilderness Act of 1964. The DSSA, approximately 2,000 acres along Forest Road 75, was created in 1970 and managed as a scenic area. DSN was an expansion of the National Forest’s "proclamation boundary" when its 6,200 acres were acquired in 1993 (MNF, 2007).

3.4.4 TES – CVNWR

The CVNWR, located in Tucker County, was established in 1994 and consists of approximately 15,245 acres. The refuge is drained by the Blackwater River and its tributaries. More than 580 plant species are known, and there are 40 distinct plant communities, including swamp forests, alder thickets, marshes, and bogs. These habitats support diverse wildlife populations, with 290 species of vertebrates known to occur. Nationally recognized as a breeding and fall migration area for the American woodcock, the refuge area also supports many other migratory bird species consistent with the Migratory Bird Treaty Act of 1918. The CVNWR provides suitable habitat for the federally threatened Cheat Mountain salamander and the endangered West Virginia

northern flying squirrel. No federally designated critical habitat exists within the refuge (USFWS, 2007).

The Buena Small Arms Firing Range, utilized by the Army during troop maneuvers, is located within the CVNWR, adjacent to Highway 32/16. Noticeable features of the former firing range, including mounds and trenching, are still visible although in a heavily-vegetated area. (Appendix M, photographs M65 and M66 depict the current condition of the former firing range.)

3.4.5 Places of Historical Significance

In 1996, the MNF prepared a survey which located and identified cultural resources in the Dolly Sods area. One reason for conducting the survey was to provide advice to the USACE for ordnance removal projects. The survey focused on trails and campsites in the DSA and resulted in the addition of nine previously-unrecorded historic sites, beyond four other known sites. Historic site locations include Shay Falls, Stonecoal Run, Red Creek Trail, homestead site near Laneville, Stonecoal Trail, homestead site near Dolly Sods road, several commercial coal mine sites (dating back to 1905), logging and railroad site at the confluence of Big Stonecoal and Red Creek, four other sites along Red Creek, and isolated finds in various locations. The field reconnaissance revealed a large concentration of artifacts dating from the early 1900's and associated with the logging and railroad history of the region. No prehistoric material was found during the 1996 survey, but large amounts have been located in previous surveys within the boundary of Dolly Sods. According to the survey, as of 1993 there were 86 prehistoric sites recorded for Tucker County and 110 for Grant County (USDA, 1996).

Registered National Natural Landmarks (NPS, 2005) within the WVMA boundary include the following:

- Canaan Valley was designated a National Nature Landmark in 1974.
- Germany Valley Karst Area (part of the Spruce Knob-Seneca Rocks National Recreation Area).
- Big Run Bog is an open fen close to the City of Davis WV.
- Fisher Spring Run Bog, located in the Red Creek area of Dolly Sods.
- Shavers Mountain Spruce-Hemlock Stand, most is within Otter Creek Wilderness.

The former ammunition depot, located north of the City of Elkins along Highway 219, is now believed to be a cemetery although this could not be completely validated. (See Appendix M, Photographs M35-M39)

4. HISTORICAL PROPERTY SUMMARY

The following sections provide a description and history of the former WVMA from pre-World War II through to the present day. Appendix H provides historical photographs of the Army's use at the former WVMA. The photographs were obtained from several

sources including Rob Whetsell (local Elkins historian), Don Rice (local Elkins historian), Duke Watson (officer at the WVMA), and the New England Ski Museum.

4.1 Chronological Property Summary

The former WVMA is generally bounded by the city of Elkins, WV, to the west, U.S. Route 50 in Preston County to the north, Petersburg, WV, to the east, and U.S. Route 33 to the south with a sliver of land extending to Franklin, WV further to the south (Appendix I, Map 1). The WVMA lies within Grant, Preston, Pendleton, Randolph, and Tucker counties of West Virginia.

4.1.1 Pre- and Post-World War II WVMA Status

The first known settlers in the Potomac Highlands Region were the Mound Builders, also known as the Adena. Huron, Iroquois, and several other Native American groups were known to have inhabited the area until the late 1700's and early 1800's. Prior to the WVMA, the area was largely forest, mainly being used for logging and agriculture (farming, grazing) purposes. Extensive logging began during the late 1800s and slowed considerably in the late 1910's to early 1920's although logging is still prevalent in the area today. Several large forest fires, as a result of logging activities, occurred in what would become the WVMA's Impact Area, dramatically changing the regions' soil structure, exposing bedrock. Local family farms and grazing fields dotted the landscape prior to, during, and following the maneuver area operations, occupying most open areas including valley floors and bare mountaintops. Once logging in the area slowed, the land's primary use shifted to agricultural purposes followed by recreational uses. Farming, grazing, hunting, and fishing were all activities that flourished prior to and following World War II.

Several notable West Virginia cities and towns are located within the former WVMA's boundaries and were utilized by the Army. Such towns included Elkins, Petersburg, Davis, Thomas, Parsons, and Franklin. Elkins, which is located on a bend in the Tygart River, was selected as the Headquarters of the WVMA largely due to its designation as a central hub of railroad activity in the area (18 passenger trains were arriving and leaving Elkins daily around the time of the WVMA). The railroad, along with coal mining and timbering, were all major industries in the Elkins area prior to and during the time of the WVMA. The town of Davis was a lumber town in the late 1800's and into the early 1900's. Due to the lumber industry, Davis enjoyed nearly 40 years of rampant growth and prosperity. Lumber mills in Davis cut timber from areas along the Blackwater River, in Canaan Valley, along Beaver Creek, and on Canaan Mountain, Cabin Mountain and Backbone Mountain, areas that would be later utilized during the operational period of the WVMA. In other parts of the area between 1916 and 1939, the U.S. Federal Government began purchasing property for inclusion in the MNF for natural resource management purposes.

Following the area's use as the WVMA, much of the area was the same as it had been prior to the maneuvers. The majority of the land belongs to the MNF, local farmers,

private individuals, or large private entities (Western Pocahontas Land Corp, the WV Central & Pittsburgh RR Co, etc). The land reverted to agriculture uses (farming, grazing), recreational activities (hunting, fishing), mining, and timbering. Today the area is well known in the eastern United States for the various outdoor activities available. Two popular state parks (Canaan Valley and Blackwater Falls) were developed in Tucker County in the years following the WVMA along with the continued growth of the MNF. Hiking, skiing, rock climbing, rafting, hunting, and fishing are all extremely popular in the area, and attract thousands of visitors annually.

See *Section 3.3* above for further details concerning property ownership at the time of the WVMA and present ownership.

4.2 Military Operations at the WVMA

The former WVMA was the scene of special low altitude mountain training activities during World War II. Regiments and battalions of larger Infantry Divisions came to the area from maneuvers and installations in other parts of the country to introduce the troops to various aspects of mountain warfare. Based on preliminary Army reconnaissance of the area within the WVMA, it was found to be similar to that of the Apennines and lower ranges of the Alps in Italy. This allowed the troops to simulate conditions that would possibly be encountered during the invasion of Italy and other mountainous regions in the war time theater.

Rugged and primitive terrain, accessible enough to provide convenient approach yet natural enough to afford the cover and concealment found in unsettled areas, was discovered in early reconnaissance in West Virginia. Variations including precipitous rock formations, steep knobs covered with woods, and deep ravines scattered throughout the area. In the history of the WVMA, XIII Corps (Appendix G, Document G-22), the author wrote "One expanse from the Allegheny Front to Canaan Valley was found to be almost uninhabited and the government determined it to be ready-made for artillery range practice."

The WVMA was selected by representatives of the Army Ground Forces, U.S. Army, subsequent to the completion of a mountain training program at Buena Vista, VA, in April 1943. The Commanding General, Fifth Service Command was directed to procure maneuver rights for the area and the Commanding General, XIII Corps was given instructions for its use.

On 15 June 1943, Col. Arthur W. Gower, reported to Headquarters XIII Corps for instructions with reference to his assignment as Director of the WVMA. On 19 June, 1943, he arrived at Elkins, WV with an advance detachment consisting of six drivers and mechanics and four quarter-ton trucks. A reconnaissance of the area was made on 19 June, 1943. The route of the reconnaissance included Elkins, Parsons, Thomas, Davis and Harman. Further reconnaissance was made commencing 21 June, 1943 by the XIII Corps, who would ultimately be responsible for the operation of the WVMA. On 27 June 1943, a formal request was made by the XIII Corps to conduct aerial photography of the

WVMA to determine proper locations for specialized training operations (Appendix G, Document G-22).

As a result of these reconnaissance activities, the Commanding General, XIII Corps, decided to establish Director Headquarters at Elkins, WV and during the period from 23 June to 20 July, 1943, further reconnaissance was made. This reconnaissance resulted in tentative selection of sites for WVMA Quartermaster (QM) Depot, QM Unit, XIII Corps, Evacuation Hospital, Headquarter (HQ) Company, 94th Signal Battalion areas, and such other corps units as it was anticipated would be assigned to the WVMA. Space was secured in the HQ of the MNF to serve as the WVMA HQ. On 30 June, 1943, the Director conferred with representatives of the Baltimore and Ohio Railroad and Western Maryland Railroad and perfected plans for hauling rail movements to and from the WVMA. The Rents and Claims Board, Fifth Service Command, cleared the Maneuver Area for use on 30 June, 1943 (Appendix G, Document G-22).

FIRE CONTROL PLAN

Prior to the use of the MNF property, a fire control plan was agreed upon by the USDA and XIII Corps in order to secure maneuver rights on MNF owned areas. The Army was to fulfill certain conditions, agreed upon in a conference held in Elkins, WV, on 8 July, 1943. A memorandum containing the agreement was approved by the Secretary of Agriculture in a letter to the Secretary of War dated 4 August, 1943. The USFS, in a document dated 6 August, 1943, prepared a complete fire control plan. (Appendix G, Document G-22)

As part of the agreement with the MNF, additional lookout towers were constructed as a result of the Army's artillery use in the Impact Area during the operational period of the WVMA. Fire lookout towers at Niges Cliff on North Mountain east of Circleville, Pigeon Roost near Bismark and Bearden Knob, in Courtland, were all constructed with Army funding during the operational period of the WVMA (WVU Public History Program, 1992). The Bell Knob Tower on Dolly Sods was also moved as a result of the Fire Control Plan. (Refer to Appendix R, Plate 21 for approximate fire tower locations.)

TRAINING OF INFANTRY DIVISION COMBAT TEAMS

Regiment exercises conducted at the WVMA emphasized physical conditioning, topography, map interpretation, bivouac establishment, stream crossing, and military problems unique to mountainous areas. Training schedules for infantry division combat teams at the WVMA typically included the following:

- Use of Yukon type pack-boards for transporting instruments, radios, light weapons, and other light loads.
- Visual signaling with emphasis on forming of definite visual-signaling teams equipped with field glasses for use in receiving over medium and long distances.
- Local security in rugged terrain including scouting and patrolling, use of trip wires, sign and countersign, and dropping of all rank in addressing officers.

- Occupation of difficult positions by firing batteries.
- Mountain surveying.
- Marches over mountainous terrain.
- Blackout condition driving.
- 3-day tactical problem for artillery, winding up with a "Shoot" involving live rounds.
- In the second week of training there were 2-day battalion combat team problems.
- Cliff-scaling training for limited officials and enlisted men.
- Specialized programs including training for engineers (improvised river crossing) and medics (including evacuation medicine, first aid and evacuation).

Infantry Divisions that attended the WVMA and dates of attendance were as follows (refer to Appendix G, Documents G-22, G-37, G-39, G-48, G-49, G-50, G-51, and G-52):

- 28th Infantry Division – 30 July 1943 – 30 September 1943
- 31st Infantry Division – 9 September 1943 – 16 November 1943
- 77th Infantry Division – 15 October 1943 – 2 January 1944
- 35th Infantry Division – 21 February 1944 – 28 March 1944
- 95th Infantry Division – 1 May 1944 – 1 July 1944

Typically Infantry Divisions would conduct troop maneuvers, including mountain marching, rock scaling, and mountain training problems, in the area generally bounded by the communities of Alpena, Sully, Gladwin, Elk, and Jenningston, WV. The Infantry Division would then conduct a more extensive problem in conjunction with artillery units within the WVMA Impact Area. Engineering units would train for river crossing exercises on the Dry Fork, Laurel Fork, or Blackwater River. Bivouac areas for Infantry Units going through the maneuvers were established at local farms, clearings, and Civilian Conservation Corps (CCC) camps throughout the maneuver area.

Small arms firing practice was conducted at two firing ranges constructed at the WVMA. One small arms range was located in Courtland (named the Buena Range in present day Canaan Valley) and the other was located outside of the WVMA boundaries in Dailey, WV (referred to as the Dailey Infiltration Camp (See Appendix H, Photo H-21)). Although the Dailey Infiltration Camp was outside of the proper WVMA boundaries, it appears to have been constructed on MNF-owned property. (According to Range Operation Common Operations Report RO-2, infiltration courses were "generally level and contain shell holes, trenches, slit trenches, wire entanglements, logs, stumps, sparse brush, and other obstacles. Machine guns were placed in position, test fired, and fitted with depression stops so that their fire was grazing and insured a three-foot clearance over crawling troops…..reduced charges of explosives representing artillery fire, mines, and booby traps could be placed throughout the course. Embankments were 30' thick at the base, 5' thick at the top, 15' high, and long enough to provide safety to the flanks of the infiltration course.") It should be noted that historical documents also refer to a Courtland Range, as well as a Buena Range. The towns of Courtland and Buena are in relatively close proximity and it is unclear if the references are toward the same installation or if there was an additional range that has not yet been discovered.

A general description of historical documents discovered during the preparation of this report indicated the 77th Infantry Division's mountain training at the WVMA included the following activities (refer to Appendix G, Documents G-40, G-42, G-47):

- Combat Teams conducted a river crossing on the Laurel Fork River.
- Combat Teams conducted mountain marching crossing Rich Mountain and rock scaling on points near Gladwin, Sully, and Jenningston including Chimney Rock and Pointy Knob.
- Combat Teams conducted a military maneuver problem consisting of attacking the high ground west of the town of Red Creek and seizing the high ground from Pointy Knob to Chimney Rock.
- Reports stated that a temporary field ammunition depot for the troop maneuvers was established at the town of Evanwood, WV, which is situated along Route 33. Exact location of this depot was not established.
- A maneuver problem involving artillery indicated that Red forces were located on/near Brown Mountain and Blue forces were holding the line at Bearden Knob. The Cannon Company was located on the west slope of Cabin Mountain. A Class I & III truck-head was located at Cosner School and the ammunition depot was located 1.5 miles north of Cosner School (both along Courtland Road (now Route 32). The Evacuation Hospital was noted as being located at Stuart Park.

A description of historical documents discovered during the preparation of this report indicated the 35th Infantry Division's mountain training at the WVMA included the following activities:

- Combat Teams conducted a river crossing on the Laurel Fork River.
- Combat Teams conducted mountain marching and rock scaling on points near Gladwin, Sully, and Jenningston including Gladwin Rocks and Jenningston Rocks.
- A Combat Team firing exercise using artillery and mortars was conducted on Brown Mountain. (It is noted that in the USGS Quad with notations in Appendix I that Brown Mountain was listed as a target for mortar firing near the confluence of Yellow Creek and the Blackwater River.)

A description of historical documents discovered during the preparation of this report indicated the 95th Infantry Division's mountain training at the WVMA included the following activities (refer to Appendix G, Documents G-41):

- Combat teams conducted platoon firing tests at a small arms firing range (refer to Appendix G, Document G-45).
- Combat teams conducted day and night river crossing on the Blackwater River.
- A combat team firing exercise was conducted on 6 June 1944. Location of firing exercise was not given.

FIELD ARTILLERY UNITS

Corps Field Artillery (FA) units were sent students to the Assault Climbing School and also attended the troop maneuvers with Infantry Division Combat teams. A medical detachment of the 13th FA Observation Battalion also took the medical evacuation course originating at the medical evacuation hospital located at the Stuart Park Recreation Area. It is believed that the field artillery units spent a majority of their time at the WVMA conducting firing practice within the WVMA Impact Area. Maps of the Impact Area indicate 105-mm and 155-mm firing occurred within the Impact Area. It is also noted in various documents that some of the mountain training focused on moving artillery units through mountainous conditions. (Refer to Appendix G, Document G-22)

TANK DESTROYER BATTALION

The 628th Tank Destroyer Battalion operated on Bearden Knob from 6 November until 8 December, 1943. The 628th lived in winterized huts at the top of Canaan Mountain near Davis, WV. It is noted that the battalion came to the WVMA to achieve three key objectives: 1) Experience in mountain driving, 2) Become toughened to harsh weather, and 3) Achieve a passing score on an Army Ground Forces test. The unit built a moving target range utilizing OQ-2A Radio Controlled Targets that were fired on by machine guns (caliber .50 and caliber .30) on tank destroyers and M-32 truck mounts (refer to Appendix G, Document G-32). M-10's were also utilized on the firing range to pass the Army Ground Forces firing range. Based on historical evidence and 1945-46 aerial photography of the site, it appears as though the location of this firing range was located near the Bearden Knob Lookout Tower (refer to Appendix G, Documents G-22, G-35, G43 & G-44) .

SIGNAL TROOPS

The 94th Signal Battalion constructed 70 miles of standard pole line and installed and maintained field wire lines through mountainous terrain to furnish telephone service for combat teams, Operations HQ, and corps units training in the WVMA. Telephone service was extended from Elkins to the Seneca Climbing School encampment and Davis. The unit operated all communications in WVMA including a message center in Alpena and messenger service. Certain signal battalion personnel also participated in the Assault Climbing School, seven graduates of which were transferred to the instruction group. The 94th Signal Battalion operated an encampment in Elkins (Tract 3 on the WVMA Real Estate Map in Appendix I) and an equipment repair shop and storage area at the Yokum Street Depot.

On 26 July 1943, orders were sent, moving the 3rd Platoon, 281st Signal Pigeon Co, to the WVMA for attachment to the XIII Corps for training and to accomplish pigeon communication in the mountain training center there. The platoon was attached to the 94th Signal Battalion for administration. As part of their operations in Elkins, the 3rd Platoon conducted experiments in mountain flying and in camouflage of lofts. The 281st Signal Pigeon Company operated an encampment in Elkins (Tract 3 on the WVMA Real

Estate Map in Appendix I) which included several pigeon roosts. According Too an 18 August 1943 Clarksburg Telegram newspaper article, 12 pigeon cotes and between 750-1,000 pigeons served in the Pigeon Battalion. On 21 December 1943 the 281st was sent to the 2nd Army maneuver area in Lebanon, TN (Refer to Appendix G, Documents G-22).

ASSAULT CLIMBING SCHOOL

The Mountain Training Group from the 10th Light Division (Alpine) was selected to assist in technical training at the WVMA. The group was comprised of two sections: the technical advisor section, which provided officers to act as staff advisors, and the Assault Climbing, Scout and Pioneer Section, which provided instructors for evacuation training, fixed rope and cliff orientation training. An assault climbing school was attended by select infantry division personnel approximately 15 days prior to the combat team's arrival at the WVMA. Every organization of the division sent representatives to the assault climbing school of which, infantry regiments and the reconnaissance troop supplied the majority of men. The assault climbing school was a two week course in all types of rock climbing and traversing, including night traverses. Groups usually ordinarily consisted of approximately 350 officers and enlisted men (EM) selected from all units of the combat team (CT) and other entities. The Operating staff of the Assault Climbing School consisted of 4 officers, 75 EM. Difficult terrain was designed to train infantry division personnel so they could prepare routes for troops and get supplies through and evacuate casualties over terrain which ordinarily is impassable. Knots, rope handling, belaying, rappelling, piton placement for protection or aid and fixed ropes were all thoroughly covered in the curriculum. This training assisted qualified infantry division artillery and infantry observers and allowed personnel to emplace infantry weapons and snipers in commanding positions (Appendix G, Document G-22).

The Assault Climbing School's encampment was located on the Kisamore pig farm in the North Fork Valley along the North Fork of the South Branch of the Potomac River. The site that was selected, 1.5 miles north of Mouth of Seneca (now Seneca Rocks) along State Route 55, is such to locate it centrally with respect to the rock formations used for training (Seneca Rocks, Champe Rocks, etc). The encampment area was set up so that pyramidal tents housing climbing school officials were located in a grove of trees near the river, with larger tents (used for the mess hall and supply) located on one side of the field, leaving the remainder of the field for use for infantry division personnel attending the climbing school. According to Duke Watson, WVMA Official, there was also a QM truck detachment located at the intersection of the Seneca Climbing School encampment access road and State Route 55. He stated that it was at this point where he remembered fueling his Army jeep from drums of gasoline (Appendix J, Interview with Mr. Watson).

MULE SCHOOL

Along with the Assault Climbing School, the Mule School was also established by the Mountain Training Group at the WVMA. The mule school training was established in order to acquaint troops with mules and teach proper packing techniques for use in mountainous situations. The Mule School and encampment area was located in a field

near the community of Gladwyn, WV. Large tents housed classrooms, mess halls, officer quarters and administration. Two man pup tents were used for officers, EM and attendees. Corrals were also built in order to keep the mules orderly. The course lasted approximately 10 days. Four men per combat team attended the training. The staff of the Mule School consisted of the 254th Pack Troop – 2 officers, 78 EM, and 301 mules. Participation in the mule school usually preceded the combat team by approximately 10 days. (Refer to Appendix G, Documents G-22 & G-54)

ENGINEER UNITS

Engineer troops constructed and maintained mountainous roads, operated water points, and participated, whenever necessary, in mountain training of combat teams. Close engineer support was included in appropriate exercises to assist the forward movement of units by maintaining existing roads/trails, improvising rope ways and other river crossing expeditions, and in conducting demolitions and other road blocks in defensive situations. Engineering units attached to Infantry Divisions conducted bridge building exercises including bridges crossing the Laurel Fork, Dry Fork and Blackwater River (Appendix G, Document G-22).

According to "Holding the Line" (Appendix G, Document G-53) the 51st Engineer Combat Battalion was located at the WVMA in September 1943. In this document it states that the engineer combat battalion participated in a 10-day exercise which included the building of a road, landing strip, and Bailey bridge. Concerning the landing strip, it is believed that this landing strip is the one depicted in Appendix R, Plate 11. No records were found stating that the landing strip was used by aircraft, and it doesn't appear that there were any permanent structures constructed based on the aerial photo and oblique photo (Appendix H, Photo H20). Two tents located across Route 32 from the landing strip are noted. According to an interview with Adrian Kibler, whose father was a pilot with the 991st Field Artillery Battalion, and documentation on the 991st FA Battalion he provided, each artillery battalion was assigned two L-4 Piper cub observation planes for forward observation for the purpose of directing artillery fire. It is believed that this landing strip was used for the piper cub airplanes to direct artillery fire during artillery training in the WVMA. Aerial photographs examined following the timeframe of the WVMA note that the landing strip became overgrown and does not appear to have been used following the WVMA.

QUARTERMASTER UNITS

Quartermaster (QM) units stationed at the WVMA included the QM Battalion (HQ and HQ Det), 2 QM Truck Co, 1 QM Laundry Co, and 1 QM Depot Co. A vacant refrigerator plant (Dornblazer's) in Elkins was converted into the central supply distribution point for all items used within the maneuver area (referred to as the WVMA Depot). A QM transportation unit was stationed in the Southgate and Riverview Districts of Elkins in close proximity of the WVMA Depot. A tent city was erected near Elkins High School and the old fairgrounds to house QM and other station troops. The types of trucks used by the QM truck company that were present in the WVMA included ¼-ton

truck, ¾-ton truck, 1 ½–ton truck, 2 ½-ton truck, scout car, half-track truck, and light or medium tank trucks. The QM Laundry Company had an encampment and laundry tents located in Bowden, WV, just off of old State Route 33. (See *Section 4.2.2* for information detailing the QM and other supply company's authorized chemicals and related material at the WVMA.) (Refer to Appendix G, Document G-22)

ENCAMPMENT AREAS

Encampment areas were spread throughout the WVMA for various organizations and activities. Documented encampments within the WVMA are shown in Table 4.1.

Encampment Area (Site # on Real Estate Map)	**Acreage**	**Property Owner During WVMA**	**Descriptions of Site Impacts**
Assault Climbing School (Site #13)	14.80 acres	Wilbert Kisamore	Located 1.5 miles North of Mouth of Seneca for the Seneca Rocks Climbing School. (Appendix R, Plate 8)
Mule School (Not Listed)	Unknown	Unknown	Located near Gladwyn, this encampment/training area contained large and small tents, mule corral and training yard. (Appendix G, Doc. G-54)
QM Units (Site #7)	14.00	Trs. of the Valley Improvement Co.	Located in southeast Elkins, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 4)
QM Units in Elkins (Site #8)	1.17	Randolph Co. BOE	Located in southeast Elkins, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 4)
150th Engineering Combat Unit (Site #11)	17.00	Edna Hartman	Located in Kerens, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 7)
Kerens (Site #12)	10.00	I.N. Vanscoy	Located in Kerens, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 7)
448th Eng Depot Company (Site #15)	6.50	J.R. Teter	Located in Kerens, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 10)
Infantry Division (Site #16)	16.72	D.D. Canfield	Located in Kerens, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics. (Appendix R, Plate 7)
Signal Corps (Site #3)	22.70	J.V. Lough & Citizens National Bank	Located in west Elkins, this was a temporary tent encampment and truck company storage area. No signs of permanent buildings or permanent logistics. (Appendix R, Plate 3)
Engineers (Not Listed)	Unknown	Unknown	Located in Alpena, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics.
Engineers (Not Listed)	Unknown	Unknown	Located in Sully, this was a temporary tent encampment, no signs of permanent buildings or permanent logistics.

Table 4.1. Known encampment areas within the WVMA.

AMMUNITION STORAGE AREAS

An Ammunition Depot was noted as Tract #10 on the WVMA Real Estate Map. There were also Ammunition Supply Points (ASP) located wherever a CT was conducting practice firing. For example, a 77th Infantry Division maneuver memorandum stated that there was an ASP located at the Cosner School during training at the WVMA Impact Area near Canaan Valley (Appendix G, Document G-47). During the courthouse research of the property it was noted that Mr. Del Sordo (listed on the Real Estate map as being the owner of the property at the time of the WVMA) owned 400 acres of land north of Elkins. Based on documentation found concerning the site, it is unclear where the four acre site, which the Army leased during the operational period of the WVMA, was in relation to the larger 400 acre tract. The photo of the suspected Ammunition Depot (Appendix H, Photo H-23) is the only known historical documentation relating to the Ammunition Depot that was found during the research for this PA. During the field reconnaissance, Mr. Whetsell and Mr. Rice indicated that they believed that the location of the Ammunition Depot is on what is now Mountain State Memorial Gardens cemetery, approximately 5 miles northeast of Elkins. This site was visited during the site visit. No visual evidence of MEC was observed at the site during the time of the site recon. According to Mr. Whetsell and Mr. Rice, the topography of the site is thought to have been leveled during the construction of the cemetery (following use by the Army). Photo H-22 in Appendix H is the area that now encompasses the Mountain State Memorial Gardens. This is evident because the house on the left of the photo is still in existence. It appears, however, that this area served as a QM or engineering camp due to the large number of trucks shown in the photo at the site. It is more likely that the ammunition depot was located closer to route 219 (as noted in the WVMA map located in Appendix I, Map1) in a vacant field near Leading Creek (see Photo M83 in Appendix M). The property is still currently a vacant field that may be used for agricultural purposes.

Ammunition Depot Area (Site # on Real Estate Map)	Acreage	Property Owner During WVMA	Descriptions of Site Impacts
Ammunition Depot (Site #10)	4.00 acres	Victor Del Sordo	Located just north of Elkins. Based on historical photos (Photos 22-23 in Appendix H) it appears this area that contained tents, which housed ordnance, and a truck storage area. (Appendix R, Plate 6)

Table 4.2. Known ammunition depots within the WVMA.

MEDICAL AREAS

The 199th Station Hospital was specifically constructed for use at the WVMA. The hospital consisted of seven frame buildings and was erected near the Davis Memorial Hospital on the south side of Gorman Street in Elkins, WV. The framed buildings included two barracks, two wards, a mess hall, administration building, and steam heating plant. According to historical documentation reviewed, it was found that these were the only semi-permanent buildings that were known to have been built by the Army

specifically for use at the WVMA. The Army hospital worked in conjunction with Davis Memorial Hospital in that the Army hospital would provide hospitalizations for moderately sick and convalescent patients, while the more severely ill personnel were sent to Davis Memorial Hospital.

The 27th and 44th Medical Evacuation Hospitals sent groups consisting of one officer and twenty men each to combat teams for training in medical evacuation. These medical evacuation field hospitals were established at Stuart Park Recreation Area within the Monongahela National Forest (approximately 10 miles east of Elkins, WV). These evacuation hospitals were established to train field medical personnel dealing with mountainous situations (field medicine, physical conditioning, and evacuation techniques). (Refer to Appendix G, Document G-30)

The 343rd Medical Group participated in a complete course in Medical Evacuation in Mountain Operations on Middle Mountain in December 1943 and January 1944. Following arrival in Elkins, the medical personnel established a bivouac at Kerens, WV. The group conducted motor marches, foot marches, bivouac removal and movement, and general physical and mental conditioning in an area between Parsons and St. George, WV. Following these field exercises, the group was selected to participate in specialized mountain training in Sully/Jenningston, WV attached to an Infantry Division (ID) Combat Teams (CT). During these situations, the medical group was attached to a combat team and was responsible for evacuating artificial casualties. Officers and EM from the 343rd also attended the Assault Climbing School (Refer to Appendix G, Document G-30). According to an 18 August 1943 newspaper article in the Clarksburg Telegram, the field hospital had three operating tents, an x-ray unit, cook and mess tents, and a pharmacy tent.

WVMA Medical Facilities (Site # on Real Estate Map)	Acreage	Property Owner During WVMA	Descriptions of Site Impacts
Hospital Site (Site #1)	4.26	Western Maryland Railroad	Site of the 199th Station Hospital in the area of Elkins. Seven frame buildings (barracks, wards, mess hall, administration) were erected (Appendix R, Plate 3)
Hospital Site (Site #2L)	No Area	Western Maryland Railroad	Location of underground steam line at the 199th Station Hospital. (Appendix R, Plate 3)
Medical Evacuation Hospital	Unknown	Monongahela National Forest	Located in the Stuart Park Recreation Area, this site was the location of the medical evacuation hospital. Large tents were used for medical facilities, mess halls and supply posts. (Appendix R, Plate 13)

Table 4.3. Known medical facilities within the WVMA.

ORDNANCE BASE SHOP

It is noted on the WVMA Real Estate Map (Appendix I, Map 1) that there was an Ordnance Base Shop located between Elkins and Beverly, WV, along State Route 250/219. During the field reconnaissance of this property, a brief interview was conducted with the operator of Appalachian Motor Repair Shop, the current tenant on the property. He stated that he was aware that the building had once been used for "tank maintenance" during the maneuver timeframe. He stated that the garage door into the building had to be expanded in order to accompany the size of larger vehicles that the Army utilized. He also noted the original maintenance area's floor had additional concrete added to ensure support for the heavier loads from the Army vehicles. Based on documentation that was found during the preparation of this report, it is unclear what activities took place at this site, but the assumption can be made that vehicle and possible ordnance maintenance occurred at the site. This includes the potential for maintenance of M-10's which are anti-tank destroyers and resemble tanks. During the field reconnaissance, Mr. Don Rice noted that the structure had been Carl & Dick's Vehicle Shop (specializing in vehicle maintenance) when owned by Carl & Richard Degler in the past, leading one to presume that the vehicle maintenance assumption is valid.

Ordnance Base Shop Area (Site # on Real Estate Map)	**Acreage**	**Property Owner During WVMA**	**Descriptions of Site Impacts**
Ordnance Base Shop (Site #9)	0.60	Carl & Richard Degler	Prior to and following the WVMA this site was used as a car repair shop according to Don Rice, local Elkins historian. (Appendix R, Plate 5)

Table 4.4. Known ordnance base shops within the WVMA.

WATER SUPPLY LOCATIONS

Water supply points were known to have existed at several locations throughout the WVMA. Known water filtration and storage points were located in the following areas:

- Kerens, WV, area near Tract #16 on the WVMA Real Estate Map (Appendix I).
- Seneca Rocks Climbing School on Track #13 on the WVMA Real Estate Map (Appendix I).
- Kingston School (location unknown), not located on the WVMA Real Estate Map. (150th).
- Davis, WV (exact location unknown), not located on the WVMA Real Estate Map. (150th).
- Stuart Park (exact location unknown), not located on the WVMA Real Estate Map. (150th).
- Near Buena Firing Range (exact location unknown), not located on the WVMA Real Estate Map. (150th).
- Near Cosner School (generally located in Canaan Valley), not located on the WVMA Real Estate Map. (150th).

According to an article in the Clarksburg Telegram dated 18 August 1943 a description of the water purification/storage process would be something like:

"At one of the field establishments in the MNF a giant water unit is kept busy sucking water from a mountain stream, running it into giant canvas tanks for settling and storage. The water tank itself consists of pumping units, filter and a chlorination unit, and the canvas tanks themselves are capable of holding hundreds of gallons of water….After being purified the water is taken to the various camp units in Lister bags."

MONONGAHELA NATIONAL FOREST (MNF) PROPERTIES

Property owned by the Monongahela National Forest and utilized by the DoD during the operational period of the WVMA housed various activities by the Army. On the 350,416-acre property the following activities were found to have taken place:

- Dailey Infiltration Camp – This camp included what is thought to be a small arms firing range and training grounds (Photo #H21 in Appendix H). Looking at Photo H21 in Appendix H it appears as though troops are conducting training while simulated or smoke rounds are being detonated around them. Currently the range is still in much the same condition as it was at the time of range operation, except for significant tree and underbrush growth has occurred at the site. The berms and "foxholes" are still visible. It is unclear whether grenades were possibly used at the site.
- The Stuart Park Recreation Area of the MNF was used as a Medical Evacuation Hospital (see Medical Areas Section above).
- The XIII Corps established the WVMA HQ office in the Monongahela National Forest HQ building.
- The Yokum Street Depot was used by the DoD during the operational period of the WVMA for several uses: veterinary hospital for the 281st Pigeon Co, encampment for military police and other servicemen, mess hall, and a small repair station for equipment/vehicles. Prior to and following the war the Yokum Street Depot was used by the CCC and Monongahela National Forest as a motor vehicle/equipment repair and storage area.
- The remainder of the MNF was used by infantry division combat teams who conducted various training exercises and combat problems.

MNF Areas (Site # on Real Estate Map)	Acreage	Property Owner During WVMA	Descriptions of Site Impacts
Maneuver Area (A)	341,266.00	U.S. Department of Agriculture	See Above
Maneuver Area (B)	9,150.37	U.S. Department of Agriculture	See Above

Table 4.5. Known Monongahela National Forest properties leased to the XIII Corps.

4.2.1 Operations Involving Military Munitions

It is documented (based upon found UXO, OE-related scrap, historical documents, historical mapping and historical photos) that several areas within the former WVMA were the site of artillery, mortar, and small arms firing. Based on information found on historical maps and historical site documents it is known that rounds fired during the 1943 to 1944 military training included the following:

- 40-mm and 57-mm armor-piercing (AP) projectile.
- 105 mm and 155-mm high explosive (HE) howitzer rounds, and 105-mm smoke rounds.
- 60-mm HE, 81-mm HE and SR, and 4.2-inch inert (sand-loaded rounds), HE, and SR mortars.
- .30 caliber and .50 caliber machine gun rounds.
- 75-mm artillery is documented as being fired in the region, although no physical evidence of such activity, has been found.
- 3.25" Rockets.
- The presence of practice anti-tank mines and practice anti-tank fuses is documented, although no evidence of use or no physical evidence has been found.

Information concerning the actual amount of ordnance used for regional training purposes is not available; records regarding military operations in the area are scarce because the majority of pertinent documents are thought to have been lost or destroyed over time.

The following sub-sections report information found during the preparation of this report which specify firing information including target and firing locations.

4.2.1.1 Historical Map Interpretation

Monongahela National Forest – Potomac Ranger District map with Notations (dated 1941, date of notations unknown)

This map was found by the U.S. Army Corps of Engineers, St. Louis District in 2003 while conducting historical document research at the Fort Worth, TX, National Archives (Appendix I, Map 3). The map is the official Potomac Ranger District map with hand-drawn artillery-related notations that were presumably drawn on by one of the decontamination teams that searched the Impact Area in the years following the use of the properties. The notations show firing and target locations within the southern Dolly Sods Area. Notations of note on this map include:

- Hachured areas indicating Impact Areas around Bear Rocks to Stack Rocks and to the north, directly west and northwest of the town of Streby, WV.
- Gun emplacements located on Harmon Knob (west of Blackbird Knob) firing on locations on/near Blackbird Knob and points along Red Creek.
- Gun emplacements located at Rohrbaugh School.

- Gun emplacements near Red Cabin firing at locations just west of Forest Road 75 and near the headwaters of Red Creek.
- A 105-mm howitzer and 81-mm mortar impact area is listed near the confluence of Stonecoal Run and Red Creek.
- A machine gun/mortar firing point is listed as being located at the southern Rohrbaugh Plains near the Tucker/Grant/Randolph County line.

USGS Topographical Quadrangle Maps with Notations (date unknown)

This map was found by the U.S. Army Corps of Engineers, St. Louis District in 2003 while conducting historical document research at the Fort Worth, TX, National Archives (Appendix I, Map 4). The map is presumably a series of connected USGS Quadrangle Maps highlighting the WVMA Artillery Range Impact Area. The map contains several hand drawn notations indicating notable artillery-related information. Important notations on this map include:

- A 105-mm and 155-mm howitzer firing point located near the Rohrbaugh School. Based on the map, the presumed target is Bear Rocks and Stack Rocks. A note found within the "Decontamination Report Memorandum" states that cross-hachured areas of Bear Rocks and Stack Rocks were still contaminated.
- Several Impact Areas are located along the northern portion of Forest Road 75.
- A 105-mm howitzer and gun emplacement is located at Bearden Knob. The target location is shown to be the western face of Cabin Mountain.
- An 81-mm and 60-mm mortar firing location is shown as being located at the confluence of Yellow Creek and the Blackwater River. The target for this firing point is shown as being Brown Mountain.
- A 155-mm howitzer firing point is shown on Beaver Creek approximately 2 miles northeast of Davis, WV. The target locations for this firing point are along the western face of Cabin Mountain.
- There are three locations where there is a rectangle located under firing points. It is believed that these are the locations of target practice or training areas based on information found in historical documents and in warnings posted in local newspapers during the operational period of the WVMA. The locations noted are located at Bearden Knob, the confluence of Yellow Creek and the Blackwater River, and along Beaver Creek.

West Virginia Maneuver Area Real Estate Map (Final Ownership Map dated 9-22-1950)

This map was provided by the U.S. Army Corps of Engineers, Baltimore District Real Estate Division (Appendix I, Map 1). The map provides Land Owner, Acreage, Lease/Permit Information, and Property Usage.

WVMA Impact Area Real Estate Map (Final Ownership Map dated 9-22-1950)

This map was provided by the U.S. Army Corps of Engineers, Baltimore District Real Estate Division (Appendix I, Map 1). The map provides Land Owner, Acreage,

Lease/Permit Information, and Property Usage of the tracts that made up the WVMA Impact Area.

4.2.1.2 Historical Newspaper Information

During the operation of the WVMA, Army officials would place warning notices in local newspapers notifying citizens of specific locations of artillery and ammunition use within the Impact Area. The local newspapers researched for inclusion within this report included the Elkins Inter-Mountain, Grant County Press, and Pendleton Times, dates inclusive of WVMA operational time frame. The general description of the Impact Area given in the Elkins Inter Mountain is as follows:

> "The area closed to the public extends from Davis/Tucker Co Line north to Tucker/Grant Co line, east to the northwest corner of the Tucker Co line, south to Jordan Run Post Office, west through Rohrbaugh school to the Tucker/Grant Co line, south to the intersection of the Grant/Tucker/Randolph county line, west to the Tucker/Randolph Co line to Dry Fork, North along SR 32 to Davis."

Below are summaries of the findings of the warning notices and the dates in which the warning was applicable.

- 5 September, 1943 – Artillery and small arms firing will take place east of Highway 32 Cabin Mountain to Brown Mountain, Stoney River, Fore Knobs and Rohrbaugh School. Small arms in the vicinity of Odleman Run will continue for 2 weeks (machine gun and rifle).
- 15-20 September, 1943 – Artillery and small arms firing takes place East of Route 32 in the area bounded by Cabin Mountain to Brown Mountain, Stoney River, Fore Knobs and the Rohrbaugh School. Small arms firing take place in the vicinity of Odleman Run.
- 21-26 September, 1943 – Pistols, rifles, carbines and other small arms on all firing ranges. (It should be noted that specific ranges were not included with this advisory.)
- 25 September, 1943 - .30 caliber machine gun firing north of Route 33 in the vicinity of Low Gap and Yellow Creek
- 18-30 October, 1943 – 105-mm artillery firing on Bear Rocks. Artillery firing also in the entire western sector of the impact zone with targets along Cabin and Brown Mountains.
- 7-8 November, 1943 – Machine gun, mortar and cannon firing Blackbird Knob and north.
- 10-13 November, 1943 – 105-mm firing at Bear/Stack Rocks.
- 20-26 November, 1943 – Artillery, cannon and machine gun firing Northern Canaan Valley (Cabin and Brown Mountains, Little Blackwater River and Glade Run) Blackbird Knob between Cabin and Allegheny Front.
- 3-7 December, 1943 – Machine gun firing in central and northern Canaan Valley and on Brown and Cabin Mountains.

- 11 December, 1943 – Machine gun and mortar firing from Harman Knob and to the north and east of this point. Artillery firing in central and northern Canaan Valley (Brown and Cabin Mountains).
- 11-18 January, 1944 – This advisory notes that machine gun firing in central and northern parts of Canaan Valley, Brown and Cabin Mountain
- 21-23 January, 1944 – This advisory notes Red Creek, Blackbird Knob, and Bear Rocks as hazardous areas.
- 18-25 January, 1944 – Machine gun firing at central and northern Canaan Valley and in the vicinity of Cabin and Brown Mountains.
- 3-4 February, 1944 – Machine gun firing at Red Creek, Blackbird Knob, Bear and Stack Rocks and Cabin Mountain.
- 27-28 February, 1944 – Rohrbaugh School, Bear Rocks, Stack Rocks and Blackbird Knob
- 3 March, 1944 – Cabin Mountain, Canaan Valley, Blackbird Knob and north. Also, Bearden Knob to Cabin Mountain
- 6 March, 1944 – Attack on Cabin Mountain. Weapons include machine guns, 81-mm mortars, 37-mm and 57-mm anti-tank guns and 105-mm cannon and howitzers. Hazardous areas included Cabin Mountain, Canaan Valley, Blackbird Knob and north, an area running east of Bearden Knob to Cabin Mountain. Battalion and regimental maneuvers have been held on Mozark, Canaan and Backbone Mountains and the Blackwater Canyon region (blank ammunition used)
- 15-16 March, 1944 – Mortar and machine gun firing in the northern Canaan Valley and Cabin/Brown Mountain areas
- 26 March, 1944 – Cannon and machine gun firing at the locations will be in Central and northern Canaan Valley, Cabin Mountain, Blackbird Knob, and in the vicinity (Allegheny Front from Rohrbaugh School to Bear Rocks and from Bearden Knob east to Cabin Mountain)
- 5-9 May, 1944 – Mortar, machine gun and cannon firing on the artillery range in the vicinity of Red Creek, Blackbird Knob and Cabin Mountain, Rohrbaugh School Area, Bear Rock and Stack Rock, Brown Mountain, and northern Canaan Valley
- 19-22 May, 1944 – Firing in the area of Brown Mountain, Canaan Valley, and Cabin Mountain
- 8-11 June, 1944 – Firing on the artillery range at the locations of Brown Mountain, Northern Canaan Valley, Cabin Mountain, and up toward the Allegheny Front
- 14-18 June, 1944 – Machine gun, mortar and howitzer firing at the locations of Red Creek, Rohrbaugh School, Alleghany Front, Bear Rocks, Stack Rocks, Brown and Cabin Mountain and the northern and central Canaan Valley
- Hunting Restrictions for 1943-44 were established for Tucker County with the following boundaries - East of 32, top of Canaan Mtn south of Davis to Elk and the territory east of a road leading from SR 72 near Elk to Alpena. Randolph County boundaries include east of road from Alpena to Elk, north of Route 33 and west of 32, around Stuart Park and other encampments (along 219 N of Elkins). Grant County areas off-limits include all territory south of a line extending east-

west across the Stoney River Dam from the Grant/Tucker line to SR 42, including the area west of Jordan Run road and SR 28.

- An editorial by a local resident included the following description of Army activity on Jordan Run: Heavy army trucks, jeeps and heavy guns. Shot from MK Barger's farm. "Seemed to pass through to Streby"
- An article by a local reporter included the following description of Army activity: Gun emplacements along Allegheny Front fired across Allegheny to Blackbird Knob near the head of Red Creek, emplacements on Dolly Sods Road fired across to Cabin Mountain.

4.2.1.3 Recent UXO and Rocket Finds Within the Former WVMA Impact Area

In recent history there have been several UXO and rocket finds within the former WVMA Impact Area. The recent finds (within the past five years) are described below (see Appendix R, Plate 22):

- July, 2004 – One 3.25" rocket was found on Canaan Valley Institute property approximately 3 miles east of Davis, WV, in Yellow Creek.
- July, 2006 – One 3.25" rocket was found on Canaan Valley Institute property approximately 3 miles east of Davis, WV, near Yellow Creek.
- July, 2006 – One 81-mm mortar find located on Raven's Ridge Trail located within the Dolly Sods North Area.
- November, 2006 – Two 3.25" rockets were found on Canaan Valley Institute property approximately 3 miles east of Davis, WV, near Yellow Creek.
- December, 2006 – One 3.25" rocket was found on Canaan Valley Institute property approximately 3 miles east of Davis, WV, near Yellow Creek.
- April, 2007 – One 105-mm howitzer round was found on CVNWR property on the western face of Cabin Mountain.
- June, 2007 – One 60-mm mortar was found on Fischer Spring Run Trail located within the Dolly Sods Wilderness Area near the intersection of Fischer Spring Run and Red Creek.

4.2.1.4 Allegheny Ballistics Laboratory Use of the Site

Following the area's use as the WVMA, the Office of Scientific Research and Development (OSRD) in the Office for Emergency Management, received a use permit from the Secretary of War to use a portion of Department of Army leased lands within the WVMA's Impact Area. On 1 May 1945, properties covered by Lease No. W33-017-Eng-345 and W33-017-Eng-1403 within the Impact Area of the WVMA were issued for OSRD's use (Appendix G, Document G-3). According to documents found in the preparation of this report, the land was to be used by the Allegheny Ballistics Laboratory (ABL) to conduct firing using experimental rockets and other projectiles. A Report of Decontamination, found at the Fort Worth, TX National Archives (Appendix G, Document G-28), stated that the experimental rocket motors that were fired had no explosive components. According to this report a large number of rounds for the 4.2-inch chemical mortars were fired, both FS (smoke filled) and inert (sand loaded). It is unclear,

based off of this description whether the description of the number of 4.2-inch mortars was describing the ammunition fired by ABL or the general nature of finds associated with the decontamination effort. According to real estate documentation of the WVMA, the properties reverted back to the Army and leases W33-017-ENG-345 and W33-017-ENG-1403 were cancelled on 28 February and 30 June 1946, respectively (USACE, 1995a and Appendix G, Document G-2).

4.2.2 Operations Involving HTRW

It is documented (based upon the WVMA Administrative and Supply Plan (Appendix G, G-23), historical documents and USACE Common Operations Reports (Appendix B, RO-1 to RO-11/CO-13 to CO-18 acquired during the preparation of this report), that several areas within the former WVMA possibly contained petroleum, oil and lubricants (POL) of note. The following section provides POL of note, storage practices and potential contamination areas.

The following information was found in the WVMA Administration and Supply Plan (Appendix G, Document G-23):

- The Director HQ operated a comprehensive depot in Elkins, WV known as the WVMA Depot. All classes of supply were handled through this depot. (Note - It is believed that the depot in question was known as Dornblazer's Refrigeration Company which was a refrigerator manufacturing plant located in southeast Elkins. The Army utilized this facility during the timeframe of the WVMA and according to people familiar with the area, served as the hub for all materials in the WVMA.
- Third and fourth echelon vehicle repairs made by service troops in the vicinity of Elkins. (Note - Third and fourth echelon maintenance involves more complex procedures, such as overhauling engines, and usually is performed by highly qualified specialists. It is believed that this type of repair was conducted at the Ordnance Base Shop. The reference to ordnance could include both weapons and vehicles.)
- The WVMA railhead was noted as being in Elkins, WV. A truckhead was established at the Mouth of Seneca to serve the maneuver establishments located in this vicinity. Additional truckheads will be selected, established and operated as required by the tactical employment of troops. (According to an interview conducted with Duke Watson, WVMA Official, he recalls there being a truck unit located on the same property as the Seneca Climbing School encampment at the intersection of the access road and Highway 55. He recalls drums of oil and gasoline for Army vehicle use in the area.)
- A Field Laundry station will be established in the vicinity of Elkins, WV. The exact location will be announced later as will the schedule for laundry service for all troops in the WVMA. (Note – There was a laundry unit located around the community of Bowden, WV based on the WVMA Real Estate Map (Appendix I). It is believed that this location is what is being referenced by the statement above.)

- A QM Truck Company will provide a WVMA Transportation Pool to provide truck transportation for cargo and personnel in accordance with priorities determined by HQ. (Based on historical documents it is believed that the truck company stored trucks near the 94th Signal Battalion encampment and near the QM encampment on Properties #3/4 and 7/8 respectively. It is unclear if maintenance or gas/oil storage occurred on these properties.)
- A QM Gasoline Supply Co. will be established and will operate a gasoline refilling point in the vicinity of Elkins, WV. Gasoline distributing points will be established and operated as required by the tactical employment of troops. (Based on information obtained during the preparation of this report the exact location of the gasoline refilling point could not be determined. According to Don Carroll, local resident, his father would deliver gasoline by truck to an area adjacent to the railroad in southeastern Elkins, just northwest of the WVMA Depot at Dornblazer's Refrigerator Factory. Mr. Carroll was not aware of what the gasoline was stored in by the Army from that point on. This information would tend to be credible since it was noted in the Administration and Supply Plan that all classes of supplies were to be handled through the WVMA Depot.
- Class III supply notes:
  - The contractor will deliver by tank car or tank quantities of gasoline, as called for by the QM Director HQ XIII Corps, direct to a Class III refilling point (gasoline, oil, lubricants).
  - A limited supply of oils, greases, kerosene and white gasoline for lanterns will be stocked at the WVMA Depot.
  - The gasoline supply company will operate a refilling point and will establish and operate such Class III distributing points as the tactical situation requires.
  - Re-supply of gasoline will be effected through the exchange of empty five gallon cans for full ones. It is unclear whether this practice was in addition to any further storage practices (aboveground and underground storage tanks).
- A motor pool will be located in the vicinity of the Depot at Elkins, WV, and will be operated by the Transportation Officer of the QM Office. (It is unclear if gas/oil storage and vehicle maintenance occurred at this site.)
- The ordnance base maintenance shop will be located in the vicinity of Elkins, WV. The base maintenance shop will support divisional maintenance company and service all other units. (Note – It is believed that the Ordnance Base Shop that was listed in this section is Tract No. 9 shown in the WVMA Real Estate Map in Appendix I. According to Don Rice, local historian, this property was previously Carl and Dick's Auto Repair Shop prior to and following the WVMA. (Reference Section 4.2 Ordnance Base Shop))
- An Ammunition Depot will be located in the vicinity of Elkins. Ammunition supply points will be located as required. (Note – It is believe that this Ammunition Depot is Tract #10 shown on the WVMA Real Estate Map in Appendix I. Appendix H, Photograph H23 shows a photo of this installation.)
  - All unexpended ammunition will be returned to nearest ASP or ammunition depot immediately upon termination of a problem. This ammunition will be returned in original containers.

- Salvage of brass is essential. Empty cartridge cases and clips will be collected and returned to the nearest ASP or ammunition depot.

- The XIII Corps will establish a Medical Supply Depot at the WVMA Depot at Elkins.
- Where practical from the standpoint of duration of stay in any particular locality, field incinerators will be constructed. Areas around messes, kitchens, incinerators, soakage pits will be kept clean. (Note – No evidence of incinerator construction was found during the preparation of this report.)

INFORMATION FROM HISTORICAL NEWSPAPER ARTICLES

An article that was obtained from the 18 August, 1943 edition of *The Telegram*, a Clarksburg, WV, newspaper stated the following concerning the laundry units and the field evacuation hospital:

> "The boiler system is a marvel of ingenuity, being a closed circulating system, with the waste exhaust steam from the tumbler being used to heat the water for the washing unit, then returned by condensers and pumps to the boiler for use again. The boiler burns fuel oil. A separate gasoline motor runs a large direct current generator that furnishes power for the washer spinner and two tumblers that are on every unit.
>
> There are three operating tents with the hospital unit, complete with sterilization chambers, operating tables, screened operating rooms, oxygen and gas units, spotlights, and almost all paraphernalia of a modern hospital operating room. An x-ray unit is located in another tent, and there are several dozen ward tents equipped with cots to handle other patients."

From these statements it appears as though there was a fuel oil and gasoline storage area located in close proximity to the laundry units. If there was a laundry unit associated with the station hospital, according to Common Operations Report (COR) CO-13 (HGL, 2006a), it states that "…facility drawings for the laundry plant boiler house identify aboveground fuel oil storage tanks. A 575-gallon storage tank is required for a 1,000-bed hospital laundry boiler house…" This would indicate that almost without uncertainty that laundry units would require an attached AST of some size. Also, x-ray units were likely at both the station hospital and the medical evacuation hospital.

4.3 Map Analysis

Several maps were acquired for the completion of this PA Report. Names of maps acquired and relevant information provided is explained below:

West Virginia Maneuver Area Real Estate Map (Ownership Map dated 9-22-1950)

This map was provided by the U.S. Army Corps of Engineers, Baltimore District (Appendix I, Map 1). The map provides Land Owner, Acreage, Lease/Permit

Information, and Properties Usage. Information found as a result of this map is as follows:

- Tract 1 – This map indicates that this property was used as a 199th Station Hospital. (Appendix R, Plate 3)
- Tract 2L – The map indicates that this is a "Lesser Interest" License. Agreement for the Army to construct an Underground Steam Line for use with the 199th Station Hospital. (Appendix R, Plate 3)
- Tract Number 3 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 3)
- Tract 4 – This map notes that this property was generically used as a "Maneuver Area". (Appendix R, Plate 3)
- Tract 5 - This map notes that this property was used for Athletic and Recreation. (Appendix R, Plate 3)
- Tract Number 6 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 3)
- Tract Number 7 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 4)
- Tract Number 8 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 4)
- Tract 9 – This map notes that this property was used as an Ordnance Base Shop. (Appendix R, Plate 5)
- Tract 10 – This map notes that this property was used as an Ammunition Depot. (Appendix R, Plate 6)
- Tract 11 – This map notes that this property was used for the 150th Engineering Combat Force. (Appendix R, Plate 7)
- Tract Number 12 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 7)
- Tract Number 13 – This map indicates that this tract was used as Tent Camp or Camp Sites. (Appendix R, Plate 8)
- Tract 14 – This map notes that this property was used for a Laundry Unit. (Appendix R, Plate 9)
- Tract 15 - This map notes that this property was used for a 448th Engineering Depot Co. (Appendix R, Plate 10)
- Tract Number 16 – This map indicates that this tract was used as Tent Camp or Camp Site. (Appendix R, Plate 7)

The map also notes that two separate Use Permits were signed between the Department of Agriculture and the DoD. These two tracts made up a majority of the leased properties within the WVMA with Use Permit dated 4 August 1943 transferring 341,266.00 acres and Use Permit dated 10 November 1943 transferring 9,150.37 acres.

West Virginia Maneuver Area Real Estate Map – Impact Area (Project Ownership Map dated 9-22-1950)

This map was provided by the U.S. Army Corps of Engineers, Baltimore District (Appendix I, Map 2). This map provides information about the tracts that made up the 48,482.59 acre WVMA Artillery Range Impact Area. Information provided includes Tract Number, Land Owner, Acreage Leased by the Army, Lease Number and Lease Termination date. For specific information on these tracts see *Section 3.3* and Appendix I.

Monongahela National Forest – Potomac Ranger District map with Notations (dated 1941, date of notations unknown)

This map was found by the U.S. Army Corps of Engineers, St. Louis District in 2003 while conducting historical document research at the Fort Worth, TX, National Archives (Appendix I, Map 3). The map is the official Potomac Ranger District map with hand drawn notations presumably from the UXO decontamination teams following the timeframe of the WVMA relating to artillery information. The notations show firing and target locations within the southern Dolly Sods Region. Notations of importance on this map include:

- Hachured areas indicating Impact Areas around Bear Rocks to Stack Rocks and to the north, directly west and northwest of the town of Streby, WV.
- Gun emplacements located on Harmon Knob firing on locations on/near Blackbird Knob and points along Red Creek.
- Gun emplacements located at Rohrbaugh School (near Forest Road 75).
- Gun emplacements near Red Cabin firing at locations just west of Forest Road 75 and near the headwaters of Red Creek.
- A 105-mm howitzer and 81-mm mortar impact area is listed near the confluence of Stonecoal Run and Red Creek.
- A machine gun/mortar firing point is listed as being located at the southern Rohrbaugh Plains near the Tucker/Grant/Randolph County line.

Lease Area-Impact Area, West Virginia Maneuver Area (Tucker and Grant Counties, date unknown)

This map was found by the U.S. Army Corps of Engineers, St. Louis District in 2003 while conducting historical document research at the Fort Worth, TX National Archives (Appendix I, Map 5). The map shows Tract numbers and property bearings for tracts that were leased for use in the WVMA Artillery Range Impact Area. Also, the areas around Bear Rocks and Stack Rocks are hachured, presumably representing their use as an Impact Area.

USGS Topographical Quadrangle Maps with Notations (date unknown)

This map was found by the U.S. Army Corps of Engineers, St. Louis District in 2003 while conducting historical document research at the Fort Worth, TX, National Archives (Appendix I, Map 4). The map is presumably a series of connected USGS Quadrangle Maps highlighting the WVMA Impact Area. The map contains several hand drawn notations presumably from the UXO decontamination teams following the timeframe of the WVMA indicating notable artillery related information. Important notations on this map include:

- A 105-mm and 155-mm howitzer firing point is located near the Rohrbaugh School. Based on the map, the presumed target is Bear Rocks and Stack Rocks. A note found within the "Decontamination Report Memorandum" states that hachured areas were still considered contaminated (areas of Bear Rocks and Stack Rocks).
- Several Impact Areas are located along the northern portion of Forest Road 75.
- A 105-mm howitzer and gun emplacement is located at Bearden Knob. Target location is shown to be the western face of Cabin Mountain.
- An 81-mm and 60-mm mortar firing location is shown as being located at the confluence of Yellow Creek and the Blackwater River. The target for this firing point is shown as being Brown Mountain.
- A 155-mm howitzer firing point is shown on Beaver Creek approximately 2 miles northeast of Davis, WV. The target locations for this firing point are along the western face of Cabin Mountain.
- There are three locations where there is a rectangle located under firing points. It is believed that these are the locations of ranges or training areas based on information found in historical documents and in warnings posted in local newspapers during the operational period of the WVMA. The locations noted are at Bearden Knob, the confluence of Yellow Creek and the Blackwater River, and along Beaver Creek.

4.4 Aerial Photographic Interpretation

As part of the preparation of this PA, historical photographs of the WVMA were acquired and reviewed by CELRH, as well as the U.S. Army Engineer Research and Development Center (ERDC) Topographic Engineering Center (TEC). TEC was contracted by CELRH to acquire and provide a professional interpretation of historic 1945 aerial photos of the Impact Area. It was the intent of the subsequent report to determine if there is visual evidence of the Army's use of the property (i.e. ground scarring, buildings, firing ranges, targets, etc). The following sections provide the interpretation of historical photographs acquired during the TEC report, as well as interpretations expressed from an Aerial Photographic Analysis conducted on the Dolly Sods Area in 2003 by the U.S. Environmental Protection Agency (USEPA). A set of 1943 aerials, conducted during Army reconnaissance of the WVMA, were also acquired from Rob Whetsell, local Elkins historian. Due to the extreme size of the former WVMA, and the potential costs involved, only the 1943 and 1945 aerial photographs were acquired for this project.

Aerial Photographic Analysis of Dolly Sods Study Area in the Former West Virginia Maneuver Area, USEPA Region 3, November 2003

This report presents the results of a historical aerial photographic analysis of the Dolly Sods study area covering approximately 16,384 acres located within the MNF. The Dolly Sods study area is situated within the former WVMA which was used by the U.S. Army for military training, including artillery target practice during World War II. Five years of photographs from the years 1943, 1945, 1958, 1969, 1990 through 1997 were analyzed for this report. An expanded area around Dolly Sods study area covering a small portion of the former WVMA has been included in this analysis for the time period from 1943 through 1945.

The results of the analysis of the historical photographs of the Dolly Sods study area revealed no impact craters from artillery munitions, military ordnance, or explosives. No visible vehicle roads were noted within Dolly Sods study area that was identified as evidence of military training activity. Ground scars and earth moving activity for possible waste burial were identified. A few of the hiking trails that serve this wilderness recreation area were visible. The dense forest and vegetation cover within the study area may have obscured from view potential ground scars resulting from past military training activities.

In the expanded area for the period 1943 through 1945 discernable signs of vehicle tracks from possible training maneuvers, a possible former firing range, and one probable camp were noted.

The following photographs listed within the report documented noticeable evidence of Army use of the property:

- Figure 5 – Area along Laneville Road (County Road 32-2). The features of interest are three large cleared areas containing ground scars on a north-sloping hillside adjacent to the south side of County Road 32-2. These ground scars appear to be the result of probable vehicle-dispersed tracks across open terrain. These ground scars were not observed at this location on the 1943 photo coverage.
- Figure 7 – Area along Timberline Road (County Road 32-16). A pattern of ground scars and bare soil, which appears to be a possible former training or firing range, with access to County Road 32-16 via a trail is observed. This possible range contains four linear rows of ground scars that are approximately 250’ apart. A significant pock-marked pattern of disturbed ground is visible within the center portion of these linear rows of ground scars. These pock-marks may be impact craters caused by weapon firing. Another linear feature can be observed at the east end of the possible range that appears to be a probable trench. A Quonset-roofed shed is visible to the north of this possible range. Analysis of the 1943 photo coverage revealed only the Quonset-roofed shed. The other

significant features of the possible range and pock-marked ground scars were not discerned.

- Figure 14 – This photograph covers the southeast border area of the Dolly Sods Wilderness Area and the Forest Service Roads 19 and 75. No features of environmental significance or military activity are discerned. (Although the report states that "No features of environmental significance or military activity are discerned" in this photo, there is a trail that leads to an open area that may represent a firing point based off the mapping listed above.)
- Figure 18 – A probable construction site with evidence of earth moving activity is visible near the southeast corner of the Dolly Sods National Scenic Area. The site is accessed by a dirt road connecting to Forest Service Road 75 and along which small buildings are observed. Within the site a probable pit, adjacent ground scars, and light-toned mounded material are visible. Neither waste disposal activity nor evidence of military activity could be confirmed at this site. Additional ground scars are also noted to the south of this site along the west side of the Forest Service Road 75. These ground scars and evidence of earthmoving activity were not observed at this location in the 1943 photograph. (Note – Also noted just north of this location is another probable firing point.)
- Figure 21 – This probable camp contains five probable barracks and several administrative buildings. Ground scars are noted in an isolated area south of the administration buildings. This camp was observed on the 1943 photograph and appeared to be operational at that time. (Note – It was found during the preparation of this report that the probable camp noted in this figure is actually the Camp North Fork CCC Camp. Although the Army did utilize the camp, it appears as though its only use was as a tent encampment according to local sources.)

GIS-Based Historical Photographic Analysis: Main Impact Area, Former West Virginia Maneuver Area, US Army Research and Development Center, Topographic Engineering Center, September 2007 (Appendix T)

This report presents the results of a special Historical Aerial Photographic Analysis of the former Impact Area of the WVMA. The Operations Division (Hydrologic and Environmental Analysis Branch) of the ERDC TEC, was tasked to collect and analyze 1945 historical photographic imagery related to the former Impact Area of the WVMA.

CELRH provided details relating to the former installation. This information, along with aerial photos and range maps, were used to identify selected features in the area.

The analysis presented in this document is primarily based upon interpretation of 1945 stereo-overlapping aerial photography of the project area. Significant features, derived through photo analysis, are displayed on selected photos in this study.

A copy of the entire ERDC TEC report is located in Appendix T. The following photographs listed within the report documented noticeable evidence of Army use of the property:

- Page 9 – Area to the east and northeast of Davis, WV, along Beaver Creek. Pits, Mounded Material, and Ground scars are all noted on this photo.
- Page 10 – Area to the northeast of Davis, WV, along Beaver Creek. Notes areas of widely-scattered ground scars, and a possible Training Area containing mounded areas and areas of excavation are noted in this project.
- Page 12 – Area northeast of Davis, WV, between Beaver Creek and Yellow Creek. Notes Vehicle tracks converging at a possible former firing point location.
- Page 13 – Area northeast of Davis, WV, between Beaver Creek and the Blackwater River. Notes Vehicle tracks converging at a possible former firing point location, numerous ground scars (some linear) and scattered ground scarring.
- Page 14 – Bearden Knob Area. Notes that area contains dirt roads and numerous ground scarring.
- Page 15 – Area West of Blackbird Knob. Three linear-shaped ground scars on a mounded area with dirt roads leading in (possible firing point directed at Blackbird Knob). Also, possible scattered ground scars are noted.
- Page 16/17 – Area south of Courtland, WV. Notes abandoned firing range, buildings, and two areas with faint ground scars.
- Page 18/19 – Eastern Slope of Cabin Mountain. Three linear-shaped ground scars on a mounded area noted (possible firing point directed at Blackbird Knob or Breathed Mountain), possible ground scarring (or possible natural rock outcrops)
- Page 20/21 – Coal Knob Area. Possible ground scars (or natural rock outcrops), and several areas of clear-cut noted in lower elevations.
- Page 23/24 – Northeast Section of Impact Area (just west of Snowy Point). Possible impact craters, ground scarring, and vehicle tracks noted
- Page 25/26 – North-central section of Impact Area (Eastern Slope of Cabin Mountain). Page 25 - Very dense pattern of ground scars, trench and widely scattered ground scars. Page 26 – Possible ordnance impact area with scattered ground scarring and impact craters. Also, linear-shaped ground scar likely ground marking or firing point.
- Page 27 – North-central Section of Impact Area. Possible ordnance impact area which contains scattered ground scars.
- Page 28 – Area north of Blackbird Knob. Possible ground markers and widely scattered ground scars.
- Page 29/30 – Blackbird Knob. Page 29 – Area east and southeast of Blackbird Knob shows signs of trenches, widely scattered ground scars and a structure/object. Page 30 – Blackbird Knob shows signs of ground markings, faint vehicle tracks, a Y-shaped trench, and widely scattered ground scars.
- Page 31 – Area west of Blackbird Knob. Vehicle tracks, possible firing point location, and ground scars were all noted.
- Page 32 – Area of Intersection between Fisher Spring Run and Red Creek. Area containing possible ground scars (or rock outcrops) and areas containing small openings in tree canopy possibly related to prior ordnance firing.

- Page 33 – Breathed Mountain. Area depicting evidence of rock slides (possible location of ordnance impacts) and areas of exposed rock and possible scattered ground scars due to ordnance impacts.
- Page 34 – Area south of Breathed Mountain near Red Creek. Area containing small openings in the tree canopy that may be related to prior ordnance firing and patches of bare ground with rock outcrops.
- Page 36 – Area east of Stony River Dam. Areas of possible ground scarring.
- Page 37 – Area near Bear Rocks. Group pattern of ground scars that resemble a firing location and small ground scars aligned in geometric patterns that may related to prior military training.
- Page 38 – Area northeast of Blackbird Knob. Widely scattered ground scars, vehicle tracks, and trenches noted.
- Page 39 – Area Northeast of Blackbird Knob. Widely scattered ground scars and vehicle tracks noted.
- Page 40 – Area adjacent to Forest Service Road 75 Northeast of Blackbird Knob. Triangular and circular-shaped ground scars and possible firing point noted.
- Page 41 – Area adjacent to Forest Service Road 75 Northeast of Blackbird Knob. Possible firing point with elevated structure, multiple road patterns and scattered ground scars.
- Page 42 – Fore Knobs Area. Ground scars in a clearing (possible firing point) noted.
- Page 43 – Fore Knobs Area. Numerous vehicle tracks and possible firing point noted.
- Page 44 – Area southeast of Breathed Mountain near Forest Service Road 75. Possible firing point noted.

Internally, CELRH-EC-CE acquired 1945-46 imagery (from the MNF and National Resources Conservation Service, Elkins) of all lands known to have been leased by the Department of Defense that are not associated with the Impact Area. These photos are presented in Appendix R. Below is a summary of the findings associated with each property.

- Site #1 – Station Hospital Site in Elkins, WV (Property owned by Western Maryland RR Co.). View from aerial photo shows seven buildings, six of which are connected by either covered walk ways or hallways. Just to the east of the site are spur lines for the railroad depot in Elkins. (Appendix R, Plate 3)
- Site #2L – License Agreement for Underground Steam Line adjacent to hospital in Elkins, WV (Property owned by Western Maryland Railroad). This lease agreement covers access to the steam line so nothing is visible from the 1946 aerial photo. It is assumed that one of the smaller buildings located on the site contains a boiler from which the steam line originates. (Appendix R, Plate 3)
- Site #3 – Tent Camp Site in Elkins, WV (Property owned by J.V. Lough and the Citizens National Bank). This was the location of the signal companies that were stationed within the WVMA. Visible from the 1946 aerial photograph is a wooded area where the pigeon roosts and the signal company encampments were

known to have been located and also a clear area behind the wooded lot, which is where QM trucks were stored. (Appendix R, Plate 3)

- Site #4 – Property stated as being used for "Maneuver Area (Property owned by the City of Elkins). In the 1946 aerial photograph it is shown that there are 10 buildings located on this photo. No documentation has been found as to what activities have occurred at this site. According to Don Rice, local Elkins historian, this location was used as the HQ offices of the military police (MP) and other special service organizations used within the WVMA. (Appendix R, Plate 3)
- Site #5 – Athletic and Recreation Facility (Property owned by J.H. Fitzwater). This property shows up as a vacant field with faint ground disturbance noted. (Appendix R, Plate 3)
- Site #6 – Tent Camp Site (Property owned by Earl Scott). This property is an open field with two structures. Minimal evidence of ground disturbance is noted. (Appendix R, Plate 3)
- Site #7 – Tent Camp Site (Property owned by Trs. of the Valley Improvement Co). In the 1946 aerial photograph it is shown that there are two structures located on this property with obvious signs of vehicle tracks through the property. (Appendix R, Plate 4)
- Site #8 – Tent Camp Site (Property owned by Randolph County Board of Education). In the 1946 aerial photograph it is shown that there is distressed vegetation with possible vehicle tracks. (Appendix R, Plate 4)
- Site #9 – Ordnance Base Shop (Property owned by Carl & Richard Degler). A structure is visible on the 1946 aerial photo of this property. (Appendix R, Plate 5)
- Site #10 – Ammunition Depot (Property owned by Victor Del Sordo). No discernable structure was noted in this photo. (Appendix R, Plate 6)
- Site #11 – 150th Engineering Combat Force Encampment (Property owned by Edna Hartman). In the 1946 aerial photograph numerous vehicle tracks are noted. (Appendix R, Plate 7)
- Site #12 – Tent Camp Site (Property owned by I.N. Vanscoy). In the 1946 aerial photograph numerous vehicle tracks are noted. (Appendix R, Plate 7)
- Site #13 – Tent Camp Site (Property owned by Wilbert Kissamore). The 1946 aerial photo for this property could not be obtained for inclusion with this report. (Appendix R, Plate 8)
- Site #14 – Laundry Unit (Property owned by Monna Bond). No signs of usage were noted. (Appendix R, Plate 9)
- Site #15 – 448th Engineering Depot Co. Tent Camp Site (Property owned by J.R. Teter). In the 1946 aerial photograph numerous vehicle tracks are noted. (Appendix R, Plate 10)
- Site #16 – Tent Camp Site (Property owned by D.D. Canfield). In the 1946 aerial photograph numerous vehicle tracks are noted. (Appendix R, Plate 7)

5. EVALUATION OF PRESENCE OF MILITARY MUNITIONS AND TECHNICAL DATA

5.1 General Evaluation of Conventional Munitions and Explosives of Concern (MEC) Presence

During the preparation of this report several information sources were researched to determine the existence of MEC that were present at the WVMA. Sources researched included National and West Virginia State Archives, reviews of historical aerial photography, interviews with individuals knowledgeable of the site, historical newspaper advisories, and a site visit.

HISTORICAL RECORDS

Members of the Project Delivery Team conducted historical research at Archives II in College Park, MD, and contacted Regional National Archive locations in Philadelphia, PA, Atlanta, GA, and Chicago, IL, for information pertaining to the WVMA. A local historian in Elkins, WV, Robert Whetsell, who had also conducted significant research at the National Archives in College Park, was contracted to provide his historical documentation relating to the property. As a result of these investigations the following information concerning the presence of MEC was found:

- Historical mapping, discovered by the USACE, St Louis District in 2003, show possible firing and target locations within the WVMA Impact Area. A detailed description of the information (firing locations, target locations, and possible firing ranges) that is found on these maps is included in Section 4.3.
- Various information on Infantry Division involvement and artillery/range activities at the WVMA was found at the National Archives in College Park, MD by CELRH-EC-CE personnel. Information from the National Archives was also provided to CELRH-EC-CE by Mr. Whetsell. Specific information that was obtained at the National Archives can be found in Appendix G.
- An Archives Search Report (USACE, 1995a/b) had previously been completed for a portion of the Impact Area known as the Dolly Sods Wilderness. This report detailed firing activities that had occurred in what are now the Dolly Sods North and Dolly Sods Wilderness Areas. This report references potential firing and target locations and the type of munitions used within the Dolly Sods area.

AERIAL PHOTOGRAPHY

Based on the aerial photography interpreted for inclusion in this report the following has been determined:

- There was a small arms firing range located on County Road 32-16 near Buena, WV.
- There was a small arms firing range located in East Dailey, WV

- Probable firing points along Forest Road 75 in the Dolly Sods Region were noted.
- Areas along Beaver Creek, northeast of Davis, WV, were noted as having pits, mounded material, ground scars, possible firing locations, and a possible training location.
- Area near Bearden Knob noted as having several dirt roads and numerous ground scaring.
- Several areas within the Dolly Sods area were noted as having possible impact zones, firing locations, and possible pits.
- Possible impact craters were noted east of Stoney River Reservoir, Cabin Mountain, northern Impact Area near Beaver Creek, and near Bear Rocks.
- Possible firing locations for 105/155-mm howitzers were noted as being located on Fore Knobs.

For a complete breakdown of the aerial photography that was acquired and reviewed for inclusion with this report see *Section 4.4*.

INTERVIEWS

Interviews conducted as part of this investigation included the following discussion concerning MEC:

- Norm Lindjham, 10th Mtn Division, recalled utilizing the rifle range in Canaan Valley.
- John Nadwondy, 77th Infantry Division, recalled having 75-mm French and 155-mm howitzers in the WVMA, but unsure if they conducted firing in the area because he was not with the field artillery units.
- Norman Black, resident near Jordan Run, recalled the infantry divisions shooting .30 caliber blanks on his family's farm in the Fore Knobs area. Mr. Black also remembered the infantry units conducting mock 105-mm firing activities. He stated that he thought that they conducted the actual howitzer firing on Jordan Run Road between FR 75 and FR 19.
- Bill VanOrsdale, USFS employee, was a liaison between the USFS and the Army at the time of the WVMA responsible for controlling forest fires. Mr. VanOrsdale recalled that large artillery firing was conducted from Canaan Valley onto Cabin Mountain. He also had an old Potomac Ranger District map that had firing points on it from Forest Road 75. He stated that they fired from Forest Road 75 and the Fore Knobs into the Dolly Sods area, Blackbird Knob and Cabin Mountain being the main target areas. Mr. VanOrsdale noted that when gun emplacements were located at Dolly Sods they were almost exclusively located to the west side of Forest Road 75.

UXO/ROCKET FINDS

From the time that the Army departed the area, there have been numerous UXO and rocket finds at several locations within the WVMA Impact Area. Some of the types of UXO/rockets that have been found include:

- 4.2” HE/SR mortar in the Monongahela National Forest
- 81-mm HE/SR mortar in the Monongahela National Forest
- 60-mm HE mortar in the Monongahela National Forest
- 105-mm howitzer round on Cabin Mountain (western face of northern section)
- 3.25” Rocket approximately 3 miles east of Davis, WV on/around Yellow Creek
- Transportation canisters for 60-mm and 81-mm mortars in the Otter Creek Wilderness of the Monongahela National Forest

For further information concerning the number and types of UXO/rockets that have been found at the WVMA Impact Area, refer to Appendix V.

Based on the information presented in the above historical records, the following MEC are believed to have been utilized at the WVMA (for Technical Data Sheets on the included MEC see Appendix F):

- 60-mm Mortar
- 81-mm Mortar
- 4.2” Mortar
- 3.25” Rocket
- 37-mm anti-tank Round
- 57-mm anti-tank gun Round
- 105-mm and 155-mm howitzer rounds
- .30 caliber
- .50 caliber

5.2 General Evaluation of Munitions Constituents (MC) Presence

Based on the MEC that has been determined to have been utilized within the WVMA Impact Area and UXO found at the site, MC is likely to be present. Refer to Appendix W for a complete list of MC associated with each MEC present at the site.

5.3 General Evaluation of RCWM Presence

The definition of a Chemical Warfare Material is “an item configured as a munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through physiological effects. Also includes V- and G- series nerve agent, H-series blister agent, and lewisite in other than munitions configurations. CWM does not include: riot control agents, chemical herbicides, smoke and flame producing items, or soil, water, debris or other media contaminated with chemical agents.”

The WVMA Administrative and Supply Plan (Appendix G, Document G-23) noted the following information concerning a “chemical detachment” that functioned in the WVMA. The information given for this detachment and chemical ammunition is as follows:

- Training ammunition will be allotted by the XIII Corps, dependent on the situation requirements. It will consist of smoke pots and colored smoke grenades, pots CN, CNB, grenades smoke, and other training ammunition.
- Storage of smoke pots and other training chemical ammunition will be at the ammunition distributing point to be located adjacent to the Ordnance ammunition distributing dump. (Note – It is believed that the Ammunition distributing dump was located north of Elkins as noted as Property #10 on the WVMA Real Estate Map in Appendix I.)
- Ammunition for chemical mortars will be handled by the chemical troops for ammunition training. Storage of this type of ammunition will be adjacent to the chemical battalion, or at a location designated by this battalion.

The 5-Year Recurring Review conducted on the Dolly Sods Project noted the following concerning smoke rounds found to have been used within the Impact Area:

> "It is documented (based upon found UXO and OE-related scrap) that rounds fired during the 1943 to 1944 military training included 40-mm, 57-mm armor-piercing (AP) and 105-mm and 155-mm high explosive (HE) projectiles, and 60-mm HE, 81-mm HE and smoke round (SR), and 4.2-inch inert (sand-loaded rounds), HE, and SR mortars (USACE, 2004a). The SR used, were reported to contain a solution of sulphur trioxide in chlorosulfonic acid (FS) as the filler (USACE, 2004b), and were intended for marking and smoke screen purposes."

Although there are several instances of chemical ammunition being noted in historical documents concerning the site, it is believed that most instances are referring to smoke rounds for training purposes. Based on the evaluation of historical documentation received for the preparation of this Preliminary Assessment, there is no evidence that Chemical Warfare Material (CWM) was utilized at the site.

5.4 Property Specific Locations

Based on historical documents, aerial photography interpretation, interviews, and UXO finds, it has been determined that the following locations were previously used by the Department of Defense and may contain MEC:

- Bearden Knob – Previously used as a 105-mm howitzer firing location and possible anti-tank firing range (Appendix I, Map 4).
- Dailey Infiltration Camp – Previously used as a small arms firing range (Appendix R, Plate 12).
- Yellow Creek – Area of several recent rocket finds and noted on a historical map as being the firing point for 60-mm and 81-mm mortars (Appendix I, Map 4).
- Fore Knobs – Previously used for troop training and the firing location of 105-mm and 155-mm howitzer rounds (Appendix I, Map 4).
- Blackbird Knob – Previously used as a target location within the Dolly Sods Wilderness Area (Appendix I, Maps 3 & 4).

- Breathed Mountain – Previously used as a target location within the Dolly Sods Wilderness Area (Appendix I, Maps 3 & 4).
- Bear Rocks/Stack Rocks Area – Previously used as a target location for 105-mm and 155-mm howitzer rounds (Appendix I, Maps 3 & 4).
- Forest Road 75 in Dolly Sods – Location of Mortar and howitzer firing points (Appendix I, Map 4).
- Western Face of Cabin Mountain – Location of 105-mm target locations (Appendix I, Map 4).
- Beaver Creek – Firing point for 155-mm howitzer (Appendix I, Map 4).
- Brown Mountain – Target location for 60-mm and 81-mm mortars fired from Yellow Creek (Appendix I, Map 4).
- Buena Firing Range – Previously used as a small arms firing range (Appendix T).
- Ammunition Depot – Confirmed location of ammunition storage for the entire WVMA. Located on a property north of Elkins. (Appendix I, Map 1)

6 EVALUATION OF HTRW PRESENCE AND AREAS

The following sections discuss the evaluation/interpretation of the potential presence of HTRW as a result of the operations of the former WVMA. The information is based on historical documents and other information acquired during the preparation of this report.

6.1 General Evaluation of HTRW Presence

Based on the evaluation of historical documentation of the WVMA little information is known about how the gasoline, fuel oil, hospital wastes, and other potential HTRW source materials were handled and potential disposal methods for each. The most comprehensive document found concerning the handling of such materials was the WVMA Administrative and Supply Plan, which was developed prior to the start of operation at the WVMA. This document provides generalities as to the handling of such items with vague locations given. (Appendix G, Document G-23 contains a QM Plan for the WVMA which provides details of the actual

No contamination releases were found as a result of the information obtained during the research of this PA and the conditions noted during the site visits to the property.

6.2 Property-Specific Locations

Based on historical documents, aerial photography interpretation, interviews, and UXO finds, it has been determined that the following locations may contain HTRW contamination concerns:

- Areas containing MC as a result of MEC – Areas containing MEC are noted in Section 5.4 above.

– Ammunition Depot – The Ammunition Depot is located approximately two miles north of Elkins.

7 EVALUATION OF CON/HTRW AND BD/DR PRESENCE

The following sections discuss the evaluation/interpretation of the potential presence of CON/HTRW and BD/DR as a result of the operations of the former WVMA. The information is based on historical documents and other information acquired during the preparation of this report.

7.1 Evaluation of CON/HTRW Presence and Areas

Based on historical documents analyzed and due to the short timeframe for which the WVMA was in operation, it is not believed that any underground storage tanks (USTs) were utilized in the area. This assumption cannot be completely verified due to the lack of information available concerning the site. It was determined, based on the WVMA Administrative and Supply Plan that a Contractor was hired to bring gasoline to the WVMA via railroad and then WVMA personnel transported the gasoline, oil and other lubricant to a distribution supply point. According to Don Carroll, local resident, his father would deliver gasoline by truck to an area adjacent to the railroad in southeastern Elkins, just northwest of the WVMA Depot at Dornblazer's Refrigerator Factory. Mr. Carroll was not aware of what the gasoline was stored in by the Army from that point on. This information would tend to be credible since it was noted in the Administration and Supply Plan that all classes of supplies were to be handled through the WVMA Depot.

It was noted in *The Telegraph* article listed above that there was a boiler that utilized fuel oil and gasoline associated with the laundry unit. According to Common Operations Report CO-13, it states that "…facility drawings for the laundry plant boiler house identify aboveground fuel oil storage tanks. A 575-gallon storage tank is required for a 1,000-bed hospital laundry boiler house…" This would indicate that if there was a laundry unit associated with the hospital it would require an attached AST of some size. There was no sign of a tank during the site reconnaissance. Based on the findings of this report there is no evidence that there are any HTRW containers (AST/UST) remaining throughout the WVMA.

7.2 Evaluation of BD/DR

Based on historical documents analyzed and due to the short timeframe for which the WVMA was in operation, few permanent structures were erected for use on the property. Historically, it appears as though the only semi-permanent structures that were built were the station hospital complex built in Elkins. Water supply points, bivouacs, and other training facilities were not designed to be permanent and following army use of the property most facilities were removed by the DoD. There was no evidence of original structures at the site during site reconnaissance for this report, therefore no structures are eligible for BD/DR.

8 PATHWAY AND ENVIRONMENTAL HAZARD ASSESSMENT

8.1 Ground Water Pathway

8.1.1 Hydrogeologic Setting

The WVMA is located to the west of the Allegheny Front with approximate centralized coordinates of latitude N 39° 07’ 08” and longitude W79° 27’ 09”. The Allegheny Front is a boundary between two provinces and is a complex with abrupt change of folded and faulted surficial strata of the Valley and Ridge and the gentler faulted strata of the High Plateau. East of the Allegheny Front the strata are found to dip steeply on the limbs of many of the anticline, many of which are asymmetrical, with more steeply dipping to overturned western limbs. West of the Front the strata dip much less steeply, usually less than 30 degrees and surface faulting is rare. This western side of the Front forms a high plateau of essentially horizontal strata and capped predominantly with resistant sandstones and conglomerates. Spruce Knob, located approximately 15 miles south of the WVMA, is West Virginia’s highest elevation at 4,861 feet, the tallest mountain in the Alleghenies, and formed on a resistant bed of Pennsylvanian Pottsville Sandstone (WV Geologic and Economic Survey, 2004).

The rocks underlying this mountainous area are of sedimentary origin, deposited during the Paleozoic Era (600 to 230 million years ago), being chiefly composed of limestone, sandstone and shale. The first mountain-building episode that affected the topography of WV was the Taconic Orageny, which formed the mountains in eastern WV which were a source of sediments during the Ordovician, Silurian, and early Devonian periods. Highlands to the northeast, formed in the Acadian Orogeny, and were the source of sediments in the Middle and Late Devonian. During the Middle Mississippian, about 330 million years ago, a sea covered West Virginia. During this period, the Greenbrier Group, composed mainly of limestone, was deposited. During the Pennsylvanian, WV was low-lying and swampy. Deposition during this period included sandstone, shale and coal. The youngest strata are of Pennsylvanian age and occur in southeastern Randolph County. In the Premian Period, the Appalachian Orogeny, the dominant geologic event in the formation of the Appalachian Mountains with much folding and faulting occurring. Since Permian time, weathering and stream erosion have been at work. No sedimentary rocks from the Mesozoic Era (230 to 70 million years ago), exist in WV. The glaciers of the ice ages never reached WV. The only Cenozoic deposits in WV result from alluvial deposits in the southern part of the state (WV Geologic and Economic Survey, 2004).

Podzolic or leached soils are predominant within this area. Many of the soils occur as long irregular and broken bands of different widths, paralleling the ridge tops, mountain tops, and stream valleys. Others occur as widely scattered areas ranging in size from 10 acres to more than a square mile. Still others where the underlying rocks are uniform cover many square miles. Substantial Quaternary alluvial deposits can be found within the Tygart Valley, Randolph County, Cheat Valley, Tucker County and Grant County. The Allegheny formation of Middle and Late Pennsylvanian age is a coal-bearing sequence consisting largely of sandstone, siltstone and shale (USDA, 1996).

The Canaan Valley lies within an eroded anticline in the Allegheny Mountain Section in Tucker County, WV. Canaan Valley occupies a breached anticline with a core of Pocono Sandstone and rimming Greenbrier Limestone, while the Mauch Chunk Formation forms the surrounding mountain slopes. The Valley is drained by the Blackwater River and its tributaries, which are part of the Cheat River drainage system. The Blackwater River begins in the southern part of the valley, flows northward, and exits the valley through a breach in the west valley wall of Canaan Mountain at Davis, WV. Wetlands are present along some reaches of the streams and in scattered areas throughout the valley. The ground water in Canaan Valley is stored in and moves through a fairly shallow layer of fractured rock near the surface of all geologic formations. All ground water in Canaan Valley originates from precipitation (rain and snow) falling in the valley and ground water interacts in complex ways with surface water (USGS, 1996).

The DSW, DSSA and DSN are located in the MNF and lie in Tucker, Grant, and Randolph counties. Dolly Sods is bounded on the southeast by the scarp of the Allegheny Front and on the northwest by Cabin Mountain and Canaan Valley. The geologic structure is synclinal, with edges formed by the Pottsville Sandstone and the interior by successively younger Allegheny formation and Conemagh Group which have more diverse lithologies, including beds of coal and limestone (Cardwell et al, 1968). The area has extensive flat rocky plains and upland bogs. Blackbird Knob, with an elevation of approximately 3,950 feet, is located within Dolly Sods North and is east of the Red Creek Campground which is located in the Dolly Sods Scenic Area. Red Creek Campground lies in the area of a Pottsville Sandstone outcrop. The southeastern region of the Wilderness area is characterized by deeply cut ravines and side streams that feed into the main branch of Red Creek. The south-western and north areas of the Wilderness are characterized by hanging valleys and rolling hills (USDA, 2007).

Otter Creek Wilderness is located in the MNF in Tucker and Randolph Counties. Otter Creek Wilderness is approximately 20,000 acres in size and lies between Shavers Fork and McGowan Mountain and northeast of the City of Elkins. Most of the streams flow into Otter Creek and then to the Dry Fork of the Cheat River. Otter Creek flows over Mississippian Greenbrier Limestone with limited exposure other than the Creek bed and concealed under coarse siliceous fluvial deposits. The Mauch Chunk Formation of Mississippian Age overlies the Greenbrier Limestone. The Pottsville Formation of Pennsylvanian age occurs as mountain spurs above Otter Creek. Elevations range from 1,800 feet at the mouth of Otter Creek to 3,900 feet on McGowan Mountain (USDA, 2007).

A majority of the soils in Fernow Experimental Forest, which borders the Otter Creek Wilderness area to the northeast, are of the Calvin and Dekalb series. A rock layer composed of fractured hard sandstone and shale underlies most of the forest with Greenbrier limestone outcrops on the southeastern part of the forest. These limestone outcrops produce a midslope zone of limestone soil of the Belmont series (fine-loamy mixed mesic Typic Hapludalfs). The average soil depth is approximately one meter (USDA, 2007).

8.1.2 Ground Water Targets

The former WVMA covered an area of 2,180,367 acres, incorporating portions of Grant, Pendleton, Preston, Randolph and Tucker counties. Groundwater impacts, if any, would have likely come from the artillery and mortar firing which occurred within the WVMA Impact Area. Due to the short duration of the maneuver actions (October 1943 – July 1944), surface use and activities in the tent encampments, battalion headquarters, hospital, storage areas, mountain climbing areas, small arms firing ranges and troop maneuver areas likely had little, if any, impacts to groundwater. Therefore, the logical focus for potential groundwater contamination appears to be on the more heavily used target areas.

Firing targets that have been identified in the Impact Area include Blackbird Knob, Brown Mountain, Cabin Mountain, Bear Rocks, and Stack Rocks sites. These target areas lie within Grant and Tucker counties, with the county lines basically running north to south through the Impact Area, with Grant County to the east and Tucker County to the west. A small portion of northeast Randolph County is within the designated Impact Area; however, this area is outside of the four mile radius from any known target area, per EPA PA guidance regarding groundwater targets (USEPA, 1991). The population of Grant County was 11,915, with a density of 25 people per square mile, and the population of Tucker County was 6,856, with a density of 16 people per square mile, per the 2006 estimate from the U.S. Census Bureau.

Adjacent to and southwest of the Impact Area is the Canaan Valley State Park (CVSP), which has a water treatment plant which serves a total population of approximately 2,204. The plant has a production capacity of 0.126 million gallons per day and a network of 16 wells (Lombardo Associates, Inc. 2005). Review of the information in the feasibility study prepared by Lombardo Associates, Inc., shows that there are at least seven groundwater supply wells in the CVSP public water supply network that are within a four mile radius of two impact areas: Blackbird Knob and Brown Mountain. There are no wells in the CVSP network within a zero to two mile radius of either Blackbird Knob or Brown Mountain. There appears to be four wells within a two to three mile radius of Blackbird Knob and an additional two wells within a three to four mile radius; these wells serve an estimated population of 400 to 500. There are no CVSP public water supply wells within a zero to three mile radius of the Brown Mountain impact area, but there appears to be one well just at the four mile boundary, which serves an estimated population of 150 to 200. There are no CVSP water supply wells within a four mile radius of the other impact areas. Therefore, the total population served by the CVSP water treatment plant within the four mile radius of these two impact areas is 700.

There are two USFS groundwater wells within the Dolly Sods Wilderness Area portion of the impact area: one in the Red Creek Campground and one at the Red Creek Wildlife Cabin. These wells serve visitors to the area. The annual visitation to the Dolly Sods Wilderness area is estimated at 45,000 to 75,000 per year; however, there is no estimate of the population which utilizes these two hand-pumped wells. The Red Creek Campground well is east of and within two miles of the Blackbird Knob impact area,

south and within three miles of the Bear Rocks impact area, and south and within 4 miles of the Stack Rocks impact area. The well at the Red Creek Wildlife Cabin is outside the four mile radius of any impact area.

Mr. Craig Cobb, Supervising District Engineer, Philippi District Office, WV Department of Health and Human Resources (WVDHHR), was interviewed concerning public water usage. Mr. Cobb's responsibilities cover 13 counties, including Randolph and Tucker Counties. He stated that the CVSP water treatment plant uses both surface water and groundwater, using groundwater mainly to blend with the surface water, to achieve drinkable water. He indicated that due to security reasons, they could not simply release public water service information to the public and that a request would have to be submitted, with the target areas shown on maps. The USACE provided the radius maps and a request for the public water service information to Mr. Cobb via the USACE FTP site. He then provided a spreadsheet that contained the coordinate locations of the public water supply wells in Tucker County. Due to security and privacy considerations, no maps or location descriptions of public water systems or private water wells are provided in this report. USACE review of the spreadsheet data determined that the information provided was comparable to that contained in the Lombardo and Associates feasibility study (Lombardo Associates, Inc. 2005).

Mr. Alan Marchun, Engineer, Kearneysville District Office, WVDHHR, was interviewed concerning public water usage. Mr. Marchun's responsibilities cover eight counties, including Grant County. He indicated that the only water supply he was aware of was at Mount Storm Lake, which provided water for the power plant on the lake. Review of site mapping indicated that this facility was outside the four mile radius from the Brown Mountain, Cabin Mountain and Stack Rocks Impact Areas. Mr. Marchun said that the Grant County Public Service District (PSD) would have information regarding public water service in the vicinity of Jordan Run, which is due east of the Bear Rocks and Stack Rocks impact areas.

Mr. James Snyder, Sanitarian/Administrator of Tucker County Health Department, stated that the area around Laneville, WV, the small community immediately south of the former impact area, was not served by a public water system. He said that in addition to residential wells, some residents obtain water from surface water intakes from Red Creek. These intakes would not be registered with the county. Residential wells were not registered in the county until 1985 and not all registered wells are recorded in an electronic database. Therefore, a search for all groundwater users in the area would require extensive review of the hand-recorded information and likely a survey would need to be conducted to find unregistered wells and those who obtain water from surface water sources, such as Red Creek.

Ms. Francis Phares, Grant County Health Department, stated that no residential wells were registered prior to 1985. The county's registered wells are by year, and not by location, so a search of their records would be very labor intensive, and was not performed for this PA. Where no information could be provided regarding residences that were on public water versus public water as provided by the Grant County PSD, the

assumption was made that the residences shown in the Jordan Run area, within the four mile radius from the Bear Rocks and Stack Rocks Impact Areas, used a groundwater well for their water supply.

Ms. Sherry Goldizen, Grant County PSD, was contacted regarding public water service in the Jordan Run area, which is due east and within the four mile radius of the Bear Rocks and Stack Rocks Impact Areas. Ms. Goldizen said that public water service extends the entire reach along Jordan Run; however, she could not tell which residences were on public water unless addresses were provided. She said that the Grant County PSD purchases their water from the Town of Petersburg, approximately 15 miles east, and that the PSD then pumps the water to water storage tanks in the Jordan Run area. She said that there may be a few residences on private wells; however, for the most part, she believed many were on public water.

Ms. Vanessa Woodyard, Hamrick PSD, was contacted regarding public water service in Tucker County in the vicinity west of the Impact Area, along WV Route 32. Ms. Woodyard said that the Hamrick PSD service did not extend in that area and that any public water service would be provided from either the Town of Elkins or the CVSP water treatment plant. She said that there is a newly-formed Canaan Valley PSD; however, they have not yet incorporated to provide public water in that area.

USGS topographic maps were reviewed to determine the potential number of residences/structures in the vicinity of the Impact Area who may use a groundwater well. For purposes of this assessment, it was assumed that each residence had three (3) occupants. The maps around the Stack Rocks Impact Area show structures located to the northeast, east and southeast. No structures were identified within a zero to one mile radius; at least 10, with an estimated population of 30, within a one to two mile radius; at least 45, with an estimated population of 135, within a two to three mile radius; and at least 90 structures, with an estimated population of 270, were within a four mile radius. The Bear Rocks Impact Area is located approximately one mile south of Stack Rocks. Review of the maps in this area showed a similar number and distribution of potential groundwater users as was observed for Stack Rocks Impact Area. Therefore, the total estimated population for these two areas is estimated to be 240 people, within a four mile radius of the impact areas.

The maps around the Blackbird Knob Impact Area show structures located to the east. No structures were identified within a zero to three mile radius but at least five, with an estimated population of 15, were within a three to four mile radius. The maps reviewed for the Brown Mountain Impact Area show structures to the south to southwest direction. No structures were identified within a zero to one mile radius; at least two, with an estimated population of 6, within a one to two mile radius; at least six, with an estimated population of 18, within a two to three mile radius and at least 40 structures, with an estimated population of 120 were within a four mile radius. The community of Canaan Heights is located in the south/southwest and the town of Davis is in the west/southwest, of the three to four mile limit. Canaan Heights receives water from the CVSP water supply system, and its population was included in the estimate for the CVSP water

treatment plant. The town of Davis receives water from a surface water intake on the Weimer Tributary. The maps reviewed for the Cabin Mountain Impact Area show structures to the west and southwest direction. No structures were identified within a zero to one mile radius; at least five, with an estimated population of 15, within the one to two mile and two to three mile radius and at least 20 structures, with an estimated population of 60 were within a four mile radius, to the west/southwest. The community of Canaan Heights is located due west of the Cabin Mountain Impact Area, approximately at the 4-mile limit. Therefore, the total population served by either the CVSP water treatment plant or by private wells within a four mile radius from all of the identified impact areas is approximately 1,120 people.

8.1.3 Ground Water Conclusions

Contamination from the Impact Area is not expected to have migrated into the groundwater and then to offsite receptors. There is little soil overburden in the Impact Area, as evidenced from the previous ordnance removal actions in the Dolly Sods Wilderness and Dolly Sods North areas, and the likelihood that nitroaromatic contamination had migrated through the many feet of rock strata within the Impact Area and into the drinking aquifer is considered very low. Nitroaromatic contaminants are likely concentrated in the target areas; however, the possibility exists that contamination could have migrated to streams or other surface water bodies within the Impact Area due to the effects of erosion, rain, or snow melt.

Additionally, interviews with personnel from the WVDHHR and Grant and Tucker Counties' PSDs indicated it was likely that some private groundwater wells existed in the area near the former Impact Area; however, complete research to identify these residences was not conducted for this PA. Review of county well registration records would need to be conducted to identify wells that have been registered since 1985 and then a subsequent survey taken in the area to identify wells installed prior to 1985. From that information, then a determination of the need to sample these wells should be made. The records review and sampling could be conducted under the long-term management phase of the current OE Project No. G03WV001304 and if nitroaromatics are detected in any water samples, an HTRW project would be proposed to perform a Site Inspection and determine the need for any future action.

8.2 Surface Water Pathway

Surface water throughout the over 2,180,367 acre site is extremely varied. Seasonal and flash flooding occurs frequently in this region due to the high precipitation. The regional and local patterns of surface water flows are established in response to the mountainous topography with lithologic variations influencing the quantity and quality of both groundwater and surface water supplies. The area is characterized by high, sharp ridges, mountains, and narrow valleys. The dendritic to trellis drainage pattern is well established. Since the 1940's several major flooding events have occurred in this region. Due to the sheer size of the WVMA area, this section will focus mainly on the areas with recommended projects on them.

AMMUNITION DEPOT

The former Ammunition Depot is located on four acres of private property that was leased by the Army. The former ammunition depot is believed to be in the City of Elkins, Highland Park area north of the downtown and is adjacent to an old railroad track. U. S. Highway 219 is within one mile of the site. Leading Creek, a tributary of the Tygart Valley River, flows past the site and 1.5 miles south empties into the Tygart Valley River. The Tygart Valley River is two miles south of the former depot and 2.25 miles from the Elkins PSD drinking water intake.

The topography within the Tygart Valley is not as mountainous and rugged as the eastern portions of the WVMA. The valley is also more populated within the large (by comparison) City of Elkins and the surrounding communities of Harpertown, Gilman, Leadsville, Sullivan, Glenmore, Midland and Canfield around the immediate area of Elkins.

Site reconnaissance conducted in 2007 revealed no outstanding markers or building foundations as remnants of the former depot. As indicated in the previous sections, the records and documents indicating the exact location of the Ammunition Depot were not precise. No metal detection devices or sampling previously have been conducted at any of the suspected sites in the past or during site reconnaissance. The possibility does exist that MEC may be present in the soil, although unlikely. The suspected area that was used as the ammunition depot is a thought to be a vacant agricultural field located adjacent to State Route 219 and Leading Creek. During the site visit to this location the site was noted as being a grassy field with trees and undergrowth present. It is anticipated if contamination occurred on the property examined it would be localized and not affect the aforementioned Leading Creek. Any such release would likely be a more concentrated area of contamination within specific boundaries of the site.

Refer to Appendix R, Plate 6, Tract 10 notes this property was used as an ammunition depot. Refer to Appendix R, Plate 32 for map of surface water flow patterns and orientation of site features.

BEARDEN KNOB-CABIN MOUNTAIN IMPACT AREA

Prominent land features that fall within the boundary of the former Bearden Knob – Cabin Mountain Impact Area are Bearden Knob, Cabin Mountain, Brown Mountain, Canaan Valley wetlands, CVNWR, CVSP, towns of Davis and Canaan Heights, former Stony River Reservoir and the Blackwater River and tributaries. Larger tributaries of the Blackwater River include Beaver Creek, Yellow Creek, Sand Run, Glade Run, Sand Run, and Yoakum Run. Mount Storm Lake lies along the Stony River and is two miles west of the northwest corner of the Impact Area boundary. Elevations of the mountain areas are approximately 3,700 feet. Bearden Knob has an elevation of 3,853 feet. Location of the Impact Area can be found in Appendix R, Plate 15.

Bearden Knob was utilized during practice maneuvers as a howitzer firing point with Cabin Mountain as the target area. Ground scarring on Cabin Mountain is apparent in aerial photographs detailed in Section 4.4, Aerial Photographic Interpretation. To reach Cabin Mountain, the flight path of the artillery would have begun at the firing point of Bearden Knob and crossed the Canaan Valley Wetlands and the North Branch and Blackwater River in flight. There is a possibility that MEC fell short of the target area and impacted waterways within Canaan Valley, as well as the Cabin Mountain impact area.

Brown Mountain is four miles north of Bearden Knob and was also utilized as a firing target during maneuver training. Mortars were fired from along Beaver and Yellow Creeks at Brown Mountain. Yellow Creek flows southwest one-mile from Brown Mountain and Beaver Creek is within two miles of Brown Mountain. As noted previously sixty-millimeter (60-mm) and 81-mm mortars were fired from those firing points. Yellow and Beaver Creeks drain into the Blackwater River and are within two miles of the Town of Davis. Several 3.25-inch rockets have been found approximately three miles east of the Town of Davis in/near Yellow Creek on a property owned by CVI.

The former Stony River Reservoir, located between Cabin Mountain and Fore Knobs (north of Bear Rocks) and 5.5 miles west of Bearden Knob was dammed in 1888 by Westvaco to create the Stony River Reservoir. Westvaco utilized the reservoir to supply the source of water for the company's main pulp mill. Since that time the reservoir has been drained to access a coal seam below the former reservoir waters, although mining stopped in 2006. Surface coal mine activities once surrounded the former reservoir. WVDEP oversees acid mine drainage treatment in this area of Stony River. The large land expanse between the former reservoir and DSN's most northern boundary is primarily remote backcountry managed by timber and mineral resource companies.

The Stony River flows northward from the former reservoir to Mount Storm Lake. Mount Storm Lake is a 1,200-acre reservoir constructed in 1962 to serve as a "cooling pond" for the Dominion Mount Storm Power Station. There have been no reports of MEC in the vicinity of the former reservoir or Mount Storm Lake.

MEC findings within the Bearden Knob-Cabin Mountain Impact Area have been isolated. Refer to Appendix V for UXO finds and Appendix R, Plate 22 for recent find locations for the entire WVMA. MEC findings have been random, as is the state of they are in, including being partially or completely buried, on the ground surface or within waterways (as in the case of a rocket found in Yellow Creek by CVI personnel in 2004). Given the amount of time since the Army activities the likelihood that individual MEC constituents have impacted surface waters is thought to be minimal. The danger to human health and the environment relates to primarily the dangers from any unexploded MEC still located at the site. There are no visible signs of surface water PPE or impacts other than the previously reported finds. (Refer to Appendix R, Plate 28 for map of surface water flow patterns and orientation of site features.)

FORE KNOBS-BEAR ROCKS IMPACT AREA

Bear Rocks Preserve is an approximate 477-acre preserve at varied elevations of around 2,000 to 4,000 feet managed by TNC. The preserve borders the MNF DSN area with one access just off Forest Service Road 75. The area is rugged, fairly remote and primarily surrounded by public lands. One mile north of Bear Rocks is Stack Rocks; to the west are portions of Dolly Sods and the impact area of Cabin Mountain. Broad Run is one mile south, Blackbird Knob is four miles southwest, and Fore Knobs Mountain borders the preserve to the west. Big Star Run tributary is located east of Bear Rocks. Big Star Run is a tributary of South Fork Lunice Creek. To the west of the preserve surface water flows into Dolly Sods from Red Creek.

Bear Rocks is frequently visited by tourists. It has been determined, based on historical information and interviews, that it was once used as a target for howitzer rounds during firing at the WVMA. In 1999, a 105-mm howitzer HE round was discovered by HFA, a contractor for The Nature Conservancy, during a clearance of the area.

Fore Knobs, east of DSSA and west of State Highway 55, was utilized as a howitzer firing point during the operational period of the WVMA according to historical documentation and interviews conducted for this report. As indicated in Section 4.3, Map Analysis, the WVMA Impact Area mapping indicated a 105-mm and 155-mm howitzer firing point was located near the Rohrbaugh School. Based on project mapping the presumed targets were Bear Rocks and Stack Rocks. Further, Section 4.4, Aerial Photographic Interpretation, indicated a group pattern of ground scars in the Fore Knobs area that resemble a firing location and small ground scars aligned in geometric patterns that may be related to prior military training activities. Ground scars in a clearing were noted in the Fore Knobs area along with numerous vehicle tracks that indicated possible firing points. During an interview recorded in Section 5.1, a resident near Jordan Run recalled the infantry divisions also shooting .30 caliber blanks on his family's farm in the Fore Knobs area. The resident also remembered the infantry units crossed their property and conducted mock 105-mm firing activities and conducted the actual howitzer firing on Jordan Run Road between Forest Road 19 and the Town of Stremmy.

It is possible that MEC remains in the area of Bear Rocks and Fore Knobs Mountain although the extent is unknown. Surface waterways may have been impacted but there have been no reported finds of MEC adjacent to or within waterways. Incidents of MEC are expected to be isolated and random. There have been no clearances or sampling conducted in this area other than that listed above. (Refer to Appendix R, Plate 29 for map of surface water flow patterns and orientation of site features.)

BUENA SMALL ARMS FIRING RANGE

The former Buena Small Arms Firing Range is located ¾-mile west of Freeland Run and ¼-mile north of the Blackwater River which flows through the Canaan Valley wetlands and the CVNWR. The CVSP is one mile southwest from the site; a cemetery along State Highway 32 is 1.25 miles from the site. The former small arms firing range is situated

within the Cheat River watershed between State Highway 32 and Freeland Run, a tributary originating high on Cabin Mountain. The site can be accessed by parking along Timberline Road and walking to the range location. During 2007 site reconnaissance, the mounds constructed for firing range purposes were still visible but overtaken with thick vegetation. (Reference Appendix M, Photos 65-66)

The Blackwater River passes through the CVSP, the CVNWR, and within a half-mile of the former firing range. The River then collects two short tributaries known as the North Branch Blackwater River and the Little Blackwater River and flows through the Canaan Valley Wetlands, collecting Yellow Creek and Beaver Creek just east of the Town of Davis. Below the mouth of the Little Blackwater River, the Blackwater turns west over Blackwater Falls and enters the gorge in Blackwater Falls State Park forming whitewater rapids. The Blackwater River joins the Dry Fork to form the Black Fork of the Cheat River at the town of Hendricks 28 miles down river from the former firing range.

The topography within the valley is flat and swampy in places with mountains rising to the east and west of the valley. A water-resources investigation was completed by the USGS in 1996 titled *Geohydrology and Ground-Water Quality of Southern Canaan Valley, Tucker County, West Virginia* report number 96-4103. According to the USGS, approximately 10 percent of the water used in Canaan Valley is supplied from groundwater sources. An estimated 199.4 million gallons of surface water is withdrawn annually from the Blackwater River and its tributaries, whereas only 22 million gallons of groundwater is withdrawn annually from aquifers within the valley. Commercial facilities serving skiers, hikers, campers, and other recreationalists withdraw 94 percent of all water used (208.3 million gallons annually). In 1996, only 6 percent was being withdrawn by residents in the valley for domestic use (USGS, 1996).

Site reconnaissance conducted in 2007 revealed no visible releases to surface water. Neither metal detection devices nor sampling have been conducted at this site in the past or during reconnaissance in 2007. It is possible that unspent small arms still remain in the area of the firing range. There is no specific PPE to surface water although the likelihood exists that MEC could have been transported by surface water during high water events. Any such release would likely be intermittent and isolated. No distressed vegetation was noted during the site visit. There was no visible evidence of suspect hazardous waste or direct deposition into waterways at the site. (Refer to Appendix R, Plate 27 for map of surface water flow patterns and orientation of site features.)

DAILEY INFILTRATION CAMP

The former Dailey Infiltration Camp is located off U. S. Highway 219/250 and State Highway 21 near the Town of East Dailey, WV. The former camp is situated on MNF property surrounded by private land holdings (primarily farmland to the west followed by a subdivision) and between two unnamed tributaries that drain into Sea Run. Sea Run in turn, drains into the Tygart Valley River located two miles from the site. The Tygart Valley River is a principal tributary of the Monongahela River and is within the Tygart Valley Watershed. The Wildwood Subdivision (approximately 24 households) is ¼ mile

from the former infiltration camp that is located downgradient the subdivision. During the 2007 site reconnaissance, those participating in the site reconnaissance parked vehicles at a farm gate entrance at the western end of the subdivision. The site was accessed by crossing a farm owned by Paul Swecker, a private landowner who attended the site visit.

The former infiltration camp, once cleared and graded for use in the WVMA, has since returned to forestland over the past 60 years with trees approximately 60 to 80 feet in height. The site was recognizable during site recon due to the existence of fox holes and mounds used as an obstacle course used by the Army. A small tributary flows from a higher elevation through and adjacent to the obstacle course. At normal flow the tributary is shallow but it appeared that in high water conditions that surface water could potentially breach its banks and flow through the mounds and trenches at the site. As surface water flows from the site it enters small ditches and open flat farm fields where it either dissipates over the ground or continues on toward the subdivision, and flows toward the tributaries and eventually the Tygart Valley River. There was heavy stream deposition in the farm field as the high water flow dispersed sediment and rubble below the site.

Downgradient of the infiltration camp was wet and swamp-like with aquatic vegetation present. This area was not delineated for the presence of a wetland during site reconnaissance. Intermittent trash and metal debris was noted during the site visit but it was not apparent if the debris was left by the Army. No past or current MEC finds have been reported on the site or within the surrounding landscape. No signs of contamination were noted during the site visit. (Refer to Appendix R, Plate 32 for a map of the surface water directional flows. See Appendix M, Property Visit Photographs, Photos H12-H19 and photo H10 depicts the Wildwood Subdivision.)

JENNINGSTON TRAINING AREA

Most current landholdings within the Jenningston Training Area are managed as public lands by the MNF. Prominent features within this area include Shavers Mountain, McGowan Mountain, Otter Creek Wilderness Area (MNF), parts of Fernow Experimental Forest operated by the MNF, the Towns of Sully, Jenningston, and Gladwin, critical habitat for an endangered species, karst terrain, numerous caves (Frosted Ash, Natural Bridge, County Line, Ginger Root), surface waterways of Otter Creek, Glady Fork, Laurel Fork, Dry Fork, Panther Camp Run, Elklick Run, Devils Gulch, Moore Run, Coal Run, Shavers Lick Run, Mill Run, Red Run, and Possession Camp Run. Canaan Mountain is north of the site, CVSP is to the northeast, Middle Mountain to the south, and the City of Elkins further to the southwest.

The western boundary of Otter Creek Wilderness Area is 3.5 miles from the Town of Sully, WV, where regiments participated in troop maneuvers. The Army established a mule school located near the community of Gladwyn, WV which is located five miles northeast of Sully and three miles from the western boundary of the Otter Creek Wilderness Area. The Town of Gladwin, WV is two miles northwest of Jenningston and

is four miles from Otter Creek Wilderness Area. The Glady Fork River (30 miles long) flows north-northeastwardly through the Sully area and through MNF lands just north of Sully, WV. State Route 72 extents through the northeast corner of the site.

In 2006, a cave containing 60-mm and 81-mm shipping canisters was located by MNF personnel conducting a karst survey project. The cave was located in the vicinity of an old quarry within 475 feet of Three Springs Run and within 2,800 feet of the Glady Fork. The small cave is located at the end of Forest Road 228. Explosives Ordnance Detonation (EOD) personnel that responded to the incident believed that the shipping canisters were a random act of disposal located in a troop maneuver area. To date, a complete sweep for further MEC in the surrounding area has not been conducted, although the MNF continues to conduct the on-going Karst Survey Project.

No MEC finds have occurred within the Jenningston Area. The trash pit, so named by the MNF, was investigated by the EOD Unit from Fort Meade, Maryland which found no MEC in the immediate surrounding area. The likelihood that the trash pit has affected Three Springs Run is minimal since only shipping containers were found. The possibility does exist (of minimal) that this trash pit is not an isolated occurrence and that other such disposal sites may exist that contain more than just shipping waste. Finding the containers may also infer that MEC was possibly used in this area during maneuver activities, although no finds or historical information reflect that to be fact. (Refer to Appendix R, Plate 30 for map of surface water flow patterns and orientation of site features.)

8.2.1 Hydrologic Setting

AMMUNITION DEPOT

The former Ammunition Depot lies within the Tygart Valley watershed. The annual mean flow of the Tygart Valley River is approximately 1,922 ft^3/s ($54m^3/s$). Two tributaries of the Tygart Valley River surround the site: Craven Run and Leading Creek.

Craven Run (WV Stream Code WVNT-43-A_00) is listed in the 2004 WV Stream Assessments as a category 5, meaning that water quality standards are not attained, and the stream is impaired. Leading Creek (WV Stream Code WVMT-43_00) is designated category 2, attaining some of the designated uses; no use is threatened and insufficient or no data and information is available to determine if the remaining uses are attained or threatened. The 2008 WV Fish Consumption Advisory does not indicate specific advisories for the Tygart Valley River, Leading Creek, or Craven Run. (Refer to Appendix R, Plate 33 for locations of the WV 303(d) Impacted Streams for WVMA.)

BEARDEN KNOB-CABIN MOUNTAIN IMPACT AREA

The topography of impact area is rugged and contains a significant portion of public lands utilized for recreation and tourism. Potential polluters are limited within the impact area with acid mine drainage being of concern in some streams. The geology of Canaan Valley is described above in the Buena Small Arms Firing Range site. The ridge of Cabin

Mountain is composed of sandstone, shale, and coal of the Pottsville Group of Early Pennsylvanian age. The Pottsville overlies the Mauch Chunk and is subdivided into an upper Kanawha Formation and lower New River Formation. Maximum measured thickness of the New River Formation is 225 feet. Much of the Kanawha Formation has been eroded. The New River Formation is characterized by massive gray sandstone units and dark, sandy shales. Shales at the base of the New River Formation near the Mauch Chunk contact are reddish or greenish. The Pottsville and Mauch Chunk Groups have similar hydrologic properties and water-quality characteristics. Fracture density of the valley and ridges appears to be highest in the center of valleys and lowest under hillsides and ridgetops. The aquifer system within Canaan Valley consists of such a system of stress-relief and tensile fractures, joints, faults, and bedding planes (USGS, 1996).

The WVMA Impact Area lies within the Cheat River Watershed and, as with the Buena Firing Range area, the Blackwater River and Canaan Valley Wetlands are the prominent surface water features within the site.

Freeland Run (WV Stream Segment WVMC-60-D-12_00) is a 1.8-mile segment categorized by WVDEP as a number 5, meaning the water quality standards are not attained and the stream is impaired. Beaver Creek (WV Stream Code is WVMC-12-B-1_00) was designated a category 4A in 2004, impaired or threatened for one or more designated uses and TMDL has been completed. Three segments of the Blackwater River (WVMC-60-D_01, 02, and 03) are also designated category 4A, while one Stream Segment (WVMC-60-D-3_00) is designated a category 5, water quality standards are not attained, and the stream is impaired. Yellow Creek (WV Stream Code WVMC-60-D-7_00) is also designated a category 5. Yokum Run (WV Stream Segment WVMC-60-D-11_00) is designated category 1, attaining water quality standards and no use is threatened.

West Virginia's 2008 Fish Consumption Advisory includes the upper Mount Storm Lake for selenium (WVDHHR, 2008). Mount Storm Lake is located just west of the site. WVDEP's Total Maximum Daily Load (TMDL) program for 2008 lists a segment of the Blackwater River from the Town of Davis down river just prior to the Town of Hendricks. Constituents of concern are iron, aluminum, and fecal coliform impairments. TMDLs have also been developed by WVDEP for segments of Sand Run, Beaver Creek, and Glade Run (WVDEP, 2008). (Refer to Appendix R, Plate 32 for locations of the WV 303(d) Impacted Streams for WVMA.)

BUENA SMALL ARMS FIRING RANGE

The topography within the valley where the Buena Small Arms Firing Range is located is flat and swampy with mountains rising to the east and west of the valley. The average elevations of the valley floor and the surrounding ridges are approximately 3,200 and 3,900 feet above sea level, respectively. The valley area is underlain mostly by carbonate rocks of the Greenbrier Group, with outcrops of the more resistant sandstones of the Pocono Group near the center of the valley (crossing the Cortland area from the base of Cabin Mountain, the base of Canaan Mountain to the west). Noncarbonate sandstones

and shales of the Pottsville and Mauch Chunk Groups form the hillsides and ridges of the valley. The bedrock is overlain by a discontinuous layer of unconsolidated deposits which ranges from zero to approximately 30 feet in thickness. All geologic formations have been extensively fractured (USGS 1996).

The former firing range lies within the Cheat River watershed. Between 10 June and 8 August 1996, the WVDEP conducted a watershed assessment visiting 276 sites within the watershed. The primary goal of the assessment was to determine the health of selected stream sites in the watershed and included benthic macro invertebrates, fecal coliform bacteria, physico-chemical samples and physical habitat data including instream and riparian zone measures as well as observations of activities and disturbances in the surrounding area. According to the report, the watershed as a whole exhibited relatively good habitat with scoring defined as less than desirable but satisfies expectations in most areas (WVDEP, 1996).

Freeland Run (WV stream segment WVMC-60-D-12_00) is a 1.8-mile segment categorized by WVDEP as a number 5, meaning the water quality standards are not attained and the stream is impaired. West Virginia's 2008 Fish Consumption Advisory did not include Freeland Run or the Blackwater River as having areas of concern (WVDHHR, 2008). WVDEP's Total Maximum Daily Load (TMDL) program for 2008 lists a segment of the Blackwater River from the Town of Davis down river just prior to the Town of Hendricks. Constituents of concern are iron, aluminum, and fecal coliform impairments (WVDEP, 2008). (Refer to Appendix R, Plate 33 for locations of the WV 303(d) Impacted Streams for WVMA.)

DAILEY INFILTRATION CAMP

The former Dailey Infiltration Camp site lies within the Tygart Valley River Watershed. The Tygart Valley River flows north-northwestwardly through Randolph, Barbour, Taylor, and Marion Counties. The Tygart eventually joins the West Fork River to form the Monongahela River. The City of Elkins, WV, is 10 miles north of the site. The Allegheny coal formation crosses the Tygart Valley River 5 miles west of Elkins with the limit of the formation being along the western slope of Laurel Ridge and near the ridge crest. Downstream of Elkins, the Tygart Valley River flows through a gap between Rich Mountain and Laurel Mountain. These two mountains mark a part of the westernmost ridge of the Allegheny Mountains and the boundary between the mountains and the Allegheny Plateau. The annual mean flow of the river is approximately 1,922 ft^3/s (54 m^3/s). The rivers highest flow rate was during the 1985 flood and was estimated at 61,000 ft^3/s (1,727 m^3/s). The lowest recorded flow was 4.9 ft^3/s (0.1 m^3/s) (USGS, 2007).

West Virginia's 2008 Fish Consumption Advisory does not list the Tygart Valley River or it's tributaries within the area of the former Dailey Infiltration Camp with a warning advisory (WVDHHR, 2008). Sea Run, the tributary adjacent to the site, is listed in the 2004 WVDEP Stream Assessment as having insufficient data and information to determine if any designated use is attained. The same rating is given to the surrounding tributaries of Stalnaker Run, Wood Run, and Ward Run. The WV Stream Code for Sea

Run is WVMT-58_00, Ward Run is WVMT-59_00, and Wood Run is WVMT-55_00. (Refer to Appendix R, Plate 33 for locations of the WV 303(d) Impacted Streams for WVMA and Plate 32 for a map of directional flow of surface water within the vicinity of the Dailey Infiltration Camp.)

JENNINGSTON TRAINING AREA

The topography of the former Jenningston Training Area is mountainous and rugged with Karst terrain. Roadways generally follow the floodplains within the valleys and are infrequent. Surface water drains from the high slopes of the McGowan and Shavers Mountains and eventually into the Cheat River system. The Shavers Mountain Hiking Trail extends the high elevation of the mountain at approximately 3,706 feet. There are numerous caverns, sink holes and springs located along the slope of Shavers Mountain and Glady Fork is located at the base of the mountain slope. There are a number of springs located on the slope including Mint Springs Resurgence and Insurgence within 2,800 feet of the old quarry where the ordnance shipping canisters were found in 2006. Three Springs Run is located within 275 feet of the shipping canister disposal area.

West Virginia's 2008 Fish Consumption Advisory does not list any streams within the Jenningston Training Area (WVDHHR, 2008). WVDEP's Total Maximum Daily Load (TMDL) program does not list any streams within the Maneuver Area for 2008 (WVDEP, 2008). Three Springs Run, a tributary of Glady Fork, is listed in the WVDEP's 2004 Stream Assessment as insufficient or no data and information to determine if any designated use is attained. This is also the same WV Stream Assessment rating for Otter Creek, Possession Camp Run, Devils Gulch, Red Run, and Panther Camp Run. (Refer to Appendix R, Plate 32 for locations of the WV 303(d) Impacted Streams for WVMA.)

8.2.2 Surface Water Targets

AMMUNITION DEPOT

Surface water drainage for the former depot site would be surface drainage ditches to Leading Creek and eventually, the Tygart Valley River. The City of Elkins drinking water intake is upstream of the Leading Creek and Tygart Valley convergence.

The Elkins PSD obtains their water source from the surface waters of a tributary that drains into the Tygart Valley River; the river is utilized as the secondary source, which, according to the plant manager, is rare. The Elkins PSD supplies water to three additional PSDs as well that serves the communities of Leadsville, Midland, Huttonville, Gilman, Kerens, Montrose, and the Canfield area. According to the EPA's on-line Safe Drinking Water Information System, the population served by the Elkins PSD is 9,046. Huttonsville PSD which purchases surface water serves a population of 1,171, Leadville PSD serves a population of 1,345, and Midland serves a population of 2,870. Valley Head Elementary School in Elkins utilizes groundwater as a source (USEPA SDWIS Oct 2007).

The Tygart Valley River flows past Elkins, adjacent to State Highway 92/U.S. Highway 33, past the Towns of Harding, Junior, and Belington and through Audra State Park into Barbour County. The 15-mile point ends between the Town of Philippi and Audra State Park. The Town of Junior purchases surface water from another PSD and serves a population of 743. The Town of Belington obtains drinking water from the Tygart Valley River as a primary source and the Mill Creek reservoir as the secondary surface water source and serves a population of 2,050 (USEPA SDWIS Oct 2007). (Refer to Appendix R, Plate 15 for reference of site in relation to entire WVMA. Refer to Appendix R, Plate 31 for 15 mile point location.)

BEARDEN KNOB-CABIN MOUNTAIN IMPACT AREA

Surface water drainage from Cabin, Bearden, and Brown Mountains flows eventually into the Blackwater River which flows through the Canaan Valley Wetlands, past the Town of Davis, over the Blackwater Falls, and through the Blackwater Falls State Park. Artillery was fired directly over the wetland area and Blackwater River and impacted Cabin Mountain. The Blackwater River collects Beaver Creek and Yellow Creek near the Town of Davis where the river continues through the Towns of Hendricks, Hambleton, and Parsons. The Blackwater River joins the Dry Fork to form the Black Fork of the Cheat River at the Town of Hendricks and is within the Cheat River Watershed.
The Town of Davis obtains its drinking water supplies from a tributary that enters the Blackwater River close to Davis. The Davis PSD utilizes surface waters from the Blackwater River as a secondary source. The Davis PSD serves 600. The Davis PSD is the primary drinking water supplier for the Blackwater Falls State Park. The Town of Canaan Heights, one quarter mile south of Bearden Knob, primarily obtains their water supply from groundwater sources. As added information the CVSP's primary water source is surface water with a population of 1,760 served. Timberline Four Season Resort Management obtains groundwater as a water source. The Town of Thomas, 2 miles north of Davis, uses surface water as a water source and serves a population of 703. The Town of Parsons WV, located 15 miles downstream from Davis, obtains their water source from surface water and serves a population of 1,572. The Town of Hendricks is served by the Hamrick PSD which obtains drinking water from surface water and serves a population of 1,612 (USEPA SDWIS Oct 2007). (Refer to Appendix R, Plate 15 for reference of site in relation to entire WVMA. Refer to Appendix R, Plate 31 for 15 mile point location.)

FORE KNOBS-BEAR ROCKS IMPACT AREA

The climate of the Bear Rocks area is a cool, alpine type climate with strong prevailing winds and precipitation totaling more than 60 inches per year. The area around Bear Rocks supports subalpine heathlands with outcrops of Pottsville conglomerate, meadows, and cranberry bogs. The West Virginia flying squirrel and Cheat Mountain salamander, both on the federal threatened and endangered species list, are known to occur on the adjacent Dolly Sods area.

Big Star Run and its' tributaries are located within ¼ mile north, east, and south of Bear Rocks. Big Star Run is a tributary of South Fork Lunice Creek, Lunice Creek being a tributary of the South Branch Potomac River that drains into Chesapeake Bay. To the west of the preserve water flows into Dolly Sods from Red Creek. There are no surface water intakes in use within the immediate downstream surface water pathway(s) surrounding the Bear Rocks Preserve.

The Fore Knobs Mountain is located west of secondary State Highway 4, also known as Jordan's Run after the stream that runs parallel to the highway. The Allegheny Front separates the Cabin Mountain to the west and the Fore Knobs Mountain to the east. (WVU, 1996).

Lunice Creek (WV Stream segment WVPSP-26_00) is categorized by WVDEP as a category 4A, meaning the stream is impaired or threatened for one or more designated uses and TMDL has been completed. Big Star Run (WV Stream Code WVPSP-26-D-2_00) is also categorized 4A. West Virginia's 2008 Fish Consumption Advisory did not include Big Star Run or Lunice Creek as having areas of concern (WVDHHR, 2008). (Refer to Appendix R, Plate 15 for reference of site in relation to entire WVMA. Refer to Appendix R, Plate 29 for 15 mile point location.)

BUENA SMALL ARMS FIRING RANGE

Surface water drainage for the former firing range would be to the Blackwater River. The Blackwater River, which flows through the Canaan Valley Wetlands, the CVNWR, within 1.5 miles of the CVSP, eight miles from the site, flows adjacent the Town of Davis' drinking water intake, and through the Blackwater Falls State Park. Fifteen miles down river would end at the southeast border of the CVSP. The area of the Blackwater River and its tributaries five miles downstream from the former firing range is an area that may result in findings of MEC within other proposed project areas as the Blackwater River passes between the firing points of Bearden Knob, Yellow Creek, and Beaver Creek which are land features within the Bearden Knob-Cabin Mountain Impact Area.

The Town of Davis, WV, is located adjacent to Bearden Knob, Canaan Valley, Blackwater Falls State Park, and Canaan Heights. According to the water plant manager, the surface water intake is at the Town of Davis, along the Blackwater River. Drinking water is obtained from a tributary flowing from Davis Mountain with the Blackwater River as a secondary source. The largest percentage of water used at this plant is by the Blackwater Falls State Park which serves a transient non-community population of 976. The Davis Water Works serves a population of approximately 600. (Refer to Appendix R, Plate 15 for reference of the site in relation to the entire WVMA. Refer to Appendix R, Plate 27 for 15-mile point location.)

DAILEY INFILTRATION CAMP

The former infiltration camp is located within the MNF near the community of East Dailey, WV. The MNF lands are partially surrounded by private in-holdings with one to

three farms bordering National Forest property just beyond the site. An unnamed tributary, which flows into Sea Run, flows through the training area.

The City of Elkins drinking water intake is ten miles north of the former site. The Elkins PSD obtains water from the Tygart Valley River. The intake is located at river mile marker 81.95 (latitude N 38° 55' 00.44" - longitude W 79° 50' 47.01). The PSD provides water source to the City of Elkins and three additional PSDs: Midland PSD, Huttonville PSD, and Leadsville PSD.

The Midland PSD draws its water supply from the City of Elkins and is located south of Elkins picking up the water service just outside the Elkins City limits. The service follows Highway 219 for approximately 2.5 miles and ends approximately ¼ mile before entering the town of Beverly, WV. The system serves approximately 1300 customers.

Huttonville PSD serves approximately 800 households. The PSD obtains water from two sources: the City of Elkins (Tygart Valley River) and the Town of Beverly (Elk Fork). The areas covered include Dailey, East Dailey, and Valley Bend. From the City of Elkins the line is located on Georgetown Road, and continues to the town of Dailey. Two storage tanks are located at Dailey and Valley Bend (south of Dailey). The PSD serves the Wildwood Subdivision, located downgradient of the former infiltration camp, as well as provides service to a subdivision to the south called Ruddle Subdivision and the Furby Subdivision (approximately 8 houses) located in East Dailey.

Leadsville PSD serves the areas of Gilman, Kerens, and Montrose. The main line follows Old U. S. Route 219 to Kerens where a storage tank is located. This PSD serves approximately 600 customers and covers County Rd 1 (Leading Creek Road), County Rd 2 (Clover Run), County Rd 9, County Rd 3, County Rd 7 (from both directions), County Rd 219/3 (Cherry Fork), County Rd 1/6 (Smith Cross), and Pond Lick. The service continues across Canfield Hollow and Spring Stone Rd. At County Rd 1 it turns off to County Rd 3/1 following Leading Creek across Canfield Farms to County Rd 1/5 (Pearcy Rd) to Laurel Rd and stops at County Rd 11. Canfield Farms obtains water from the PSD for residences, rental properties, and barns. (Refer to Appendix R, Plate 15 for reference of site in relation to entire WVMA. Refer to Appendix R, Plate 32 for 15 mile point location.)

JENNINGSTON TRAINING AREA

Currently there were no MEC finds within the Jenningston Area portion of the WVMA. There were mortar shipping canisters (60-mm and 81-mm) in a small cave located within the boundary of the MNF's Otter Creek Wilderness. The majority of the land holdings with the Jenningston Area are public managed by the MNF. The area of Shavers Mountain has an abundance of caves within the karst topography of the landscape. The towns of Sully, Jenningston, and Gladwin are located west of the Otter Creek Wilderness Area. A mule school was operated by the Army during the operational period of the WVMA, near Gladwyn, WV, that focused on the use of pack mules. During the 2007 site

reconnaissance, the mule school location was visited. There were no visible remnants left by the Army at the mule school location and no contaminants were observed.

The small cave where the canisters were found was located 475 feet from Three Spring Run and within an old quarry. It is believed that there was no contamination or release to surface water as a result of the shipping canisters. Three Springs Tributary empties into the Glady Fork which flows to the Dry Fork, Black Fork and eventually, 15 miles downriver at the Town of Parsons, empties into the Cheat River. Surface waters within the Jenningston Training Area drain into the Cheat River Watershed.

The karst topography and cave systems of this area provide habitat for federally-designated endangered species. Federally-designated critical habitat for the Virginia Big-Eared Bat exists at the western edge of the Otter Creek Wilderness Area. Groundwater is the primary source of drinking water for towns within the Jenningston Training Area. Population trends for Sully, Gladwin, and Jenningston are not available from the U. S. Census Bureau for 2006 or 2000, but during site reconnaissance the area appeared sparsely populated. (Refer to Appendix R, Plate 15 for reference of site in relation to entire WVMA. Refer to Appendix R, Plate 30 for 15 mile point location.)

8.2.3 Surface Water Conclusions

Areas of concern listed in the surface water assessment of this PA could potentially have MEC to some degree in random, isolated impact points. MEC may have been displaced from their original point of impact and transported by surface water beyond the vicinity of Army maneuver activities. Surface waterways throughout the WVMA could have accelerated the transportation of MEC or other contaminants due to potential high flow volumes and propensity of flooding. Impacts to surface waters, if any, would probably be isolated and widely scattered over rugged terrain. The former Ammunition Depot would likely be a more contained area of contamination due to its limited size and the fact that it appears to have been landlocked. There is a possibility at the former depot location that contaminants could have been moved to other parts of the property or transported off site by surface runoff or other means.

Major waterways and their tributaries that may have been affected by former Army activities include the Blackwater River, Canaan Valley Wetlands, Stony River, and the Tygart Valley River. The overall effects on the listed waterways as a result of the Army's use of the property are unknown given the 60 years that have passed and the areas of potential contamination that have yet to be investigated. It is expected that any contamination transported within the WVMA is likely to be an isolated release that has been transported over the years by surface water to another location or that was lodged or buried near a waterway and still in place at the impact point.

Bearden Knob-Cabin Mountain Impact Area, Buena Small Arms Firing Range, Fore Knobs-Bear Rocks Impact Area, and the Jenningston Training Area are all areas in which significant portions lie within lands managed by the MNF with multiple recreation and tourism areas and therefore, the population density is low although the visitor

numbers could potentially be high. The former Ammunition Depot and former Dailey Infiltration Camp are located within the Tygart Valley with a higher population density.

According to the U. S. Census Bureau the 2006 population estimates for the counties within the WVMA are as follows:

Tucker County	6,856
Randolph County	28,465
Grant County	11,915
Barbour County	15,788

The 2006 population estimates for towns within the WVMA are as follows:

Tucker County	
Parsons	1,380
Hendricks	310
Hambleton	245
Davis	576
Randolph County	
Elkins	7,046
Beverly	652

8.3 Soil Exposure and Air Pathways

Direct contact with MEC is believed to be the only soil hazard exposure of concern from former WVMA activities. During PA research, no maneuver activities were found which are presumed to have caused a release of HTRW, and thus exposure to chemical contaminants, other than those constituents which could have been released from MEC, is thought to be highly unlikely. Direct contact with MEC is the immediate and most dangerous concern to human health. There is no air pathway exposure presumed because chemical warfare material, which would be an extreme hazard if present, is not thought to have been used, and other chemicals that may be present from the MEC are not volatile to cause an air exposure hazard.

The soils on Brown Mountain and Cabin Mountain, two impact areas that have not been investigated or recently cleared of ordnance, are described as being very stony land-Dekalb Association soil; moderately deep to deep, very stony (USDA, Soil Conservation Service, General Soil Map of Tucker County and Part of Northern Randolph County, West Virginia, March 1966). Due to this condition of very little soil cover, ordnance is expected to be on the surface or near surface, and it is possible that hunters, hikers or other visitors to these areas are the most likely to encounter live ordnance. As noted during the FS and subsequent OE removal actions at DSN and DSW, ordnance was found very near to the surface, in many instances, lying on the ground exposed. Due to the effects of being exposed to the elements for 60 years, and then being dislodged and displaced due to landslides, erosion, flooding, or other effects, the ordnance could possibly be less stable, presenting an even more hazardous condition.

Chemical contamination is not expected to be a widespread concern at the impact areas, because any contamination should be limited to the area where ordnance had impacted. However, there is the potential that ordnance constituents could have migrated from the "immediate impact area" due to erosion or other natural means. There are few residences in these areas, so exposure is likely to be limited to hunters, hikers, and other visitors, and would be on a very limited, short-term basis. There is likely ecological exposure; however, the areas of concern, and thus exposure, are very small in comparison to the vastness of the MNF with respect to the WVMA's size.

8.3.1 Physical Conditions

General soil types are presented in the sequence/pattern that are related to the geology, the landforms, relief, climate, and the natural vegetation of the counties that fall within the boundaries of the WVMA. Information regarding soils of the region was obtained through county soil surveys prepared by the USDA Soil Conservation Service, in cooperation with the Forest Service and the West Virginia University Agricultural and Forestry Experiment Station. See Appendix B for references to USDA Soil Conservation Service, Randolph County Area, Pendleton County, Grant County, and Tucker Counties of West Virginia. Since there were no identifiable uses by the Army during WWII in Preston County, it was not included here.

<u>GRANT COUNTY SEQUENCE/ASSOCIATION – Refer to Appendix R, Plate 17</u>

- Dekalb-Hazleton-Laidig-Opequon
- Bers-Weikert (bordering Tucker County on the east)
- Potomac-Tioga-Melvin
- Berks-Lehew-Dekalb (bordering Tucker County on the east)
- Monongahela-Clarksburg-Ernest
- Schaffenaker-Drail
- Shouns-Belmont-Calvin (bordering Tucker County on the east)
- Wharton-Gilpin-Cavode (in area of former Stony River Reservoir westward to Preston/Tucker Counties)

<u>RANDOLPH COUNTY SEQUENCE/ASSOCIATION, minus a Northern Section – Refer to Appendix R, Plate 18</u>

- Gilpin-Dekalb-Lily
- Gilpin-Dekalb-Buchanan
- Calvin-Belmont-Meckesville (vicinity of the town of Harman and follows some of the Dry Fork along Route 29. Surrounds the Town of Glady.)
- Berks-Calvin-Weikert (location just beyond (approx 3 miles) the flood plain of the Tygart Valley River. Area of Bowden Fish Hatchery)
- Ernest-Atkins-Monongahela-Philo (includes both banks and flood plain of the Tygart Valley River. Only location of this soil sequence in the county. Elkins, Beverly, Mill Creek, Montrose)
- Dekalb-Buchanan (follows the Shavers Fork River)

- Dekalb-Berks-Calvin
- Dekalb-Binkerton Variant

PENDLETON COUNTY SEQUENCE/ASSOCIATION – Refer to Appendix R, Plate 19
(Note – Only the Seneca Rocks Climbing School Area was listed.)

- Dekalb-Blackthorn-Elliber
- Potomac-Clarksburg-Ernest
- Berks-Weikert

TUCKER COUNTY SEQUENCE/ASSOCIATION with Northern Randolph County – Refer to Appendix R, Plate 16

- Gilpin
- Barbour-Pope-Sequatchie
- Calvin
- Dekalb-Calvin-Belmont
- Dekalb-Gilpin
- Dekalb very stony land
- Dekalb-Brinkerton
- Ernest-Brinkerton-Leetonia very stony land
- Blago-Dekalb wet terrace land

SOIL DESCRIPTIONS/CHARACTERISTICS

Atkins – Deep, poorly drained soils that are nearly level and on flood plains. Erosion hazard is slight to moderate. Hazard of flooding, a high water table with moderately slow and slow permeability. In most areas the substratum below a depth of about 24 inches is coarser textured than the surface layer.

Barbour – A deep, well drained soil, medium textured to moderately coarse textured. Medium acid to strongly acid. Water table is commonly at a depth of three to four feet. In narrow valleys along rapidly flowing streams, the texture is generally cobble loamy sand. In larger valleys a short distance downstream, the texture is generally gravelly sandy loam.

Belmont – Soils are deep and moderately steep to very steep and are throughout the uplands. The Belmont soils occupy narrow strips along the lower slopes of Limestone Mountain, McGowan Mountain, and Green Mountain and on the floor of Canaan Valley. They are extensive along Dry Fork in the south-central area. Moderately permeable. Erosion hazard is high. The depth to bedrock ranges from 20 to 50 inches; the average depth is 35 inches.

Berks – Found along the gentler slopes along Lunice Creek and Patterson Creek watersheds Berks are medium textured moderately deep soils. Limited depth to bedrock, doughtiness and steep slopes are characteristic. Water from wells usually has a high concentration of dissolved minerals, including iron and sulfur.

Blackthorn – Soils are on the lower hillsides, on foot slopes and in coves. Very deep gently sloping to very steep. These soils formed in areas underlain by limestone or limy shale.

Blago – Soils are deep, very poorly drained. The soils are mostly of Canaan Valley. They are saturated with water for long periods. These soils occur near areas of Muck and Peat and Wet terrace land and contain a large amount of organic matter.

Brinkerman – Soils are moderately deep, poorly drained, and strongly sloping to very steep. Erosion hazard is moderate on most areas. Limited depth to bedrock, high water table, slow permeability, with stones and boulders on surface. The soils are saturated with water in spring and in fall because the firm layer in the subsoil is very slowly permeable. Strongly acid to extremely acid. The depth to the firm pan ranges from 13 to 26 inches.

Buchanan – Medium–textured and moderately fine textured subsoil. The soils are well drained, and strongly sloping to moderately steep and are on foot slopes.

Calvin – High base substratum soils that are moderately deep and moderately steep to very steep. Located throughout the uplands. Well drained and strongly acid to very strongly acid. The depth to bedrock ranges from 22-48 inches; it averages 32 inches.
Cavode – Somewhat poorly drained, deep, and gently sloping.

Clarksburg – Soils are gently sloping to moderately steep. Medium textured and moderately fine textured subsoil that is very firm and brittle in the lower part. Slow permeability. Groundwater from wells has a high concentration of dissolved minerals, including iron and sulfur.

Dekalb – Deep, upland and foot slope soils Steep slopes, stones on the surface, and shallowness to bedrock are characteristics. Pollution of ground water by waste disposal facilities is a hazard in areas with limestone bedrock. The hazard of erosion is moderate, especially in steep areas. Very strongly acid or extremely acid. Moderately permeable. The depth to bedrock ranges from 20 to 48 inches; it averages 30 inches.

Drail – Soils are deep, excessively drained, and coarse textured. Characteristic of steep slopes, stoniness, doughtiness, and depth to bedrock.

Elliber – Soils are on hillsides, benches, and ridge tops. Very deep and gently sloping to extremely steep. These soils formed in areas underlain by cherty bedrock.

Ernest – Soils are gently sloping to moderately steep and are on foot slopes, in coves, and along small drainageways on the terraces. Same texture as Clarksburg and Monongahela soils. Slow permeability. Groundwater from wells has a high concentration of dissolved minerals, including iron and sulfur. These soils have a moderately firm fragipan below a depth of 18-24 inches. Moderately low supply of plant nutrients.

Gilpin – Moderately deep, well drained, and gently sloping to very steep. Wetness and stones on the surface of with limited depth to bedrock. Gilpin soils have slopes of less than 15 percent. Both The Gilpin and Dekalb soils are acidic and droughty. Very strongly acid to extremely acid. Hazard of erosion is moderate.

Hazleton – Steep slopes, stones on the surface, and shallowness to bedrock are characteristics. Pollution of ground water by waste disposal facilities is a hazard in areas with limestone bedrock.

Laidig – Deep soils Steep slopes, stones on the surface, and shallowness to bedrock are characteristics. Pollution of ground water by waste disposal facilities is a hazard in areas with limestone bedrock.

Leetonia – Excessively drained, moderately deep to deep soils of the uplands. Occur with the well drained Dekalb soils and moderately to rapidly permeable. The depth to bedrock ranges from 20 to 48 inches.

Lehew – Medium textured, channery subsoil formed in material weathered mostly from sandstone. Characteristic of steep slopes, stoniness, droughtiness, and limited depth to bedrock

Lily – Moderately deep and gently sloping to strongly sloping. Erosion hazard is generally moderate to severe. Moderately slow and slow permeability with hazard of flooding.

Meckesville – Soils are deep and strongly sloping and moderately steep. Hazard of erosion is moderate to severe with moderate hazard of erosion. Steep slope and the limited depth to bedrock. Strongly acid to very strongly acid. Below a depth of 36 to 48 inches is a faint to evident fragipan that is slowly permeable.

Melvin – The Melvin soils are poorly drained, medium-textured subsoil.

Monongahela – Nearly level to strongly sloping and are throughout the terraces. A medium-textured subsoil that is very firm and brittle in the lower part. Slow permeability. Groundwater from wells has a high concentration of dissolved minerals, including iron and sulfur. The depth to the fragipan ranges from approximately 18 to 24 inches. In areas along major drainageways, there are cobblestones of various sizes and in various amounts in the lower horizons.

Opequon – soils are shallow Steep slopes, stones on the surface, and shallowness to bedrock are characteristics. Pollution of ground water by waste disposal facilities is a hazard in areas with limestone bedrock.

Philo – Deep, moderately well drained soils. Nearly level with flood plains. Erosion hazard is slight to moderate. Hazard of flooding, a high water table with moderately slow

and slow permeability. The depth of mottling generally ranges from 15 to 18 inches and in some areas gravel occurs above a depth of 18 inches.

Pope – Well-drained soils that are strongly acidic. Subject to occasional flooding along the larger streams and frequent flooding along the smaller streams.

Potomac – Potomac soils are coarse-textured substratum and somewhat excessively drained.

Schaffenaker – Moderately deep, well drained, and coarse textured. Characteristic of steep slopes, stoniness, droughtiness, and depth to bedrock.

Sequatchie – Deep, well-drained soils that are moderately permeable and slightly acid to very strongly acid. These soils are good for growing most plants with amendment additions.

Shouns – Deep soils and moderately steep found on foot slopes on the uplands. Medium-textured and moderately fine textured subsoil.

Tioga – Tioga soils are well drained, medium-textured and moderately coarse textured subsoil

Weikert – Found along the gentler slopes along Lunice Creek and Patterson Creek watersheds Weikert are medium textured shallow soils. Limited depth to bedrock, droughtiness and steep slopes are characteristic. Water from wells usually has a high concentration of dissolved minerals, including iron and sulfur.

Wet Terrance Land (Wt) – Moderately deep to deep and somewhat poorly drained. All of this land is in Canaan Valley in nearly level areas at the elevation of more than 3,000 feet. Limestone is dominant, particularly in the southern end of Canaan Valley. Poor drainage and slow permeability.

Wharton – Deep, moderately drained, and gently sloping to very steep soils.

8.3.2 Soil and Air Targets

The estimated total population encompassed in and within a four mile radius of the former WVMA is approximately 50,000 people. Population distributions for the areas under investigation within this report are included in Section 8.1.2. Section 8.2 gives information concerning the amount of wetlands located within the areas under investigation within this report. There are no schools or daycares found within 200 feet of the proposed project locations. Workers that work within in the proposed project locations include officials with MNF, CVNWR, CVI, and other personnel working for property owners. It is unclear how many workers from these organizations actually work in impacted areas. The following sensitive environments are located in or near the areas of potential contamination in the form of OE (Refer to Appendix R, Plate 20):

- Dolly Sods Wilderness Area
- Dolly Sods North
- Dolly Sods Scenic Area
- CVNWR
- Bear Rocks Preserve

The most likely source of human contact within the proposed project locations in the former WVMA is hunters, hikers, fishermen, and other people utilizing the outdoors in the area of the WVMA Impact Area and other proposed project locations. According to the Dolly Sods Recurring Review (USACE, 2004) between 45,000 to 75,000 people visit Dolly Sods annually. The reason for the usage ranges from sightseeing to backpacking or hunting. These people can and do stray from trails that have been cleared for UXO. The CVNWR allows full access of their lands to registered hunters during hunting season. Other visitors to the CVNWR must stay on all designated trails and roads. These roads and trails have not been cleared for UXO and in the case of the Brown Mountain Trail, are located within suspected impact areas. The Canaan Valley Institute property is completely open to the public for hiking and camping purposes. There are hunting and fishing clubs located within the WVMA Impact Area that have complete access to their organization members. There also private property owners located within the WVMA Impact Areas. The only property that has had extensive UXO clearance in the former WVMA is the hiking trails and campgrounds in the Dolly Sods Region in 1997and 1998.

8.3.3 Soil Exposure and Air Pathway Conclusions

A release to the air is not suspected, but potentially contaminated dust may become entrained in the air. This is especially true if patrons are exposed to MC following a detonation by an EOD squad. No odors were detected in any of the areas visited during the 2007 site reconnaissance. The area encompassing the WVMA is largely forest and undeveloped. No soil or air sampling have been conducted on the property to determine potential contamination and contamination migration.

9 SUMMARY AND CONCLUSIONS

The following sections summarize and provide conclusions based upon the information obtained during the preparation of this report.

9.1 Areas That May Warrant No Further Action by DoD

The following areas warrant no further investigation based on the findings of this report.

199th Station Hospital

A historical photograph that was reviewed during preparation of the PA from the period 1945-46 shows that the 199th Station Hospital was located approximately 1/4 to 1/3 mile from the left descending bank of the Tygart Valley River, adjacent to and northwest of

the main rail yard in Elkins, WV. Numerous rail lines and a roundhouse are visible in the same photograph. Historical records showed that the hospital consisted of seven frame buildings; however no records were obtained during PA research that documented activities such as wastes that were generated and their disposal.

Common Operations Report (COR) CO-15 (HydroGeoLogic, Inc., HGL, 2006b) contains information on potential wastes generated and disposal methods from the processing of X-ray photographs. Developer and fixer solution chemicals are listed in Tables 3.1 and 3.2 of that report, including sodium carbonate, sodium metaborate, elon, hydroquinone, potassium bromide, sodium sulfite, acetic acid, sodium thiosulfate, ammonium thiosulfate, potassium alum, chrome alum, and aluminum chloride (HGL, 2006b). As stated in Section 4.0 of CO-15, regarding potential waste disposal methods "It [was] a good practice to flush the drain with rapidly flowing water after old processing solution [had] been discarded through it, to prevent corrosion and to wash away any sludge and gelatin" (HGL, 2006b). No records were obtained during the PA research which showed if the hospital site contained any drains or drain pipes where wastes may have been disposed or their ultimate discharge point.

As evidenced from the PA site visit, the site of the former 199th Station Hospital now contains a physician's building, with an asphalt-paved parking lot. The area to the southeast, once the site of the rail yard and roundhouse, has since been re-developed with commercial buildings, including a hotel. No information was obtained for the PA regarding any environmental investigations which may have been performed at the former rail yard prior to site re-development. The rail yard and roundhouse were never leased as part of the WVMA.

Due to the development at the site and the paved surfaces, there is no surface exposure pathway to potential contaminants which may have been related to the 199th Station Hospital. The Town of Elkins surface water intake is located on the Tygart Valley River, about 3/4 mile downstream of the former hospital site. Any contamination which may have existed from former hospital operations would have to migrate at least 1/4 mile in the subsurface to the river and then travel the remaining distance to the town's water intake. Any contamination from the former hospital would likely be diluted from the river and not pose a threat to the drinking water supply. It is also noted that the hospital was only in existence from October 1943 until July 1944, and in this time period, likely generated little waste.

Due to the short duration of operations, minor contamination may be present; however, the direct soil exposure pathway does not exist and the river would likely dilute any potential surface water contamination prior to reception by the town's water intake. It is therefore believed that there is little potential for HTRW contamination from the former 199th Station Hospital that presents a risk and no further investigation is recommended.

Laundry Unit at Bowden, WV

A historical photograph that was reviewed during preparation of the PA from the period 1943-44 shows that the Bowden Laundry unit was located near the Shavers Fork River, at the current location of the Bowden National Fish Hatchery. No ground disturbances were noted from an aerial photograph that was reviewed for this investigation. Historical records reviewed for the PA showed that the laundry unit consisted of a series of several large tents used for the cleaning of troop laundry; however no records were obtained during PA research that documented the process that was employed or wastes that were generated and their disposal.

A newspaper article from *The Telegram*, Clarksburg, WV, 18 August 1943, stated "…Nowadays the Army provides laundry service for its men, and the Central West Virginia maneuvers area is no exception……jobs on trailers, each with a 3 1/2 ton tractor unit which is detached except on actual move. They are complete with washer, spin drier, steam tumbler, boiler, motor-generator, water pumps, hot water tanks, and their own electric system. The dirty clothes are dumped into the washer along with the proper amount of GI soap, give from 19 to 23 minutes wash, spun dry in about five minutes, then given a steam tumbler trip of 12 minutes that dries them completely".

As evidenced from the PA site visit, the site of the former Bowden Laundry unit is the location of the Bowden National Fish Hatchery. There was no evidence of the laundry unit from the site visit. No facilities are believed to have existed at the site prior to the hatchery.

Due to the likelihood that the facility was a laundry facility, as noted in the newspaper article that was obtained during PA research and the real estate map, it is presumed that any discharges to the Shavers Fork River from the Bowden Laundry would have been soap solutions which would have left little trace of contamination today. It is therefore believed that there is little potential for HTRW contamination from the former Bowden Laundry unit that presents a risk and no further investigation is recommended.

Ordnance Base Shop

A historical photograph from the period 1945-46 that was reviewed during preparation of the PA shows that the Ordnance Base Shop was located approximately 5 miles south of Elkins within 1.5 miles of the left descending back of the Tygart River. No ground disturbances were noted from the aerial photograph that was reviewed.

Mr. Don Rice, a local historian who was interviewed during preparation of the PA, stated that the site where the Ordnance Base Shop was located was an auto repair shop prior to and following the maneuvers. No records were obtained during PA research that documented any leases or contracts for use of this facility, nor was any information obtained that showed the ultimate disposition of the auto repair facility. The site is currently a pet store and small motor repair facility. No records were obtained during PA research that documented the activities of the Ordnance Base Shop, but during the site

visit team members spoke with the operator of the store that is currently at the building that was used as the Ordnance Base Shop. The man, whose name was not obtained during the site visit, stated that he knew a couple of alterations were made to the building during the operational period of the WVMA to accommodate larger vehicles the Army was using at the training area. The man stated that the buildings garage doors were widened and additional concrete was added to the buildings foundation to support the larger vehicles. Since historical documents showed that the base shop was located at this former auto repair facility and based on the operator's information, it is surmised that the Army used the facility for vehicle repairs.

No environmental conditions were observed at the site that could have been attributed to former DoD use. There was no information in the EDR database search for this area to indicate that there were any leaking USTs, spills, discharges or other environmental enforcement action at the property. No further investigation is recommended for this site under the DERP-FUDS program.

9.2 Potential Hazards That May Warrant FUDS Projects

The following subsections present areas that warrant further investigations based on previous DoD use documented within this report.

9.2.1 HTRW

Based on the findings of this report, no HTRW-related contamination was determined and therefore no HTRW Projects are recommended.

9.2.2 MMRP

The former WVMA served as a low-altitude mountain training facility for infantry maneuvers and artillery practice, with associated ammunition depots, infiltration ranges, small arms ranges, and artillery firing points and impact areas. Based on the findings of this report, the following MMRP are proposed based upon the property's historical use:

<u>MRA #1/MRS #1 – Dailey Infiltration Camp</u>

Findings: Based on historical documentation, aerial photography interpretation and a site visit conducted on the property, it is determined that the Dailey Infiltration Camp was once used as a small arms range (and potential grenade range) and obstacle course training facility during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a portion of the Monongahela National Forest and is currently not developed. **Estimated Proposed Project Acreage:** 200 acres

Conclusions: A site inspection (SI) should be conducted to determine the presence of small arms and other possible MEC located on this property. Site sampling should be conducted to determine the presence of potential munitions constituents (MC) contamination located on this property.

MRA #2/MRS #2 – WVMA Ammunition Depot

Findings: Based on historical mapping, historical documentation, and a site visit it is determined that the WVMA Ammunition Depot served as the main ammunition storage area during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a vacant field previously used for growing crops. **Estimated Proposed Project Acreage:** 4 acres

Conclusions: A SI should be conducted to determine the presence of Discarded Military Munitions (DMM) located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #3/MRS #3 – Jenningston Training Area

Findings: Based on the canister find in the Otter Creek Wilderness, historical documentation, and aerial photography interpretation, it is determined that the area around the community of Jenningston, WV was once used as infantry division troop maneuver area used during the operational period of the WVMA. This site is generally bounded by the Otter Creek Wilderness Area to the west, Mozark Mountain to the north, Chimney Rock/community of Dryfork to the east and the community of Sully to the south. **Current Use:** The area encompassed in this proposed project is currently a combination of Monongahela National forest land and farmland with residences. **Estimated Proposed Project Acreage:** 40,000 acres

Conclusions: A SI should be conducted to determine the presence of possible MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #4/MRS #4 – Fore Knobs/Bear Rocks Firing Ranges

Findings: Based on UXO found in proximity to this site, historical mapping and documentation, interviews and aerial photography interpretation, it is determined that the Fore Knobs/Bear Rocks Firing Ranges was once used as firing points and target locations for 105-mm and 155-mm howitzer rounds used during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a combination of Monongahela National forest land, The Nature Conservancy's Bear Rocks Preserve, forested land and farmland with residences. **Estimated Proposed Project Acreage:** 42,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #5/MRS #5 – Bearden Knob Firing Range

Findings: It was determined that the area near Bearden Knob was once used as a 105-mm and 155-mm howitzer round firing point and possible anti-tank firing range used during the operational period of the WVMA. These determinations have been made based on rocket finds near Yellow Creek, a UXO find on Cabin Mountain (105-mm howitzer round), historical mapping, historical documentation, aerial photography, and interviews. **Current Use:** The area encompassed in this proposed project is currently a combination of private property (residences, agricultural land) and Canaan Valley national Wildlife Refuge property. **Estimated Proposed Project Acreage:** 8,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #6/MRS #6 – Brown/Cabin Mountain Firing Ranges

Findings: It was determined that the areas around Beaver and Yellow Creeks were once used as a firing point for a 155-mm howitzer rounds, firing points for 60-mm and 81-mm mortars, and possible rocket or firing range used during the operational period of the WVMA. Brown Mountain was used as target area for the 60-mm and 81-mm mortar rounds fired from Yellow Creek during the operational period of the WVMA. The Cabin Mountain Firing Range was used as a target location for 105-mm and 155-mm howitzer rounds used during the operational period of the WVMA. These determinations have been made based on historical mapping, historical documentation, aerial photography interpretation, and interviews with personnel familiar with the WVMA. A 105-mm howitzer round was found in 2006 on Cabin Mountain within the Canaan Valley National Wildlife Refuge. **Current Use:** The area encompassed in this proposed project is currently a combination of a preserve owned by Canaan Valley Institute, U.S. Fish and Wildlife's Canaan Valley National Wildlife Refuge. **Estimated Proposed Project Acreage:** 16,000 acres

Conclusions: A SI should be conducted to determine the presence of MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

MRA #7/MRS #7 – Buena Small Arms Firing Range

Findings: Based on historical documentation, aerial photography interpretation and a site visit conducted on the property, it is determined that the Buena Small Arms Firing Range was once used as a small arms range (and possible grenade range) used during the operational period of the WVMA. **Current Use:** The area encompassed in this proposed project is currently a portion of the Canaan Valley National Wildlife Refuge. **Estimated Proposed Project Acreage:** 50 acres

Conclusions: A SI should be conducted to determine the presence of small arms and other possible MEC located on this property. Site sampling should be conducted to determine the presence of potential MC contamination located on this property.

9.2.3 PRP/HTRW Considerations

Based on the findings of this report, there are no PRP/HTRW projects recommended at the former WVMA.

9.2.4 PRP/MMRP Considerations

There is a potential for a PRP/MMRP project with the Allegheny Ballistics Laboratory (ABL) use of a portion of the WVMA Impact Area following the operational timeframe of the WVMA. The area covered under a use permit (as noted in Section 4.2.1.4) issued to the Office of Scientific Research and Development, for use as a test range by ABL, is predominately within the existing Dolly Sods (DS) MMRP Project (FUDS Project #G03WV001304). The existing DS MMRP Project Area had a UXO removal action conducted in 1997-98 and is currently in the Long Term Management (LTM) phase of the project life cycle. Previous documents developed for the Dolly Sods Project and the previous UXO removal action have produced no evidence of ABL's use of the property. Due to the discovery of the permit (Appendix G, Document G-3), and the fact that the area in question is within a current project area, further evaluation of the potential PRP issue is recommended for this area.

Based on the findings of this report, there are no other PRP/MMRP issues noted within the former WVMA.

9.2.5 CON/HTRW

Based on the findings of this report, there are no CON/HTRW projects recommended at the former WVMA.

9.2.6 BD/DR

Based on the findings of this report, there are no BD/DR projects recommended at the former WVMA

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Appendix A – Reference Sources and Records Reviewed

APPENDIX A

Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
Aerial Photography Field Office	2222 W. 2300 South Salt Lake City, UT 84119	Sherrie Holyoak	(801) 975-3503 (801) 975-3500	Aerial photos post-1955 available
ATK		Jim Robson		Historical Information concerning ABL obtained
Beverly, WV (town of)	Water and Sewage Plant		(304) 636-7815	Information on drinking water supplies/sources
Canaan Valley Institute	Thomas, WV	Janette Bennett, Ken Dzaack	(304) 463-4739	Tucker Co Aerial Photography, Site Visit Assistance
Canaan Valley NWR	Davis, WV	Leah Ceperley, Ken Sturm	(304) 866-3858	Threatened & endangered species list, critical habitat, Site visit assistance
Canaan Valley State Park	Water Treatment Plant	Art Teter	(304) 866-4353	Information on drinking water supplies/sources
Center of Military History	Attn: DAMH-RAS 1099 14th NW Washington, DC 20536	Commander Library (Lenore) www.army.mil/cmh	(202) 685-2733 (202) 685-4042	Provided copies of mountain climbing training guide
Barbara Carroll		Barbara Carroll	(304) 636-2701	Father was Carl Degler who owned the property was the Ordnance Base Shop of the WVMA.
City of Elkins Water Treatment Plant	1 West Davis Street Elkins, WV 26241	Mike Barkley	(304) 636-2250	Information on City of Elkins drinking water supply
Consolidated Farm Service Agency	6 Park Street Petersburg, WV 26847	Mike Taylor	(304) 257-4068	Soil surveys
Consolidated Farm Service Agency	200 Sycamore Street Elkins, WV 26241	Denise Thompson	(304) 636-6703	Aerial photos
Davis City Water Plant		George Wilforg	(304) 259-5502	Information on drinking water supplies/sources
Davis & Elkins College	History Department Geology Department	Russ McClain	(304) 637-1806	No Information Received
DIALOG Information Services, Inc.	75 E Wacher Drive, 5th Floor Chicago, IL 60601		(312) 726-9206	No Information Received
Directorate of Real Estate	441 G Street Washington, DC 20314	Bob Webb		Forwarded to the USACE, Baltimore District. No information found.
DoD - Defense Library on Disk	Pentagon Library, Washington D.C.	Matthew Brown	(804) 279-5303	No Information Received
DoD - Defense Logistics Studies Information Exchange (DLSIE)	Fort Lee, VA 23801-6043	Tim Renick (library)	(804) 765-4176, (804) 734-4007	No Information Received
DoD - Defense Technical Information Center	Fort Belvoir, VA	Diane Schnurrpusch	(703) 767-9069	No Information Received
DoD - Defense Visual Information Center	www.dodmedia.osd.mil/dvic/index.htm			No Information Received
DoD Explosives Safety Board	Alexandria, VA			No Information Received
DoD Publications Archive	www.defenselink.mil/pubs/archive.html			No Information Received
Duke Watson	The Highlands Seattle, WA		(206) 363-8866	Information provided during the interview is presented in Appendix J
Elkins Inter Mountain		Nancy Moore		Archives of newspaper articles is located at WVU
FBI	10th and Pennsylvania Avenue Washington D.C.	Mike Flanning	(202) 324-2696	No Information Received
Five Counties Library	301 Walnut Street Parsons, WV 26287	Kathy	(304) 478-3880	No Information Received
Fort Drum	Fort Drum, Oklahoma	Mr. Cuvvison/Burke		No Information Received

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Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
George Washington University	History Department Phillips Hall Room 335 801 22nd Street NW Washington DC 20052		(202) 994-6230	GWU archives were researched, photos and historical documents were obtained
Irvin Gordon		Irvin Gordon	(609) 921-8863	Trained at WVMA. Told experience in training.
Grant County Clerks Office	5 Highland Ave. Petersburg, WV 26487	Loretha Allen	(304) 257-4550	Owner Information
Grant County Extension Service	115 ½ Virginia Ave. Petersburg, WV 26847	Rebecca Ketterman	(304) 257-4688	No Inforamtion Received
Grant County Health Department			(304) 257-4922	No Inforamtion Received
Grant County Library	18 Mt. View Street Petersburg, WV 26847		(304) 257-4122	Referrals Provided
Grant County Sheriff's Dept.	5 Highland Ave. Petersburg, WV 26847	Lawrence Cornell, Deputy	(304) 257-4122	No Information Received
Harmon (town of)		Keith Teter	(304) 227-4131 (304) 642-4336 cell	information on drinking water supplies/sources
Historical Accident Database (DDESB)	Attn: SMCAC-ESM Savanna, IL 61074-9639		(703) 325-8624	No Information Received
Huffman Logging, Inc.	HC33, Box 620	Gerald Huffman	(304) 257-4105	logged in the Dolly Sods area for 30 years without encountering OEW (from ASR)
Huttonsville Public Service District		Milford Jones	(304) 335-2035	Information on drinking water supplies/sources
John Markwell	Seneca Rocks, WV 26884		(304) 567-2254	Provided referral to National Ski Patrol
Adrian Kibler	1000 Cogliandro Dr, Chesapeake, VA 23320	Adrian Kibler	(757) 547-4017	Provided information on FA Battalion Piper Cub Observation Units
Leadsville Public Service District			(304) 636-8834	information on drinking water supplies/sources
Library of Congress, Geography and Map Division	Washington D.C.	Thomas DeClair	(202) 707-5522	No Information Received
Midland Public Service District	Randolph County	Ron Vance	(304) 636-1431	information on drinking water supplies/sources
Monongahela National Forest	200 Sycamore Street Elkins, WV 26241	Mary Smakula, F. Eng.	(304) 636-1800	groundwater well inventory
Monongahela National Forest	200 Sycamore Street Elkins, WV 26241	Dan Arling, Wildlife biologist	(304) 636-1800	Threatened & endangered species list, critical habitat
Monongahela National Forest		Winifred Fink	(304) 636-1800	Referals suggested
Mountaineers History Committee		Lowell Skoog	(206) 525-6083	Provided Duke Watson's contact inforamtion and photos Mr. Watson has taken.
National Archives - Fort Worth		Barbara Rust		Provided clearer copies of 2003 USACE St. Louis District findings
National Archives - Washington National Records Center	4205 Suitland Road Suitland, MD Suitland Branch - Civil and Military	Rose Mary Christian	(703) 806-5689	No Information Received
National Archives - Great Lakes Region	7358 South Pulaski Road, Chicago, IL 60629	Scott Forsythe	(773) 948-9001	No Information Received.
National Archives I	Pennsylvania Avenue & 7th Street Washington DC Old Military Modern Military		(202) 501-5390 (202) 501-5385	No Information Received

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Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
National Archives II	8601 Adelphi Road College Park, MD 20704 Civil Reference Branch Cartographic and Architectural Branch Still Photo Branch Textual Branch Motion Picture Branch		(301) 713-7250 (301) 713-7040 (301) 713-6660 (202) 501-5385 (202) 713-7060	Information received is contained in Appendix G. Record Groups investigated include RGs 16, 18, 30, 38, 48, 71, 72, 74, 77, 80, 92, 96, 107, 111, 112, 127, 143, 156, 159, 160, 165, 168, 175, 179, 181, 225, 234, 240, 250, 269, 270, 291, 319, 334, 335, 336, 337, 338, 340, 341, 342, 407, 429, 429
National Archives, Mid-Atlantic Region	Room 1350 9th and Market Street Philadelphia, PA 19107	Patrick Connelly	(215) 606-0100	No Information Received
National Archives, Southeast Region	1557 St. Joseph Ave. East Point, GA 30344	Guy Hall	(404) 763-7477	No Information Received
National Defense University Library	3/1 - Talked with Mrs. Jugg and she said she'd look through her files.	Rose Mary Marlowe-Jugg	(202) 685-3954	No Information Received
National Imagery Mapping Agency, Bethesda, MD				No Information Received
National Personnel Records Center - Military Personnel	9700 Page Ave. St Louis, MO 63132	Wilson Sullivan	(314) 538-4085	No Information Received
Natural Resource Conservation Service	6 Park Street Petersburg, WV 26847	Richard Gray	(304) 257-4068	No Information Received
Natural Soil Resource Service	200 Sycamore Street Elkins, WV 26241 www.ncbc.navfac.navy.mil/cec museum/historian.htm	Larry Cassedy	(304) 636-6808	Soil surveys and 1945 aerial photography
New England Ski Museum		Jeff Leich	(603) 823-7177	Photos taken of WVMA provided.
NOAA/National Climate Center	Federal Building, 151 Patton Ave Asheville, NC 28801	Yolanda Goosch	(828) 271-4800	local climatological data provided
Northern Illinois Library System	4034 E. State Street, Rockford, IL 61108		(815) 229-0330	No Information Received
Office of General Council	310 W. Wisconsin Ave. Suite 200 Milwaukee, WI 53202	John Vandlik	(414) 297-3774	Left message no return calls
Online Computer Library Center, Northern Illinois Library	4034 E. State Street Rockford, IL 61108		(800) 848-5878	No Information Received
Randolph County Assessors Office	4 Randolph Avenue, Elkins, WV 26241	Chuck Keller	(304) 636-2114	Tax maps
Randolph County Clerk's Office	2 Randolph Avenue, Elkins, WV 26241		(304) 636-5885	Current owner information
Randolph County Emergency Management Office			(304) 636-1945	No Information Received
Randolph County Health Department			(304) 636-0396	No Information Received
Randolph County Sheriff's Department	4 Randolph Avenue, Elkins, WV 26241	Willard Herron, Sheriff	(304) 636-2100	No Information Received
Donald Rice		Donald Rice	(304) 636-0841	Local historian in Elkins. Told valuable information about his knowledge of the WVMA.
Richmond Map Facility				No Information Received
Metropolis Revisited		Rob Whetsell	(304) 637-5806	Interview, historical documents, site visit assistance provided

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Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
Rock Island Arsenal Museum, Rock Island Arsenal	Rock Island, IL	Kris Leinicke Bob Ronic Maggie Brown (PAO)	(309) 794-5021 (309) 794-5576 (309) 782-1121	No Information Received
Rock Island Arsenal, Office of History	Rock Island, IL	Dr. Herb LaPore	(309) 794-1276	No Information Received
Scientific & Technical Information Library Auto	689 Discovery Dr. Huntsville, AL 35806		(205) 922-9820	No Information Received
Steve Shafer		Steve Shafer	(301) 334-5378	Involved with cola mining in Stoney Reservoir area. Told of finding ordnance near Stack Rocks.
Smithsonian Institute - National Air & Space Museum			(202) 633-2320	No Information Received
Smithsonian Institute Research	Historical Research Division Washington D.C.		(202) 357-3133	No Information Received
Nathan Shoehalter		Nathan Shoehalter	(510) 528-8350	Medic who trained at the WVMA. Told stories about his time at WVMA.
The Nature Conservancy		Rodney Bartgis, State Director	(304) 637-0160	No Information Received
Tucker County Clerk's Office	Tucker County Courthouse, Parsons, WV	Allen Loughry	(304) 478-2414	Current owner information
Tucker County Convention & Vistors Bureau	P. O. Box 565 Davis, WV 26260		(800) 782-2775	Information on visitor numbers for Randolph County/Canaan Valley
Tucker County Emergency Squad			(304) 478-2296	No Information Received
Tucker County Extension Service	215 1st Street Parsons, WV 26287	Larry Campbell	(304) 478-2949	Aerial photos
Tucker County Health Department			(304) 478-3572	No Information Received
Tucker County Sherriff's Department	318 2nd Street Parsons, WV 26287	Marshall Davisson	(304) 478-2321	No Information Received
Tucker County Solid Waste Authority			(304) 259-4867	
Tucker County Tax Assessor's Office	215 1st Street Parsons, WV 26287	Nelson Wade	(304) 478-3727	plat maps
Tucker County Tax Office	318 2nd Street Parsons, WV 26287	Carol Irons	(304) 478-2321	Referalls provided
U.S. Army / U.S. Air Force Reservation File	Director of Real Estate Washington D.C.	Fred Lombardo	(202) 794-1275	No Information Received
U.S. Army Air Defense Center and Fort Bliss	2 Sheridan Road Fort Bliss, TX 79916-3802	historian, Anti-Aircraft Museum	(915) 568-6906	No Information Received
U.S. Army Armor Center & Fort Knox	Fort Knox, KY	Dr. Braham	(502) 624-1495	Data Searches Revealed Nothing
U.S. Army Aviation Center and Fort Rucker	Fort Rucker, AL 36362-5000	Dr. James Williams	(334) 255-9151	No Information Received
U.S. Army Chemical School	Fischer Library, Building 1081 Aberdeen Proving Ground, MD 21010-5423	Dick Pastorett	(205) 848-4414	No information Received
U.S. Army Construction Engineering Research Lab	Champaign, IL	Pat Lacey	(217) 373-7127	No Information Received
U.S. Army Maneuver Support Center	Fort Leonard Wood, MO			No information received
U.S. Army Military History Institute	Carlisle Barracks Building 22 Carlisle, PA 17013-5008	Dennis Vetock listed as POC for ASR.	(717) 245-3611	No Information Received

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Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
U.S. Army Ordnance Museum	Aberdeen PG, MD www.ordmusfound.org			No Inforamtion Received
U.S. Army Safety Management Information System (ASMIS)	Fort Rucker, AL		(205) 255-6485	No Inforamtion Received
U.S. Army Technical Center for Explosives Safety	McAlester, OK - www.dac.army.mil/es	Defense Ammunition Center	(703) 805-3459	No Inforamtion Received
U.S. Army Technical Escort Unit Historical Office	Aberdeen Proving Ground, MD			No Inforamtion Received
U.S. Army Test and Evaluation Command	www.atec.army.mil			No Inforamtion Received
U.S. Army, Fort Belvoir EOD	Fort Belvoir, VA			No Information Provided
U.S. Geological Survey	Reston, VA 22092	Dave Keys	(703) 648-5956	Aerial photos available
U.S. Naval Historical Center	805 Kidder Breeze Street, SE Washington, DC 20374-5060		www.history.navy.mil	No Inforamtion Received
U.S. Navy Construction Battalion Center	Port Hueneme, CA			No Inforamtion Received
U.S. Navy Real Estate	Norfolk Office	Francis Hoover	(757) 322-4910	No Information Received
US Fish and Wildlife Service	694 Beverly Pike Elkins, WV 26241	Melissa Carter	(304) 636-6586	Endangered species information Ecological information maps
US Fish and Wildlife Service	Charleston, WV		(304) 965-6059	
US Forest Service - Monongahela National Forest	HC 59, Box 240 Petersburg, WV 26847		(304) 257-4488	Interview & background information Maps provided
US Forest Service - Monongahela National Forest	200 Sycamore St. Elkins, WV 26241		(304) 636-1800	Background information
US Naval District, Washington DC	www.ndw.navy.mil			No Information Received
US Naval Explosive Ordnance Disposal Technology Division	US Naval Ordnance Safety and Security Activity, Ordnance Environmental Support Office, Indian Head, MD naveodtechdiv.navsea.navy.mil			No Information Received
US Naval War College Archives	Newport, RI - www.nwc.navy.mil			No Information Received
US Navy Safety Center, Naval Air Station	Norfolk, VA - www.safetycenter.navy.mil			Records begin in 1980, no information received
USACE	USACE Headquarters, Office of History, Alexandria, VA			Real Estate Information Provided
USACE Huntsville	Huntsville Division PO Box 1600 Huntsville, AL 35807-4301		(205) 895-1545	Background information received
USACE Huntsville	Huntsville Division 4800 University Square Huntsville, AL 35816-1822		(205) 895-1612	Maps and background information received
USACE Louisville	Louisville District PO Box 59 Louisville, KY 40201			Referrals provided
USACE Lakes & Rivers Div	PO Box 1159 Cincinnati, OH 45202		(513) 684-6248	Background information received
USACE Omaha	215 North 17th Street Omaha, NE 68102		(402) 221-4321	No Infromation Received

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Reference Sources and Records Reviewed

ORGANIZATION/PERSON	ORGANIZATION INFORMATION	CONTACT	PHONE NUMBER	SUPPORT PROVIDED
USEPA, National Exposure Research Laboratory	Environmental Photographic Interpretation Center (EPIC) Reston, VA (www.epa.gov/nerlesd1/land-sci/epic/default.htm)	Donald Garofolo, Environmental Scientist	(703) 648-4285	Aerial photography image interpretation for 2003
USGS, West Virginia District		Doug Chambers	(304) 347-5130 x231	Provided geological information about the WVMA
West Virginia Bureau of Waste Management			(304) 558-5929	No Information Received
West Virginia Department of Natural Resources		Barbara Seargent	(304) 637-0245	Endangered species, habitat information
West Virginia Division of Forestry, Moorefield Industrial	RR C 85, Box 302 Moorefield, WV	John Anderson	(304) 538-2397	No Information Received
West Virginia Military Affairs and Public Safety			(304) 558-2930	No Information Received
West Virginia National Guard - Adjutant General's Office	1707 Coonskin Drive Charleston, WV 25311-1099	Col. Norman Southern, Facility Manager Tim Fry, SGT Barker	(304) 341-6450 (304) 341-6130	No Information Received
West Virginia Public Service Commission			(304) 340-0300	No Information Received
West Virginia State Archives	Archives and History Library The Cultural Center 1900 Kanawha Blvd. East Charleston, WV 25305-0300	John Lilly, Editor	(304) 558-0230 x168	Historical newspaper articles, Goldenseal articles received
West Virginia State Fire Marshall			(304) 558-2191	No Information Received
West Virginia State Police	1300 Harrison Avenue, Elkins, WV 26241	SGT Kershner	(304) 637-0200	Referrals Provided
West Virginia State Police	341 2nd Street Parsons, WV 26287	Michelle Herb		No Information Received
West Virginia State Police	525 Depot Street Romney, WV 26757	SGT Ben Flanagan	(304) 822-3562	No Information Received
West Virginia State Police	HC85 Box 104, US 220 Moorefield, WV 23836	SGT Roger Hefner	(304) 257-1411	No Information Received
William Vanorsdale	1003 S. Henry Ave. Elkins, WV 26241	William Vanorsdale	(304) 636-4997	Interview on VHS tape

Appendix B – References

REFERENCES

1. American Geosciences, Inc. Geophysical Survey Summary Report: CVI Property (Davis, Tucker County, West Virginia), June 29, 2005.

2. BR Sude Research, A Guide to FUDS/PRP Research at NARA Repositories in the Washington Region.

3. Bailey, Robert G., USDA Forest Service, 17 August 2001, http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html, Ecological Units of the United States.

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5. Dynamac Corp., Support Service Operation Report (CO-16) – Small Arms and Artillery Material Maintenance, September 2005.

6. Dynamac Corp., Support Service Operation Report (CO-17) – Vehicle Maintenance, February 2005.

7. Dynamac Corp., Support Service Operation Report (CO-18) – Ammunition and Explosives Storage and Maintenance, April 2005.

8. Harper, Reinhardt and Sude, Guides to Environmental Research: Environmental Cleanup at Former and Current Military Sites, November 2001.

9. Hames, H.L., The Mule School: The West Virginia Home Front in World War II, Goldenseal Magazine, Spring 1991.

10. Human Factors Applications, Inc. (HFA), 1998, Final Removal Report: Ordnance and Explosives Removal Action Dolly Sods Wilderness, Monongahela National Forest. Prepared for U. S. Army Engineering and Support Center (USAESC), Huntsville, AL

11. HFA, 1999a, Final Removal Report: Ordnance and Explosives Removal Action Dolly Sods North, Monongahela National Forest. Prepared for USAESC, Huntsville, AL.

12. HFA, 1999b, Final UXO Avoidance Report for the Bear Rocks Property, Monongahela National Forest. Prepared for Virginia Power.

13. HydroGeoLogic, Inc. (HGL), 2006a, Final Support Service Operation Report, CO-13, Laundry and Dry Cleaning, May 2006. Prepared for U.S. Army Corps of Engineers, HTRW Center of Expertise, Omaha, NE.

14. HGL, 2006b, Final Support Service Operation Report, CO-15, Medical Operations, May 2006. Prepared for U.S. Army Corps of Engineers, HTRW Center of Expertise, Omaha, NE.

15. Interstate Technology Regulatory Council, Munitions Response Historical Records Review.

16. Lewis, Julian J., Ph.D., USDA Forest Service, Eastern Region, December 2001, Conservation Assessment for South Branch Valley Cave Millipede (*Pseudotremia princeps*).

17. Lewis, Julian J., Ph.D., USDA Forest Service, Eastern Region, December 2001, Conservation Assessment for Timber Ridge Cave Beetle (*Pseudanophthalmus Hadenoecus*).

18. Lombardo Associates, Inc., July 25, 2005, *Canaan Valley, Tucker County, West Virginia, Wastewater Management Feasibility Study, Executive Summary*, submitted to the Canaan Valley Institute

19. Marshall University, 2002, Herpetology Lab, Dr. Thomas K. Pauley, Ph.D., http://www.marshall.edu/herp/Salamanders/cheat_mountain.htm, Cheat Mountain Salamander.

20. Metcalf & Eddy, Inc., 1991, Feasibility Study Dolly Sods Wilderness: Final Work Plan for Surface and Subsurface Investigation and On-Site Disposal of Ordnance. Prepared for USACE, Huntsville District, Huntsville, AL.

21. Metcalf & Eddy, Inc., 1992, Feasibility Study Dolly Sods Wilderness: Engineering Report for Extent of OEW Contamination and Evaluation of Remedial Action Alternatives. Prepared for USACE, Huntsville District, Huntsville, AL.

22. Monongahela National Forest (MNF), 2006, Trip Report: Shavers Mountain Project's Very Unusual Find, Linda Tracy.

23. MNF, 30 August 2007, http://www.fs.fed.us/r9/mnf/index.shtml, Otter Creek Wildness.

24. MNF, 20 August 2007, http://www.fs.fed.us/r9/mnf/index.shtml, Dolly Sods History.

25. National Climatic Data Center (NCDC), 02 May 2007, www.ncdc.noaa.gov, West Virginia.

26. New Bold Enterprises (NBE), 1995, Dolly Sods Wilderness Ordnance Removal Project Environmental Assessment. Prepared for USACE, Huntington District, Huntington, WV.

27. NBE, 1997, Dolly Sods North Ordnance Removal Project Environmental Assessment. Prepared for USACE, Huntington District, Huntington, WV.

28. Rice, Donald, *West Virginia Maneuver Area*, Goldenseal Magazine, Fall 2007.

29. S&C Advertising and Public Relations (SCPR), 2004, Public Awareness and Organizational Plan of Unexploded Ordnance at Dolly Sods. Prepared for USACE, Huntington District, Huntington, WV

30. SCPR, 2005, Public Involvement Plan: Dolly Sods Region, Former West Virginia Maneuver Area. Prepared for USACE, Huntington District, Huntington, West Virginia

31. USACE – St. Louis District, Range Operations Report (RO-1) – Small Arms Range, January 2006.

32. USACE – St. Louis District, Range Operations Report (RO-2) – Multiple Weapons Type Range, January 2006.

33. USACE – St. Louis District, Range Operations Report (RO-3) – Field Artillery Range, January 2006.

34. USACE – St. Louis District, Range Operations Report (RO-4) – Mortar Range, January 2006.

35. USACE – St. Louis District, Range Operations Report (RO-5) – Shoulder-Launched Small Rocket Range, January 2006.

36. USACE – St. Louis District, Range Operations Report (RO-11) – Anti-Tank Gun Range, February 2006.

37. USACE, 1990, Inventory Project Report, Dolly Sods Wilderness Area (West Virginia Maneuver Area), Davis, West Virginia, Project No. G03WV006500, May

38. USACE, 1992, Revised Inventory Project Report and Findings and Determination of Eligibility for DERP-FUDS Site No. G03WV0065, West Virginia Maneuver Area (including Dolly Sods Wilderness Area), Davis, West Virginia, January

39. USACE, 1995a, Archives Search Report: Findings for the Former Dolly Sods North, Tucker County, West Virginia, Project Number G03WV006504. Prepared by USACE, Rock Island District, Rock Island, IL and U .S. Army Defense Ammunition Center and School, Savanna, IL, for USACE, Huntsville District, Huntsville, AL, September.

40. USACE, 1995b, Archives Search Report: Conclusions and Recommendations for the Former Dolly Sods North, Tucker County, West Virginia, Project Number G03WV006504. Prepared by USACE, Rock Island District, Rock Island, IL and U .S. Army Defense Ammunition Center and School, Savanna, IL, for USACE, Huntsville District, Huntsville, AL, September.

41. USACE, 1996, Action Memorandum, Dolly Sods Wilderness, Former West Virginia Maneuver Area, near Davis, West Virginia, May.

42. USACE, 1997, Action Memorandum, Former West Virginia Maneuver Area, near Davis, West Virginia, July.

43. USACE, 2004a, CEMVS-ED-P Memorandum dated 26 April 2004, Subject: Potential DERP FUDS Projects – West Virginia Maneuver Area.

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45. USACE, 2004c, Ordnance and Explosives Recurring Review, Dolly Sods Project, Former West Virginia Maneuver Area, Monongahela National Forest, West Virginia, Draft Final Report - May 2004.

46. USACE, 2005, Formerly Used Defense Sites (FUDS) Program: Guidance to Performing Preliminary Assessments Under FUDS, September 2005.

47. USACE, 2007, Memorandum Subject: Implementation Guidance for FUDS MMRP Project Designation, 12 February 2007.

48. USDA, Soil Conservation Service, March 1967, Soil Survey of Tucker County, Part of Northern Randolph County, West Virginia, in cooperation with the Forest Service and the WV University Argicultural and Forestry Experiment Station.

49. USDA, Soil Conservation Service, August 1982, Soil Survey of Randolph County Area Main Part, West Virginia, in cooperation with the Forest Service and the WV University Argicultural and Forestry Experiment Station.

50. USDA, Soil Conservation Service, November 1989, Soil Survey of Grant and Hardy Counties West Virginia, in cooperation with the Forest Service and the WV University Argicultural and Forestry Experiment Station.

51. USDA, Soil Conservation Service, February 1992, Soil Survey of Pendleton County, West Virginia, in cooperation with the Forest Service and the WV University Argicultural and Forestry Experiment Station.

52. USDA Forest Service, Monongahela National Forest, June 1996, Dolly Sods Wilderness UXO CR, Whetsell, Dahihelm, Paxton, Cogar, Brinker.

53. USDA, Forest Service, Northern Research Station, May 2004, Characterization of High Elevation Central Appalachian Wetlands, Francl, Ford, Castleberry.

54. USDA Forest Service, Monongahela National Forest, 29 March 2006, Biological Assessment for Threatened and Endangered Species, Karriker, Van Gundy, Arling.

55. USDA, Forest Service, Northern Research Station, 01 February 2007, http://www.nrs.fs.fed.us/ef/locations/wv/fernow/, Fernow Experimental Forest.

56. U.S. Environmental Protection Agency (USEPA), Office of Emergency and Remedial Response, *Guidance for Performing Preliminary Assessments Under CERCLA*, EPA/540/G-91/013, September 1991

57. USEPA Region 3, *Aerial Photographic Analysis of Dolly Sods Study Area in the Former West Virginia Maneuver Area*, November 2003.

58. USEPA, 25 June 2007, http://www.epa.gov/owow/watershed/, Region 3 Water, Watershed, Environmental Information, Related Information.

59. USEPA, Region 3, List of Water Systems in Safe Drinking Water Information System (SDWIS).

60. U. S. Fish and Wildlife Service, 28 September 2007, America's National Wildlife Refuge System, www.fws.gov, Canaan Valley National Wildlife Refuge.

61. U.S. Geological Survey (USGS), WV Water Science Center, 27 August 2007, www.usgs.gov, Water Resources of West Virginia.

62. Venable, Norma Jean, West Virginia University Extension Service, third printing 1996, Dolly Sods.

63. West Virginia Department of Health and Human Resources, 2008, www.wvdhhr.org/fish, 2008 Sport Fish Consumption Advisory.

64. West Virginia Division of Environmental Protection (WVDEP), Office of Water Resources, *An Ecological Assessment of the Cheat River Watershed*, Report Number 0502004 – 1996, 1996.

65. West Virginia Division of Environmental Protection (WVDEP), Office of Water Resources, *Cheat River Watershed – Total Maximum Daily Load*, 2008.

66. West Virginia Geological and Economic Survey, 16 July 2004, www.wvgs.wvnet.edu, Physiographic Provinces of West Virginia.

67. West Virginia University Public History Program, *The Monongahela National Forest 1915-1990*, March 1992.

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69. Wildlife Resource Section, April 2006, Eagles of West Virginia, Wildlife Diversity Program, Elkins WV, Publication 10V 4/06

Appendix C – Abbreviations, Acronyms, and Brevity Codes

LIST OF ABBREVIATIONS, ACRONYMS, AND BREVITY CODES

AD	Army Depot
AOC	Area of Concern
AP	Armor Piercing
AR	Administrative Record
ARAR	Applicable Relevant and Appropriate Requirements
ASCS	Agricultural Stabilization and Conservation Service
ASR	Archives Search Report
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AT	anti-tank
BD/DR	Building Demolition/Debris Removal
bgs	below ground surface
CCC	Civilian Conservation Corps
CEMVS	Corps of Engineers, Mississippi Valley St. Louis District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
COC	Chemical of Concern
CON/HTRW	Containerized Hazardous, Toxic and Radioactive Waste
COR	Common Operations Report
CT	Combat Team
CVI	Canaan Valley Institute
CVNWR	Canaan Valley National Wildlife Refuge
CVSP	Canaan Valley State Park
CWM	Chemical Warfare Materials
CWS	Chemical Warfare Service
DERP	Defense Environmental Restoration Program
DNR	Division of Natural Resources
DoD	Department of Defense
DOQQ	Digital Orthophoto Quarter Quads
DSN	Dolly Sods North
DSSA	Dolly Sods Scenic Area
DSW	Dolly Sods Wilderness
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EM	Engineering Manual
EOD	Explosive Ordnance Disposal

LIST OF ABBREVIATIONS, ACRONYMS, AND BREVITY CODES (Continued)

ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FA	Field Atillery
FDE	Findings and Determination of Eligibility
FFID	Federal Facility Identifier/Identification
FINDS	Facility Index System
FONSI	Finding of No Significant Impact
FS	Feasibility Study
ft bgs	feet below ground surface
FUDS	Formerly Used Defense Site
FUDSMIS	FUDS Management Information System
GIS	Geographic Information System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
GSA	General Services Administration
HE	High Explosive
HEAT	High Explosive Anti-tank
HFA	Human Factors Applications, Inc.
HQ	Headquarters
HQDoA	Headquarters, Department of the Army
HRS	Hazard Ranking System
HTRW	Hazardous, Toxic and Radioactive Waste
HTRW-CX	Hazardous, Toxic and Radioactive Waste Center of Expertise
INPR	Inventory Project Report
LTM	Long Term Monitoring
LUST	Leaking Underground Storage Tank
MC	Munitions Constituent
MEC	Munitions and Explosives of Concern
mg/l	milligram per liter
mg/kg	milligram per kilogram
M&E	Metcalf & Eddy, Inc.
MMRP	Military Munitions Response Program
MNF	Monongahela National Forest
MP	military police
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NA	Not Applicable
NARA	National Archives and Records Administration
NBE	New Bold Enterprises
NEPA	National Environmental Policy Act
NFRAP	No Further Response Action Planned

LIST OF ABBREVIATIONS, ACRONYMS, AND BREVITY CODES (Continued)

NRCS	National Resource Conservation Service
OE	Ordnance and Explosives
OEW	Ordnance and Explosives Waste
PA	Preliminary Assessment
POC	Point of Contact
PPE	Probable Point of Entry
PR	Public Repository
PSD	Public Service District
QA/QC	Quality Assurance/Quality Control
QM	Quartermaster
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RG	Record Group
RI/FS	Remedial Investigation/Feasibility Study
SAA	Small Arms Ammunition
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SSHP	Site Safety and Health Plan
SR	Smoke Round
TES	Threatened and Endangered Species
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USAESC	United States Army Engineering and Support Center
USDA	United States Department of Agriculture
USDoA	United States Department of the Army
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UXO	Unexploded Ordnance
WAA	War Assets Administration
WDP	West Virginia Diversity Program
WSP	Water Supply Point
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resources
WVDNR	West Virginia Division of Natural Resources
WVDoF	West Virginia Division of Forestry
WVMA	West Virginia Maneuver Area
WWII	World War II

Appendix D – Glossary

GLOSSARY

Access Road - A paved or unpaved route permitting an approach to a site with a vehicle.

Ammunition - Type of munitions normally containing an explosive element and designed to inflict damage upon structures, personnel, materiel, or military objectives. Ammunition includes shells, grenades, bombs, pyrotechnics and mines together with projectiles such as bullets, shot and their necessary primers, propellants, fuzes and detonators.

Building – A relatively permanent, usually boxlike and roofed man-made structure.

Caliber - The caliber of a weapon is the diameter of the bore in inches. With the adoption of metric measurements, the use of caliber measurements in millimeters has come into common use. When more than one weapon uses the same bore diameter or caliber then if desired the weapon can be identified by the caliber followed by the length of the bore expressed in units equal to the caliber. For example, a 5-inch/38 is a gun with a 5-inch diameter bore and a bore length equal to 38 calibers or 38 times 5 inches.

Cannon - A generic term that includes guns, howitzers, and mortars. A cannon is a device by which the force of expanding gas is used for the purpose of propelling a projectile in a definite direction. It consists of a metal tube, closed at one end. In modern terms, a cannon consists of the barrel and the breach mechanism. A complete artillery piece consists of a cannon or gun, a recoil mechanism, and a carriage used to transport the weapon.

Center of Impact - Center of the dispersion pattern of impact bursts. Considered from the point of view of the range only, it is the range center. Considered from the point of view of deflection, it is the deflection center.

Chemical Warfare Material (CWM) - An item configured as a munitions containing a chemical substance that is intended to kill, [seriously injure], or incapacitate a person through physiological effects. Also includes V- and G- series nerve agent, H-series blister agent, and lewisite in other than munitions configurations. Due to their prevalence and military unique application, chemical agent identifications sets (CAIS) are also considered CWM. CWM does not include: riot control agents, chemical herbicides, smoke and flame producing items, or soil, water, debris or other media contaminated with chemical agent. CWM also falls under the definition of munitions and explosives of concern (MEC).

CWM is a general term that includes four subcategories of specific materials:

1) CWM, explosively configured, is those munitions that contain a CWA fill and any explosive component. Examples include M55 rockets with CWA, the M23 VX mine, and the M360 105-millimeter GB artillery cartridge.

2) CWM, non-explosively configured, is those munitions that contain a CWA fill but that do not include any explosive components. Examples include any chemical munitions that do not contain an explosive component and VX or mustard agent spray canisters.
3) CWM, bulk container, are those non-munitions-configured containers of CWA (e.g., a tone container).
4) Chemical Agent Identification Sets (CAIS). All forms of CAIS are scored the same except for CAIS K941, toxic gas set M-1; and K942, toxic gas set M-2/E-11, which are scored higher due to the relatively large quantities of agent they contain.

Closed Range - A military range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. A closed range is still under the control of a DOD component.

Contamination - In the ordnance context, contamination means unexploded ordnance (UXO) and/or ordnance remnants, e.g., exploded munitions components, munitions debris, target material, and range support facilities.

Critical Habitat – as defined by the Endangered Species Act is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Contaminated Area - Any area where unexploded munitions (UXO) are suspected or known to be present, regardless of the type or means by which the munitions came to be present in the area.

Dark, Medium-, or Light-toned – Tones of features in question are compared with the darkest and lightest tones of gray on a print.

Defense Environmental Restoration Program (DERP) - A program established at 10 United States Code (USC) 2701 et seq. that gives the DoD the authority to identify, investigate, and clean up hazardous substances at FUDS in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Under the DERP program, the Secretary of Defense is to carry out all response actions with respect to releases of hazardous substances from “each facility or site which was under the jurisdiction of the Secretary and owned by, leased to, or otherwise possessed by the United States *at the time of actions leading to contamination* by hazardous substances” (emphasis added).

Defense Site - Locations that are or were owned by, leased to, or otherwise possessed or used by the DOD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions.

Depression – An area sunken below its surroundings.

Discarded Military Munitions (DMM) - Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.

Dispersion Pattern - The distribution of a series of rounds fired from one weapon or a group of weapons under conditions as nearly identical as possible, the points of bursts or impact being dispersed about a point called the center of impact.

Dud - A munition where all actions necessary to cause a detonation have occurred but the item failed to detonate.

Excavation – A cavity in the earth formed by digging or scooping material.

Explosive - The term explosive, or explosives, includes any chemical compound or mechanical mixture which, when subjected to heat, friction, detonation or other suitable initiation, undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases which exert pressures in the surrounding medium

Firing Point – That point in the firing circuit where the device employed to initiate the detonation of the charges is located. The physical position from which ordnance is directed to an area or target.

Formerly Used Defense Sites (FUDS) – Those properties previously owned, leased or otherwise possessed or used by the DoD for military purposes; now owned by private entities, native Americans or non-DoD governmental agencies. DOD no longer has control over these sites.

FUDS MMRP Project - A FUDS Project is a unique name given to an area of an eligible FUDS Property containing one or more releases or threatened releases of a similar response nature, treated as a discrete entity or consolidated grouping for response purposes. For the purposes of this guidance, an MMRP Project is equal to the MRS. The MMRP Project is the level at which all Cost to Complete (CTC) estimates will be prepared.

Ground disturbance – A rough area where the ground surface has been dug up or overturned.

Ground scar – A ground surface, vegetated or unvegetated, where marks from a previous activity or feature, or from a subterranean feature are visible.

Gun - A gun is a cannon with a relatively long barrel (30 calibers or more) designed to throw a projectile a long distance with a flat trajectory. The term is used for types of artillery with long barrels that fire projectiles at a high velocity and at a relatively flat trajectory (low angle of fire). The term gun is also often used as a synonym for firearm including small arms rifles.

High Explosive - A high explosive is characterized by the extreme rapidity with which its decomposition occurs; this action is known as detonation. When initiated by a blow or shock, it will decompose almost instantaneously. High explosives are usually nitration products of organic substances such as toluene, phenol, pentaerythritol, amines, glycerin, and starch and may be nitrogen-containing inorganic substances or mixtures of both.

Historical Evidence - Historical evidence means that the investigation: (1) found written documents or records: (2) documented interviews of persons with knowledge of site conditions; or (3) found and verified other forms of information.

Howitzer - Normally, a cannon with a medium length barrel between that of a mortar and a gun in length, operating with a relatively high angle of fire and having a medium velocity.

Impact Area - The primary danger area for indirect fire weapons that is established for the impact of all rounds. When applied to direct fire weapons, it is the area located between established range limits. The impact area is within the approved surface danger zone.

Impact Crater – A pit, depression, or surface ground scar formed by the collision of a projectile.

Mounded material – Piles of raw or waste materials on or in the vicinity of the site.

Military Munitions - All ammunition products and components produced for or used by the armed services for national defense and security, including ammunition products or components under control of the Department of Defense, the Coast Guard, the Department of Energy, and National Guard. Such term includes the following: (1) confined gaseous, liquid, and solid propellants; (2) explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; (3) chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, and demolition charges; and (4) devices and components of any item specified in (1) through (3). Such term does not include wholly inert items and Improvised explosive devices. Nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42U.S.C.2011 et seq.) have been completed.

Military Munitions Response Program (MMRP) Site - Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. An MMRP Site is essentially the same as a Munition Response Area and/or Munition Response Site but without regard to whether the boundaries overlap with other MMRP sites.

Military Range - Designated land and water areas set aside, managed, and used to conduct research on, develop, test, and evaluate military munitions and explosives, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas.

Misfire - 1) Failure to fire or explode properly. 2) Failure of a primer or the propelling charge of a round or projectile to function wholly or in part.

Munitions and Explosives of Concern (MEC - This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means:

1) Unexploded Ordnance (UXO), as defined in 10 U.S.C. 2710 (e) (9);
2) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710 (e) (2); or
3) Munitions constituents (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC) - Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munition.

Munitions Response Area (MRA) - Any area on a defense site (which includes by definition a FUDS Property) that is known or suspected to contain Unexploded Ordnance (UXO), Discarded Military Munitions (DMM), or Munitions Constituents (MC). In accordance with the basic definition an MRA contains one of more Munition Response Sites (MRS) and the acreage of all of the MRSs must add up to the total MRA acreage.

Munitions Response Site (MRS) - A discrete location within an MRA that is known to require a munitions response. For the purposes of this guidance, an MRS is the basis for the designation of an MMRP Project, is equal to or part of a larger defined MRA, and is the level for all Munitions Response Site Prioritization Protocol (MRSPP) scoring.

Range - A designated land or water area that is set aside, managed, and used to conduct research, develop, test, and evaluate military munitions and explosives, other ordnance, or weapons systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas. For the purposes of this guidance, any range, range complex, or non-range munitions response

area previously identified during the Range Inventory and/or currently existing in FUDSMIS as a Military Munitions Response Area is defined as a Munitions Response Area (MRA) and is initially set as equal to the Munitions Response Site (MRS).

Range Activities - The term 'range activities' means: (1) research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and (2) the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems.

Range Clearance - The recovery, collection, and on-range destruction of military munitions (e.g., UXO), munitions debris, and other range-related debris (e.g., targets) on operational ranges to maintain or enhance operational safety or to allow the continued use of the range for its intended purpose. The term "range clearance" does not include on-range disposal or burial of UXO and munitions constituents, when the burial is not a result of normal use.

Rifle - In artillery, the term rifle refers to a cannon that has grooves (rifling) cut spirally into the bore. The grooves put a spin on the projectile, increasing accuracy over a longer distance.

Rock Outcrop – A portion of bedrock or other stratum protruding through the soil level.

Shallow Clearance - A range clearance whereby the area is systematically swept with standard service mine detectors and all ferrous cased duds on the surface and down to a depth of 20-24 inches below ground surface are located, removed, and disposed of properly. It provides no assurance that all hazardous items have been removed. The use of shallow cleared areas is restricted to activities causing only shallow surface disturbance, such as agriculture.

Site Visit – Trips taken to sites for the purpose of conducting preliminary assessments or archives searches, or to gather data for writing scopes of work or work plans.

Site Investigations – Trips taken to sites for the purpose of confirming the presence of Munitions and Explosives of Concern (MEC) or determining the extent of Munitions Constituents (MC) contamination.

Small Arms Ammunition - Small arms ammunition means ammunition that is .50 caliber or smaller and shotgun shells.

Stratigraphy – Study of rock strata, particularly the distribution, deposition, and age of sedimentary rocks.

Surface Clearance - A range clearance where the surface area is searched by visual means and duds and other munitions debris are removed and disposed of properly. It provides no assurance that all hazardous items have been removed. Surface-cleared ranges are

restricted to activities that require no groundbreaking and limited access. For munitions responses, “surface removal” should be used in place of “surface clearance.

Structure – A man-made feature which cannot be classified as a building.

Target Area - The point of location to which the weapon is to be fired. For demolitions, the target area is the point of location at which the demolition charges is emplaced.

Trench – A long, narrow excavation unrelated to drainage.

Unexploded Ordnance (UXO) - Military munitions that: (1) have been primed, fused, armed, or otherwise prepared for actions; (2) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (3) remain unexploded either by malfunction, design, or any other cause.

Appendix E – Preliminary Assessment Form

OMB Approval Number: 2050-0095
Approved for Use Through: 1/92

EPA Potential Hazardous Waste Site Preliminary Assessment Form

Identification

State: WV | CERCLIS Number: N/A

CERCLIS Discovery Date: N/A

1. General Site Information

Name: WV Maneuver Area	Street Address: N/A				
City: Davis	State: WV	Zip Code: 26260	County: Tucker, Grant, Randolph	Co. Code:	Cong. Dist: 01
Latitude: 39 0 07 ' 08 . 0 "	Longitude: 79 0 27 ' 09 . 0 "	Approximate Area of Site: 2,180,367 Acres ____ Square Ft	Status of Site: ☐ Active ☐ Not Specified ■ Inactive ☐ NA (GW plume, etc.)		

2. Owner/Operator Information

Owner: US Forest Service (primary)			Operator:		
Street Address: 200 Sycamore Street			Street Address:		
City: Elkins			City:		
State: WV	Zip Code: 26241	Telephone: (304) 478-2000	State:	Zip Code:	Telephone: ( )

Type of Ownership:
- ■ Private
- ■ Federal Agency
  Name US Forest Service
- ■ State
- ☐ Indian
- ☐ County
- ☐ Municipal
- ☐ Not Specified
- ☐ Other ____

How Initially Identified:
- ☐ Citizen Complaint
- ☐ PA Petition
- ☐ State/Local Program
- ☐ RCRA/CERCLA Notification
- ■ Federal Program
- ☐ Incidental
- ☐ Not Specified
- ☐ Other ____

3. Site Evaluator Information

Name of Evaluator: Nickolas L. McHenry	Agency/Organization: US Army Corps of Engineers, Huntington District	Date Prepared: 21 September 2007
Street Address: 502 8th St	City: Huntington	State: WV
Name of EPA or State Agency Contact: Jim Maurin, WV Department of Environmental Protection	Street Address: 2031 Pleasant Valley Road	
City: Fairmont	State: WV	Telephone: (304) 368-3950

4. Site Disposition (for EPA use only)

Emergency Response/Removal Assessment Recommendation: ☐ Yes ☐ No Date: ____	CERCLIS Recommendation: ☐ Higher Priority SI ☐ Lower Priority SI ☐ NFRAP ☐ RCRA ☐ Other ____ Date: ____	Signature: Name (typed): Position:

CERCLIS Number: N/A

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site (check all that apply):
- ☐ Industrial
- ■ Commercial
- ■ Residential
- ■ Forest/Fields
- ☐ Agriculture
- ■ Mining
- ☐ DOD
- ☐ DOE
- ■ DOI
- ☐ Other Federal Facility _____
- ☐ Other _____

Site Setting:
- ☐ Urban
- ☐ Suburban
- ■ Rural

Years of Operation:
Beginning Year 1943
Ending Year 1944
☐ Unknown

Type of Site Operations (check all that apply):
- ☐ Manufacturing (must check subcategory)
  - ☐ Lumber and Wood Products
  - ☐ Inorganic Chemicals
  - ☐ Plastic and/or Rubber Products
  - ☐ Paints, Varnishes
  - ☐ Industrial Organic Chemicals
  - ☐ Agricultural Chemicals (e.g., pesticides, fertilizers)
  - ☐ Miscellaneous Chemical Products (e.g., adhesives, explosives, ink)
  - ☐ Primary Metals
  - ☐ Metal Coating, Plating, Engraving
  - ☐ Metal Forging, Stamping
  - ☐ Fabricated Structural Metal Products
  - ☐ Electronic Equipment
  - ☐ Other Manufacturing
- ☐ Mining
  - ☐ Metals
  - ☐ Coal
  - ☐ Oil and Gas
  - ☐ Non-metallic Minerals
- ☐ Retail
- ☐ Recycling
- ☐ Junk/Salvage Yard
- ☐ Municipal Landfill
- ☐ Other Landfill
- ■ DOD
- ☐ DOE
- ☐ DOI
- ☐ Other Federal Facility _____
- ☐ RCRA
  - ☐ Treatment, Storage, or Disposal
  - ☐ Large Quantity Generator
  - ☐ Small Quantity Generator
  - ☐ Subtitle D
    - ☐ Municipal
    - ☐ Industrial
  - ☐ "Converter"
  - ☐ "Protective Filer"
  - ☐ "Non- or Late Filer"
- ☐ Not Specified
- ☐ Other _____

Waste Generated:
- ■ Onsite
- ☐ Offsite
- ☐ Onsite and Offsite

Waste Deposition Authorized By:
- ☐ Present Owner
- ■ Former Owner
- ☐ Present & Former Owner
- ☐ Unauthorized
- ☐ Unknown

Waste Accessible to the Public:
- ■ Yes
- ☐ No

Distance to Nearest Dwelling, School, or Workplace:
Within area _____ Feet

6. Waste Characteristics Information

Source Type: (check all that apply)	Source Waste Quantity: (include units)	Tier*:
☐ Landfill		
☐ Surface Impoundment		
☐ Drums		
☐ Tanks and Non-Drum Containers		
☐ Chemical Waste Pile		
☐ Scrap Metal or Junk Pile		
☐ Tailings Pile		
☐ Trash Pile (open dump)		
☐ Land Treatment		
☐ Contaminated Ground Water Plume (unidentified source)		
☐ Contaminated Surface Water/Sediment (unidentified source)		
☐ Contaminated Soil		
■ Other Unexploded ordnance	unknown	100
☐ No Sources		

* C = Constituent, W = Wastestream, V = Volume, A = Area

General Types of Waste (check all that apply)
- ☐ Metals
- ☐ Organics
- ☐ Inorganics
- ☐ Solvents
- ☐ Paints/Pigments
- ☐ Laboratory/Hospital Waste
- ☐ Radioactive Waste
- ☐ Construction/Demolition Waste
- ☐ Pesticides/Herbicides
- ☐ Acids/Bases
- ☐ Oily Waste
- ☐ Municipal Waste
- ☐ Mining Waste
- ■ Explosives
- ☐ Other _____

Physical State of Waste as Deposited (check all that apply):
- ■ Solid
- ☐ Sludge
- ■ Powder
- ☐ Liquid
- ☐ Gas

EPA Potential Hazardous Waste Site
Preliminary Assessment Form - Page 3 of 4

CERCLIS Number: N/A

7. Ground Water Pathway

Is Ground Water Used for Drinking Water Within 4 Miles:
- ■ Yes
- ☐ No

Type of Drinking Water Wells Within 4 Miles (check all that apply):
- ■ Municipal
- ■ Private
- ☐ None

Is There a Suspected Release to Ground Water:
- ☐ Yes
- ■ No

Have Primary Target Drinking Water Wells Been Identified:
- ☐ Yes
- ■ No

If Yes, Enter Primary Target Population: _____ People

Depth to Shallowest Aquifer: 7 Feet

Karst Terrain/Aquifer Present:
- ■ Yes
- ☐ No

Nearest Designated Wellhead Protection Area:
- ☐ Underlies Site
- ☐ >0 - 4 Miles
- ■ None Within 4 Miles

List Secondary Target Population Served by Ground Water Withdrawn From:

0 - ¼ Mile	<1,000
> ¼ - ½ Mile	
> ½ - 1 Mile	
>1 - 2 Miles	
>2 - 3 Miles	
>3 - 4 Miles	
Total Within 4 Miles	<1,000

8. Surface Water Pathway

Type of Surface Water Draining Site and 15 Miles Downstream (check all that apply):
- ■ Stream ■ River ☐ Pond ■ Lake
- ☐ Bay ☐ Ocean ☐ Other _____

Shortest Overland Distance From Any Source to Surface Water: Within area _____ Feet _____ Miles

Is There a Suspected Release to Surface Water:
- ☐ Yes
- ■ No

Site is Located in:
- ■ Annual - 10 yr Floodplain
- ☐ >10 yr - 100 yr Floodplain
- ☐ >100 yr - 500 yr Floodplain
- ☐ >500 yr Floodplain

Drinking Water Intakes Located Along the Surface Water Migration Path:
- ■ Yes
- ☐ No

Have Primary Target Drinking Water Intakes Been Identified:
- ☐ Yes
- ■ No

If Yes, Enter Population Served by Primary Target Intakes: _____ People

List All Secondary Target Drinking Water Intakes:

Name	Water Body	Flow (cfs)	Population Served
Elkins	Tygart Valley River	527	9,844

Total within 15 Miles _____

Fisheries Located Along the Surface Water Migration Path:
- ☐ Yes
- ■ No

Have Primary Target Fisheries Been Identified:
- ☐ Yes
- ■ No

List All Secondary Target Fisheries:

Water Body/Fishery Name	Flow (cfs)

CERCLIS Number: N/A

8. Surface Water Pathway (continued)

Wetlands Located Along the Surface Water Migration Path:
- ■ Yes
- ☐ No

Have Primary Target Wetlands Been Identified:
- ☐ Yes
- ■ No

List Secondary Target Wetlands:

Water Body	Flow (cfs)	Frontage Miles
Little Blackwater River	3.8	5
S. Br. Potomac River	115	20
Beaver Creek	13	10
Shavers Fork	78	10

Other Sensitive Environments Located Along the Surface Water Migration Path:
- ■ Yes
- ☐ No

Have Primary Target Sensitive Environments Been Identified:
- ☐ Yes
- ■ No

List Secondary Target Sensitive Environments:

Water Body	Flow (cfs)	Sensitive Environment Type
Blackwater River	29	National wildlife refuge
Red Creek	13	Designated Federal wilderness area
Otter Creek	50	Designated Federal wilderness area

9. Soil Exposure Pathway

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination:
- ■ Yes
- ☐ No

If Yes, Enter Total Resident Population: <500 People

Number of Workers Onsite:
- ☐ None
- ■ 1 - 100
- ☐ 101 - 1,000
- ☐ >1,000

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:
- ■ Yes
- ☐ No

If Yes, List Each Terrestrial Sensitive Environment:
- Dolly Sods Wilderness Area
- Dolly Sods Scenic Area

10. Air Pathway

Is There a Suspected Release to Air:
- ☐ Yes
- ■ No

Enter Total Population on or Within:

Onsite	
0 - ¼ Mile	
> ¼ - ½ Mile	
> ½ - 1 Mile	
> 1 - 2 Miles	
> 2 - 3 Miles	
> 3 - 4 Miles	
Total Within 4 Miles	

Wetlands Located Within 4 Miles of the Site:
- ☐ Yes
- ☐ No

Other Sensitive Environments Located Within 4 Miles of the Site:
- ☐ Yes
- ☐ No

List All Sensitive Environments Within ½ Mile of the Site:

Distance	Sensitive Environment Type/Wetlands Area (acres)
Onsite	
0 - ¼ Mile	
> ¼ - ½ Mile	

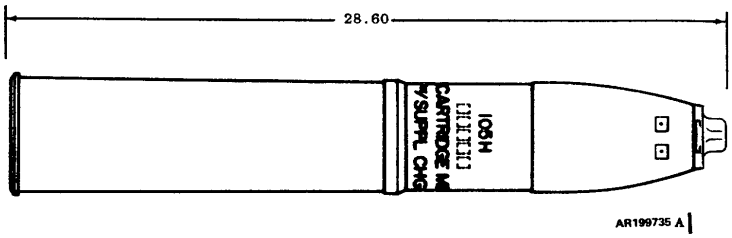
Appendix F – Ordnance Technical Data Sheets

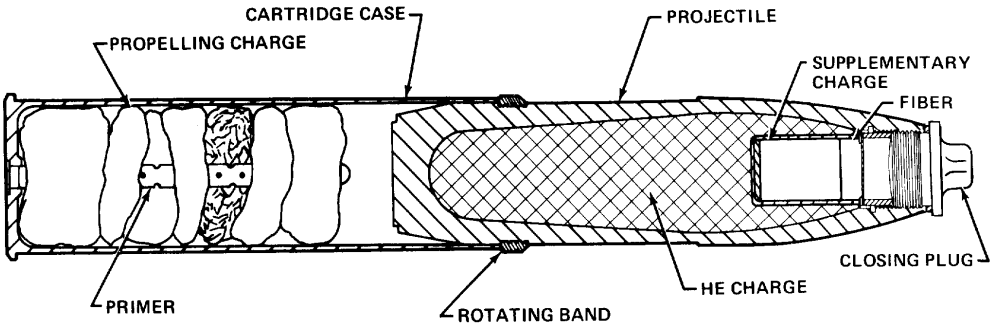
Ordnance Technical Data Sheets

1. Cartridge, 105mm, HE, M1
2. Shell, Semi-Fixed, 105mm, heat, M67
3. Cartridge, 105mm, illuminating, M314A3
4. Cartridge, 105mm, smoke, HC & colored, M84 series
5. Cartridge, 105mm, smoke, white phosphorous, M60, M60A1, M60A2
6. Cartridge, 105mm, TP-T, M67
7. Projectile, 105mm, white phosphorous, and 105mm, high-explosive
8. Projectile, 155mm, HERA, M549 and M549A1
9. Projectile, 155mm, practice, M804 and M804A1
10. Projectile, 155mm, illuminating, M485 series
11. Projectile, 155mm, smoke, white phosphorous, M104
12. Projectile, 155mm, armor-piercing, M112
13. Projectile, 155mm, high-explosive, M107
14. Projectile, 155mm, high-explosive, M102, MK I, MK IA1
15. Projectile, 155mm, illuminating, M118 series
16. Projectile, 155mm, shrapnel, MK I
17. Projectile, 155mm, smoke, white phosphorous, M110 and M110E1
18. Projectile, 155mm, smoke, M116 & M116B1
19. Projectile, 155mm, high-explosive, M483A1
20. Projectile, 155mm, Copperhead, high-explosive, M712
21. Propelling charge, 155mm, M3 series
22. Propelling charge, 155mm, M4 series
23. 60mm Mortar, high-explosive
24. 81mm Mortar, high-explosive and white phosphorous
25. 4.2" Mortar, high-explosive and white phosphorous
26. 3.25” Target Rockets M2A1
27. 37-mm Anti-tank Projectiles
28. 57-mm Anti-tank Projectiles

29. Caliber .30 cartridges
30. Caliber .50 cartridges

CARTRIDGE, 105-mm, HE, M1





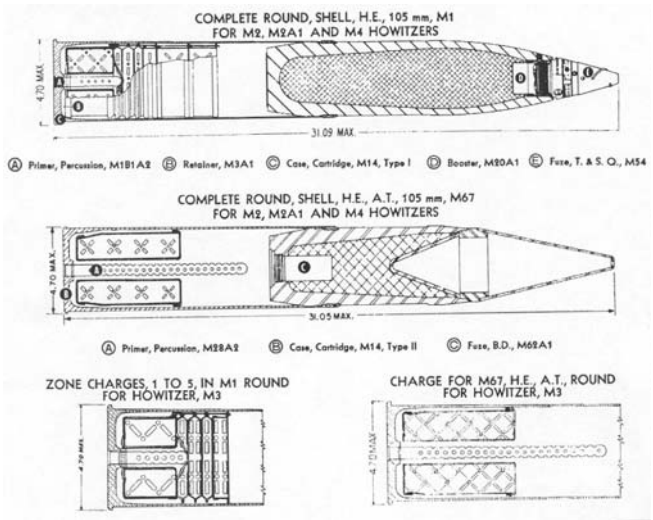
Use. The projectile of this cartridge contained high explosive and was used for fragmentation, blast, and mining in support of ground troops and armored columns.

Description. The projectile consisted of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. A base cover was welded to the base of the projectile for added protection against the entrance of hot gases from the propelling charge during firing. The high explosive filler within the projectile was either cast TNT or Composition B. A fuze cavity was either drilled or formed in the filler at the nose end of the projectile and this cavity was either shallow or deep. A cavity liner, to preclude dusting of HE during transportation and handling, was seated in the cavity and expanded into the lower projectile fuze threads. A supplementary charge was placed in the fuze cavity of projectiles having deep cavities. Projectiles with shallow cavities or deep cavities containing a supplementary charge used only short intrusion fuzes, PD, or MT. Those with deep cavities accepted the long intrusion proximity fuse after removing the supplementary charge. The cartridge case contained a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The percussion primer assembly consisted of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags were tied together. These were assembled into the cartridge case, around the primer flash tube.

Weight ..... 39.92 pounds
Length with Closing Plug ..... 28.60 inches
Filler and Weight
  Normal Cavity ..... Comp B, 5.08 pounds
    TNT, 4.80 pounds
  Deep Cavity ..... Comp B, 4.60 pounds
    TNT, 4.25 pounds
Propellant Charge (max weight) ..... 2.83 pounds
Color ..... Olive drab w / yellow markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

SHELL, SEMI-FIXED, 105-mm, HEAT, M67



Use. It was effective against either face-hardened or homogeneous armor plate and was designed for use against tanks. Use with the M2, M2A1, M3, and M4 Howitzers.

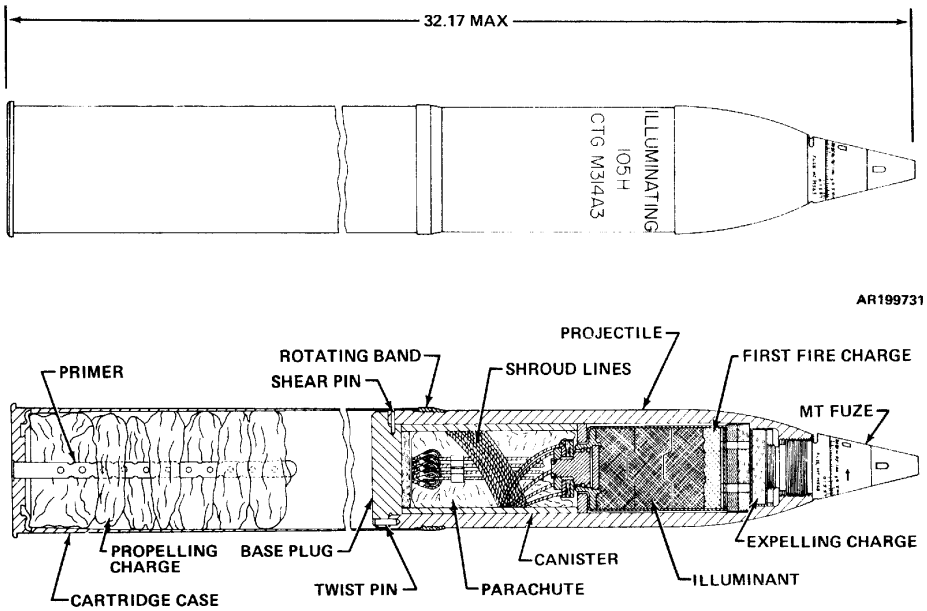
Description. The projectile consisted of three major parts; the ogive, the cone, and the body. The ogive has two purposes: to set up an effective distance between hollow charge and plate to be penetrated, and to streamline the round. It was a straight-sided hollow cone which threaded into the body and was maintained in position by three set screws that passed through the body. The cone was held in position between the ogive and the shell body was designed to form a hollow in the charge that provided the "hollow charge" or, "Munroe effect." The body or rear portion of the projectile was made of forged steel. The base of the body was boat-tailed with an approximate 9° taper and was provided with a threaded opening to take the M62 B.D. fuze.

Components. A complete round of M67 H.E., A.T. Ammunition consisted of a loaded and fuzed projectile, assembled loosely to an M14 Cartridge Case with its propelling charge of approximately 3 pounds in one bag and an M1B1A2 Primer. Originally, it was designed as fixed round with a loose propelling charge of smokeless powder in an M14, Type II, Cartridge Case. However, this changed back to semifixed class to facilitate packing and shipping in accordance with existing standards. The round was adapted for firing from an M3 Airborne Howitzer.

Weight (projectile) ..... 29.22 lb
Filler ..... Pentolite, 2.93 lb
Fuze M62A1
Propellant ..... FNH (1.20 –1.50 lb)
Primer M28A2
Maximum Range ..... 8590 yd

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944; *Catalogue of Standard Ordnance Item, Volume III,* 1944

CARTRIDGE, 105-mm, ILLUMINATING, M314A3



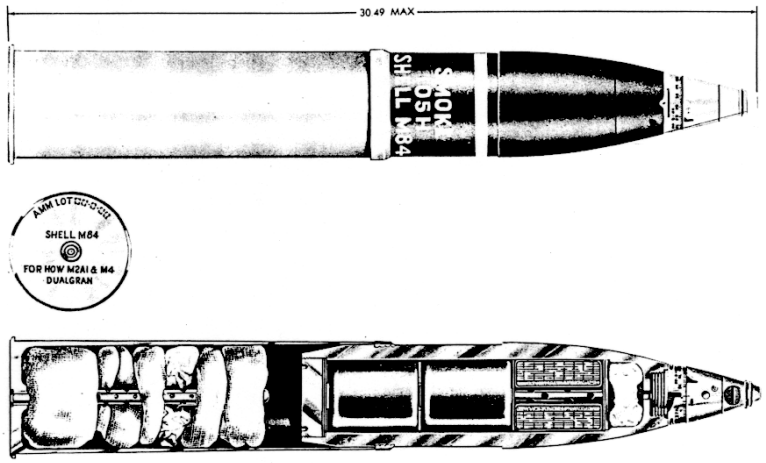
Use. This cartridge was for signaling or illuminating a designated area.

Description. The projectile was a hollow steel forging with a streamlined ogive, a gilding metal rotating band and a pinned base plug. The projectile was assembled with an MT fuze screwed into the nose. The projectile cavity contained an expelling charge, illuminating canister and a parachute assembly. The expelling charge consists of 0.18 pounds of black powder contained in a sealed plastic holder. The illuminating canister body contains the illuminant and 0.15 pounds of first fire composition. The illuminating canister body is fitted with anti-rotational brakes. The parachute assembly is attached to the illuminating canister body. The base plug is inserted into the opening at the base of the projectile and held in place by three shear pins and three twist pins. The complete projectile assembly is free fitted to a cartridge case. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together and assembled into the cartridge case, around the primer flash tube.

Weight ..... 46.43 pounds
Length ..... 32.17 inches
Filler ..... Illuminating, 1.97 pounds
Expelling Charge ..... Black powder, 0.18 pounds
Fuze ..... MT M565 or M548
Propellant ..... 4.7 to 5.9 pounds
Color ..... White w / black markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

CARTRIDGE, 105-mm, SMOKE, HC & COLORED, M84 SERIES

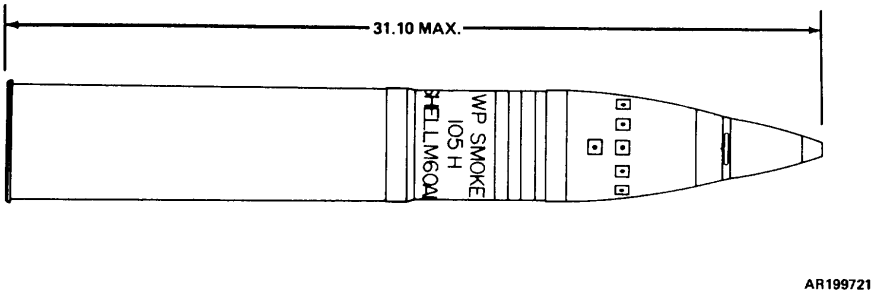


Description. The projectile body consists of a hollow steel forging with a boattail base, a streamlined ogive gilding metal rotating band, and base plug. A black powder expelling charge is assembled into the projectile at the nose end. Next, a steel baffle (pusher) plate, with a central hole, is assembled behind the expelling charge followed by three smoke canisters, alternating spacers, fillers, and the base plug. The spacers are assembled between canisters, as well as at the base, to insure a tight canister pack. An MTSQ or MT fuze is assembled to the nose of the projectile. The canisters are metal cylinders with a central igniter core. Around the igniter core is a first-fire mix which serves to initiate the smoke mix. The smoke mix surrounds the first-fire mix and when initiated, generates a white (HC) or, in the cases of the M84 and M84B1, HC or other colored smoke. The cartridge case contains a percussion primer assembly and even individually bagged and numbered propelling charge increments. 'the base of the cartridge case is chilled and the primmer assembly is press fitted in the base. The percussion primer assembly consists of a percussion ignition element ad a perforated flash tube containing black powder. The seven numbered increment bags are tied together, in numerical order, with acrylic cord. These are assembled into the cartridge case, around the primer flash tube, with Increment I at the base of the cartridge case and Increment 7 toward the mouth of the cartridge case.
Functioning. The projectile functions above ground at a predetermined height based upon time of flight. The fuze initiates the black powder in the expelling charge which flashes through the center hole of the baffle plate initiating the first-fire mix in the canisters. The burning black powder generates gas pressure against the baffle plate which, through the canisters, causes the base plate and canisters to leave the projectile. The first-fire mix initiates the smoke charge. The canisters burn for 40 to 90 seconds.

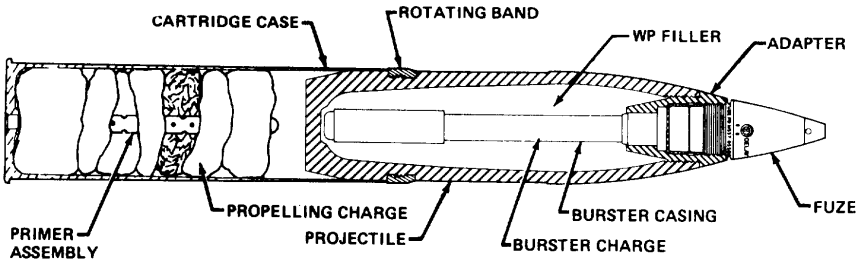
Length ..... 30.49 inches
Diameter ..... 105-mm (4.13 inches)
Weight ..... 41.96 pounds
Filler ..... 12.3 pounds
Expelling charge ..... 0.14 pounds Black Powder
Propelling Charge ..... M67, 2.83 pounds
Fuze ..... MTSQ - M501, M501A1, M577, M548; MT - M565; ET - M762

Reference: TM 43-0001-28, *Army Ammunition Data Sheets for Artillery Ammunition*, April 1994

CARTRIDGE, 105-mm, SMOKE, WP, M60, M60A1, M60A2



AR199721



AR199720

Use. The projectile of this cartridge contains white phosphorous (WP which is dispersed over the target area for screening purposes. The WP also has a limited incendiary effect.

Description. The projectile consists of a hollow steel forging with a boattail base, a streamlined ogive, and gilding metal rotating band. The projectile cavity is filled with cast White Phosphorous (WP). A steel nose adapter, having a female fuze thread, with a press fitted burster casing, is threaded into the nose of the projectile providing a seal for the filler. A burster charge is placed inside the burster casing and a fuze is threaded into the adapter. The cartridge case contains a percussion primer assembly and seven individually bagged and numbered propelling charge increments. The base of the cartridge case is drilled and the primer assembly pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The seven numbered increment bags are tied together. These are assembled into the cartridge case around the primer.

Weight ..... 42.92 pound
Length ..... 31.10 inches
Filler ..... White Phosphorous
Filler Weight ..... 3.86 pounds
Propellant (max weight) ..... 2.83 pounds
Fuze ..... PD, M557; MTSQ, M564
Color
- **Old manufacture** ..... gray w / yellow markings
- **New manufacture** ..... Light green w/ yellow bands with light red markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

105-MM AA GUN AND HOWITZER COMPLETE ROUNDS

Complete Round	Status	Projectile	Filler	Fuze	Booster	Cartridge Case	Primer	Weapon	Class
Shell, H.E., M38	S	M38	TNT	M.T. M2	.....	M6	M1B1A2	Gun	Fixed
Shell, H.E., M38A1	S&M	M38A1	TNT	M43 (all mod.)	M20	M6	M1B1A2	Gun	Fixed
Shell, Prac., M38	S	M38	Inert	M2	.....	M6	M1B1A2	Gun	Fixed
Shell, Prac., M38A1	S&M	M38A1	Inert	M43 (all mod.)	M20	M6	M1B1A2	Gun	Fixed
Cart., Drill, M8	S	Cast Bronze	.....	M44A2	.....	Cast Bronze	Inert	Gun	.....
Cart., Drill, M11	S&M	Cast Bronze	.....	T23	.....	Cast Bronze	Inert	Gun	.....
Shell, H.E., M1	.....	M1	TNT	M48 M54	M20	M14	M1B1A2	How.	Semifixed
Shell, Chem. B.E., M84	S&M	M84	H.C. Mixture	M54	.....	M14	M1B1A2	How.	Semifixed
Shell, Chem., M60	S S S&M	M60	F.S. W.P. H.S.	M57	M22	M14	M1B1A2	How.	Semifixed
Shell, H.E., AT, M67	S&M	M67	50/50 Pentolite	M62	.....	M14	M1B1A2	How.	Semifixed
Cart., Drill, M14	S&M	Cast Bronze	.....	M59 Dummy M54 Inert	.....	M14	Dummy M1B1A1	How.	Semifixed
Blank Ammunition	S&M	.....	Black Powder	.....	.....	M15	Mk. II	How.	.....

Round. The components are the same as those in the high-explosive rounds.

CARTRIDGE, Drill, M8 (S) and M11 (S&M).

General. These drill rounds are similar in make-up to other drill rounds previously discussed, and they serve the same purpose. The T23 Dummy Fuze is used on the M11 Round while the M44A2 is used on the M8.

Packing. 105-mm AA gun ammunition is packed 1 round per fiber container, 2 rounds per box.

AMMUNITION FOR 105-MM HOWITZERS.

General. Three different types of howitzers are provided in the 105-mm caliber. Their difference lies in the function they are designed to perform, and in the carriage mount which equips them to fulfill that function. The light field howitzer, mounted on a split-trail type of carriage and towed behind a prime mover, is designed to meet the traditional demand of the artillery. It is designed to provide the infantry with necessary cover and support. The same weapon mounted on a full track chassis similar to that of the medium tank, will perform essentially the same job as the tank itself and, because of its lighter weight, it will have important advantages over the tank. These 105-mm howitzers are provided in two models: the "Limited Standard," M2, and the "Standard," M2A1, which are interchangeable and differ only slightly.

The third type is the recently developed, M3 Airborne Howitzer. It is naturally lighter, and complete rounds are not interchangeable between the M3 and the other howitzers.

All ammunition provided for the 105-mm howitzer is of the semi-fixed class.

Types of ammunition provided for the 105-mm howitzer are:
High-explosive
High-explosive, antitank (H.E., A.T.)
Chemical
Drill
Blank

Fuzes. Fuzes used may be listed as follows:
M48, P.D., selective, S.Q. and short delay
M54, combination, time and superquick
M57, P.D., superquick
M62, base-detonating
All of the above fuzes have been completely discussed with 75-mm gun ammunition components.

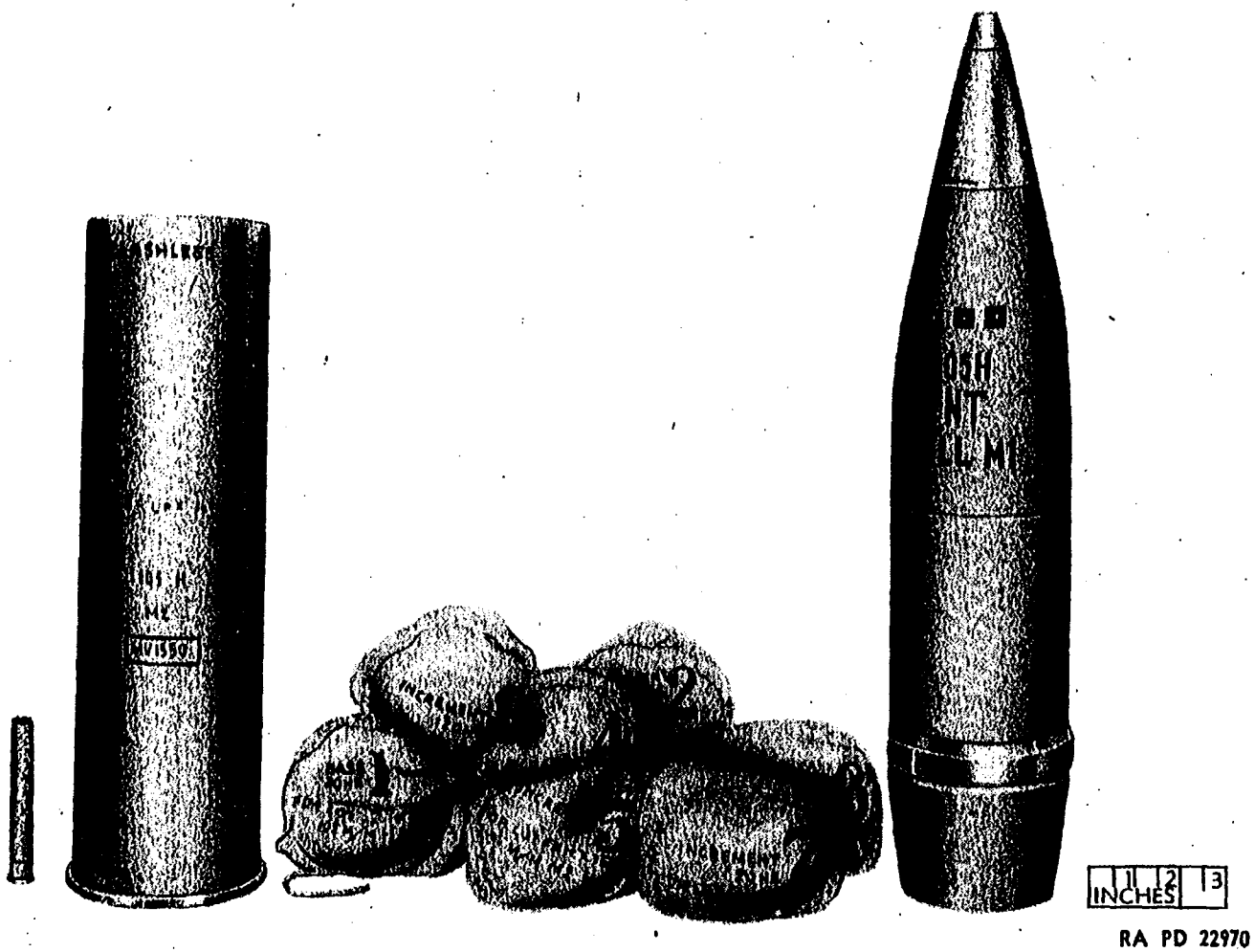


Figure 187 — Components of a Complete Round of Semifixed Ammunition (7 Zone Charges)

ARTILLERY AMMUNITION

Boosters. The M20 (or M20A1) Booster is used in the H.E. rounds with the M48 or M54 Fuzes. The M22 is used in conjunction with the M5 Burster for the 105-mm Chemical Shell M60. The M22 is similar in size and outward shape. It differs in that a detonator of lead azide and tetryl is located in the body of the booster in line with the central flash channel of the fuze. As rounds assembled with this booster are not boresafe, the use of this booster will be restricted to chemical shell. The Burster M5 is similar to that in 75-mm chemical ammunition, except, naturally, for the fact that it is much larger. The burster charge is 1,331 grains of tetryl or tetrytol.

Cartridge Case. The standard case used with 105-mm howitzer ammunition is the M14, type I. This case is 14.64 inches long and weighs 5.9 pounds. It is made of brass. The type II case has a slightly smaller mouth, and was used in the ROUND H.E., AT, M67. M14 Cartridge Cases are designed to seat the M1B1A2 100-grain, Percussion Primer, and are found with and without screw eyes in the head to fasten the propelling charge. A retainer disc is used on cases that do not have screw eyes.

Propelling Charge. The smokeless powder used is FNH. It is inserted in seven increments, each in a cloth bag. Seven zones of fire result from the base and increment type of charge. The increments are of unequal weight and are, therefore, not interchangeable.

The propelling charge for rounds to be fired from the M3 Airborne Howitzer consists of a reduced charge which includes only a base and four increments, allowing five zones of fire. This difference makes the complete rounds for this weapon not interchangeable with those provided for other 105-mm howitzers.

The base charge (No. 1) and increment(No. 2) have a doughnut shape which enables the primer to fit up into the charge. When the retainer disc is used, it is sewn to the base charge and is then forced over the primer, holding the propelling charge firmly in the case.

Primer. 105-mm howitzer ammunition is provided with the M1B1A2 100-grain Percussion Primer exclusively. This primer is discussed in detail with 75-mm ammunition.

SHELL, Semifixed, H.E., M1.

General. The H.E. Shell M1 is issued to the using arms as a fuzed complete round, weighing 42.07 pounds.

Projectile. The M1 Projectile is of forged steel construction, streamlined in shape with a boat-tail base, and is adapted for a fuze that continues the contour. It has a steel base plate and a 0.81-inch rotating band of gilding metal. Provision is made for a 4.8-pound H.E. filler.

Components. A complete round of M1 H.E. Ammunition consists of a loaded and fuzed (M48 or M54 Fuze) projectile loosely attached

AMMUNITION INSPECTION GUIDE

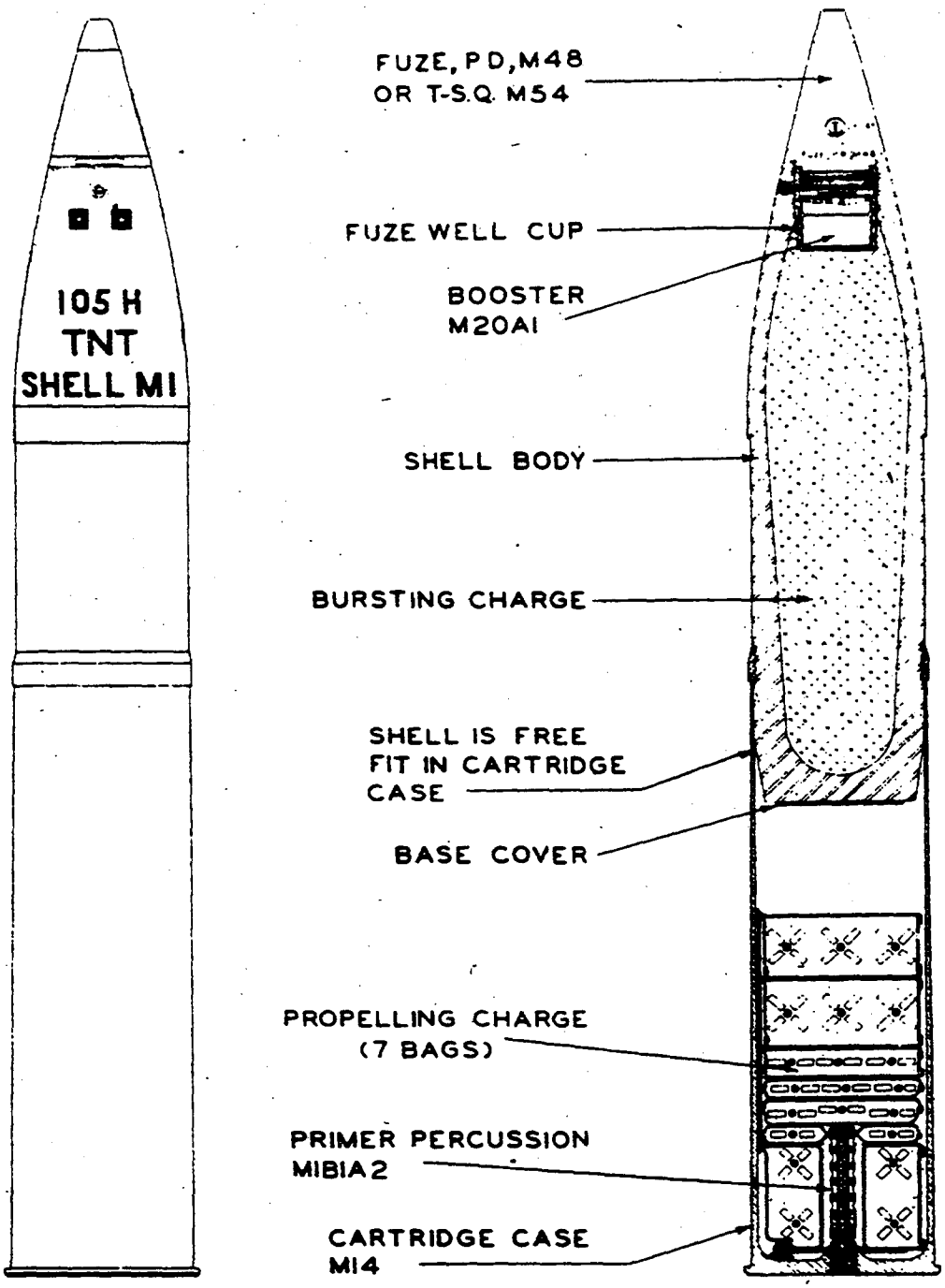


Figure 188 — SHELL, H.E., 105-mm, M1

to the M14 Cartridge Case with its 3-pound bag of propelling charge (7 zones) of FNH powder and an M1B1A2 Primer. If fired in the M3 Airborne Weapon, the reduced propelling charge will consist of a base and four increments.

SHELL, Semifixed, Chemical, M60.

General. There are three types of fillers for the Chemical Shell M60. These fillers are H (mustard), FS (smoke), and WP (smoke). Of the three fillers, only shell filled with H are classed as "Standard," the FS and WP filled shell being made "Substitute Standard" because of the standardization of the base-ejection type Smoke Shell M84.

Projectile. The M60 Projectile is of forged steel construction with the same general shape and size as the M1 H.E. Projectile. The body is actually 1 inch shorter, but the adapter that is necessary to hold the burster brings the length up to 19.33 inches, the same length as the M1. This projectile has no base plate. The rotating band, radius of ogive, and boat-tail base are the same in both rounds. The loaded weight of rounds varies with the filler: 37.77 pounds with H, 34.7 with WP, and 35.21 pounds with FS. The projectile has provisions for the M5 Burster which consists of the Burster Casing M5, and the Burster Charge M5.

Components. A complete round of M60 Chemical Ammunition consists of a loaded and fuzed (P.D. M57 Fuze with M22 Booster) projectile loosely attached to an M14 Cartridge Case with its propelling charge of seven increments of FNH powder and an M1B1A2 Primer. The Burster M5 consists of 1,331 grains of tetryl pressed in pellets. The fillers are found in the following quantities: H—3.17 pounds; WP—4.06 pounds; FS—4.61 pounds.

SHELL, Semifixed, Smoke, B.E., M84.

General. Two factors contributed to the adoption of the M84 base-ejection type of smoke shell in place of the M60 Smoke Shell. The first was the failure of the M60 to satisfy the requirements of the using arms for a screening smoke producer, and the second was the successful development and use of the base-ejection type by the British in their 25-pounder gun.

The general effect of the M60 Smoke Shell, with its superquick type of impact fuze and a burster charge of high explosive to disperse the chemical agent, is to create a large cloud of dense white smoke, most of which, due to the heat evolved, rises rapidly so that only a small percentage of the total remains to produce screening effect. This tendency to form a mushroom-shaped pillar of smoke is obviously unsatisfactory.

The British developed a base-ejection type of smoke shell similar to the ordinary star shell (illuminating projectile). It is fitted with

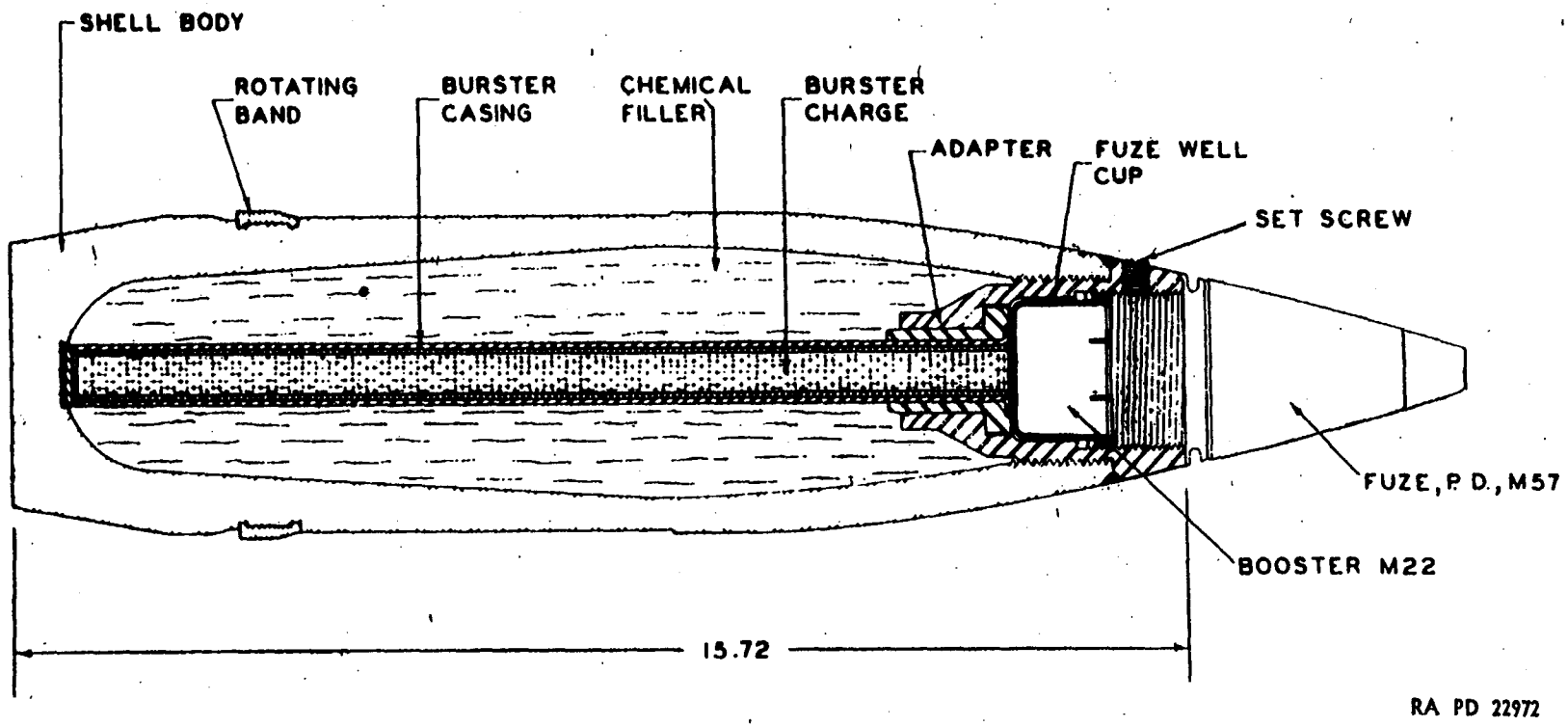
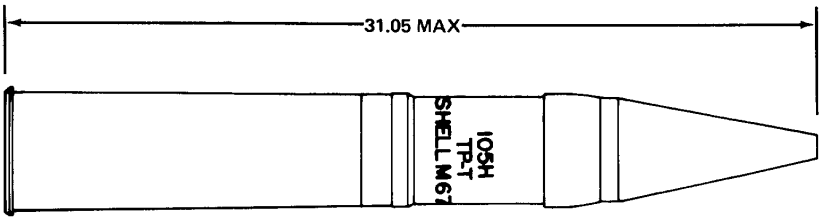


Figure 189 — SHELL, Chemical, 105-mm, M60

CARTRIDGE, 105-mm, TP-T, M67



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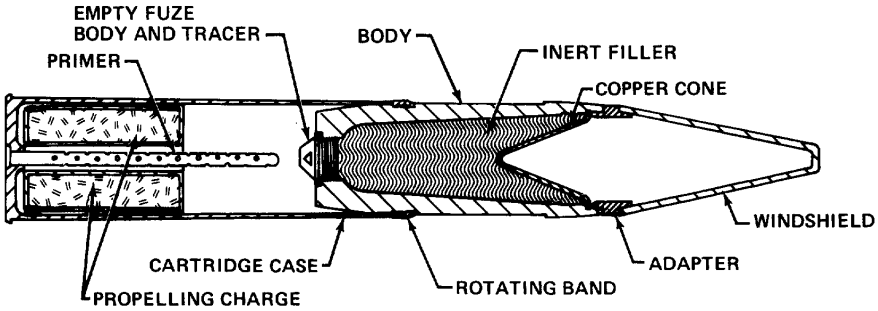


AR199714

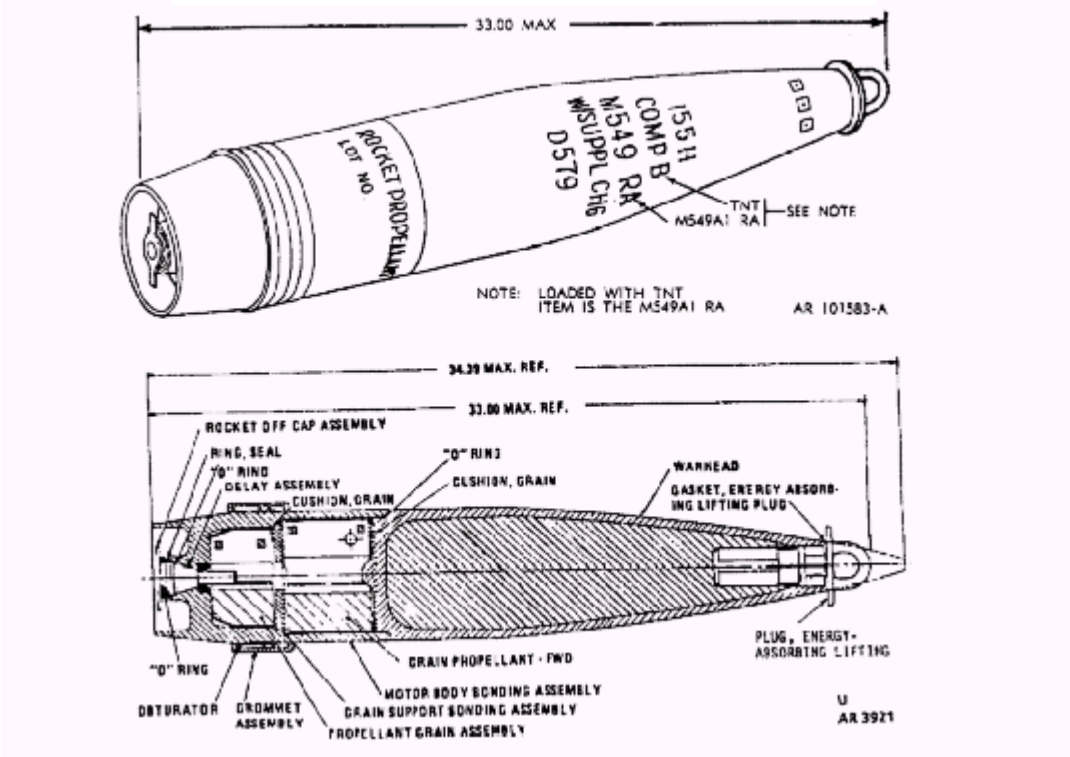
Use. This cartridge is used for training in marksmanship.

Description. The projectile consists of a boattailed steel body fitted with a steel windshield and gilding metal rotating band. The windshield is a hollow steel cone fitted to the front of a steel adapter. The adapter is threaded into the front end of the projectile, and retains a copper conical liner in the projectile cavity. The projectile cavity contains an inert filler. An empty fuze body with a live tracer is threaded into the base of the projectile. The complete projectile assembly is a free fit in the cartridge case. The cartridge case contains a percussion primer assembly and a single propelling charge increment. The base of the cartridge case is drilled and the primer assembly is pressed into the base. The percussion primer assembly consists of a percussion ignition element and a perforated flash tube containing black powder. The single increment bag is assembled into the cartridge case around the primer assembly..

Weight ..... 37.06 pounds
Length ..... 31.05 inches
Filler ..... Inert
Propellant ..... 1.54 pounds
Color ..... Blue or Black w / white markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition,* April 1977

PROJECTILE, 155-mm, HERA, M549 and M549A1



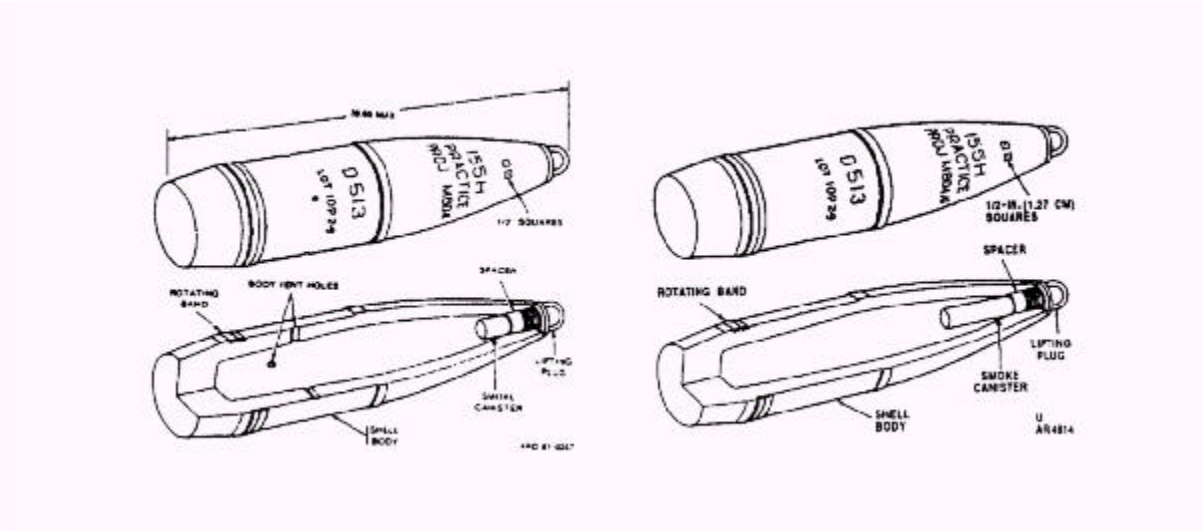
Use: This projectile is used to deliver fragmentation and blast effects against personnel and material.

Description: This projectile consists of two major components, a warhead filled with high explosive and a solid propellant rocket motor. These components are threaded together so that the outer steel shells of both form a streamlined ogive. A rocket cap is threaded into the base. The cap is removed prior to firing to allow ignition of the rocket motor for extended range.

Weight of Projectile ..... 96 pounds
Length of Projectile w/fuze ..... 34.39 inches
Filler and Weight ..... Comp B, 16 lbs or TNT, 15lbs
Rocket Motor ..... 7 lbs propellant
Fuzes ..... Standard Artillery Fuzes
Propelling charges ..... M4, M119, or M203
Color ..... Olive drab w/yellow markings

Reference: TM 43-0001-28, Army Ammunition Data Sheets for Artillery Ammunition, April 1994

PROJECTILE, 155MM, PRACTICE, M804 AND M804A1



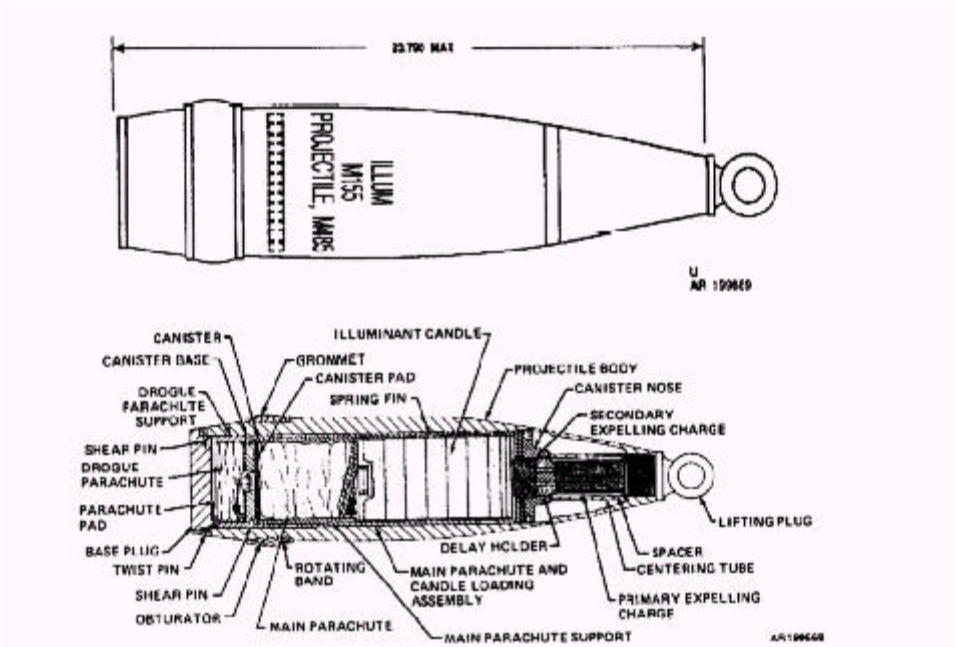
Use: The 155mm, M804/M804A1 projectile is used in place of the M107, HE projectile for training in indirect fire of 155mm howitzers. The M804/M804A1 projectile contains a smoke canister in the fuze well, which provides for a visual determination of functioning. It can be used in training at less cost than an M107 projectile, without the blast and fragmentation which accompany functioning of an M107.

Description: The M804/M804A1 is similar in weight and external configuration to the M107 HE projectile. The body of the projectile is a thick walled hollow steel shell, which contains no filler. A smoke canister, which has the same external appearance as a supplementary charge, is contained in the deep fuze cavity. A threaded lifting plug closes the fuze cavity at the nose of the projectile for handling and storage. A rotating band encircles the shell casing near the base and a steel base plate is welded over the base to prevent entry of propellant gasses into the interior.

Weight of Projectile as fired .....90.0 to 94.6 pounds
Length of Projectile w/lifting lug .....26.85 inches
Filler and Weight.....None
Fuzes.....PD, M557, M739 series, MTSQ, M564, M582, prox. M732 or ET, M767
Propelling charges.....M3, M4, M119
Color .....Blue w/white marking and brown band (M804) or yellow band (M804A1)

Reference: TM 43-0001-28, Army Ammunition Data Sheets for Artillery Ammunition, April 1994

PROJECTILE, 155MM, ILLUMINATING, M485 SERIES



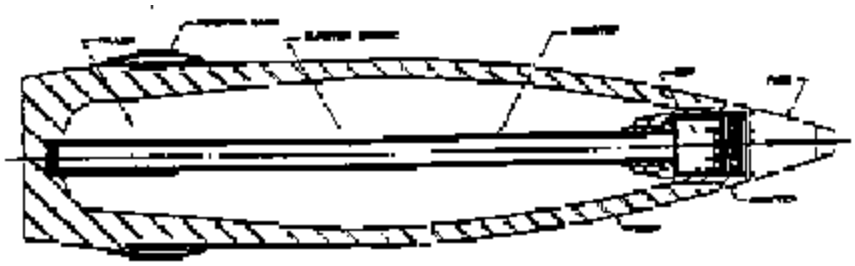
Use: This projectile is fired from 155mm howitzers and is used to illuminate the battlefield at night or during other conditions of reduced visibility.

Description: The projectile is a hollow steel shell containing an illuminate canister, a canister expelling charge in the nose, and a drogue parachute in the base. The illuminate canister contains the main parachute and lines, the illuminant candle assembly, a secondary expelling charge and a delay element holder. The outer shell of the canister is fitted with four longitudinal fins. The fins extend under spin forces when the canister is ejected from the projectile. The base of the projectile is closed with a press-fitted steel plug retained by shear and twist pins.

Weight of Projectile w/o Fuze.....92 pounds
Length of Projectile w/o lifting lug.....23.79 inches
Filler and Weight.....Illuminating Compound, 94 oz
Fuzes.....MT, M565; MTSQ, M577; ET M762
Propelling charges.....M3, M4, M119
Color .....Olive Drab w/white marking and white band

Reference: TM 43-0001-28, Army Ammunition Data Sheets for Artillery Ammunition, April 1994

PROJECTILE, 155MM, SMOKE, WP, M104



(Best available drawing)

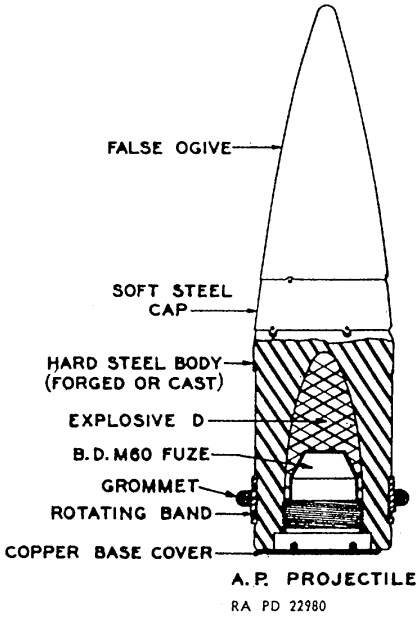
Use: The M104 smoke projectile was designed for anti-personnel, incendiary, spotting and screening purposes. It was primarily use by the US Marine Corps.

Description: This is a separate loaded, central burst WP smoke round similar to the HE round, and is used for anti-personnel, smoke screening, and spotting effects. There is a 2-in wide rotating band located near the base of the projectile. An aluminum burster tube extends the full length of the projectile cavity and is supported at the forward end by the adapter, which also holds a PD fuze. The base is boat-tailed. Upon impact the PD fuze ignites the burster charge which explodes the projectile and releases the filling. This projectile is used with 155mm guns M2 or M46.

Weight of Projectile as fired .....100 pounds
Length of Projectile w/fuze.....27.66 inches
Filler and Weight.....White phosphorus, 15.6 pounds
Fuzes.....PD, M51A5; TSQ, M55 or MT M67
Propelling charges.....Unknown
Color .....Unknown, assumed light green w/ yellow band and light red markings

Reference: Bureau of Naval Weapons, Fourth Consolidated Report of BW/CW Study, 31 March 1961

PROJECTILE, 155mm, AP, M112



Use. This round was designed for armor-piercing (AP) work with old and new 155-mm guns (1944 era).

Projectile. The projectile is filled with 1.44 pounds of explosive D, and fuzed with the Base Detonating Fuze M60. the projectile consists of a heavy steel body hollowed out to receive the filler and fuze, a steel adapter soldered and crimped to the nose of body and a steel windshield threaded to the adapter. The addition of the windshield continues the ogive which has a radius of approximately 65 inches. The base of the projectile is not tapered, and has a groove cut in it to receive a copper base after the M60 Fuze has been inserted. The fuze designation and lot number are stamped on the rotating band, and the appropriate delay is stenciled on the base cover. The projectile loaded and fuzed weighs 100 pounds. Since it contains a high explosive, the projectile is painted olive drab and stenciled in yellow.

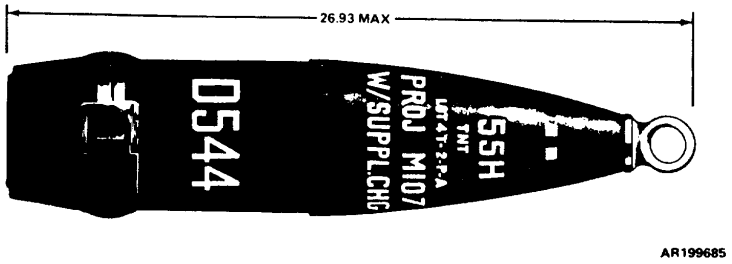
Propelling charge. The propelling charge for M1917-17A1-18MI or M1 and M1A1 Guns, depending on the weapon the round is to be used in.

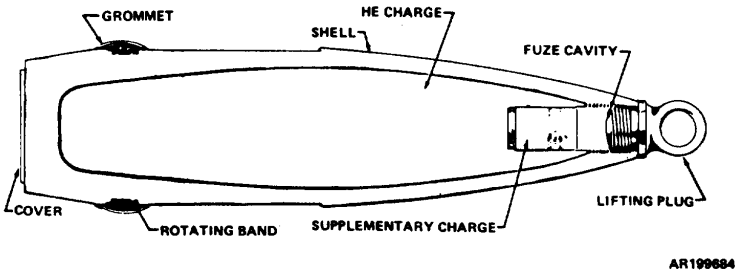
Primer. Mk.II or Mk.IIA 21-grain Percussion Primer.

Weight ..... 100 pounds
Net Explosive Weight ..... 1.44 pounds
Explosive Fill ..... Composition D
Fuze ..... M60 Base Detonating

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944

PROJECTILE, 155mm, HE, M107





Use. This projectile is fired from 155mm howitzers and is used for blast effect, fragmentation, and mining.

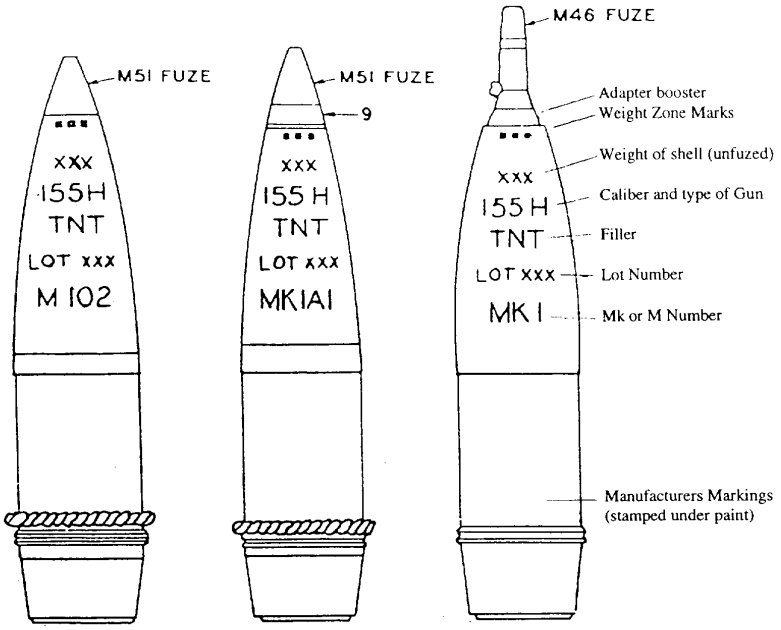
Description. The projectile is a hollow steel shell filled with 14.6 pounds of TNT or 15.4 pounds of Composition B. The shape is ogival with a boattail for aerodynamic efficiency. A supplementary charge of 0.3 pounds. TNT is contained in an aluminum liner in the deep fuze cavity. A threaded lifting plug closes the fuze cavity at the nose of the projectile for handling and storage. Point detonating, time or proximity (deep cavity only) fuzes may be used with this projectile. When a proximity fuze is fitted, the supplementary charge is removed. A rotating band encircles the shell casing near the base and is protected by a grommet before loading. A steel plate (base cover) is welded over the base to prevent entry of hot propellant gases into the projectile interior.

Weight ..... 94.36 pounds
Length (w/o lifting lug) ..... 23.89 inches
Filler and Weight
  Comp B ..... 15.4 pounds
  TNT ..... 14.6 pounds
Fuzes ..... PD: M557, M78 series, M739 series
MTSQ: M564, M582 series
Prox: M728, M732
Propelling charge M3, M3A1, M4A1, M4A2, M119, M119A1

Color ..... Olive drab w / yellow markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

PROJECTILE, 155mm, HE, M102, MK I, MK IA1

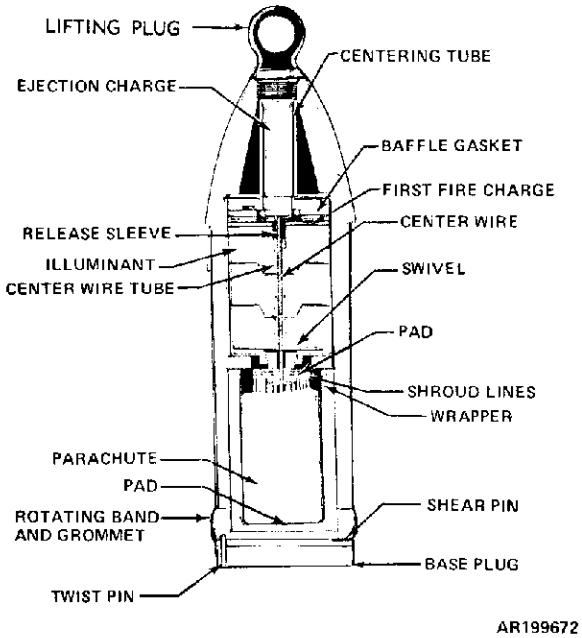


Description. The bodies of all 155-mm H.E. projectiles are very similar in construction. They range in length from 22.84 inches to 23.80 inches, have tapered bases, are manufactured from forged steel, and are hollowed out to nearly their entire length to receive the TNT filler. The recesses for rotating bands machined into the bodies vary in size depending on the weapon in which it is used. The Mk, and modified Mk series gun shells have two rotating bands, each 0.602 inch in width and separated by a space of 0.5625 inch. The M-series gun projectiles are provided with a single rotating band 2.02 inches wide. The old Mk. series H.E. shells are threaded in the nose to take the Mk IIIA adapter booster. These adapter boosters take the old M46 and M47 fuzes. The modified Mk. and M-series H.E. shell are threaded in the nose to take the M21 and M21A1 booster directly. Fuzes include Point-detonating M46, M47, M54, M51, and M51A1. Also included is the Time/Superquick Fuze M55 and M55A1, and Mechanical Time Fuze M67. The projectile is painted Olive drab with yellow stencil.

Length ..... 22.84 - 23.80 inches
Diameter..... 155 mm
Weight, loaded & fuzed..... 94.71-95.33 pounds
Filler..... TNT
Weight of filler..... .15.17 - 15.56 pounds
Fuze ..... Point Detonating M46, M47,
M54, M51, M51A1
Time/Superquick M55, M55A1
Mechanical Time M67
Color..... Olive Drab with yellow stencil

Reference: TM 9-1904, *Ammunition Inspection Guide*, 2 March 1944, *Complete Round Chart, No. 5981*, January 1940

PROJECTILE, 155mm, ILLUMINATING, M118 SERIES



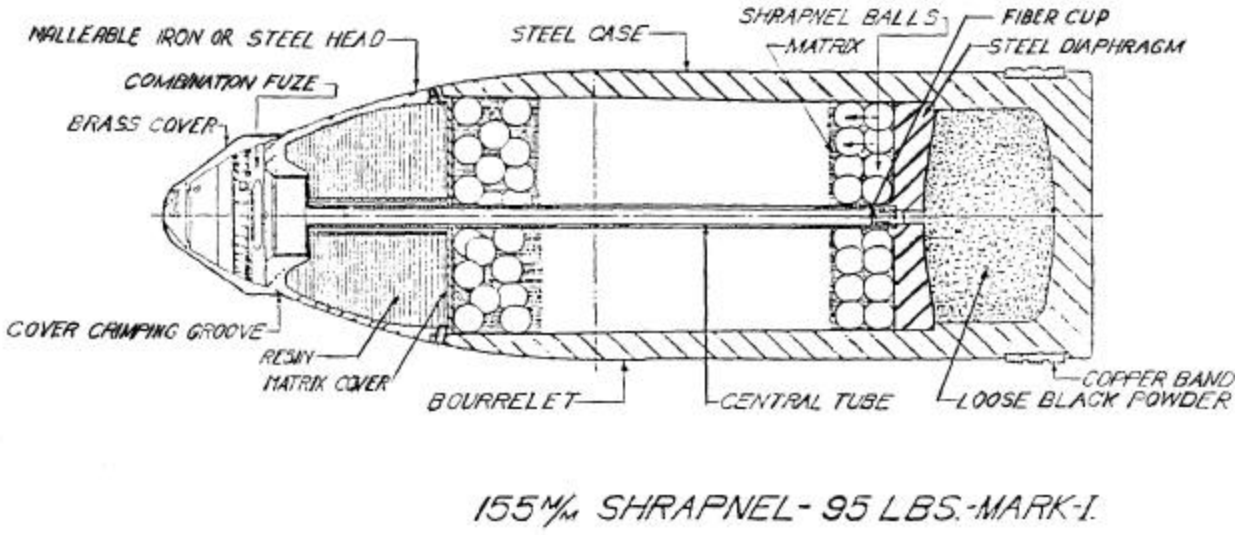
Use. This projectile is fired from 155mm howitzer for battlefield illumination at night or during other conditions of reduced visibility.

Description. The projectile is a hollow steel shell containing an illuminant canister, an ejection charge in the nose, and a parachute in the base. A threaded nose cavity is provided for an Mechanical Time Super Quick (MTSQ) fuze, and a lifting plug installed in the fuze cavity for shipment and handling. The base of the projectile is closed with a steel plug retained by twist and shear pins. A center wire connecting the parachute suspension lines and the illuminant canister runs through the illuminant charge within a tube and is secured at the forward end by solder attachment to a release sleeves. The release sleeve is imbedded in the forward end of the illuminant assembly behind a first fire charge. A rotating band encircles the projectile near the base and is protected by a grommet for shipment and handling.

Weight ..... 102 pounds
Length (with lifting lug)..... 23.40 inches
Filler..... illuminant composition
Filler weight ..... 4.30 pounds
Fuze MTSQ, M501 series
Propelling charge ..... M3, M4 series
Color..... Gray w / white markings
(later manufacture - Olive Drab
w/ white markings and a white band)

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

PROJECTILE, 155mm, SHRAPNEL, MK I

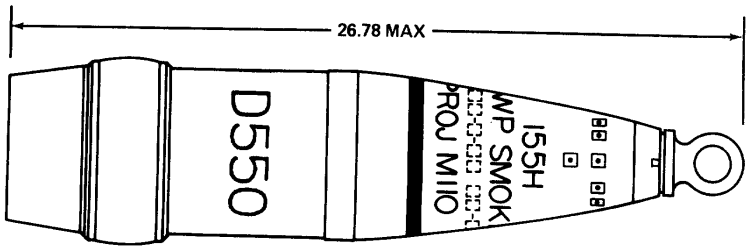


The round was developed during World War I and used against aircraft at that time. By 1944, however, due to added armament on aircraft, shrapnel served no effective service use, and was therefore classified limited standard. Existing stocks were used for target practice.

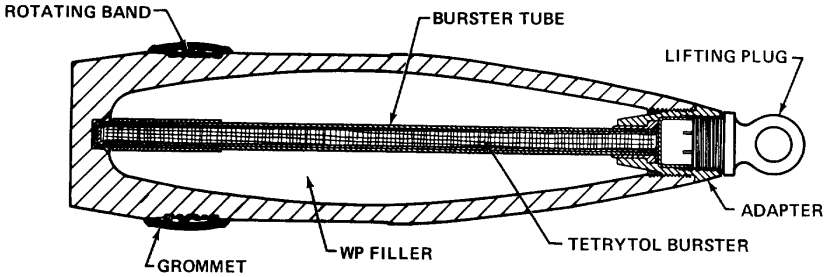
Length without fuze ..... 16.9 inches
Length, Overall ..... 18.74 inches
Diameter ..... 155 mm
Weight, loaded & fuzed ..... 95 pounds
Expelling Charge ..... 1.35 pounds Black Powder
Filler ..... 800± Lead Balls
Fuze ..... 45 sec Combination Fuze

Reference: TM 9-1904, *Ammunition Inspection Guide*, 2 March 1944
Complete Round Chart, No. 5981, January 1940

PROJECTILE, 155mm, SMOKE, WP, M110 AND M110E1



AR 199679-A



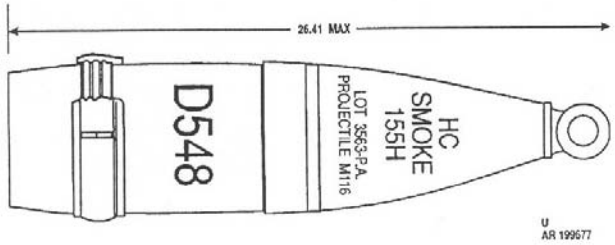
Use. These projectiles are fired from 155mm howitzers to produce screening smoke. The projectiles also have a slight incendiary effect.

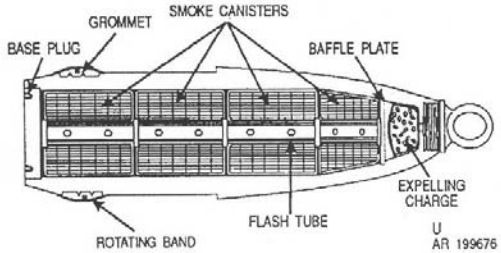
Description. The 155mm Smoke White Phosphorous (WP), M110, and M110E1 projectiles consists essentially of a steel shell (casing) containing an M6 burster loaded with tetryl running through the center of the shell, and 15.6 pounds of White Phosphorous. An adapter in the nose of the projectile is threaded to receive the fuze. A rotating band encircles the projectile case near the base and is protected by a grommet for shipment and handling. A PD fuze is normally used with these projectiles. Except for the WP contents, these projectiles are exactly the same as the projectile H/HD. The ballistics and configuration are the same as the HE, M107 projectile.

Weight with lifting lug ..... 98.49 pounds
Length (w/ lifting lug) ..... 26.78 inches
Filler ..... White Phosphorous
Filler weight ..... 15.6 pounds
Fuzes ..... PD: M557, M739
MTSQ: M564
Propelling charges ..... M3 / M4 series, M119, M119A1
Color ..... Light Green w / yellow band
and light red markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

PROJECTILE, 155-mm, SMOKE, M116 & M116B1





Description. This base-ejection type projectile is a hollow steel shell containing four canisters of chemical smoke compound. The canister filler may be either hexachloroethane-zinc (HC) or a smoke mixture in colors of green, red or yellow. The canisters are stacked with the projectile and each has a perforated central tube so that in the stack a flash tube is continuous through the contents. The front canister is cone-shaped to conform to the curvature of the projectile case. AN expelling charge of black powder is contained in the nose of the projectile under the fuze cavity. The fuze cavity is fitted with a lifting ring plug for shipment and handling. A baffle plate with a central hole near the flash tube separates the expelling charge from the first smoke canister. A rotating band with a protective grommet for shipment and handling encircles the projectile near the base. The base is closed with a metal closure disk and threaded plug.

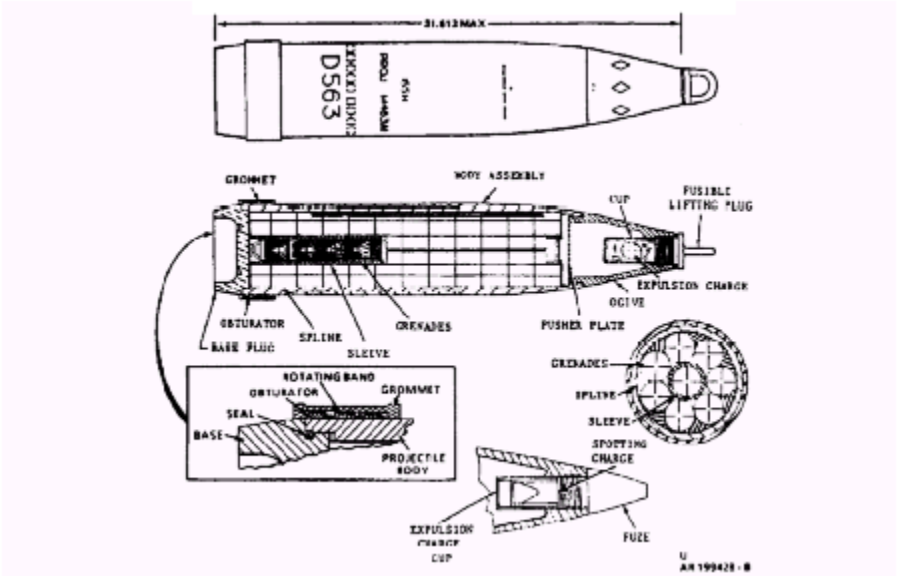
Function. When the weapon is fired, the burning propellant generates rapidly expanding gases to propel the projectile through the barrel with the velocity required to reach the target. The rotating band engages the barrel rifling to impart spin to the projectile. The rotating band also forms a seal to prevent escape of gas pressure past the projectile. Functioning of the fuze ignites the expelling. The expelling charge flashes through the central tube to ignite the smoke canisters. An effective smoke cloud is produced within 30 seconds, and maximum smoke emission occurs in about one minute.

Color. *Old manufactures.* The body of the projectile is painted Gray with yellow markings.
New manufactures. The body of the projectile is Light-green with black markings. Color smoke indicated by a series of 3 C's.

Weight as fired
HC ..... 94.80 pounds
Colored ..... 86.23 pounds
Length (w/ lifting lug) ..... 26.41 inches
Filler and Weight ..... HC - 25.84 lbs.; Colored Smoke - 17.19 lbs.
Fuzes ..... MTSQ - M501 series
Propelling charges ..... M3 & M4 series
Range ..... 3,900 - 18,100 meters

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

PROJECTILE, 155-mm, HE, M483A1



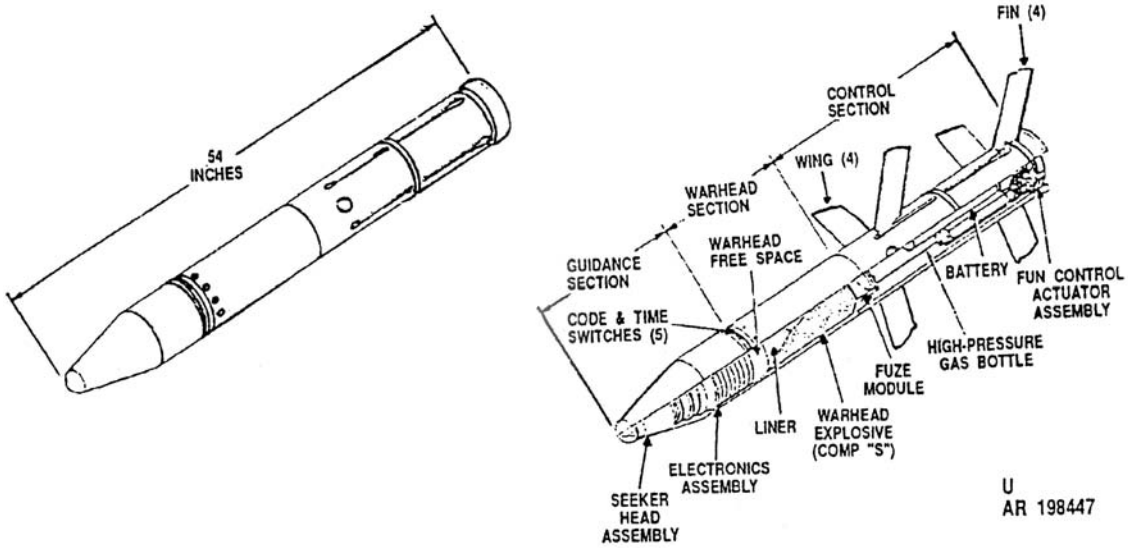
Use: This projectile is used to deliver sub-missiles dual purpose armor defeating and anti-personnel grenades.

Description: This projectile is of the separate loading type. The fuze, propelling charge, and primer are handled and loaded separately. The projectile is provided with a fusible lifting plug in the place of a fuze for handling. The lifting plug may be the yellow fusible type or the universal type. The plug must be replaced by a fuze before the projectile is loaded. The projectile contains a total of 88 dual-purpose grenades. The grenades are contained by a base plug, with left-hand thread which is screwed into the base of the projectile. For normal usage, the expulsion charge is contained in a cavity in the nose of the projectile to eject the grenades. The expulsion charge can be bagged expulsion charge assembly or the cylindrical plastic expulsion charge type. If desired, this expulsion charge may be replaced by a spotting charge designated to detonate the entire projectile as if it were a bulk-loaded HE projectile.

Weight of Projectile ..... 102.6 pounds
Length of Projectile w/fuze ..... 35.4 inches
Filler and Weight ..... 64 ea M42 and 24 ea M46 grenades
Fuzes ..... MTSQ, M577 or ET, M762
Propelling charges M3, M4
Color ..... Olive drab w/yellow diamonds and markings

Reference: TM 43-0001-28, Army Ammunition Data Sheets for Artillery Ammunition, April 1994

PROJECTILE, 155-mm, COPPERHEAD, HE, M712



Use. Cannon Launched Guided Projectile; M712, Copperhead, is a 155-mm, separate loading, laser-guided, high-explosive, projectile. It is intended to be used against tanks, armored vehicles, and other moving or stationary hardened targets. The M712 projectile is designed for use with M109A1/A2/A3, M198, and M114A2 howitzers.

Description. The M712 projectile consists of three main sections: a forward section (guidance section), a center section (warhead or payload section), and an aft section (control section). The guidance section consists of two major assemblies: the seeker head assembly and the electronics assembly. The laser detector, decoding circuits, gyro, and all of the electronic circuits that stabilize and control the flight of the projectile to the target are contained in this section. Also, there are several components of the fuzing system physically located in the guidance section. These include a dual section direct impact sensor (DIS) located in the forward end of the seeker head assembly and six shock wave sensors (SWS) located strategically throughout the guidance section. Also, there are five screwdriver-set switches located in the forward bourrelet. These switches, identified as code and time switches, are set by the howitzer crew just prior to loading and firing the projectile.

The warhead section is classified as high explosive antitank warhead. The housing is a cylindrical steel shell with a cone-shaped liner located at the forward end and a fuze compartment located at the aft end. The explosive filler, consisting of 14.75 pounds of Composition B, is cast into the space between the liner and the fuze compartment. A cylindrical shaped fuze assembly (module) fits into the fuze compartment. The fuze module consists of a dual-channel safety and arming (S&A) device, two detonators, two explosive actuators, two explosive leads, and a single booster charge. Except for the booster, the fuze is a dual-channel redundant system where both channels are totally independent of one another and where initiation of either channel will cause normal functioning of the warhead explosive charge.
The control section contains a battery that provides electrical power, a high-pressure gas bottle that provides pneumatic power, four fins, four wings, and the mechanism to extend and actuate these control surfaces during flight. The housing for the control section is a cylindrical steel shell. The forward end is designed to mate with the warhead section by means of an internal-fitting splice ring. The aft end is designed to receive a screw-on aft closure (base) with a rotating plastic obturator. The obturator is

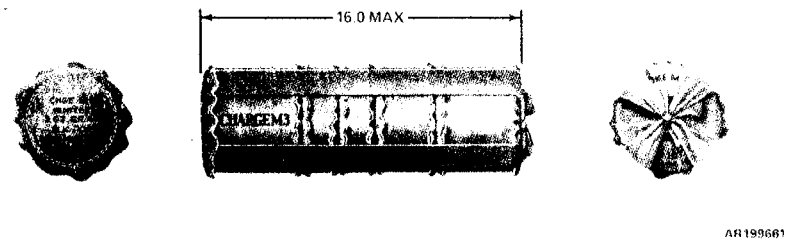
retained between the aft closure and the control section housing. It is designed to not only seal off propelling charge gases but the rotating feature of the obturator reduces the spin of the projectile to approximately 10 revolutions per second. This spin rate is sufficient to deploy the fins, but slow enough to allow the control surfaces to stabilize the projectile through the entire flight. The base of the M712 projectile is designed to receive an extractor device used to unload the projectile from the gun tube.

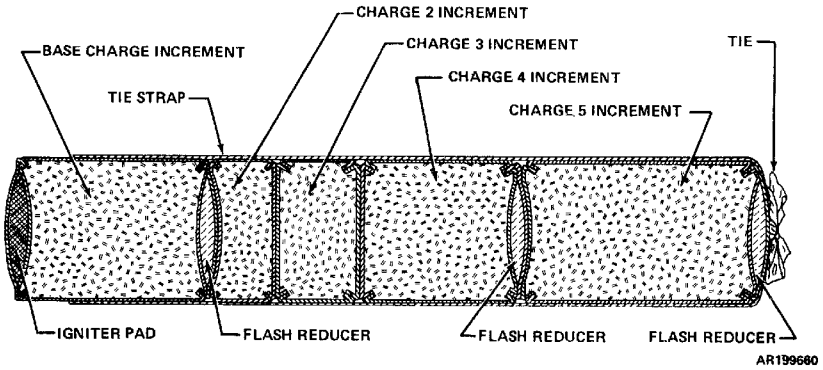
Function. The M712 projectile is designed for indirect firing operations only. However, the projectile trajectory can be programmed for either the ballistic mode or (high trajectory) or the glide mode (generally flatter). When the round is fired, the setback and acceleration forces initiate the mechanical arming portion of the fuze S&A. These forces also cause the fins to unlatch and a portion of the battery to activate. On leaving the tube, the fins snap out by centrifugal force, and lock in the extended position. After the time delay set in by the code and time switches has expired, the main portion of the battery will activate, providing electrical power to all of the electronic circuits in the projectile. At the approximate midpoint of the trajectory, the wings will be deployed and the roll control and guidance functions will take over the flight of the projectile. When the projectile receives and decodes the laser energy reflected from the target, the projectile will steer onto a gilding intercept course to the target. At the same time, the fuze will become electrically armed. When the projectile hits the target, either the direct impact sensors or the shock wave sensors will trigger the fuze detonators and the warhead will function.

Weight ..... 138 pounds
Length ..... 54 inches
Explosive Fill ..... Comp B, 14.75 pounds
Propelling Charge ..... M3A1, M4A2, M119, A1 & A2
Primer M82
Color ..... Black with Yellow Markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1994

PROPELLING CHARGE, 155-mm, M3 SERIES





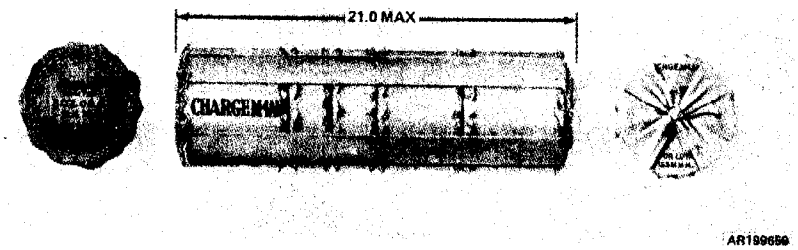
Use. The M3 series propelling charges are green bag type designed for use in 155-mm howitzers for firing zone 1 through 5.

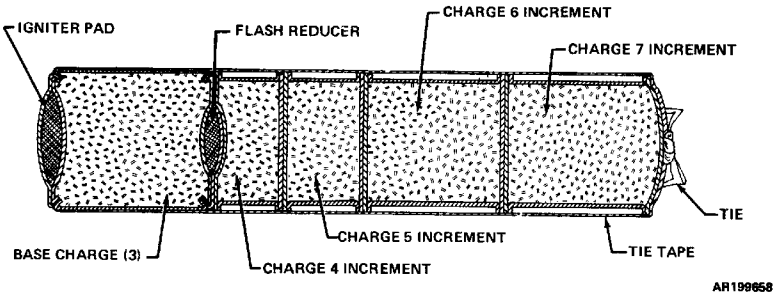
Description. The full charge consists of approximately 5.50pounds of propellant including a base charge and four unequal increments loaded in cloth bags. The bags are fastened together with four cloth straps sewn to the base and tied on top of increments 5. Charge M3 is assembled without flash reducer pads. Charge M3A1 includes 3 flash reducer pads containing potassium nitrate or potassium sulphate. A 2-ounce pad is assembled forward of the base charge and there are two 1-ounce pads forward of increments 4 and 5. The igniter charge of the M3A1 is 3.5 ounces of clean burning igniter in a red cloth bag sewn to the rear of the base section. The igniter charge of the M3 is 3 ounces of black powder. The seams of the base charge section are inverted on the M3A1 only so that the edges of the cloth are inside to reduce residue after firing.

Weight ..... 6.2 pounds
Length ..... 16 inches
Propellant ..... M1, 5.6 pounds
Color ..... Green with black markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

PROPELLING CHARGE, 155-mm, M4 SERIES





Use. This white bag propelling charge is used in 155-mm howitzers for firing zone 3, 4, 5, 6 and 7.

Description. The total charge (M4A2 Prop charge) consists of 13 pounds of propellant and is divided between a base charge and four unequal increments loaded in a white cloth bags. The increments are connected by four cloth tapes sewn to the base and tied on top of increment 7. The igniter for Charge M4A2 is 3.5 ounces of clean burning igniter in a red cloth pad sewn to the bottom of the base charge. A flash reducer pad containing 1-ounce of potassium nitrate or potassium sulfate is assembled at the front end of the base increments. The seams in the base pad are inverted so that the edges of the cloth are inward to reduce residue after firing.

Weight ..... 14.0 pounds
Length ..... 21 inches
Propellant ..... M1, 13.4 pounds
Color ..... White with black markings

Reference: TM 43-0001-28, *Army Ammunition Data Sheets, Artillery Ammunition*, April 1977

COMPLETE ROUND CHART FOR 60-MM TRENCH MORTAR WEAPONS

Complete Round Designation	Filler	Fuze	Propellent Increment	Percussion Primer	Ignition Cartridge	Packing	Status
SHELL, H.E., M49A2	TNT	P.D. M52	140 grains (4 incr—M3)	M32	M5A1	Fuzed	S & M
SHELL, practice, M50A2	Inert Mat'l B.P. Pellet	P.D. M52	140 grains (4 incr—M3)	M32	M5A1	Fuzed	S & M
SHELL, training, M69	.....	.....	.....	.....	M4	.....	S & M
SHELL, illuminating, M83	Flare Composition	Time M65	112 grains (4 incr—M4)	M32	M5A1	Fuzed	S & M

is utilized, preventing the set-back pin from moving rearward against its spring during handling.

Function. This fuze is armed in the same manner as the M45 and M52 P.D. Fuzes previously described. The cotter pin or safety wire is removed, freeing the set-back pin. The shell is dropped down the bore of the weapon. The force of set-back resulting from ignition of the propelling charge causes the set-back pin to move rearward against its spring, freeing the safety pin. The safety pin, due to the action of its spring, is forced out of the fuze until its head comes in contact with the bore of the mortar. After emerging from the mortar, the safety pin is completely ejected by its spring from the fuze. The slider is now free, and due to the action of the slider spring is forced into the armed position, thereby bringing the detonator in direct alinement with the explosive train. The slider also serves to close the hole left by the safety pin so as to prevent the entrance of mud or dirt into the slider cavity which might interfere with the fuze function. The slider is locked in the armed position by a slider lock which is forced up into a recess in the slider by a spring.

Upon impact with the target, the striker is forced inward against its shear wire, breaking it and bringing the firing pin of the striker into a primer. The flame from the primer ignites a black powder delay pellet which burns for 0.1 second. The pellet in turn ignites a relay of lead azide which detonates and in so doing sends a wave to the detonator of lead azide and tetryl. The detonator in turn functions the lead charge of tetryl which detonates the booster of tetryl. The booster charge amplifies the wave and sends it to the shell filler of TNT.

General Information. 81-mm ammunition can be used in 3-inch trench mortar weapons by making the following modifications:

1. The firing pin in the 3-inch trench mortar weapon must be lengthened. This modification will be found in the 3-inch Trench Mortar Mk. IA2. Therefore, the 81-mm mortar ammunition may be used only in the 3-inch Mk. IA2, and never in the 3-inch Trench Mortar Mk. I or Mk. IA1.

2. Maximum number of increments must be changed in the following manner:

Outer zone propelling charge must be reduced from six to four increments, for the M43A1 and M44 Shells.

Outer zone propelling charge must be reduced from four to three increments, for the M56 and M57 Shells.

The full charge of four increments may be used with the M45 shell.

The 3-inch trench mortar shell can be fired in an 81-mm weapon without any modifications being made.

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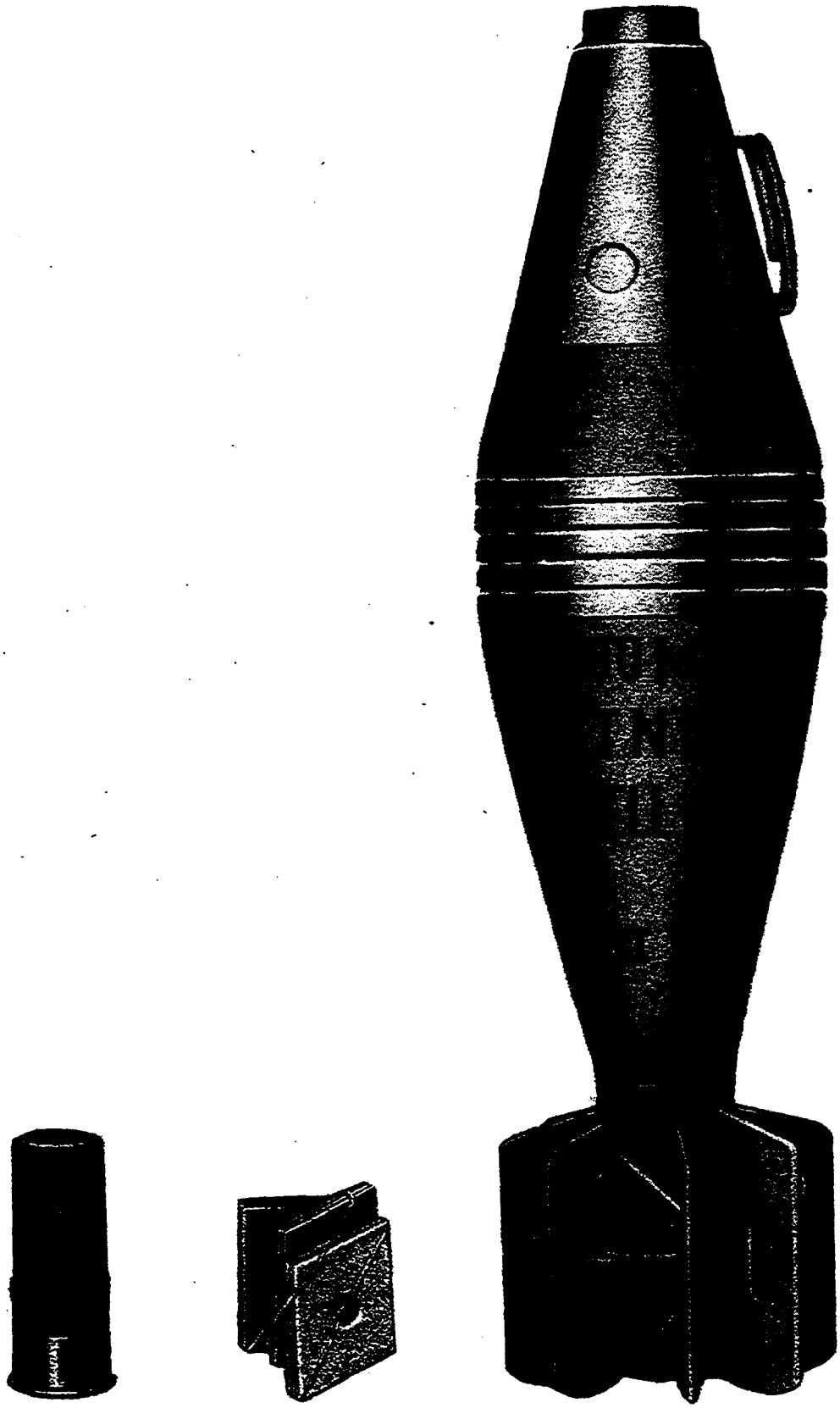

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Figure 120 — SHELL, H.E., M49A2

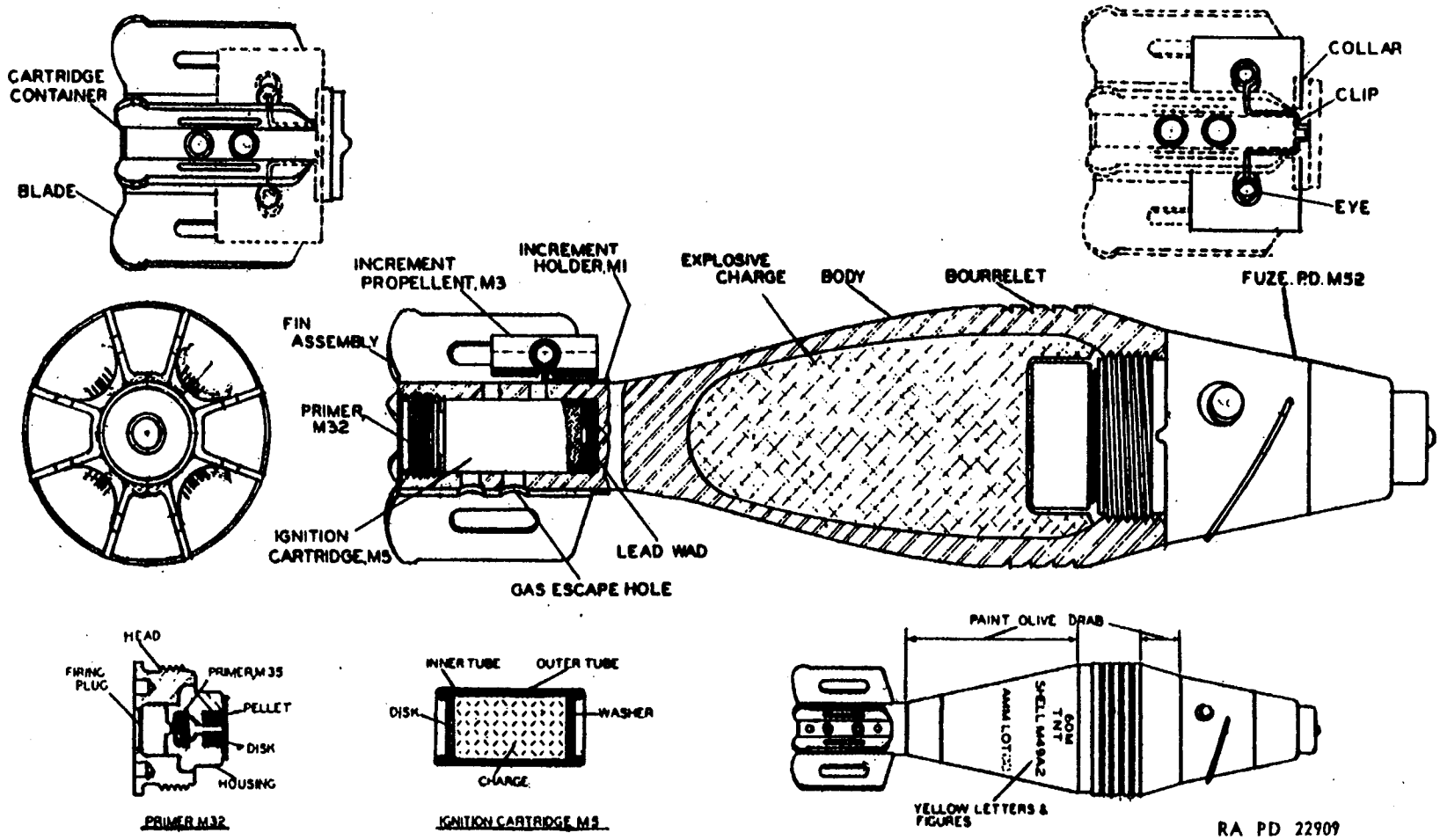

Figure 121 — SHELL, H.E., M49A2

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60-MM TRENCH MORTAR.

General. For missions between ranges of usefulness of hand grenade and 81-mm trench mortar, the Ordnance Department initiated the development of a light 42-mm trench mortar.

Before a 42-mm trench mortar could be made, the Brandt Company furnished a 47-mm trench mortar which was suitable for infantry. The cavalry wanted something that had a greater maximum range than the 47-mm weapon. Consequently, a 60-mm trench mortar and ammunition for it was developed by the Brandt Company.

In 1938, the 60-mm trench mortar was adopted and the 47-mm trench mortar was rejected. The mobility of the weapon, due to its light weight, and the quantities of ammunition that can be carried, increased the fire power of the using arms in movement.

The general design of the 60-mm trench mortar shell is similar to the light shell for the 81-mm trench mortar. The method of firing is exactly the same. The color, marking, and stenciling are the same as for the 81-mm mortar ammunition of the same types. The class of ammunition used for the 60-mm mortar is once again semifixed. Four types of ammunition are at present provided for use in the 60-mm mortar: high-explosive shell, practice shell, training shell, and illuminating shell.

SHELL, H.E., M49A2. This is the present standard high-explosive shell for use in 60-mm trench mortar. It is used against light targets and personnel in the open.

Shell body. In shape, the body of this shell closely resembles the light shell for the 81-mm trench mortar; however, it is much smaller in size. Several methods of manufacturing the shell body are in practice at the present time, depending on the method best adapted to the individual manufacturer. The body may be of forged steel, cupped-rolled, plate-welded longitudinally, or a machined casting.

It is tear-dropped in shape, having a blunt nose and tapered tail. Near the nose end of the shell is a machined bourrelet which acts as a forward bearing surface and as a gas check. The nose is threaded to receive the fuze directly. The fuze used is the P.D. Fuze M52 which has a superquick action. Due to the light weight and blunt nose, very little penetration can be obtained. The shell is designed to produce fragments as the other light shells previously described. The tail end is closed and internally threaded to receive the stabilizer assembly. Earlier models of this shell had the stabilizer and body made from one piece with the fins attached. The shell filler is 0.34 pound of flake TNT. The weight of the round completely assembled is 2.94 pounds; the entire length of the shell with fuze attached is 9½ inches.

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Zones of fire and range. The shell has five zones of fire. The first zone of fire consists of the ignition cartridge and percussion primer. Zone five consists of the ignition cartridge, percussion primer, and four propellent increments.

Zone one has a range of approximately 100 yards.

Zone five has a range of approximately 1,935 yards.

Marking and packing. The shell body is painted olive drab with yellow stencil. The shell is shipped as a complete assembled round. One round is packed per individual fiber container, six individual fiber containers per large outer fiber container, three large outer containers (18 rounds) per bundle. One bundle per chocolate-stained wooden crate for overseas shipment.

SHELL, Practice, M50A2. SHELL, practice, M50A2, is similar to SHELL, H.E., M49A2. The shell body, components used, and packing are identical to the shell previously described. It differs in that its filler consists of 0.29 pound of inert material and 0.05 pound of a smoke producing pellet of black powder to act as a spotting charge. The body is painted blue with white stencil to indicate a practice shell.

SHELL, Training, M69. This shell is designed to give the mortar crew training in loading the weapon, and practice in firing under conditions which will not permit firing in more than the first zone.

Shell body. The body of the shell is cast iron. It is similar in shape to the 60-mm trench mortar shell and the M68 Training Shell for 81-mm mortar previously described. It is tear-dropped with a blunt nose and tapered tail. It has a bourrelet on the body near the nose to act as a forward bearing surface and gas check. At the tail end is a recess which is threaded to receive a stabilizer assembly. The nose end is closed and rounded with no provisions made to receive a fuze. Its weight varies depending on its weight zone. Seven weight zones are possible with a minimum of 3.83 pounds for weight zone one and a maximum of 4.07 pounds for weight zone seven without fin assembly and ignition cartridge.

The fin assembly and propelling charge. The fin assembly is of the same construction and shape as previously described. It receives the Ignition Cartridge M4. Several ignition cartridges are provided with each round so that the shell can be fired more than one time. There are no propellent increments used, for the shell is designed to be fired in the first zone only.

Marking and packing. The shell is painted black with white stencil. On the shell body will be found a number of white squares (one to seven) with a prick punch mark in the center of each to indicate the zone weight.

The fin assembly. The fin assembly consists of a machined cartridge container closed at one end with a threaded protrusion to screw into the shell body. It is hollow, with the other end threaded to receive an ignition cartridge and a percussion primer. A series of holes in the cartridge container serves to allow for the escape of gas, and to conduct the flame from the ignition cartridge to the propellent increments. Attached to the cartridge container are eight stationary fins in which may be seated the increments, or as recently changed, the increments are placed between the fins and held there by an increment holder.

The ignition cartridge. The ignition cartridge is the M5A1. It consists of a cardboard container having approximately 40 grains of double base powder. It supersedes the M5, and differs from it in that the number of grains of powder has been reduced from 47 to 40 grains. A hollow celluloid tube three-fourths inch long was also introduced at ignition end of cartridge. The M5 Ignition Cartridge produced erratic flight. Short ranges made it necessary for all members of the crew to be protected. With the M5A1, muzzle velocities have been reduced, but the maximum range obtained with all propellent increments and cartridges have not been reduced.

Previous to the M5 Ignition Cartridge, the M4 had been used. The M4 was a cardboard container having 47 grains of double base powder with a primer located in a brass base. It fitted snugly into the cartridge container and was disadvantageous in that set-back would cause residue of the M4 Ignition Cartridge to remain in the weapon.

The percussion primer. The Percussion Primer M32 is of the same construction and shape as the M33 previously described. It differs in that it has a narrow body diameter.

The propellent increments. The Propellent Increments M3 are made up of thin square sheets of double base powder sewn together. Each increment weighs approximately 35 grains. In the center of each increment is a hole which serves to increase the burning surface, and allows the increment to be held by the Propellent Increment Holder M1, by fitting into the wire loop of the increment holder. The corners, the sides, or edges may be notched to adjust the increment to the desired weight. The increments are held in place by seating in the fins diagonally, or recently by use of the Propellent Increment Holder M1. The Propellent Increment Holder M1 consists of a wire band seated around the stabilizer assembly near the body of the shell. Two thin wires bent in a V-shape, their ends in a circular loop, extend from the band down between the fins. On these loops are placed the increments by means of the holes in their center.

The percussion primer, ignition cartridge, and four increments comprise the full propelling charge; a total of 180 grains of powder.

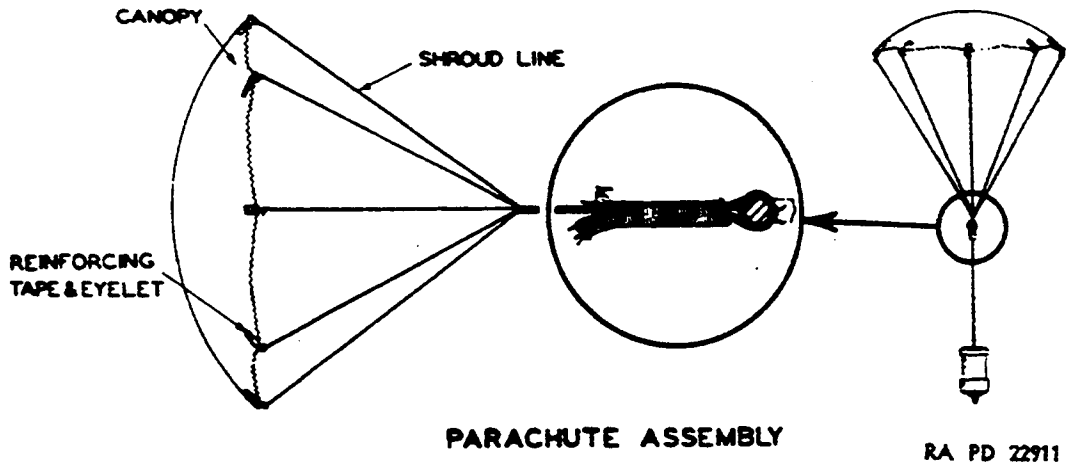

Figure 122a — SHELL, Illuminating, M83 — Parachute Assembly

Information as to the exact packing of the shell is not available at the present time. However, the complete round comes in separate units consisting of the shell body, ignition cartridge, and fin assembly.

SHELL, Illuminating, 60-mm, M83. The SHELL, illuminating, M83, was designed to provide a night light of relatively high candle power that could be fired from a standard infantry weapon. The SHELL, illuminating, M83, adequately fills the need, having 110,000 candle power, minimum, and burning for 25 seconds while drifting earthward on its parachute. The shell consists of the following components: fuze, body assembly, parachute assembly, illuminant assembly, fin assembly, propellant, and ignition cartridge.

Shell body. The body is constructed of a machined steel tube. It is cylindrical in shape with a tapered tail assembly and a nose assembly having its taper produced by the contour of the fuze. At the nose is a steel adapter spot welded and internally threaded so as to receive the Time Fuze M65. At the base of the cylindrical body is a coupling which serves to join the body to the tail assembly. The body is held to the coupling by means of four shear pins and Pettman cement. The tail assembly is held to the coupling by means of spot welding and Pettman cement,

The tail assembly consists of a cone to which is attached a fin adapter. The fin adapter is internally threaded to receive the fin assembly. The total weight of the shell completely assembled is approximately 3.8 pounds. Entire length of the fuzed shell is approximately 14.2 inches.

Parachute assembly. The parachute assembled in the illuminating shell is of sufficient size to permit the illuminant to burn 25 seconds while falling to the ground from a height of approximately 400 feet. The parachute assembly consists of a parachute canopy, tying cord, eight eyelets, eight shroud lines, reinforcing tape, and tying thread.

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The parachute canopy is cut from Fortisian cloth, in the form of an octagon, having a width of 36 inches and pinked on the periphery. The canopy has a porosity of 225 cubic feet air per minute per square foot.

At each corner of the octagonal canopy, an eyelet is crimped into the cloth, the latter being first reinforced by sewing on a strip of cotton tape with nylon thread.

One end of each of the shroud lines is tied to an eyelet. The cords in each assembly are the same length, usually 31 inches. The lines are tied together with tying cord, at a point 27 inches distant from the eyelets.

The shrouds are run through the flare assembly loop and tied firmly back upon themselves with tying thread. The canopy is then folded according to specified directions and inserted in the parachute case.

After the illuminant assembly is inserted in the body tube, the suspension wire (to which the shroud lines are attached) is coiled in the bottom of the parachute case. The two hemicylindrical steel parachute spacers are fitted into the rear end of the body tube. They fit snugly against the inner wall of the tube and rest on the steel disc of the flare assembly. The two spacers form the cylindrical parachute case into which the chute is placed. The chute and the suspension wire are separated in the case by an onionskin paper separator.

Two chipboard parachute discs are forced into place against the walls of the spacers. A coupling disc is placed on the runs of the parachute spacers and the tail assembly is pressed into position, and the shear pins are inserted.

Illuminant assembly. The illuminant assembly is the functional part, the "heart" of the shell, and is carefully designed to insure its effectiveness. The assembly fits into the shell body, and its front face is in contact with the fuze. Its rear face is attached to the parachute assembly by means of a suspension wire. The illuminant assembly consists of a case, first fire charge, illuminant charge, priming charge, suspension wire, steel disc, quick match disc, top disc, plywood plug, quick match, top seal, spacer, quick match spacer, tying string, reinforcing band, and binding tape.

The quick match is in contact with the expelling charge of the fuze. The quick match leads through four alined holes in the steel quick match disc, hair felt quick match spacer, and top disc. The ends of the quick match, which is in two lengths, are exposed to the fuze; the middles, after passing through the four holes pass thru the priming charge.

The priming charge consists of a 0.055-ounce pellet of Army black powder that is located just above and in contact with the first fire charge. The first fire charge is 0.74-ounce pellet consisting of a mixture of 25 percent black powder and 75 percent illuminant com-

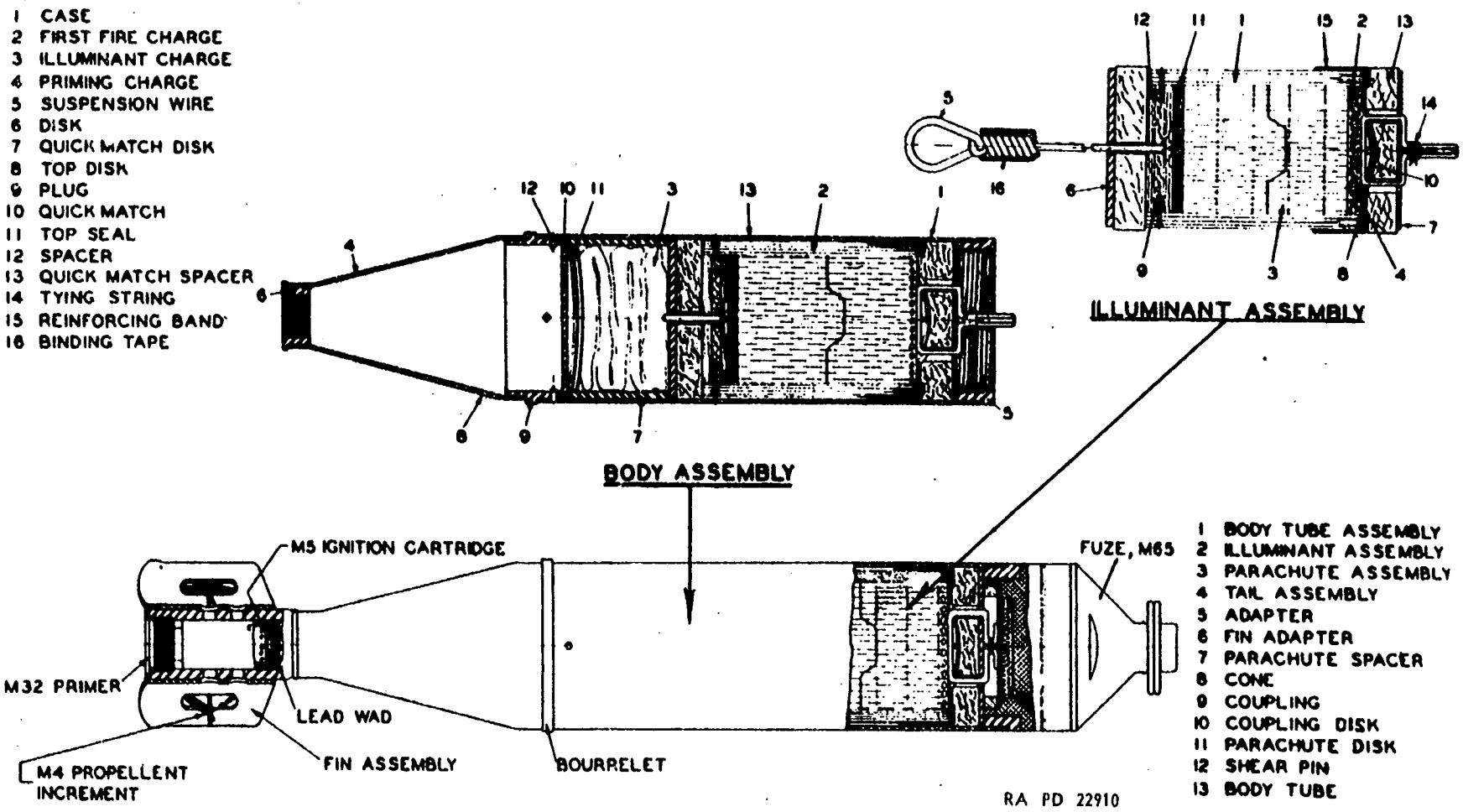

Figure 122b — SHELL, Illuminating, M83 — Body and Illuminant Assemblies

position. Since the illuminant is difficult to ignite, the straight black powder priming charge and the partially black powder first fire charge are set up in series to insure ignition of the illuminant. The illuminant charge is just below the first fire charge and in contact with it.

The illuminant charge, which is pressed in two equal increments, weighs approximately 8.8 ounces, and has the following compositions:

	Percent
Barium nitrate	52.1
Sodium nitrate	10.4
Aluminum	26.0
Sodium oxalate	5.2
Sulfur	4.1
Castor oil	1.1
Linseed oil	1.1

The illuminant is ignited by the first fire composition and burns with a clear white light of 110,000 candle power, minimum, for 25 seconds minimum time. The illuminant (when the shell is in firing position) rests on a ⅛-inch thick top seal of fire clay. Just below the fire clay is a ⅜-inch thick plug of plywood, with a hole through its center.

All the components of the illuminant assembly mentioned previously with the exception of the quick match disc and a quick match spacer are within the illuminant case. The case is constructed of sheet box board ⅜ inch thick in the shape of a tube which will fit freely into the shell body. The quick match passes through four holes in the top disc. The disc serves as a cover for the case, after being glued and nailed into place. The fire clay top seal, illuminant, priming charge, and first fire charge are all shaped into discs to fit into the case. The quick match in passing through holes in the top disc and the quick match disc and spacer, anchors the latter two parts in place.

The suspension wire passes through the hole in the plywood plug, with the knotted end fitting flush in the pocket. The wire passes through alined holes in the hair felt spacer and steel disc. The steel disc forms the rest for the parachute spacer in the parachute case. The suspension wire from the surface of this disc to the end of the loop is approximately 11½ inches long. The loop is formed by wrapping the wire about itself and then binding with tape. The complete illuminant assembly slips freely into the shell case coming to rest against the fuze.

The top disc closing one end of the case is further sealed by the addition of a strip of crinoline that is pasted over the sides of the case and top disc.

The hair felt spacers serve to protect the illuminant charge against the sudden shocks of set-back and expulsion from the body tube. They

also assist in preventing the escape of expelling charge gases around the illuminant case.

Fin assembly. The fin assembly is the same as that assembled with the SHELL, H.E., M49A2.

Ignition cartridge. The ignition cartridge is the M5A1 previously described.

Primer. The primer is the M32 Percussion Primer previously described.

Propellent increments. The Propellent Increment M4 assembled with the illuminating shell are essentially the same as the Propellent Increment M3. The M4 Increments are composed of flake propellent powder, and each increment weighs 28 grains, which is less than the weight of the M3. Four increments are assembled with the illuminating shell, corners of the increments being wedged into the fin blade slots to hold them in place. An increment holder may be used with the illuminating shell to hold the propellent increments in place.

The percussion primer, ignition cartridge, and four increments comprise the full propelling charge; a total of 152 grains of powder.

Zone of fire and range. The shell is normally fired with the full complement of propellent increments. This fact and the fixed burning time of the fuze cause the shell to shear and the flare to commence to burn at a point at 800 yards range and 400 feet elevation. The parachute canopy controls the speed of descent so that the flare burns completely during its descent and no effect is lost by the flare burning on the ground.

Action. The cotter pin is removed from the fuze and the round is dropped down the bore of the mortar. The round is propelled from the mortar in the same manner as the H.E. shell, the propellent gases being confined by the bourrelet. Set-back causes the fuze to function in the manner described in pages 314 to 318. Ignition of the expelling charge in the fuze has two functions. First, to ignite the quick match; and second, to expel the flare assembly. The latter is accomplished by the expelling charge gases acting forcibly against the steel quick match disc. The shock caused by these gases is transmitted to the shear pins that hold the body tube to the tail assembling coupling. These pins are sheared and the flare assembly is expelled from the body tube. The tail assembly, the fuze, and the body tube fall free.

As the flare assembly (designation of the parachute assembly and the illuminant assembly together) is forced out of the case, the two parachute spacers fall free as do the coupling and parachute discs. The parachute spacers guide the ejection of the chute from the core, and when they fall free the parachute unfolds and checks the descent of the illuminant case. The flame from the expelling charge ignites the quick match, which in turn ignites the primer charge. As the quick

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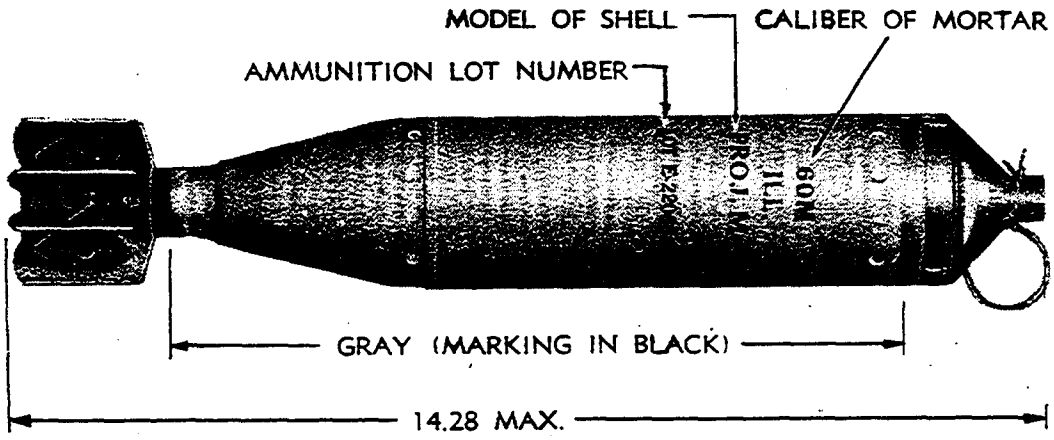

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Figure 122c — SHELL, Illuminating, M83 — Marking Diagram

match burns through the holes in the quick match disc, and the quick match spacer disintegrates, the two components fall free.

The primer charge ignites the first fire charge, and the latter ignites the illuminant charge. The burning of the illuminant ignites the illuminant case, but the case being in several thicknesses, burns at the same rate as the illuminant and is able to support the charge for its period of burning. The fire clay prevents the flame of the burning illuminant from igniting the shroud lines, during the period of descent.

Marking and packing. The shell body is painted gray with black stencil. The shell is shipped as a complete assembled round. One round is packed per individual fiber container, six individual fiber containers per large outer fiber container, three large outer containers (18 rounds) per bundle. One bundle per chocolate-stained wooden crate for overseas shipment.

FUZE, Time, (Fixed) M65. The Time Fuze (Fixed) M65 is assembled to the SHELL, illuminating, M83. It is a simple powder time-train fuze whose burning time is fixed. The fuze consists of a body assembly, a time train ring assembly, a head assembly, and a primer assembly.

Body assembly. The body is alumimum alloy die cast to the shape illustrated in figure 123. The upper projection is threaded to receive the head, and a recess is drilled to seat the primer. This recess narrows, and is met at right angles by a hole drilled through the walls of the time-train recess. The continuation of the primer recess and the hole which meets it, form the flash vent for the primer flame. The surface of the base on which the time-train may rest is cut with eight annular grooves. Glued to this grooved surface is a cloth washer. In the rear face of the body, a recess is formed for the expelling charge. The lower edge of this recess is threaded to receive the steel ex-

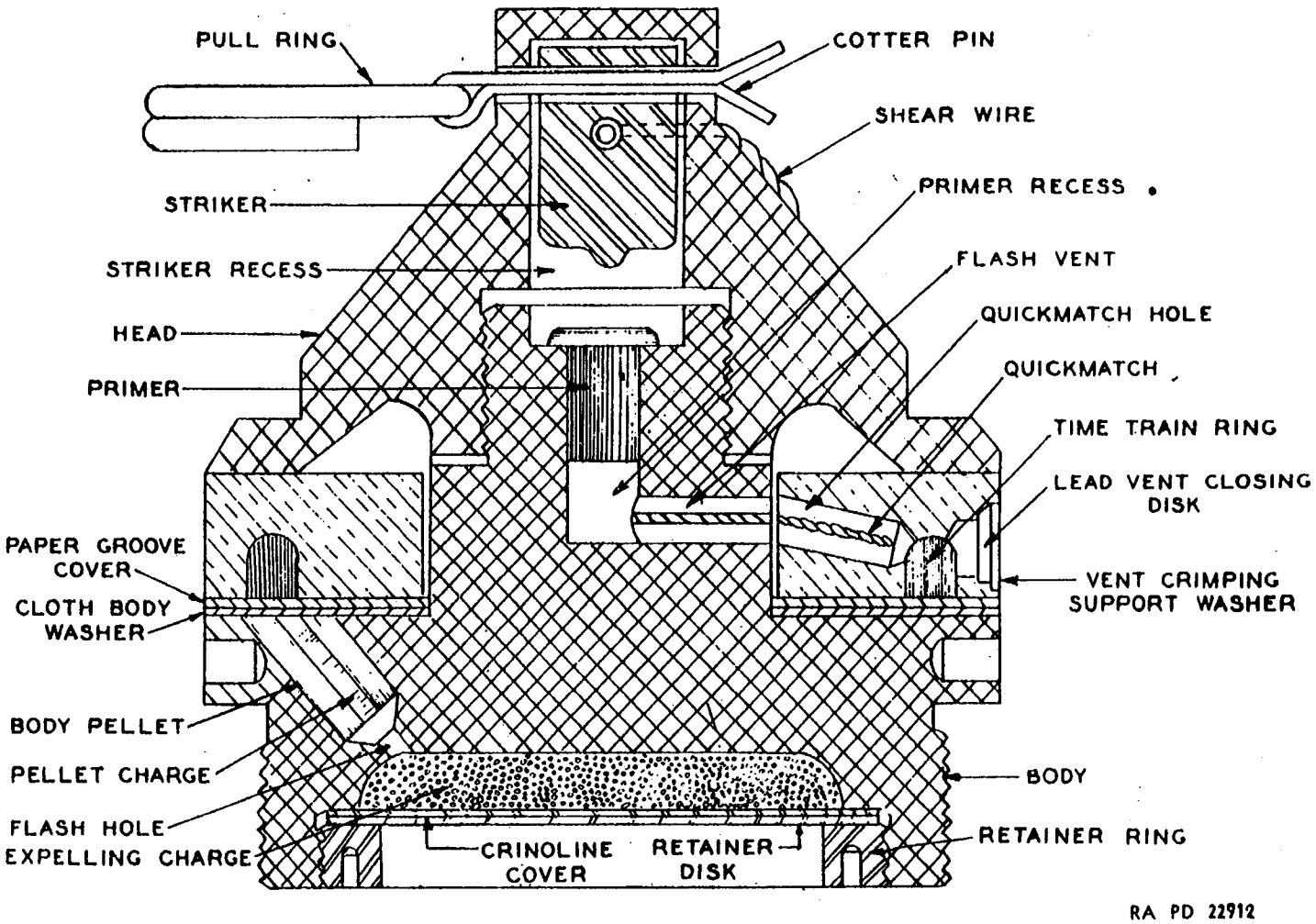

Figure 123 — FUZE, Time (Fixed), M65

TM 9-1904

pelling charge retainer-ring that holds the steel expelling charge retainer-disc and crinoline against the expelling charge. Leading from the surface of the time-train ring recess base to the expelling charge recess is a hole. It is drilled at a 45-degree angle to the surface of the time-train ring recess base. The upper or larger section houses the body pellet; the lower section is empty, and is the flash hole proper. A final hole is drilled normal to the surface of the time-train ring base. In this hole is seated a brass locating pin that fits into a hole in the time-train ring, thus properly locating the ring in the final assembly.

Time-train ring assembly. The time-train is essentially a large thick washer that fits over the upper projection of the body and rests on the fuze cloth-covered surface of the time-train ring recess base. The time ring is made of brass. In the lower surface of the ring is an annular groove interrupted by a brass plug. The black powder time-train ring (groove charge) is housed in this groove. Leading into the groove from the inner wall of the ring is a hole. This hole is a continuation of the primer flash vent in the head and houses a length of quick match. Drilled from the outer wall of the ring and meeting the annular groove at the ignition of the quick match hole and similar groove hole is another hole. This hole is closed by a lead vent closing disc and vent crimping support washer. The disc melts on ignition of time-train charge and permits the combustion gases to escape. An onionskin paper groove cover is shellacked to the lower surface of the ring.

Head assembly. The head made of aluminum alloy has two functions: first, to house the striker; second, to hold the time-train ring securely in place. The striker is housed in a recess in the top of the head. Passing through the head and striker, is a removable cotter pin and pull ring. Also passing through the striker and head is a shear wire. The inner recess of the head is threaded to receive the projection on the body. An outer flange rests on top of the time-train ring, and, when the head is tightened, holds the ring firmly in place.

Explosive components. A primer which is the standard Mk. V Primer is used in this fuze. In the flash vent of the time-train ring is housed a ¼-inch length of quick match that transmits the primer flame to the groove charge. The groove charge is approximately 60 grains of fuze powder, black powder of a very fine texture. It provides a time delay of approximately 14 seconds. The body pellet which leads from the ring to the expelling charge consists of approximately 5.2 grains of black pellet powder. The body pellet has a core, the pellet charge, which consists of approximately 0.02 grains of nitrocellulose. The expelling charge consists of 40 grains of black powder.

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Function. The cotter pin is removed prior to dropping the round down the bore of the mortar. The shear wire retains the striker in its normal position. The sudden forward motion of the round being fired causes the striker, through set-back, to shear the wire and move to the rear. The firing pin of the striker functions the primer. The flame from the primer ignites the quick match in the time-train ring flash hole. The quick match in turn ignites the time-train ring groove charge. The groove charge has a burning time of about 14 seconds. When the flame from the groove charge has completed its circle about the time-train ring, it ignites the body pellet of black powder and the pellet charge of nitrocellulose. This, in turn, ignites the expelling charge. The flame from the expelling charge passes to the rear through apertures in the expelling charge retainer disc. The fixed burning time of the fuze permits the round, fired with full increment charge, to be nearly at its optimum range and height when the fuze has completed its function.

Marking. On the circumferential flange just above the body threads of the fuze is stamped in small characters: "Time fuze, M65."

Packing. The fuze is packed assembled to the round.

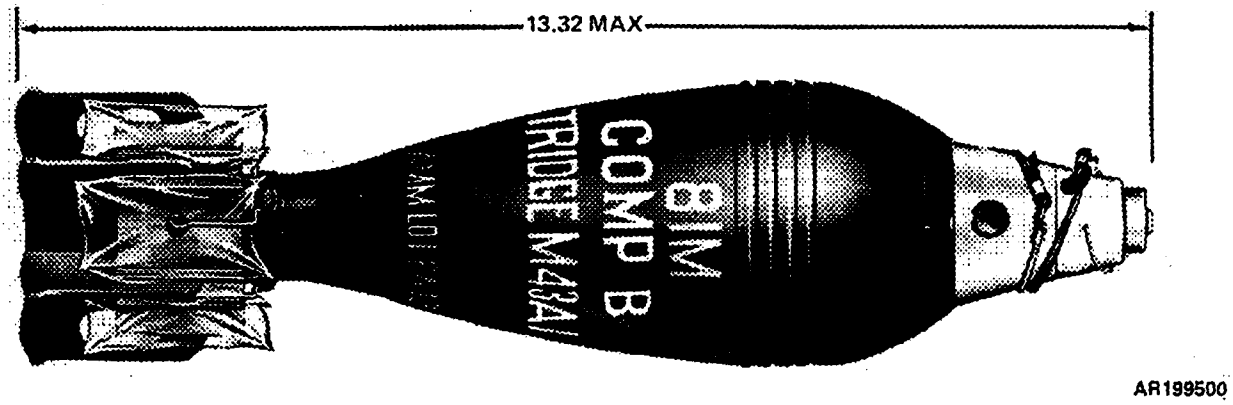
Safety precautions. The cotter pin must only be removed immediately before the round is placed in the mortar.

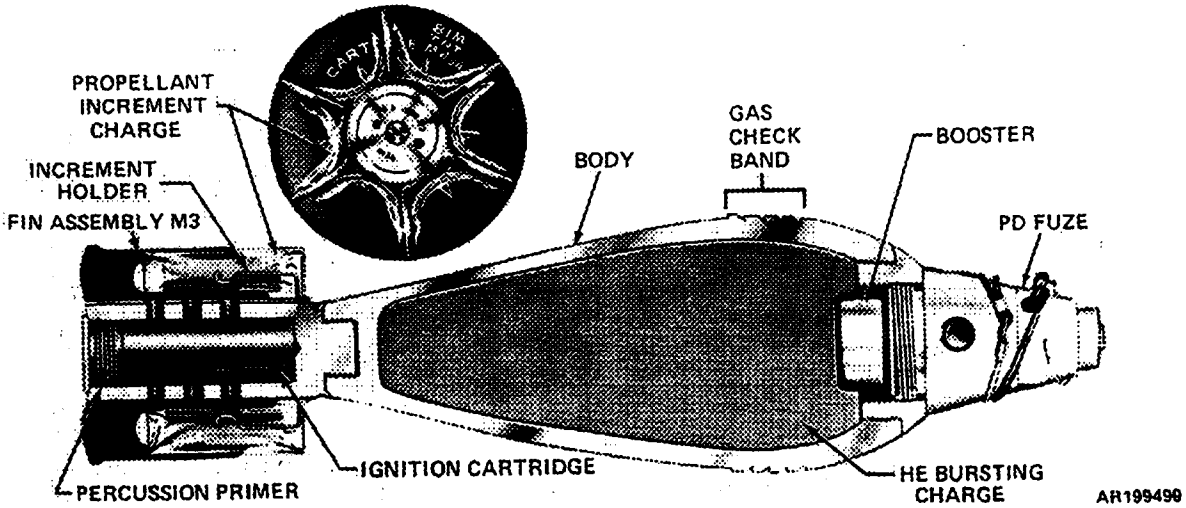
FURTHER REFERENCES: TM 9-1900, Ammunition in General; OS 9-18, Ammunition in General; The Ordnance Sergeant; TR 1350-3A, 3-inch Trench Mortar Ammunition; FM 23-90 Basic Field Manual, 81-mm Mortar M1; SNL R-4 Parts 1 and 2; Complete Round Chart No. 5981; O.O. 7224, Ordnance Safety Manual Elements of Ordnance, Hayes; Ordnance Drawings; Picatinny Text, Vol. III; Ammunition for 60-mm and 81-mm Mortars, Savanna Section, Ordnance School.

COMPLETE ROUND CHART FOR 81-MM TRENCH MORTAR WEAPONS

Complete Round Designation	Filler	Fuze	Propellent Increment	Percussion Primer	Ignition Cartridge	Packing	Status
SHELL, H.E., M43	TNT	P.D. M45 or M52	400 grains (4 incr)	.....	M3	Fuzed	S
SHELL, H.E., M43A1	TNT	P.D. M52	700 grains (6 incr—M1)	M33	M6	Fuzed	S & M
SHELL, practice, M43A1	Inert Mat'l B.P. Pellet	P.D. M52	700 grains (6 incr—M1)	M33	M6	Fuzed	S & M
SHELL, practice, M44	Inert Mat'l B.P. Pellet	P.D. M52	700 grains (6 incr—M1)	M33	M6	Fuzed	S & M
SHELL, H.E., M45	TNT	P.D. M45 or M53	400 grains (4 incr)	.....	M3	Fuzed	S
SHELL, H.E., M56	TNT	P.D. M53	820 grains (4 incr—M2)	M34	M6	Fuzed	S & M
SHELL, chemical, M57	WP, FS, H	P.D. M52	820 grains (4 incr—M2)	M34	M6	Fuzed	S & M
SHELL, training, M68	.....	.....	.....	.....	M3	.....	S & M

CARTRIDGE, 81 MILLIMETER: HE, M43A1 AND M43A1B1





Type Classification:

OBS 11756003.

Use:

This cartridge is used against personnel and light materiel, providing both fragmentation and blast effect.

Description:

The complete round consists of a projectile body, a point-detonating fuze, a fin assembly, a propellant charge, and an ignition charge with a percussion primer. The projectile body is of forged steel, and is threaded internally at the nose to accept the fuze and at the base to accept the fin assembly. The projectile body is filled with Composition B high explosive.

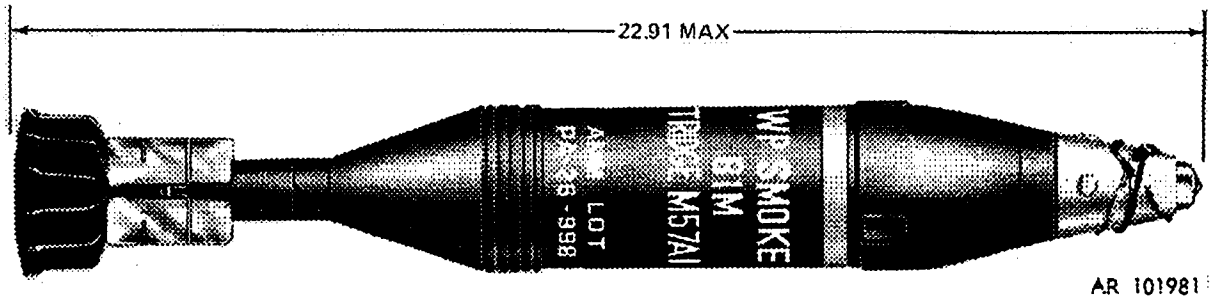
Functioning:

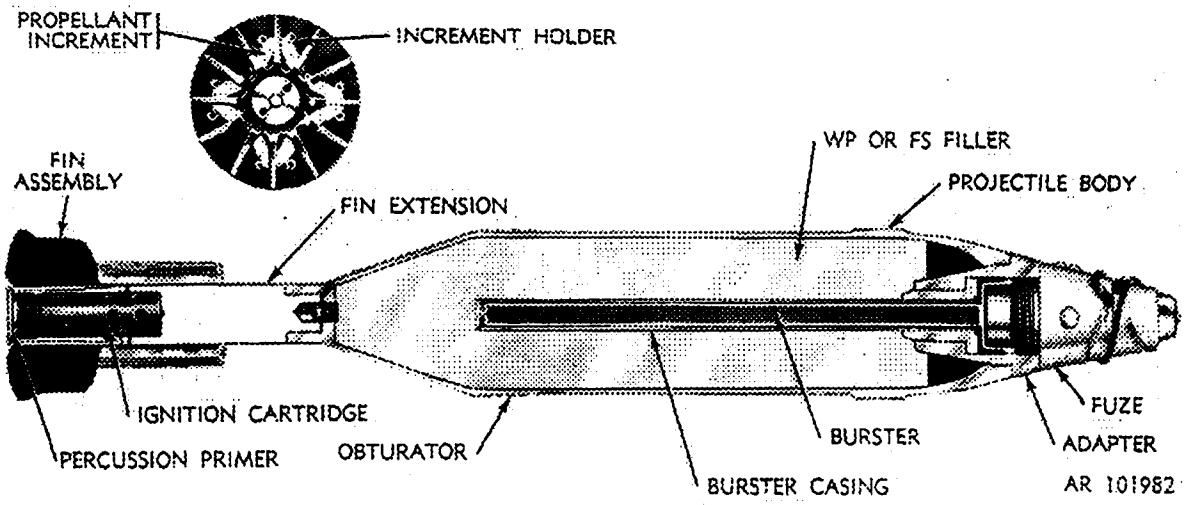
When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the target. The projectile is fin-stabilized in flight. The PD fuze functions on impact detonating the fuze booster charge and, in turn, the high explosive charge. The bursting charge shatters the projectile body, producing near optimum fragmentation and blast effect at the target.

Difference Between Models:

The two cartridges differ only in some minor metal parts.

CARTRIDGE, 81 MILLIMETER: SMOKE, WP, M57A1 AND M57





Type Classification:

With WP Filler: CON 11756003.
With FS Filler: OBS OTCM 37196 dtd 1961.

Use:

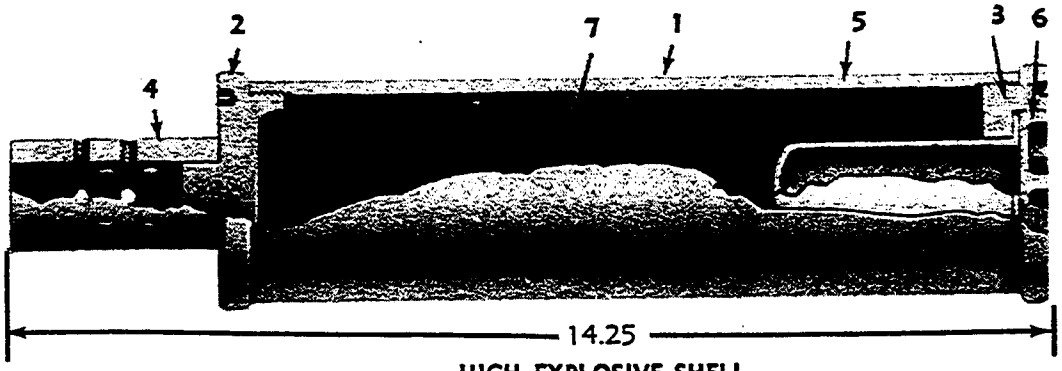
This cartridge is used against personnel and materiel as an incendiary device and also to produce screening smoke.

Description:

The complete round consists of a projectile body with a burster assembly, a point-detonating fuze, a fin assembly, a propellant charge, and an ignition cartridge with a percussion primer. The projectile body is of relatively thin-walled steel, and is filled with white phosphorous (WP) or a liquid smoke filler (FS). The base of the projectile is internally threaded to accept the fin assembly, and the nose is fitted with a steel adapter. The adapter is internally threaded to accept the fuze, and is designed to hold the burster assembly. The burster assembly is a thin-walled steel tube filled with tetryl and extends into the smoke charge.

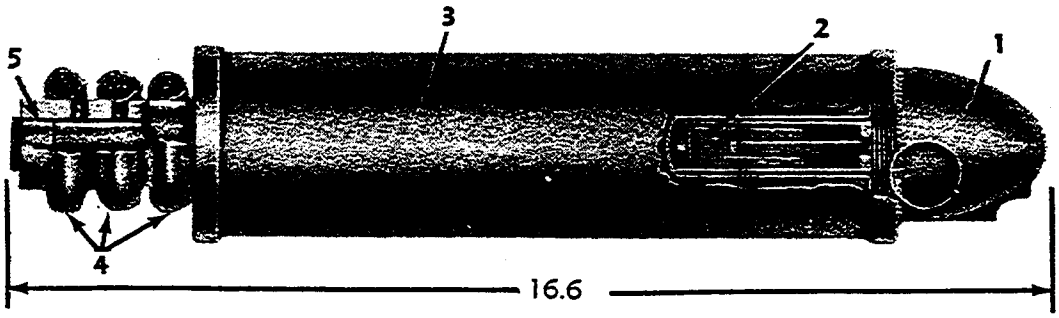
Functioning:

When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube with the velocity required to reach the target. The fuze functions on impact, detonating the burster charge which ruptures the projectile and disperses the chemical filler. Both WP and FS react spontaneously on contact with the air; WP ignites producing a dense white smoke and some incendiary effect, while FS, combining with the moisture in the air, creates a cloud-like smoke screen without burning.



HIGH EXPLOSIVE SHELL

1 — CASING
2 — BASE
3 — HEAD
4 — CARTRIDGE CONTAINER
5 — BOOSTER JACKET
6 — FUZE HOLE PLUG
7 — EXPLOSIVE FILLER (TNT)



COMPLETE ROUND

1 — FUZE
2 — BOOSTER
3 — SHELL
4 — POWDER RINGS
5 — CARTRIDGE

RA PD 15199

Figure 109 — 3-inch and 81-mm Trench Mortar Ammunition Mk. I

AMMUNITION INSPECTION GUIDE

81-MM TRENCH MORTAR.

General. The first attempt to obtain more efficient trench mortar ammunition was with the development of the 75-mm smooth bore mortar in which the old 75-mm French type shell was modified by tapering the shell from the bourrelet back to the base, and fitting an aluminum fin in the base of the shell. The round was propelled by means of an ignition cartridge inserted in a short cartridge case, and with propelling increments inserted between the blades of the fin. The stability of the round was not satisfactory, and the development was abandoned. A streamlined projectile with fin assembly was then designed for the 3-inch trench mortar with poor results. Several attempts were made with shell of different contours, but proved unsatisfactory because proper stability was not obtained.

After World War I, there was an early trend away from the low powered, muzzle-loading Stokes mortar to breech and rifled mortars which were mounted on wheels. The muzzle velocity, the range, and the weight increased, but in so doing, the effectiveness of the trench mortar was decreased in that it lost its simplicity. The weapon became too cumbersome and unwieldly.

Meanwhile the Edgar Brandt Company worked on the 81-mm trench mortar which turned out to be simple in design, utilizing ammunition which was stable in flight and had a long range. In 1931 and 1932, tests conducted by the War Department proved that this mortar and ammunition were highly satisfactory. In 1932, manufacturing rights were purchased from Brandt Company. The weapon itself was a refinement of the 3-inch trench mortar, consisting mainly of a cross leveling mechanism, a better sight, and a heavier baseplate. For simplicity and effectiveness, this mortar proved a remarkable weapon.

Advantages of 81-mm over 3-inch Trench Mortar Ammunition.

1. The 81-mm ammunition is more stable in flight.

2. The 81-mm ammunition has a longer range.

3. The 81-mm ammunition comes to the firing line assembled, ready for use.

4. The 81-mm ammunition utilizes a point detonating fuze.

Types of 81-mm Ammunition: High-explosive shell, chemical shell, practice shell, and training shell.

Class of Ammunition. 81-mm ammunition is classified as semi-fixed; although the ammunition is designed to be loaded into the weapon in one operation, provisions are made for adjusting the propelling charge at the point of fire.

Description. The ammunition itself is streamline in design. It has a stabilizer assembly in the rear of the shell to produce stability in flight and to seat the propelling charge. The stability adds to the

range, velocity, and accuracy of the projectile, and causes the projectile to strike point first, allowing the use of a point detonating fuze. It comes assembled with fuze, propelling charge, and ignition cartridge in place. The only operation necessary before loading the shell into the weapon is to remove the round from its fiber container and then pull the cotter pin or safety wire from the fuze and drop shell into the weapon.

SHELL, H.E., M43. The shell was originally adapted as the light shell for the 81-mm mortar. It is designed for use against light targets such as machine gun nests, barbed wire entanglements and personnel in the open.

Shell body. The body of this shell is constructed of forged steel. It is tear-dropped in shape; that is, blunt nose and tapered tail. It has a bourrelet machined near the nose of the shell consisting of several annular grooves which serves to act as a forward bearing surface and a gas check. The action of the propelling charge gases expanding in the grooves and contracting to pass the raised portions tends to slow the gases and prevent their passing the bourrelet. The nose is machined and threaded to receive an adapter. The adapter is threaded and acts as a bushing for a bakelite fuze well cup and the fuze. The bakelite fuze well cup is fitted to the adapter before it is assembled to the shell body and prevents the entrance of foreign material into the fuze cavity prior to the assembly of the fuze to the round. The fuze used is the Point-detonating Fuze M45. This fuze has a selective element and can be set for either superquick or delay action. (For details, see pages 295 to 298.) To the rear of the bourrelet is a curved taper reducing the base of the shell to approximately 1½ inches. The base is closed and machined so as to receive a stabilizer assembly. The shell filler is 1.22 pounds of TNT. The total weight of completely assembled round is 7.05 pounds. Entire length of the fuzed shell is 13¼ inches.

Fin assembly. The fin assembly consists of a machined cartridge container to which are attached six stationary fins. One end is closed and threaded so as to be screwed on to the body of the shell. The other end is machined and hollow inside so as to receive the ignition cartridge. Several holes leading from the interior to the exterior periphery of the cartridge container serve to conduct the flames from the ignition cartridge to the propellent increments which are seated in the fins.

The ignition cartridge. The Ignition Cartridge M3, red, is similar in appearance to a shotgun shell; the head is of brass and contains the percussion primer; the body is of cardboard, red in color, and contains 120 grains of finely granulate double base powder. It is designed to fit into the hollow portion of the stabilizer assembly.

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The propellent increments. The propellent increments are in the form of small half-round celluloid increments. These increments are often referred to as "chocolate drops" due to their similar shape. Each of these increments contains 100 grains of finely granulated double base powder.

A total of one ignition cartridge and a set of increments comprise the full propelling charge (720 grains of ballistite). The increments are held in the stabilizer assembly by small flanges on the fins and may be removed to adjust the propelling charge.

Zones of fire and range. This shell has seven zones of fire. The first zone of fire consists of the ignition cartridge. Zone seven consists of the ignition cartridge and six increments.

Zone one has a range of approximately 100 yards.

Zone seven has a range of approximately 3,300 yards.

Marking and packing. The shell body is painted olive drab lustreless with yellow stencil to indicate H.E. filler. The stenciling includes the following information: caliber of weapon, kind of filler, model number of shell, and ammunition lot number.

For storage, shipment, and issue this shell is packed as a complete assembled round with the fuze and propelling charge in place.

It is packed one round per individual fiber container, six containers per bundle. Weight of a full bundle is 59 pounds. It may also be packed one per individual fiber container, eight containers per wooden box. Weight of a full box is 91 pounds.

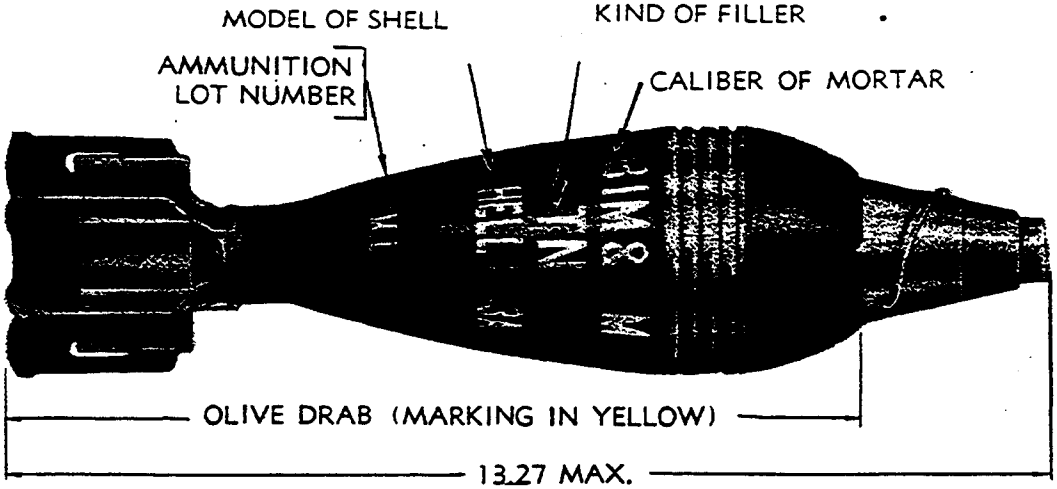
Individual fiber containers are sealed with adhesive tape. The color of the tape and stenciling indicate the type of the shell inside.

Metal plates are placed on the ends of each packing bundle. One plate gives the number of rounds contained in the bundle, the nomenclature of the rounds, the lot number, and initials of the loading plant. The plate at the opposite end gives the proper shipping name as listed in SNL R-4, the total weight of the loaded bundle, and cubic displacement.

Packing bundles are held together by a rod passing through the center of the bundle with a wing nut at the end. After assembling, each bundle is sealed with a wire and lead seal. If this seal has not been broken, the bundle may be considered as the original package, positively identified by the metal plates at the ends of the bundle and by the marking of the fiber container.

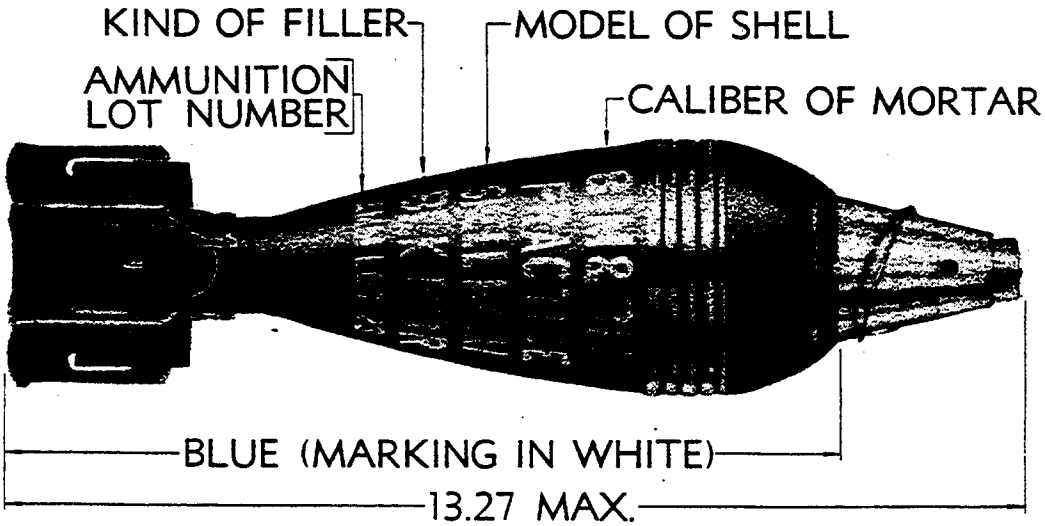
SHELL, H.E., M43A1. This shell was designed to replace SHELL, H.E., M43. It is standard for issue and manufacture (S & M), whereas the SHELL, H.E., M43, is standard for issue (S).

Shell body. The body, filler, adapter, and bakelite fuze well cup are exactly the same as in the M43. The fuze used is the Point-detonating Fuze M52, which has a superquick action. Due to the light



RA PD 7232B

Figure 110a — SHELL, H.E., M43A1, 81-mm Mortar



RA PD 7235A

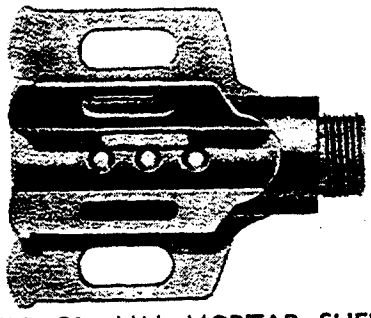
Figure 110b — SHELL, Practice, M43A1, 81-mm Mortar

weight and blunt nose of this shell, very little penetration can be obtained. This shell, as the M43, is designed, therefore, to produce fragments as its primary function against personnel in the open and against barbed wire entanglements. Fragments to be effective must be above ground. The use of a superquick fuze to burst the shell above ground is therefore mandatory. For details in the functioning of the M52 P.D. Fuze, see page 298 to 300.

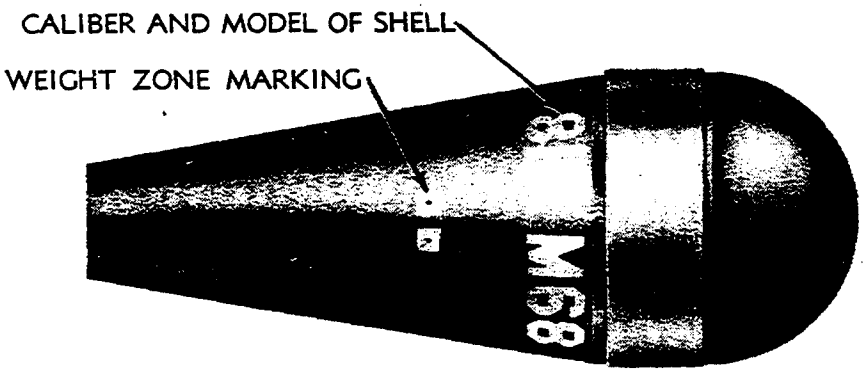
Fin assembly. The fin assembly is similar to that previously described. It differs in that the flanges on the fins for holding the propellent increments are omitted, as they are not necessary with the newer type increments. Later models, without any change in designation, have the hollow end threaded in the inside so as to receive the new percussion primer.

AMMUNITION INSPECTION GUIDE

PRIMER, PERCUSSION, M33
AND
CARTRIDGE, IGNITION, M6

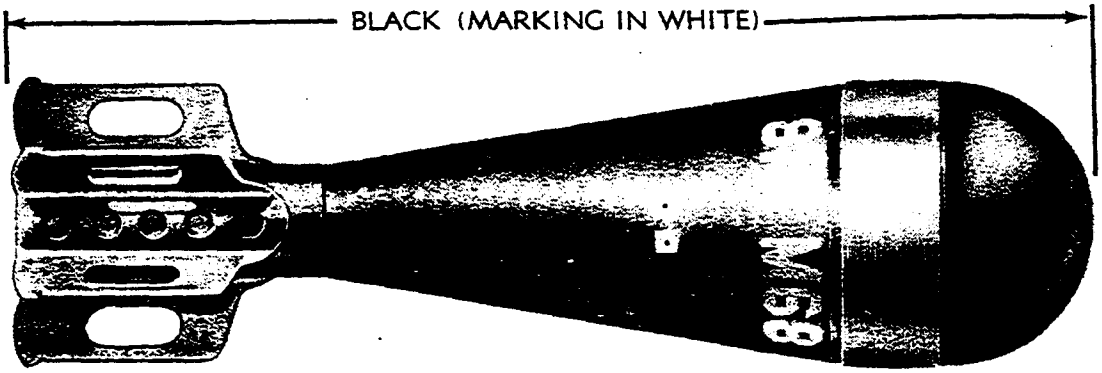


FIN, 81 - MM MORTAR SHELLS,
M43A1 AND M68



SHELL, TRAINING, M68, 81-MM MORTAR,
W/O FIN, IGNITION CARTRIDGE, AND PRIMER

A — COMPONENTS



B — ASSEMBLED

RA PD 80777B

Figure 110c — SHELL, Training, M68, 81-mm Mortar

Ignition cartridge. The Ignition Cartridge M6, red, consists of a cardboard container having approximately 120 grains of double base powder. It supersedes the M3 red and differs from it in that the percussion primer is no longer part of the ignition cartridge but a separate component.

The percussion primer. The Percussion Primer M33 is a relatively new component. The percussion primer is contained in an aluminum head and is threaded so as to screw into the end of the cartridge container after the ignition cartridge has been inserted. The advantage of this type of percussion primer and ignition cartridge is that the whole assembly will leave the mortar with the shell whereas the older type ignition cartridge would, due to the force of setback, at times leave its brass head in the trench mortar weapon, fouling the firing pin and possibly causing a misfire in subsequent rounds.

Propellent increments. The Propellent Increment M1 consists of square strips of double base powder sewn together to form increments. Passing thru these increments will be found holes to increase the burning surface. These sheets are thin and flexible and will not crumple or break as did the old celluloid containers of double base powder used with the M43 Shell. Each increment has 117 grains of double base powder. Occasionally one corner edge of an increment will be cut away (notched) so as to bring the charge to the desired weight and specification. The increments are held in the stabilizer assembly by being placed diagonally in the holes of the fins.

The percussion primer, ignition cartridge and six increments make up the full propelling charge of a total of 822 grains of powder. The increments may be removed to adjust the propelling charge.

Zone of fire and range. This shell has the same number of zones of fire and approximately the same range as described for SHELL, H.E., M43.

Marking and packing. The shell body is painted olive drab with yellow stencil. It is packed one per individual fiber container, six fiber containers per bundle, one bundle per wooden chocolate-stained crate for overseas shipment. The rounds are completely assembled, ready to fire.

SHELL, Practice, M43A1. SHELL, practice, M43A1, is similar to SHELL, H.E., M43A1. The shell body, components used, and packing are identical to the shell previously described. It differs in that the filler consists of 0.16 pound of black powder to act as a spotting charge, and 1.06 pounds of inert filler such as wax, talcum, or rosin which will not crack up in handling. The body is painted blue with white stencil to indicate a practice shell.

TM 9-1904

AMMUNITION INSPECTION GUIDE

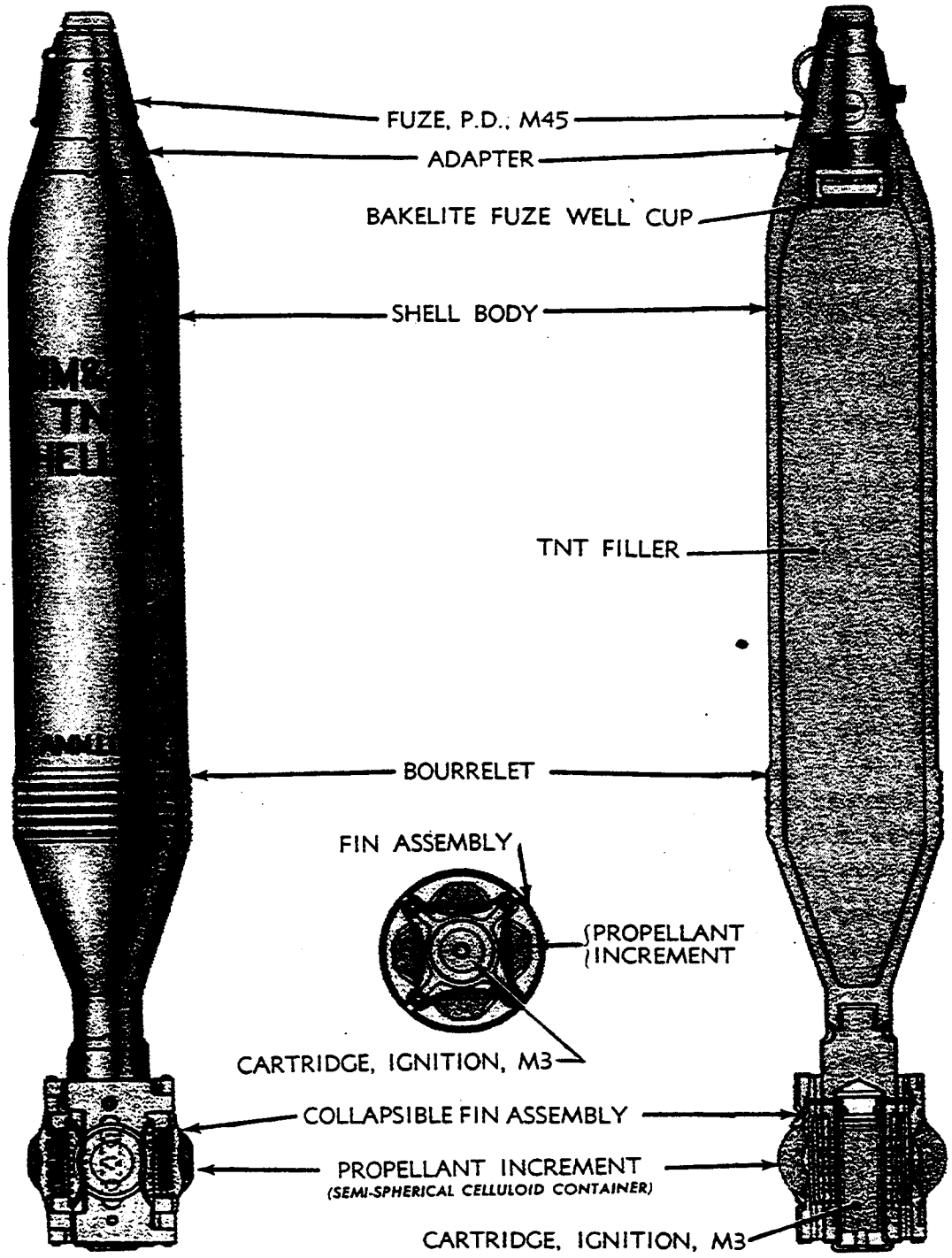


Figure 111 — SHELL, H.E., M45, 81-mm Mortar

SHELL, Practice, M44. This shell is used for practice firing in the 81-mm trench mortar weapon.

The body of the shell is made of cast iron and contains an inert filler. A small amount of black powder (0.20 pound) is placed below the fuze to give a spotting effect when the fuze functions. The body shape, size, and weight are identical to the M43 Shell. It has no adapter, however. The fuze screws directly into the nose of the shell.

The shell body is painted blue with white stencil and is packed in the same manner as SHELL, H.E. M43.

SHELL, H.E., M45. This shell is one of the early types adopted for use in the 81-mm mortar. At the present time, this shell is standard for issue but not standard for manufacture. The principal use of this shell is against dugouts, heavy barricades, and underground structures where a mining action is most effective.

Shell body. The body of this shell is constructed of forged steel. It is cylindrical in shape, having a tapered nose and tail. It has a bourrelet machined on the body near the tail which serves as a rear bearing surface and a gas check. There is no bourrelet at the front of the shell. The nose is threaded to receive an adapter.

The adapter is threaded to receive the fuze well cup and fuze. The use of an adapter bushing allows the shell to be loaded with less difficulty and also permits the use of the same fuze for the 81-mm and 60-mm shells. The fuze used is the P.D. M45 having a selective setting for either superquick or delay action. For details as to functioning of the M45 Fuze see pages 295 to 298. The base of the shell is closed and threaded so as to receive a stabilizer assembly. The shell filler is 4.48 pounds of TNT. The total weight of the completely assembled round is 15.10 pounds. The entire length of the shell is 23½ inches.

Fin assembly. The fin assembly consists of a machined cartridge container to which are attached collapsible fins. One end of the cartridge container is closed and threaded to be screwed on the body of the shell. The other end is machined and hollow inside to receive the ignition cartridge. Holes in the cartridge container act to lead the flame from the ignition cartridge to the propellent increments.

The propellent increments are held in place by the collapsible fins. The fins are always being forced into their open position by compressed springs. The fins are kept in position before firing by a small copper wire tied around them. The blast of the propelling charge shears the copper wire and permits the fins to open to a greater diameter than the shell body after it has cleared the muzzle of the weapon. This was designed to increase the stability of the shell by increasing the fin surface.

This type of fin assembly has not proved successful for several reasons:

During storage the springs which are always compressed will lose their tension or become set.

The fins, due to their size, are delicate and the blast of the propelling charge explosion will in many cases cause distortion.

Both of the above reasons tend to result in unstable flight and the purpose for which this stabilizer assembly was designed is defeated.

The ignition cartridge. The ignition cartridge is the M3 red previously described.

The propellent increments. The propellant is in the form of half-round celluloid increments previously described.

A total of one ignition cartridge and four increments comprise the full propelling charge of 520 grains of double base powder.

The propelling charge may be adjusted to vary the range.

Zones of fire and range. This shell has five zones of fire. The first zone of fire consists of the ignition cartridge itself. Zone five consists of ignition cartridge and four increments.

Zone one has a range of approximately 100 yards.

Zone five has a range of approximately 1,275 yards.

Marking and packing. The shell body is painted olive drab lustreless with yellow stencil to indicate H.E. filler.

The shell is packed as complete and assembled rounds for storage, shipment, and issue in the following manner:

One per individual fiber container, three rounds per bundle, or one per individual fiber container, four rounds per wooden box.

SHELL, H.E., M56. This shell was developed to replace the H.E. Shell M45 and is standard for issue and manufacture (S & M). It is used against dugouts, barricades, and underground structures where a mining action is desired. This shell is a much more effective one than the M45 due to the fact that it contains approximately 40 percent explosive filler as compared to 30 percent explosive filler of the M45. The greater the percentage of explosive filler, without sacrificing the penetrating ability of the shell body, the more effective is the shell when used for mining effect.

The shell body. The shell body is constructed of forged steel. It is long and cylindrical in shape with a tapered nose and tail. It has a bourrelet machined on the body near the base of the shell which acts as a rear bearing surface and a gas check. There are three raised portions around the shell near the nose to act as a forward bearing surface. The nose is machined and threaded to receive an adapter. The adapter is threaded to receive a fuze well cup and fuze. The fuze used is the M53 P.D. which has a delay in action on impact. For mining effect, penetration of the target produces the most effective

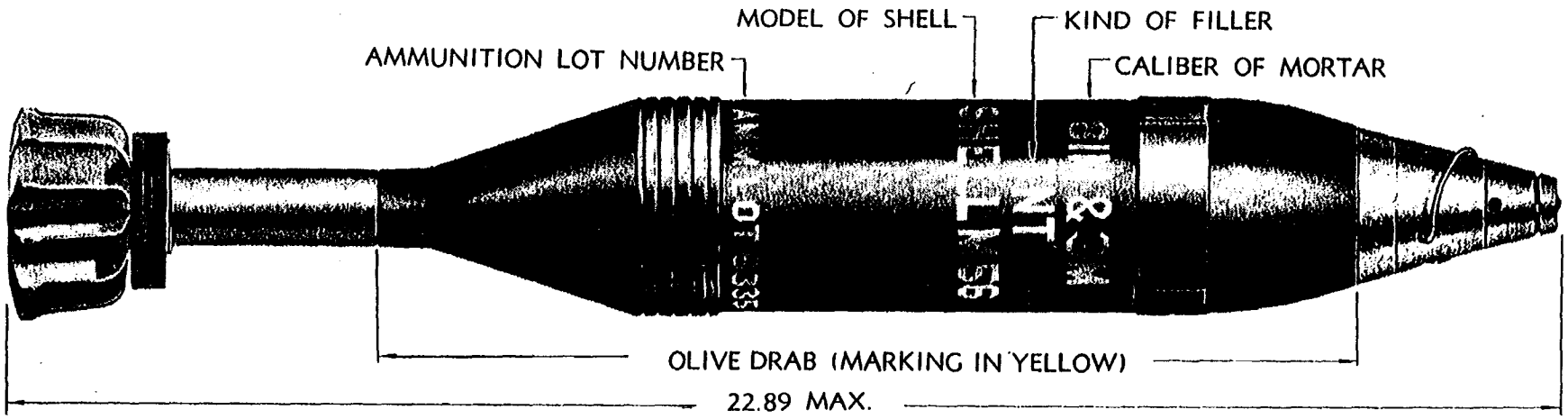


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Figure 112 — SHELL, H.E., M56, 81-mm Mortar

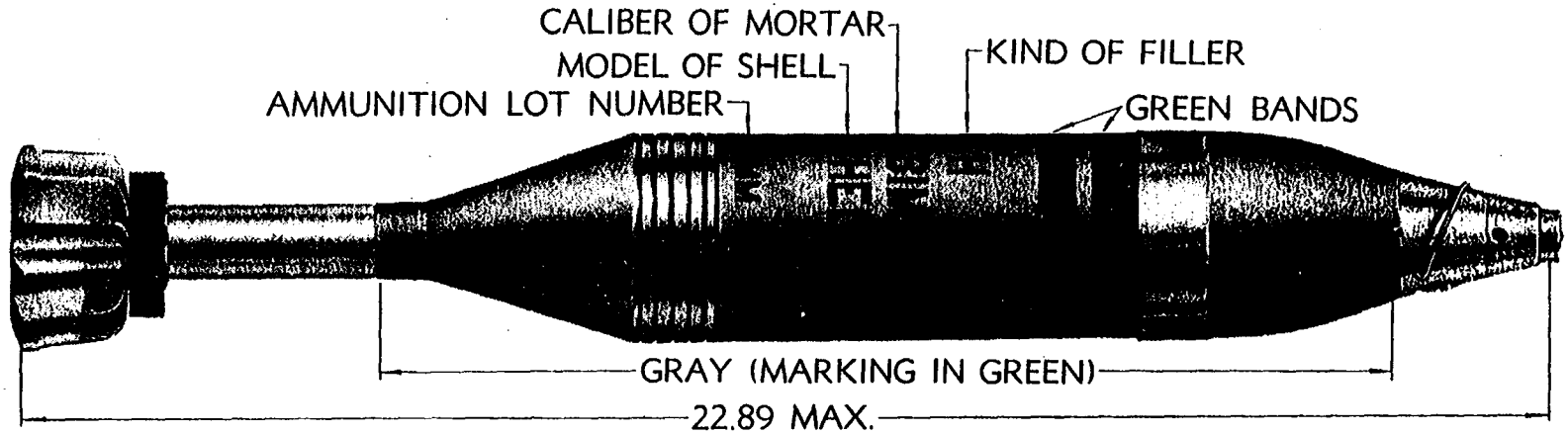

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Figure 113 — SHELL, Gas, Persistent, H, M57, 81-mm Mortar

results. The use of a delay action fuze, therefore, to allow penetration is mandatory. For details of functioning of the M53 P.D. Fuze, see page 300 to 303. The base of the shell is closed, machined, and threaded to receive the stabilizer assembly. The shell filler consists of 4.31 pounds TNT. The weight of the completely assembled round is 10.77 pounds. The entire length of the shell with fuze assembled is 22.89 inches.

The fin assembly. The fin assembly consists of a long stem and cartridge container made of aluminum alloy. Having stationary fins formed at the open end of the cartridge container, the stem is closed and threaded so as to be screwed to the shell body. The cartridge container which is part of the same unit is hollow, machined, and threaded at the open end to receive the percussion primer. There are holes in the cartridge container near the fins so as to conduct the flames from the ignition cartridge to the propellent increments which fit around the cartridge container.

The ignition cartridge. The earlier shell of this model used the M3 Ignition Cartridge red. The later shell of the same model had the fin assembly threaded so as to receive the M6 Ignition Cartridge and percussion primer.

The percussion primer. The Percussion Primer M34 is of the same construction and shape as the M33 previously described except that it has a greater diameter.

The propellent increments. The Propellent Increment M2 is made up of thin square sheets of double base powder sewn together. A hole of the same diameter as the stem of the fin assembly is cut in the center of the increment and a slit runs to the outer edge so that the increments can be easily attached to the stem or removed to adjust the propelling charge. In the latest manufacture, however, the increments are held in place by a star shaped spring wire clip known as a propellent holder. Each increment has 205 grains of double base powder.

The percussion primer, ignition cartridge, and four increments comprise the field propelling charge; a total of 940 grains of powder.

Zone of fire and range. The shell has five zones of fire. The first zone of fire consists of the ignition cartridge and percussion primer; zone five consists of the ignition cartridge, percussion primer, and four propellent increments.

Zone one has a range of approximately 300 yards.

Zone five has a range of approximately 2,655 yards.

Marking and packing. The shell body is painted olive drab with yellow stencil. It is packed one per fiber container, three fiber containers per bundle, and one bundle per wooden crate for overseas shipment. The rounds are completely assembled ready for fire.

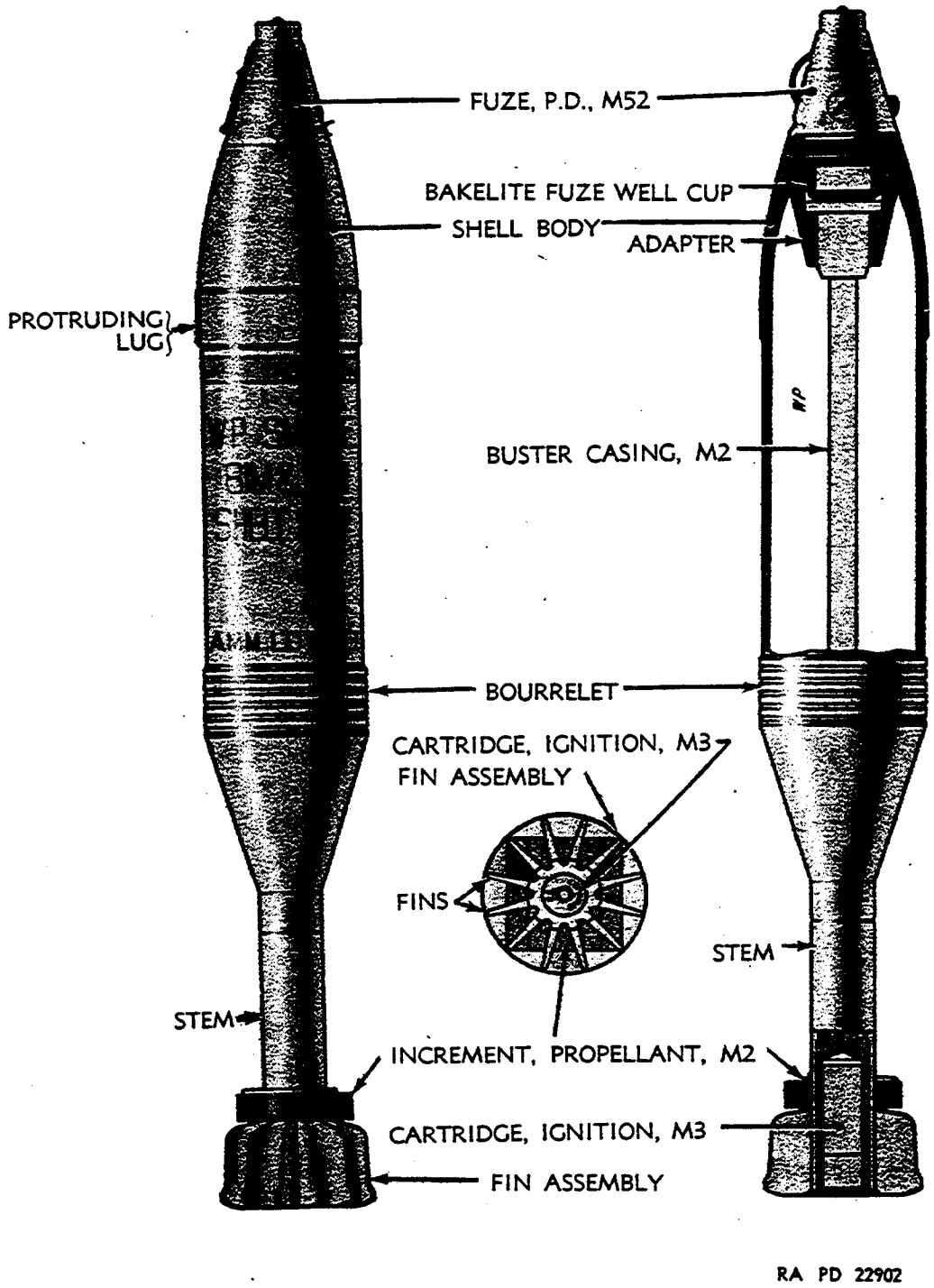

Figure 114 — SHELL, Chemical, M57, 81-mm Mortar

AMMUNITION INSPECTION GUIDE

SHELL, Chemical, M57. This shell is used for the placing of smoke screens and gas clouds with a secondary incendiary effect when WP is used as its chemical filler.

Shell body. In general construction, this shell body has the same outer characteristics as the High-explosive Shell M56. The nose of the shell is threaded to receive the type of adapter peculiar to chemical shell. The adapter is threaded internally to receive the Point-detonating Fuze M52 which has a superquick action. All chemical shell to produce efficient dispersion of filler must burst above ground. A superquick action fuze is therefore used to produce such action. For details, in function of the M52 P.D., see pages 298 to 300.

The chemical filler is loaded into the shell body, and then the burster casing is pressed in place. The head of the Burster Casing M2 is wider than the body of the burster casing and has a slight taper; when pressed into place in the adapter sleeve it forms a gas-tight seal and acts as a seat for the burster charge. A recess is machined in the base of the shell body internally so as to receive the end of the casing, preventing it from becoming loose due to the shock and jars incident to shipment. During the loading of the chemical filler and the pressing of the burster casing in place, there is no explosive charge present in the casing.

The Burster Charge M1 consists of tetryl pellets or tetrytol in a thin aluminum or cardboard cylinder. It is placed in the burster casing prior to the assembly of the fuze to the shell. This construction burster as compared to the old booster found in the 3-inch smoke shell is much more efficient. The explosive charge runs through the entire length of the shell and splits the shell from nose to tail upon function of the fuze, allowing for the dispersion of all the chemical filler in the shell. The old booster charge found in 3-inch smoke shell split the shell near the nose where the booster charge was located, and allowed a good deal of the chemical filler to remain in the base of the shell.

The fin assembly, ignition cartridge, propellent increments, and percussion primer are identical to those used with the High-explosive Shell M56.

Three chemical fillers are loaded at the present time; WP smoke, FS smoke, and H gas. The weight of the completely assembled round varies with the filler used. The weights of the various rounds are:

Filler	Weight of Filler (lb)	Weight of Completely Assembled Round (lb)
WP	4.04	11.50
FS	4.59	12.00
H	3.15	10.45

The total length of the shell with the fuze assembled is 22.89 inches.

Marking and packing. Shell loaded with WP and FS are painted a blue-gray base color with yellow stencil and one yellow band to indicate a nonpersistant screening smoke filler. Shell loaded with H are painted a blue-gray base color with green stencil and two green bands indicate a persistant toxic filler.

Packing is the same as for M56 High-explosive Shell.

SHELL, Training, M68. The shell is designed to give the mortar crew training in loading the weapons and practice in firing under conditions which will not permit firing in more than the first zone.

Shell body. The body of the shell is cast iron. It is similar in shape to the light H.E. 81-mm shell which is tear-drop with a blunt nose and tapered tail. It has a bourrelet on the body near the nose to act as a forward bearing surface and gas check. At the tail end is a recess which is threaded to receive a stabilizer assembly. The nose end is closed and rounded with no provisions made to receive a fuze. Its weight varies depending on its weight zone. Nine weight zones are used with a minimum of 9.50 pounds for weight zone one, and a maximum of 10.10 pounds for weight zone nine, weighed without fin assembly and ignition cartridge.

The fin assembly and propelling charge. The fin assembly is of the same construction and shape as previously described. It receives the Ignition Cartridge M3. Several ignition cartridges are provided with each round so that the shell can be fired more than one time. There are no propellent increments used because the shell is designed to be fired in the first zone only. The maximum range is 350 yards.

Marking and packing. The shell is painted black with white stencil. On the shell body may be found a number of white squares (one to nine) with a prick punch mark in the center of each to indicate the zone weight.

Information as to the packing of the shell is not available at the present time. However the complete round comes in separate units consisting of shell body, ignition cartridge, and fin assembly.

TRENCH MORTAR FUZES.

General. The fuzes used with the 81-mm and the 60-mm mortar ammunition are, except for the 60-mm illuminating shell, of the point-detonating type. The stability of the shell in flight allows the use of this type of fuze. The M45 Fuze, first used on the M43, M44 and M45 Shells, is a point-detonating fuze having a selective feature which allows the fuze to be set for either superquick or delay action as desired. The superquick action is used for effect against light

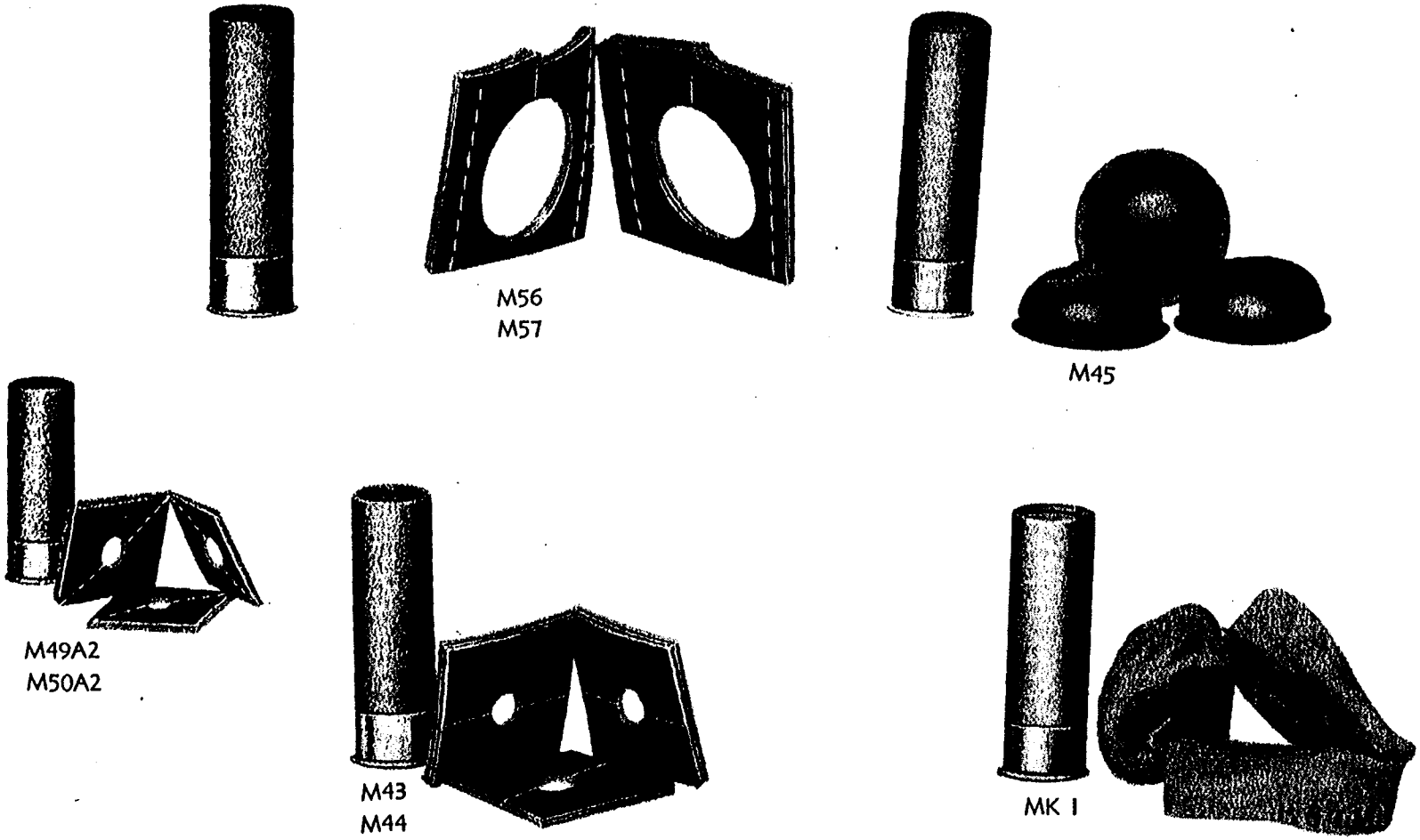

Figure 115 — Trench Mortar Propellants

RA PD 22903

targets above the ground where no penetration is necessary, and a fragmentation effect is desired such as against personnel and barbed wire entanglements. The delay action is used against heavy targets and underground structures where penetration is desired to produce the most effective mining and concussion results.

Recently it was decided that each shell could be classified as for use against light targets or as for use against heavy targets. Thus, a single action fuze could be definitely assigned to each shell according to its tactical use. All of the light shell (7 pounds or less) were classified for use against light targets, as very little penetration could be obtained due to their light weight and blunt construction. It is also to be noted that the percentage of explosive filler as compared to the percentage of metal components (approx. 17 percent) was designed to destroy the light shell so as to produce efficient fragments which can be effective only if distributed above ground. The M52 P.D. Superquick Fuze was also assigned to the Chemical Shell M57, as it is necessary to function the chemical shell above the ground to obtain the proper effects and dispersion to its chemical filler. All the heavy shell of the H.E. type were classified for use against heavy targets and for use where a mining effect was necessary. It is also to be noted here that the percentage of explosive filler as compared to the percentage of metal components (approx. 40 percent) was designed to produce an efficient mining or concussion result with heavy shell which would be most effective if allowed to penetrate its target and then explode. The M53 P.D. Delay Action Fuze was assigned to these shell.

The M45 P.D. Selective Fuze was declared limited standard (S). It was a waste of one element to use a selective fuze on trench mortar shell, because it was known before the shell ever reached the firing point what action fuze was desired. The M52 P.D. superquick and the M53 P.D. delay are standard for issue and manufacture (S & M). It is interesting to note that the subdivision of a selective fuze into two separate fuzes is in definite opposition to the trend in artillery fuze design where the tendency is to combine two fuzes into one selective or combination fuze. This is true because in artillery fuzes the action desired varies with the condition at the field of battle.

Rounds used with these fuzes may be considered boresafe. The detonating elements are positively separated from the booster until the projectile has left the bore of the mortar. The fuzes are assembled to their respective shell and stacked in place. They are, therefore, being stored, shipped, and issued as a permanent part of the complete round. Each fuze is stamped with its model number, manufacturer's initials, and lot number for positive identification. The M45 can be obtained in a practice type. It has a black powder charge in place of a tetryl booster charge, and is designated as a point practice

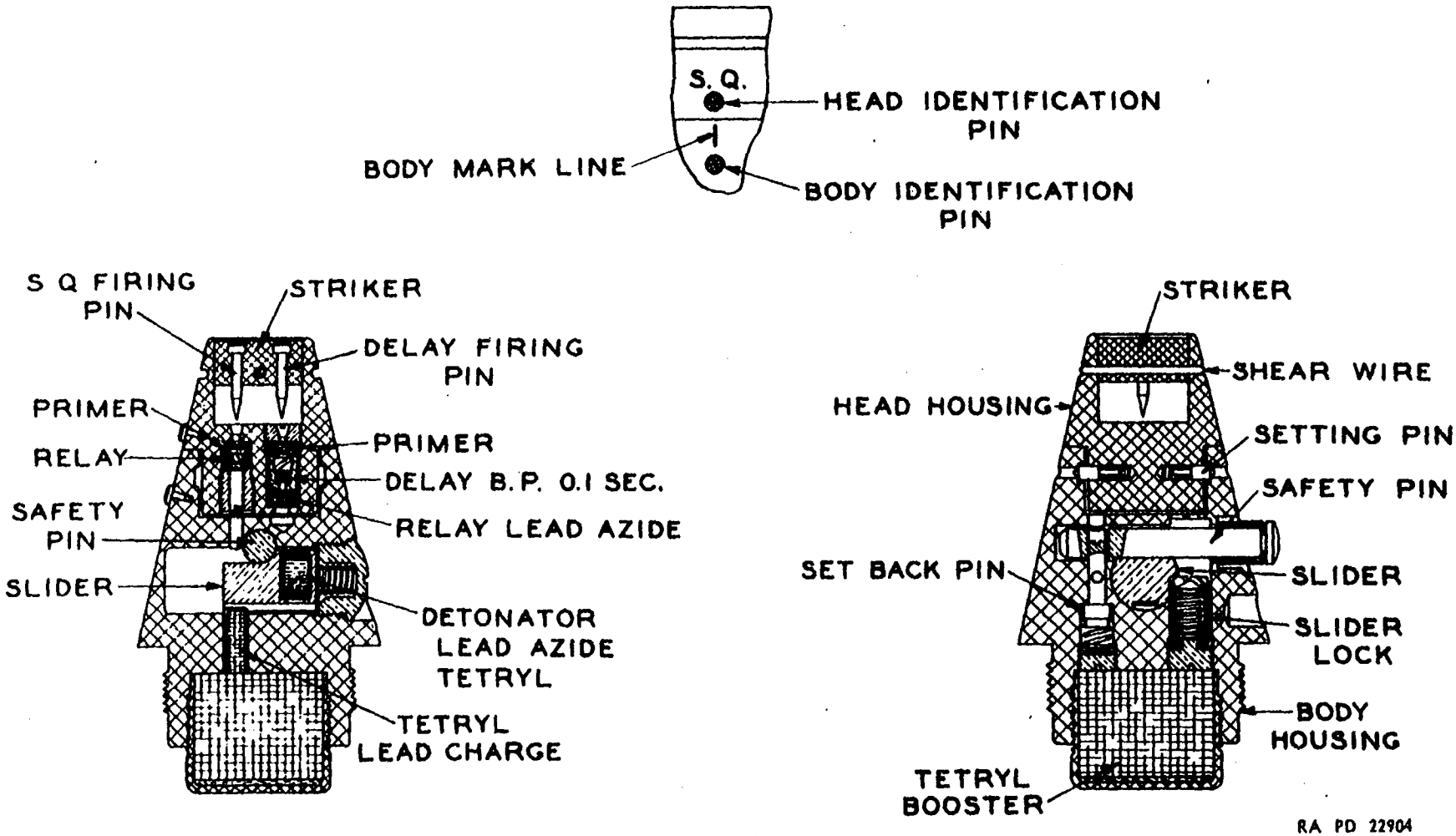

Figure 116 — FUZE, P.D., M45

fuze. The head is painted blue, and "Fuze, Point, M45, Practice" is stamped on the body.

Point-detonating Fuze M45.

Description. The M45 Point-detonating Fuze is a selective, superquick, and delay action fuze, used to effect functioning of SHELL, H.E. M45, fired from the 81-mm trench mortar. This shell and fuze are now limited standard. The superquick setting is used when it is desired to obtain fragmentation of the shell above the ground, whereas the delay setting is used for underground action. The fuze weighs approximately 0.52 pounds.

The fuze housing is made of aluminum. The head of the fuze fits into the body so as to be able to turn on the body housing. The head houses a comparatively short, but wide, striker which is flush with the nose. The striker has two firing pins and is held in place by a shear wire. Underneath the firing pins is a superquick element and a delay element. One element is directly in line with a flash hole to the body explosive charges, and the other element is in line with a dead flash hole depending on the setting. Located in the head are setting pins and setting pin springs which when in proper position for either delay or superquick setting will engage recesses in the body. On the external surface of the head are stamped "S.Q.," or "D," to indicate the setting. The body houses the slider, slider lock, safety pin, and set-back pin, with their respective springs. In the center and at the base of the body is an inverted brass cup known as a lead cup. It is held in place by crimping, and contains a tetryl lead pellet. The base of the body is internally threaded to receive a booster cup, which in turn houses a tetryl booster pellet. On the external surface of the body is a marked line and an identification pin which indicates the setting.

Setting. When set for superquick action the head is set so that the "S.Q." stamped thereon is in line with the line on the body. Identification pins are provided for setting at night. These pins are so located that for superquick setting the heads of the pins are directly in line and for delay setting, they are 180 degrees removed. Pressure applied on the setting pin by the setting pin springs forces them to engage in recesses in the body at the exact position of "S.Q.," and "D" so as to restrain the head in proper position.

Safety features. The M45 Fuze is boresafe. This is accomplished by assembling the detonator into a slider which in the armed position holds the detonator out of alinement with the explosive train. Arming of the slider in the bore of the mortar is prevented by a safety pin, the head of which bears against the bore, thereby retaining the slider in the safe position. To prevent arming of the set-back pin, which holds the safety pin in position, a cotter pin is utilized, preventing

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the set-back pin from moving rearward against its spring during handling.

Function when set for superquick action. The cotter pin is removed, freeing the set-back pin. The shell is dropped down the bore of the weapon. The force of set-back resulting from ignition of the propelling charge causes the set-back pin to move down against the set-back pin spring, freeing the safety pin. The safety pin, due to the action of the safety pin spring, is forced out of the fuze until its head comes in contact with the bore of the mortar. After emerging from the mortar the safety pin is completely ejected by its spring from the fuze. The slider is now free, and due to the action of the slider spring is forced into the armed position, thereby bringing its detonator in direct alinement with the explosive train. The slider also serves to close the hole left by the safety pin, so as to prevent the entrance of mud or dirt into the slider cavity which might interfere with the fuze functioning. The slider is locked in the armed position by a slider lock which is forced up into a recess in the slider by a slider lock spring.

Upon impact with the target the striker is forced inward, breaking the shear wire and carrying both firing pins into their respective elements. The superquick firing pin ignites a primer which in turn ignites a lead azide relay charge. The lead azide relay detonates, and sends a wave to the detonator charge of lead azide and tetryl in the slider. The wave from the detonator functions the lead charge of tetryl. The wave from the lead charge of tetryl detonates the booster of tetryl which amplifies the wave and sends it to the shell filler. Simultaneously with the above action, the delay firing pin functions its primer. If the superquick action functions properly, the delay action will proceed no farther. If the superquick fails to function, the primer will ignite a black powder pellet which will burn for 0.1 second. The flame from the black powder delay pellet in turn will set off a relay of lead azide which will detonate and carry a wave into a blank flash hole where it will be stopped and will proceed no farther.

Function on delay. The head must be turned so that the "D" stamped thereon is in line with the mark line on the body. By means of setting the head as described, the delay element is brought into alinement with the flash hole and the superquick primer is 180 degrees removed. The fuze function is exactly the same until action on impact.

Upon impact the striker is forced inward, breaking the shear wire, carrying both firing pins into their respective elements. The superquick firing pin ignites its primer which in turn sets off a relay of lead azide. The wave produced passes into a blank flash hole and proceeds no farther. Simultaneously with the above action, the delay firing pin functions its primer. The flash from the primer ignites a

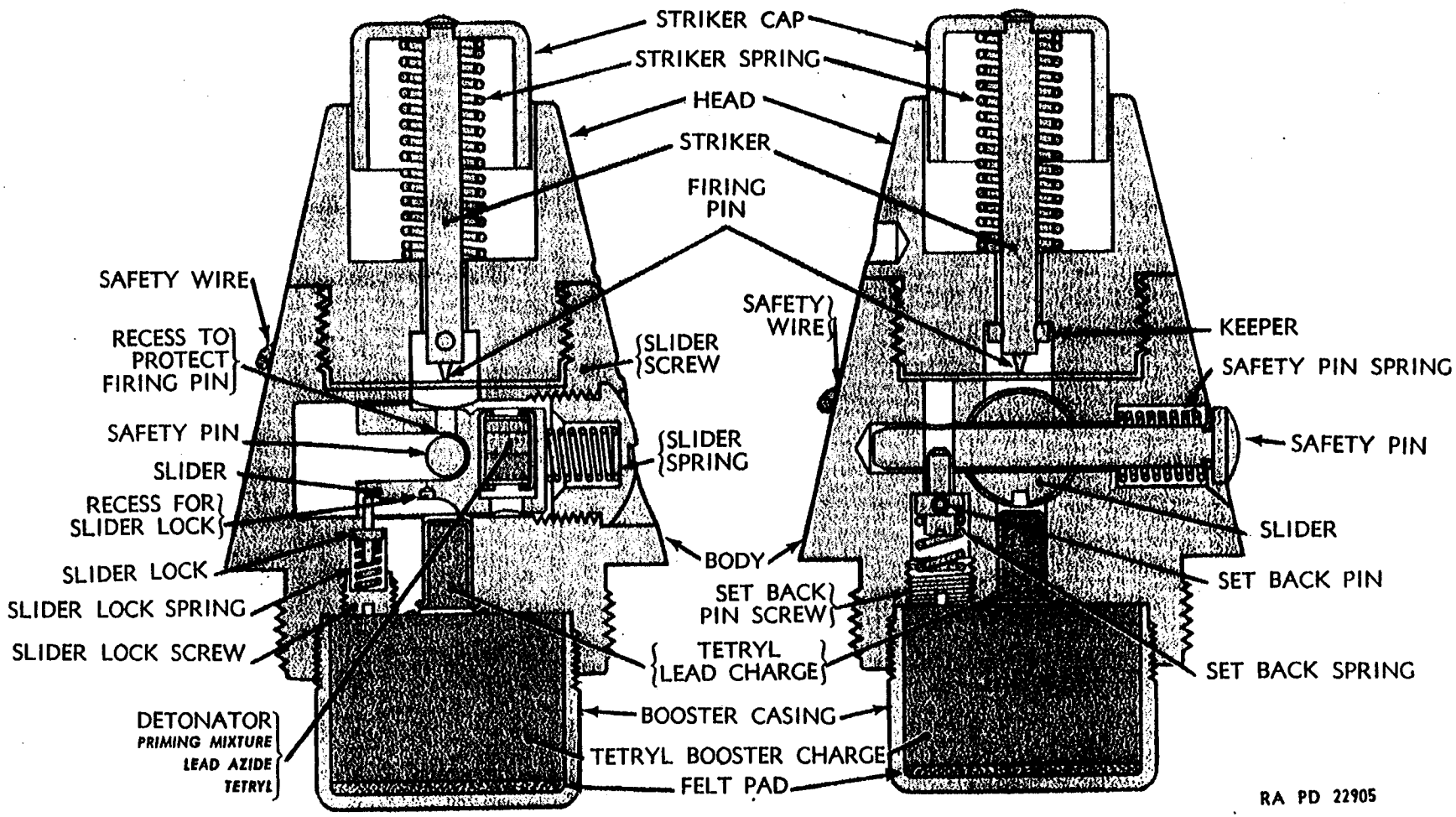


Figure 117 — FUZE, P.D., M52

black powder delay pellet which burns for 0.1 second. The delay pellet ignites a relay of lead azide which detonates, and in turn sets off the detonator charge of lead azide and tetryl located in the slider. The wave from the detonator functions the lead charge of tetryl which detonates, and functions the booster of tetryl. The booster charge amplifies the wave and sends it to the shell filler.

Point-detonating Fuze M52.

Description. The M52 Fuze is a superquick fuze used to effect the functioning of rounds fired from the 81-mm and 60-mm mortars. It is normally used with light shell when fragmentation above the ground is desired. This fuze will fit any of the present "M" series of shell; however, it is only assembled in the following shell at present:

M43A1 H.E. for 81-mm T.M.	M57 Chemical for 81-mm T.M.
M43A1 Practice for 81-mm T.M.	M49A2 H.E. for 60-mm T.M.
M44 Practice for 81-mm T.M.	M50A2 Practice for 60-mm T.M.

The weight of the fuze is 0.45 pound.

The fuze housing is made of aluminum. The head of the fuze screws into the body. The head houses a long protruding striker and a compressed restraining spring. The striker and restraining spring are held in place by a keeper. The body houses the slider, slider lock, safety pin, and set-back pin, with their respective springs. In the center and at the base of the body is an inverted cup known as a lead cup. It is held in place by crimping and contains a tetryl lead pellet. The base of the body is internally threaded to receive a booster cup which in turn houses a tetryl booster pellet. The slider carries a detonator and a blank flash hole to receive and protect the firing pin from shocks due to handling and set-back action.

Safety features. The safety features correspond to the M45. The M52 Fuze is boresafe. This is accomplished by the assembling of the detonator into a slider which in the unarmed position holds the detonator out of alinement with the firing pin and the tetryl lead charge. Arming of the slider within the bore of the weapon is prevented by the safety pin, the head of which bears against the bore and retains the slider in the unarmed position. To prevent arming of the set-back pin, which holds the safety pin in position, a cotter pin (safety wire in later manufacture) is utilized.

Function. This fuze is armed in the same manner as the M45. The cotter pin or safety wire is removed to free the set-back pin. The shell is dropped down the bore of the weapon. The force of set-back resulting from ignition of the propelling charge causes the set-back pin to move rearward against its spring. This frees the safety pin.

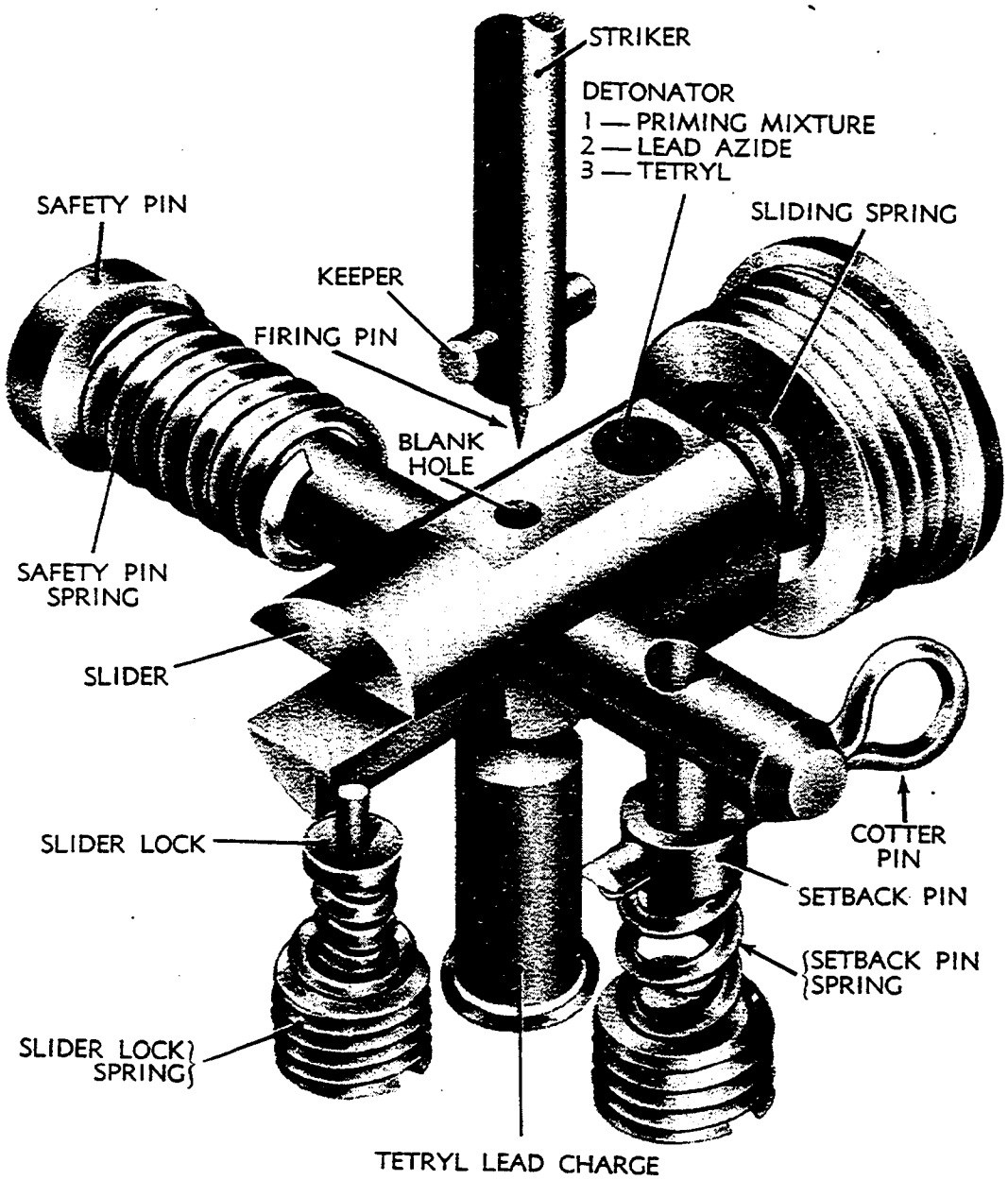


Figure 118 — Working Parts for FUZE, P.D., M52

The safety pin, due to the action of its spring, is forced out of the fuze until its head comes in contact with the bore of the mortar. After emerging from the mortar, the safety pin is completely ejected by its spring from the fuze. The slider is now free, and due to the action of the slider spring, is forced into the armed position, thereby bringing the detonator in direct alinement with the explosive train. The slider also serves to close the hole left by the safety pin, so as to prevent the entrance of mud or dirt into the slider cavity which might interfere with the fuze functioning. The slider is locked in the

armed position by a slider lock which is forced into a recess in the slider by a slider lock spring.

Upon impact with the target, the striker is forced inward against its spring bringing the firing pin into the detonator charge of priming mixture, lead azide, and tetryl. The wave produced functions the lead charge of tetryl which in turn detonates the booster of tetryl. The booster charge amplifies the wave and sends it to the shell filler.

Point-detonating Fuze M52B1. This fuze differs from the M52 in that the body and head housing are made of bakelite instead of aluminum as the M52. In all other respects, it is identical to the M52 Fuze.

Point-detonating Fuze M52B2. This fuze differs from the M52 in that the body housing is made of bakelite, but the head housing is made of aluminum alloy. In all other respects, it is identical to the M52 Fuze.

Point-detonating Fuze M53.

Description. The M53 Fuze is a delay fuze used to effect the functioning of rounds fired from the 81-mm trench mortar. It is normally used with heavy shell where penetration is desired. This fuze will fit any of the "M" series of shell; however, it is only authorized to be assembled in the H.E. Shell M56 for 81-mm mortars. The weight of the fuze is 0.45 pound.

The fuze housing is made of aluminum. The head of the fuze screws into the fuze body. The head houses a comparatively short striker which is flush with the nose of the fuze. The striker is held in place by a shear wire. The head is internally threaded at the base to receive a delay assembly. The delay assembly houses a primer, delay pellet of black powder and a relay of lead azide. The body houses the slider, slider lock, safety pin, and set-back pin, with their respective springs. In the center and at the base of the body is an inverted brass cup known as a lead cup. It is held in place by crimping and contains a tetryl lead pellet. The base of the body is internally threaded to receive a booster cup which in turn houses a tetryl booster pellet.

Safety features. The safety features correspond to the M45 and M52 P.D. Fuzes previously described. The M53 is boresafe. This is accomplished by the assembling of the detonator into a slider which in the unarmed position holds the detonator out of alinement with the relay charge of lead azide and the lead charge of tetryl. Arming of the slider within the bore of the weapon is prevented by the safety pin, the head of which bears against the bore, thereby retaining the slider in the unarmed position. A set-back pin is used to hold the safety pin in position until set-back action occurs. To prevent arming of the set-back pin, a cotter pin (safety wire in later manufacture)

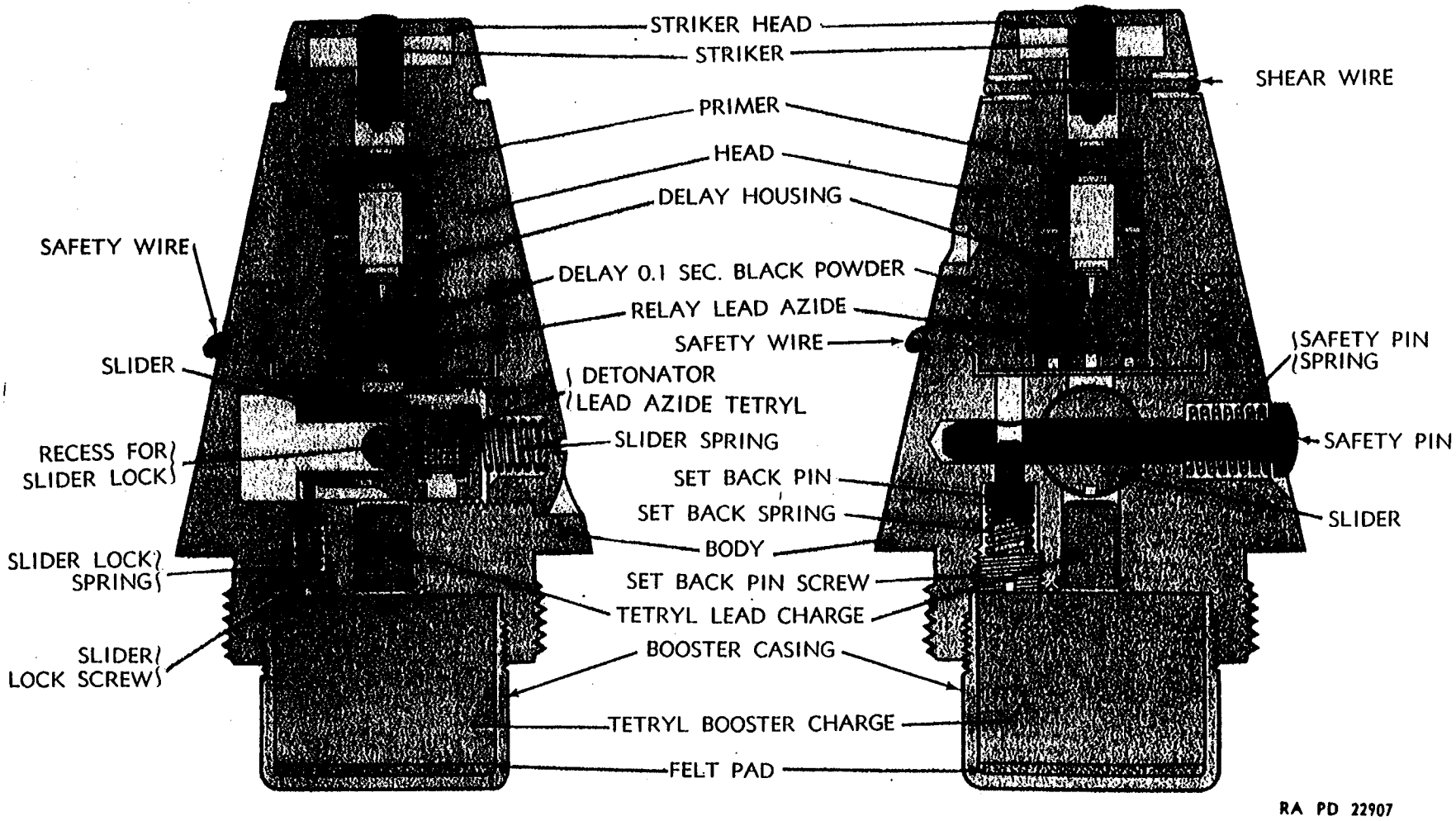
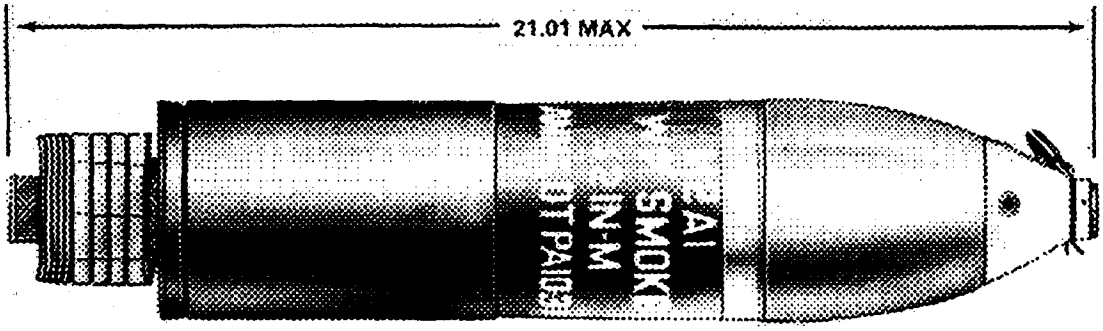


Figure 119 — FUZE, P.D., M53

CARTRIDGE, 4.2-INCH: SMOKE, PWP OR WP, M2A1 & M2



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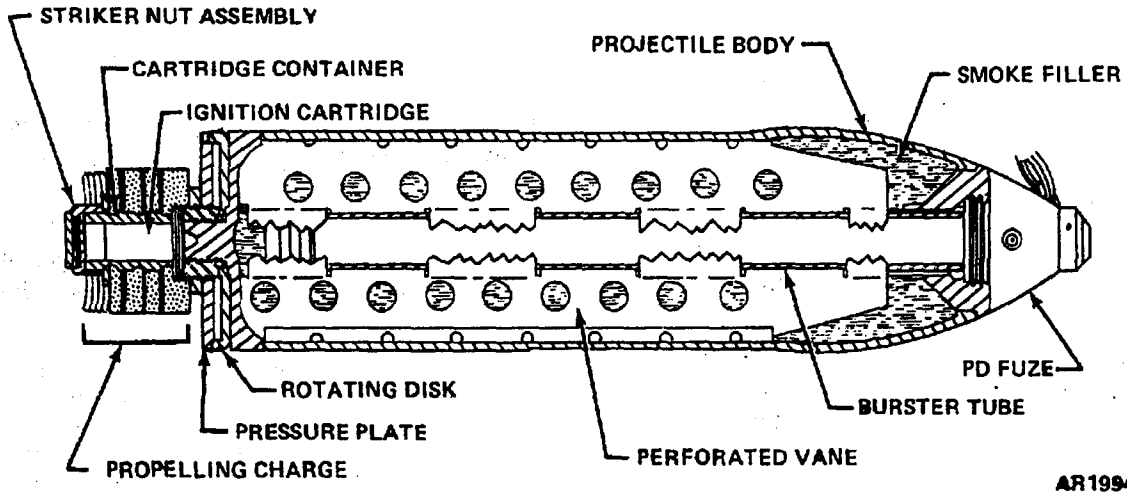

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Type Classification:

OBS 11756003.

Use:

This cartridge is used against personnel and materiel as an incendiary device, and to produce a screening smoke.

Description:

The complete round consists of a projectile body, a PD fuze with an integral burster, and a tail assembly. The body contains a perforated vane assembly welded to the inside of the body and designed to accommodate the burster tube that extends from the fuze. The tail assembly consists of a pressure plate and rotating disc, a propelling charge, a cartridge container and ignition cartridge, and a striker nut assembly.

Functioning:

When the cartridge is released, it slides down the mortar tube until the percussion primer strikes the firing pin. The flash from the primer ignites the ignition cartridge which, in turn, ignites the propelling charge. The gases from the propelling charge exert pressure on the pressure plate at the base of the projectile which expands the rotating disc, engaging it in the rifling of the tube. The spin imparted to the projectile as it leaves the weapon stabilizes it in flight. On impact, the functioning of the fuze detonates the burster charge which shatters the projectile casing, dispersing the filler. On contact with the air, the WP (or PWP) filler ignites creating a dense white smoke with some incendiary effect.

Difference Between Models:

Cartridge M2 differs slightly from cartridge M2A1 in the design of the obturating mechanism.

	PROJECTILE																	
		BODY						FILLING			Fuze (Including Burster or Booster) (3)			PROPELLING CHARGE				
ol. o.	Complete Round Nomenclature	Type and Kind	Designation	Av. Wt. Shell Casing (lbs.)	Wt. Base Components	Diameter (approx.)	Length (less fuze) (approx.)	Type	Wt. Filling (lbs.)	Minimum Void (0/0)	Designation	Type	Weight (lbs.)	Designation	Cartridge (5)	Total Charge Wt. (lbs.)	Complete Assembly Wt. (lbs.)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Shell, Smoke, WP, 4.2-inch Chemical Mortar, M2	Shell Smoke	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	WP	7.5	14.7	M2	Impact	1.5	M6(4)	M2	.51	25.5
2	Shell, Smoke, FS, 4.2-inch Chemical Mortar, M2	Shell Smoke	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	FS	7.5	23.0	M2	Impact	1.5	M6(4)	M2	.51	25.5
3	Shell, Gas, Nonpersistent, CG, 4.2-inch Chemical Mortar, M2	Shell Gas	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	CG	6.25	14.3	M2	Impact	1.5	M6(4)	M2	.51	24.25
4	Shell, Gas, Persistent, HD, 4.2-inch Chemical Mortar, M2	Shell Gas	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	HD	5.8	10.0	M2	Impact	1.5	M6(4)	M2	.51	24.2
5	Shell, Gas, Irritant, CNB, 4.2-inch Chemical Mortar, M2	Shell Gas	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	CNB	5.45	5.7	M2	Impact	1.5	M6(4)	M2	.51	23.5
6	Shell, Gas, Irritant, CNS, 4.2-inch Chemical Mortar, M2	Shell Gas	M2 M2-ALT	13.86 13.86	1.84 1.84	4.19"	20.4"	CNS	7.0	4.5	M2	Impact	1.5	M6(4)	M2	.51	25.0
7	Shell, 4.2-inch Chemical Mortar, (HE), M3 (W/M3 Fuze)	Shell HE	M3 M3-ALT	12.72 12.72	1.84 1.84	4.19"	20.4"	HE	8.5	None	M3	Impact	1	M6(4)	M2	.51	24.5
8	Shell, 4.2-inch Chemical Mortar, (HE), M3 (W/M4 Fuze)	Shell HE	M3 M3-ALT	12.72 12.72	1.84 1.84	4.19"	21.0"	HE	8.5	None	M4(1)	Delay	1	M6(4)	M2	.51	24.5
9	Shell, 4.2-inch Chemical Mortar, (HE), M3 (W/M5 Fuze)	Shell HE	M3 M3-ALT	12.72 12.72	1.84 1.84	4.19"	22.0"	HE	8.5	None	M5(1)	T & S	2.0	M6(4)	M2	.51	25.5
0	Shell, Sub-caliber, 3-inch, M5 (For 4.2-inch Chemical Mortar)	Shell Dummy	M5	6.0	--	3.0"	12.5"	--	--	--	M1(2)	Impact (FM-Nose)	Approx. 1/4	M8	M8A1	.14	6.0

) Fu l and shipped separately. To be added to shell at point of use.
) Sn ge, shipped separately.
) Sta nomenclature for fuzes.
a. Fuze, shell, 4.2-inch chemical mortar, M2
b. Fuze, shell, 4.2-inch chemical mortar, (HE), M3
c. Fuze, delay, shell, 4.2-inch chemical mortar, M4
d. Fuze, time and superquick, shell, 4.2-inch chemical mortar, M5
e. Charge, smoke, 3-inch, sub-caliber shell, M1

(4) Standard nomenclature for propelling charges:
a. Charge, propelling, 4.2-inch chemical mortar, M6
b. Charge, propelling, 3-inch sub-caliber shell, M8

(5) Standard nomenclature for cartridge: Cartridge, ignition, 4.2-inch chemical mortar, M2

FIGURE 64. *Authorized rounds for 4.2-inch chemical mortar.*

d. Keep cartridge and propelling charges dry. Moisture reduces range; therefore, moist propelling charge increments should be separated from dry ones so as to eliminate the possibility of short rounds when firing over friendly troops.

e. When it is necessary to leave ammunition in the open, place it on dunnage at least 6 inches from the ground and cover with a double thickness of paulin. Suitable trenches should be dug to prevent water from flowing under the pile. For further precautions in storage, see TM 9–1900.

f. Complete round should be free of foreign matter—sand, mud, grease, etc.—before loading into the mortar.

g. Propelling charges of rounds prepared for firing should be protected by slipping one end of laminated shell container over base of round.

h. Rounds prepared for firing but not fired will be returned to their original condition by reinserting safety pins, replacing packings, and appropriately marking. Fuzes will be inspected prior to repacking. Such components will be used first in subsequent firing, in order that stocks of opened packings may be kept at a minimum.

i. Do not handle duds. Because their fuzes may be armed, duds are extremely dangerous. Do not move or turn them, but destroy them in place, in accordance with directions contained in TM 9–1900.

62. Authorized Rounds

The standard ammunition authorized for use in the 4.2-inch chemical mortar is described in figure 64. Note that the nomenclature completely identifies the ammunition.

63. Shell

a. General. Four shell, similar except for minor construction differences, are issued for the 4.2-inch chemical mortar. These shell are known as the M2, M2 alternate, M3, and M3 alternate.

b. Filling. The M3 and M3 alternate are high explosive shell with TNT filling. They differ from the M2 and M2 alternate (chemical-filled) in that they contain solid filling with no steel vane inside the body and a booster which is one-third the length of the burster in the M2 shell.

c. Construction. (1). The M2 and M3 shell (fig. 65) have a body made from a steel forging with base and walls integral, the casing being swaged to form the ogive.

(2) The M2 alternate and M3 alternate shell, designed to simplify manufacturing operations, are made of seamless steel tubing. The base is slip-fitted and silver-soldered to the end of the tubing.

(3) In the M2 and M2 alternate shell, a perforated sheet steel vane is welded inside the body. This aids in stabilizing flight of the shell by forcing the liquid filling to rotate with it. Holes in the vanes are designed to facilitate distribution of liquid in the shell.

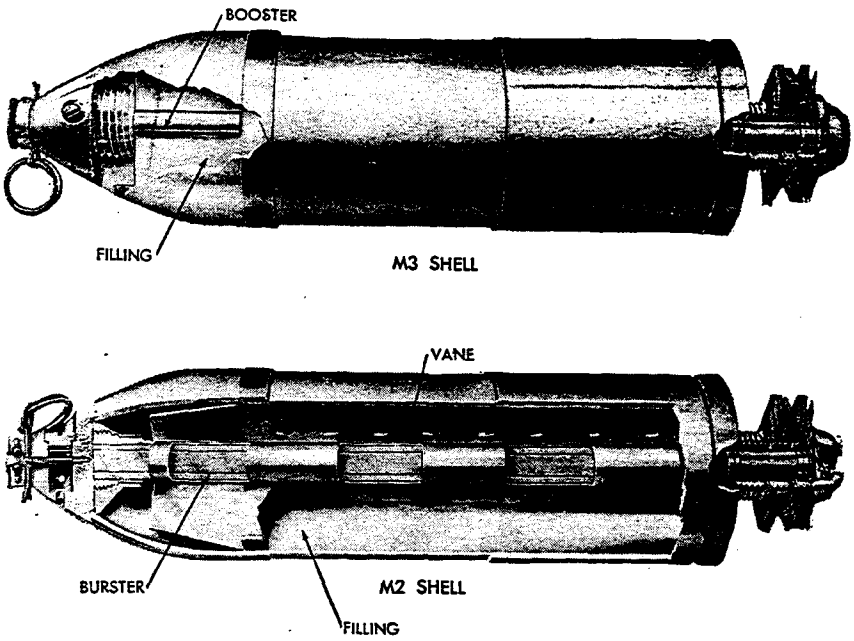


Fig. 65. Comparison between M2 and M3 chemical mortar shells

(4) A steel adapter is welded in the nose of the M2 and M3 shell. In the M2 alternate and M3 alternate shell, the adapter is silver-soldered. The M2 shell has a smooth finished central opening into which the burster tube well is pressed after the shell has been filled, thus forming a gastight seal. The M3 shell has a ringlike adapter to receive fuze.

(5) On the base of all the shell is a threaded stud to which the cartridge container is secured. The cartridge container is a tube of machine steel, threaded on the inside to screw onto the stud on the base of the shell. It is also threaded externally and has a wire propellant holder and a striker nut to hold the propellant over the ventholes. After removing the undesired rings, the propellant holder is pushed down against the remaining rings in order to hold them tightly between the holder and the striker nut. The ventholes are drilled radially through the walls of the cartridge container and serve to transmit the flash of the ignition cartridge to the rings of powder, thus igniting them. The striker nut, in addition to holding the propelling charge and ignition cartridge in place, also carries a striker plate and striker point to fire the primer of the ignition cartridge. It prevents the base of the ignition cartridge from being blown out into the base of the barrel when the mortar is fired, and causes the flash of the ignition cartridge to spread through the radial holes in the

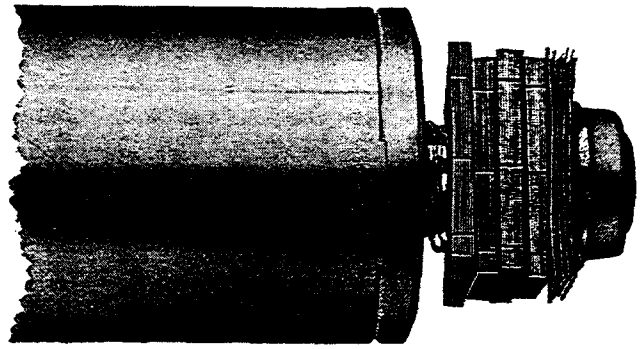
cartridge container and into the powder rather than being blown out the rear end of the cartridge container.

(6) The rotation unit of all the shell consists of a brass rotating disk and a steel pressure plate. In the surfacing of the rotating disk is a groove 1.5 inches wide and 0.062 inch deep, fitting over a key on the base of the shell and transmitting rotation to the shell. Diameter of rotating disk is approximately equal to that of the shell, while the pressure plate is slightly smaller and fits into rotating disk. When assembled, disk and plate form a hollow ring. Under the pressure of the propellent gases, the plate is pressed into the disk, expanding the disk in such manner that the rim of the disk engages the rifling of the barrel.

64. Propelling Charge

a. CHARGE, PROPELLING, 4.2-INCH CHEMICAL MORTAR, M6. The M6 propelling charge consists of an ignition cartridge and 25½ rings of non-hygroscopic disk powder. The full propelling charge comes affixed to the shell (fig. 66). Ranges varying from 4,397 yards down to 565 yards may be obtained by removing rings as required to conform with appropriate firing tables. The basic unit of propelling powder is a ring which consists of two sheets sewn together. The M6 propelling charge includes one half-ring, five one-ring bundles, and four five-ring bundles (fig. 67).

b. IGNITION CARTRIDGE (fig. 68). The ignition cartridge used with the M6 propelling charge is designated as follows: *cartridge, ignition, 4.2-inch chemical mortar, M2.* It is similar in exterior appearance to a commercial 12-gauge shotgun shell.



c. Propellent powder. (1) The propellent powder is practically nonhygroscopic and smokeless, but not flashless. It is in the form of thin, square sheets, 2¾ inches square and about 0.026 inch thick. A circular hole 1.35 inches in diameter is cut in the center of each square.

(2) The sheets of powder weigh approximately 60 grains each. Each square is slit radially from the circular hole to one of the edges. The size of units may be identified by their thickness.

65. Preparation for Firing

When shell are delivered to mortar position packed in waterproof containers, prepare ammunition in an orderly sequence for purposes of safety and economy of effort as follows:

a. Remove shell from its waterproof container.

b. Clean by removing all rust-preventive compound and remove any dirt from guides, body, cartridge container, and flash outlet holes. Use emery cloth to remove rust from guides.

c. Pull safety pin and examine fuze. See that shear wire is in place and bent over at both ends, and that two steel balls are present. Replace safety pin.

d. Examine guides for burrs which might cause shell to stick in the barrel. Burrs must be filed down.

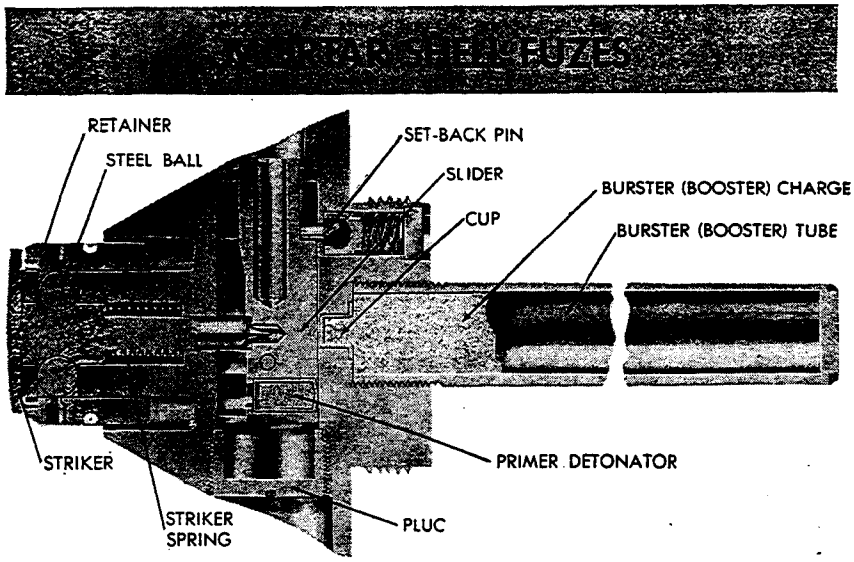
e. Remove rings of propellant as required for range.

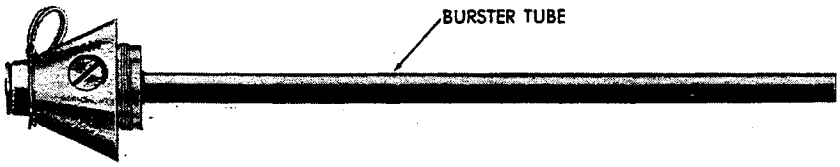
f. Propellant must be fastened firmly between striker nut and propellant holder. This is accomplished by first tightening the striker nut against the propellant and then the propellant holder against the powder.

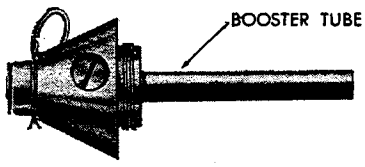
g. When necessary, ends of safety pin in fuze may be straightened with a pair of pliers to facilitate rapid removal by mortar squad.

66. M2 and M3 Fuzes

a. General (fig. 69). The fuze, shell, 4.2-inch chemical mortar, M2 is an impact fuze of the point detonating type, weighing about 1½ pounds. The complete assembly consists of the fuze proper with an aluminum body, its various components, and a seamless steel burster tube. The bursting charge consists of about 65 grams of tetryl pellets in the burster tube and the cup. After the burster tube has been screwed into the base of the fuze body, the entire outside surface of the tube is given a coating of rust-preventive compound. This fuze is furnished with the M2 shell. The fuze, shell, 4.2-inch chemical mortar, (HE), M3 is furnished with the M3 shell. *The M2 and the M3 fuze heads are identical, but the M2 fuze has a burster tube, while the M3 fuze has a booster.* The burster tube of the M2 fuze (fig. 70) is about three times the length of the seamless steel booster tube of the M3 fuze (fig. 71). This difference is necessary because the M2 burster must contain a sufficient amount of tetryl


RETAINER
STEEL BALL
SET-BACK PIN
SLIDER
CUP
BURSTER (BOOSTER) CHARGE
BURSTER (BOOSTER) TUBE
STRIKER
PRIMER DETONATOR
STRIKER SPRING
PLUC


BURSTER TUBE


BOOSTER TUBE

to rupture the shell body, while in the M3 the booster merely conducts the shock action to the high explosive (TNT) filling which, in turn, bursts the shell. The M3 fuze has the same safety features as the M2 and functions in exactly the same manner.

b. SAFETY FEATURES. The M2 and M3 fuzes have four safety features:

(1) The *safety pin* is a cotter pin passing through (off center) the body of the fuze and the retainer. The pin secures the retainer firmly to the body of the fuze and prevents its movement. Its function is to act as a reinforcement for the shear wire. Just before firing, the safety pin is pulled from the fuze by means of the ring attached to the pin.

(2) The *shear wire* passes through the retainer and the fuze body. This prevents any movement of the retainer, even after the safety pin has been withdrawn, as long as the shear wire itself remains unbroken. The ends of the shear wire are bent into the annular groove around the outer surface of the retainer. This prevents accidental damage to the shear wire from external sources and enables the fuze to arm itself by cutting the shear wire inside the retainer only.

(3) The *retainer* is a brass ring which holds two steel balls in cylindrical holes 180° apart in the upper part of the fuze body. When the striker is in the unarmed position, two hemispherical recesses, 180° apart in the stem, are located opposite the two holes in the fuze body. The diameter of the holes is slightly larger than the diameter of the balls but their depth is less. When the retainer is held in the unarmed position by the shear wire, its inner surface covers the outer openings of the holes so that approximately one-third of each ball fits into the corresponding hemispherical recess in the striker stem. The other two-thirds remains in the cylindrical hole in the body of the fuze. The balls prevent movement of the striker. Immediately below the retainer is a well in the fuze body into which the retainer drops when the shear wire is cut. The retainer has either two slots or two holes through which the two steel balls can be seen. For safety, every fuze must contain the two steel balls.

(4) The *slider is* a cylindrical brass piece. Holes are cut in the slider to take the primer detonator, the striker point, and the lock pin, and there is a groove for the guide screw. In the unarmed position, the primer detonator is out of line with the bursting charge and the striker. The point on the end of the striker fits into a hole in the slider, locking it in place as long as the retainer is held in position by the shear wire.

(5) The *set-back pin assembly* consists of set-back pin, socket, and spring. In the unarmed position, the slider is held safe by the set-back pin which is held in place by force of the spring. This serves as an additional safety feature in preventing alignment of the primer detonator with bursting charge before firing.

c. FUNCTIONING. (1) The safety pin is pulled out of the fuze just before the shell is inserted in the barrel. After striking the striker pin at

foreign material when assembling fuzes to shell. Assemble with proper seating.

(3) Do not attempt to alter or disassemble fuzes in the field.

(4) Do not remove plugs or fuzes from shell except when a new fuze is to be inserted immediately.

(5) Protect fuzes against shock, heat, and fire. Take special care to avoid blows to nose and base of fuze.

(6) Leave safety pin in fuze until ready to fire. Replace immediately if round is not fired.

67. Delay Fuze M4

a. General. The fuze, delay, shell, 4.2-inch chemical mortar, M4 (figs. 72 and 73) consists of three subassemblies: head assembly, body assembly, and booster assembly. The head assembly consists of head and firing pin assembly, a delay element assembly which contains a percussion primer, a 0.15-second delay charge, and a relay charge assembly. The body assembly consists of a body, a booster lead charge and safety pin assembly, a detonator slider containing a detonator and a slider lock, a slider spring, a closing cup, a guide screw, and a set-back element and spring. The booster assembly consists of a tube and a 22-gram tetryl booster charge. Total weight of a fuze, loaded and completely assembled, is 1 pound.

b. Functioning. (1) The fuze is a point detonating, delayed action fuze, designed to produce demolition effect by initiating detonation of the HE in the shell 0.15 second after impact.

(2) The fuze is detonator safe in that the tetryl booster charge does not explode from the force of the detonator if it functions in the offset, unarmed position. The fuze is not armed until detonator is aligned with explosive train by centrifugal force and/or spring action.

(3) After fuze is assembled to shell, the first step in arming, preparatory to firing, is to remove the safety pin. If the round is not fired, the safety pin should be replaced. When shell is fired, the force delivered to base of shell by the burning propelling charge causes the set-back element in the fuze, which holds the slider in the unarmed position, to move to the rear; this frees slider so that it moves to armed position under centrifugal force and/or spring action. The slider is locked in armed position by slider lock.

(4) Upon impact, the striker in the head of the fuze is driven in, cutting the shear wire and allowing point of firing pin to strike the percussion primer, causing it to ignite delay charge. The delay charge burns for 0.15 second after which it ignites the relay charge which initiates functioning of the detonator. The detonator sets off the booster charge which in turn explodes HE in the shell.

c. Use. This fuze may be used in any existing type of 4.2-inch chemical mortar HE-loaded shell. In the event that shell are already equipped with

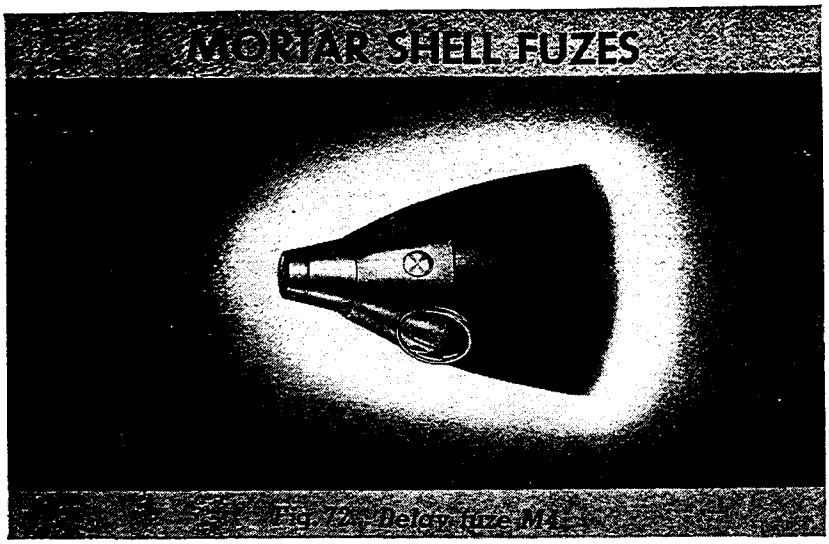


Fig. 72. Delay fuze M4.

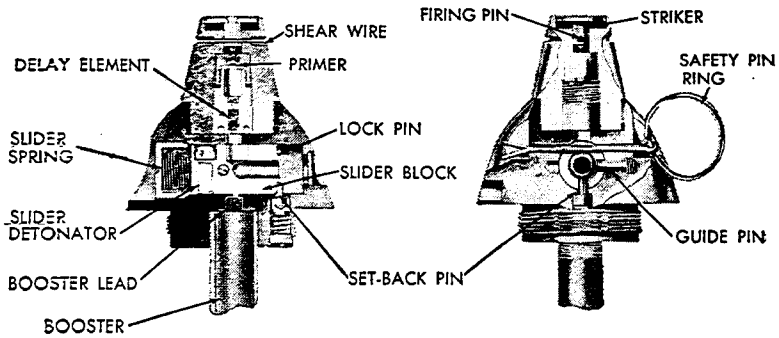
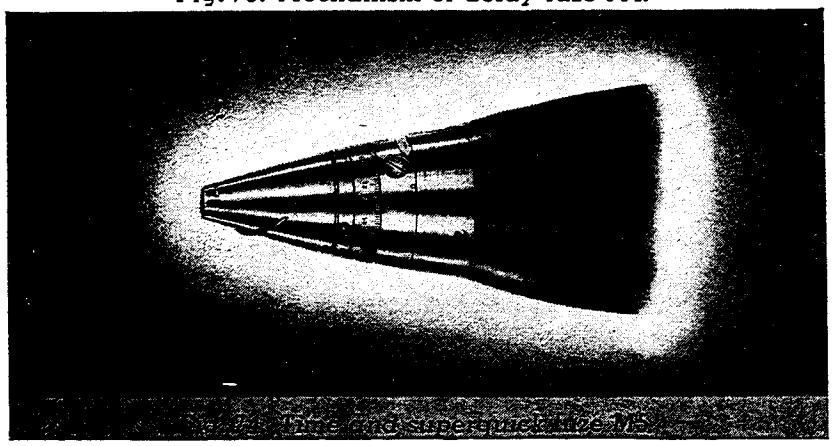


Fig. 73. Mechanism of delay fuze M4.



Inert and Superquick fuze M5.

the point detonating fuze M3 (instantaneous action), the M3 fuze may be safely removed from the shell and the M4 fuze substituted by means of a fuze wrench.

d. SAFETY PRECAUTIONS. See paragraph 66*d*.

68. Time and Superquick Fuze M5

a. GENERAL. The fuze, time and superquick, shell, 4.2-inch chemical mortar, M5 (fig. 74) is a modified ordnance M54 powder train type. It is provided with an adapter-booster or an adapter-burster assembly to fit the 4.2-inch chemical mortar shell. The M54 fuze portion consists of a body assembly, time train ring assembly (two rings), and a closing cap assembly with a lead annulus. The adapter-booster (burster) has internal threads to receive the M54 fuze and external threads for assembly into the shell. The adapter-booster (burster) contains a detonator which is initiated by the flash produced by functioning of the fuze, and a booster or burster charge detonated by functioning of the detonator.

b. FUNCTIONING. The fuze is a combination time and superquick type containing two separate mechanisms for producing these actions.

(1) The *superquick mechanism* is contained in the closing cap assembly. When nose of fuze is crushed, a firing pin is driven into a detonator, causing it to function. The flash from this upper detonator passes through an axial hole through closing cap and body assemblies and functions the detonator in the adapter-booster (burster).

(2) The *time mechanism* is initiated by plunger contained in the closing cap assembly. An internal safety feature prevents instantaneous action. The plunger is supported by two small shear wires until fired; to insure safety in handling, the plunger is locked in place by a spiral safety wire. The safety wire is removed immediately before firing. When shell is fired, inertia of plunger causes it to cut shear wires and move downward against a primer striker in the fuze body. The primer striker bends until it fires a primer in the fuze body. This primer ignites one end of a pressed black powder time train contained in upper (fixed) time train ring. The upper time train burns completely and, if fuze is not set safe, ignites lower time train after approximately one-half of set time. A magazine charge of black powder is ignited after lower time train has burned the remainder of the set time, and flame from the magazine charge causes lower detonator in adapter-booster (burster) to detonate.

(3) Whether initiated by superquick element or time element, the lower detonator in the adapter-booster (burster) detonates and causes booster (burster) charge to detonate. Detonation of booster charge in HE shell causes detonation of HE filling; detonation of the burster charge in chemical shell ruptures the shell case. The superquick action is always operative after arming and functions on impact unless prior functioning has been caused by time action.

Section IV

TARGET ROCKETS

27. DESCRIPTION AND DATA.

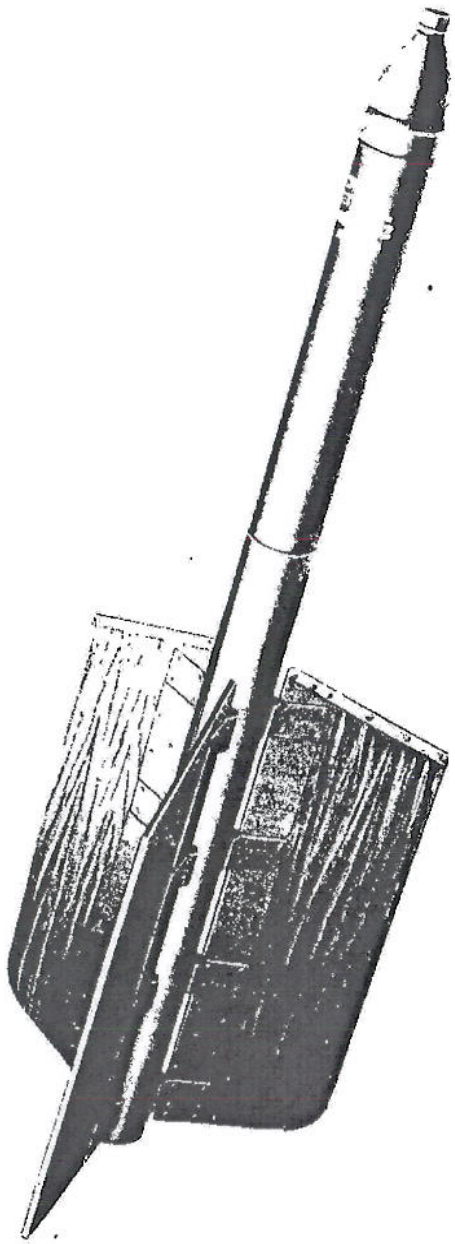
a. **General.** The 3.25-inch target rocket (fig. 25) is designed to provide a fast-flying target for training of automatic antiaircraft gun crews. It consists of a motor assembled in a long tubular body to which three large plywood fins are attached. Later models have a flare assembled to the nose for increased visibility and easier spotting. The motor is assembled in the forward part of the body and contains a 3.2-pound propelling charge in the form of 18 single-perforated grains strung on the wires of a cage-like support. The individual grains are ⅞-inch outside diameter and 5 inches long. The igniter consists of a charge of black powder divided between a tube in the nose and a pair of cylindrical bags attached to the propellant. The igniter squib is assembled in the tube with one lead grounded to the body of the rocket and the other connected to the nose which is insulated from the body by a fiber disk. The fins are shipped unassembled and are attached to the body by spring hooks. The fins are much larger than necessary to stabilize flight in order to provide a large target area. However, care should be exercised in firing with a cross wind since the large fins cause the rocket to tend to head into the wind.

b. **Models.**

(1) 3.25-inch AA target rocket M2 is characterized by the ogival nose closed by a standard pipe cap.

(2) 3.25-inch AA target rocket M2A1 is characterized by the addition of a small flare assembly to the nose of the rocket. The flare assembly replaces the pipe cap.

(3) 3.25-inch AA target rocket M2A2 is characterized by a flat nose with the flare assembled thereto, and a different system of igniter contact. This model has the lead wires passing in turn through the nozzle and an inner fiber closing cup, and is connected to a household-type service plug, which is held by an outer fiberboard closing cup.



RA PD 89398

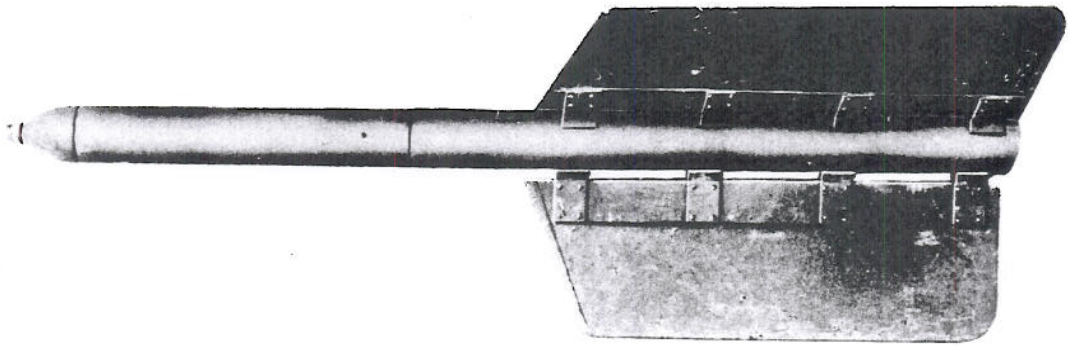
Figure 25 — 3.25-inch AA Target Rocket M2

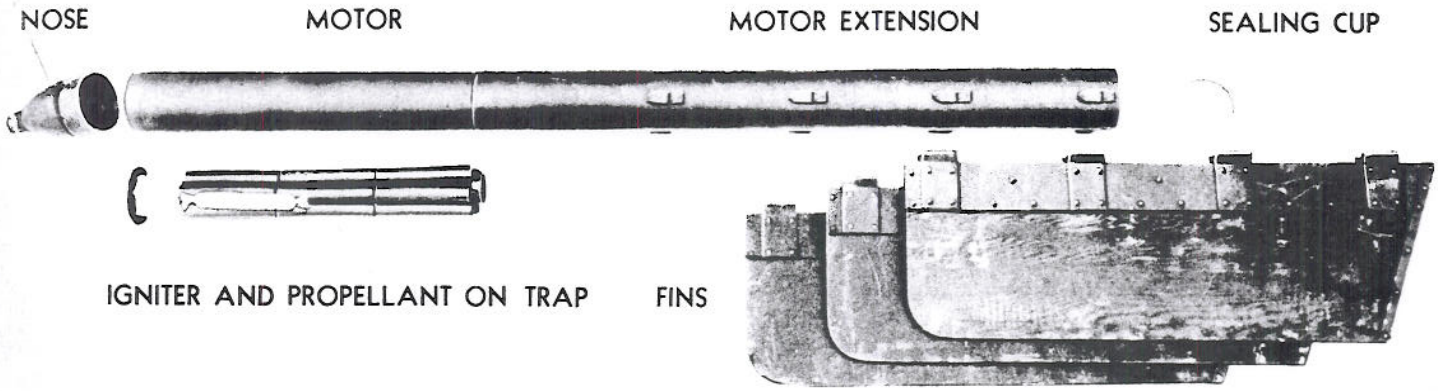
Eighteen inches of igniter cable coiled between the closing cups provides for withdrawing the plug for connection to the launcher.

c. **Data.**

MODEL	M2	M2A1
Range (max)	1700 yd	1700 yd
Velocity (max)	530 ft per sec	530 ft per sec
Temperature limits	+30 to +120 deg F	+30 to +120 deg F
Burning time	.25 to .10 sec	.25 to .10 sec
Burn-out point (feet from muzzle)	70 ft	70 ft
Length	59.1 in.	59.9 in.
Weight	35.1 lb	36.3 lb
Flare, burning time	—	30 sec

3.25-INCH A.A. TARGET ROCKET M2—LIMITED STANDARD





3.25-INCH A.A. TARGET ROCKET M2

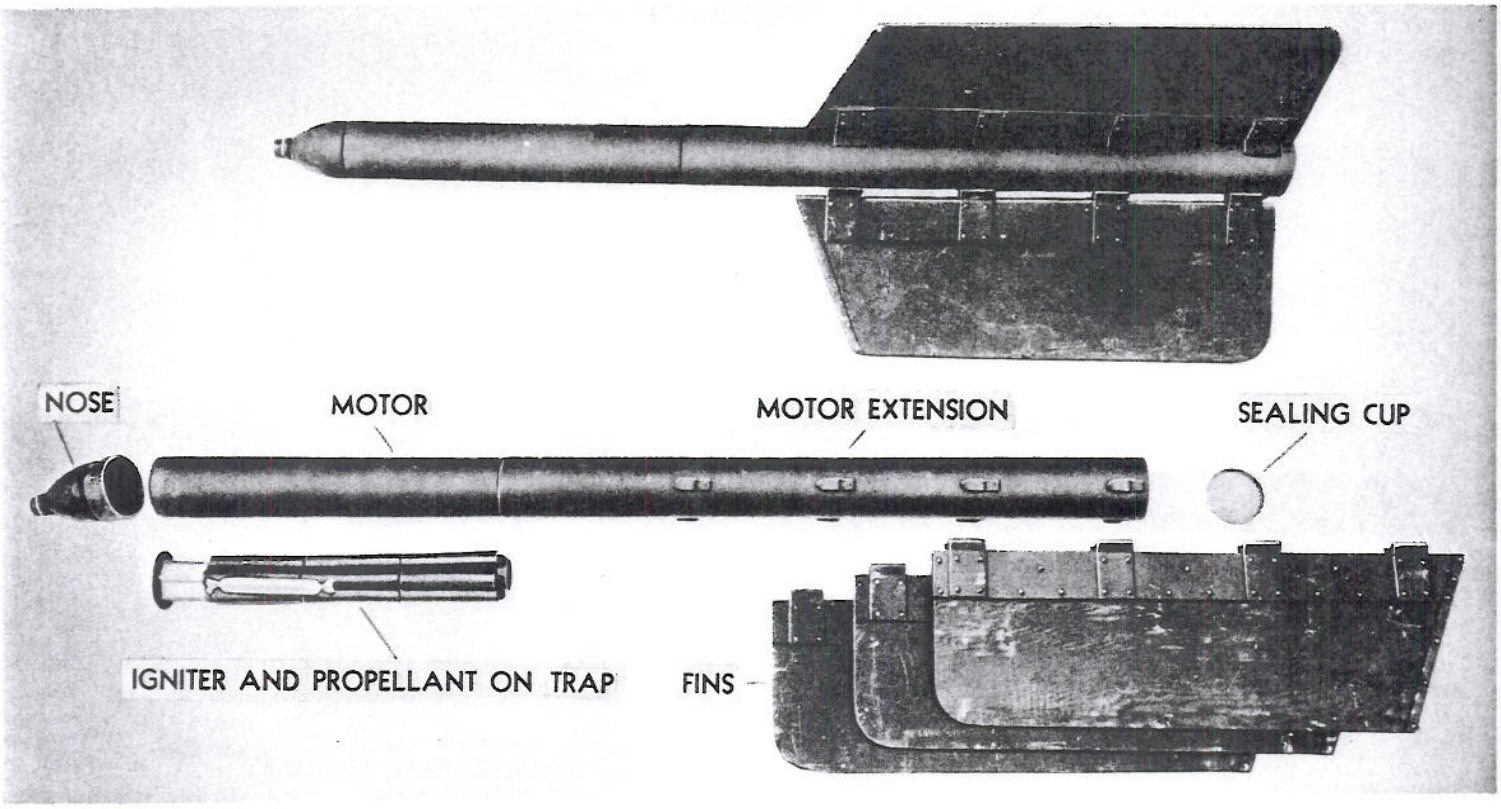
The 3.25-Inch A.A. Target Rocket M2 is designed to simulate low flying aircraft in the training of antiaircraft gun crews. The large fins act as a target.

This rocket has not been fired for specific data on range and dispersion.

CHARACTERISTICS

Range . . . . . 1,700 yd. (estimated)
Dispersion . . . . . No data
Velocity . . . . . 530 f/s (estimated)
Service temperature limits . . . . . 30° to 120° F.
Burning time:
At 30° F. . . . . 0.25 sec. (estimated)
At 120° F. . . . . 0.10 sec. (estimated)
Type of stabilization . . . . . Fixed fins
Length, overall . . . . . 59.1 in.
Weight of round, loaded . . . . . 35.1 lb.
Fuze . . . . . No fuze
Motor assembly:
Diameter, outside . . . . . 3.25 in.
Length . . . . . 25.25 in.
Weight (less propellant) . . . . . 8.44 lb.
Material . . WD 1010 to WD 1025 steel tubing
Propellant . . . . . 3.2 lb. solvent extruded double base powder, 0.875 in. O.D. by 0.281 in. I.D. by 5 in. long
Type of loading . . 18 sticks strung on a 6-wire cage
Shell assembly:
Caliber . . . . . 3.25 in.
Length . . . . . 4.1 in.
Filler . . . . . Solid cast nose except for 1⅛ in. axial hole
Weight, filler . . . . . None
Weight, total . . . . . 5.83 lb.
Type of ignition . . . . . Electric squib contained in cardboard cartridge in nose. Ignition aided by auxiliary igniter bag tied to cage
Launchers . . . . . Target Rocket Projector M1
Packaging . . . . . Either two or three rounds per wooden box

3.25-INCH A.A. TARGET ROCKET M2A1—STANDARD



3.25-INCH A.A. TARGET ROCKET M2A1

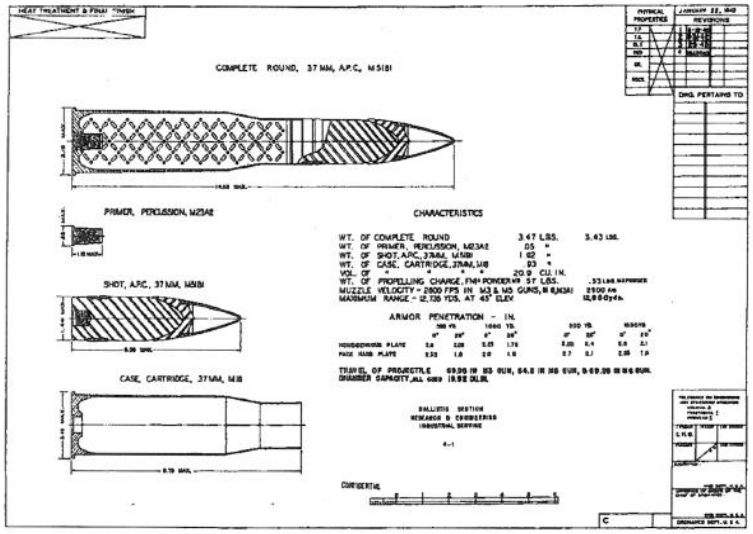
The 3.25-Inch A.A. Target Rocket M2A1 is identical to the M2 Target Rocket except for a flare attachment which burns from 20 to 30 seconds. The flare is ignited by the ignition cartridge when the rocket is launched.

This rocket has not been fired for specific data on range and dispersion.

CHARACTERISTICS

Range . . . . . 1,700 yd. (estimated)
Dispersion . . . . . No data
Velocity . . . . . 530 f/s (estimated)
Service temperature limits . . . . . 30° to 120° F.
Burning time:
  At 30° F. . . . . 0.25 sec. (estimated)
  At 120° F. . . . . 0.1 sec. (estimated)
Type of stabilization . . . . . Fixed fins
Length, overall . . . . . 59.9 in.
Weight of round, loaded . . . . 36.3 lb. (estimated)
Fuze . . . . . No fuze
Motor assembly:
  Diameter, outside . . . . . 3.25 in.
  Length . . . . . 25.25 in.
  Weight (less propellant) . . . . . 8.44 lb.
  Material . . WD 1010 to WD 1025 steel tubing
Propellant . . . . . 3.2 lb. solvent extruded double base powder 0.875 in. O.D. by 0.281 in. I.D. by 5 in. long
Type of loading . . . . . Eighteen sticks strung on a 6-wire cage
Shell assembly:
  Caliber . . . . . 3.25 in.
  Length . . . . . 7.5 in. w/flare
  Filler . . . . . Solid cast nose except for 1⅛ in. axial hole
  Weight, filler . . . . . None
  Weight, total . . . . . 7 lb. w/flare (estimated)
Type of ignition . . . . . Electric squib contained in cardboard cartridge in nose. Ignition aided by auxiliary igniter bag tied to cage
Launchers . . . . . Target Rocket Projector M1
Packaging . . . . . Probably similar to M2

SHELL, 37-mm, APC, FIXED, M51B1



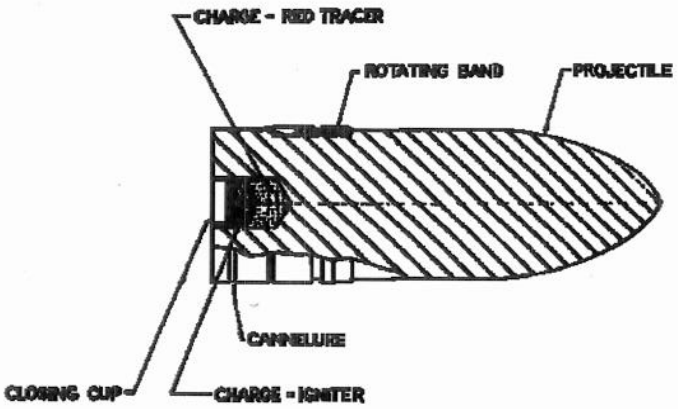
Use. Anti-tank Gun M3A1 or Tank Guns M5A1 and M6

Description. The M51B1 Armor Piercing Capped Shell is standard for issue and manufacture although it was replaced in 1943 by the 57-mm Gun. The projectile consists of hardened shot body, a cap and a windscreen. No explosives were used in this round but a tracer was installed in the base of the projectile and was designed to burn for approximately three seconds.

Length (projectile)	8.36 inch
Over-all length w/cartridge case	14.53 inch
Diameter	37-mm
Weight, complete round	3.47 pounds
Filler	None
Fuze	None

Reference: *Catalog of Standard Ordnance Items, Second Edition*, 1 June 1945

PROJECTILE, 37-mm, ARMOR PIERCING, M74 WITH TRACER



Complete round. As indicated by the nomenclature, this round does not include an armor-piercing cap. It was designed as "Substitute Standard" for SHOT, APC, M59.

Cartridge cases. M17 and M17B1 are "Standard" and "Substitute Standard" respectively.

Primer. M23A2, 20 grain, Percussion Primer is "Standard". Some rounds may contain M23A1 primer.

Propelling charge. 4 ounces of FNH powder impact a muzzle velocity of 2,050 feet per second.

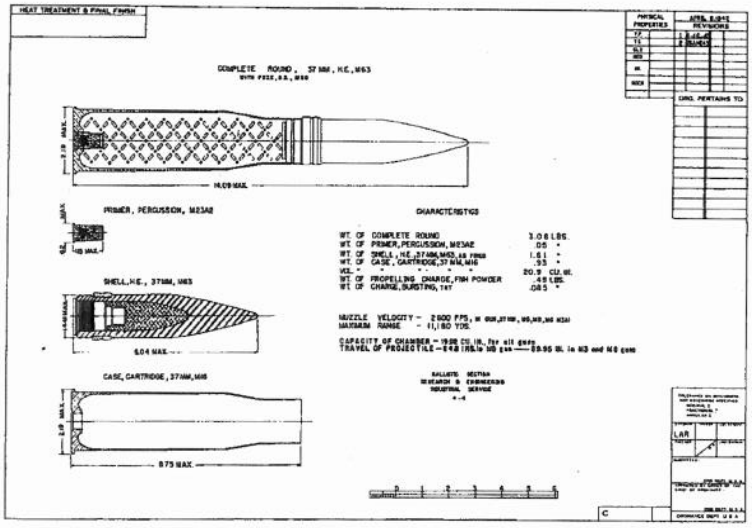
Projectile. The projectile is exactly the same as the M74 used for 37-mm Tank and Anti-tank Guns M5, M6, M3, and M3A1.

Identification. The extracting groove on the cartridge case and size of the round identify it as belonging to 37-mm antiaircraft group. The black painting with white stencil and the stubby nose distinguish it as SHOT, AP, M74. The complete round is 13.01 inches long and weighs 3.07 pounds.

Projectile Length	4.84 inch
Diameter	1.44 inch
Color	Black with white markings
Weight	1.92 pounds
Filler	None
Fuze	None

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944

SHELL, 37-mm, HE, FIXED, M63



Use. Anti-tank Gun M3A1 or Tank Guns M5A1 and M6

Description. The M63 HE Shell is standard for issue and manufacture although it was replaced in 1943 by the 57-mm Gun. The projectile consists of projectile body and a base detonating fuze. The projectile was used initially as a standard HE projectile for the 37-mm gun. However, with the replacement of the 37-mm with the 57-mm, its use was restricted to the 37-mm sub-caliber gun.

Length (projectile)	6.04 inch
Over-all length w/cartridge case	14.09 inch
Diameter	37-mm
Weight, complete round	3.08 pounds
Filler	0.085 pounds TNT
Fuze	Base Detonating, M58

Reference: *Catalog of Standard Ordnance Items, Second Edition*, 1 June 1945

CARTRIDGE, 37-mm, TP, M51A2

Figure 48. Shot, fixed, TP-T, M51A2, for 37-mm gun M6.

Use. 37-mm Gun M6

General. This shot simulates SHOT, fixed, APC-T, M51, for practice firing from the tank gun. Components are the same as for the service round, except that the projectile body is a solid slug having the same over-all dimensions as combined body and armor-piercing cap of service shot. The windshield is attached to the body instead of the cap as in the M51 APC shot. The M51A2 TP shot supersedes an M51A1 TP design, which was similar except that no windshield was present.

Projectile Length	6.36 inches
Length of complete round	14.55 inches
Length of cartridge case	8.75 inches
Radius of ogive (false ogive)	8.97 calibers
Weight of complete round	3.39 pounds
Width of rotating band	0.74 inches
Muzzle velocity	2,900 fps
Maximum range	12,850 yards

References: TM 9-1901, *Artillery Ammunition*, 11 September 1950

CARTRIDGE, 57-mm, TP, M70

No Picture Available

General. The M70 AP Projectile is a solid shot of hardened steel with a cavity machined into the base to receive a tracer. The ogive is continued to a point, and has a radius of 3.14 inches. A waved or knurled recess 0.79 inch wide is machined into the shot 1.01 inches above the base to receive a copper rotating band. A cannelure for receiving the crimps from the cartridge case is located 0.51 inch behind the rotating band.

The tracer charge consists of approximately 73 grains of red tracer composition in the form of 3 solid pellets and 20 grains of igniter charge in one pellet. The tracer charge is sealed into the tracer cavity with a clear celluloid cup cemented into place. The tracer burns for about 3 seconds. The projectile with tracer assembled weighs 6.37 pounds and is 6.81 inches long.

The complete round is 23.20 inches long and weighs about 12.64 pounds with the brass cartridge case. The size, length of cartridge case, stubby projectile, and black painting with white stencil identify the round as CARTRIDGE, AP-T, M70. On visual inspection the only difference between this round and the target practice round is the blue painting and white stenciling of the practice projectile, however, by examining the manufacturer's information just above the rotating band, it may be possible to distinguish between the two if the painting and stenciling is obliterated.

Propelling Charge. 2.25 pounds of FNH powder poured loosely into the cartridge case propels the projectile from the gun at a muzzle velocity of 2,800 feet per second.

Primer. The M1B1A2, 100-grain percussion primer is standard for use in 57-mm ammunition.

Cartridge Case. The M23A2 Brass Case is "Standard"; M23A2B1 Steel Case is "Substitute Standard".

References: TM 9-1904, *Ammunition Inspection Guide*, 2 March 1944

CARTRIDGE, 57-mm, APC-T, M86

Use. This cartridge is fired from the M1 57-mm Gun and British 6-pounder (2.24") and is intended for defeating armor plate. It was used extensively in the latter stages of World War II and was limited standard during the Korean War.

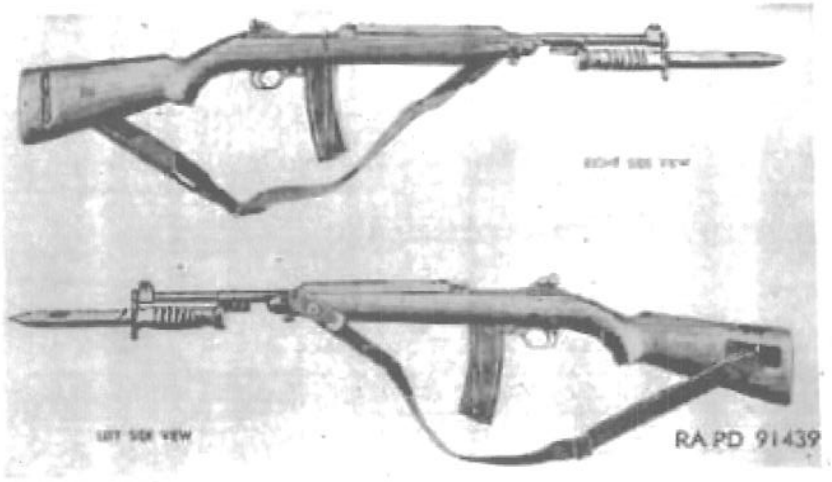
Description: The complete round consists of the standard cartridge case, primer, and propelling charge, assembled to a loaded armor-piercing-capped projectile. The projectile body is of hardened steel, and has a square base and ogival nose. The hardened steel cap, crimped to the nose, increases the effectiveness against face-hardened plate. For better ballistics, a lightweight ogival windshield is secured to the cap by crimping. An M72 base detonating fuze is fitted to the base to explode the small high explosive charge of explosive D. The fuze has incorporated in it the M17 detonator assembly, which detonates the explosive D and tetryl pellet bursting charge.

Functioning. The fuze functions with delay action and has a tracer in its base, which operates independently of the fuze mechanism. The tracer burns for approximately 4.5 seconds after being ignited by the propelling charge, providing a visible trace for observation purposes over a range of about 3,000 yards.

Length (complete round)	26.72 inches
Length (fuzed projectile)	11.24 inches
Weight (complete round)	13.73 pounds
Fuze	M72 Base detonating
Filler	Explosive D, tetryl
Color	Olive Drab with yellow markings

Reference: TM 9-1901, *Artillery Ammunition*, 11 September 1950; TM 9-1904, *Ammunition Inspection Guide*, 2 March 1944

CARBINE, CAL. .30, M2 AND M3



CARBINE, CAL. .30, M2

GENERAL

The cal. .30 carbine M2 is a gas operated, magazine fed, lightweight, offensive or defensive shoulder weapon. It is capable of firing ammunition either in single shots or automatically. When firing single shots, it is a self loading weapon. Automatic fire is achieved by means of a selector, located on the top left side of the receiver, which is manually controlled by the operator. Its rear sight is adjustable for both elevation and windage. The front band permits the attaching of the bayonet-knife M4. The cal. .30 carbine M3 (not illustrated) is identical to the cal. .30 carbine M2 except for the receiver which is designed to mount part of the sniperscope. Sights are eliminated from the cal. .30 carbine M3. The sniperscope is the responsibility of the Corp of Engineers and covered in engineer series technical manuals.

CARBINE DATA

Weight (w/o accessories)	5 lb 2 oz
Weight of magazine	5 oz
Length (over-all)	35 9/16 in.
Length of barrel	18 in.
Operation	Gas
Feed	Magazine
Capacity of feeding device	30 rds
Muzzle velocity	1,970 fps
Rate of fire (full automatic)	750-775 rounds per minute
Maximum range	2,200 yd
Cooling	Air

AMMUNITION

Cal. .30 carbine cartridges	Ball, tracer, and dummy
Grenades and signals	See grenade launcher M8

APPENDAGES (for M2 only)

BAYONET KNIFE, M4 with
SCABBARD, trench knife, M6 or
SCABBARD, trench knife, M8 or
SCABBARD, trench knife, M8A1
LAUNCHER, grenade, M8

CARBINE EQUIPMENT

BRUSH, cleaning, cal. .30, M2 (wire)
BRUSH, cleaning, cal. .30, M31 (bristle)
BRUSH, cleaning, cal. .30
CHECK, recoil, M1
HIDER, flash, M3
OILER, hand, carbine, cal. .30, M1
ROD, cleaning, jointed, cal. .30, M8 (3 sections w/handle)
SLING, carbine, cal. .30, M1 (webbing)
THONG, cal. .30 (for cleaning brush)

SHIPPING DATA

Shipped 10 carbines w/10 slings, 10 oilers and 10 magazines per wood box

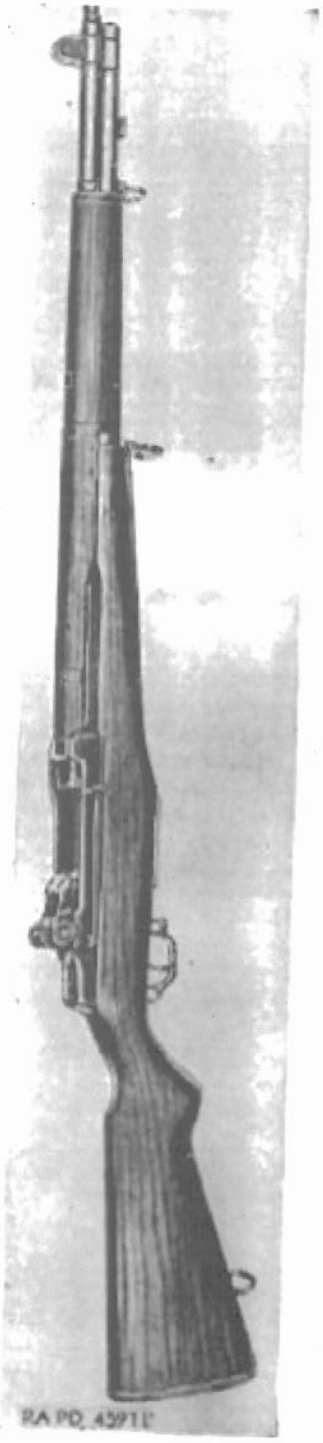
Length	3 ft 5 in.
Width	1 ft 5 in.
Height	1 ft
Volume	4.8 cu ft
Gross weight	98 lb
Ship tons	0.12

REFERENCES

FM 23-7; TM 9-1276; SNL B-28

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 15

RIFLE, U. S., CAL. .30, M1



GENERAL

The cal. .30 U. S. rifle M1 is a gas operated, semiautomatic, clip-fed, offensive shoulder weapon. Eight cartridges, loaded into a clip, are inserted into the receiver and a new cartridge automatically feeds into the chamber after each round is fired. When the last round in the clip has been fired, the clip is automatically ejected from the receiver and the bolt remains in its rearmost position ready for the insertion of another loaded clip. The trigger must be actuated to fire each round.

RIFLE DATA

Weight (w/o accessories)	9 lb 9 oz
Length (over-all)	3 ft 7½ in.
Length (over-all w/bayonet M1)	4 ft 5 in.
Length of barrel	24 in
Operation	Gas
Feed	Clip
Cooling	Air
Muzzle velocity	2,800 fps
Maximum range	3,500 yd

AMMUNITION

Cal. .30 cartridges	Ball, AP, tracer, blank, and dummy.
Clip	8 rds
Grenades and signals	See grenade launchers M7 and M7A1

APPENDAGES

BAYONET, M1 with
SCABBARD, bayonet, M7
LAUNCHER, grenade, M7 or
LAUNCHER, grenade, M7A1.

RIFLE EQUIPMENT

BRUSH, cleaning, cal. .30, M2 (wire)
BRUSH, cleaning, cal. .30 M31 (bristle)
BRUSH, cleaning, cal. .30
ROD, cleaning, cal. .30, M3
SLING, gun, M1907 (leather) or
SLING, gun, M1 (webbing)
THONG, cal. .30 (for cleaning brush)

SHIPPING DATA

Shipped 10 rifles per wood box

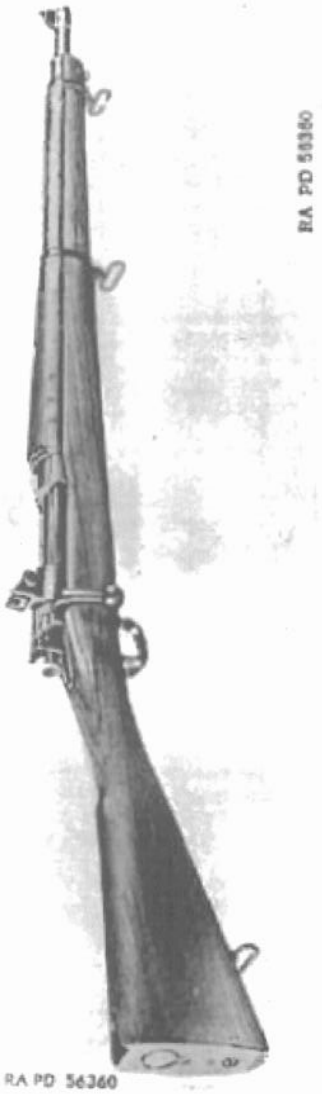
Length	3 ft 11 in.
Width	1 ft 5 in.
Height	1 ft
Volume	3.5 cu ft
Gross weight	145 lb
Ship tons	0.14

REFERENCES

FM 23-5; TM 9-1275; SNL B-21

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 18

RIFLE, U. S., CAL. .30, M1903A3



GENERAL

The cal. .30 U. S. rifle M1903A3 is a magazine-fed, manually operated, bolt action offensive shoulder weapon. Ammunition may be received in 5-round clips for ease in loading. The clip is not inserted in the receiver. It has a ramp type rear sight assembled to the bridge of the receiver and a military type stock which may or may not have a pistol grip. This rifle is being replaced by the cal. .30 U. S. rifle M1.

RIFLE DATA

Weight (w/o accessories)	8 lb 10 oz
Length (over all)	3 ft 7½ in.
Length (over all w/bayonet M1)	4 ft 5 5/16 in.
Length of barrel	24 in
Operation	Manual
Feed	Receiver magazine
Cooling	Air
Muzzle velocity	2,800 fps
Maximum range	3,500 yd

AMMUNITION

Cal. .30 cartridges	Ball, AP, tracer M1, blank, and dummy
Clips	5 rds
Grenades and signals	See grenade launcher M1

APPENDAGES

BAYONET, M1
LAUNCHER, grenade, M1
SCABBARD, bayonet, M7

RIFLE EQUIPMENT

BRUSH, cleaning, cal. .30, M2 (wire)
BRUSH, cleaning, cal. .30
CASE, plastic (for oiler, thong, and brush)
ROD, cleaning, cal. .30, M2A1
ROD, cleaning, jointed, cal. .30, M1 (3 sections w/handle)
SLING, gun, M1 (webbing)
or
SLING, gun, M1907 (leather)
or
SLING, gun, M1923 (webbing)
THONG, cal. .30 (for cleaning brush).

SHIPPING DATA

Shipped 10 rifles w/10 slings and 10 front sight covers per wood box

Length	4 ft
Width	1 ft 2 in.
Height	1 ft 1 in.
Volume	5.1 cu ft
Gross weight	150 lb
Ship tons	0.13

REFERENCES

FM 23-10; TM 9-1270; SNL B-3.

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 21

RIFLE, AUTOMATIC, CAL. .30, BROWNING, M1918A2

GENERAL

The cal .30 Browning automatic rifle M1918A2 is a gas operated, magazine-fed, automatic, light infantry weapon. A selector located on the receiver regulates the rate of automatic fire so that the rifle can be fired either at high speed or at a retarded speed. Provision for firing single shots is not made. The rifle can be fired either from the shoulder, hip, or ground. When fired from the ground, a bipod attached to the muzzle end of the barrel is used. The butt plate has a hinged shoulder rest to provide additional support when firing.

RIFLE DATA

Weight (w/o accessories)	16 lb 5 oz
Weight of magazine	8 oz
Weight of bipod	2 lb 7 oz
Length (overall)	3 ft 11 13/16 in
Length of barrel	24 1/16 in
Operation	Gas
Feed	Magazine
Capacity of feeding device	20 rds
Cooling	Air
Muzzle velocity	2,800 fps
Maximum range	3,500 yd
Rate of fire (high speed)	500–600 rounds per minute
Rate of fire (retarded speed)	300–350 rounds per minute

AMMUNITION

Cal .30 cartridges. Ball, AP, tracer M1, blank, and dummy

RIFLE EQUIPMENT

BRUSH, chamber, cleaning, M1
BRUSH, cleaning, cal .30, M2 (wire)
BRUSH, cleaning, cal .30
ROD, cleaning, cal .30, M2A1
ROD, cleaning, jointed, cal .30, M1 (3 sections w/handle)
SLING, gun, M1 (webbing)
or
SLING, gun, M1907 (leather) (modified)
THONG, cal .30 (for cleaning brush)

SHIPPING DATA

Shipped 5 rifles w/ 10 bipod legs, 5 bipod bodies, 5 bearings, 5 washers, and 5 magazines per wood box

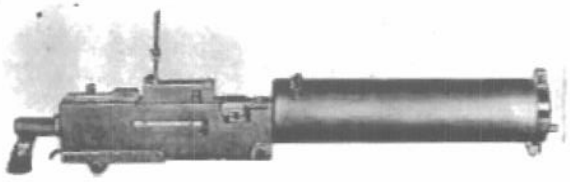
Length	4 ft
Width	1 ft 5 in
Height	8 in
Volume	3.8 cu ft
Gross weight	141 lb
Ship tons	0.10

REFERENCES

FM 22-15; TM 9-1211; SNL A-4.

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 23

GUN, MACHINE, CAL. .30, BROWNING, M1917A1



GENERAL

The cal .30 Browning machine gun M1917A1 is an automatic, recoil operated, belt-fed, water cooled machine gun. Either the metallic link or web belt can be used to feed the ammunition into the left side of the gun. The gun is mounted on the cal .30 tripod mount M1917A1. This gun is known as the cal. .30 heavy machine gun.

GUN DATA

Weight (w/o water) ..... 32 lb 5 oz
Weight (w/water) ..... 41 lb
Length (overall) ..... 3 ft 2⅝ in
Length of barrel ..... 23 13/16 in.
Operation ..... Short recoil
Feed ..... Fabric or link belt
Capacity of feeding device
Fabric belt 250 rds
Link belt—as desired
Capacity of cooling system ..... 1 gal
Cooling ..... water
Muzzle velocity ..... 2,800 fps
Maximum range ..... 3,500 yd
Rate of fire ... 450–600 rounds per minute

AMMUNITION

Cal .30 cartridges ... AP, API, ball, blank, dummy, tracer M1, tracer M25
Cal .30 web belt ..... Belt M1917
Cal .30 links ... Link M1 and belt end M1

GUN EQUIPMENT

BRUSH, cleaning, cal .30, M2 (wire)
BRUSH, cleaning, chamber, M6 (bristle)
CHEST, water, M1918
or
CHEST, water, cal .30, M1
or
CHEST, water, cal .30, M1A1
or
CHEST, water, machine gun, cal .30, M5
DEVICE, steam condensing, cal .30
HIDER, flash, M1923
or
HIDER, flash, cal .30, M8
ROD, cleaning, cal .30, M2A1
ROD, cleaning, jointed, cal .30, M1 (4 sections w/handle)

SIGHTING EQUIPMENT

CLINOMETER, machine gun, M1917
TABLE, firing, 0.30 A 4
TABLE, firing, 0.30 A 1

SHIPPING DATA

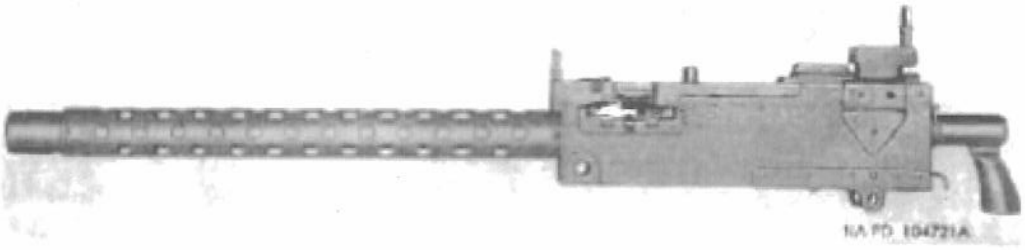
Shipped 1 machine gun per wood box
Length ..... 3 ft 6 in.
Width ..... 7 in.
Height ..... 9 in.
Volume ..... 1.5 cu ft
Gross weight ..... 70 lb
Ship tons 0.04

REFERENCES

FM 23 65; TM 9 1205, SNL A-5, SNL A 35, Sec 1

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 53

GUN, MACHINE, CAL. .30, BROWNING, M1919A4, FLEXIBLE



GENERAL

The cal. .30 Browning machine gun M1919A4 flexible is an automatic, recoil operated, belt fed, air-cooled machine gun. Either the metallic link or web belt can be used to feed the ammunition into the left side of the gun. It is a general purpose offensive or defensive weapon which can be mounted on either the cal. .30 tripod mount M2 or cal. .30 M1917A1 and is used in most vehicles and tanks. The back plate is equipped with a pistol grip. This weapon is known as the cal. .30 heavy barrel machine gun.

GUN DATA

Weight	31 lb
Length (over-all)	3 ft 5 1/8 in.
Length of barrel	24 in.
Operation	Short recoil
Feed	Fabric or link belt
Capacity of feeding device	250 rds.
Fabric belt– Link belt	as desired
Cooling	Air
Muzzle velocity	2,800 fps
Maximum range	3,500 yd
Rate of fire	400–550 rounds per minute

AMMUNITION

Cal. .30 cartridges.. AP, API, ball, blank, dummy, tracer M1, tracer M25
Cal. .30 web belt ..... Belt M1917
Cal. .30 links.. Link M1 and belt end M1

GUN EQUIPMENT

BRUSH, cleaning, cal. .30, M2 (wire)
BRUSH, cleaning, chamber, M6 (bristle)
HIDER, flash, M6
ROD, cleaning, cal. .30, M2A1
ROD, cleaning, jointed, cal. .30, M1 (3 sections w/handle

SIGHTING EQUIPMENT

CLINOMETER, machine gun, M1917
TABLE, firing, 0.30–A–4
TABLE firing, 0.30–J–1

SHIPPING DATA

Shipped 2 machine guns per wood box

Length	3 ft 10 in.
Width	8 in.
Height	9 in.
Volume	1.9 cu ft
Gross weight	85 lb
Ship tons	0.05

REFERENCES

FM 23-55; TM 9-1205; SNL A-6, SNL A-35, Sec. 1.

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 54

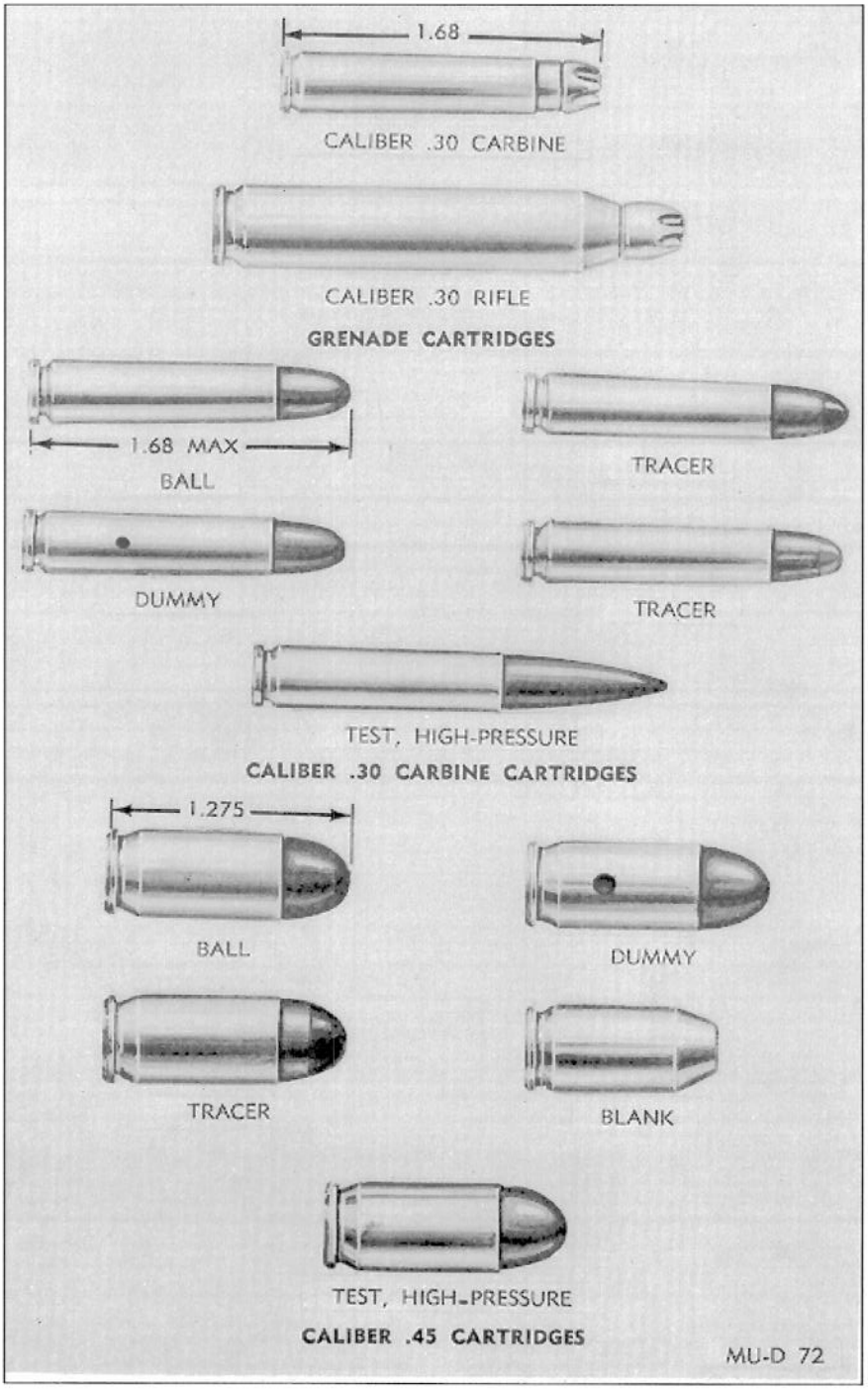


Figure 45 - Caliber .30 carbine and caliber .45 cartridges

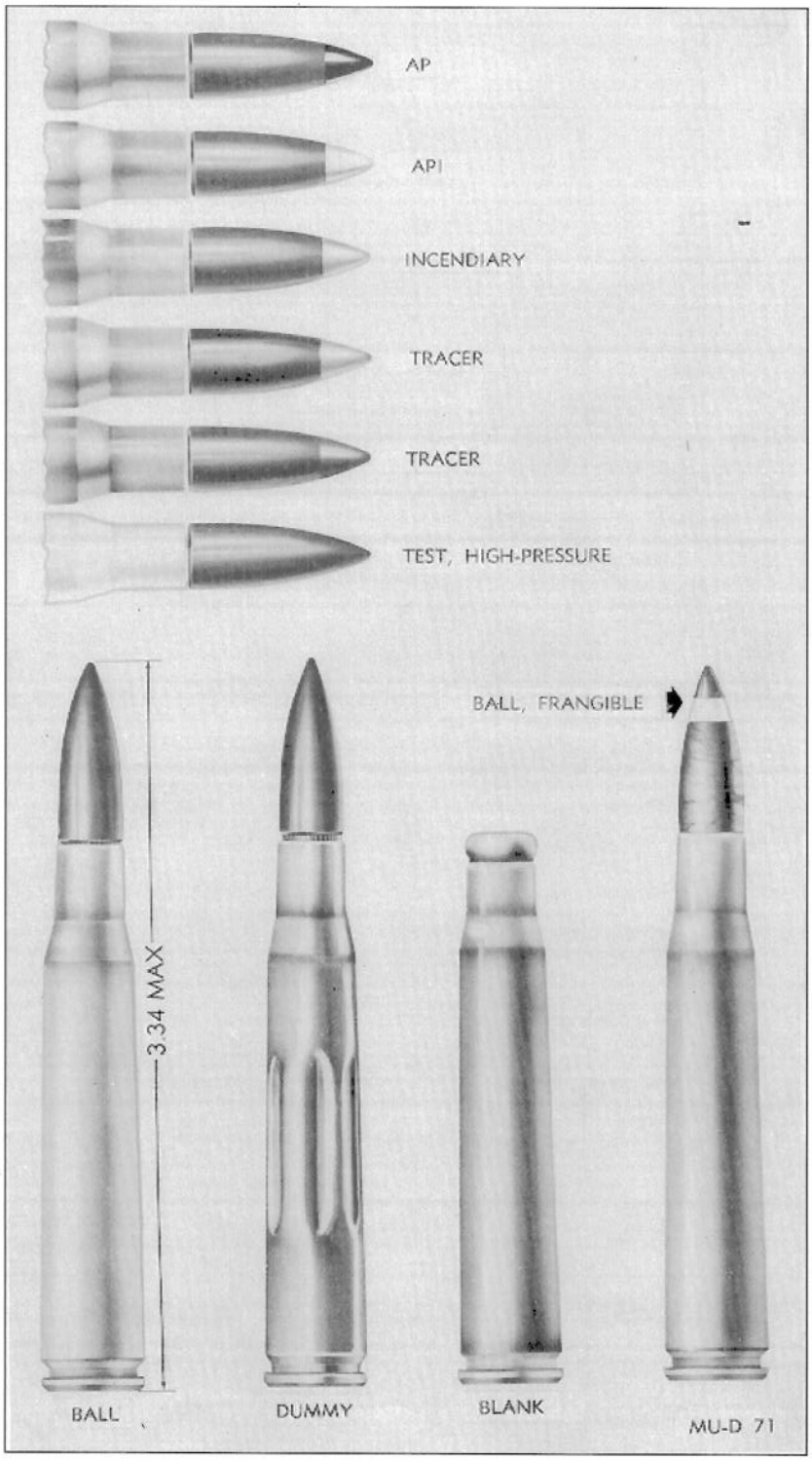


Figure 44 - Caliber .30 cartridges

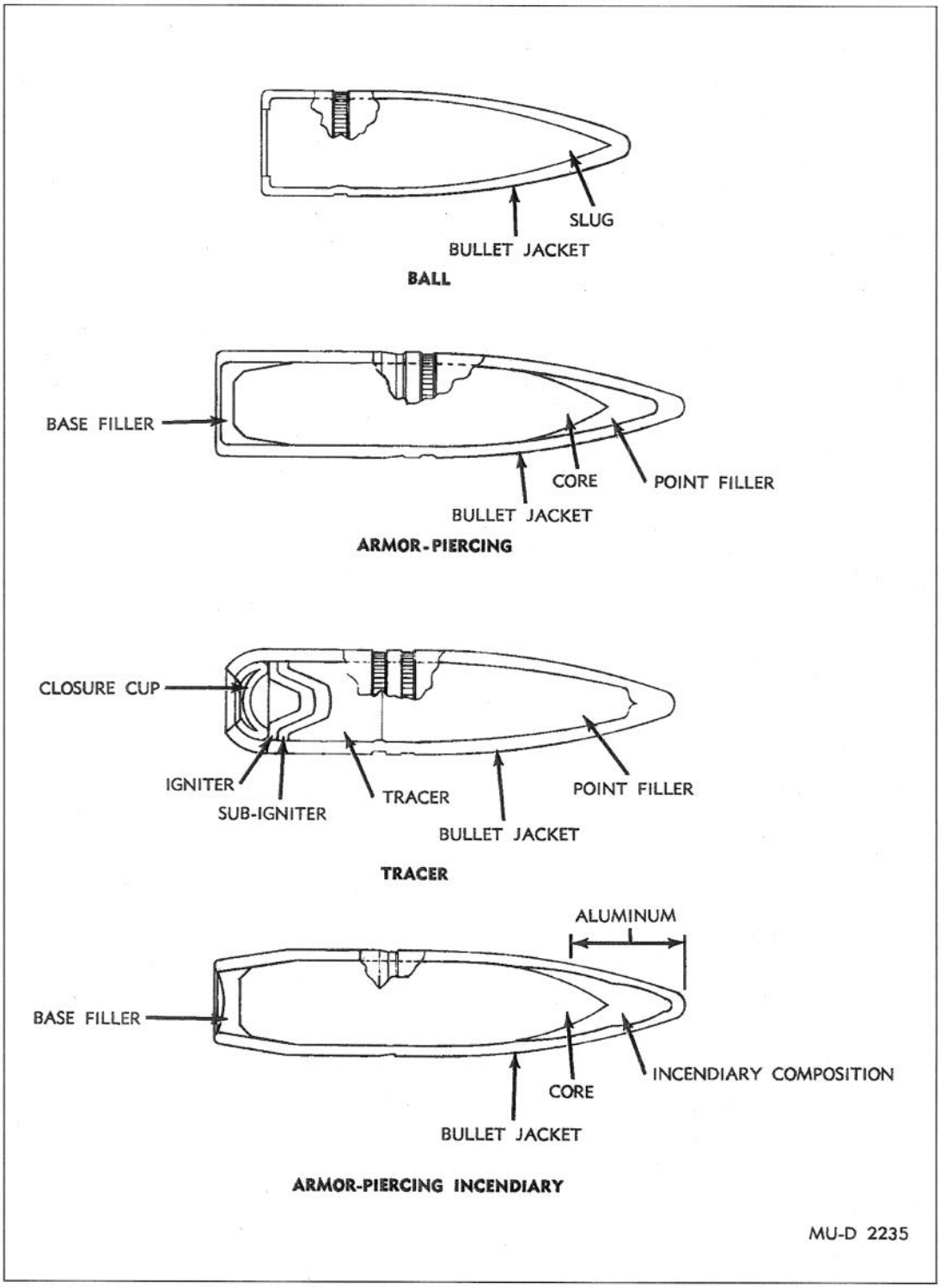


Figure 41 - Caliber .30 bullets (sectional)

Small Arms Ammunition

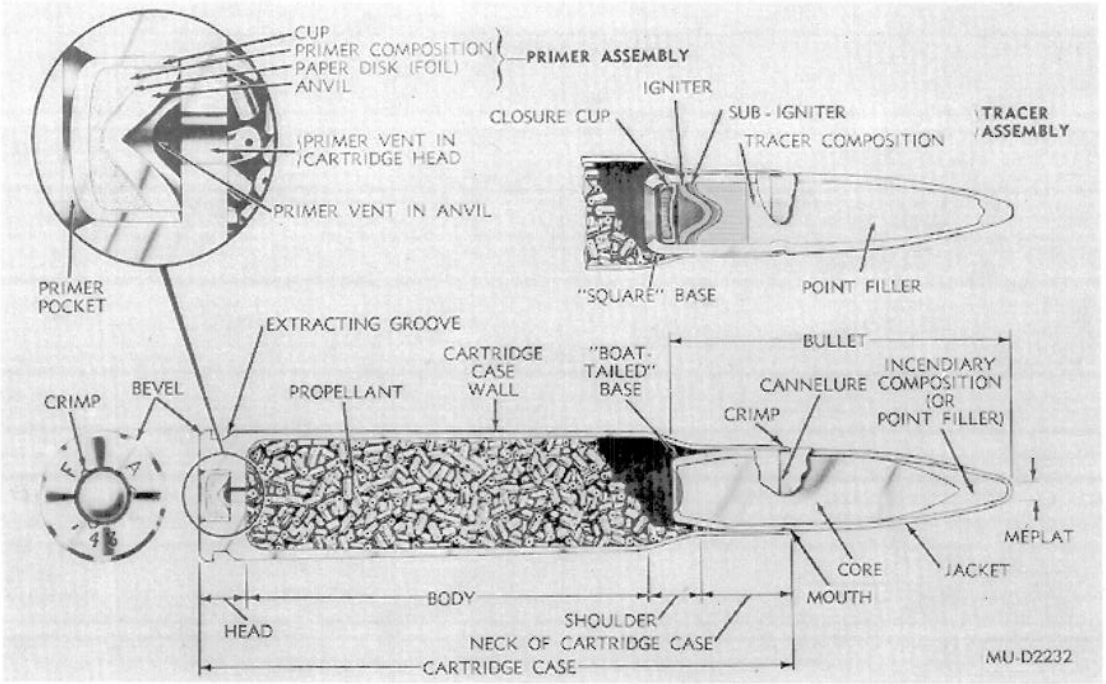


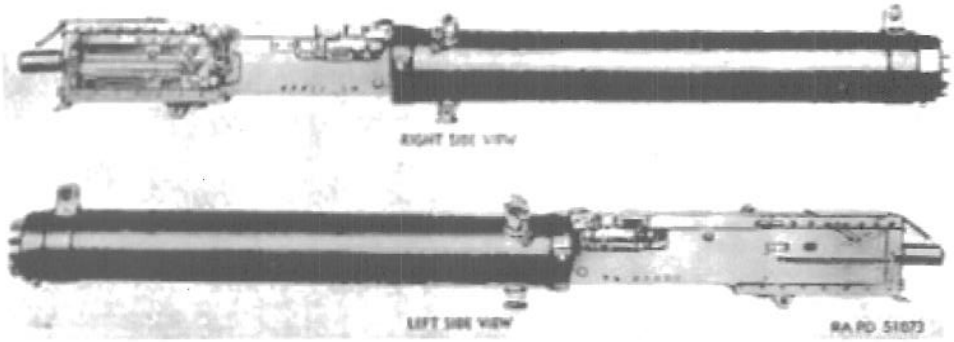
Figure 38 - Typical cartridge (sectional)

General. Small-arms ammunition is a cartridge or family of cartridges for use in hand-held or mounted weapons through 30 millimeter. Within a caliber designation, weapons may include one or more of the following: rifles (except recoilless), carbines, pistols, revolvers, machineguns and shotguns. Small-arms ammunition may be grouped as cartridges for combat or training (API, HEI, tracer or ball); for training only (blank or dummy); or special purposes (rifle grenade or spotter-tracer). See TM 9-1306-200 for detailed information on small-arms ammunition.

Cartridges. A small-arms cartridge is an assembly of cartridge case, primer, propellant within the cartridge case, and a bullet or projectile. Blank and rifle grenade cartridges were sealed with paper closure disks rather than bullets. Dummy cartridges were composed of a cartridge case and a bullet. Some dummy cartridges contained inert granular materials to simulate the weight and balance of live a cartridge. A typical cartridge and terminology for its components are shown in Figure 38.

Case. Steel, aluminum, zinc and plastic materials were used experimentally however, brass, a composition of 70 percent copper and 30 percent zinc, was the most commonly used cartridge case material. Steel was also an approved material for .45 caliber cartridge cases. Brass, paper and plastic are used for 12-gage shotgun shell bodies. Aluminum was used for military-type .410 gage shotgun shell bodies. Configurations of cartridges and bullets are illustrated in Figures 39 through 43.

GUN, MACHINE, CAL. .50, BROWNING, M2
WATER-COOLED, FLEXIBLE



GENERAL

The cal. .50 water-cooled Browning machine gun M2 flexible is an automatic, recoil operated, belt-fed, water-cooled machine gun. This machine gun is similar to other cal. .50 Browning machine guns of the M2 series with the exception of the barrel and water jacket. The gun is furnished with a retracting slide attached to the right side of the receiver. The back plate is of the flexible type with or without spade grips. The spade grip back plate is assembled only when the gun is used with antiaircraft pedestal mount M46. This gun is also used in the cal. .50 machine gun antiaircraft mount M3. It can also be used in the cal. .50 antiaircraft machine gun mount M63 but will not be issued for such use. This mount is considered as an emergency mount for the water-cooled gun to be used when other mounts designed for this gun are not available, or when its use on account of lightness and portability is considered expedient. Front and rear sights are no longer assembled to the gun, however, the front sight base is retained for locating an antiaircraft sight.

GUN DATA

Weight (w/o water)	100 lb 8 oz
Weight (w/water)	121 lb
Length (over all)	5 ft 6 in.
Length of barrel	45 in.
Operation	Short recoil
Feed	Link belt
Capacity of feeding device	As desired
Capacity of cooling system	2½ gal
Cooling	Water
Muzzle velocity	2,930 fps
Maximum range	7,400 yd
Rate of fire	550–700 rounds per minute

AMMUNITION

Cal. .50 cartridges: AP, API M8, API-T, ball, dummy, incendiary M1, tracers M1 and M17

Cal. .50 links: Links M1 and M2

GUN EQUIPMENT

BRUSH, cleaning, cal. .50, M1

CHEST, water, M3

FILTER, flash, T19

GUIDE, belt

ROD, cleaning, cal. .50, M6

ROD, cleaning, pedestal, cal. .50, M7 (5 sections w/handle)

SIGHTING EQUIPMENT

TABLE, firing, 0.50 H-1

TABLE, firing, 0.50 AA T-1

SHIPPING DATA

Shipped 1 machine gun w/1 retracting slide group assembly, 1 bolt handle, 1 rear cartridge stop, 1 link stripper, and 1 left hand retracting slide lever spring per wood box.

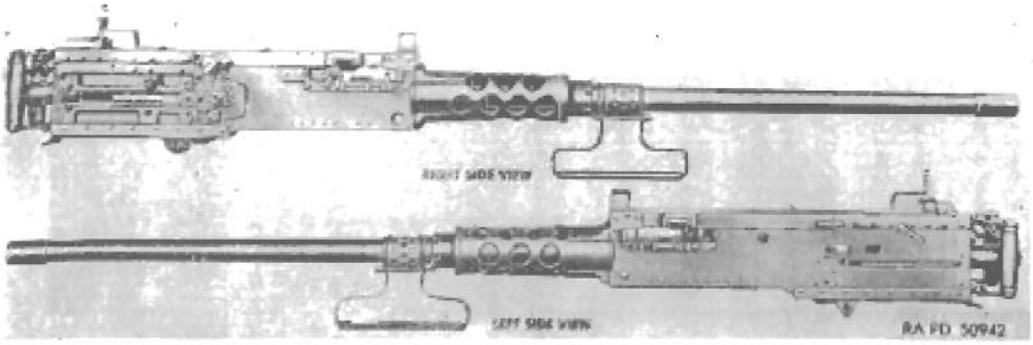
Length	5 ft 9 in.
Width	9 in.
Height	10 in.
Volume	3.6 cu ft
Gross weight	138 lb
Ship tons	0.09

REFERENCES

TM 9-220, TM 9-1225, SNL A-37.

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 59

GUN, MACHINE, CAL. .50, BROWNING, M2, HEAVY BARREL, FLEXIBLE



GENERAL

The cal. .50 heavy barrel Browning machine gun M2 flexible is an automatic, recoil operated, belt-fed, air-cooled machine gun. By repositioning some of the component parts, ammunition may be fed from either the right or left side. The metallic link belt is used in all cases. This gun is equipped with a back plate having spade grips, trigger, and bolt latch release. A bolt latch in the receiver will hold the bolt in the open position after each round is fired unless the bolt latch release on the back plate is in the locked position making the bolt latch inoperative. This gun may be mounted on the cal. .50 machine gun tripod mount M3, the cal. .50 machine gun antiaircraft mount M5, the cal. .50 twin machine gun pedestal mount M65, the cal. .50 machine gun antiaircraft mount M63, and on most vehicles and tanks as an antiaircraft weapon. When mounted on the cal. .50 antiaircraft mount M3, the handle frames and spade grips must be removed from the back plate. The gun is equipped with leaf type sights and a barrel carrier assembly. A retracting slide assembly is furnished with each gun. Heavy barrel guns do not recoil with as much force as other types of cal. .50 machine guns, therefore several parts of the oil buffer assembly are eliminated and recoil oil is not used.

GUN DATA

Weight	84 lb
Length (over-all)	5 ft 5⅛ in.
Length of barrel	45 in.
Operation	Short recoil
Feed	Link belt
Capacity of feeding device	As desired
Cooling	Air
Muzzle velocity	2,930 fps
Maximum range	7,400 yd
Rate of fire	450–550 rounds per minute

AMMUNITION

Cal. .50 cartridges... AP, API M8, API-T, ball, dummy, incendiary M1, tracers M1 and M17

Cal. .50 links..... Links M1 and M2

GUN EQUIPMENT

LINK, metallic belt link

BRUSH, cleaning, cal. .50, M4

CHUTE, metallic belt link, cal. .50, M1

FILTER, flash, T21

ROD, cleaning, cal. .50 M6

ROD, cleaning, jointed, cal. .50, M7 (5 sections w/handle)

SIGHTING EQUIPMENT

TABLE, firing, 0.50-H-1

TABLE, firing, 0.50-AA-T-1

SHIPPING DATA

Shipped 1 machine gun per wood box

Length	4 ft 1 in.
Width	7 in.
Height	9 in.
Volume	1.8 cu ft
Gross weight	116 lb
Ship tons	0.05

REFERENCES

FM 23-65; TM 9-1225; SNL A-39.

TM 9-2200, Small Arms Material and Associated Equipment, 14 April 1949, p. 61

Figure 46 - Caliber .50 cartridges

Appendix G – Textual References of Source Documents

TEXTUAL REFERENCES OF SOURCE DOCUMENTS

Real Estate Documents

G-1 – Military Acquisition Project Report dated 25 July 1950. The report 65 tracts of land totaling 48,557 acres of land being leased as part of the WVMA.

G-2 – Tract Register for 65 tracts of land dated 26 July 1950.

G-3 – Permit granted to The Office of Scientific Research and Development, with tract map, dated 8 September 1945. The permit grants The Office of Scientific Research and Development the use of area marked on the tract map for testing of rockets and other projectiles.

G-4 – Real Property Management and Disposal Report dated 15 April 1951. The report shows 48,557 acres of leased land being surplus.

G-5 – Letter to the Honorable Secretary of Agriculture, from Henry L. Stimson, Secretary of War, dated 15 July 1943. The letter states there is a military necessity for portions of the Monongahela National Forest, West Virginia, for Army maneuvers.

G-6 – Letter with 2 endorsements to The Commanding General, Army Service Forces, from the Chief of Engineers, U.S. Army, dated 23 July 1943. The letter states there is a military necessity for the acquisition of 52,820 acres of land for use as artillery training grounds.

G-7 – Letter to the Condemnation Section and Leasing Section, Corps of Engineers, from Col. TF Farrell, Planning and Appraisal Section, Corps of Engineers, dated 28 July 1943. The letter states there is a need for an additional 4,849 acres of land for use as artillery training grounds.

G-8 – Letter to Henry L. Stimson, the Secretary of War, from Claude R. Wickard, the Secretary of Agriculture, dated 4 August 1943. The letter grants permission for the Army to use 341,266 acres of land more or less in the Monongahela National Forest.

G-9 – Letter to the Condemnation Section and Leasing Section, Corps of Engineers, from Col. TF Farrell, Planning and Appraisal Section, Corps of Engineers, dated 29 October 1943. This letter revises acreage to be leased as 48,067.

G-10 – Letter to the Acquisition Branch, Purchase Section, from the Chief, Real Estate Division, dated 8 December 1943. The letter recaps land acquisition and describes additional land required.

G-11 – Letter to the Ohio River Division Engineer, from the Office of the Chief of Engineers, dated 28 June 1945. The letter discusses disposal of the maneuver area and the need to decontaminate all land regardless of value.

G-12 – Letter to the Chief of Engineers, from Mr. CB Raymer, Real Estate Officer, Ohio River Division, dated 18 July 1950. The letter discusses the termination of two use permits issued by the Department of Agriculture.

G-13 – Right of Way agreement between the U.S. Army and the Western Maryland Railroad to install a steam line to the WVMA Station Hospital. The date of the agreement is 17 December 1943.

G-14 – Real Property Inventory Report from the War Department, Office of the Chief of Engineers, dated 6 December 1943.

G-15 – Letter to the Chief, Forest Service, Department of Agriculture, from Col. WH Hastings, Corps of Engineers, Assistance Chief of Engineers for Real Estate, dated 10 August 1950. The letter discusses release of 350,531 acres of land by the Army and states that the land has been thoroughly searched for explosive material and that all such material reasonably possible to detect has been removed or neutralized.

G-16 – Letter to the Commanding General, Fifth Service Command thru the Chief of Engineers from Lt. Col JP Dryden, Army Ground Forces. The letter discusses the initial reconnaissance and logistical information concerning the WVMA.

G-17 – Letter to the Commanding General, Army Ground Forces from EF Reinhardt, Major General of the US Army. This letter discusses information concerning the WVMA Impact Area.

G-18 – Letter to the Lt. Col. Hawkins, Commanding General, Army Ground Forces from Col. John O'Brien, Chief Real Estate Branch, Corps of Engineers. This letter discusses the boundaries of the WVMA Impact Area.

G-19 – Letter to the Chief of Engineers, U.S. Army from AC Allen, Major, Real Estate Officer, Corps of Engineers. This letter, dated 5 July 1945, discusses the declaring of surplus for all WVMA property.

G-20 – Programs of Event for the Allegheny Ballistics Laboratory dated 8 November 1945. The program notes that the laboratory operates a long firing range located on Allegheny Mountain about 40 miles south of the main site.

G-21 – Real Property Management and Disposal Report dated 15 April 1951. This document reports the disposal of Department of Agriculture and private property. Also, a Warning Notice given by the Army Service Forces, Office of the Chief of Engineers notifying surplus of property.

<u>Logistical/Supply Documents</u>

G-22 – History of the West Virginia Maneuver Area. This document presents a summary of the West Virginia Maneuver Area.

G-23 – West Virginia Maneuver Area Administrative and Supply Plan. This document presents information concerning logistical and supply information for the WVMA.

G-24 – This letter dated 3 July 1943 from Lt General McNair to the Commanding General of the XIII Corps. This letter refers to aerial photography that is requested for the WVMA.

G-25 – This letter dated 12 November 1943 from JL Taylor, Lt Col for the Quartermaster Company to the Commanding General of the Army Ground Forces. This letter refers to petroleum requirements within the WVMA.

G-26 – This memorandum dated 7 March 1944 instructs to the construction of a Field Firing Range.

G-27 – This letter dated 14 April 1944 from Major General Gillem to Commanding General of the 95th Infantry Division. This letter refers to required ammunition to bring to the WVMA and the proposed schedule of the 95th within the WVMA.

G-28 – This information packet found at the Fort Worth National Archives by USACE, St. Louis District gives pertinent information on post maneuver area decontamination exercises at the WVMA.

Training Information

G-29 – Letter dated 15 March 1944 from R.A. Merideth, Major, Army Ground Defenses, to the Commanding General of the XIII Corps. This letter gives general information concerning the WVMA.

G-30 – Letter dated 17 January 1944 from Col. TF Keefe, Adjunct General, to the Commanding General of the Army Ground Forces. This memorandum provides information concerning training of the 343rd Medical Group.

G-31 –Letter dated 8 February 1944 from Col. TF Keefe to the Commanding General of the 35th Infantry Division. This letter provides general information concerning training at the WVMA.

G-32 – Memorandum concerning the "Operation of OQ-2A Radio Controlled Targets" at the 628th Tank DestroyerBattalion range.

G-33 – Note dated 26 October 1943 from Col. JF Williams concerning the schedule of the 31st and 77th Infantry Divisions.

G-34 – Memorandum slip from the Headquarters of the Army Ground Forces concerning the 95th Infantry Division's training at the WVMA.

G-35 – Movement Assignment and Activation Orders from Lt. Col. Lemp concerning the 628th Anti-Tank Destroyer Battalion.

G-36 – Division Ordnance Office Unit Journal from 23 July 1943 through 3 September 1943.

G-37 – Miscellaneous schedule of maneuvers being conducted throughout the United States during preparation for World War II.

G-38 – Notes for Conference at Army Ground Forces concerning the WVMA Training.

G-39 – Letter dated 23 November 1943 from Brig. General Christiansen, Chief of Staff to the Commanding General of the XIII Corps concerning a site visit to the WVMA on 9-14 November 1943.

G-40 – Letter dated 13 November 1943 from Major Merideth, Assistant Ground Adjunct General to the Commanding General of the XIII Corps concerning a site visit to the WVMA on 25 October 1943.

G-41 – 377th Infantry Regiment Unit Journal from 12-17 June 1944.

G-42 – 305th Infantry Regiment Unit Journal from 28-30 November 1943.

G-43 – 628th Tank Destroyer Battalion Journal.

G-44 – History of the 628th Tank Destroyer Battalion.

G-45 – Qualification results in firing at a small arms firing range located in the WVMA.

G-46 – Field Orders dated 16 September 1943 from Col. John Jenkins concerning a maneuver problem.

G-47 – Training information and journal for the 305th Infantry Regiment.

G-48 – Excerpt for Presenting the 35th Infantry Division in World War II, 1941-45, undated. The excerpt indicated training in the WVMA.

G-49 – Excerpt from the Historical and Pictorial Review of the 28th Infantry Division in World War II, undated. The excerpt indicated training in the WVMA.

G-50 – Excerpt from the 95th Infantry Division History and Mission, undated. The excerpt indicates training in the WVMA.

G-51 – Excerpt from the History of 31st Infantry Division, In Training and Combat, 1940-45, undated. The excerpt indicated training in the WVMA.

G-52 – Excerpt from the History of the 77th Infantry Division, Ours to Hold it High, undated. The excerpt indicated training in the WVMA.

G-53 – Excerpt from "Holding the Line" The 51st Engineer Combat Battalion and the Battle of the Bulge (December 1944 – January 1945). This except describes the 51st Engineer Combat Battalion's time at the WVMA.

G-54 – Excerpt from "The Mules' Last Bray" concerning information about the Pack Mule School at the WVMA.

MILITARY A[illegible]ION PROJECT REPORT

REPORTS CONTROL SYMBOL
ENGLC - 2 (R2)

TO: Chief of Engineers Washington 25, D. C. ATTN: ENGLH	FROM (Division) Ohio River	DISTRICT Louisville, Ky.	STATE (S) West Virginia
PROJECT NAME West Virginia Maneuver Area		DIRECTIVE DATE 4-10-42, 7-23-43, 7-28-43, 10-29-43	DIRECTIVE NUMBER RE-D 773 RE-D 2418, Gen. RE-D 2418A Gen. RE-D 2418A
PURPOSE Mountain Training		DATE OF REPORT 7-26-50	
		CHECK ONE [XX] ARMY [ ] AIR FORCE [ ] ATOMIC ENERGY COMM.	

3029	CURRENT PERIOD			PROGRESS TO DATE		
	TRACTS	ACRES	DOLLARS	TRACTS	ACRES	DOLLARS
GENERAL						
1. TOTAL AUTHORIZED FOR ACQUISITION				65	48,557	26,200
a. FEE				-	-	-
b. EASEMENTS & LESSER INTERESTS				* 1	-	-
c. PUBLIC LANDS				-	-	
d. LEASED TO U.S.				** 64	48,557	
ACQUISITION OF FEE, EASEMENTS AND LESSER INT.						
2. TOTAL (*Items 1a & 1b*)				1	-	-
3. TRACT OWNERSHIP DATA COMPLETED				1		
4. TRACT MAPS COMPLETED				1		
5. APPRAISALS APPROVED				-	-	-
6. TITLE EVIDENCE ORDERED				1		
7. TITLE EVIDENCE RECEIVED				1		
PURCHASE (*Including Donations*)						
8. OPTIONS OBTAINED				* 1		
9. OPTIONS ACCEPTED				1	-	-
10. TITLE EVIDENCE SUBMITTED				1		
11. PRELIMINARY TITLE APPROVED				1		
12. PAYMENTS AND CLOSINGS COMPLETED				1	-	-
13. FINAL TITLE PAPERS SUBMITTED				1	-	-
CONDEMNATION (*Including Declarations of Taking*)						
14. ASSEMBLIES SUBMITTED						
15. CONDEMNATION PETITION FILED						
16. ORDER OF POSSESSION ENTERED						
17. TITLE EVIDENCE TO U.S. ATTORNEY						
18. DECLARATION OF TAKING FILED						
19. STIPULATIONS AND AWARDS APPROVED						
20. AWARDS AND DEFICIENCIES DEPOSITED						
21. PARTIAL DISBURSEMENTS						
22. FINAL JUDGEMENT ENTERED						
23. FINAL DISBURSEMENTS						

PROJECT MANAGER (*Name*) C.B. Raymer C.B. RAYMER, Chief, Real Estate Division	OFFICE ADDRESS P.O. Box 59 Louisville, Ky.

(SEE INSTRUCTIONS ON REVERSE SIDE)

ENG FORM 1 JUN 50 1010 PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE.

INSTRUCTIONS

a. ORTS WILL BE PREPARED QUARTERLY AS OF 15 MARCH, 15 JUNE, 15 SEPTEMBER, AND 15 DECEMBER.

b. ORTS WILL BE PREPARED IN QUINTUPLICATE FOR THE FOLLOWING DISTRIBUTION: Forward original and one copy in sufficient time to reach the Office, Chief of Engineers on or before the 22nd of the month in which the report is prepared. One copy forwarded to the Division Office, one to the District Office and one copy retained in the project office.

c. SUBMISSION OF REPORTS WILL BEGIN AS SOON AS NOTICE OF ISSUANCE OF A DIRECTIVE IS RECEIVED AND CONTINUED UNTIL ALL ACTION HAS BEEN COMPLETED, INCLUDING DISTRIBUTION OF FUNDS DEPOSITED ON EXCESS AWARDS.

d. RECORDS WILL BE MAINTAINED ON A FRACTIONAL ACREAGE AND DOLLAR BASIS: Totals thereof however will be rounded to the nearest acre or dollar in preparing this report (.50 acre will be reported as an additional acre; 50 cents will be reported as an additional dollar).

e. THE NUMBER OF TRACTS, ACRES, AND AMOUNT OF MONEY SHOWN IN ITEM 1 OF THE INITIAL REPORT WILL BE AS RECITED IN THE DIRECTIVE. The number of tracts and acres will be revised as the preparation of tract ownership data and tract maps progresses. The amount of money will remain constant under item 1 unless changed by a subsequent Directive.

f. THIS REPORT WILL COVER ALL TYPES OF ACQUISITION OF REAL ESTATE OR INTERESTS THEREIN:

1. Tracts involving Public Domain, State owned land not being acquired, or land to be leased will NOT be reported in six columns of report but will be reported under remarks below. Tracts under lease will be identified by contract number, tract number and acreage.
2. Completed transactions not involving condemnation which do not follow regular acquisition procedure steps (such as easements, licenses, and donations) will for report purposes be reflected in all purchase steps (items 8-13) and will be identified by appropriate footnote showing interest acquired and number of tracts. Where no actual acreage is involved as in the case of informal agreements to top trees, only "tract" and "dollar" data will be reported.

g. ALL TRACTS TRANSFERRED FROM "PURCHASE" TO "DECLARATION OF TAKING" SHOULD BE DEDUCTED FROM ALL "PURCHASE" STEPS AFFECTED AND REPORTED UNDER "DECLARATION OF TAKING".

h. ALL TRACTS TRANSFERRED FROM "CONDEMNATION" TO "PURCHASE" SHOULD BE DEDUCTED FROM ALL "CONDEMNATION" STEPS AFFECTED AND REPORTED UNDER THE "PURCHASE" STEPS.

i. WHERE TWO OR MORE "REAL ESTATE DIRECTIVES" HAVE BEEN ISSUED IN CONNECTION WITH THE SAME PROJECT, A SEPARATE REPORT WILL BE SUBMITTED FOR EACH DIRECTIVE. "GENERAL DIRECTIVES" WILL BE REPORTED WITH THE "REAL ESTATE DIRECTIVE" TO WHICH EACH RELATES.

ADDITIONAL TRACTS: DURING THE CURRENT PERIOD, _____ TRACTS, IDENTIFIED AS TRACTS NUMBERS _____

_____ WERE ADDED UNDER THE FOLLOWING AUTHORITY

AND FOR THE FOLLOWING REASONS:

TRACT REDUCTIONS: DURING THE CURRENT PERIOD, _____ TRACTS, IDENTIFIED AS TRACTS NUMBERS _____

_____ WERE DROPPED UNDER THE FOLLOWING AUTHORITY

AND FOR THE FOLLOWING REASONS:

REMARKS

3152

* 1 license, no area and nominal cost.

** For lease number, tract numbers and acreage of tracts taken by leasehold, see tract register, same directive.

61 1471

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER

☐ PRELIMINARY
☒ FINAL 3029
(Separate Register to be prepared for each Real Estate Directive)

PROJECT (Official Name): West Virginia Maneuver Area
PURPOSE (As Set Forth in Directive): Mountain Training
DATE OF DIRECTIVE: 4-10-42, 7-23-43, 7-28-43, 10-29-43
DIRECTIVE NUMBER: RE-D 773, RE-D 2418, Gen.RE-D 2418A, Gen.RE-D 2418 A

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Leases)
2-L	The Western Maryland RR Co.	No area	Nominal	LI	P	License dated 12-17-43	For steam line
A-67	Virgil F. Stonestreet	158.80	180.00	LE	L	Lease No. W33-017 Eng 351 dated 10-1-43	Cancelled 6-30-46 $332.58 for period from 8-6-43 to 8-31-43, $180.00 per annum thereafter.
A-75	Harry B. Herr, et al	3,830.00	223.80	LE	L	Lease No. W-33-017 Eng 1322 dated 11-1-43	Cancelled 6-30-46 $223.80 per annum.
A-76A	The W. Va. Central & Pittsburgh R.R. Co. and The Davis Coal & Coke Co.	17,515.54	None	LE	L	Lease No. W33-017 Eng 1403 dated 8-6-43	Cancelled 2-28-46 $1.00 per annum, receipt acknowledged.
A-76B	The W. Va. Central & Pittsburgh R.R. Co. and The Davis Coal & Coke Co.	2,107.74	None	LE	L	Lease No. W-33-017 Eng 1403 dated 8-6-43	Cancelled 2-28-46.
A-76C	The W. Va. Central & Pittsburgh R.R. Co. and The Davis Coal & Coke Co.	3,512.00	None	LE	L	Lease No. W33-017 Eng-1403 dated 8-6-43	Cancelled 2-28-46.
A-77	W. Va. Power & Transmission Co.	9,523.37	1,300.00	LE	L	Lease No. W33-017 Eng 439 dated 11-1-43	Cancelled 9-30-46 $3,033.88 for period from 8-6-43 to 8-31-43, $1300.00 per annum thereafter. Includes Tracts A-91, A-92 and A-93.
A-78	Tacy A. Carwell	1,082.00	499.92	LE	L	Lease No. W33-017 Eng 347 dated 10-1-43	Cancelled 2-28-46 $106.60 for period from 8-6-43 to 9-30-43 $499.92 per annum thereafter.
A-79	Willie J. Trout & John R. Harper	875.50	300.00	LE	L	Lease Contract No. W33-017 Eng 457 dated 11-15-43	Cancelled 2-15-46 $320.95 for period from 8-6-43 to 8-31-43 and $300.00 per annum thereafter.
A-80	Alice Coffman	553.60	100.00	LE	L	Lease Contract No. W33-017 Eng 364 dated 10-1-43	Cancelled 2-5-46 $100.00 per annum
A-81	Roscoe C. Beall, et ux	368.00	100.00	LE	L	Lease Contract No. W33-017 Eng 352 dated 10-1-43	Cancelled 2-28-46 $167.00 for period from 8-6-43 to 8-31-43 and $100.00 per annum thereafter.
A-82	Jason Harmon Estate	939.20	600.00	LE	L	Lease Contract No. W33-017 Eng 918 dated 10-1-43	Cancelled 2-28-46 $311.90 for period from 8-6-43 to 8-31-43 and $600.00 per annum thereafter.
A-86	West Virginia Pulp & Paper Co.	474.71	None	LE	L	Lease Contract No. W33-017 Eng 2257 dated 11-1-43	Cancelled 4-30-45 $1.00 for term of lease-receipt acknowledged.
A-87A	The W.Va. Central & Pittsburgh R.R. Co. and The Davis Coal & Coke Co.	290.00	None	LE	L	Lease Contract No. W33-017 Eng 1403 dated 8-6-43	Cancelled 6-30-46

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER (Cont'd)

☐ PRELIMINARY
☒ FINAL 3029
(Separate Register to be prepared for each Real Estate Directive)

PROJECT (Official Name): West Virginia Maneuver Area
PURPOSE (As Set Forth in Directive): Mountain Training
DATE OF DIRECTIVE: 4-10-42, 7-23-43, 7-28-43, 10-29-43
DIRECTIVE NUMBER: RE-D 773 RE-D 2418, Gen. RE-D 2418A Gen. RE-D 2418A

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Leases)
A-87B	The W. Va. Central & Pittsburgh R.R. Co. and The Davis Coal & Coke Co.	134.00	None	LE	L	Lease Contract No. W33-017 Eng 1403 dated 8-6-43	Cancelled 6-30-46
A-89	George Ervin Rohrbaugh	291.20	80.00	LE	L	Lease Contract No. W33-017 Eng 350 dated 10-1-43	Cancelled 6-30-46 $285.59 for period from 8-6-43 to 8-31-43 and $80.00 per annum thereafter.
A-90	John H. Rohrbaugh & Claudia A. Rohrbaugh	140.00	150.00	LE	L	Lease Contract No. W33-017 Eng 349 dated 10-1-43	Cancelled 6-30-46 $220.48 for period from 8-6-43 to 8-31-43 and $150.00 thereafter
A-91	W. Va. Power & Transmission Co.	412.27	See A-77	LE	L	Lease Contract No. W33-017 Eng 439 dated 11-1-43	Cancelled 9-30-46 Per Annum Cost included in Tract A-77.
A-92	W. Va. Power & Transmission Co.	6.64	See A-77	LE	L	Lease Contract No. W33-017 Eng 439 dated 11-1-43	Cancelled 9-30-46 Per Annum Cost included in Tract A-77.
A-93	W. Va. Power & Transmission Co.	35.27	See A-77	LE	L	Lease Contract No. W33-017 Eng 439 dated 11-1-43	Cancelled 9-30-46 Per Annum Cost included in Tract A-77.
A-94A	Parsons Realty & Machinery Co.	309.00	None	LE	L	Lease Contract No. W33-017 Eng 409 dated 11-15-43	Cancelled 6-30-46 $1.00 per annum receipt acknowledged.
A-94B	Parsons Realty & Machinery Co.	258.50	None	LE	L	Lease Contract No. W33-017 Eng 409 dated 11-15-43	Cancelled 6-30-46.
C-8	T. G. Smith	505.00	20.00	LE	L	Lease Contract No. W33-017 Eng 348 dated 10-1-43	Cancelled 6-30-46 $20.00 per annum.
C-25	W.C. Halterman Estate	103.00	30.00	LE	L	Lease Contract No. W33-017 Eng 365 dated 10-1-43	Cancelled 6-30-46 $30.00 per annum.
C-26	Margaret Hall & Jeff Hall	101.00	90.00	LE	L	Lease Contract No. W33-017 Eng 346 dated 10-1-43	Cancelled 6-30-46 $149.29 for period from 8-6-43 to 8-31-43 and $90.00 per annum thereafter.
C-29	Unknown Owner	128.00	*	LE	D/T	Civil Action 1919 for period from 8-6-43 to 6-30-46	No D/T was filed and no money deposited in Court Petition filed 8-6-43. See note at bottom of last page of this tract register.
C-30	Carroll B. Tyson	240.00	77.00	LE	L	Lease Contract No. W33-017 Eng 455 dated 11-1-43	Cancelled 6-30-46 $77.00 annual rental.
C-31	Unknown Owner	62.00	*	LE	D/T	Civil Action 1919 for period from 8-6-43 to 6-30-46	No D/T filed and no money deposited in Court. Petition filed 8-6-43. See note at bottom of last page of this tract register.
C-32	C. J. Burgess	112.00	45.00	LE	L	Lease Contract No. W33-017 Eng 366 dated 10-1-43	Cancelled 6-30-46 $263.14 for period from 8-6-43 to 8-31-43 and $45.00 per annum thereafter.
	TOTAL						

1/ "F" Fee; "LE" Leasehold; "LI" License; "PE" Permit; "E" Easement.
2/ "P" Purchase; "D/T" Declaration of Taking; "WPA" War Powers Act Condmn; "U" Unnegotiated; "T" Transfer; "D" Donation; "SC" Straight Condmn.; "L" Lease; "MWPA" Matured War Powers Action; "AG" Informal agreement; "LS" Lease - Suspension Agreement; "R" Reassignment.

DIVISION: Ohio River
DATE PREPARED: 7-26-50

ENG FORM 1019 1 NOV 46

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G-2

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER

☐ PRELIMINARY
☒ FINAL 3029
(Separate Register to be prepared for each Real Estate Directive)

PROJECT (Official Name): West Virginia Maneuver Area
PURPOSE (As Set Forth in Directive): Mounting Training
DATE OF DIRECTIVE: 4-10-42, 7-23-43, 7-28-43, 10-29-43
DIRECTIVE NUMBER: RE-D 773, RE-D 2418, Gen. RE-D 2418A, Gen. RE-D 2418A

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Leases)
C-34	Unknown Owner	96.00	*	LE	D/T	Civil Action 1919 for period from 8-6-43 to 6-30-46	No D/T was filed and no money deposited in Court. Petition filed 8-6-43. See note at bottom of last page of this tract register.
C-35	Lillian Stockton Klein	464.00	145.00	LE	L	Lease Contract No. W33-017 Eng 463 dated 11-1-43	Cancelled 6-30-46 $145.00 per annum.
C-37	O. J. Weimer Estate	230.00	80.00	LE	L	Lease Contract No. W33-017 Eng 373 dated 10-1-43	Cancelled 6-30-46 $165.59 for period from 8-6-43 to 8-31-43 and $80.00 per annum thereafter.
C-37A	Unknown Owner	298.00	*	LE	D/T	Civil Action 1919	No D/T was filed and no money deposited in Court. Petition filed 8-6-43. See note at bottom of last page of this tract register.
C-38	Bessie Weimer Berg	198.00	100.00	LE	L	Lease Contract No. W33-017 Eng 368 dated 10-1-43	Cancelled 6-30-46 $70.00 for period from 8-6-43 to 8-31-43 and $100.00 per annum thereafter.
C-39	Carl E. Weimer & John B. Weimer	208.00	100.00	LE	L	Lease Contract No. W33-017 Eng 370 dated 10-1-43	Cancelled 6-30-46 $186.99 for period from 8-6-43 to 8-30-43 and $100.00 per annum thereafter.
C-40	Unknown Owner	96.00	*	LE	D/T	Civil Action 1919 for period from 8-6-43 to 6-30-46	*No D/T was filed and no money deposited in court. Petition filed 8-6-43. See note on last page.
C-41	A. J. Welton Estate	118.00	25.00	LE	L	Lease Contract No. W33-017 Eng 344 dated 10-1-43	Cancelled 6-30-46 $25.00 per annum.
C-42	J. Evers Evans, et ux	128.00	110.00	LE	L	Lease Contract No. W33-017 Eng 369 dated 10-1-43	Cancelled 6-30-46 $407.68 for period from 8-6-43 to 8-31-43 and $110.00 per annum thereafter.
C-54	Willie Burgess & Arthur Barger	78.75	110.00	LE	L	Lease Contract No. W33-017 Eng 363 dated 10-1-43	Cancelled 6-30-46 $112.69 for period from 8-6-43 to 8-31-43 and $110.00 per annum thereafter.
C-56	Harrison Evans	150.00	200.00	LE	L	Lease Contract No. W33-017 Eng 361 dated 10-1-43	Cancelled 6-30-46 $463.99 for period from 8-6-43 to 8-31-43 and $200.00 per annum thereafter.
C-59	Aaron C. Goldizen	200.00	150.00	LE	L	Lease Contract No. W33-017 Eng 354 dated 10-1-43	Cancelled 6-30-46 $391.48 for period from 8-6-43 to 8-31-43 and $150.00 per annum thereafter.
	TOTAL						

1/ "F" Fee; "LE" Leasehold; "LI" License; "PE" Permit; "E" Easement.
2/ "P" Purchase; "D/T" Declaration of Taking; "WPA" War Powers Act Condmn; "U" Unnegotiated; "T" Transfer; "D" Donation; "SC" Straight Condmn.; "L" Lease; "MWPA" Matured War Powers Action; "AG" Informal agreement; "LS" Lease - Suspension Agreement; "R" Reassignment.

DIVISION: Ohio River
DATE PREPARED: 7-26-50

ENG FORM 1019
1 NOV 48

48 11310

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER

☐ PRELIMINARY
☒ FINAL 3029
(Separate Register to be prepared for each Real Estate Directive)

PROJECT (Official Name): West Virginia Maneuver Area
PURPOSE (As Set Forth in Directive): Mountain Training
DATE OF DIRECTIVE: 4-10-42, 7-23,43,7-28-43,10-29-43
DIRECTIVE NUMBER: RE-D 773, RE-D 2418,Gen.RE-D 2418A, Gen.RE-D 2418A

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (Including Contract No. of Leases)
C-60	Arlie Goldizen	101.00	50.00	LE	L	Lease Contract No. W33-017 Eng 362 dated 10-1-43	Cancelled 6-30-46 $50.00 per annum.
C-61	Delphia Berg & Ben Berg	47.50	82.00	LE	L	Lease Contract No. W33-017 Eng 367 dated 10-1-43	Cancelled 6-30-46 $125.73 for period from 8-6-43 to 8-31-43 and $82.00 per annum thereafter.
C-65	Adam H. Evans	40.00	50.00	LE	L	Lease Contract No. W33-017 Eng 360 dated 10-1-43	Cancelled 6-30-46 $163.49 for period from 8-6-43 to 8-31-43 and $50.00 per annum thereafter.
C-66	Earl H. Rohrbaugh, et ux	88.00	66.00	LE	L	Lease Contract No. W33-017 Eng 371 dated 10-1-43	Cancelled 6-30-46 $234.61 for period from 8-6-43 to 8-31-43 and $66.00 per annum thereafter.
C-68	M. E. Goldizen	104.00	50.00	LE	L	Lease Contract No. W33-017 Eng 358 dated 10-1-43	Cancelled 6-30-46 $193.49 for period from 8-6-43 to 8-31-43 and $50.00 per annum thereafter.
C-69	M. K. Barger	16.00	60.00	LE	L	Lease Contract No. W33-017 Eng 359 dated 10-1-43	Cancelled 6-30-46 $134.19 for period from 8-6-43 to 8-31-43 and $60.00 per annum thereafter.
C-71	Central Tie and Lumber Co.	592.00	30.00	LE	L	Lease Contract No. W33-017 Eng 345 dated 10-1-43	Cancelled 6-30-46 $30.00 per annum.
C-72	Abijah Rohrbaugh	323.00	180.00	LE	L	Lease Contract No. W33-017 Eng 353 dated 10-1-43	Cancelled 6-30-46 $232.58 for period from 8-6-43 to 8-31-43 and $180.00 per annum thereafter.
C-73	T.J. & J.B. Grove Estate	784.00	88.00	LE	L	Lease Contract No. W33-017 Eng 372 dated 10-1-43	Cancelled 6-30-46 $88.00 per annum.
1	Western Maryland R.R. Co.	4.26	None	LE	L	Lease Contract No. W33-017 Eng 437 dated 10-5-43	Transferred to FPHA 7-1-46. $1.00 per annum receipt acknowledged.
3	J.V. Lough & Citizens National Bank	22.70	113.50	LE	L	Lease Contract No. W33-017 Eng 197 dated 8-1-43	Cancelled 8-7-44 $113.50 per annum.
4	City of Elkins	1.05	100.00	LE	L	Lease Contract No. W33-017 Eng 1170 dated 1-1-44	Cancelled 2-2-46 $100.00 per annum.
5	J.H. Fitzwater	1.00	None	LE	L	Lease Contract No. W33-017 Eng 248 dated 7-1-43	Cancelled 6-5-44 $1.00 per annum receipt acknowledged.
6	Earl Scott	7.00	35.00	LE	L	Lease Contract No. W33-017 Eng 137 dated 8-1-43	Cancelled 4-10-44 $25.00 per annum $525.00 in lieu of restoration.

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER

PROJECT (*Official Name*) West Virginia Maneuver Area | PURPOSE (*As Set Forth in Directive*) Mountain Training | DATE OF DIRECTIVE 4-10-42, 7-23-43, 7-28-43, 10-29-

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (*Including Contract No. of Leases*)
7	Trs. of the Valley Improvement Co.	14.00	None	LE	L	Lease Contract No. W33-017 Eng 158 dated 8-1-43	Cancelled 9-15-44 $1.00 per annum receipt acknowledged.
8	Randolph Co. Board of Education	1.17	None	LE	L	Lease Contract No. W33-017 Eng 161 dated 8-2-43	Cancelled 9-15-44 $1.00 per annum receipt acknowledged.
9	Carl Degler & Richard Degler	0.60	50.00	LE	L	Lease Contract No. W33-017 Eng 909 dated 4-1-44	Cancelled 5-27-44 $50.00 per annum.
10	Victor Del Sordo	4.00	20.00	LE	L	Lease Contract No. W33-017 Eng 330 dated 9-14-43	Cancelled 4-10-44 $20.00 per annum.
11	Edna F. Hartman	17.00	170.00	LE	L	Lease Contract No. W33-017 Eng 326 dated 10-5-43	Cancelled 6-5-44 $170.00 per annum.
12	I. N. Vanscoy	10.00	100.00	LE	L	Lease Contract No. W33-017 Eng 450 dated 10-16-43	Cancelled 4-10-44 $100.00 per annum.
13	Wilbert Kisamore	14.80	201.00	LE	L	Lease Contract No. W33-017 Eng 160 dated 7-26-43	Cancelled 8-7-44 $201.00 per annum.
14	Mrs. Monna Bond	5.30	25.00	LE	L	Lease Contract No. W33-017 Eng 212 dated 7-26-43	Cancelled 8-7-44 $25.00 per annum.
15	J. R. Teter	6.50	60.00	LE	L	Lease Contract No. W33-017 Eng 321 dated 10-13-43	Cancelled 4-10-44 $60.00 per annum.
16	D. D. Caufield	18.72	150.00	LE	L	Lease Contract No. W33-017 Eng 355 dated 10-10-43	Cancelled 6-5-44 $150.00 per annum.

NOTE:

No Declarations of Takings were filed on Tracts C-29, C-31, C-34, C-37A and C-40. Petition filed 8-6-43 for a term of years ending 6-30-44 with subsequent extensions to 6-30-46. These tracts were not extended beyond 6-30-46, however, final judgments have not been entered and ownerships thereof have never been determined. The fair rental values have not been determined and no deposits have been made in court. When deposits are made, and remain unclaimed for a period of 5 years, the money will be returned to the U. S. Treasurer.

26 July 1950

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THE OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT in the Office for Emergency Management, Executive Office of the President, is hereby granted a permit commencing May 1, 1945, but revocable at will be the Secretary of War, to use as a range for test firing of rockets and other projectiles a portion of the WEST VIRGINIA MANEUVER AREA MILITARY RESERVATION, West Virginia, located substantially as shown in red on Exhibit "A" attached hereto and made a part hereof.

THIS PERMIT is granted subject to the following provisions and conditions:

1. That the premises covered by this permit are embraced in leases from the Central Tie and Lumber Company, whose address is Petersburg, West Virginia, to the United States of America under Lease No. W 33-017-Eng-345 for the period beginning August 6, 1943, through June 30, 1944, and the West Virginia Central and Pittsburgh Railway Company and the Davis Coal and Coke Company, whose address is in care of H. A. Bruck, Real Estate and Tax Agency, Western Maryland Railway Company, Hillin Station, Baltimore 2, Maryland, to the United States of American under Lease No. W 33-017-Eng-1403, for the period beginning August 6, 1943, through June 30, 1944, both leases provided that, unless and until the Government shall give notice of termination in accordance with Provision 6 thereof, the lease shall remain in force thereafter from year to year without further notice; provided further that the lease shall in no event extend the period of occupancy of the premises beyond six (6) months after the date of termination of the unlimited National Emergency as declared by the President of the United States in Proclamation No. 2487, dated May 27, 1941, and a permit from the Department of Agriculture dated August 4, 1943, for such period as may be necessary, and this permit, subject to all the provisions and conditions of said leases and permit, shall be extended automatically until the termination or expiration of said leases and permit. It is understood that this permit shall be subject to all the provisions and conditions contained in said leases and permit.

2. That the permittee will make arrangements with the Forest Service, Department of Agriculture, for responsibility for forest fire protection on the national forest land in the Monongahela National Forest which is included in the area described herein.

3. That the permittee shall have the right to attach fixtures, and erect structures or signs, in or upon the premises, which fixtures and structures, or signs, so placed in, upon, or attached to the said premises shall be and remain the property of permittee and may be removed or otherwise disposed of by permittee.

4. That the permittee will give immediate notice to the Office, Chief of Engineers, at such time as it is determined the area is no longer to be used.

5. The privileges herein granted may be exercised by the permittee through its agencies or contractors, subject to the terms and conditions herein contained; provided, however, that the permittee is not relieved of its responsibilities and obligations under this

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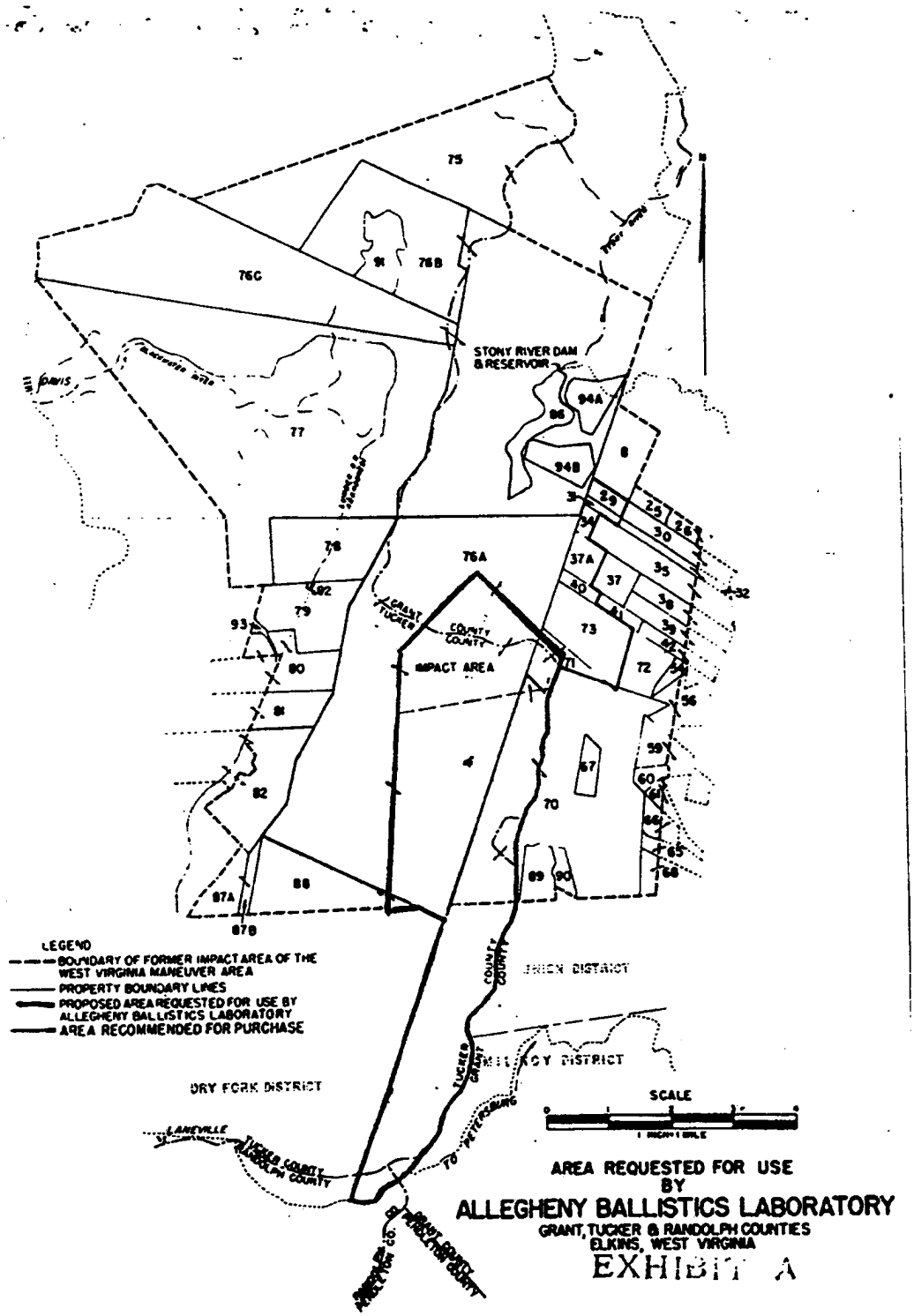
permit. Such agencies and contractors shall be required to warrant that as long as the premises are used and occupied by them, they will not include in any price charged the Government or any supplier of the Government for the work performed therein, any charges (including amortization and depreciation) for the premises herein granted, exclusive of coats of alterations, improvements, maintenance or other charges for which they may be obligated.

IN WITNESS WHEREOF I have hereunto set my hand by authority of the Secretary of War and under the direction of the Chief of Engineers this 8th day of September 1945.

/s/ ROBERT H. FABIAN
ROBERT H. FABIAN
Major, Corps of Engineers
Chief, Management and
Disposal Division
Real Estate


STONY RIVER DAM & RESERVOIR
IMPACT AREA
GRANT COUNTY
TUCKER COUNTY
UNION DISTRICT
DRY FORK DISTRICT
LANEVILLE
TUCKER COUNTY
RANDOLPH COUNTY
TO PETERSBURG
LEGEND
BOUNDARY OF FORMER IMPACT AREA OF THE WEST VIRGINIA MANEUVER AREA
PROPERTY BOUNDARY LINES
PROPOSED AREA REQUESTED FOR USE BY ALLEGHENY BALLISTICS LABORATORY
AREA RECOMMENDED FOR PURCHASE
SCALE
AREA REQUESTED FOR USE
BY
ALLEGHENY BALLISTICS LABORATORY
GRANT, TUCKER & RANDOLPH COUNTIES
ELKINS, WEST VIRGINIA
EXHIBIT A

these Stat.

REAL PROPERTY MANAGEMENT AND DISPOSAL REPORT			REPORTS CONTROL SYMBOL ENGKL - 12 (R3)
TO: Chief of Engineers ATTENTION: ENGLH Washington 25, D. C.	DIVISION Ohio River	DISTRICT Louisville	DATE OF REPORT 4-15-51

PART I

INSTALLATION	LOCATION
West Virginia Maneuver Area No. 3029	Elkins

ARMY	AIR FORCE	ATOMIC ENERGY COMMISSION	MILITARY	COMMAND	INDUSTRIAL	CIVIL	FLOOD CONTROL	RIVER & HARBORS
XX				XX				

ACREAGE ENTIRE INSTALLATION	FEE OWNED	PUBLIC LAND	LEASED	LESSER INT.	COUNTY	STATE
		350,416	48,557	*	Randolph, etc.	W. Va.

PART II

DATE	STATUS	E OR P	FEE OWNED (Acres) (1)	PUBLIC LANDS (Acres) (2)	LEASED (Acres) (3)	LESSER INT. (Acres) (4)	NATURE OF FACILITIES	COST TO GOVT. (Dollars)	CUSTODY BY C.E. (Date)
A 3/19/45	Surplus	E	—	350,416	48,553	*	Land		
B 3/19/45	"				4		"		
C									
D									
E									
F									
G									
H									
I									

PART III

TEMPORARY USE GRANTS

REF.	IN PROCESS NO.	IN PROCESS ACRES	IN PROCESS CONSIDERATION ($)	GRANTED NO.	GRANTED ACRES	GRANTED CONSIDERATION ($)	PURPOSE

REPORTED TO WAA OR GSA

REF.	REPORTED TO WAA OR GSA	DESIGNATED DISPOSAL AGENCY	DATE DESIGNATED	DISPOSITION

TRANSFER OR RETRANSFER TO OTHER GOVERNMENT AGENCIES

REF.	DATE AUTHORIZED	RECEIVING AGENCY	DATE OF LTR FROM ARMY	RESTORATION OR BLDG.	DATE

INSTRUCTIONS

ALL NUMBERS WILL BE ROUNDED TO THE NEAREST DOLLAR OR ACRE IN PREPARING THIS REPORT

a. REPORTS WILL BE PREPARED MONTHLY AS OF THE 15TH DAY OF EACH MONTH.

b. REPORTS WILL BE PREPARED IN QUADRUPLICATE FOR THE FOLLOWING DISTRIBUTION: Original and one copy will be forwarded so as to reach the Chief of Engineers, ATTENTION ENGLH, not later than the 23rd day of the month in which the report is prepared. One copy forwarded to the Division office and one copy retained in the preparing office.

c. WHEN REQUIRED: Reports will be required commencing with the month in which the installation or any portion thereof is placed in Standby, Inactive, Excess, or Surplus status and continued until excess or surplus property is disposed of by transfer, sale, termination of leases, or otherwise, but if another portion of the installation is placed in a management or disposal status at a later date and the report resumed, all previous actions subsequent to 1 July 1949, will be reflected; where the installation or portion thereof is inactive or Standby, the report may be suspended when the granting of temporary use of facilities made available for such purposes shall have been completed or definite information shall have been received that temporary use of facilities at installations or portions thereof in Standby or inactive status cannot be granted. Only military installations are definitively placed in a Standby or inactive status; therefore, reports covering Civil Works or Atomic Energy Commission Projects are required only in connection with excess or surplus statuses. Where no progress has been made during a reporting

period, a "Negative ENG Form 836" may be submitted id[illegible]ying the installation, the state, the Division, the District, [illegible]he reporting period with the words, "No Progress since report dated . . . .", posted in Part II of the report.

d. PART I will identify the installation as to name, location, department and type and set forth the entire acreage either acquired or being acquired. The acreage will be divided to show Fee owned, Public Lands (Public Domain and Lands transferred from other Government Agencies), Leased, and Lesser interests. If an installation is part Industrial and part Command, the acreages of these parts similarly broken down will be reflected in "Remarks". State, County or municipally owned lands will not be shown as Public Lands.

Part II will reflect information as to areas which have been placed in a "Standby", "Inactive", "Excess", or "Surplus" status. A separate line will be used for [illegible]h report of status, but subsequent withdrawals or adjustments affecting an area will be reflected by net figures with an explanation under "Remarks". The date [illegible]l be that on which the Appropriate Authority approved the status. A symbol P or E will be used to denote whether the area is a Portion of or the Entire [illegible]nstallation. The acreage will be divided as explained in PART I above, but will cover only the actual area or areas involved, the nature or use of the area will be reflected under "Nature of facilities", i.e. Housing Area, Warehouse Area, Modification Center #2, POW Camp, etc. and if the installation is comprised of both command and industrial portions the Symbol I (Industrial) or C (Command) will be used to indicate to which portion the area belongs. The cost of both land and construction will be shown under "Cost to Government". If the Corps of Engineers assumed custody the date will be shown, otherwise "NO" will be entered in the last column.

f. PART III will reflect management of disposal actions taken in connection with areas listed under PART II. The reference column will indicate the area by referring to the line on which it is listed under PART II (A, B, C, etc.) and the appropriate column (1), (2), (3), or (4). No areas or portions of areas which were listed separately in Part II will be combined in a single line under PART III, however, it may be necessary to use several lines under PART III to reflect separate actions taken in connection with an area listed on a single line under PART II. The latter occurence will be explained under "Remarks" and if necessary a further division of acreage recited.

1. TEMPORARY USE GRANTS will be reported by cumulative figures showing the number of instruments, acres involved and annual consideration. When right of entry has been given but a formal instrument not executed and delivered it will be reported "In process" with appropriate footnote under "Remarks" including date right of entry granted. After delivery of the instrument it will be reported "granted". "Purpose" will reflect type of interest Le for Lease, Li for License and the proposed use of the area, such as agriculture, industrial, etc. Elaboration where necessary will be made under "Remarks".

2. REPORTED TO WAA OR GSA will include only property formally reported by Forms SPB-5, SPA-5, WAA 1005, or GSA Form 30 for disposal but will not include leases reported for clearance purposes only. The following will be recorded: date of report, name of disposal agency designated, and the date disposal agency designated. (In case of Declaration of Surplus to WAA and its predecessor agencies, the date of designation of disposal agencies need not be recorded unless readily available). Disposition column will be utilized (a) to reflect assumption of custody by the disposal agency by recording the symbol "CT" followed by the date of assumption, or (b) to refer to further disposal actions recorded in subsequent portions of the report where the CE is designated disposal agency or is acting under specific direction of GSA. The symbol "TR" will refer to "Transfer to other Government Agencies". The Symbol "LC" will refer to "Lease Cancellations". The symbol "OD" will refer to "Other Disposals".

3. TRANSFERS TO OTHER GOVERNMENT AGENCIES will include transfer, retransfer, or relinquishment of all types of interests or estates to another Gov't. Agency not acting as a disposal agency. If property has been reported to GSA and so recorded under "Reported to WAA or GSA" the entry in the reference column will be preceded by the symbol "R". Entries in the second, third, and fourth columns will be made from information or informational copies of documents received from OCE, except when leases are transferred at the direction of GSA Field offices. The date restoration or building disposal (if required) is completed will be shown, otherwise the entry "none" will be made. The last column will reflect the date of written acceptance either from a field or departmental level with appropriate notation in "Remarks".

4. LEASE CANCELLATIONS will include all excess or surplus leases which have been cancelled or are proposed for cancellation. If leases have been formally reported for disposal to GSA (GSA Form 30), entry in the "Reference" column will be preceded by the symbol "R" and no entry will be made in "Reported to GSA" column. If leases have been reported to GSA (GSA Form 30) for clearance purposes only, the symbol "R" will not be placed in the "Reference" column and the date they were "Reported to GSA" for clearance will be recorded. An explanatory entry, reflecting disposal status, reasons for delay and expected termination date, will be made in "Remarks" for any lease that has been in an excess status for a period of ninety days or longer.

5. OTHER DISPOSALS will include sales, termination of special contracts involving interests in realty, disposal of easements, etc. Entries most nearly applicable to the circumstances will be recorded with an explanation in "Remarks" to explain unusual actions. If the property has been formally reported to GSA (by GSA Form 30) the symbol "R" will precede the entry in the "Reference" column.

KS

* 1 license (no area) terminated 11-27-50

** Report revised to agree with final audit.

Leases cancelled as follows;

No. of Leases	Acres	Annual Rental	Date Cancelled
4	27.50	$215.00	4-10-44
1	.60	50.00	5-27-44
3	36.72	320.00	6-5-44
3	42.80	339.50	8-7-44
2	15.17		9-15-44
1	474.71		4-30-45
1	1.05	100.00	2-2-46
1	553.60	100.00	2-5-46
1	875.50	300.00	2-15-46
6	25,524.48	1,199.92	2-28-46
36	11,022.75	2,571.80	6-30-46
4	9,977.55	1,300.00	9-30-46

B 9614

2-1713-ARMY-FORT BELVOIR, VA.-11-13-50-20,000

C O P Y

OF 671.3 MONONGAHELA NATIONAL FOREST - SPEID

July 15, 1943

The Honorable,

The Secretary of Agriculture.

Dear Mr. Secretary:

There is a military necessity for the use of portions of the Monongahela National Forest, West Virginia, for Army Maneuver purposes.

This Department is acquiring maneuver rights over all private and state owned lands in the counties of Preston, Grant, Randolph, Tucker and Pendleton, West Virginia, and it is desired that a permit be issued to this Department to use the National Forest lands situate in those counties and under the jurisdiction of the Department of Agriculture.

It has been indicated that the use of the forest by the Army will greatly increase the fire hazard and representatives of the two Departments are preparing an agreement setting forth a plan for fire prevention and fire fighting. It is considered advisable to have the fire prevention measures and actual fire fighting administered by the Forest Service. It is understood that funds available in your Department are not sufficient for this purpose. It has been administratively determined that the performance of this work by your Department is in the interest of the Government and that the contemplated services cannot be as conveniently or more cheaply performed by private agencies. Upon receipt of Standard Form 1080, the War Department will advance the sum necessary to cover the cost of this work by your Department.

It is requested that permission be granted to use the forest lands pending final agreement on the details of a fire control plan, your cooperation in making these lands available and rendering the necessary fire fighting services is greatly appreciated.

Sincerely yours,

JJO'B

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JBM

MEADOWS
77714

Secretary of War.

ADDRESS REPLY TO
CHIEF OF ENGINEERS, U. S. ARMY
WASHINGTON, D. C.

WAR DEPARTMENT

OFFICE OF THE CHIEF OF ENGINEERS

WASHINGTON

REFER TO FILE No. CE 601.53(Elkins,W.Va.)SPELR

23 July 1943

SUBJECT: Acquisition of Land for the West Virginia Training Grounds, Army Ground Forces, Tucker & Grant Counties, near Elkins, W.Va.

To: The Commanding General, Army Service Forces.

1. There is a military necessity for the acquisition of land indicated under subject above and described more in detail in paragraph 2 below.

2. Description of the land and other pertinent data are as follows:

a. BRIEF DESCRIPTION OF THE LAND: The subject land is located in the State of West Virginia, in portions of the Counties of Tucker and Grant, more particularly described on the attached map and perimeter description.

b. PROPOSED USE: Artillery training grounds for the Army Ground Forces.

c. ACREAGE INVOLVED: 52,820 acres.

d. IMPROVEMENTS: None.

e. ESTIMATED RENTAL: $23,200 per annum.

f. ESTATE TO BE ACQUIRED: Leasehold interest.

g. METHOD OF ACQUISITION: Negotiation or condemnation.

h. REMARKS: The abovementioned lands include only Area A and Tracts 12, 13, and 14 of Area B, as shown on the inclosed map. The balance of the area is to be obtained for maneuver rights.

3. The determination of military necessity for the acquisition of the subject land is based upon the request of the Division Engineer, set forth in letter of 2 June 1943; and the approval of the Commanding General, Army Ground Forces, as indicated in the 2nd Indorsement of 23 June 1943; both of which are inclosed.

4. Attention is invited to memorandum dated 9 July 1943 from Military Construction Branch, wherein the proposed site for the subject project was approved at Meeting No. 306 of the Interdepartmental Air Traffic Control Board on 7 July 1943, subject to the provision that firing activities in that portion of the area which extends into Red Airway No. 18 shall be controlled as to safeguard navigable air space.

5. Funds for this acquisition are available from Public 108, 78th Congress, approved 1 July 1943.

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

RE-D 2418

CE 601.53 (West Va. (heuver Area)

MEMORANDUM to Condemnation & Purchase (Cont'd)

6. Pursuant to general directive dated 10 April 1942, issued by the Under Secretary of War, you are authorized to proceed with the acquisition of the subject land as described hereinabove.

O'Brien

O'BRIEN

ami

Attached:
Ltr 7-24-43 w/3 Indls.

HNB

MTD

RES

SUBJECT: Acquisition of Land for the West Virginia Training Grounds, Army Ground Forces, Tucker & Grant Counties, near Elkins, W.Va.

1st Ind.

War Department, Headquarters, Army Service Forces. 23 July 1943

To: The Under Secretary of War.

The Secretary of War directs that you be informed that a military necessity exists for the acquisition of the land described in the preceding basic communication.

For the Commanding General:

F. W. Smith
Col. G.S.C.
For W. D. STYER,
Major General, G. S. C.,
Chief of Staff.

Incls. n/c

2nd Ind.

Office of the Under Secretary of War, 23 July 1943

To: The Chief of Engineers.

For acquisition of land in accordance with Section VII, Circular No. 47, W.D. 1942.

By direction of the Under Secretary of War:

Marion Rushton
MARION RUSHTON
Colonel, J.A.G.D.
Administrative Officer

Incls. n/c

WAR DEPARTMENT

OFFICE OF THE CHIEF OF ENGINEERS

File No. CE 601.53 (Elkins, W.Va.) SPELR Date

Subject: Acquisition of Additional Land for the West Virginia Training Grounds, Army Ground Forces, Tucker and Grant Counties, Elkins, West Virginia.

From: PLANNING & APPRAISAL SECTION To: CONDEMNATION SECTION
LEASING SECTION

1. Directive dated 23 July 1943 authorized the acquisition of 52,820 acres of land by lease for the proposed artillery ranges, Army Ground Forces. The estimated annual rental is $23,200.

2. It has now been determined that a military necessity exists for the acquisition by lease of a portion of the lands referred to in paragraph 2-h of the abovementioned directive as the balance of the area to be obtained by maneuver rights and designated as Area "C" on the inclosed map.

3. Description of the land and other pertinent data are as follows:

a. BRIEF DESCRIPTION OF THE LAND: The subject land is located adjacent to the eastern boundary of Areas "A" and "B" as referred to in original directive dated 23 July 1943, and more particularly shown in red on the inclosed map.

b. PROPOSED USE: Artillery training grounds for the Army Ground Forces.

c. ACREAGE INVOLVED: 4,849 acres.

d. IMPROVEMENTS: None.

e. ESTIMATED ANNUAL RENTAL: Not to exceed $3,000.

f. ESTATE TO BE ACQUIRED:: Leasehold interest.

g. METHOD OF ACQUISITION: Negotiation or condemnation.

h. REMARKS: The abovementioned lands are to be acquired on the same basis and in the same court proceedings as Area "A", and the using service intends to utilize this additional area in the same manner as they propose to use Area "A", i.e., for artillery firing ranges. This action will therefore authorize the acquisition by lease of a total of 57,669 acres of land, more or less, for the use of the using service as artillery ranges. Immediate possession of the abovementioned additional land is requested under War Powers Act and it is recommended that this area be included with the proceedings to obtain possession of Area "A" as requested in memorandum of transmittal dated 23 July 1943, under subject above.

4. The determination of military necessity for the acquisition of the additional land is based upon the request of the Division Engineer, as set forth in letter dated 24 July 1943; and the recommendations of the Commanding Officer, West Virginia Maneuver Area, as indicated in letter of 17 July 1943; both of which are inclosed.

5. Funds for this acquisition are available from Public 108, 78th Congress, approved 1 July 1943.

2 Forwarded to Condemnation Section 28 July 1943.

6. It is recommended that the Under Secretary of War be informed that a military necessity exists for the acquisition of the abovementioned land and that he be requested to authorize this office to acquire the necessary leasehold interest in same.

For the Chief of Engineers:

T. F. Farrell
T. F. FARRELL,
Colonel, Corps of Engineers,
Executive Assistant.

Incls.
1 - Memo 7-9-43
2 - Ltr 6-2-43 w/2 Inds.
3 - Directive Map.

DEPARTMENT OF AGRICULTURE
Washington

August 4, 1943

The Honorable
The Secretary of War

Dear Mr. Secretary:

I have Acting Secretary of War Patterson's letter of July 15, 1943, in which he requests that your Department be granted formal permission to use national forest land in the Monongahela National Forest in the counties of Preston, Grant, Randolph, Tucker and Pendleton, West Virginia, for Army maneuver purposes, and that this Department, with funds to be advanced by the War Department, administer the fire prevention measures and actual forest fire fighting on all of the lands that are used by your Department in the above mentioned counties.

The Forest Service has issued a special use permit to the Town of Parsons covering the Elklick Run Watershed for municipal water supply purposes. This same watershed also includes the Fernow Experimental Forest, which is administered for research purposes. In order to prevent the pollution of this municipal water supply, and so that the long-time experiments being conducted on the experimental forest may not be interfered with, it will be appreciated if your Department refrains from use of this watershed.

Although we do not have in Washington any specific records of rights of use and occupancy which hitherto may have been granted under the authority of the Secretary of Agriculture, it is known that some such rights do exist. A specific list of all the permits, agreements and rights issued and outstanding on the national forest land concerned will be made available to your representatives located at Elkins, West Virginia.

The Forest Service will assume the responsibility for protecting the maneuver area from forest fires in accordance with Memorandum of Understanding dated July 8, 1943, which was prepared and signed by Colonel A. W. Gower, C.A.C., Director; Major Holland V. Shields, C.E., Fifth Service Command, Rents and Claims Board; and Forest Supervisor Arthur A. Wood, Monongahela National Forest. Standard Form 1080 is being prepared in the sum of $43,083 as specified in the above mentioned agreement, for the fiscal year 1944, in order to effectuate the transfer of funds between Departments.

Monongahela National Forest, W. Va.

G-8

2 - Secretary of War -

Subject to the conditions above set forth, the use by your Department of the 541,266 acres, more or less, of national forest land in the Monongahela National Forest, in the counties of Preston, Grant, Randolph, Tucker and Pendleton, West Virginia, is hereby authorized for such period as may be necessary.

Sincerely,

Signed: Claude R. Wickard,
Secretary

WAR DEPARTMENT

OFFICE OF THE CHIEF OF ENGINEERS

File No. CE 601.53 (Elkins, W. Va.)SPELR Date 29 October 1943

Subject Revised Description of Area for the West Virginia Training Grounds, Tucker and Grant Counties, Elkins, West Virginia.

From PLANNING & APPRAISAL SECTION To CONDEMNATION SECTION
LEASING SECTION

1. By 2nd Indorsement dated 23 July 1943, the Under Secretary of War authorized the acquisition by lease of 52,820 acres of land at an estimated annual rental of $23,200.

2. Pursuant to general directive issued by the Under Secretary of War 10 April 1942, the acquisition of an additional 4,849 acres of land by lease was authorized 28 July 1943, at an estimated annual rental of $3,000.

3. Based upon the recommendation of the Division Engineer by letter dated 21 October 1943 and the concurrence of the Commanding General, Army Ground Forces by letter dated 8 October 1943, a military necessity exists for the revision in the boundary description and total acreage authorized in the directives referred to in paragraphs 1 and 2 above.

4. The total acreage is hereby amended to the leasing of a total of 48,067 acres, more or less, and the boundary of the area amended to agree with the revised boundary description attached. However, the revised area is generally the same lands authorized in the abovementioned directives, except for the elimination of certain areas whereby unrestricted firing would endanger farming activities and rural dwellings. The revised boundary of the subject area to be acquired by lease is shown by a dash-line on the inclosed "Directive Map".

5. It is requested that the present condemnation action for possession under War Powers be amended to agree with the abovementioned revision.

O'BRIEN

ami

Attached:
Ltr 10-8-43
Ltr 10-21-43 w/incls.

RE-D 2418 A

JMC

RES

Forwarded to Condemnation Section 29 October 1943.

WAR DEPARTMENT

OFFICE OF THE CHIEF OF ENGINEERS

File No. [illegible] (Elkins, W. Va.)SPELR Date 8 DECEMBER 1943

Subject Acquisition of additional land for West Virginia Training Grounds, Elkins, West Virginia.

From CHIEF, REAL ESTATE DIVISION To ACQUISITION BRANCH
PURCHASE SECTION
Attn: Mr. Frazier

1. Directive dated 23 July 1943 authorized the acquisition by lease of 52,820 acres of land at an estimated rental of $23,200 per annum.

2. General directive dated 28 July authorized the acquisition by lease of an additional 4,849 acres of land at an estimated annual rental of $3,000.

3. General directive dated 29 October 1943 amended the abovementioned directives to reduce the total acreage to be acquired to 48,067 acres.

4. Based upon the approval of the Commanding General, Army Ground Forces by 1st Indorsement dated 23 October 1943, a military necessity exists for the acquisition of additional land described in detail below:

a. BRIEF DESCRIPTION OF THE LAND: The subject area is bounded: (1) on the west by a line extending northerly from the Town of Laneville to the south line of the area referred to in the abovementioned directives, said line having a bearing of N 11° 26' W -- approximately 255 chains in length; (2) on the north by the south line of the abovementioned project; (3) on the east the boundary generally follows the Tucker and Grant County line to the intersection with the Tucker and Randolph County line; and (4) on the south by an irregular east-west line connecting the Town of Laneville with the intersection of the Grant-Tucker and Tucker-Randolph County lines, being a part of Tucker and Randolph Counties, State of West Virginia, as indicated on the attached directive map dated 2 December 1943 and entitled "Monongahela Area".

b. PROPOSED USE: Impact area.

c. AREA INVOLVED: 9,470 acres.

d. OWNERSHIP: U. S. Government.

e. ESTATE TO BE ACQUIRED: Use permit.

f. METHOD OF ACQUISITION: Formal request from the Government Agency having jurisdiction over said land.

5. It is requested that necessary action be taken promptly to acquire the abovementioned use permit.

[illegible] O'BRIEN

Encl:
Attached:
1 - Ltr to C.[illegible], AGF 10-20-43
w/3 Inds & Incls.
2 - Directive map 12-2-43

Forwarded to Purchase Section 8 December 1943.

KWB
MSG
JMC
RdS

ED-D 2413 B

OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

TRACT REGISTER

PROJECT (*Official Name*)	PURPOSE (*As Set Forth in Directive*)	DATE OF DIRECTIVE
West Virginia Maneuver Area	Mountain Training	12-8-43

TRACT NUMBER	LANDOWNER'S NAME	ACREAGE	PRICE	ESTATE 1/	METHOD 2/	LAST ACTION STEP TAKEN	REMARKS (*Including Contract No. of Leases*)
B	Dept. of Agriculture	9150.37	—	-	T	Use Permit dated 11-10-43	

NOTE:

Use Permit furnished from OCE sets out area to be 9265.00 acres. However, due to the exception of 114.63 acres, the area as transferred under this use permit has been reduced to 9150.37 acres.

OSL/lj

CE 602 Elkins West Virginia Maneuver Area. 3/SLT 1st Ind.
(Bas. ltr. 13 June 45)
SUBJECT: Real Estate Disposal Plan West Virginia
Maneuver Area and Base Installations, Elkins, West Va.

OCE, Washington 25, D. C., 28 June 1945.

TO: The Ohio River Division Engineer, COLUMBUS 16, OHIO.

1. The real estate disposal plan for the West Virginia maneuver area and base installations is approved as recommended with certain exceptions as hereinafter set forth.

2. The disposal plan recommends (page 27, paragraph 3B), that the War Department acquire 12,760 acres in fee in order to save the expense of decontaminating land of low value, such acquired land to be later transferred to the Monongahela National Forest Reserve. It is the policy of the War Department as promulgated in Circular Letter No. 3680 (Real Estate No. 69), dated 13 April 1945, to decontaminate all contaminated areas regardless of cost, even though it would be cheaper to acquire the land in fee. Therefore, the recommendation that the War Department acquire this land is not favorably considered. This office advised your office by letter dated 28 March 1945, that a trained decontamination squad would be available for performance of neutralization work in the West Virginia maneuver area when requested. No contaminated land should be returned to the owner until such decontamination work has been performed.

3. All maneuver rights given to the Government should be relinquished if not needed in the performance of decontamination work.

4. This office has previously authorized the transfer of the two demountable CCC buildings at the Elkins Equipment Depot to the Allegheny Ballistics Laboratory. The remaining CCC buildings may be salvaged in accordance with existing regulations.

5. The buildings added to the Elkins Equipment Depot by the War Department during its occupancy thereof may be disposed of to the Monongahela National Forest Reserve on a reimbursable basis, pursuant to RE Manual 1205.10 or sold in accordance with RE Manual 1205.06.

6. The recommendation made on page 9, paragraph 2(e), of the disposal plan, regarding dismissal of tract A-36 from condemnation, will be made the subject of a separate communication.

7. Approval of the disposal plan is subject to adjustments in boundary descriptions of the area requested by the Office of Scientific Research and Development, and subsequent reactivation of such area by the War Department.

8. The transfer of Government improvements in connection with the termination of leases should be supported in each case by proper restoration cost estimates and valuations of improvements in accordance with existing procedure and regulations.

BY ORDER OF THE CHIEF OF ENGINEERS:

ROBERT H. FABIAN
Major, Corps of Engineers
Chief, Management and Disposal Division
Real Estate

1 Incl. N/c
(except 2 cys w/d)

SUBJECT: Termination of Permits from Department of Agriculture covering West Virginia Maneuver Area, Elkins, West Virginia (Ltr fm OCE dtd 6 July 1950 ENGLT)

OWLMS 601.52 (Elkins, W.Va., West Virginia Maneuver Area)1 2nd Ind

O Dist Engr, P. O. Box 59, Louisville 1, Ky. 18 July 1950

THRU: The Div Engr, OHDiv, Cincinnati 1, Ohio OWDVR

TO: The Chief of Engineers, Washington 25, D.C.

Attention: ENGLT

1. In compliance with paragraph 2 of basic communication, and to the extent information is available in this office, requirements as provided for in paragraph 5111.08 c(2) of Orders and Regulations are as follows:

a. Mountainous, uninhabited land, a great portion being high plateaus covered with rock, scrub growths and timber, located in Grant, Pendleton, Preston, Randolph and Tucker Counties, West Virginia.

b. August 4, 1943 and November 10, 1943.

c. Department of Agriculture (Forest Service).

d. Two Use Permits.

e. ENG Form 1440 included as Inclosure No. 1.

f.g.h. No restoration work was performed by Department of the Army. In accordance with Memorandum of Understanding dated July 8, 1943, and two amendments thereto, between local representatives of Forest Service and Department of the Army, the Forest Service assumed responsibility for protecting the maneuver area from forest fires. The Forest Service constructed the necessary facilities, the cost of construction and maintenance being borne by the Department of the Army on a reimbursable basis under existing regulations. It is indicated from the records that the funds were made available directly by OCE to Forest Service, and, provided for the construction of lookout towers and road building and repairs due to the additional fire hazards caused by Department of the Army maneuvers within the area under use permit.

i. Three Reports of Decontamination Work are included as Inclosure No. 2.

j. WAA Form 1005 is not necessary as land was not improved by Department of the Army.

601.32 (Elkins, W.Va., West Virginia Maneuver Area)1 OVLRM (7-18-50) 2nd Ind
SUBJECT: Termination of Permits from Dept. of Agriculture covering W.Va. Maneuver area, Elkins, W.Va.

2. This installation was placed in surplus status as of 19 March 1945, and subsequently withdrawn for the purpose of issuing a permit for use thereof by the Office of Scientific Research and Development. Warning Notice No. 825 dated 10 August 1945, withdrew this entire area from surplus, however, correspondence in this office indicates that by letter dated 21 April 1945, from Office for Emergency Management, Office of Scientific Research and Development, Washington, D.C., to OCE, it was requested that OCE issue to OSRD a permit to use itself or through its agencies or contractors, a portion of the maneuver area. No information is available as to the actual issuance of the permit by OCE, or the terms or conditions under which the permit was granted.

FOR THE DISTRICT ENGINEER:

2 Incls
1 - ENG Form 1140 (trip)
2 - Decontamination Reports

C. B. RAYMER
Real Estate Officer

OVDVR 3rd IND.
OHIO RIVER DIVISION
21 July 1950
TO CHIEF OF ENGINEERS ENGLT
2 INCLS. n/c

251

CR FORM 185
(11-30-42)

Rec. 12/2/43 TMC

WAR DEPARTMENT
Office of the Chief of Engineers
Construction Division
Real Estate Branch

LICENSE FOR INSTALLATIONS UPON RIGHT OF WAY

THIS AGREEMENT, made this 17th day of December 1943, by and between The Western Maryland Railway Company, hereinafter called the "Licensor", and THE UNITED STATES OF AMERICA, hereinafter called the "Government", WITNESSETH:

THAT, for and in consideration of the sum of One Dollars ($1.00) and other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, and in consideration of the mutual covenants, promises, and agreements herein made, the Licensor hereby grants to the Government a license to construct, operate, maintain, renew, and remove an underground steam line (Type of installation) along, across, beneath, and over the right-of-way and property of the Licensor at the following location, viz:

The steam line extends from the Mess Hall of the Government Hospital area to the siding of the Western Maryland Railroad, southwest of the intersection of 2nd Street and Sycamore Avenue in Elkins, W. Va. and runs across the property of the Western Maryland Railroad Co. a point in the southwest line of the property retained by the railroad near the south corner thereof and 30 feet southwest of the southwest line of Sycamore Avenue in a northwesterly direction to the existing railroad siding.

in the County of Randolph, State of West Virginia, as shown on attached sketch marked Exhibit A, for use in connection with a War Department establishment known as West Virginia Mountain Area Hospital (Name of post, camp, station, etc.), and upon the following terms, provisions, and conditions:

I. All installations placed upon said right-of-way by the Government shall be and remain the property of the Government and may be removed therefrom by the Government at any time.

II. The construction, operation, maintenance, renewal, and removal of said installations shall be accomplished by the Government at its sole cost and expense and in such a manner as will at all times enable the Licensor to use the surface of the right-of-way.

III. In the event of any future alterations of the property of the Licensor or of the line or grade of the right-of-way necessitating changes in said installations, the Government will make such changes in its installations as may be necessary in connection with said alterations.

IV. The Licensor shall not be liable for damages to property or injuries to persons arising from the construction, operation, maintenance, renewal, or removal

G-13

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V. This agreement, with the rights and privileges herein granted, shall be subject to cancellation or termination only by mutual agreement of the parties, or in the event the terms and conditions hereof are not fulfilled, or in the event the Government abandons the use of the premises for the purposes herein granted. In either of the latter two events, cancellation may be effected by either party hereto upon thirty (30) days' written notice to the other; and upon the expiration of said thirty (30) days after service of such notice, this agreement and the rights and privileges hereby granted, as well as the obligations hereby imposed upon the parties, shall absolutely cease and determine.

VI. The Government hereby covenants and agrees that, on or before the termination of this license, it will remove said installations and the appurtenances connected therewith from the premises of the Licensor and restore said premises to the condition existing at the time of entering upon the same under this license, reasonable and ordinary wear and tear and damages by the elements or by circumstances over which the Government has no control excepted.

VII. All expenditures to be made by the Government under the provisions of this agreement shall be subject to appropriations being available for the purpose.

VIII. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this agreement or to any benefit to arise therefrom. Nothing, however, herein contained shall be construed to extend to any incorporated company if the agreement be for the general benefit of such corporation or company.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be properly executed by their duly authorized representatives as of the day and year first above written.

THE WESTERN MARYLAND RAILWAY COMPANY

by _____

its VICE PRESIDENT AND GENERAL MANAGER

ATTEST:

_____
its Secretary

UNITED STATES OF AMERICA

by _____

Rank [redacted]

Contracting Officer.

WITNESSES:

_____

_____

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CERTIFICATE OF AUTHORITY

I, J. W. Broome, hereby certify that I am the _____ Secretary of Western Maryland Railway Company, the corporation described in and which executed the foregoing agreement with the United States of America; that said corporation is organized under the laws of the States of Maryland and Pennsylvania; that the corporate seal affixed to said instrument is the seal of said corporation; that _____ G. R. Haworth, who executed said agreement as Vice-President and General Manager of said corporation was then Vice-President and General Manager of said corporation and has been duly authorized to execute said instrument on behalf of said corporation; that I know the signature of said G. R. Haworth; and that the signature affixed to such instrument is genuine.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of said company, this 13th day of December, 1943.

J. W. Broome
Secretary.

Elkins, W. Va.
(W. Va. Maneuver Area Corps)

Draft of 2 Nov. 1943

OCE FORM NO.

REAL PROPERTY INVENTORY REPORT

WAR DEPARTMENT
Office of the Chief of Engineers
Washington, D.C.

1. 3597th S. U. Station Hospital (Name of Post, Camp, Station or Installation)

2. Date of Report: 6 December 1943

3. (a) Elkins (Location) (b) Randolph (County) (c) West Va. (State)

4. (a) Medical (Using Force) (b) ~~Fifth (5th) Service Command~~ (Command or Service)

5. Station Hospital
(Type of Station, Rep. Tr. Center - Armored Div. Camp, etc.)

6. (a) 0 miles distant from City of (b) in Elkins whose population is (c) 7,000

7. TOTAL LAND AREA:

	GOV'T OWNED	LEASED	
(a) Areas maintained under continuous use	None	3.5	acres.
(b) Other areas necessary to operation	None	None	acres.
(c) Areas not in use (excess lands)	None	None	acres.
(d) Description of excess lands	None	None	acres.
(e) Recommendations relative to EXCESS LANDS above	None		

8. LEASED FACILITIES: Type (Hotel, Warehouse, Airfield, etc.)
Annual Rental . . . . . $
Total Cost of Alterations at Government expense to date. $ -0-

WD 4:0 From 8/11 show [illegible] 4.25 acres

Proj 8/27/52

	(A) DESIGNED CAPACITY	(B) ACTUAL OCCUPANCY OR USE as of Dec. 1943	(C) GENERAL CONDITIONS E-Excellent G-Good F-Fair U-Unsatisfactory Rating by Post	Rating by Serv.Com.
9. HOUSING:				
(a) Military Personnel (For capacity based on 60 sq.ft. per man, 120 sq.ft.per officer	60	62	G.	G
(b) Civilian War Housing:				
1. Family Units	None	None		
2. Dormitory Units				
(c) Prisoners of War (For capacity, based on 60 sq.ft. per man, 120 sq.ft.per officer	None	None		
(d) Other Housing	None	None		
(e) TOTAL HOUSING	60	62		G
10. HOSPITALS (Bed Capacity):				
(a) General Hospitals				
(b) Station Hospitals	83	None	E.	E
11. STORAGE SPACE (square feet):				
(a) Closed Storage				
1. Heated	2000	None	G.	G
2. Unheated				
(b) Open Storage				
1. Paved	None	None		
2. Unpaved	None	None		
12. OFFICE BUILDING SPACE (square feet) . .	1200	None	G.	G
13. SHOP SPACE (square feet).	None	None		

14. BUILDINGS & STRUCTURES	Number on Gov't. Owned Lands	Number on Leased Lands	GENERAL CONDITION Rating by Post	GENERAL CONDITION Rating by Serv. Com.
(a) Permanent Buildings . . . . . (Masonry Walls)	None	None		
(b) Temporary Buildings				
(1) Cantonment Type	None	8	E.	E
(2) T. of O. Type	None	None		
(3) Hutments	None	None		
(c) Tents	None	None		
(d) Hangars . . . . . (Sizes:	None	None		
15. ROADS:				
(a) Primary (miles).	None			
(b) Secondary (miles).	None			
(c) Parking areas (sq. yds.) . . .	None			
16. RAILROADS:				
(a) Trackage (miles)	None			
(b) Average weight of rail _____				

17. RUNWAYS (list each separately)	Runway No. 1	Runway No. 2	Runway No. 3	Runway No. 4
(a) Direction				
(b) Type of paving				
(c) Length				
(d) Width				
(e) Design Load				
(f) Character of approaches				
(g) Type of plane now using				
(h) Traffic volume				
(i) Are pavements satisfactory for present traffic?				
(j) What is life expectancy with:				
1. Present Traffic				
2. Lighter Traffic				
3. Heavier Traffic				
(k) General Condition - Rating by Post				
Rating by Serv. Com.				

18. TAXIWAYS (list each separately):
(a) Type of Paving
(b) Length
(c) Width
(d) Design Load
(e) General Condition - Rating by Post
Rating by Serv. Com.

19. APRONS:
(a) Type of Paving
(b) Square yards
(c) Design Load
(d) General Condition - Rating by Post
Rating by Serv.Com.

20. WEATHER:
(a) Maximum Temperature (annual 69.8°F
(b) Minimum Temperature (annual 30.9°F.
(c) Average Annual Temperature 50.3°F.
(d) Normal Annual Rainfall 47 inches
(e) Normal Annual Snowfall 48 inches

21. CIVILIAN PERSONNEL - Availability:
Plentiful _____ Sufficient Yes Insufficient _____

22. TRANSPORTATION FACILITIES:
(a) RAILROAD: (1) Passenger Service - Adequate Yes (yes or no)
(2) Freight Service - Adequate Yes (yes or no)
(b) AIRWAY: Airport Service - Adequate No (yes or no)
(c) HIGHWAY: Access Roads - Adequate Yes (yes or no)
(d) WATERWAYS: - Adequate No (yes or no)or none)

23. DEPTH OF GROUND WATER LEVEL: 10 feet

24. TYPE OF SOIL Clay subsoil, rich friable ~~top soil~~

25. GENERAL DRAINAGE CONDITIONS (describe briefly The general drainage conditions are good.

26. FLOODING FROM RIVERS, RAINFALL, ETC? Yes (yes or no) DESCRIBE BRIEFLY EXTENT AND RECURRENCE

Three (3) times in fifty (50) years

27. RECURRENT HEAVY WIND STORMS? No (yes or no) DESCRIBE BRIEFLY EXTENT AND RECURRENCE

28. WATER SUPPLY: (a) Adequate for 250 troops based on 60 gals. per capita per day.
(b) Chemically and bacteriologically satisfactory? Yes (yes or no)

29. SEWAGE SYSTEM: (a) Adequate for 250 troops based on 60 gals per capita per day.
(b) Does discharge of effluent create health menace or nuisance? No (yes or no)

30. ELECTRICAL SUPPLY: (a) Is supply source satisfactory? Yes (yes or no)
(b) Condition of post distribution system: Good Yes (yes or no) Satisfactory _____ (yes or no)
Unsatisfactory _____ (yes or no)

31. REFRIGERATION: (a) Adequate for 145 troops. (b) Ice plants adequate for None troops.

32. PRINCIPAL FUEL: Coal Yes. Gas _____. Oil _____. Other (describe) _____

33. SPACE HEATING, PRINCIPALLY BY: Central Plant Yes. Furnaces _____. Stoves _____

34. LAUNDRY: (a) Is it post-operated No (yes or no) (b) Rating capacity (No. of men) _____

35. SERVICES TO OTHER: Describe utility services, if any, furnished to other agencies or to private consumers:

None

36. STATE CONDITIONS THAT CONTRIBUTE TO HIGH OPERATION AND MAINTENANCE COSTS:

None available, not activated to date.

37. LIST ESTIMATED COST OF LARGE REPAIRS OR RECONSTRUCTION REQUIRED IN NEXT 12 MONTHS None

IN THE 12 MONTHS FOLLOWING None

38. Layout map attached showing acreages of areas, location and identification of buildings and improvements, etc. If not attached, when will it be submitted? 15 January 1944

39. Are photographs of general area and buildings available? No

PREPARED BY: Herman Brunke 1st. Lt. C.E. APPROVED: J. H. Carson Lt. Col., M.C.
HERMAN BRUNKE Post Engineer J. H. CARSON Commanding Officer

TO BE ANSWERED BY SERVICE COMMAND

40. TOTAL COST OF CONSTRUCTION TO DATE $84,000. (Authorized) (Cost of Land excluded. State whether Estimated or Actual and year or years of construction; if part is estimated, give amount of estimate and describe part.)

$5,230 (In place) $78,770. (Est. to complete) 1943

41. SUITABILITY OF POST FOR PRESENT USE: Excellent ____ Good X Fair ____ Unsatisfactory ____

42. SUITABILITY OF POST FACILITIES FOR PARTIAL USE FOR: (a) Hospital X (b) Civilian Housing ____
(c) Prisoners of war ____ (d) Closed Storage ____ (e) Open Storage ____

43. SUGGESTED OTHER USE (for Army or otherwise): Small station hospital only.

OCE FORM NO.

REAL PROPERTY INVENTORY REPORT

Draft of 2 Nov. 1943.

WAR DEPARTMENT
Office of the Chief of Engrs.
Washington, D.C.

1. West Virginia Maneuver Area
(Name of Post, Camp, Station or Installation)

2. Date of Report: Nov. 25, 1943

3. (a) Elkins (Location) (b) Randolph (County) (c) W. Va. (State)

4. (a) Army Ground Forces (Using Force) (b) XIII Corps (Command or Serv)

5. Maneuver Area for ground force troops including an artillery impact area. This Maneuver Area lies generally North and East of Elkins, W.Va which is operations base
(Type of Station, Rep. Tr. Center- Armored Div. Camp, etc.)

6. (a) _____ miles distant from City of (b) Elkins whose population is (c) 8,133

7. Total Land Area:
(a) Areas maintained under continuous use. (Leased) 44,833 acres.
(b) Other areas necessary to operation. (See Note)*
(c) Areas not in use (excess lands) NONE ~~(See Note)**~~
(d) Description of excess lands.
(e) Recommendations relative to EXCESS LANDS above. No excess lands.

8. LEASED FACILITIES: Type (Hotel, Warehouse, Airfield, etc.) Artillery impact Area and various bivouac and service areas within the Maneuver Area.
Annual Rental $ 6,733.
Total Cost of Alterations at Government expense to date.
(All expenditures from SFE Funds, Hq. XIII Corps)

(*) Maneuver Rights on 1,747,056 acres of private property.
~~(**)~~ Maneuver Rights on 349,000 acres of Forestry Department Land.

9. HOUSING:	(A) Designed Capacity	(B) Actual Occupancy or use as of _____ 19___	(C) General Condition E-Excellent G-Good F-Fair U-Unsatisfactory	
			Rated by Post	Rated by Sp comd.
(a) Military Personnel (For capacity based on 60 sq. ft. per man, 120 ft. per Officer.	(Improved from existing CCC and NYA Buildings to house Director Hq Personnel Service and Training Trps under Canvas)	285 EM 20 Off.	Fair	
(b) Civilian War Housing				
1. Family Units	None			
2. Dormitory Units	None			
(c) Prisoners of War (For Capacity, based on 60 sq. ft. per man, 120 ft. per Officer	None			
(d) Other Housing	None			
(e) TOTAL HOUSING		285 EM 20 Off.	Fair	
10. HOSPITALS (Bed Capacity):				
(a) General Hospitals				
(b) Station Hospitals	~~100~~	~~unoccupied at this time~~	~~Good~~	
11. STORAGE SPACE (Square feet):				
(a) Closed Storage				
1. Heated (Stoves)	55,550	55,550	Fair	
2. Unheated	1,428	1,428	F	
(b) Open Storage				
1. Paved	None			
2. Unpaved (Shed)	6,348	6,348	F	
12. OFFICE BUILDING SPACE (Sq. Ft.)	7,635	7,635	Good	
13. Shop Space (Sq. Ft.)	4,508	4,508	F	

14. BUILDING AND STRUCTURES	Number on Gov't owned lands.	No. on leased lands	Rating by Post	Rating by Serv. Comm.
(a) Permanent Buildings (Masonry Walls)	None	2	Good	
(b) Temporary Buildings				
(1) Cantonment Type	None	28	Fair	F
(2) T. of O. Type				
(3) Hutments				
(c) Tents				
(d) Hangars (Sizes)				

15. ROADS: In the Maneuver Area, Approx. Totals.				
(a) Primary (miles)	150 miles.		good	
(b) Secondary (miles)	300 miles.		Fair	
(c) Parking Areas (Sq. yds.)	None			

16. RAILROADS:				
(a) Trackage (miles)	150 miles.			
(b) Average weight of rail (90 lbs. per yd.)				

17. RUNWAYS (list each separately)	Runway No. 1.	Runway No. 2.	Runway no. 3.	Runway no4
(a) Direction	None			
(b) Type of Paving	X			
(c) Length	X			
(d) Width	X			
(e) Design Load	X			
(f) Character of Approaches	X			
(g) Type of plane now using	X			
(h) Traffic volume	X			
(i) Are pavements satisfactory for present traffic?	X			
(j) What is life expectancy with:	X			
1. Present traffic?	X			
2. Lighter Traffic	X			
3. Heavier Traffic	X			
(k) General Condition - Rating by Post Rating by Serv. Comm.				

18. TAXIWAYS (list each separately):

(a) Type of Paving	None			
(b) Length	X			
(c) Width	X			
(d) Design Load	X			
(e) General Condition - Rating by Post .. Rating by Serv. Comm.	X			
	X			

19. APRONS:

(a) Tye of Paving	X
(b) Square yards	X
(c) Design Load	X
(d) General Condition - Rating by post.. Rating by Serv. Comm.	X

20. WEATHER:

(a) Maximum Temp. (Annual)	99	(d) Normal Annual Rainfall	47.57"
(b) Minimum Temp. (Annual)	-28	(e) Normal Annual Snowfall	47.08"
(c) Average Annual Temp.	50.4		

21. CIVILIAN PERSONNEL - Availability:

Plentiful No Sufficient Yes Insufficient

22. TRANSPORTATION FACILITIES:

(a) RAILROAD:	(1)	Passenger Service - Adequate	No (Yes or No)
	(2)	Freight Service - Adequate	Yes (Yes or No)
(b) AIRWAY:		Airport Service - Adequate	~~Yes~~ (Yes or No)
(c) HIGHWAY:		Access Roads - Adequate	Yes (Yes or No)
(d) WATERWAYS:		- Adequate	None (Yes or No)

23. Depth of Ground Water Level: Varies due to Mountains 24. Type of Soil: Varies from Sand Loam to Rock

25. General Drainage Conditions (Describe briefly) Large amount of ground water present Over entire area.

26. Flooding from Rivers, Rainfall, etc. Yes (Yes or No) Describe briefly extent and recurence Streams and rivers flood on average twice annually.

27. Recurrent Heavy Wind Storms? Yes (Yes or No) Describe Briefly extent and recurrence Early Spring and Fall

28. Water Supply: (a) Adequate for 10,000 troops based on 10 gals. per capita per day.
City of Elkins. (b) Chemically and bacteriologically satisfactory? Yes. (Yes or No)

28 a. Water Supply: (a) Troops in training draw from field water points.

29. Sewage System: (a) Adequate for 5000 troops based on 10 gals. per capita per day.
City of Elkins. (b) Does dfscharge of effluent create health menace or nuisance? No (Yes or No)

29 a. Sewage System: (a) Troops in training use Field Latrines.

30. Electrical Supply: (a) Is supply source satisfactory? Yes (Yes or No)
(b) Condition of post distribution system: (See Note)
(Some base installations are supplied direct by Monongahela West Penn Power Co.)

31. Refrigerations (a) Adequate for [illegible] Troops. (b) Ice plants None

32. Principal Fuel: Coal. Yes Natural Gas. Minor Usage.

33. Space Heating, Principally By: Stoves. Yes.

34. Laundry: (a) Is it post-operated No. (Yes or No) Note: Accomplished by a field unit (QM) Laundry Co. Rated capy 10,000 troops per week.

35. Service to other: Describe utility services, if any, furnished to other agencies or to private consumers: None

36. State conditions that contribute to high operation and maintanance costs. None

37. List estimated cost of large repairs or reconstruction required in next 12 months. None.

38. Layout map attached showing acreages of areas, location and identification of buildings and improvements, etc. If not attached, when will it be submitted? No.

39. Are photographs of general area and buildings available? No

PREPARED BY: R. C. Powell, Jr.
R. C. POWELL, JR.
Major, Corps of Engrs.
Engineer Officer
Maneuver Dir's. Hq.

APPROVED: A. W. Gowen
A. W. GOWEN, Colonel, CAC
Commanding Officer.

TO BE ANSWERED BY SERVICE COMMAND

40. Total cost of construction to date (0) (Cost of Land excluded. State whether Estimated pr Actual and year or years of construction; if part is estimated, give amount of estimate and describe part.

41. Suitability of Maneuver Area for present use: Excellent____ Good ✓ Fair____ Unsatisfactory____

42. Suitability of post facilities for partial use for: (a) Hospital____ (b) Civilian Housing____

(c) Prisoners of War____
(d) Closed Storage____
(e) Open Storage____

43. Suggested other use (for Army or otherwise):

FMJ/pm

802 West Virginia Maneuver Area,
West Virginia - ENOLT

10 August 1950

TJC

Chief, Forest Service
Department of Agriculture
Washington 25, D. C.

HO'N

EJF

Dear Sir:

GFM

Reference is made to letters dated 4 August 1943 and 10 November 1943 from the Secretary of Agriculture to the Secretary of War, granting the War Department the right to use approximately 350,531 acres of land in the Monongahela National Forest, West Virginia, for Army maneuvers.

The use of this land is no longer required by the Department of the Army and, accordingly, the rights granted in the above referenced letters are hereby relinquished.

The land has been thoroughly searched for explosive material on the land as a result of military operations and all such material reasonably possible to detect has been removed or neutralized as indicated in the inclosed Report of Decontamination.

The cooperation of the Forest Service in making this land available for use by the Army is appreciated.

Sincerely yours,

2 Incls:
1. Ltr 24 May 46 (cy) w/Report of Decontamination (cy)
2. Cy of Map

W. H. HASTINGS
Colonel, Corps of Engineers
Assistant Chief of Engineers for
Real Estate

cc: ORD, Cincinnati, Ohio

JAG, Attn: Lands Division

RESTRICTED

AWKINS/jon/389

[illegible] to the War Dept., Wash., D. C. File 685/37(R)-GNGCT. Subj: [illegible] Maneuver Area. (To: Chief, Fifth Service Command) 32

9 JUN 1943

~~685/37(R)-GNGCT~~ requests the Chief of Engineers and the Commanding General, Fifth Service Command to acquire a maneuver area in West Virginia.

The acquisition of this maneuver area was approved by the Commanding General on 5 June 1943.

Subject: West Virginia Maneuver Area.

To : Commanding General, Fifth Service Command, Fort Hayes, Columbus, Ohio.
Spec. Proj. - (Major Jackman)

Thru : Chief of Engineers, War Department, Washington, D. C. (Attn: Captain Goidel, Real Estate Branch).

1. It has now become necessary to acquire a maneuver area in the mountain regions of West Virginia. This area will, in general, be used in the same manner as the Tennessee and Louisiana maneuver areas. It is contemplated that the subject area will be needed for the duration of the war.

2. Representatives from this headquarters conducted an investigation and selected the area indicated on Inclosure No. 1. This area was selected in order that a particular type of training can be obtained. It is believed that the maximum advantage has been taken of government owned lands and that the area selected will not interfere with agricultural activities.

3. It is requested that the necessary trespass rights be acquired on the land outlined on map attached as Inclosure No. 1, by 1 July 1943. The establishment of a board of officers to settle the claims arising from the maneuvers conducted in this area will be made the subject of a separate correspondence to the Commanding General, Fifth Service Command.

4. Mr. A. H. Wood, Supervisor of the Monongahela National Forest, Elkins, West Virginia, accompanied the representatives of this headquarters on the original investigation of the area and could probably be of great assistance to your real estate representatives.

For the COMMANDING GENERAL:
Operations Division, AGF

9 June 43
Date

DISPATCHED 8 JUN 1943

[illegible] LINDEN,
Lt. Col., A.G.D.,
Asst. Grounds & Bldg.

1 Incl.
Map of proposed maneuver area (Map).

Copy furnished: CG, FIFTH SERVICE COMMAND.
(To be sent forward)

RESTRICTED

DECLASSIFIED
Authority NND 883119
By KJ NARA Date 01/10/07

RESTRICTED

(Memo for Record to ltr Hqs AGF, Wash., D. C., file 685/37(R)-GNGCT, Subj: West Virginia Maneuver Area, To: CG, 5th Service Command)

MEMO FOR RECORD:

This action requests the Chief of Engineers and the Commanding General, Fifth Service Command to acquire a maneuver area in West Virginia.

The acquisition of this maneuver area was approved by the Commanding General on 5 June 1943.

Concurrence: -

Spec. Proj. - (Major Jackman)

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

25 August 1943

864 (GNMC)

SUBJECT: Impact Area, West Virginia Maneuver Area.

TO : Commanding General, Army Ground Forces, Army War College, Washington 25, D. C. (Attention: G-3 Section, Special Projects Division).

1. Attention is invited to the attached map of the impact area in the West Virginia Maneuver Area. The original impact area as proposed by Colonel Gaither is indicated by a solid black line. The red line indicates the approximate boundary of the area as determined by the Rents and Claims Board, 5th Service Command. The boundary shown in red has been taken from a map which is in the process of completion by the Rents and Claims Board, 5th Service Command and is believed to be approximately correct.

2. A comparison of the originally proposed impact area and the approximate existing impact area shows a marked constriction and is not as usable as might appear after consideration of the limitations involved. These limitations are expressed in part by application of safety regulations, and the fact that the weapons of all arms must be within the confines of the impact area in order to fire, the latter being a restriction not generally encountered on other military reservations.

3. In view of the facts above, additional land would be quite desirable. The training of combat teams consecutively and the contemplated service practice for the entire artillery in the Corps, which may amount to seven or eight battalions firing at the same time, further substantiates the desirability for additional land.

4. Request that efforts be made to enlarge this impact area to the maximum either by complete lease of the area indicated by dotted black lines or any part contiguous to the impact area or by securing rights to fire from the area outlined into the impact area.

E. F. REINHARDT
Major General, U. S. Army
Commanding

FILE CLERK
ROUTING CLK
CLASSIFICATION
CHIEF CLERK
GNMCS (RECORDS)

DECLASSIFIED
Authority NND 883119
By MS NARA Date 7-10-09

AUG 25 1943

DECLASSIFIED
Authority NND803119
By NS NARA Date 7-10-07

[illegible]

Boyer
Ex. 78491

20 October 1943

MEMORANDUM FOR THE COMMANDING GENERAL, ARMY GROUND FORCES.
Attn: Lt. Col. Hawkins - Army War College.

SUBJECT: West Virginia Maneuver Area, Elkins, West Virginia.

1. Pursuant to the understanding of the representatives of this office present at the conference at Elkins, West Virginia 6 October, pertaining to the determination on the exterior boundary lines of the area within the West Virginia Maneuver grounds firing range, the attached map is forwarded herewith which indicates by red outline the area over which unrestricted firing operations may be effected, subject to the limitations of the Stony River Dam.

2. It is also informally understood in this office that all Government-owned land within the area outlined in green is desired for unrestricted firing operations and that any private ownerships thereon which are presumed to be in the western portion of the area will not be required.

3. This matter is forwarded for comment and approval. Upon the return of your recommendations and the attached map, this office will proceed to take further necessary action required to effect the desires of your office pertaining to land requirements.

For the Chief of Engineers:

Incl.
Map.

JOHN J. O'[illegible]
Colonel, Corps of Engineers
Chief, Real Estate Branch

DECLASSIFIED
Authority NND 947556
By Br NARA Date 3-14-07

CONFIDENTIAL

OFFICE OF CHIEF OF ENGINEERS
DIVISION ENGINEER
OHIO RIVER DIVISION
CORPS OF ENGINEERS, U. S. ARMY
P. O. BOX 1799, 1120 HUNTINGTON BANK BLDG.
COLUMBUS 16, OHIO

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

134329

FILE NO. ORDRM

9 July 1945

Mr Lewis 5-2-19

SUBJECT: West Virginia Maneuver Area

TO: Chief of Engineers, US Army, Washington 25, DC

SPELD

1. For information and files there is inclosed copy of letter dated 5 July 1945 together with 1st indorsement on above subject.

FOR THE DIVISION ENGINEER:

A. C. Allen

A. C. ALLEN
Major, Corps of Engineers
Executive Assistant to
Real Estate Officer

1 Incl.
1. Cy Ltr 5 July 45 w/1st Ind

(West Va. maneuver area) (G-19)

CUT-OFF AS OF 31 DECEMBER 1945

RECEIVED 12 JUL 1945 OFFICE CHIEF OF ENGINEERS

FILE

CONFIDENTIAL

12 JUL 1945

J.Q.M.D. 100M—11-6-44 c-6

REPRODUCED AT THE NATIONAL ARCHIVES

DECLASSIFIED
Authority NND 947556
By BR NARA Date 3-14-07

CONFIDENTIAL

134329

C
O
P
Y

ARMY SERVICE FORCES
Headquarters, Fifth Service Command
Fort Hayes, Columbus 18, Ohio

5 July 1945

SPVSE-T 354.11

SUBJECT: West Virginia Maneuver Area

TO: Division Engineer
Ohio River Division
Columbus 16, Ohio

1. This headquarters has received informally information to the effect that the West Virginia Maneuver Area, including the Station Hospital at Elkins, West Virginia, was declared surplus as of 19 March 1945.

2. It is proposed to relieve the Regional Post Engineer, Huntington, West Virginia, of further duty as Post Engineer and Commanding Officer of the above two installations.

3. In view of the surplus status of these two installations, it is requested that the Division Engineer take necessary action in accordance with War Department Circular No 89 dated 20 March 1945 to assume responsibility and accountability at the earliest practicable date.

FOR THE COMMANDING GENERAL:

/s/ Warren C. Edwards
WARREN C. EDWARDS
Major, AGD
Asst Adj Gen

FILE

CONFIDENTIAL

Dn 0#1

REPRODUCED AT THE NATIONAL ARCHIVES

DECLASSIFIED
Authority NND 947556
By Br NARA Date 3-14-07

CONFIDENTIAL

134329

SUBJECT: [illegible] July 45)

602 (W Va [illegible]
Dis Engr, Ohio [illegible]

1st Ind
7 July 45

TO: District Engr, [illegible]

HMW/xx

July 1945

1. The District [illegible] and not as [illegible] accountability Virginia National [illegible] for the West rehabilitation of this [illegible] Leased [illegible] installation.

2. This action will [illegible] Washington, D. C. [illegible] of effecting the transfer.

BY ORDER OF THE [illegible]

For information [illegible]
dated 5 July 1945 [illegible]

FOR THE [illegible]

cc: CO, 5th Eng

Regional Port Engr
Huntington, W. Va.

1 Incl:
1. Ltr Dir 5 July [illegible]

CUT-OUT NO. OF [illegible] NUMBER [illegible]

CONFIDENTIAL

G-19

CONFIDENTIAL UNTIL RELEASE

Copy No. _____

ABL-SR-13
OSRD No. 6299

Note: This material is to be considered confidential until released by the Joint Board on Scientific Information Policy

OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT

National Defense Research Committee

Division 3 Section H

PROGRAM OF EVENTS

for

PRESS DAY AT ABL, NOV. 8, 1945

and

Memorandum Describing Laboratory Facilities and Developments

ALLEGANY BALLISTICS LABORATORY
Box 210, Cumberland, Maryland

Operated by The George Washington University
Under OSRD Contract OEMsr-273

CONFIDENTIAL UNTIL RELEASE

a mountain at the edge of the reservation. The flight of the projectiles is studied by means of cameras and electronic equipment.

The flight ranges provide facilities for the investigation, under actual firing conditions, of the interior and exterior ballistic performance of rockets and other weapons. General flight characteristics and velocity-time measurements are obtained from photographs taken with ribbon-frame cameras especially developed for this purpose which photograph a long narrow field along the trajectory every 1/120 second. From the velocity-time measurements, it is possible to calculate the acceleration of the projectile as a function of time, and from this deduce the internal pressure at any instant. Such measurements, therefore, make possible the investigation of the interior ballistic performance of rockets in flight. Photographic data also yield a measure of the burning time and burning distance of rocket projectiles, important factors in determining their flight.

Velocity data are also obtained with counter chronographs using sky-screens or solenoids. Dispersion data are obtained by spotting the projectile impacts on the target area with aiming circles. Since the trajectory of the rocket is almost entirely determined during the burning period, the relatively short ranges available (500 and 1,000 yds.) are entirely adequate for studying the significant causes of dispersion.

One of the ranges is devoted to the testing of mortars and recoilless guns. At this range there are instruments for recording the pressure in the gun as a function of time as well as the usual flight range equipment.

The laboratory operates a long firing range located on Allegany Mountain about 40 miles south of the main site.

REAL PROPERTY MANAGEMENT AND DISPOSAL REPORT	REPORTS CONTROL SYMBOL ENGKL - 12 (R3)

TO: Chief of Engineers ATTENTION: ENGLH Washington 25, D. C.	DIVISION	DISTRICT	DATE OF REPORT
	Ohio River	Louisville	4-15-51

PART I

INSTALLATION	LOCATION
West Virginia Maneuver Area No. 3029	Elkins

ARMY	AIR FORCE	ATOMIC ENERGY COMMISSION	MILITARY: COMMAND	MILITARY: INDUSTRIAL	CIVIL: FLOOD CONTROL	CIVIL: RIVER & HARBORS
XX			XX			

ACREAGE ENTIRE INSTALLATION	FEE OWNED	PUBLIC LAND	LEASED	LESSER INT.	COUNTY	STATE
		350,416	48,557	*	Randolph, etc.	W. Va. **

PART II

DATE	STATUS	E OR P	FEE OWNED (Acres) (1)	PUBLIC LANDS (Acres) (2)	LEASED (Acres) (3)	LESSER INT. (Acres) (4)	NATURE OF FACILITIES	COST TO GOVT. (Dollars)	CUSTODY BY C.E. (Date)
A 3/19/45	Surplus	E	—	350,416	48,553	*	Land		**
B 3/19/45	"				4		"		**
C									
D									
E									
F									
G									
H									
I									

PART III

TEMPORARY USE GRANTS

REF.	IN PROCESS NO.	IN PROCESS ACRES	IN PROCESS CONSIDERATION ($)	GRANTED NO.	GRANTED ACRES	GRANTED CONSIDERATION ($)	PURPOSE

REPORTED TO WAA OR GSA

REF.	REPORTED TO WAA OR GSA	DESIGNATED DISPOSAL AGENCY	DATE DESIGNATED	DISPOSITION

TRANSFER OR RETRANSFER TO OTHER GOVERNMENT AGENCIES

REF.	DATE AUTHORIZED	RECEIVING AGENCY	DATE OF LTR FROM ARMY AF OR AEC	RESTORATION OR BLDG. DISP. COMPLETED (Date)	DATE CUSTODY ASSUMED
A(2)		Dept. of Agriculture			8-10-50
(B) 3		FPHA			7-1-46

LEASE CANCELLATIONS

REF.	NO.	ACRES	RENTAL (Dollars)	REPORTED TO GSA	CANCELLED
A(3)	63	48,852	6496 (annual)	—	See remarks

OTHER DISPOSALS

REF.	CLASSIFIED	APPRAISED	ADVERTISED	DATE SET FOR OPENING OF BIDS	COMPLETED	CONSIDERATION ($)
A-4						

SIGNATURE	TITLE	ADDRESS
C. B. Raymer C. B. RAYMER	Chief, Real Estate Div.	Louisville, Ky.

ENG FORM 1 MAY 50 836

(Letter of transmittal Unnecessary)

DOCKET COPY

ARMY SERVICE FORCES
OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE

DATE 10 August 1945

WARNING NOTICE

(Continental United States)

TO: DIRECTOR OF REAL ESTATE, OFFICE OF THE CHIEF OF ENGINEERS
CHIEF, PLANNING BRANCH, ACQUISITION DIVISION, REAL ESTATE, O.C.E.
CHIEF, REALTY CONTROL BRANCH, REQUIREMENTS DIVISION, REAL ESTATE, O.C.E.
CHIEF, MANAGEMENT AND DISPOSAL DIVISION, REAL ESTATE, O.C.E.
CHIEF, MANAGEMENT BRANCH, MANAGEMENT AND DISPOSAL DIVISION, REAL ESTATE, O.C.E.
CHIEF, DISPOSAL BRANCH, MANAGEMENT AND DISPOSAL DIVISION, REAL ESTATE, O.C.E.
CHIEF, OFFICE SERVICE DIVISION, O.C.E. (Surplus Properties)
DIRECTOR OF MILITARY CONSTRUCTION, O.C.E., Attention: Mr. Lanier
CHIEF, REDISTRIBUTION & SALVAGE DIVISION, READJUSTMENT. O.C.E., Attention: Major Walker
CHIEF, MILITARY RESERVATION DIVISION, OFFICE OF JUDGE ADVOCATE GENERAL, (Surplus Government Owned Properties)
DIVISION ENGINEER, Ohio River DIVISION, Attention: REAL ESTATE OFFICER, For Information Only

1. Notice was received on 10 August 1945 that, effective 3 August 1945, the following described property has been classified as

INACTIVE____ STANDBY____ EXCESS____ SURPLUS____ REESTABLISHED____ REDISTRIBUTED X

Name of Installation: West Virginia Maneuver Area

Location nearest: Elkins (City) ____ (County) W. Va. (State)

Acreage: Total 365,418 W.D. Owned ____ Public Lands 341,266 Lesser Interests ____ Leased 24,151

Entire Installation ____ Portion of Installation X

Land Only X Land and Improvements ____ Improvements Only ____

Industrial Installation ____ Command Installation X

Property Used By AGF For Army Maneuvers and Artillery Range

2. Proposed disposition and remarks: Withdrawn from surplus status and redistributed as a Class IV installation under the jurisdiction of the Chief of Engineers for the purpose of issuing a permit for use thereof by the Office of Scientific Research and Development.

Eng. Form 1128
Rev. 1 May 1945

25-41865

ARMY SERVICE FORCES
OFFICE OF THE CHIEF OF ENGINEERS
REAL ESTATE DIVISION

DATE 26 March 1945

WARNING NOTICE

TO: CHIEF, REAL ESTATE DIVISION, OFFICE OF THE CHIEF OF ENGINEERS
CHIEF, PLANNING SECTION, ACQUISITION BRANCH, REAL ESTATE DIVISION, O.C.E.
CHIEF, REALTY RECORDS SECTION, REQUIREMENTS BRANCH, REAL ESTATE DIVISION, O.C.E.
CHIEF, DISPOSAL BRANCH, REAL ESTATE DIVISION, O.C.E.
CHIEF, PLANNING SECTION, DISPOSAL BRANCH, REAL ESTATE DIVISION, O.C.E.
CHIEF, CARTOGRAPHIC SECTION, REQUIREMENTS BRANCH, REAL ESTATE DIVISION, O.C.E. (Surplus Government Owned Properties)
CHIEF, OFFICE SERVICE BRANCH, O.C.E. (Surplus Properties)
CHIEF, MILITARY CONSTRUCTION DIVISION, O.C.E., Attention: Mr. Lanier
CHIEF, REDISTRIBUTION & SALVAGE BRANCH, READJUSTMENT DIVISION, O.C.E., Attention: MAJOR WALKER
CHIEF, MILITARY RESERVATION DIVISION, OFFICE OF JUDGE ADVOCATE GENERAL, (Surplus Government Owned Properties)
DIVISION ENGINEER, Ohio River DIVISION, Attention: REAL ESTATE OFFICER, For Information Only

1. Notice was received on 26 March 1945 that, effective 19 March 1945, the following described property has been classified as

INACTIVE ____ STANDBY ____ EXCESS ____ SURPLUS X REESTABLISHED ____ REDISTRIBUTED ____

Name of Installation: West Virginia Maneuver Area

Location nearest: Elkins (City) ____ (County) W. Va. (State)

*Acreage: Total 2,180,367 W.D. Owned - Public Lands 350,531 Lesser Interests 1,781,769 Leased 48,067

Entire Installation X Portion of Installation ____

Land Only ____ Land and Improvements X Improvements Only ____

Industrial Installation ____ Command Installation X

Property Used By AGF For Training

2. Proposed disposition and remarks: * Acreage held under "Lesser Interests" are covered by Trespass Agreements; acreage held under "Public Lands" are covered by permits from the Department of Agriculture.

ENG FORM 1128
REV. 1 MAR 45

688

25-29368-3M

RPS OF ENGINEERS, U. S. AR
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE DISTRICT
830 WEST BROADWAY
LOUISVILLE 3, KENTUCKY

ADDRESS REPLY TO:
DISTRICT ENGINEER
LOUISVILLE DISTRICT
CORPS OF ENGINEERS
P. O. BOX 59
LOUISVILLE 1, KY.

REFER TO FILE NO. [illegible] (Elkins, W Va)

30 August 1950

Western Maryland Railway Company
Baltimore, Ohio

Attention: Real Estate & Tax Agent

Gentlemen:

Under date of 17 December 1943, the Western Maryland Railway Company granted to the United States a license to construct, operate, maintain, renew, and remove an underground steam line across the company's property adjacent to a Government hospital installation at Elkins, West Virginia. The ground area on which the hospital buildings were constructed consisted of 4.26 acres, which were also owned by the railroad company and were made available to the United States by lease.

The hospital buildings were declared surplus and were transferred to the Public Housing Administration. That agency negotiated a cancellation of the lease with the railway, effective 30 June 1946; and the Daniel's Post #29 of the American Legion acquired the hospital buildings by transfer. We are informed that the Legion Post secured a new lease from the railway company for the use of the ground, effective 1 July 1946.

In view of the circumstances recited above, the United States has no further interest in the right-of-way for the underground steam line which was authorized by the license dated 17 December 1943; and pursuant to Article V of the license, application is hereby made that the same be cancelled.

If you acquiesce in the cancellation of the license, request is made that you cause the railway's acceptance to be executed on one copy of this letter in the space provided below, and return the same for the files of this office.

FOR THE ACTING DISTRICT ENGINEER:

Yours very truly,

C. B. RAYMER
Chief, Real Estate Division

The cancellation of the above described license is hereby approved this 27th day of November 1950.

WESTERN MARYLAND RAILWAY COMPANY

By /s/ C. B. Hoffman

FMJ/pmh

608 West Virginia Maneuver Area,
West Virginia - KMOLT

10 August 1950

TJC

Chief, Forest Service
Department of Agriculture
Washington 25, D. C.

HO'N

EJF

Dear Sir:

GFM

Reference is made to letters dated 4 August 1943 and 10 November 1948 from the Secretary of Agriculture to the Secretary of War, granting the War Department the right to use approximately 550,531 acres of land in the Monongahela National Forest, West Virginia, for Army maneuvers.

The use of this land is no longer required by the Department of the Army and, accordingly, the rights granted in the above referenced letters are hereby relinquished.

The land has been thoroughly searched for explosive material on the land as a result of military operations and all such material reasonably possible to detect has been removed or neutralized as indicated in the inclosed report of decontamination.

The cooperation of the Forest Service in making this land available for use by the Army is appreciated.

Sincerely yours,

W. M. MARTINEZ
Colonel, Corps of Engineers
Assistant Chief of Engineers for
Real Estate

Inclos:
1. Dr 24 cy 46 (cy)
w/report of
decontamination (cy)
2. Cy of Map

cc: Ohio, Cincinnati, Ohio

JAB, ABOH: Lands Division

001.6 (Elkins, Wn, West Virginia Maneuver Area)1 OVLRM (7-18-50) 2nd Ind
SUBJECT: Termination of Permits from Dept. of Agriculture covering W.Va. Maneuver area, Elkins, W.Va.

1. This installation was placed in surplus status as of 19 March 1945, and subsequently withdrawn for the purpose of issuing a permit for use thereof by the Office of Scientific Research and Development. Warning Notice No. 825 dated 10 August 1945, withdrew this entire area from surplus, however, correspondence in this office indicates that by letter dated 21 April 1945, from Office for Emergency Management, Office of Scientific Research and Development, Washington, D.C., to OCE, it was requested that OCE issue to OSRD a permit to use itself or through its agencies or contractors, a portion of the maneuver area. No information is available as to the actual issuance of the permit by OCE, or the terms or conditions under which the permit was granted.

FOR THE DISTRICT ENGINEER:

2 Incls
1 - ENG Form 1140 (trip)
2 - Decontamination Reports

C. B. RAYNER
Real Estate Officer

OVDVR 3rd IND.
OHIO RIVER DIVISION
21 July 1950
TO CHIEF OF ENGINEERS ENGLT
2 INCLS. n/c

SUBJECT: Termination of Permits from Department of Agriculture covering West Virginia Maneuver Area, Elkins, West Virginia (Ltr fm OCE dtd 6 July 1950 ENGLT)

OWLEN COL.SE (Elkins,W.Va., West Virginia Maneuver Area)1 2nd Ind

O Dist Engr, P. O. Box 59, Louisville 1, Ky. 18 July 1950

THRU: The Div Engr, OHDiv, Cincinnati 1, Ohio OWDVR

TO: The Chief of Engineers, Washington 25, D.C.

Attention: ENGLF

1. In compliance with paragraph 2 of basic communication, and to the extent information is available in this office, requirements as provided for in paragraph 5111.06 a(2) of Orders and Regulations are as follows:

a. Mountainous, uninhabited land, a great portion being high plateaus covered with rock, scrub growths and timber, located in Grant, Pendleton, Preston, Randolph and Tucker Counties, West Virginia.

b. August 4, 1943 and November 10, 1943.

c. Department of Agriculture (Forest Service).

d. Two Use Permits.

e. SAM Form 1440 included as Inclosure No. 1.

f.,g.,h. No restoration work was performed by Department of the Army. In accordance with Memorandum of Understanding dated July 8, 1943, and two amendments thereto, between local representatives of Forest Service and Department of the Army, the Forest Service assumed responsibility for protecting the maneuver area from forest fires. The Forest Service constructed the necessary facilities, the cost of construction and maintenance being borne by the Department of the Army on a reimbursable basis under existing regulations. It is indicated from the records that the funds were made available directly by OCE to Forest Service, and, provided for the construction of lookout towers and road building and repairs due to the additional fire hazards caused by Department of the Army maneuvers within the area under use permit.

i. Three Reports of Decontamination Work are included as Inclosure No. 2.

j. SAM Form 1005 is not necessary as land was not improved by Department of the Army.

OSL/1j

CE 002 Elkins West Virginia Maneuver Area. SPALT 1st Ind.
(Ltr. 12 June 45)
SUBJECT: Real Estate Disposal Plan West Virginia
Maneuver Area and Base Installations, Elkins, West Va.

OCE, Washington 25, D. C., 29 June 1945.

TO: The Ohio River Division Engineer, COLUMBUS 16, OHIO.

1. The real estate disposal plan for the West Virginia maneuver area and base installations is approved as recommended with certain exceptions as hereinafter set forth.

2. The disposal plan recommends (page 27, paragraph 38), that the War Department acquire 12,760 acres in fee in order to have the expense of decontamination, land of low value, such acquired land to be later transferred to the Monongahela National Forest Reserve. It is the policy of the War Department as promulgated in Circular Letter No. 3680 (Real Estate No. 69), dated 19 April 1945, to decontaminate all contaminated areas regardless of cost, even though it would be cheaper to acquire the land in fee. Therefore, the recommendation that the War Department acquire this land is not favorably considered. This office advised your office by letter dated 24 March 1945, that a trained decontamination squad would be available for performance of neutralization work in the West Virginia maneuver area when requested. No contaminated land should be returned to the owner until such decontamination work has been performed.

3. All maneuver rights given to the Government should be relinquished if not needed in the performance of decontamination work.

4. This office has previously authorized the transfer of the two demountable CCC buildings at the Elkins Equipment Depot to the Allegheny Ballistics Laboratory. The remaining CCC buildings may be salvaged in accordance with existing regulations.

5. The buildings added to the Elkins Equipment Depot by the War Department during its occupancy thereof may be disposed of to the Monongahela National Forest Reserve on a reimbursable basis, pursuant to WD Manual 1205.10 or sold in accordance with WD Manual 1205.06.

6. The recommendation made on page 9, paragraph 2(e), of the disposal plan, regarding dismissal of tract A-86 from condemnation, will be made the subject of a separate communication.

7. Approval of the disposal plan is subject to adjustments in boundary descriptions of the area requested by the Office of Scientific Research and Development, and subsequent reactivation of such area by the War Department.

Recd 6/1/45

X. The transfer of Government improvements in connection with the termination of leases should be supported in each case by proper restoration cost estimates and valuations of improvements in accordance with existing procedure and regulations.

BY ORDER OF THE CHIEF OF ENGINEERS:

ROBERT H. FABIAN
Major, Corps of Engineers
Chief, Management and Disposal Division
Real Estate

1 incl. s/c
(except 2 c s w/d)

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DECLASSIFIED
Authority NND 873917
By MNARA Date 10/2/02

HISTORY OF XIII CORPS

Entry
RG 407, 427, Box 4552

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DECLASSIFIED
Authority NND 13397
By MLR NARA Date 10/2/02

Reproduced at the National Archives

DECLASSIFIED
Authority NND 813592
By MNARA Date 10/2/02

WEST VIRGINIA MANEUVER AREA

HISTORY

GENERAL

The West Virginia Maneuver Area, in the mountainous terrain to the west of Alleghany Front, has been the scene of special training activities of particular significance. Regiments and separate battalions have come into the area from maneuvers in other parts of the country and from camps and barracks, and without exception they have found experience in West Virginia especially valuable for the kind of objective training so important as a preliminary for actual combat.

Rugged and primitive terrain, accessible enough to provide convenient approach yet natural enough to afford the cover and concealment found in unsettled areas, was discovered in early reconnaissance in West Virginia. Variations including precipitous rock formations, steep knobs covered with woods, and deep ravines hidden between low mountain ranges, were scattered throughout the area.

One expanse from the Alleghany Front to Canaan Valley was found to be almost uninhabited and ready-made for artillery range practice. This large area was later used for firing tests and problems involving overhead fire of all weapons employed to advance infantry troops.

Reproduced at the National Archives

DECLASSIFIED
Authority NND 873997
By MN NARA Date 10/2/02

PRELIMINARY PLANNING

The West Virginia Maneuver Area was selected by representatives of the Army Ground Forces, U. S. Army, subsequent to the completion of a mountain training program at Buena Vista, Virginia, in April, 1943. The Commanding General, Fifth Service Command was directed to procure maneuver rights for the area and the Commanding General, XIII Corps was given instructions for its use.

On June 15, 1943 Colonel Arthur W. Gower, CAC, reported to Headquarters XIII Corps for instructions with reference to his assignment as Director of the WVMA. On June 19, 1943, he arrived at Elkins, West Virginia, with an advance detachment consisting of six drivers and mechanics and four 1/4 ton trucks secured from the 168th Quartermaster Truck Co, at A. P. Hill Military Reservation, Virginia.

A reconnaissance of the area was made on June 19, 1943, by a party including Major General Emil F. Reinhardt, Commanding XIII Corps; his Chief of Staff, Colonel John T. Zellars, GSC; and Deputy Chief of Staff, Colonel Charles S. Whitmore, GSC. Their route included Elkins, Parsons, Thomas, Davis, and Harman. Further reconnaissance was made commencing June 21, 1943, by the XIII Corps G-3, Colonel Walter C. Stanton, GSC; Colonel John M. Whistler, GSC, G-4; Colonel Lawrence L. Skinner, QMC; Lt. Col. George A. Morris, CE, and Major Albert H. Jackman, Special Projects Division, Army Ground Forces, Washington, D. C.

As the result of these reconnaissance activities, the Commanding General, XIII Corps, decided to establish Director Headquarters at Elkins, West Virginia, and during the period from June 23 to July 20, 1943, inclusive, further reconnaissance was made by additional members of the Corps staff, by the Director, by the Commanding Officer, 94th Signal Battalion, and additional members of the West Virginia Maneuver Area staff subsequent to their assignment to duty. These reconnaissances resulted in tentative selection of sites for WVMA QM Depot, QM Unit, Corps, The Evacuation Hospital, Headquarters Company (Prov), 94th Signal Battalion areas and for such other corps units as it was anticipated would be assigned to the WVMA. Locations were likewise selected for the Finance Officer, APO, Prophylaxis Station, Post Exchange and Telephone Exchange. Space was secured in the Forestry Building, U. S. Department of Agriculture for Director's Headquarters. A plan of communications was tentatively completed by representatives of this headquarters, working in conjunction with the Signal Officer of the Fifth Service Command and representatives of the local telephone company. Plans were also perfected with Postal Inspectors for the establishment and operation of the APO. On June 30, 1943, the Director reconnoitered and conferred with representatives of the Baltimore and Ohio Railroad and Western Maryland Railroad and perfected plans for handling rail movements to and from WVMA.

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During the period of preliminary planning, conferences were held with U. S. Public Health Officials, Civic Officials, FSA representatives and OPA Officials to coordinate the policies of the Commanding General, XIII Corps, concerning the relationship between troops and civilians in the WVMA. A copy of these policies is attached as Inclosure #1. Arrangements for traffic control and traffic routes were likewise completed. The Rents and Claims Board, Fifth Service Command, cleared the maneuver area for use on June 30, 1943. Continuing reconnaissance of the entire maneuver area and of the proposed impact area in preparation for proposed troops training, was made during this preliminary period.

PROPERTY ACQUISITION

Maneuver rights were secured by the Rents and Claims Board, Fifth Service Command, for over five counties in West Virginia, namely Randolph, Tucker, Grant, Preston and Pendleton. One tract in this area consisting of the Elklick Run Watershed was restricted for maneuver purposes as outlined in a letter of the Secretary of Agriculture to the Secretary of War, dated August 4, 1943. 341,266 acres of the Monongahela National Forest are included in the maneuver area, and authority for the use of this land is conveyed in the above cited letter.

The "Impact Area", consisting of upward of 60,560 acres, was leased by the Rents and Claims Board in compliance with Directive, Headquarters, Army Ground Forces. The details of acquisition of the property were the subject of repeated conferences. Authority for an extension of the impact area to the south, with all land being included in the Monongahela National Forest, was granted in a letter of the Secretary of the Treasury to the Secretary of War, dated Novemenber 10, 1943.

Since some of the original tract of the impact area was under the airways channel, authority was given in Minutes No. 306, Interdepartmental Airways Board, for the use of this land and restrictions was imposed upon firing. No clearance was obtained from the above board for firing from the impact area extension, entirely under the Airway Channel. However, it is not contemplated that high angle firing will ever be conducted in this area.

Use of buildings for officers and warehouses and land for bivouacs was obtained by requests upon the Rents and Claims Board, Fifth Service Command, who in turn have negotiated leases. Authority to make such requests was delegated to the Director by the Commanding General, XIII Corps. Description of such lease holds is contained in Inclosure #3.

FIRE CONTROL PLAN

A fire control plan was set up by the Department of Agriculture in order to secure maneuver rights within the Monongahela National Forest. The Army was to fulfill certain conditions, agreed upon in a conference at Elkins, West Virginia, July 8, 1943, and attended by Mr. Arthur H. Wood, Forest Supervisor, Monongahela National Forest, Major Holland V. Shields, CE, Fifth Service Command Rents and Claims Board, and the Director. A Memorandum containing the agreement was approved by the Secretary of Agriculture

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in a letter to the Secretary of War dated August 4, 1943. The Forestry Service in a document dated August 6, 1943, prepared a complete fire control plan.

The WVMA has fulfilled its part of the agreement. However, one element of the agreement provides that a combat engineer battalion, trained by the Forestry Service, is to be made available to the Forestry Service on call. Trained engineer troops have been transferred from the area and the training of new engineer units, or units of comparable size, has been undertaken to prepare for the next period of fire hazards. There has been closest cooperation between the Forestry Service and this headquarters in working out the details of this and other problems arising in connection with the use of National Forest properties.

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INSTRUCTIONAL STAFF

An initial group of commissioned and enlisted Technical Advisors and Assault Climbing Instructors was furnished from the Mountain Training Center, Camp Hale, Colorado, arriving July 24, 1943.

It became apparent that this personnel would not be sufficient to carry on instruction of augmented combat teams, provide for senior umpires, and take care of any absentees due to injury or other causes. Accordingly thirteen (13) officers were procured from various sources in XIII Corps and sent to WVMA. These officers were trained, upon their arrival, to act as Technical Advisors. This has provided a balanced and sufficient instructions team. In order to secure sufficient instructors at the Assault Climbing School, students were selected from early Corps units undergoing instruction at Seneca, who possessed the qualifications necessary as instructors. Of these students initially selected, one officer and fourteen (14) enlisted men were finally transferred to Headquarters Company (Prov) as instructors.

TRAINING OF COMBAT TEAMS

Combat Team 112, 28th Division, arrived July 30, 1943. Instruction commenced August 1, 1943. Combat Team 109, 28th Division, arrived August 8, 1943, and started training August 10, 1943. These teams overlapped and a sufficient number of trained technical advisors was present, and necessary to make up training schedules which would provide the maximum training with the means available and adhere closely to these schedules. Due to a change in amphibian training schedules, the last combat team of the 28th Division was not sent to WVMA for training.

The combat teams of the 31st Division, CT 167, 154, 155, and those of the 77th Division, CT 306, 305 and 307 (the last two less their artillery components) have undergone training in WVMA. In some instances Division units were attached to combat teams for training. This is reflected in the tabulation of personnel in training as shown in Incl. #2. The inclosure also shows the number of officers and enlisted men from each unit who completed the assault climbing course.

Combat teams of the 35th Division arrived in the area beginning with the 134 CT, which trained from February 22, 1944 to March 7, 1944. 137 CT and 320 CT followed 134 CT in the area.

ASSAULT CLIMBING SCHOOL

The site selected for the Assault Climbing School, 1½ miles north of Mouth of Seneca, is such as to locate it centrally with respect to the rock formations used for training. The permanent overhead consists of one officer and a detachment of enlisted men from Headquarters Company (Prov), detachments of medical personnel, military police, engineer troops, quarter-

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master truck unit, and commissioned and enlisted assault climbing instructors. Since the senior instructor is the senior officer present he also acts as Detachment Commander. All administration is under the CO Headquarters Company (Prov), however.

All detachment personnel are housed under heavy canvas. All students, both commissioned and enlisted, live in shelter tents.

The training schedules provide for fourteen (14) days of assault climbing instruction including night and day tactical problems. The schedules have been modified from time to time at the instance of Army Ground Forces to provide a more comprehensive and balanced course.

CORPS TROOP TRAINING

Mountain training of corps troops has been given however, whenever possible and in numbers as will best fit them for combat missions.

ENGINEER TROOPS

Whenever engineer units have remained in WVMA for a long enough period to permit sending officers and enlisted men to the Assault Climbing School, such students have been detailed generally in the same numbers as provided for combat team engineer troops. These troops have also constructed and maintained mountainous roads, operated water points and a rock crusher and participated, whenever necessary, in mountain training of combat teams.

SIGNAL TROOPS

The 94th Signal Battalion has constructed seventy (70) miles of standard pole line and installed and maintained field wire lines through mountainous terrain to furnish telephone service for combat teams, the Director, Operations Headquarters, and corps units training in the area. This unit has also rehabilitated many miles of forestry telephone lines. In addition, it has operated all communications in WVMA including message center and messenger service. Certain personnel also participated in the Assault Climbing School, and seven (7) enlisted graduates were transferred to the instruction group.

The 3rd Platoon, 281st Signal Pigeon Co., has trained pigeons and furnished them for communication work to nearly all units training in mountain operations in WVMA.

QUARTERMASTER UNITS

The truck companies have serviced all units over all roads in the maneuver area. Initially, students were detailed from Quartermaster units to Seneca School and from these units, one officer instructor was secured.

MEDICAL UNITS

The 27th and 44th Evacuation Hospitals have sent groups consisting of

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one officer and twenty (20) men each to combat teams for training in medical evacuation.

The 343d Medical Group participated in a complete course in Medical Evacuation in Mountain Operations, on Middle Mountain in December and January.

FIELD ARTILLERY UNITS

Corps Field Artillery units sent students to Seneca School as shown in Inclosure #2. These units trained in the terrain of the WVMA under Corps supervision, but secured valuable training through use of this terrain. A medical detachment of the 13th FA Observation Battalion also took the course in medical evacuation.

Although normal training of Corps units was under supervision of XIII Corps, this headquarters has augmented the training by constructing two small arms ranges, by coordinating the use of these ranges and other training aids, and by assisting the corps staff in securing status reports, in inspection of cadres, and in conduct of Army Ground Force, MTP and ITP Tests, show-down inspection and preparation of initial shortage lists. This headquarters also serviced the OQ 2A Target detachment which conducted Anti-Aircraft machine gun firing in December, 1943.

TANK DESTROYER BATTALION

The 628th Tank Destroyer Battalion operated from Bearden Knob from November 6 until December 8, 1943. Lt. Col. William M. Hernandez was in command of the battalion.

A moving target range of 3" firing was built by the 628th Tank Destroyer Battalion with assistance of this headquarters.

ORDNANCE

The 84th Ordnance Bn with the 512th Ord Hv Maint Co arrived in the area on Sept 11, 1943. The units were followed by the 204th Ord Med Maint Co, the 3468th Ord Med Maint Co, the 588th Ord Hv Maint Co, the 906th Ord Med H A M Det, the 47th Ord Bn, the 3539th Ord M A M Co, the 916th Ord Maint Co, and the 77th Ord Bn. Operations under primitive field conditions and in deep mud trained the personnel in meeting these difficulties.

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SUPPLY

In the original plan as outlined, the G-4 in the WVMA was the coordinator of all supply functions within the maneuver area. He was assisted by the various special staff sections, who in turn controlled supply activities of various respective sections.

The QM Staff Officer supervised the function of the QM Supply Office, the Class I Railhead, the Class III Dump, Transportation facilities, and the Salvage Operations. The QM Supply Office was established primarily to provide replacement stock (replacement by direct exchange), for items of clothing and equipment worn out through fair wear and tear, damage, or otherwise destroyed in maneuver operations. Also set up were Supply facilities for special mountain clothing and equipment which was shipped into the maneuver area in the early fall of 1943, involving a shipment of some 46 carloads. The Class I Railhead was originally established as a Third Service Command Railhead, operated, by Third Service Command personnel as augmented by personnel of local troops; however, the Third Service Command eventually pulled out their personnel and left the operation of the Class I Railhead entirely to maneuver service troops. The Class III Dump was originally established by obtaining fuel and lubricants by local purchase of TPS contracts. However, as time progressed the Third Service Command changed the method of Class III Supply so that the standard procedure finally involved all shipments of fuel and lubricants from points on the east coast. The Transportation Section of the QM coordinated all rail and motor transportation movements in and out of the maneuver area. The Fifth Service Command provided a Salvage Officer who operated as a part of the QM activities in this installation for Salvage of QM clothing and equipment.

The Engineer Staff Section supervised the operation of all engineer supply activities which were operated by the Engineer Supply Officer. The Engineer Supply Section was originally planned to operate on a replacement basis, all replacements to be handled by direct exchange. This section also handled the purchase of all material for construction within the maneuver area and also provided Engineer training aids to all troops participating in the maneuvers within the area.

The Ordnance Staff Section supervised all Ordnance supply activities which included provisions for motor parks, motor replacement and ammunition as required. The Ordnance Supply Section was established, providing for the stocking of a large supply of small arms parts, and also a motor replacement pool for exchange of vehicles.

The Signal Staff Officer supervised all signal supply activities which included the operation of the signal supply section, operating on the same replacement basis for worn out signal parts as well as to provide wire, etc, for the combat teams.

The Medical Supply Section operated without medical staff section supervision. Its principal duty was to maintain a storage of supply for the

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Evacuation Hospital and medical units of other types within the maneuver area.

Likewise the CWS Supply Office operated without Staff Section supervision. Its supply activities consisted principally of replacements and maintenance of CWS Equipment as well as handling issues of Chemical Smoke and Signal Smoke used by the maneuvering troops.

The plan as outlined above, developed however, as the maneuver area became more established.

G-4 became responsible to XIII Corps for equipping all units in the maneuver area which were placed in an equipment priority under the provisions of the WD Directive for equipping units for overseas service, as well as to outfit units which arrived in the maneuver area from other posts ill equipped. This added responsibility added greatly to supply activities and caused a rapid expansion of all of the supply sections. Many units came into the maneuver area in the early fall without proper issue of T/BA clothing and equipment which necessitated that the QM Section put in special requisitions and maintain a larger stock not otherwise necessary, to take care of these special cases. One combat team arrived in the maneuver area after participating in long desert training and the equipment of this combat team was in such bad shape that much of the clothing had to be replaced. The various staff sections were charged with the processing of shortages for the units in equipment priority and submission of an initial shortage list to Chiefs of Technical Services, acting in part as post, camp, or station supply agency, which was not the original intention.

Two of the greatest problems of supply in the maneuver area were the issue of special clothing and equipment and the Ordnance replacement of vehicles. Due to the bulk of the special mountain clothing and equipment that was issued to the combat teams training in the area, a large number of personnel was required to issue and to receive the equipment used, also to classify the equipment at the end of each turn in, in order that all equipment could be renovated for re-issue. This was a long, slow, tedious job and was well performed by the troops required to carry out this function. Ordnance replacement of vehicles became very acute, as there was a high mortality rate of 2½ ton GMC motor vehicles in the maneuver area due to mountain operation. Another problem was the constant rapid turnover of service troops, which created the necessity of frequent property turnover in the various supply sections.

All of the supply sections were organized under one groupment called "The West Virginia Maneuver Area Depot". This was probably a misnomer, inasmuch as the depot as operated was not an ASF General Depot. In reality, it constituted of a field depot, or a field dump, which would probably be found in the theater of operation. It was operated entirely by combat troops, independent of any AS F installation. Basis of supply initially was maintenance of a 30 day level of supply for replacement purposes, for 5000 troops, which was later raised to a 7500 man level on the same 30 day basis.

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ADMINISTRATION

Memorandum No. 1, Hq, XIII Corps, dated 21 July 1943, contained the administration and supply plan for WVMA. Annexes supported the general plan for matters pertaining to the Quartermaster, Engineers, Signal Officer, Ordnance Officer, Chemical Officer, Surgeon (Medical Service and Sanitation), Finance Officer, Postal Officer, and Members of Courts-Martial. A copy of the memorandum is hown in the Appendix.

Administrative memoranda and instructions issued for Corps troops upon approval of Headquarters XIII Corps and published from time to time amplified and supplemented operating procedures.

The administrative departments formed as officers and men became available for the functional operation were as follows:

1. Director Headquarters
2. General Staff Section
3. Adjutant General Section
4. Chaplain Section
5. Engineer Section
6. Finance Section
7. Ordnance Section
8. Provost Marshal
9. Quartermaster Section
10. Signal Section
11. Medical Section
12. Special Service Section
13. Headquarters Co (Prov)
    - Elkins Base Camp
    - Seneca Base Camp
14. Depot & Railhead
    - Depot Headquarters
    - Quartermaster Supply Section
    - Ordnance Supply Section
    - Signal Supply Section
    - Engineer Supply Section
    - Medical Supply Section
    - Chemical Supply Section

Personnel of the Fifth Service Command were in charge of the following activities:

1. Purchasing and Contracting
2. Rents and Claims
3. Intelligence
4. Post Exchanges
5. Salvages

An organization chart presenting the functional assignment of departments, and a proposed Table of Organization for the manning of administrative agencies is shown in appendix.

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10

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WEST VIRGINIA MANEUVER AREA
MEMORANDUM NO. 1

21 July 1943

WEST VIRGINIA MANEUVER AREA ADMINISTRATIVE AND SUPPLY PLAN.

Administrative Plan (Section I)
Supply Plan (Section II)

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REC'D AG MISC SEC HQ AGF 25 JUL 1943

Section I - Administrative Plan

1. APPLICATION This memorandum applies to permanent troops within the area as well as troops stationed there temporarily for training.

2. VISITORS Provisions will be made by the Headquarters Commandant, Director Headquarters to billet all visitors to that Headquarters.

3. CAMPS

a. Base Camps:

(1) A base camp will be established for service troops of the maneuver area at ELKINS, WEST VIRGINIA.

(2) A second base camp will be established at SENECA, West Virginia, for troops at the SENECA installation.

(3) Both base camps will be of winterized tent construction throughout.

b. Bivouacs: Tactical troops will establish tactical bivouacs only.

c. Bivouac Areas:

(1) The bivouac areas will be assigned by Director Headquarters.

(2) Advance detachments will notify the Director Headquarters immediately upon their arrival in the maneuver area.

(3) Advance detachments will furnish guides to the Provost Marshal to direct the main body of the units to bivouac areas.

(4) Roads in bivouac areas will be kept open for military vehicles.

4. CLAIMS

a. All claims will be handled by the Claims Officer, First Service Command, located at ELKINS.

b. Units will appoint unit Damage Officers, who will report all claims promptly to the First Service Command Claims Officer, through Maneuver Director Headquarters.

5. CLOTHING, EQUIPMENT AND PROPERTY

a. Preparation for Movement Overseas: Units participating in the West Virginia Maneuvers are subject to all troop movement overseas while in the maneuver area. Such units may move direct from the maneuver area to a Port of Embarkation or a staging area without returning to home stations.

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b. Government Property: Government property will be turned in to home station prior to departure for maneuver area.

c. Post, Camp and Station Property: [illegible] clearance from the Post Quartermaster, Post Camp, and Station Property prior to departure from home station.

d. T/BA Allowances: Units will move into the maneuver area with T/BA and T/E allowances. All clothing and equipment will be inspected for serviceability, and all unserviceable clothing and equipment replaced. Type X clothing will be taken to the maneuver area.

e. Personal Property: Personal property not authorized for movement overseas will not be brought into the maneuver area.

f. Accounts: Units and individuals will settle all personal indebtedness and other obligations prior to departure from home station.

g. Uniform and Equipment:

(1) Uniform:

(a) During tactical exercises, unless otherwise prescribed by the Director, Maneuvers, the following uniform will be worn:

1. Enlisted men: [illegible] with leggins.

2. Officers: As prescribed by unit commanders.

3. Officers and enlisted men will be fully armed, including steel helmets, and gas masks, and wear the prescribed maneuver identification as directed.

(b) In visiting nearby towns, whether on or off duty, special attention will be given to a neat and soldierly appearance.

(2) Equipment:

(a) No tonnage other than T/BA or T/E tonnage will be brought to the maneuver area.

(b) Maneuver identification materials and umpire control flags for use during tactical exercises will be furnished by the Quartermaster, XIII Corps [illegible] ELKINS, WEST VIRGINIA. Units will [illegible] maneuver area all such materials on hand.

(c) All supplies and equipment [illegible] stations, earmarked for [illegible] will be shipped to the Quartermaster [illegible] Depot, ELKINS, WEST VIRGINIA [illegible] station, unless otherwise directed. [illegible] will be made [illegible] prior to departure from home station.

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(a) Storage [illegible] will be made with consideration of units and [illegible] to be [illegible] under [illegible]. Requests will be [illegible] to the Director Headquarters with the [illegible] and [illegible] showing type and amount of equipment, together with the tonnage and cubage of each type that is desired to be stored.

(b) In so far as practicable, Director Headquarters will provide storage space for all units as required.

(c) During active participation in tactical exercises, storage of individual clothing and equipment, not used during the exercises, together with other property, is a command responsibility.

(d) Movement of stored property will not interfere with combat exercises. Guard detachments will be held to a minimum.

(4) Care of Equipment and Supplies:

(a) Movements within the maneuver area are particularly hazardous to equipment, especially to instruments, leather, and metal. Therefore, the care of equipment will be given a high priority by all concerned.

(b) Complete T/E, T/BA allowances of cleaning and preserving materials for a 30 day period will be brought into the maneuver area by all units.

(c) The upkeep of supplies is based on absolute minimum requirements and, unless properly cared for and judiciously expended, a shortage may result that will detract from the comfort of the troops.

6. MOVEMENTS TO AND FROM THE MANEUVER AREA:

a. Orders:

(1) No [illegible] and/or motor will be issued [illegible] proportion to all units under control of the XIII Corps.

(2) When [illegible] motor movement is ordered, maximum use will be made of [illegible] to transport individual equipment [illegible].

(3) All [illegible] will accompany units. No TPA will be authorized.

9

b. Arrival in Maneuver Area:

(1) Troops will arrive in [illegible] two (2) [illegible] portions of [illegible] [illegible]

(2) [illegible] date and hour of departure from home station, together with strength of personnel will be [illegible] and hour of opening command post [illegible] [illegible] Commanding General, [illegible] Port, Delaware, and to Director, Headquarters, [illegible] Maneuver Area, ELKINS, W. VA.

(3) Date and hour of closing in the maneuver area, together with report of personnel and vehicle counts, will be reported by telegram to this headquarters.

c. Rail Movement:

(1) A rail movement to and from the maneuver area will be conducted as outlined in Army Regulations, 55-series, Transportation Corps, [illegible] the necessary duties and procedure for [illegible] movements.

(2) All movements will be so timed as to permit the troops closing in the maneuver area within the specified time.

(3) Service troops located in the vicinity of ELKINS, WEST VIRGINIA, will assist the detraining of the troops, as directed by Director Headquarters. Portable ramps will be provided where necessary.

(4) All unloading and loading at ELKINS will be under unit commander's supervision.

d. Motor Movement:

(1) Units will [illegible] necessary arrangements with the Post Quartermaster Officer of their home station for supplies, vehicle and lubricants to be used enroute to the maneuver area.

(2) Unit Commanders are responsible that all vehicle tanks and [illegible] are filled to capacity prior to departure from home station.

(3) A sufficient quantity of engine oils and other lubricants, together with grease, will be brought from home station to complete the motor movement with one week's supply on hand for all vehicles after arrival.

7. MOTOR VEHICLES:

a. All motor equipment will be serviced prior to departure from home station.

b. [illegible] area for first [illegible]

c. [illegible]

d. Repairs [illegible]

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b. Third and fourth echelon repairs will be made by service troops in the vicinity of [illegible].

c. [illegible] will be carried to the maneuver area for first and second echelon repairs by each division and separate unit.

d. Reports:

(1) All units in the maneuver area will render a report in duplicate to Director Headquarters of the vehicles on hand in the unit in the maneuver area as of midnight of the first day after closing in the maneuver area.

(2) The above report will be forwarded to reach Director Headquarters within forty-eight (48) hours after closing in the maneuver area. Division report will be consolidated.

8. SERVICE TROOPS:

a. Station list: A station list of all service troops and their assignment will be published by Director Headquarters at a early date. Amendments will be published as issued.

b. Employment:

(1) Employment of Service Units under field conditions, utilizing their full equipment, is required to the maximum extent practicable.

(2) [illegible] and similar service units will be employed under tactical control.

9. TRAFFIC CONTROL:

a. General traffic will be under supervision of Director Headquarters who will establish a traffic control headquarters.

b. Enforcement by Provost Marshal.

c. Procedure on Entry into the Maneuver Area: Motor Movement.

(1) A unit, on entering the maneuver area, will send a liaison officer to each column to the Traffic Control Headquarters at [illegible] according routes to [illegible] will arrive at least twelve (12) hours in advance of the [illegible] column (s) with information as to time of entry, number of vehicles, routes desired, [illegible] the column uses of radio communication, [illegible] frequencies will also be known. The officer will [illegible] means of communications [illegible] which send before it reaches the maneuver area.

(2) Traffic Control Headquarters will assign a route and time schedule on the route, [illegible] in accordance with priorities to be established by Director Headquarters.

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10. LOST AND FOUND PROPERTY:

a. All expendable property lost in the maneuver area will be reported by letter, through channels, to the Director Headquarters, HIKINS, WEST VIRGINIA, Attention appropriate staff officer.

b. Serial numbered property found in the maneuver area will be turned in to the WVMA Depot at HIKINS and reported to the proper Staff Officer, Director Headquarters. In the absence of instructions to the contrary, all other property and equipment found in the maneuver area will be turned in to the WVMA Depot at HIKINS for ultimate disposition. Field wire, and other critical items of material regardless of condition, will be recovered from the field and turned in for reclamation.

11. FIRE PREVENTION:

a. Responsibility:

(1) The enactment of necessary fire preventative measures is a command responsibility.

(2) Enforcement of preventative measures will be the responsibility of the entire chain of command, down to include each company, battery, and troop.

(3) Every unit commander will impress upon all members of his command the necessity for constant watchfulness to prevent the starting and spread of dones, or grass fires in the maneuver area.

(4) A Fire Officer will be appointed in each battalion or separate unit. His primary responsibility will be supervision of the prevention and fighting of fires. His actions following the discovery of a fire will include prompt notification to higher and adjacent units, Provost Marshal, Director Headquarters, and the Rents Board in HIKINS.

b. Preventative Measures:

(1) No open fires will be built by troops during active participation in exercises except upon specific authority of a unit commander, for the preparation of food by an organization kitchen.

(2) All open fires will be built in shallow trenches or will be banked on all sides by earth.

(3) No open fires will be left unattended at any time.

(4) All open fires will be cleared of leaves, dry wood, and other inflammable material for a distance of four feet from the outer edge of the fire.

(5) Fires will not be built in such places as to cause conflagration of surrounding trees.

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(6) [illegible] cooking or water heating will conform to the above [illegible] for open fires.

(7) Gasoline and other volatile materials will not be stored or [illegible] within 100 feet of any fire.

(8) All fires will be completely extinguished by shoveling earth from [illegible] completely doming the fire area with a mound of earth before being left unattended.

(9) All bivouac areas will be inspected by a commissioned officer immediately upon evacuation of troops, to insure that no fires are left burning.

(10) No smoking will be permitted while riding in motor vehicles.

(11) Smoking will be permitted only at hourly halts when [illegible] themselves on the ground is cleared of all inflammable material.

(12) Smokers will:

(a) Detach the [illegible] cigarette and extinguish it by [illegible].

(b) Split the cigarette paper, empty the tobacco from it, [illegible].

(c) Wad the cigarette paper into a small ball and throw it away.

d. Fighting Fires.

(1) Conducting combat fires will be the responsibility of U.S. Forest Service personnel. Army personnel will assist the Forest Service in fighting fires.

(2) All fires will be reported to Director Headquarters by the most expeditious method. Any available Signal Corps means of communication will be used for reporting fires and all such messages will be handled as URGENT.

(3) Each separate unit will maintain constantly in the vicinity of its CP a truck available for immediate use with the following equipment:

Shovels
[illegible]

The above vehicle will be [illegible] to fires. It will be [illegible] to CP as soon as the fire is [illegible].

(4) [illegible] immediately extinguish same. [illegible] to be [illegible] by [illegible] fire by the [illegible].

(5) Troops will not be [illegible] out of their [illegible] to fight fires [illegible] Director Headquarters.

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(3) Personnel will at all times know the location of available fire fighting equipment, water, tractors, trucks, etc.

e. Fire Fighting Organization:

(1) One Engineer Combat Battalion will be given a short course in fighting forest fires on arrival in the maneuver area.

(2) Thereafter, one company of the above mentioned battalion will always be on call, at the direction of Director Headquarters, for fire fighting.

f. Measures for preventing and suppressing of fires will be published as necessary.

12. ACCIDENT PREVENTION:

a. Common Accident Causes:

(1) Walking on roads at night.

(2) Congregating on roads waiting for buses.

(3) Sleeping under vehicles in bivouacs.

(4) Failure to observe traffic regulation and speed limits.

(5) Overloading of vehicles.

(6) Excessive use of alcoholic beverages.

(7) Swimming and diving in unknown waters.

(8) Improper use of field ranges, M1937.

(9) Undue exposure during electrical storms.

(10) Walking on railroad tracks.

b. The major cause of accidents is CARELESSNESS.

c. Preventative Measures:

(1) Units will publish accident preventative regulations.

(2) Read the above to all troops at first formation after entering maneuver area.

(3) Publish on all bulletin boards.

(4) Repeat reading to the troops on each payday.

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13. DESTRUCTION OF CROPS:

a. Due to the critical shortage of foodstuffs now existing in the United States, great care will be taken by all echelons of command to prevent destruction of crops. Fields with growing crops will not be entered without authority of Battalion or higher commander.

b. Unit damage officers will report all crop destruction or damage.

14. TIMBER:

a. Down and Dead Timber:

(1) Down and dead timber found within the maneuver area may be used at the discretion of unit commanders.

b. Standing Timber:

(1) Standing timber will not be cut indiscriminately or wantonly damaged.

(2) Wanton destruction of timber will be handled under the 105th Article of War.

(3) When standing timber is cut, discretion will be exercised to prevent denuding an area. Outside of trees over 3" in diameter and less than 10" will be so dispersed that no two cuttings will occur within 50 feet of each other.

c. Underbrush:

Unit commanders may authorize clearing of underbrush as desired in bivouac areas or other locations if deemed necessary.

d. Tree Plantings:

All tree plantations will be placed "OUT LIMITS" by troop commanders except as absolutely needed for maneuver purposes.

e. All merchantable timber over 12" in diameter will be designated by a forest officer before being cut for military purposes.

15. RECREATIONAL CONVOYS:

a. Operation:

(1) Convoys to swimming places and to nearby towns on days of rest only.

(2) Held to absolute minimum.

(3) Radius of operation limited to thirty (30) miles from bivouac.

c. Supervision.

(1) Command responsibility.

(2) Convoys for recreational trips to be supervised by officers.

(a) One officer per each five (5) vehicles, or fraction thereof.

(b) Single vehicles will be accompanied by one officer.

(3) Due to the mountainous road net within the maneuver area, great care will be exercised by all concerned to prevent accidents.

(4) Convoys will operate at safe driving speed, and in no case faster than twenty-five (25) miles per hour.

16. VISITING TOWNS.

a. During Training Hours.

(1) All town sites declared "Off Limits" for all troops during hours of training, except when on official business.

(2) The fact of official business will be supported by written authority of the commanding officer. Written authority will be presented when required.

(3) Personnel in towns on official business will visit only those places or houses concerned in their performance of official duty.

(4) Loitering or loafing at stores, restaurants, beer saloons, etc., will not be tolerated.

b. During Rest Periods.

(1) All troops will be permitted a rest period of one day per week.

(2) During rest periods, and during evening hours when not practicable to visit local towns, or other forms of hours of training, troops may visit nearby towns.

c. Curfew.

(1) All troops visiting nearby towns will depart from such town prior to midnight.

(2) Convoy officer will dispatch all convoys back to camp in such time as to be in camp prior to midnight.

17. PROVOST MARSHAL.

a. Duties.

(1) Control all military police activities within the maneuver area. Coordinate activities with civilian police authority.

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(2) Maintain military police at ELKINS, W. VA., at all times.

18. EXCHANGES, FIELD:

a. Operation:

(1) Operation of Exchanges will be a function of the Special Service Division, Director Headquarters.

(2) Hours of operation will be announced by Director Headquarters.

19. CASUAL AND REPLACEMENT DEPOT:

The Director Headquarters will establish and operate a casual and replacement depot at ELKINS, W. VA., consisting of one (1) Officer and such enlisted men as are necessary to handle replacements, stragglers, and other personnel returning to their organizations. This personnel will be forwarded to organizations concerned as promptly as possible.

20. LEAVES, FURLOUGHS, AND PASSES:

For troops undergoing specialized training, leaves of absence and furloughs will not be granted except in cases of emergency. Passes may be granted from after duty hours until midnight. Exception: Troops under-going specialized training of a duration of two weeks or less will not be granted passes. For all troops in the maneuver area, one day in seven will ordinarily be a day of rest and recreation.

21. PRIVATE AUTOMOBILES AND TRAINING:

a. Personnel of all [illegible] will be informed prior to entry into the maneuver area that the area is sparsely settled, generally inaccessible, roads are few, and housing and other similar accommodations for civilians within the area are very limited.

b. Use of private automobiles for official travel by officers and enlisted men will not be authorized either within, to, from, or within the maneuver area.

22. QUARRIES:

a. No operation of quarries or gravel pits will be undertaken except at points approved by the Engineer, Director Headquarters.

b. When gravel pit operation is authorized, reports of cubic yards of material removed must be forwarded to the Engineer, Director Headquarters.

23. FENCE REPAIR OPERATIONS:

a. Whenever [illegible] the gap in other premises through a fence will be used, [illegible] to continue maneuver operation property or to other adjacent [illegible] will be [illegible] a post and the gap opened.

b. In order to prevent [illegible] fences will close the operating [illegible] For this purpose any supply officer or supply NCO [illegible] fencing materials from the Engineer Dump serving his unit. When [illegible] by local troops is impracticable due to conditions of the maneuver [illegible] lack of material the condition will be reported at once to the [illegible] Headquarters.

c. Permanent repairs will be accomplished by Corps [illegible] of claims filed with the Rents and Claims Board SUTTLINS, W. VA. [illegible] owners will be advised to place in their claim the number of posts [illegible] woven wire and barbed wire needed for each repair job.

24. HUNTING AND FISHING:

Hunting and fishing will be authorized only to personnel obtaining necessary permits through Director Headquarters, West Virginia Maneuver Area. Under no circumstances will the use of any fire arms or ammunition be authorized for hunting. These instructions on hunting and fishing will be brought to the attention of each individual.

25. GENERAL PLAN OF SUPPLY:

a. Base Depots:

(1) Director Headquarters will operate a depot at THORN, W. VA. known as the WVMA Depot.

(2) All classes of supply will be handled through the depot.

(3) Class I and III Supply: (See Quartermaster Annex).

(4) Class II and IV Supply: (See Quartermaster, Ordnance, Signal, Engineer and Chemical Annexes).

(5) Class V Supply: (See Ordnance Annex).

b. Level of Supply:

Authority (50) days maintenance level of supply will be maintained at the Depot at SUTTLINS.

c. Water:

Procured locally. (See Annex No. 2).

d. Evacuation:

(1) Personnel. (See Medical Annex)

(2) Materiel. (See Quartermaster, Ordnance, Engineer Annexes).

e. Bathing Facilities, Shoe Repairs: (See [illegible]

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26. OPERATION OF SUPPLY POINTS:

a. Class I: Due to the uncertainty of the hour of the arrival of the daily train, parking areas will be furnished for stop vehicles selected at some place away from the railhead, under cover. Vehicles will arrive in the parking area in accordance with the time schedule for issuing rations and will be parked under cover to avoid congestion at the railhead. Traffic control personnel will then dispatch the vehicles from the parking area to the railhead on orders of the railhead officer when their rations are ready.

b. Class III: A similar system to the above will be followed for Class III supplies. No more vehicles than can be filled by the gasoline distributing personnel at one time will be allowed at the gasoline distributing point.

27. BILLS OF MATERIAL FOR RAIL MOVEMENT:

a. Units arriving in the maneuver area by rail will police all detraining points when unloading is completed.

b. Loading and blocking materials subject to further use will be cleaned, classified, inventoried, and stored as directed by Director Headquarters, for further use.

c. Upon completion of the above, units will submit to the Engineer Section, WVMA Depot at [illegible], N. Y., through channels, a report of materials needed to ship the unit from the maneuver area by rail, as prescribed below:

(1) Additional materials, beyond those salvaged from that used in the movement to the maneuver area, required for blocking and chocking. This includes lumber, wire, nails, etc.

(2) Special materials required, showing design and dimensions of chocking.

d. Due to the period of time required for obtaining the above material, it is imperative that the above information be furnished with the least practicable delay.

By command of Major General REINHARDT:

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General.

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

ANNEX NO. 1 21 July 1943
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

QUARTERMASTER PLAN

1. a. RAILHEAD: ELKINS, W. VA.

b. TRUCKHEAD: One initially will be established at MOUTH OF THE SENECA to serve the maneuver establishments located in this vicinity. Additional truckheads will be selected, established and operated as required by the tactical employment of troops.

2. LOCATION OF QUARTERMASTER ESTABLISHMENTS:

a. Depots for Quartermaster Supply. The following installations have been established to serve the troops in the West Virginia Maneuver Area:

(1) Zone of the Interior: RICHMOND ASF DEPOT (Cl II & IV).
PITTSBURGH RHD (Cl I).
39 S.C. BALTIMORE, MD. (Cl III).

(2) Advance Depot Cl I: ELKINS, WEST VIRGINIA (3d S.C.)

(3) WEST VIRGINIA MANEUVER AREA DEPOT: ELKINS, WEST VIRGINIA. Depot for all classes Quartermaster supplies, operated by a Provisional Depot Company organized from Quartermaster Service Troops in the maneuver area.

b. Limited depot stocks in the maneuver area have been based upon normal Theater of Operations maintenance allowances. Participating units will therefore take steps to complete issues of equipment and to replace unserviceable items, especially clothing and individual equipment, prior to departure from home stations.

c. FIELD LAUNDRY:

Will be established in the vicinity of ELKINS, W. VA. The exact location will be announced later, as will the schedule for laundry service for all troops in the maneuver area.

3. EMPLOYMENT OF QUARTERMASTER UNITS:

a. Quartermaster Truck Company will provide a Maneuver Area Transportation Pool to provide truck transportation for cargo and personnel in accordance with priorities determined by Director Headquarters.

b. A Quartermaster Gasoline Supply Company will establish and operate a gasoline refilling point in the vicinity of ELKINS, W. VA. Gasoline distribution points will be established and operated as required by the tactical employment of troops.

c. A Hq & Hq Detachment, Quartermaster Laundry Battalion will provide

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officer and enlisted personnel [illegible]

d. A Quartermaster Laundry Company will [illegible] in the vicinity of ELKINS, W. VA.

e. Personnel from service units in the maneuver area will provide a labor pool to operate the QM section of the ELKINS DEPOT.

f. A railhead company (less one platoon) will operate the railhead initially at ELKINS and establish and operate other railheads and [illegible] as may be required to support the tactical plan.

4. QUARTERMASTER SUPPLY ARRANGEMENTS:

a. Class I Supply.

(1) The field ration will be issued in accordance with Standard Menu in effect in the Third Service Command. Sandwich menu will be provided when so stipulated in daily program.

(2) Daily telegram will be submitted to the Quartermaster, Director's Headquarters, XIII Corps by Division Quartermaster and Supply Officers of separate units prior to 0900 daily. The time lag between submission of strength and consumption of food will be announced later.

(3) Railhead or railhead distribution of rations to units will be in accordance with a published schedule. Ration cycle will start with supper.

(4) Troops will arrive in the maneuver area with sufficient rations to carry them through the noon meal of the second day following the day of arrival.

(5) Reserve rations. Type "C" and Type "K" rations will be held in storage in the Depot for use in emergency or for maneuvers as directed by G-4 Director Headquarters XIII Corps.

(6) Ice will be available to troops and will be distributed with rations.

(7) Waxed paper and bags for wrapping sandwiches and paper bags for ration breakdown will be furnished automatically on daily train.

b. Class II and IV Supplies.

(1) A thirty (30) day level of stock based on Theater of Operation maintenance allowance for permanent overhead personnel will be maintained in the Depot at ELKINS, W. VA.

(2) Issues to units will be by direct exchange or requisition.

(3) Units will bring sufficient blank forms, stationery and office supplies to meet their needs for the duration of the maneuver. The Depot will stock only sufficient quantities of these supplies to meet the needs of Directors Headquarters XIII Corps and [illegible] to the maneuver area.

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(4) Units will [illegible] the maneuver area sufficient expendable supplies for [illegible] maneuver. Issues will be made at the West Virginia Maneuver Area Depot. Basis for issue of expendable supplies will be as follows:

(a) Calcium hypochlorite - 33 tubes [illegible] per [illegible] per day.

(b) Candles, laundry - [illegible] per company.

(c) Candles, issued - six candles per [illegible] enlisted men per day.

(d) Brushes, scrubbing - four per company per month.

(e) Matches, safety, box - one box per company per day.

(f) Paper, [illegible] - one half [illegible] per man per month.

(g) Paper, toilet - one roll per [illegible] per day.

(h) Soap, laundry - one pound per [illegible] enlisted men per day.

(i) Soap, scouring - six cakes per 50 enlisted men per month.

(j) Soda, caustic, lye - two cans per company per month.

(k) Lime, chlorinated - ten pounds per company per day.

(l) Wool, steel - five pounds per company per month.

(m) Lysol, cresole - three gallons per company per month.

(n) Lysol, tablets - three tablets per man per day.

c. Class III Supplies.

(1) The [illegible] will deliver by tank car or tank truck quantities of gasoline, as called for by the Quartermaster, Director Headquarters, XIII Corps, direct to Class III refilling points.

(2) Limited supply of [illegible], kerosene and white gasoline for lanterns will be stocked at the Depot.

(3) Issues will be made [illegible] separately with small [illegible] will include [illegible] daily [illegible] their [illegible] requirements of gasoline, [illegible] oil and greases.

(4) The [illegible] company will [illegible] and will [illegible] as the tactical situation requires [illegible] No. [illegible] to perform [illegible].

(5) Resupply of [illegible] will be [illegible] the exchange of empty five gallon cans for full ones. Resupply will be made as required and not on a time schedule.

(6) Class III distribution points will normally be located as recommended [illegible] by the Quartermaster, XIII Corps, by the unit tactical commander.

(7) White gasoline for lanterns, kerosene for lanterns, solvents and crude oil for [illegible] will be available for issue at the Depot.

(8) Fuel for [illegible] model [illegible] will be issued at Class III distribution points and will be identical to that used in motor fuel (Regular) [illegible] purpose vehicles.

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26. OPERATION OF SUPPLY POINTS:

a. Class I: Due to the uncertainty of the hour of the arrival of the daily train, parking areas will be established for supply vehicles selected at some place away from the railhead, under cover. Vehicles will arrive in the parking area in accordance with the time schedule for issuing rations and will be parked under cover to avoid congestion at the railhead. Traffic control personnel will then dispatch the vehicles from the parking area to the railhead on orders of the railhead officer when their rations are ready.

b. Class III: A similar system to the above will be followed for Class III supplies. No more vehicles than can be filled by the gasoline distributing personnel at one time will be allowed at the gasoline distributing point.

27. BILLS OF MATERIAL FOR RAIL MOVEMENT:

a. Units arriving in the maneuver area by rail will police all detraining points when unloading is completed.

b. Loading and chocking materials subject to further use will be cleaned, classified, inventoried, and stored as directed by Director Headquarters, for further use.

c. Upon completion of the above, units will submit to the Engineer Section, WVMA Depot at ELKINS, W. VA., through channels, a report of materials needed to ship the unit from the maneuver area by rail, as prescribed below:

(1) Additional materials, beyond those salvaged from that used in the movement into the maneuver area, required for blocking and chocking. This includes lumber, wire, nails, etc.

(2) Special materials required, showing design and dimensions of chocking.

d. Due to the period of time required for obtaining the above material, it is imperative that the above information be furnished with the least practicable delay.

By command of Major General REINHARDT:

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General.

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By NS NARA Date 7-10-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

ANNEX NO. 1
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

21 July 1943

QUARTERMASTER PLAN

1. a. RAILHEAD: ELKINS, W. VA.

b. TRUCKHEAD: One initially will be established at MOUTH OF THE SENECA to serve the maneuver establishments located in this vicinity. Additional truckheads will be selected, established and operated as required by the tactical employment of troops.

2. LOCATION OF QUARTERMASTER ESTABLISHMENTS:

a. Depots for Quartermaster Supply. The following installations have been established to serve the troops in the West Virginia Maneuver Area:

(1) Zone of the Interior: RICHMOND ASF DEPOT (Cl II & IV).
PITTSBURGH RED (Cl I).
39 S.C. BALTIMORE, MD. (Cl III).

(2) Advance Depot Cl I: ELKINS, WEST VIRGINIA (3d S.C.)

(3) WEST VIRGINIA MANEUVER AREA DEPOT: ELKINS, WEST VIRGINIA. Depot for all classes Quartermaster supplies, operated by a Provisional Depot Company organized from Quartermaster Service Troops in the maneuver area.

b. Limited depot stocks in the maneuver area have been based upon normal Theater of Operations maintenance allowances. Participating units will therefore take steps to complete issues of equipment and to replace unserviceable items, especially clothing and individual equipment, prior to departure from home stations.

c. FIELD LAUNDRY:

Will be established in the vicinity of ELKINS, W. VA. The exact location will be announced later as will the schedule for laundry service for all troops in the maneuver area.

3. EMPLOYMENT OF QUARTERMASTER UNITS:

a. Quartermaster Truck Company will provide a Maneuver Area Transportation Pool to provide truck transportation for cargo and personnel in accordance with priorities determined by Director Headquarters.

b. A Quartermaster Gasoline Supply Company will establish and operate a gasoline refilling point in the vicinity of ELKINS, W. VA. Gasoline distributing points will be established and operated as required by the tactical employment of troops.

c. A Hq & Hq Detachment Quartermaster Laundry Battalion will provide

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officer and enlisted personnel for the operation of the Quartermaster office.

d. A Quartermaster Laundry Company will establish a mobile laundry in the vicinity of ELKINS, W. VA.

e. Personnel from service units in the maneuver area will provide a labor pool to operate the QM section of the ELKINS DEPOT.

f. A railhead company (less one platoon) will operate the railhead initially at ELKINS and establish and operate other railheads and truck heads as may be required to support the tactical plan.

4. QUARTERMASTER SUPPLY ARRANGEMENTS:

a. Class I Supply.

(1) The field ration will be issued in accordance with Standard Menu in effect in the Third Service Command. Sandwich menu will be provided when so stipulated in daily program.

(2) Daily telegram will be submitted to the Quartermaster, Director's Headquarters XIII Corps by Division Quartermaster and Supply Officers of separate units prior to 0900 daily. The time lag between submission of strength and consumption of food will be announced later.

(3) Railhead or truckhead distribution of rations to units will be in accordance with a published schedule. Ration cycle will star with supper.

(4) Troops will arrive in the maneuver area with sufficient rations to carry them through the noon meal of the second day following the day of arrival.

(5) Reserve rations. Type "C" and Type "K" rations will be held in storage in the Depot for use in emergency or for maneuvers as directed by G-4 Director Headquarters XIII Corps.

(6) Ice will be available to troops and will be distributed with rations.

(7) Waxed paper and bags for wrapping sandwiches and paper bags for ration breakdown will be furnished automatically on daily train.

b. Class II and IV Supplies

(1) A thirty (30) day level of stock based on Theater of Operation maintenance allowance for permanent overhead personnel will be maintained in the Depot at ELKINS, W. VA.

(2) Issues to units will be by direct exchange or requisition.

(3) Units will bring sufficient blank forms, stationery and office supplies to meet their needs for the duration of the maneuver. The Depot will stock only sufficient quantities of these supplies to meet the needs of Directors Headquarters XIII Corps and servic or assigned to the maneuver area.

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(4) Units will bring into the maneuver area sufficient expendable supplies for ten days, thereafter issues will be made at the West Virginia Maneuver Area Depot. Basis for issue of expendable supplies will be as follows:

(a) Calcium hypochlorite - 3 tubes per bag water sterilizing per day.
(b) Candles, lantern - as required.
(c) Candles, issue - six candles per sixty enlisted men per day.
(d) Brushes, scrubbing - four per company per month.
(e) Matches, safety, box - one box per company per day.
(f) Paper, fly - one half sheet per man per month.
(g) Paper, toilet - one roll per 45 enlisted men per day.
(h) Soap, laundry - one pound per 24 enlisted men per day.
(i) Soap, scouring - six cakes per 50 enlisted men per month.
(j) Soda, caustic, lye - two cans per company per month.
(k) Lime, chlorinated - ten pounds per company per day.
(l) Wool, steel - five pounds per company per month.
(m) Insecticide - three gallons per company per month.
(n) Salt tablets - three tablets per man per day.

c. Class III Supplies.

(1) The contractor will deliver by tank car or tank truck quantities of gasoline, as called for by the Quartermaster Director Headquarters XIII Corps, direct to Class III refilling point.

(2) A limited supply of oils, greases, kerosene and white gasoline for lanterns will be stocked at the Depot.

(3) Division Quartermaster and separate unit supply officers will include in the daily telegram their estimated requirements of gasoline, lubricating oils and greases.

(4) The gasoline supply company will operate refilling point and will establish and operate such Class III distributing points as the tactical situation requires in accordance with Changes No. 1 to paragraph 66, FM 10-10.

(5) Resupply of gasoline will be effected through the exchange of empty five fallon cans for full ones. Resupply will be made as required and not on a time schedule.

(6) Class III distributing points will normally be located as recommended to the Director Headquarters XIII Corps, by the unit tactical commander.

(7) White gasoline for lanterns, kerosene for lanterns, solvents and crude oil for latrines will be available for issue at the Depot.

(8) Fuel for field ranges model 1937 will be issued at Class III distributing points and will be identical to that used as motor fuel (P-72) for general purpose vehicles.

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9 (9) Units will arrive in the maneuver area with sufficient lubricating oils and greases to meet their needs for one week after arrival.

5. MOTOR POOL:

The motor pool will be located in the vicinity of the Depot at ELKINS, W. VA. and will be operated by the Transportation Officer of the Quartermaster Office.

6. SALVAGE:

a. Salvage clothing and individual equipment will be replaced by direct exchange at the West Virginia Maneuver Area Depot.

b. Egg cases, burlap bags, cartons and cans are important salvage items and will be evacuated to railheads or truckheads by units. Cans must be cleaned and flattened before delivery to railhead.

7. BURIAL:

Contract for burial will be made with local undertaker by the Quartermaster, Director Headquarters XIII Corps. This will be coordinated with the Surgeon.

8. LAUNDRY SERVICE:

Laundry service will be furnished maneuver troops through mobile laundry company.

9. SHOE REPAIR:

Instructions will be issued at a later date for submission of shoes for repair and return to the original owner.

10. MISCELLANEOUS:

Receipts for rail shipments. Instructions for accomplishing bills of lading for property shipped to the maneuver area will be issued later.

By command of Major General REINHARDT:

T. F. KEETE,
Colonel, A.G.D.,
Adjutant General.

ANNEX -
TO WEST V- MANEUVER, CORPS
MEMORANDUM NO. 1 Delaware

G-23

1. GENERAL:

ENGINEER PLAN

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By MS NARA Date 7-10-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 2
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

ENGINEER PLAN

1. GENERAL:

a. The plan for Engineer Operations covers the following essential elements:

(1) Function of Engineer Staff Section.

(2) Employment of Engineer troop units.

(3) Construction and special installations.

(a) Proposed construction for housing.

(b) Seneca installation.

(4) Supply.

(a) Map Supply.

(b) Supply of Engineer materials and equipment.

2. ENGINEER STAFF SECTION:

The Engineer Staff Section will normally consist of one (1) Officer and three (3) enlisted men on the Director Staff. This section will function as a normal Corps Engineer Staff Section and will coordinate all Engineer activities pertaining to maneuvers: i.e., attachment of Engineer units to Division Combat Teams, assignment of area or task work to Corps Engineer Troops in support of the Combat Teams, etc. The above Engineer Officer will function through the Commanding Officer, Engineer Combat Group, in accomplishing tasks pertaining to the Maneuvers.

3. EMPLOYMENT OF ENGINEER TROOP UNITS:

a. The number and type of Engineer units participating will vary, however subsequent paragraphs cover duties of the several types of units when present.

b. Plan for employment of Engineer units.

(1) Function of Engineer Combat Group.

(a) All non-divisional Engineer units participating will be attached to this unit forming a Corps Combat Group. This will be primarily a tactical command group.

(b) All activities of this group will be coordinated by the

Engineer Officer on the Director Staff through the Commanding Officer, Engineer Combat Group.

(2) Employment of Engineer Combat Battalions.

(a) Type of work will be primarily of a pioneer nature and will approximate that done under actual tactical conditions.

(b) The maintenance and repair of routes of communication will constitute the major task of these units. A considerable amount of bridge reinforcing, preparation of fords and maintenance of roads is anticipated.

(c) Reinforce Division Engineer units.

1. When the tactical situation calls for additional Engineer support for Combat Teams, attachments will be furnished from Corps Engineer Combat Battalions.

(d) Furnish direct assistance to Combat Units not assigned to a Division, as directed by the Maneuver Director.

(3) Employment of unit from Engineer Water Supply Battalion.

(a) This unit will prepare and provide water to all Service and non-divisional units in the maneuver area. In addition it will supplement the Division Water Supply if conditions warrant.

(b) For initial operations in the area the Water Supply Battalion will also furnish a detail for the operation of the Engineer Section of the Depot at ELKINS, W.VA., which will consist of one (1) Officer and ten (10) enlisted men.

(4) Engineer Topographical Company.

(a) This unit will be employed initially in vicinity of ELKINS, W. VA.

(b) Mosaics of the area will be prepared from photos and information secured by reconnaissance.

(c) This unit will prepare special maneuver maps, map substitutes, make reproductions and perform other normal functions.

4. CONSTRUCTION AND SPECIAL INSTALLATIONS:

a. The responsibility for initiation of requisitions and construction will rest with Director. All requests for construction must be approved by Headquarters XIII Corps.

b. Tactical Troops (Exclusive of Seneca Installation).

(1) No construction work will be performed by Corps Troops for

these units.

these units, as pertains to bivouacs.

(2) No materials will be furnished these troops for use in bivouacs.

(3) Normal supply of Engineer equipment and materials will be used for tactical purposes.

c. Service Troops.

(1) Summer installations will include:

(a) Kitchens - To be framed and screened.

(b) Tents - No flooring or frames to be provided.

(c) Electrical - Drops to be provided only in kitchen, supply and orderly tents. Circuits to be designed so all tents may have a drop when winter construction is undertaken.

(d) Latrines - Minimum installation as set up in AR. Connection to city sewage system where possible.

(e) Showers - Duckboards, overhead piping and canvas screens.

(2) Winter installations will include:

(a) All tents to be walled and framed and drop provided.

(b) Latrines to be made more substantial.

(c) Shower units to be housed and portable water heater provided.

(d) Heating units to be installed in and near depot and other semi-permanent supply points.

d. Seneca Installation.

(1) Summer, same as for Service Troops.

(2) Winter, same as for Service Troops.

5. SUPPLY:

a. Map Supply.

(1) Map supply will be requisitioned through Director Headquarters.

(2) Mosaics and map supplements will be prepared by the Engineer Topographical Company.

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b. Engineer Supply.

(1) An Engineer Section of the West Virginia Maneuver Area Depot at ELKINS, W. VA., will be operated by one (1) Officer and a detail of enlisted men.

(2) Engineer material for construction, etc., will normally be stocked at the Depot.

(3) Engineer supplies will be obtained by means of direct exchange through, or requisition to the Depot.

By command of Major General REINHARDT:

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General

ANNEX NO. 3
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

1. GENER...

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By MS NARA Date 7-10-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 3
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

SIGNAL PLAN

1. GENERAL:

   a. This plan includes the general policies for the following:

      (1) Signal Depot

      (2) Signal Section

      (3) Employment of Signal Units

      (4) Supply

      (5) Maintenance

2. SIGNAL DEPOT:

   a. Designation.

      (1) The Signal Depot for the West Virginia Maneuver Area will be known as the "West Virginia Maneuver Area Signal Depot" (WVMASD).

   b. Location.

      (1) The WVMASD will be located in the vicinity of ELKINS, W. VA., as part of the Depot to be established at that point.

   c. Organization.

      (1) The following units will be located at the WVMASD:

         (a) Two Radio Repair Sections (Sig Rep Co)

         (b) One Wire Repair Section (Sig Rep Co)

         (c) One Storage and Issue Section (Sig Depot Co)

   d. Function.

      (1) The WVMASD will supply all signal equipment for all troops participating in the maneuver. The depot will function as any normal supply agency would function on a post, camp or station.

3. SIGNAL SECTION:

a. Organization.

(1) The organization of the staff will be flexible. The section will be headed by the Signal Officer and will consist of the Signal Property Officer along with the enlisted personnel.

(2) The Signal Officer will be on the Special Staff of Director Head quarters.

b. Functions.

(1) The Signal Officer will advise the Director on all Signal matters.

(2) The Signal Property Officer will be in charge of the WVMASD under supervision of the Signal Officer.

(3) The Signal Officer will exercise active control over all signal units in the depot to insure a well coordinated system of signal installation, operation, construction, supply and repair.

(4) The Signal Officer will enforce such policies as may be necessary to confine communications expenses to the amounts allotted.

4. EMPLOYMENT OF SIGNAL UNITS:

a. Radio and Wire Repair Sections (Sig Rep Co).

(1) The repair sections are charged with:

(a) The repair of all signal equipment which requires 4th echelon maintenance.

(b) The repair of signal equipment requiring 3rd echelon maintenance which cannot be accomplished in the field.

(c) Other repair as directed by the Signal Officer.

b. Storage and Issue Section (Sig Depot Co)

(1) The Storage and Issue Section is charged with:

(a) The operation of WVMASD.

5. SUPPLY:

a. All signal equipment for the WVMASD will be requisitioned through the Lexington Signal Depot, Avon, Kentucky.

b. A thirty (30) day level of supply will be maintained at the WVMASD.

c. Issue will be made to, and requisitions received from the following only:

(1) Non-divisional units.

(2) Division Signal Company.

(a) Supply for division units will be through the Division Signal Company only.

d. Divisional units will be supplied through normal Division Supply Channels.

6. MAINTENANCE:

a. First and second echelon maintenance will be accomplished by troops in the field.

b. All units equipped to accomplish third echelon maintenance will do so.

c. In cases where a and b above are not practical, equipment may be forwarded to the WVMASD for repair.

7. MISCELLANEOUS:

a. Telephone Service.

(1) Telephone service may be obtained through the Signal Officer where warranted.

b. Pigeons.

(1) Pigeons will be available at Directors Headquarters and may be obtained as approved by the Signal Officer.

By command of Major General REINHARDT:

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 4
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

ORDNANCE PLAN

1. GENERAL:

Base Maintenance Shop - ELKINS, W. VA.

2. MAINTENANCE AND SUPPLY:

a. Base maintenance shop will support divisional maintenance company and service all other units.

b. Contact parties from base shop will regularly visit divisional Maintenance Company and non-divisional units. These parties will:

(1) Resupply parts, C & P Materiel, and replacement of major items.

(2) Accomplish all practicable repairs.

(3) Evacuate unserviceable equipment that cannot be immediately repaired to base shop.

c. Base Maintenance Officer will coordinate repairs, supply, and evacuation with Division Ordnance Officer and S-4's non-divisional troops.

d. In an emergency, any unit will evacuate to, or call for service upon the nearest Ordnance establishment.

3. AMMUNITION:

a. Ammunition depot - vicinity of ELKINS, W. VA.

b. ASP's will be located as required.

c. Units will bring all available ammunition to the maneuver area. Immediately upon arrival all ammunition will be turned in to the Depot. Credit against annual allowances will be given for all ammunition turned in.

d. Ammunition will be allocated and drawn before each problem in which ammunition is to be used.

e. All unexpended ammunition will be returned to nearest ASP or Ammunition depot immediately upon termination of a problem. This ammunition will be returned in original containers.

f. Units will be issued necessary guard ammunition upon requests approved by the maneuver director.

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g. Salvage of brass is essential. Empty cartridge cases and clips will be collected and returned, as accumulated, to nearest ASF or Ammunition Depot.

h. Expenditure reports (OFM 304) will be submitted weekly by divisions and non-divisional units. Report to be made as of 2400 each Thursday and due in Office of Ordnance Officer Director Headquarters 1200 Friday.

i. Unit of fire, general packing, and average weight of packing of common types of ammunition furnished for information only.

		Unit of fire Rds per weapon	Rds per container	Wt per container (Pounds)
Shell, 37mm, A T		100	20	100
Shell, 57 Gun			3	48.5
Shell, 75 How		300	3	69*
Shell, 3" A T		75	4 3	153 101
Shell, 105 How		200	3	154*
Complete Round, 155 How		150		110*
Shell, 60mm Mortar		100	18	91
Shell, 81mm	M43A1	100	Lt 6	58
	M45		Hvy 3	57.1
Mine, A T per day, Triangular Inf Division		110	5	162
Torpedo bangalore			10	172
Cartridge, Carbine, Cal. .30		60	3000 2000	99 66
Cartridge, Cal. .30	BAR Rifle MG	750 150 2000	1200 1500	98 110
Cartridge, Cal. . 50	Gd	500	350	113
Cartridge, ball Cal. . 45	Pistol TSMG	10 200	2000	110

* Average

By command of Major General REINHARDT:

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

ANNEX NO. 5
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

21 July 1943

CHEMICAL PLAN

1. PERSONNEL FOR HEADQUARTERS OPERATION:

The chemical detachment will consist of one (1) officer and three (3) enlisted men, who will function as a section of the maneuver area depot. This detachment will prepare necessary requisitions for supplies as required, receive and assist in the delivery of all chemical items. They will assist the salvage officer in the salvage of chemical materials.

2. CHEMICAL AMMUNITION REQUIREMENTS:

Training ammunition will be allotted by the XIII Corps, dependent on the situation requirements. It will consist of smoke pots and colored smoke grenades, pots CH, CNB, grenades smoke, and other training ammunition.

3. STORAGE AND ISSUE:

a. Storage of smoke pots and other training chemical ammunition will be at an ammunition distributing point to be located adjacent to the Ordnance ammunition distributing dump and will be operated by the chemical detachment at maneuver area headquarters.

b. Ammunition for chemical mortars will be handled by the chemical troops ammunition train. Storage of this type of ammunition will be adjacent to the chemical battalion, or at a location designated by this battalion. Personnel for the handling of this ammunition will be furnished by the chemical battalion.

4. SUPPLIES:

a. Gas masks and gas mask parts will be maintained in the West Virginia Maneuver Area Depot for supply to the troops in the area.

b. Supply to units by requisition or exchange.

By command of Major General REINHARDT:

T. F. KEHFE,
Colonel, A.G.D.,
Adjutant General

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By MS NARA Date 7-10-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 6
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

MEDICAL PLAN

Section 1 - General Provisions

MEDICAL SUPPLY

1. MEDICAL SUPPLY:

a. Unit Surgeons are responsible for entering maneuvers with the prescribed medical supplies, blank forms and equipment. All chests to be as complete as possible.

b. Depot: The XIII Corps will establish a M.S.D. at The West Virginia Maneuver Area Depot, at ELKINS, W. VA., and will be prepared to establish sections if necessary. It will maintain a thirty (30) days' supply for normal use. The M.S.D. will replenish medical supplies upon requisition approved by Divisions or Unit Surgeons. Linen exchange will be by M.S.D. Transportation of medical supplies to be by the unit concerned. Prompt property exchange to be maintained by all units, from aid stations to the evacuation hospitals (Par 7 b, FM 8-10).

2. EVACUATION:

a. All medical units will accompany the combat units to which assigned through all phases of the maneuver. All units will establish the necessary medical installations for the treatment of minor cases of sick and injured.

Sick and Injured expected to be incapacitated	(over 3 days to Evac. Hospital) (over 10 days to Gen. Hospital)

b. (1) All contagious diseases will be promptly evacuated to a clearing station.

(2) All infectious venereal cases will be promptly evacuated to a clearing station in each division for the treatment of infectious venereal diseases. Non-infectious syphilis will be treated by their unit surgeons or at Evacuation Hospitals.

(3) Evacuation of military personnel from hospitals other than military will be prompt.

c. Evacuation from Corps Hospital will normally be to a military hospital where bed credits will be arranged. Patients returned to duty will be sent to Casual and Replacement Depot, West Virginia Maneuver Area, ELKINS, W. VA., for return to unit or to other points designated by Corps Surgeon.

d. Arms and equipage of patients will be retained in their organization.

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When necessarily accompanying a patient they will be retained at the first medical installation where the arms and equipment will be returned to the unit. Each patient will have suitable shoes and clothing to facilitate his discharge from a hospital.

e. The service records of patients will be retained in their company unless called for by medical authorities.

f. The ration for the sick is one ration plus 50%. It does not apply to clearing stations.

g. Civilians attached to or serving with the Army will not be admitted to clearing stations or Evacuation Hospitals except in great emergencies to save life, except as to civilian automotive advisers (Cir Ltr No. 67, OSG, 1942).

h. Army Regulations will govern the giving out of information to anyone (relative or friends) regarding the illness or condition of patients.

i. Evacuation Hospitals will be marked according to the Geneva Convention.

j. Ambulances will be regarded as tactical except when marked with a GREEN flag when actually transporting patients.

k. The Dental Surgeons will designate special handling for emergency fractures of the jaw bones.

l. Deaths will be reported by the most rapid manner to the Commanding General, XIII Corps, and to Director Headquarters, ELKINS, W. VA., giving, (1) Name, grade or rank, serial number and organization of the deceased, (2) The time, place, and the cause of death (if known), (3) The home address and nearest relative of the deceased, and (4) The fact as to whether or not the relatives have been notified. In cases of death by accident or otherwise and while outside a medical installation, the Unit Commander is responsible for furnishing such information to the hospital. The remains of deceased personnel will be accepted by any medical installation. (AR 30-1820). Due consideration will be given to local and state laws regarding reports of deaths, and the action of Coroners in sudden deaths occurring under unusual circumstances. See Paragraph 76, FM 8-45.

m. Veterinary inspections of foods and food products at railheads will be normal.

3. CASUALTIES:

a. Normally two and one-half (2 ½) casualties per thousand strength may require evacuation from clearing stations to a hospital each day. Of these, one and one-half (1 ½) per thousand may require treatment in excess of one week and will therefore require evacuation to fixed hospitals.

b. Emergency cases of serious illness, or grave injury, will be evacuated without delay to hospitals equipped to give treatment on orders of Surgeon, XIII Corps.

4. MISCELLANEOUS:

All non-divisional XIII Corps medical units assigned or attached will function under Corps control unless released to or attached to other

b. Evacuation of corps hospitals will be by zone of
nounced later.

c. Dispensary service: By regimental
for the area in which located and for
personnel.

d. Medical Recor
sized. Responsi
ssure both

XIII Corps.

4. MISCELLANEOUS:

a. All non-divisio

function under Corps control unless released to or attached to other headquarters.

b. Evacuation of corps hospitals will be by zone of interior, or as announced later.

c. Dispensary service: By regimental or separate unit medical personnel for the area in which located and for the attached small units without medical personnel.

d. Medical Records: The importance of proper reports and records is emphasized. Responsible surgeons will exercise supervision in their preparation to assure both accuracy and promptness.

By command of Major General REINHARDT:

T. F. KEFFE,
Colonel, A.G.D.,
Adjutant General

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

July 21, 1943

ANNEX NO. 7
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

SANITATION

Section 1 - General

AUTHORITIES: The application of established measures for health preservation is essential. Field Manual 8-40, "Field Sanitation," and Field Manual 21-10, "Military Sanitation and First Aid," will serve as proper guides.

1. RESPONSIBILITY FOR ALL CONCERNED:

General responsibility for protecting the health of troops rests with the commanding officers. Officers of all grades are responsible not only for initiating, but of complete and continuous enforcement of sanitary measures. A high degree of individual discipline will be observed.

2. WATER:

a. Approved water points will be established by the Engineer Water Supply units. Commanding Officers of all grades are responsible that only approved sources of water are used for supplying their troops.

b. Units unable to obtain water from announced W.D.P. or approved municipal water systems, will sterilize all drinking water, in water-sterilizing bags.

c. The senior commanders present will designate areas along streams of water; (1) for men, (2) for animals, (3) for bathing, (4) laundering, and (5) for washing vehicles and equipment, and will mark such areas with suitable signs.

3. FOOD:

All meat, meat food, and dairy products will be procured from the Quartermaster Corps. The purchase of fresh milk by individuals or organizations at farms, dairies, roadside stands and peddlers is prohibited.

4. FOOD PROTECTION:

a. All foods will be protected from rain, dust, dirt, oil, flies, etc., while in storage; in transit; upon receipt and issue and in the kitchens. Clean trucks only will be used at receiving and distribution points and at Division breakdown points.

b. The washing of mess kits, serving tables, the cleanliness of kitchens and the areas surrounding them, and facilities for washing the hands of mess personnel, are more important in the field than in the barracks, and will be enforced.

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5. DISPOSAL OF WASTES:

a. Human: Shovels for covering feces will be provided and daily treatment will be made with crude oil if used over 24 hours. Latrine screens will be used. Where practical, box latrines will be provided, also urinal troughs. They will be constructed to be fly-proof and will be maintained in that manner. They will be sprayed with crude oil daily and the seats will be scrubbed with soap and water daily. Urinal cans, when used, will be placed in the company streets at night and removed at reveille and kept sprayed with crude oil.

b. Garbage: Where practical from the standpoint of duration of stay in any particular locality, field incinerators will be constructed. Areas around messes, kitchens, incinerators, soakage pits and garbage cans will be kept scrupulously clean.

6. INSECTS - PLANTS - SNAKES:

a. Flies: The elimination of breeding places will be a major item in reducing this menace. All foods will be kept covered.

b. Mosquitoes: Do not allow mosquitoes to breed in man-made breeding areas. Empty all tin cans; small stagnant areas, etc.

c. Chiggers: The chigger or "Red Bug" does not transmit any disease. A small pinch of common sulphur dusted in the neck of the shirt after dressing each day has quite a prophylactic value.

d. Ticks: Ticks transmit disease. When bathing, persons should search for ticks on themselves. Ticks will not be pulled from the skin. To do so will leave the head of the tick still embedded. This usually causes infection and a sore of several weeks' duration. The tick when found will be removed by wetting with alcohol, gasoline, camphor, liquid soap or greasing with sulphur ointment. A lighted cigarette held close to but not touching the tick often causes it to loosen.

e. Snakes: Soldiers will be instructed to, (1) Kill the snake immediately; (2) Bring the snake bite victim to medical attention, and bring the dead snake along for examination.

f. Poison Ivy: Susceptible persons can reduce the severity of attacks or prevent them by timely washing of the exposed skin area with soap and water. G.I. soap is more effective than the toilet soap.

7. COMMUNICABLE DISEASES:

Diarrhea can be prevented by supplying pure water and enforcement of water and food discipline. Protection of food supplies from fingers and flies. Scrupulous care in personal hygiene and selection of menus. So-called salad dressings or mayonaisse dressings will not be used on sandwiches, or for lunches in the field.

8. HEAT EXHAUSTION:

In extremely hot weather sweating depletes the body of salt. Additional salt is required. It is best taken with meals.

9. FRACTURES:

No case of fractu
the field until after bein

SUNBURN:

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field.

8. HEAT EXHAUSTION.

In extremely hot weat
It is best
t is required.

9. FRACTURES:

No case of fracture of a long bone will be evacuated by ambulance from the field until after being adequately splinted.

10. SUNBURN:

Working parties will wear sufficient clothing to protect the body against exposure to the direct rays of the skin. Stripping to the waist is prohibited.

By command of Major General REINHARDT:

T. F. Keefe

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General.

9. FRACTURES:

No case of fracture of a long bone will be evacuated by ambulance from the field until after being adequately splinted.

10. SUNBURN:

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By command of Major General REINHARDT:

REPRODUCED AT THE NATIONAL ARCHIVES

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 8
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

FINANCE PLAN

1. FISCAL:

a. All purchases of supplies and services must be certified by the Purchasing and Contract Officer, (a representative of the Fifth Service Command). Payment of all such claims, when certified and correct will be made by the Finance Officer, U. S. Army, Columbus, Ohio.

b. Special Field Exercise Funds will be allotted for all necessary expenditures in the establishment and operation of the Maneuver Area.

2. FINANCE:

Information as to the payment of troops within the West Virginia Maneuver Area:

a. Officers and Warrant Officers will be paid by the Finance Officer normally paying their accounts.

b. Divisional troops will continue to be paid through Division Finance Section even though the Finance Section is in a rear echelon not in the area.

c. Non-divisional tactical units and service troops will be paid by Class "A" Agents appointed to the disbursing officer who normally handles their payrolls.

c. A Class "B" Agent Officer will be set up by Commanding General, XIII Corps, to make payments according to AR 35-320, and Par 4 of TM 10-325, restricted by Par a, b, and c above.

By command of Major General REINHARDT:

T. F. Keefe

T. F. KEEFE,
Colonel, A.G.D.,
Adjutant General

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 9
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

POSTAL PLAN

SECTION I . . . . . General

II . . . . . Quarters, Equipment, and Transportation

III . . . . . Responsibilities of Postal Officers

IV . . . . . Responsibilities of Commanding Officers of Companies and Similar Units

V . . . . . Responsibilities of Unit Mail Orderlies

VI . . . . . Postal Services

VII . . . . . Outgoing Mail

VIII . . . . . Locator Cards and Directory Service

IX . . . . . Postal Irregularities

X . . . . . Telegrams and Express

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SECTION I

GENERAL

1. Postal service for the units participating in the XIII Corps maneuvers will be provided through a Base Post Office established and operated in the Post Office of ELKINS, W. VA. Both incoming and outgoing mail will be handled through the Base Post Office.

2. The Postal Regulating Section is located in the building formerly occupied by an office furniture company on Davis Avenue, next to Amoco Gas Station, near the Base Post Office.

3. a. APO's that will operate in the maneuver area will be announced at a later date.

b. Division APO's will provide mail service for organic divisional troops and such other troops as may be attached to the Division for the period of the maneuvers.

c. Postal service for Director Headquarters will be provided direct from the Base Post Office, at ELKINS, W. VA.

d. The attachment of troop units to APO's will be announced at a later date.

e. Since civilian Money Order clerks will not always be available, it is recommended that each Division participating in maneuvers arrange to have appointed a total of six Mail Clerks.

SECTION I

4. The postal officers will be responsible for the receiving and dispatching of mail for their units at the Regulating Station daily, or Base Post Office, ELKINS, W. VA., at a time to be announced in a later Postal Directive, using their own transportation. Mail clerks, when calling at the APO's for incoming mail, will at the same time bring to the APO's serving them, all outgoing mail. All mail clerks calling for mail at the APO must present authorizations signed by their Commanding Officer and bearing the mail clerk's signature.

5. Organization commanders will bring to the attention of all personnel of their commands, War Department instructions pertaining to disclosure of military information which might by of value to the enemy. Letters and correspondence generally should contain no specific information as to unit, strength, details or operations or movement orders.

6. Registered and Insured mail will be handled through APO and receipted for by properly designated APO Mail Clerks. The general procedure prescribed in Section IV, WD Circular No. 27, 21 January 1943 will be followed. It is imperative that adequate receipts be obtained and records kept as a part of the permanent organization records in all units responsible for handling Registered or Insured mail up to the time it is actually receipted for by the addressee. Maintenance of such records is a command responsibility.

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SECTION II

QUARTERS, EQUIPMENT, AND TRANSPORTATION

1. The Commanding Officers of units having APO's will provide suitable accommodations for same, as well as necessary equipment, transportation, and signs indicating the location of the APO etc., for APO equipment see Par 9, Weekly Directive No. 13, this headquarters dated 4 June 1943.

2. Vehicles of Corps or Division APO's actually transporting or enroute to pick up mail, will display "U.S. MAIL" signs, front and rear. Such signs will render these vehicles immune to capture by opposing forces. This provision does not apply to vehicles distributing mail to units served by an APO. When in the opinion of the Corps Commander such action is necessary, vehicles transporting mail for separate units of Corps troops may be permitted to carry "U.S. MAIL" signs. When not actually transporting or enroute to pick up mail, the "U.S. MAIL" signs will be removed.

SECTION III

RESPONSIBILITIES OF POSTAL OFFICERS

1. Postal Officers will be responsible for the complete administration of postal service within their organization, as covered in Section IV, WD Circular No. 27, 1943, FM 12-105 and FM 12-275, and for the proper handling of mail in units served by their APO's. They will make periodic inspections to determine that current instructions and regulations are being complied with by unit commanders and mail orderlies.

SECTION IV

RESPONSIBILITIES OF COMMANDING OFFICERS OF COMPANIES AND SIMILAR UNITS

1. Each organization commander is responsible that the personnel of his command are informed of the exact manner in which mail is to be addressed for that particular unit. All units participating in the XIII Corps maneuvers, with the exception of Director Headquarters XIII Corps and of units attached to the XIII Corps from stations outside of the area of the XIII Corps, will retain their present mailing address. The address of Director Headquarters XIII Corps and other excepted units will be West Virginia Maneuver Area, Elkins, West Virginia, effective upon arrival in the maneuver area. All personnel must be instructed to advise correspondents accordingly.

EXAMPLE

Private John D. Doe (ASN)
Co. A, 381st Inf.
APO #96
Fort Lewis, Washington

Corp. Richard H. Doe (ASN)
Hq Btry 75th FA Brig
West Virginia Maneuver Area
Elkins, West Virginia

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Authority NND 803119
By MS NARA Date 7-10-07

2. It is contemplated that an APO number will be assigned the maneuver area at a later date. Personnel remaining at their home stations will be instructed to have the mail addressed "Rear Detachment". The Postal Officer of the posts concerned will be furnished a list of personnel remaining behind.

3. In previous maneuvers it has been noticed that the APO designation without the unit has frequently been given as the address. It should be brought to the attention of all personnel that this is not sufficient information and results in delay in their receipt of the mail because of the necessity of rendering directory service to such pieces. It is desired that the provisions of this paragraph and the foregoing paragraph 1, be brought to the attention of all personnel, preferably by posting on bulletin boards.

4. Officers, with whose commands civilians will be engaged, should cause them to have their mail addressed in the same manner as members of the command and will furnish the APO through which they will receive mail, and this headquarters, the full name, address, and work assignment of all such persons. Temporary locator cards will be made on the receipt of this information.

SECTION V

RESPONSIBILITIES OF UNIT MAIL CLERKS

1. The Commanding Officer of each unit down to and including companies and similar units requiring postal service will designate a mail clerk and also an alternate mail clerk. Duties of mail clerks are covered in TM 12-275. Written authorization of mail orderlies and alternate mail orderlies, signed by the Commanding Officer of the unit to be served and including the signature of the mail orderlies so authorized, will be forwarded to the APO serving the unit.

2. Mail orderlies will be fully instructed in their duties and responsibilities. Their present method of handling effecting delivery, and obtaining receipts should be examined and any irregularities therein should be corrected.

3. From time to time during the period of maneuvers, numerous companies and similar organizations will have one or more platoons, sections or smaller groups detached for service at more or less distant points. It will be necessary to deliver all ordinary mail addressed to members of a company or similar unit to the mail clerks for the particular organization as the identity of the personnel composing the detachment will be unknown at the APO.

4. To provide for prompt forwarding of mail [illegible] on detached service, the unit mail clerk will prepare and carry a list of [illegible] names of the personnel of detachments to which mail must be forwarded.

5. In cases in which it is necessary to return mail for forwarding, the mail clerks should place the forwarding address on first class mail at the APO, if possible to do so, in order to prevent undue delay. It should then be immediately returned to the Postal Service. Registered and Insured mail to be forwarded should not be accepted by Army Postal personnel. Instead, information will be provided as the proper forwarding address.

SECTION VI

POSTAL SERVICES

1. Positive personal identification will be required in all cases before money orders will be cashed.

2. NO C.O.D. SERVICE WILL BE PROVIDED AT APO'S AND ALL PERSONNEL SHOULD BE INSTRUCTED NOT TO HAVE C.O.D. MAIL SENT TO THEM, SINCE DELIVERY IS VERY UNCERTAIN.

3. Money should be forwarded to or from personnel in the field by money orders ONLY. Money should not be sent by ordinary mail or Special Delivery, -- unit commanders will discourage this practice.

4. No Special Delivery service will be provided in the maneuver area during the exercises. Special Delivery matter will be handled as ordinary mail. Signatures are required on delivery but delivery is not guaranteed. Personnel taking part in the maneuvers should notify their correspondents to this effect.

SECTION VII

OUTGOING MAIL

1. The complete return address should be shown on all outgoing mail.

2. MAIL WILL NOT BE DEPOSITED IN RURAL MAIL BOXES OR LOCAL UNITED STATES POST OFFICES, BUT WILL BE DEPOSITED AT THE UNIT HEADQUARTERS, OR AT AN APO.

3. Unit mail clerks will separate outgoing letters as to short letters and long letters faced (each letter so placed that the address will be in relatively the same position, and tied in packages), Bulky letters, Special Delivery Mail and Air Mail letters should be tied separately from ordinary letters. All Air Mail packages will be inspected if the matter is acceptable for mailing, the package, parcel, or other matter shall be resealed and endorsed: "Contents Examined at _____ followed by the names of the examining employee and
(Army Post Office)
witness, together with the postmark of the Army Post Office where examined. No sealed package, parcel, or other sealed article (except letters in their ordinary and usual form, and official mail) shall be accepted for transmission by air mail unless it bears on the address side thereof the name and address of the sender, together with the indorsement, "Postmaster: This package may be opened for postal inspection if necessary".

SECTION VIII

LOCATOR CARDS AND DIRECTORY SERVICE

1. All mail that cannot be delivered after reference to the division directory service or non-divisional directory service should be promptly forwarded to the Base Post Office in packages labeled as follows: "Directory Service, APO, c/o Postmaster, Elkins, West Virginia." However, it is expected that a determined effort will have been made to effect delivery before any mail is forwarded to the base APO. All mail so forwarded will be indorsed in accordance with paragraph 8, TM 12-275.

Auth By M

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2. Locator cards on troops in the maneuver area will be supplied the Directory Section by the 23d Machine Records Unit, XIII Corps, Fort Du Pont, Delaware.

SECTION IX

POSTAL IRREGULARITIES

1. Any loss, damage, or other serious irregularity in the handling of mail will be promptly reported to the Postal Officer at the APO concerned.

SECTION X

TELEGRAMS AND EXPRESS

1. Telegraph and express shipments will be addressed as shown in Section IV, and will be handled by APO's as mail upon receipt.

By command of Major General REINHARDT:

T. T. Keefe

T. T. KEEFE,
Colonel, A.G.D.,
Adjutant General

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Authority NND 803119
By MS NARA Date 7-10-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

21 July 1943

ANNEX NO. 10
TO WEST VIRGINIA MANEUVER
MEMORANDUM NO. 1

COURTS-MARTIAL PLAN

1. GENERAL COURTS-MARTIAL:

a. Divisional troops will handle all general court cases arising within their units.

b. XIII Corps will maintain a general court-martial composed of officers of non-divisional units. The Director, WVMA, will recommend the original membership of the court and also replacements. Charges arising in non-divisional troops requiring trial by general court-martial will be formally investigated and forwarded to this Headquarters together with the personally signed recommendation of the unit commander for disposition by general court. This headquarters will refer the charges to WVMA non-divisional general court and dispose of the case after trial.

2. SPECIAL COURTS-MARTIAL:

a. The following units will exercise their own special court-martial jurisdiction. They will try special court cases arising within their own commands, except as provided for the 63rd Laundry Battalion:

94th Sig Bn
44th Evac Hosp
238th Engr C Bn
63rd Ldry Bn (Will also try special court cases arising within the 1st Plat, 281st Sig Pgn Co, and Det, 187th Sign Rep Co)

b. A Corps Special Court comprising officers selected from non-divisional units, less Bns listed above, will be appointed by this headquarters through recommendations from the Director, WVMA, for the trial of special court cases arising within the following units:

168th QM Trk Co
88th QM Bkd Co
Hq Co (Prov) XIII Corps, WVMA, (Incl Seneca Det)
Co B, 403d Engr WS Bn
663rd Engr Top Co
3468th Ord Co
217th MP Co

c. Charges to be disposed of by the Corps Special Court will be informally investigated and sent to this headquarters. This headquarters will refer the case to the Corps Special Court at the WVMA and process the case after trial is completed.

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d. Divisional troops will handle all special court cases arising within their units.

3. SUMMARY COURTS-MARTIAL:

a. The following units will exercise summary court jurisdiction over cases arising within their respective commands:

Battalions:

94th Sig Bn
44th Evac Hosp
238th Engr C Bn
63rd QM Ldry Bn (Will also exercise summary court jurisdiction over 1st Plat, 281st Sig Pgn Co, and Det, 187th Sig Rep Co.)

Separate Companies:

168th QM Trk Co
88th Rhd Co (QM)
Hq Co (Prov) XIII Corps, WVMA, (Incl Seneca Det)
Co B, 403d Engr WS Bn
663rd Engr Top Co
3468th Ord Co
217th MP Co

b. Divisional troops will handle all summary court cases arising within their units.

4. The 1st Plat, 281st Sig Pgn Co, WVMA, and Det, 187th Sig Rep Co, WVMA, are attached to the 63rd Ldry Bn for special and summary court-martial purposes. The officers of these units are available to the Commanding Officer, 63rd Ldry Bn for detail on his courts.

By Command of Major General REINHARDT:

T. F. K[illegible],
Colonel, A.G.D.,
Adjutant General.

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Authority NND 803119
By MS NARA Date 7-10-07

STEWART/fs/465

354.2 (Maneuvers-1943)(27 Jun 43) GNGOT 3 JUL 1943 15

SUBJECT: Aerial Photographing of West Virginia Maneuver Area.

TO: Commanding General, XIII Corps, A.P.O. 463, Fort Du Pont, Delaware.

1. Reference your letter, 27 June 1943, no file number, requesting photographs of the West Virginia Maneuver Area, this project will be flown by the 1st Mapping Group, Bolling Field, D. C. Project will be flown at the earliest possible date, weather permits.

2. Two (2) copies of each print will be delivered directly to your headquarters by the 1st Mapping Group. Additional prints will be furnished direct by the air force photographic laboratory to be placed on file in their respective theaters. Negatives and additional prints will be furnished upon request.

3. Due to equipment available, prints will be 9" x 9" with 40% side overlap in lieu of 9" x 18" with 60% overlap as originally requested.

By command of LT. GEN. McNAIR:

DISPATCHED AGF DIST. CTR. 4 JUL P.M

JUL 2 1943
G-3 Section

MEMO FOR RECORD: Basic ltr fr XIII Corps, subject as above, To: CG, AGF 27 Jun 1943, w/2 Incls. Basic requests aerial photographs of West Virginia Maneuver Area, and information as to the approximate date when flights will be made, anticipating use of maps about 10 July 1943. Basic forwarded to CG, AAF, by 1st Ind.

COMPLETE COPY OF CORRESPONDENCE ON FILE IN AC & S-2 RECORDS.

CONCURRENCE: Col. Elliott, Gnd Engr.

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By NLS NARA Date 7-10-09

COPY

WAR DEPARTMENT
ARMY SERVICE FORCES
OFFICE OF THE QUARTERMASTER GENERAL
WASHINGTON

IN REPLY REFER TO SPQKO 463.7
(Army Ground Forces)

12 November 1943

SUBJECT: Class III Supplies for Maneuvers.

TO: Commanding General, Army Ground Forces, Army War College, Washington, D. C. THRU: Commanding General, Army Service Forces.

see 463.7/377 SEP

1. Your attention is invited to Paragraph 3a, AGO Memorandum No. W5-7-43 dated 23 April 1943 which states:

> Purchases for the Zone of Interior.--a. The petroleum requirements for maneuvers directed by the Commanding General, Army Ground Forces, the commanding generals of defense commands or armies, and those conducted by the Desert Training Command will be purchased only at the direction of The Quartermaster General. Concurrent with the formulation of the supply plan for each maneuver period, Quartermaster Depot (s) will be designated to purchase Class III supplies. The designated depots will obtain the requirements of Class III supplies from the appropriate maneuver commands as indicated in the approved supply plans, and will forward these requirements to The Quartermaster General. The Quartermaster General will direct the purchase of these requirements in accordance with the prevailing situation.

2. It is the opinion of this office that this circular assigns the staff and functional duties relative to the procurement of Class III supplies for maneuvers to the Office of The Quartermaster General.

3. Whenever new maneuvers are planned, the Operations Branch, Fuels and Lubricants Division, OQMG, should be advised by direct information from Headquarters, Army Ground Forces, so that a depot may be designated to obtain the requirements from the consuming unit. Such action would conform with the AGO Memorandum mentioned above.

4. Petroleum requirements for maneuvers should <u>not</u> be purchased on Treasury Procurement Contract, as these contracts are negotiated on

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By NS NARA Date 7-10-09

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SPGKO 463.7

Commanding General, AGF, 13 November 1943 (Cont'd)

definite requirements of established Government activities. Hence, unexpected issues such as maneuver consumption exhaust the contracts.

5. Such is the case of the XIII Corps Maneuvers in West Virginia, and steps are being taken by this office to clear that situation.

For The Quartermaster General:

/s/ J. L. TAYLOR,
Lt. Col., Q. M. C.,
Assistant.

SPICY

1st Ind.

OAG: 3292

War Department, Headquarters, Army Service Forces, Control Division, Washington, D. C. 15 November 1943

TO: The Commanding General, Army Ground Forces
Room 25, Army War College.

1. Noted and forwarded.

For the Commanding General:

/s/ C. F. ROBINSON
Brigadier General, G. S. C.
Director, Control Division

COPY

48

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Authority NND 883559
By NARA Date 7/11/12

HEADQUARTERS, ARMY GROUND FORCES
Army War College
Washington 25, D.C.

684/417(7 Mar 44)GNGCT

SUBJECT: Field Firing Range - Machine Gun, Caliber .30.

TO: Commanding General, Army Service Forces, Washington 25, D. C.
(Attention: Requirements Division)

1. It is requested that range facilities for firing the marksmanship course prescribed in War Department Training Circular No. 7, dated 24 January 1944, be constructed with the least practicable delay at stations at which Army Ground Forces troops armed with the .30 caliber machine gun are assigned and which will not be closed prior to 1 July 1944.

2. Range facilities required:-

a. It is desired that four (4) firing points be installed at a one division post; six (6) firing points at a two division post; one (1) firing point at a regimental station.

b. Unit training centers will require range facilities on a basis similar to divisional unit needs.

c. Replacement training centers will require this type of range.

3. Communication System:-

a. An improvised communication system will be necessary in order to conserve vital telephone, telegraph or radio equipment for more important needs.

b. With the exception of field wire, the communication equipment of units using the range will seldom be available in sufficient quantity to establish a range communication system.

c. Some established substitute system must be provided for general use.

d. Pull cord signals, whistles, horns, sirens, electric bells, wooden speaking tubes for use between pits in a group, a light flashing signal system utilizing field wire, power from vehicle storage batteries, and low voltage bulbs are among possible devices which might be utilized.

INCLOSURE 1
(15 Mar 44)

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By D NARA Date 7/11/12

e. It is expected that control systems will be devised and developed by those charged with the construction of the ranges according to equipment and materials locally procurable.

4. Land requirements: - It is not contemplated that additional land will be secured for the construction of these ranges. The requirements of danger space backing for the new ranges should be kept to a minimum by utilizing established impact and danger space areas.

5. Layout of Ranges and Firing Points:-

a. Range - Eight double "E" targets are located in a lane not more than 75 yards wide and 800 yards deep. Nearest target will be located approximately 400 yards from the firing point, and the farthest approximately 800 yards. Intermediate targets will be spaced irregularly in width and depth. If any two targets are closer together than 5 mils in width (measured from the firing point), they will not be closer than 150 yards in depth. In determining the location of targets, care must be exercised that all targets can be covered by the manipulation of the traversing handwheel of the water cooled machine gun, caliber .30 1917 from the gun location. Any number of lanes may be constructed.

b. It is realized that at many places range space will not be available for the establishment of all ranges in one area. Superimposing this range upon an existing range where feasible, may be done if necessary.

c. Separation of the ranges and the firing points to fit in between existing ranges is expected.

d. Since these ranges will have a number of characteristics similiar to combat ranges, considerable latitude in their layout is allowable.

e. The pits may be located in any arrangement as far as echelonment is concerned to take advantage of suitable terrain. They may extend off the center line of firing 15 degrees to 20 degrees, if necessary.

f. Due to lack of space, it may be necessary to establish a group of firing points so that certain pit locations fall within the danger space of an existing adjoining range. Coordination in the use of ranges thus placed must be under the control of one person, so that the entrance to and exits from pits may be safely made. Such an arrangement is undesirable, but is considered preferable to establishing new impact areas which would reduce other needed training areas.

g. Relocate 1000" ranges where existing backing for these ranges is suitable for the field firing ranges and it is economical to make the change.

h. The pattern of the danger space shown for machine gun ranges in Office, Chief of Engineer drawings 1600-101 is adaptable to field firing machine gun ranges since the gunner will remain at a fixed point.

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By NARA Date 7/11/12

6. Clearing of woods:-

a. Clearing for the ranges will be kept to a minimum. In wooded areas, every advantage should be taken of differences in elevations to shoot over the tops of intervening trees into cleared openings which may exist or which can be cleared with a minimum of labor and expenses.

b. General clearing is not contemplated. Tree limbs, brush and other objects which obstruct the gunner's view of targets will be removed.

c. An area sparsely covered with trees need only be thinned out to give a clear view of targets.

7. Construction of pits:-

a. Inclosures Nos. 1, 2, and 3 show suggested construction of pits.

b. It is desired to make the pits as simple and economical as possible.

c. In order to properly protect personnel without construction of overhead cover, pits must be constructed narrow and deep. It is believed that revetment will be necessary in most cases.

d. On ranges where trees are close to the pits and are a source of danger by causing ricochets to enter pits, a pit of the design shown in Inclosure No. 3 is recommended.

8. Other construction features:-

a. No built-up firing points are desired. A couple of stakes to establish the location of the firing line on the ground from which the targets are visible is preferable.

b. Unimproved roads or tracts leading from main access range roads to field firing range or firing points are considered sufficient.

9. Troop labor:-

a. It is contemplated that Army Ground Forces units will ordinarily be available to construct subject ranges.

b. When clearing is beyond the capabilities of the troops, a request will be submitted for necessary clearing to this headquarters through the service command.

10. General Remarks:-

a. The number of firing points recommended for construction is considered to be the minimum which should be provided for permanent use.

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b. At times, it may be necessary or desirable to provide additional temporary facilities to hasten firing of units through the field firing range. Prior to the firing, the using of other available troops may engage in field entrenchment training and construct temporary pits or trenches, which would be suitable for use in conducting the transition course firing.

For the COMMANDING GENERAL:

/s/ R. J. Delacroix
/t/ R. J. DELACROIX
Major, A.G.D.,
Ass't Ground Adjutant General

3 Incls.
#1 - Illustration Ordinary Type Pit
#2 - Illustration pit with parapet
#3 - Illustration pit with overhead protection against ricochets

Reproduced
HQ XIII CORPS
4 April 1944

DECLASSIFIED
Authority NND 883559
By NARA Date 7/11/12

SUBJECT: Field Firing Range - Machine Gun, Caliber .30.

JH/er

SPRMG 413.68 (7 Mar 44) 1st Ind. 10 Mar 44 Ext. 6900

Headquarters, Army Service Forces, Washington, D. C.

To: The Chief of Engineers, New War Department Building,
21st and Virginia Avenue, N.W., Washington, D.C.

1. The construction of .30 caliber Machine Gun Field Firing Ranges, using troop labor as far as possible, at Ground Forces stations and Training Centers as indicated in Paragraphs 1 and 2 of basic letter, for the purpose of accomplishing the marksmanship course prescribed in War Department Training Circular No. 7, dated 24 January 1944, is approved.

2. As the greatest portion of this work will be accomplished by Army Ground Forces Units, it is desired that you colaborate with the Commanding General, Army Ground Forces and the appropriate Service Commander and accomplish, in accordance with War Department Construction Policy, all necessary work, particularly clearing, which is beyond the capabilities of Ground Force troops.

For the COMMANDING GENERAL:

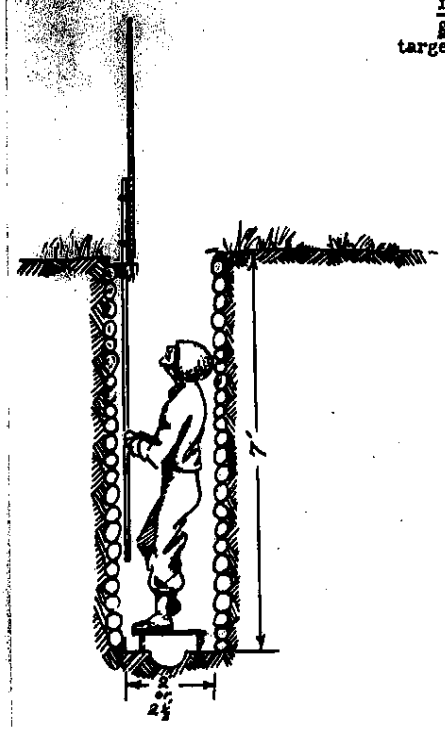
/s/ Lee A. Denson
/t/ LEE A. DENSON,
Colonel, G.S.C.,
Director, Requirements Division

3 Incls: n/c

Reproduced:
HQ XIII CORPS NBW.
4 April 1944

Ordinary type of pit (1st choice)(2 yards long)

a. Type desired where soil conditions permit.
b. Construct narrow.
c. Dispose of soil.
d. Provide a seat in one end; a ladder in the other end.
e. Drainage by bucket.
f. Provide duck-board.
g. Provide simple type of bracket for target rest.



Incl. #1.

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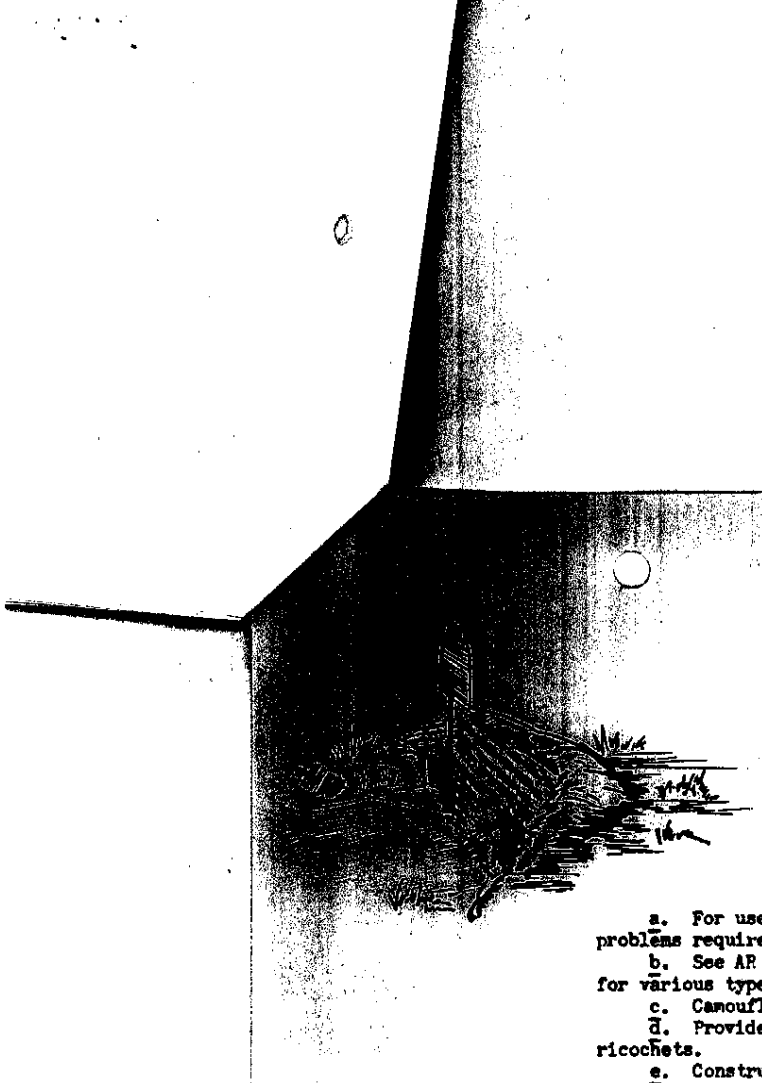
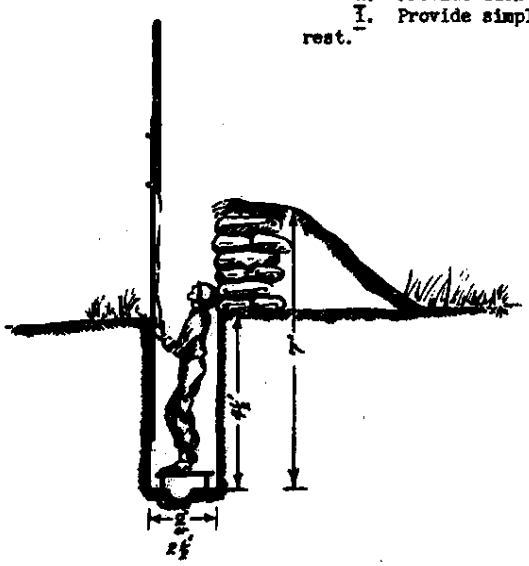
NARA, Date 7/11/7



Pit with parapet
(2 yards long)

a. For use where soil conditions or drainage problems require.
b. See AR 750-10 for thickness of parapet for various types of soil.
c. Camouflage of paraget desired.
d. Provide with wings to protect against ricochets.
e. Construct pit narrow.
f. Provide a seat in one end: a ladder in other end.
g. Drainage by bucket.
h. Provide duck-board.
i. Provide simple type of bracket for target rest.



Incl. 12

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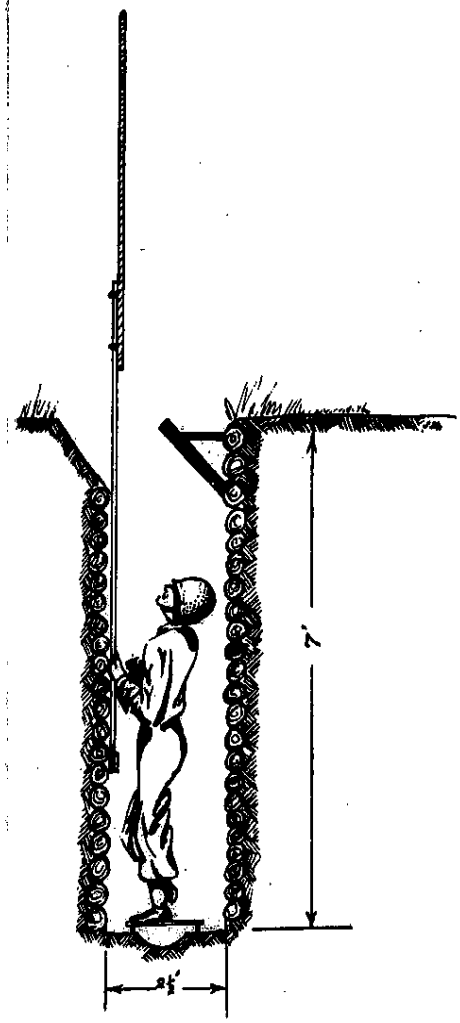
NARA, Date 7/11/2



Pit with Overhead Protection against ricochets.

a. For use when trees are close to pits; when pit openings are exposed, due to slope of ground; or for other similar reasons.

b. Solid 2" planking is recommended for overhead protection cover; due to steep angle which ricochet must have to enter pit, its velocity will be well spent.

c. Other remarks - same as for Ordinary Type of Pit, Inclosure No. 1.

Inclosure #3

REPRODUCED BY 672nd ENGINEER TOPO. CO. CORPS

NARA, Date 7/11/72

DECLASSIFIED
Authority NND 883559
By NARA Date 7-11-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

SC/sl

353 GNHMO

14 APR 1944

SUBJECT: Mountain Training.

TO : Commanding General, 99th Infantry Division, Indiantown Gap Military Reservation, Penna.

1. Reference is made to Inclosure No. 3, letter, this headquarters, 353 GNHMO, subject as above, dated 30 Mar 44.

2. Above inclosure is revoked in its entirety and the following substituted therefor:

a. The amounts of ammunition shown to the left of the nomenclature below will be expended by each RCT. Each RCT will take to West Virginia Maneuver Area the amount of ammunition indicated below on the right of the nomenclature. The difference will be issued by West Virginia Maneuver Area immediately upon arrival. The medium artillery battalion will carry to the Maneuver Area and expend the amount of ammunition shown below:

By each RCT:	RCT 1	RCT 2	RCT 3
573 SHELL, HE, for 105mm How M2,M2A1 & M4	573	573	573
60 SHELL, smoke for 105mm How M2, M2A1 & M4	60	60	60
180 SHELL, HE, for 105mm How M3	180	180	180
468 SHELL, HE, for 81mm mortar (Lt)	468	468	468
72 SHELL, smoke, for 81mm mortar (Lt)	72	72	72
432 SHELL, HE, for 60mm mortar	432	432	432
93,000 CART, ball, cal. .30	63,000	63,000	93,000
6,000 CART, tracer, cal. .30	6,000	6,000	6,000
80,000 CART, blank, cal. .30	0	0	66,000
500 CART, ball, cal. .50	500	500	500
360 SHOT, AP or TP, 57mm Gun	360	360	360
500 MINE, AT, prac	500	500	500
500 FUZE, mine, AT, prac	500	500	500

MAILED XIII CORPS APR 14 1944

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Authority NND 887559
By NARA Date 7-11-07

Hq Medium Artillery Battalion:

321 C/R SHELL, HE, 155mm New

b. Responsibility for storage and handling of the above ammunition in the Maneuver Area will rest with the unit commander.

c. Ammunition not used by each unit will be returned to the Home Station by the unit.

d. All ammunition expended in the Maneuver Area will be charged against the annual allowance of the division.

e. Ammunition will be taken to the Maneuver Area from ammunition available to the division at the Home Station.

f. Availability of the above ammunition is the responsibility of the division.

By command of Major General GILLEM:

RL

48B

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Authority NND 887559
By NARA Date 7-11-07

FILE COPY
PREPARED BY
COORDINATED WITH
APPROVED BY
CG

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

353 (GNMG)

30 MAR 1943

SUBJECT: Mountain Training.

TO : Commanding General, 95th Infantry Division,
Indiantown Gap Military Reservation, Pa.

1. Pursuant to instructions from Headquarters, Army Ground Forces, the 95th Infantry Division will train in Mountain Warfare at West Virginia Maneuver Area in accordance with the schedule in Incl. #1.

2. Purpose, to train:

a. Selected individuals in assault climbing and mountaineering.

b. Selected individuals in the technical operation and employment of animal pack transport.

c. Troops physically.

d. Troops to operate tactically and conduct firing realistically in difficult, mountainous terrain.

3. Plan. Elements of the Division, supported by such non-divisional combat units as practicable, will be rotated through the training for periods of approximately three (3) weeks. Periods may be extended as necessary. The regimental combat team will be the normal element of the Division to be rotated.

4. Training.

a. Training of elements of the Division in WVMA will be controlled by the CO, WVMA.

b. Assault Climbing and Pack Training. A selected group of officers and EM will precede the combat team into the area to receive special training in assault climbing and mountaineering. (See Incl. #2). This group will be trained as instructors for their units and as teams to assist their units in cross-country operations (par 2a above). Another group of officers and men will be selected to precede the combat team into the area to receive animal pack training (par 2b above).

c. Rosters of the personnel of each group showing name, rank, ASN, and organization will be delivered to CO, WVMA, five (5) days prior to the arrival

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of the group. Direct communication with the CO, FTR, is authorized in reference to time and place of reporting detachments for this training.

5. [illegible]

a. A depot for all classes of supply is established at Elkins, West Virginia.

b. Necessary installations and [illegible] will be [illegible] Area by XIII Corps to support the operations of troops undergoing training, as if such troops were operating in the field as part of an independent unit.

c. [illegible] tion, maintenance and communication are published as separate documents and will be forwarded under separate cover by this headquarters.

d. Ammunition. (See Incl. #2)

e. Maintenance. Preventive maintenance by all units and echelons will be stressed. In this connection the provisions of par 4, Daily Memorandum No. 52, Hq XIII Corps, 20 Dec 43, subject: [illegible] will be impressed upon all drivers and other personnel [illegible] in the care of vehicles.

6. Evacuation.

a. Personnel. Maximum use will be made of field medical units. Those cases requiring further hospitalization will be evacuated to the 109th Station Hospital at Elkins, W. Va.

b. Equipment. The evacuation of equipment will be expected promptly through normal echelons and supply units.

7. Fire Prevention. Every precaution will be taken to guard against forest fires especially during the dry season. [illegible] with the Supervisor, Monongahela National Forest, will be maintained.

8. Movement of Troops. [illegible] for the movement of these elements as follows:

a. It is directed that you issue the necessary instructions to move the elements of the 66th Infantry Division, with attached Division Troops, from present station to Elkins, West Va, and return upon completion of scheduled training. Movements will be made on dates and times [illegible] you deem to accomplish the training [illegible] set forth in Incl. [illegible] required for each unit [illegible] and is to include the [illegible] Infantry Regiment and each Battalion and from the [illegible] Artillery Battalion. A representative from each company and battery is to be sent with the advance detachment. The advance detachment is to precede the main body of troops by forty-eight (48) hours. Direct communication is authorized with the CO, FTR, in this respect.

b. Movements will be made by rail and motor. Full advantage will be taken of available motor transportation for the movement of individuals and

(40)

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By NARA Date 7-11-07

organizational equipment. (Track laying vehicles will be moved by rail.)

c. Coordinate rail movements with [illegible] at stations of origin. Rail movements, including [illegible], [illegible] Chief of Commanding General, Army Service Forces.

d. Rations will be taken by [illegible] days after arrival. Post Transportation Officers at stations of origin are authorized to determine the number of troop train rations required for the journey on each rail movement.

e. Complete individual clothing and individual and organizational equipment as prescribed by appropriate T/E's will be taken to the Maneuver Area.

f. Arrange with Post Quartermasters at stations of origin for fuels and lubricants sufficient for the journey on all motor movements.

g. Reports:

(1) Report by wire the strength, method of travel, routes, number of vehicles (where applicable), time and date of departure, expected arrival time, and identity of each movement to the following:

CG's, Third and Fifth Service Commands
CG, XXII Corps
CO's, Indiantown Gap Military Reservation, Pa, or WVMA, when either agency is at destination.

(2) Report actual arrival times, including opening of ROT CP's to this headquarters by wire.

(3) Reports will use Greenwich Civil Time and unit designations, and will bear deferred classifications when sent to this headquarters.

h. Orders issued by you for the movement of these elements to Elkins, West Va, and reports of these movements will bear the classification [illegible].

i. Attention directed to the following:

Sec IV, TM 38-205	WD 101, WD, 8 Dec 42
Par 8, AR 55-130	Par 15, AR 345-900
Par 4, AR 55-145	Par 5, AR 40-1080, GS.

By command of Major General GILLEM:

MAILED XVII CORPS MAR 30 1944

T. F. KEEFE
Colonel, AGD
Adjutant General

3 Incls:
1. Schedule of Tng.
2. Assault Climbing & Pack Tng.
3. Ammunition.

Copy furnished:
CO, WVMA

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Authority NND 887559
By NARA Date 7-11-07

INCLOSURE NUMBER 1

SCHEDULE OF TRAINING - 88TH INF DIV

5 - 18 Apr, incl.	Advance assault climbing and pack training period. (Personnel to attend as desired by the Division Commander).
18 Apr - 1 May, incl.	Assault climbing and pack training, 1st BCT
2 - 15 May, incl.	Mountain Training, 1st BCT
8 - 21 May, incl.	Assault climbing and pack training, 2d BCT
22 May - 7 Jun, incl.	Mountain Training, 2d BCT
22 May - 10 Jun, incl.	Assault climbing & pack training, 3d BCT
12 - 27 Jun, incl.	Mountain Training, 3d BCT

NOTE: Minor changes in the above schedule may be arranged by direct communication with CO, WVMA, and reported to this headquarters.

Incl. 1

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By NARA Date 7-11-07

INCLOSURE NUMBER 2

ASSAULT GLIDERS AND PARA TRAINERS

1. **Recommended Breakdown of Personnel in Regular Assault Glider Trainer (for [illegible] movement in [illegible] units).**

[illegible]

Division Staff 2
G-2 Section 1
G-3 Section 1

Medium Artillery, 155mm How. 4
Bn Hq . . . . . 1 total 1*
Each Btry . . . . . 1 total 3**

Reconnaissance Troop 1

3 Regimental Combat Teams. 99
From each RCT
Regt Hq. 1
Regt IAR Plat. 1
Inf Bn (each 7). 21
AT Co. 1
Gun Co 1
FA Bn. 6
Engr Co (atchd). 1
Bn Med Sec (atchd) 1
Coll Co (atchd). 1
33

Total from Division. 106

[illegible]

Medium Artillery 39
Bn 155mm How (Gpr & Gunn Plats) . . . .7, total 7
(1 Surv & Instr Sgt, 3 Surv & Instr Men, 2 rad oprs, 2 [illegible] & tel oprs)
Btry 155mm How (Btry detail). . . . . .4, total 12
(1 [illegible], 1 rad opr, 1 wireman and tel opr, 1 Surv & Instr Man)

Reconnaissance Troops. 12
Scout Car Section (each 4)

3 Regimental Combat Teams. 615
From each RCT
Regt IAR Plat. 10
Rifle Co (each 10) . . . . . [illegible]
Hv Gunn Co (each 10) 80

40

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INCLOSURE NUMBER 2, Continued

Cam Co	[illegible]
AT Co.	[illegible]
Bn 105mm How, Bn & Bn Btry	[illegible]
(Opns & Comm Plats) (1 rad opr, 2 sirgnm & 1 tel oprs, 1 surv & instr sgt, 2 surv & instr men)	
Btry 105mm How (Btry detail) (each 4)	16
(1 NCO, 1 rad opr, 1 wireman & 1 tel opr, 1 surv & instr men)	
Engr Co.	10
Bn Med Sec	20
Cavl Co.	15
	[illegible]
Total from Division	544

* Bn S-2, Asst S-2 or Liaison Officer
**BC, RO or Enms
\# Should be scouts or equivalent in training.

2. Personnel to Receive Peak Training:

1 Off per Bn
4 to 6 EM from each company, btry, or troop.

3. Each group (para 1 and 2 above) will require its own mess personnel and equipment.

4. Selection of Personnel for Mountain Assault Climbing Training:

a. Previous directives from this headquarters have stressed the importance of training in the Mountain Assault Climbing School, Seneca, W Va, and have emphasized the importance of selecting officers and men temperamentally adaptable and physically qualified. These men should be selected on a volunteer basis, within the limitations of allotments to unit, prior to making arbitrary assignments. Past records and reports indicate that apparently sufficient importance is not being given to selecting these men, resulting in a large number of replacements and loss of training.

b. Previous experience with other divisions has indicated that the best results are obtained when the following is read to all men prior to the selection of students for this school:

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ENCLOSURE NUMBER 2, Continued

(1) This unit has been selected for Mountain Training, and each organization is allowed to select a number of students to attend the Mountain Assault Climbing School in the WTA.

(2) This training is not dangerous and the instruction is given in progressive steps as the students become proficient. No man is required to do any climbing for which he is not prepared. No dare-devils are desired, just men with average strength and common sense. Those men who have lived in the country or mountains or who have devoted considerable time to hunting and climbing are better qualified to receive this training. This climbing becomes a sport after you become proficient, and will be enjoyed as thousands of other men have before you.

(3) This training will enable you to take ropes up steep mountain slopes and attach them, enabling the remainder of the unit to ascend and descend the mountain by the use of these ropes. The ability of the units to attain certain terrain heights will depend upon the skill of you few men. Our forces in foreign theaters of operations have already had occasion to profit from this training.

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By NARA Date 7-11-07

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

SC/sl

353 GNNMO

G-3 - MK

14 APR 1944

SUBJECT: Mountain Training.

TO : Commanding General, 95th Infantry Division, Indiantown Gap Military Reservation, Penna.

1. Reference is made to Inclosure No. 3, letter, this headquarters, 353 GNNMO, subject as above, dated 30 Mar 44.

2. Above inclosure is revoked in its entirety and the following substituted therefor:

a. The amounts of ammunition shown to the left of the nomenclature below will be expended by each RCT. Each RCT will take to West Virginia Maneuver Area the amount of ammunition indicated below on the right of the nomenclature. The difference will be issued by West Virginia Maneuver Area immediately upon arrival. The medium artillery battalion will carry to the Maneuver Area and expend the amount of ammunition shown below:

By each RCT:	RCT 1	RCT 2	RCT 3
573 SHELL, HE, for 105mm How M2,M2A1 & M4	573	573	573
60 SHELL, smoke for 105mm How M2, M2A1 & M4	60	60	60
180 SHELL, HE, for 105mm How M3	180	180	180
468 SHELL, HE, for 81mm mortar (Lt)	468	468	468
72 SHELL, smoke, for 81mm mortar (Lt)	72	72	72
432 SHELL, HE, for 60mm mortar	432	432	432
93,000 CART, ball, cal. .30	63,000	63,000	93,000
6,000 CART, tracer, cal. .30	6,000	6,000	6,000
80,000 CART, blank, cal. .30	0	0	66,000
500 CART, ball, cal. .50	500	500	500
360 SHOT, AP or TP, 57mm Gun	360	360	360
500 MINE, AT, prac	500	500	500
500 FUZE, mine, AT, prac	500	500	500

MAILED XIII CORPS APR 14 1944

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Authority NND 880759
By NARA Date 7-11-07

Hq. Medium Artillery Battalion:

321 C/R SHELL, HE, 155mm Howe

b. Responsibility for storage and handling of the above ammunition in the Maneuver Area will rest with the unit commander.

c. Ammunition not used by each unit will be returned to the Home Station by the unit.

d. All ammunition expended in the Maneuver Area will be charged against the annual allowance of the division.

e. Ammunition will be taken to the Maneuver Area from ammunition available to the division at the Home Station.

f. Availability of the above ammunition is the responsibility of the division.

By command of Major General GILLEM:

RL

48B

DECLASSIFIED
Authority NND 887559
By NARA Date 7-11-07

FILE COPY
PREPARED BY
COORDINATED WITH
APPROVED BY
CG

HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

353 (GNMG)

30 MAR 1943

SUBJECT: Mountain Training.

TO : Commanding General, 95th Infantry Division,
Indiantown Gap Military Reservation, Pa.

1. Pursuant to instructions from Headquarters, Army Ground Forces, the 95th Infantry Division will train in Mountain Warfare at West Virginia Maneuver Area in accordance with the schedule in Incl. #1.

2. Purpose, to train:

a. Selected individuals in assault climbing and mountaineering.

b. Selected individuals in the technical operation and employment of animal pack transport.

c. Troops physically.

d. Troops to operate tactically and conduct firing realistically in difficult, mountainous terrain.

3. Plan. Elements of the Division, supported by such non-divisional combat units as practicable, will be rotated through the training for periods of approximately three (3) weeks. Periods may be extended as necessary. The regimental combat team will be the normal element of the Division to be rotated.

4. Training.

a. Training of elements of the Division in WVMA will be controlled by the CO, WVMA.

b. Assault Climbing and Pack Training. A selected group of officers and EM will precede the combat team into the area to receive special training in assault climbing and mountaineering. (See Incl. #2). This group will be trained as instructors for their units and as teams to assist their units in cross-country operations (par 2a above). Another group of officers and men will be selected to precede the combat team into the area to receive animal pack training (par 2b above).

c. Rosters of the personnel of each group showing name, rank, ASN, and organization will be delivered to CO, WVMA, five (5) days prior to the arrival

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By NARA Date 7-11-07

of the group. Direct communication with the CO, WVA, is authorized in reference to time and place of reporting detachments for this training.

5. [illegible]

a. A depot for all classes of supply is established at Elkins, West Virginia.

b. Necessary installations and services will be furnished [illegible] Area by XIII Corps in support the operations of troops [illegible] such troops were operating in the field as part of an independent unit.

c. [illegible] tion, maintenance and communication are published as separate documents and will be forwarded under separate cover by this headquarters.

d. [illegible] (See Incl. #2)

e. Maintenance. Preventive maintenance by all units and echelons will be stressed. In this connection the provisions of par 2, Weekly Directive No. 52, Hq XIII Corps, [illegible] will be impressed upon all drivers and other personnel [illegible] operations.

6. Evacuation.

a. Personnel. Maximum use will be made of field medical units. Those cases requiring further hospitalization will be evacuated to the 105th Station Hospital at Elkins, W. Va.

b. Equipment. The evacuation of equipment will be accomplished generally through normal echelons and supply units.

7. Fire Prevention. Every precaution will be taken to guard against forest fires especially during the dry season, [illegible] with the Supervisor, Monongahela National Forest, will be maintained.

8. Movement of Troops. [illegible] the movement of these elements as follows.

a. It is directed that you issue the necessary instructions to move the elements of the 44th Infantry Division, with attached Division Troops, from present station in Elkins, West Va, and return upon completion of scheduled training. Movements will be made on dates and [illegible] to accomplish the training [illegible] set forth in Incl. #1. [illegible] required for each unit [illegible] and is to include the [illegible] Infantry Regiment and each Battalion and from the Field Artillery Battalion. A representative from each company and battery is to be sent with the advance detachment. The advance detachment is to precede the main body of troops by forty-eight (48) hours. Direct communication is authorized with the CO, WVA, in this respect.

b. Movements will be made by rail and motor. Full advantage will be taken of available motor transportation for the movement of individuals and

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By NARA Date 7-11-07

organizational equipment. (Track laying vehicles will be moved by rail.)

c. Coordinate rail movements with [illegible] at stations of origin. Rail movements, including entraining and [illegible], under control of Commanding General, Army Service Forces.

d. Rations will be taken by [illegible] days after arrival. Post Transportation Officers at stations of origin are authorized to determine the number of troop train vehicles required for the journey on each rail movement.

e. Complete individual clothing and individual and organizational equipment as prescribed by appropriate T/E's will be taken to the Maneuver Area.

f. Arrange with Post Quartermasters at stations of origin for fuels and lubricants sufficient for the journey on all motor movements.

g. Reports:

(1) Report by wire the strength, method of travel, routes, number of vehicles (where applicable), time and time of departure, expected arrival time, and identity of each movement to the following:

CO's, Third and Fifth Service Commands
CG, XIII Corps
CO's, Indiantown Gap Military Reservation, Pa. or WVMA, when either agency is at destination.

(2) Report actual arrival times, including opening of ROT CP's to this headquarters by wire.

(3) Reports will use Greenwich Civil Time and unit designations, and will bear deferred classifications when sent to this headquarters.

h. Orders issued by you for the movement of these elements to [illegible], West Va, and reports of these movements will bear the classification [illegible].

i. Attention directed to the following:

Sec IV, TM 38-205	TC 101, WD, 2 Dec 42
Par 8, AR 55-130	Par 15, AR 345-900
Par 4, AR 55-145	Par 5, AR 40-1080, CS.

By command of Major General GILLEM:

MAILED XIII CORPS MAR 30 1944

3 Incls:
1. Schedule of Tng.
2. Assault Climbing & Pack Tng.
3. Ammunition.

T. F. KEEFE
Colonel, AGD
Adjutant General

Copy furnished:
CO, WVMA

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Authority NND 887559
By NARA Date 7-11-07

INCLOSURE NUMBER 1

SCHEDULE OF TRAINING - 86TH INF DIV

5 - 16 Apr, incl.	Advance assault climbing and pack training period (Personnel to attend as desired by the Division Commander).
18 Apr - 1 May, incl.	Assault climbing and pack training, 1st ROT
2 - 15 May, incl.	Mountain Training, 1st ROT
16 - 22 May, incl.	Assault climbing and pack training, 3d ROT
23 May - 7 Jun, incl.	Mountain Training, 3d ROT
28 May - 10 Jun, incl.	Assault climbing & pack training, 3d ROT
12 - 27 Jun, incl.	Mountain Training, 3d ROT

NOTE: Minor changes in the above schedule may be arranged by direct communication with CO, WVMA, and reported to this headquarters.

Incl. 1

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By NARA Date 7-11-07

INCLOSURE NUMBER 2

ASSAULT GLIDERS AND PACK TRAINING

1. **Recommended Breakdown of Personnel to Receive Assault Glider Training (for Airborne subunits in airborne units).**

[illegible]

Division Staff 2
G-2 Section 1
G-3 Section 1

Medium Artillery, 155mm How. 4
Bn Hq . . . . . 1 total 1*
Each Btry . . . . . 1 total 3**

Reconnaissance Troop 1

3 Regimental Combat Teams. 99
From each RCT
Regt Hq. 1
Regt I&R Plat. 1
Inf Bn (each 7). 21
AT Co. 1
Gun Co 1
FA Bn. 5
Engr Co (atchd). 1
Bn Med Det (atchd) 1
Coll Co (atchd). 1
33

Total from Division. 106

[illegible]

Medium Artillery 39
Bn 155mm How (Opr & Gunn Plats) . . . .7, total 7
(1 Surv & Instr Sgt, 2 Surv & Instr Men, 2 rad oprs, 2 [illegible] & tel oprs)
Btry 155mm How (Btry detail). . . . . .4, total 12
(1 NCO, 1 rad opr, 1 wireman and tel opr, 1 Surv & Instr Man)

Reconnaissance Troops. 12
Scout Car Section (each 4)

3 Regimental Combat Teams. 615
From each RCT
Regt I&R Plat. 10
Rifle Co (each 16) 96*
Hv Wpns Co (each 16) 80

40

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INCLOSURE NUMBER 2. Continued

Gun Co	[illegible]
AT Co.	[illegible]
Bn 105mm How, Bn & Bn Btry	[illegible]
(Opns & Comm Plats) (1 rad opr, 2 sergeant A tel oprs, 1 surv & instr sgt, 2 surv & instr men)	
Btry 105mm How (Btry detail) (each A)	18
(1 NCO, 1 rad opr, 1 wireman 4 tel opr, 1 surv & instr men)	
Engr Co.	16
Bn Med Sec	20
Cavl Co.	15
	[illegible]
Total from Division	648

* Bn S-2, Asst S-2 or Liaison Officer
**SC, RO or Enms
Should be scouts or equivalent in training.

2. Personnel to Receive Pack Training:

1 Off per Bn
4 to 6 EM from each company, btry, or troop.

3. Each group (para 1 and 2 above) will require its own mess personnel and equipment.

4. Selection of Personnel for Mountain Assault Climbing Training:

a. Previous directives from this headquarters have stressed the importance of training in the Mountain Assault Climbing School, Seneca, W Va, and have emphasized the importance of selecting officers and men temperamentally adaptable and physically qualified. These men should be selected on a volunteer basis, within the limitations of allotments to unit, prior to making arbitrary assignments. Past records and reports indicate that apparently sufficient importance is not being given to selecting these men, resulting in a large number of replacements and loss of training.

b. Previous experience with other divisions has indicated that the best results are obtained when the following is read to all men prior to the selection of students for this school:

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By NARA Date 7-11-07

ENCLOSURE NUMBER 2, Continued

(1) This unit has been selected for Mountain Training, and each organization is allowed to select a number of students to attend the Mountain Assault Climbing School in the USA.

(2) This training is not dangerous and the instruction is given in progressive steps as the students become proficient. No man is required to do any climbing for which he is not prepared. No dare-devils are desired, just men with average strength and normal nerves. Those men who have lived in the country or mountains or who have devoted considerable time to hunting and climbing are better qualified to receive this training. This climbing teaches a sport after you become proficient, and will be enjoyed as thousands of other men have before you.

(3) This training will enable you to take ropes up steep mountain slopes and attach them, enabling the remainder of the unit to assault and descend the mountain by the use of these ropes. The ability of the units to attain certain terrain heights will depend upon the skill of you few men. Our forces in foreign theaters of operations have already had occasion to profit from this training.

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By NARA Date 7-11-07

INCLOSURE NUMBER 3

AMMUNITION

1. Ammunition listed below will be taken to the Maneuver Area as indicated:

a. By each RCT:

[illegible] SHELL, HE, for 105mm How HE, M2A1, M4
[illegible] SHELL, smoke, for 105mm How WP, M2A1, M4
[illegible] SHELL, HE, for 60mm mortar
[illegible] SHELL, HE, for 81mm mortar
[illegible],000 BARE, ball, cal 50 M 2 tra (M9 tra)
[illegible],000 BARE, [illegible] cal 30
[illegible],000 BARE, ball, cal 30
[illegible] BARE, [illegible] M8
[illegible] SHOT, AP or TP, 57mm Gun

b. By Medium Artillery Battalion:

[illegible] C/R SHELL, HE, 155mm How

2. Responsibility for storage and handling of the above ammunition in the Maneuver Area will rest with the unit commander.

3. Ammunition not used by each unit will be returned to the Home Station by the unit.

4. All ammunition expended in the Maneuver Area will be charged against the annual allotment of the division.

5. Ammunition will be taken to the Maneuver Area from ammunition available to the Division at the Home Station.

6. Availability of the above ammunition is the responsibility of the Division.

Incl. 3

O
P
Y

WAR DEPARTMENT
Office of the Chief of Engineers
Washington, D.C.

Refer to File No. CE 602 Bomb Disposal ENGLT

9 July 1946

SUBJECT: Report on Investigation of Report of Unexploded Shells in West Virginia Maneuver Area

TO: The Division Engineer
Ohio River Division
Columbus, Ohio

1. Reference is made to letter, your office, dated 19 June 1946, concerning a report of duds on the property of Tacy A. Carwell in the West Virginia Maneuver Area.

2. This area was visited by Lt. C. E. Spear, of this office, approximately 27 June 1946. The reported duds were shown to him by Mr. S. R. Harper, of Davis, West Virginia, on whose father's land they were located. The reported dangerous items turned out to be a stack of empty cardboard containers for 81-MM mortar shells. Lt. Spear proceeded to crush the cases so that they could not be mistaken for shells in the future, and to explain to Mr. Harper that no danger existed.

3. Inclosure number one to letter of 19 June 1946, basic lease assembly, is returned herewith.

BY ORDER OF THE CHIEF OF ENGINEERS:

EDWARD J. FANFLIK
Chief, Management and
Disposal Division
Real Estate

2 Incls
1. Cy of Lt Spear's Rpt dtd 4 Jul 46
2. Cy of Lease No. W-33-017-eng-347

C
O
P
Y

HEADQUARTERS

Det. #6, 9800 TH TSU-CE

Bomb and Shell Disposal Team

Petersburg, West Va.

24 May 1946.

SUBJECT: Report of Decontamination Work, West Virginia Maneuver Area.

TO: Real Estate Officer, Ohio River Division.

1. In an attempt to clarify the report already submitted by Capt. Luter, the attached report has been prepared to accompany the real estate map of the maneuver area.

2. A copy of this report is being sent to the O.C.E., and another to Capt. Luter.

/s/ Charles E. Spear
CHARLES E. SPEAR
1st Lt. CE

C
O
P
Y

REPORT OF DECONTAMINATION

WEST VIRGINIA MANEUVER AREA

Engineer Bomb and Shell Disposal Team No. 6 was assigned to decontaminate the areas in the West Virginia Maneuver Area, in the vicinity of Davis and Petersburg, West Va., on which explosive projectiles had been fired.

Activities in the area included maneuvers by ground forces, with organic and attached artillery; and firing of experimental rocket and mortar projectiles by the Allegany Ballistics Laboratory of George Washington University. Ground force maneuvers extended from September 1942 to June 1943. The Ballistics Laboratory completed its firing in November 1945. The artillery ammunition fired was 75 mm, 105 mm, and 155 mm. A few experimental rocket motors were fired by the Allegany Ballistics Laboratory; but they had no explosive components. A large number of rounds for the 4.2 inch chemical mortar were fired--both FS--smoke-filled, and inert, sand-loaded rounds. Over two hundred smoke rounds were destroyed. The inert rounds were left untouched, although their identity was always positively established. Only four artillery rounds were found and destroyed.

The team personnel--one officer, eight enlisted--made the preliminary survey of the impact areas, and directed the work of a civilian search crew of 20 men hired through the Pittsburgh District Engineer office. Organic equipment and vehicles, augmented by a 2½ ton truck and "Weasel" (Cargo carrier M29C) were used to do the job. The team was occupied in the job from 30 March to 24 May 1946.

The "Impact Area" printed on the attached map can be totally disregarded. Why it was placed where it was, no one seems to know. But the true impact areas were in other parts of the maneuver area; and a thorough investigation showed that there was not so much as a shell hole in that vicinity.

A survey of the whole east face of the mountain (see contours on attached map) by the entire team, guided by a local forest ranger who knew where every target was, disclosed that the two years' growth and windfalls since the last artillery was fired have thoroughly hidden every trace of duds, shrapnel, and shell holes. The terrain is extremely rough and rocky, and heavily forested. No organized search could be run there. And there never were many artillery rounds fired, according to local residents. No official records exist. Furthermore, the percentage of duds was bound to be very low, because of the high angle of impact against the mountain.

In view of the foregoing considerations, it is recommended that those tracts lying on the east face of the mountain be released as entirely suitable for their intended use--i.e., grazing and forestry. The land is not suited for cultivation. Cross-hatched areas on the

attached map are those which can be considered still contaminated, in the literal sense. Double-hatched areas are those where concentrations of fire fell. The single-hatched area is where scattered firing was done at targets which are not apparent now. The contamination does not, in the opinion of this detachment, establish any danger whatsoever to anyone using the land. Every known or suspected impact area in the remainder of the reservation was searched, and the duds destroyed. All tracts lying on top of Cabin mountain, or further to the west, have been decontaminated (no exceptions). These areas are used normally for grazing, hunting, and fishing, and by large numbers of local residents for public recreation and for berry picking. None are suitable for cultivation. All are recommended for disposal as entirely safe for these uses.

C
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HEADQUARTERS,
Det. #6, 9800 TSU-CE
Bomb & Shell Disposal Team
Petersburg, W. Va.

23 May, 1946

Supplement to Decontamination Report of West Virginia Maneuver Area (20 May 46)

I certify that a thorough reconnaisance was made of the entire West Virginia Maneuver Area by Lt. Charles E Spear and the undersigned. Mr. Jeff Goldizen employed by the Forest Service, Potomac Division, Petersburg, West Virginia, who was attached to the army during the maneuvers and at the time of the firing, acted as our guide, and pointed out all the impact areas.

These impact areas with the exception of the cross-hatched areas were thoroughly searched by a twenty man civilian search crew accompanied by the Bomb Disposal Team; every yard of the ground was covered. The terrain in the impact areas is very rocky and any disturbance by the exploded shells or duds were clearly visable. In no cases did we find where a shell had penetrated the surface beyond visability. In almost all cases they were found on the surface (clearly visable) five to fifteen feet from the point of impact.

These duds were marked by the searched crew with red and yellow flags and exploded shortly thereafter by the Demolition Team.

Our records show finding 189 FS smoke filled 4.2 CM shell. Artillery shells found were one (1) - 155 MM, three (3)-105 MM and two (2)-40 MM a total of 195 plus some 12 or 14 sand filled. All these duds were exploded and destroyed with the exception of a few cases where the shells were sand-filled, and the fuze and back-plate had been knocked off. In these cases the sand was poured out, which left no more than a steel hull. These were allowed to remain but cannot be considered as duds, and will soon rust away.

The land-owners of the property in the entire maneuver area are using the land for grazing, hunting and fishing; it appears they have been ever since the army moved out. The restricted area signs don't mean much to the people in this country.

I hereby recommend that the land be turned back to the original owners, who are now using it anyway; and that a notice be published in the papers to the effect the West Virginia Maneuver Area has been cleared of all duds so far as practical. Tresspassers, hunters, fishermen, etc., be warned that they enter at their own risk and in the event a dud is found not to move it, but to leave it alone. It is doubtful if any will be found, but it is possible.

/s/ Asa B. Luter G-28
ASA B. LUTER
Capt. CE
Commanding

COPY

Decontamination of The West Virginia Maneuver Area

Decontamination work on the West Virginia Maneuver Area has been completed. The results of the search are shown on the attached map. (The printed cross-hatched area on the map marked "Impact Area" can be disregarded.)

The heavily cross-hatched area are those which remain contaminated. The single-hatched areas are those where the terrain is too rough, or the overgrowth too heavy, to make a search feasible. The danger in them is negligible, because of the fact that they were subjected to only a small amount of firing, and that they were artillery shells, with an extremely low percentage of duds. Inasmuch as it is all woodland, up on the side of the mountain, it ought to be regarded as no more dangerous for its intended use than is the "clear" area. The "contaminated" areas themselves should not be regarded as too dangerous for grazing, hunting, fishing, lumbering, etc., because even there (they are the principal points of impact) the number of explosive duds is very low.

Thorough reconnaisance was made of the entire maneuver area west of the firing line. Known impact areas were searched but spot inspection by the team personnel showed that few duds remain. The open country on top of the mountain was contaminated by FS smoke-filled 4.2 CM shells. Nearly 200 were destroyed.

All farmland, regardless of its location, is recommended as again safe for agricultural use. The remaining land, with the exception of the areas crossed-hatched, is recommended as safe for grazing, lumbering, or hunting. Very little regard should be given to the possible danger anywhere in the maneuver area, in view of the nature of the land and the slight use to which it is put.

Mr. Carl E. Bergtorf, Forest Ranger, Potomac Division, Petersburg, W. Va., has been very co-operative. Several times he assigned Mr. Jeff Goldizen to work with the unit as a guide. Mr. Goldizen rendered valuable assistance in the location of Boundary Marks of impact areas, as no army records were available, as to the amount of firing that was done in each impact area. Mr. Goldizen worked with the army here when the firing was done and his knowledge of everything made the job much easier.

/s/ Asa B. Luter
ASA B. LUTER
Capt. CE
Commanding

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
SAVANNAH DISTRICT
200 East St. Julian Street
Savannah, Georgia

SASVE

5 May 1953

SUBJECT: Travel Orders No. 8-8

TO: Major ~~Captain~~ Dallas R. Lynch, CE, 01101561
Sgt (E5) Grant W. Colburn, RA 36471782
Cpl (E4) Billy T. W. Walker, RA 44172403
Pvt (E2) Tommy Terry, US 53123671
Pvt (E1) Fred Hille, US 51208706
9800th TSU-CE Det No. 8, Engineer Range Clearance Team,
Ft Belvoir, Va.

SAVANNAH, GEORGIA (DS)

Under authority of para 5111, Part I, Chapter V, and Part I, Chapter VIII, Orders and Regulations, CE, and letter dated 27 April 1953 from Office of the Division Engineer, South Atlantic Division, subject, "Reconnaissance Survey - West Virginia Maneuver Area," file SADRM 602 Dedudding - RE General, you will proceed on further TDY as directed below, the travel directed herein being necessary in the military service, and upon completion of such temporary duty, return to your presently assigned TDY station within the Savannah District.

DEPARTURE DATE: On or about 12 May 1953, for approximately 15 days.

FROM: TDY station, Southern Pines, N. C.

TO: Elkins, West Virginia, and such points in the vicinity thereof as may be necessary to complete specific mission.

DUTY: In connection with military activities of the Corps of Engineers; for the purpose of making a reconnaissance survey of West Virginia Maneuver Area, and making a report to the Division Engineer, Ohio River Division, of findings and recommendations.

Officer will register upon arrival at and departure from each activity or installation where duty is performed.

Travel by rail, bus, and/or government-owned vehicle is authorized.

Expenses authorized are chargeable to 2132020 8-8619 F1541-02 S09-133, to be reimbursed by Ohio River Division when the cost of the survey has been determined.

BY ORDER OF THE DISTRICT ENGINEER:

J. W. Morris
J. W. MORRIS
Major, CE
Executive Officer

Distribution: Budget & Accounting Branch
CO, Det No. 8
EM concerned
DIV ENGR, Ohio River Div
SADIV, Attn: SADPM and SADRM
Files

D-18

9500 TSU-CE DETACHMENT NO. 8
ENGINEER RANGE CLEARANCE TEAM
General Delivery
Southern Pines, N. C.

21 May 1953

SUBJECT: Report of Inspection of West Virginia Maneuver Area

TO: Office Chief of Engineers
Building T-7
Washington 25, D. C.
Attn: Real Estate

Ohio River Division
Custom House
Cincinnati, Ohio
Attn: Real Estate

THRU: Louisville Engineer District
Post Office Box 59
Louisville, Kentucky
Attn: Real Estate

1. Per instructions contained in Savannah District Engineer Travel Order 8-8 dated 5 May 53 & verbal direction recieved from Mr. Dave Potter of Louisville Engineer District, this unit conducted inspection operations covering the impact areas of the West Virginia, Maneuver area. The Maneuver area covered 350,000 acres of Northeast West Virginia between Elkins & Petersburg. The impact area covered roughly 50,000 acres in the Eastern side of the Maneuver area about 12 to 15 miles West of Petersburg. The impact area is generaly barren, rocky & mountainous terrain, with portions of mountain sides heavely over grown. The lands are considered of very little value, from 50 cents to $1.00 dollar per acre.

2. Impact areas (See Attached Map) of the subject area were located and inspected with the assistance of Mr. Jeff Goldizen of Petersburg & Mr. Bill Cruser of Davis. These men are ex rangers. They were assigned to work with the military during firing operations, had seen the shells fall & knew the impact areas well. There is very little evidence left of the areas having been used. Blast marks & Craters are still recognizable in very rocky areas. It appears that previous Clearance operations were good. Shells remaining in the area are of isolated nature & must be recovered disposed of on a location & call basis. Detail search of the areas is not recommended.

3. The 549 Ordnance EOD Det, from Baltimore Maryland with 3 Officer & 15 EM is presently in the Davis area for 2 or 3 weeks field training, with the mission of disposal of all known duds. To date six missiles have been recovered and/or destroyed.

4. Articles were placed in local papers to draw attention to our Unit activities & to collect information on location of all known missiles. Missiles reported will be disposed of by the Ordnance Det during their stay. This should take care of the dedudding problem in the area for some time.

5. Usefull & friendly assistance was recieved from Mr. Clair Carr, forest Service Office in Petersburg. The assistance recieved from Mr. Goldizen & Mr Cramer was in valueable.

D. R. LYNCH
Major., CE
Commanding

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By NARA Date 7-11-07

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HEADQUARTERS
ARMY GROUND FORCES
Army War College
Washington 25 D.C.

353(XIII Corps)(15 Mar 1944)GNGCT 15 March 1944 31

SUBJECT: Mountain Training Directive.

TO: Commanding General, XIII Corps, Fort Du Pont, Delaware.

1. General.

a. Letter, Hq AGF, 353/6 (Mtn)(C)(16 Jul 43)GNGCT, 16 July 1943, subject: "Mountain Training Directive," is rescinded.

b. Training in mountain warfare will be conducted in the West Virginia Maneuver Area for such divisions as may be designated by this headquarters. The area will be preserved as nearly as practicable in its primitive state. Establishment of service installations will be held to a minimum. Improvement of roads and trails will be accomplished incident to actual operations only.

2. Purpose.

a. To train selected individuals in assault climbing and mountaineering.

b. To harden troops physically.

c. To train troops to operate tactically and conduct firing realistically in difficult, mountainous terrain.

3. Plan. Elements of the division, supported by such non-divisional combat units as practicable, will be rotated through the training for periods of approximately three (3) weeks. Periods may be extended as necessary. The regimental combat team will be the normal element of the division to be rotated.

4. Training.

a. Assault Climbing. A selected group consisting of an officer and as many enlisted men as practicable will precede the combat team into the area to receive special training in assault climbing and mountaineering. Intelligence personnel will be included. These groups will be trained as instructors for their units and as teams to assist their units in cross-country operations.

b. Individual Training. Individuals will train in rock-climbing, cross-country marching in difficult terrain and the use of climbing equipment and packboards. During the period October-March instruction will include winter hygiene, and care, use and maintenance of special winter clothing and equipment. (See Training File 8-1297, Personal Health in Snow and Extreme Cold.)

c. Unit Training.

(1) Unit training will progress from the squad to the regimental combat team and will accustom units to mountain operations, both day and night. Exercises will emphasize maneuver of small units, initiative and leadership of subordinate commanders,

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and the actions of small, semi-independent units in seizing and defending dominant heights. Live ammunition will be used in as many exercises as practicable.

(2) Close engineer support will be included in appropriate exercises to assist the forward movement of units by maintaining existing roads and trails and improvising rope ways and other crossing expedients; and in effecting demolitions and other road blocks in defensive situations.

(3) Supply and the evacuation of simulated casualties will be accomplished realistically.

5. Mountain Training Group. A Mountain Training Group has been allotted to assist in technical training. The group is composed of two sections:

a. The Technical Advisor Section which provides officers to act as staff advisors.

b. The Assault Climbing, Scout, and Pioneer Section which provides instructors for evacuation training, fixed rope and cliff orientation training.

6. Supply.

a. Service units will be provided from units under your command.

b. Supplies and materiel will continue to be drawn from depots and supply points in accordance with current procedure.

7. Evacuation.

a. Personnel. Maximum use will be made of field medical units. Those cases requiring further hospitalization will be evacuated to the 199th Station Hospital at Elkins, West Virginia.

b. Equipment. The evacuation of equipment will be executed promptly through normal echelons and supply points.

8. Maintenance. Preventive maintenance by all units and echelons will be stressed. In this connection, the provisions of Army Ground Force Weekly Directive No 51, dated 21 December 1943, par 1, subject: "Mountain Operation of Motor Vehicles", will be impressed upon all drivers and other personnel involved in vehicular operations.

9. Movement of Troops. This headquarters will designate the divisions to be trained at least 30 days prior to the movement into the maneuver area.

10. Fire Prevention. Every precaution will be taken to guard against forest fires especially during the fire seasons, spring and fall. Close collaboration with the Supervisor, Monongahela National Forest, will be maintained.

By command of LT. GEN. McNAIR:

/s/ R. A. MEREDITH
Major, A.G.D.,
Asst Ground Adj Gen.

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PREPARED BY
COORDINATED WITH
APPROVED BY
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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

353 (GHMC)

RAC/jr

17 JAN 1944

SUBJECT: Report on 343d Medical Group.

TO : Commanding General, Army Ground Forces, Army War College, (Attention G-3 Section, Special Projects Division), Washington, 25, D. C.

The attached report on training of the 343d Medical Group in the West Virginia Maneuver Area is forwarded for your information.

For the Commanding General:

MAILED XIII CORPS JAN 17 1944

T. F. KEEFE
Colonel, AGD
Adjutant General

1 Incl:
Rpt on 343d Med Gp w/incls.

DIRECTOR'S HEADQUARTERS
West Virginia Maneuver Area
XIII Corps

Elkins, West Virginia
11 January 1944

SUBJECT: Report on 343d Medical Group.

TO: Commanding General, XIII Corps, APO #463,
Fort Du Pont, Delaware.

1. The following report is made on the 343d Medical Group covering training in the West Virginia Maneuver Area for the period 13 December 1943 to 11 January 1944.

2. The 343d Medical Group consisted of the following units:

343d Med Gp Hq
188th Med Bn Hq & Hq Det
488th Med Coll Co
489 Med Coll Co.
490th Med Coll Co
630th Clr Co
668th Clr Co
187th Med Bn Hq & Hq Det
485th Med Coll Co
486th Med Coll Co
487th Med Coll Co
629th Clr Co

3. During the period covered by this report the Medical Group was subjected to more severe weather conditions than any Combat Team training in this area to date. Several days of sub-zero temperatures of 5-10 below were experienced; and several periods of precipitation of snow, sleet and rain occurred which made driving on all roads and trails very difficult.

4. The training program for the entire stay in the maneuver area was as follows:

9 Dec - Advance Detachment arrived in area.
13 Dec - Entire Medical Group closed in area. Bivouacked in vicinity of Kerens, W. Va.
14-16 Dec - Drawing and issuing of mountain clothing and equipment, orientation, acclimatization, and preparation of training schedules.
17-24 Dec - Training, under Group Command, consisting of motor marches, foot marches, establishing and moving of bivouacs, and general physical and mental conditioning in area between Parsons and St. George, W. Va. Conference of all officers held by Director's Headquarters personnel relative to period of specialized mountain training.
25 Dec - Preparation for move to Sully - Jenningston area.

26 Dec - Move to Sully - Jenningston area.
27 Dec to - Specialized mountain training under direct supervision of
3 Jan - Director's Headquarters. (Schedule previously submitted to XIII Corps by this Headquarters).
4 Jan - Maneuver, evacuating artificial casualties. (Copies of problem and attached instructions previously submitted to XIII Corps).
5 Jan - Movement from Sully - Jenningston area to vicinity of Kerens.
6 Jan to - Additional mental and physical conditioning under supervision
11 Jan - of Group Headquarters.

27 Dec to - 9 Officers and 72 Enlisted Men attended Assault Climbing
4 Jan - School at Seneca.

5. Enclosures #1 and #2 are the reports submitted by the two (2) medical technical advisors of Director's Headquarters who were in direct control of the specialized mountain training and who acted as technical observers for the maneuver on 4 January 1944.

6. The following comments are relative to remarks contained in enclosure #3:

a. The need of advance information concerning Memoranda, Directives, and the conduct of operations in the West Virginia Maneuver Area has been expressed by several organization commanders. It is felt that this would be desirable, and a list of such information is being prepared by this headquarters for submission to XIII Corps Headquarters in order that all or part of it may be incorporated in the material issued to organizations prior to movement to this area.

b. The desirability of having a non-tactical bivouac during the specialized mountain training period has been discussed with representatives of XIII Corp Headquarters during visits to this area.

c. The organization of technical advisors of this Headquarters is adequate to handle the normal medical personnel of a Regimental Combat Team. Some difficulty was encountered in reorganizing to provide sufficient technically trained personnel to provide adequate supervision of specialized training for a medical group.

d. A publication is being prepared for issue to all technical advisors for use during training, and after approval by higher headquarters, for future issue to training units.

e. The rate of movement of the maneuver, 4 Jan, was somewhat abnormal for the poor condition of the roads which existed at the time of the problem, due to heavy precipitation immediately prior to the start of the problem.

7. The following comments are relative to remarks contained in enclosure #4:

a. The available training area is adequate for normal medical personnel accompanying a Regimental Combat Team, but was somewhat restricted for an entire Medical Group.

b. Evacuation of casualties by collecting company personnel is normally only from battalion aid stations. The additional training of evacuation from difficult locations was given to care for a situation where collecting company personnel are used to supplement battalion aid station personnel. The problem would have been unduly prolonged to have included this in the maneuver.

c. The apparent lack of reconnaissance, prior preparation, and coordination resulted mainly from the unexpected and unprecedented road and trail conditions existing the day of the problem.

8. The following comments are relative to remarks contained in enclosure #5:

a. The slowness of signal communication in the control net resulted from an attempt to train service troop signal personnel during the maneuver. This difficulty has been brought to the attention of Director's Headquarters Signal Officer and will not recur.

C. E. MORRISON,
Lt Col, Cav,
Acting Director.

5 Incls:
Incl #1: Report on Status of Training
Incl #2: Report on Maneuver
Incl #3: Comments by CO, 343d Med Gp
Incl #4: Comments by CO, 187th Med Bn
Incl #5: Comments by CO, 188th Med Bn

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DIRECTOR'S HEADQUARTERS
West Virginia Maneuver Area
XIII Corps

Elkins, West Virginia
6 January 1944

SUBJECT: Report on Status of Training of 343d Medical Group.

TO: Director, DIRECTOR'S HEADQUARTERS, West Virginia Maneuver Area, Elkins, West Virginia.

1. In compliance with the Training Schedule - 343d Med Gp, Dir Hq, WVMA, Elkins, W. Va, the training program for Medical units in Mountain Medical Evacuation was carried out from 27 Dec 1943 to 3 Jan 1944.

2. The medical units that took part in the training program were as follows:

343d Med Gp Hq	O - 8	EM - 23
188th Med Bn Hq	O - 5	
188th Hq Det	O - 1	EM - 18
488th Med Coll Co	O - 5	EM - 85
489th Med Coll Co	O - 4	EM - 91
490th Med Coll Co	O - 4	EM - 89
630th Clr Co	O - 7	EM - 91
668th Clr Co	O - 7	EM - 121
187th Med Bn Hq	O - 6	
187th Hq Det	O - 1	EM - 23
485th Med Coll Co	O - 4	EM - 87
486th Med Coll Co	O - 5	EM - 86
487th Med Coll Co	O - 5	EM - 84
629th Clr Co	O -10	EM - 90

The daily average attendance during the training period was approximately 40 officers and 800 enlisted men.

In order to facilitate better control, more personal training supervision, and a greater utilization of training area facilities, the 343d Med Gp was split into 2 groups designated as Group A and Group B.

3. In addition to the conferences, demonstrations, and exercises designated in the Training Schedule, two (2) informal conferences were conducted during the evening hours primarily for the purpose of discussing tactical operations. These conferences were attended by all officers of the 343d Med Gp.

4. <u>Deficiencies Noted During Training Period</u>:

a. Bivouac areas in general too noisy for a tactical operation.

b. Insufficient concern and supervision by junior officers and NCOs regarding the individual comfort of the enlisted man in bivouac area.

Incl #1

c. Leadership displayed by junior officers and NCOs poor.

d. Delegation of responsibility to junior officers and NCOs weak.

e. March discipline to and from training areas poor.

f. Discipline and small unit control in training area poor. This was especially marked in regard to fire discipline when junior officers and NCOs huddled around fires and disregarded the training in progress.

g. Failure by junior officers and NCOs to intelligently adapt the methods of evacuation learned to the problems in the field.

5. Commendations:

a. Operation of mess in the field very good. The food was well prepared and well served at all times. The sanitation was satisfactory throughout the training period.

b. The physical conditioning of the individual enlisted man was very good and when properly led, the enlisted man generally displayed commendable enthusiasm and spirit.

c. The morale of the troops was very good at all times in spite of the inclemencies of the weather and poor leadership.

d. The enlisted men very quickly absorbed the new technique of evacuation taught and presented good material for further training.

e. The staff officers of the group and of both battalions were excellent and were extremely cooperative and helpful at all times.

MORRIS HERMAN,
Captain, MC

JOHN K. MENEELY,
Captain, MC

DIRECTOR'S HEADQUARTERS
West Virginia Maneuver Area
XIII Corps

Elkins, West Virginia
6 January 1944

SUBJECT: Report on Maneuver of 343d Medical Group.

TO: Director, DIRECTOR'S HEADQUARTERS, West Virginia Maneuver Area, Elkins, West Virginia.

1. In compliance with Directive, Med Problem #1 - 343d Med Gp, Dir Hq, WVMA, Elkins, W. Va, dated 21 December 1943, all medical units comprising the 343d Med Gp took part in a one (1) day maneuver problem on 4 January 1944.

2. The purpose of the problem was to provide each medical unit with the opportunity to put into operation the tactics and methods of evacuation taught during the training period and to test their flexibility during forward displacements and retrograde movements.

3. The problem started at 0830, 4 January 1944 and terminated at 1830 4 January 1944. All units participating in the maneuver moved during the evening of 3 January 1944 and were in position at the start of the problem.

4. The entire 668th Clearing Company and personnel taken from the 629th and 630th Clearing Companies, the Group Headquarters, and the 187th and 188th Medical Battalion Headquarters provided the simulated casualties which were evacuated during the maneuver. Technical Advisors of Director's Headquarters, WVMA, acted as Battalion Surgeons and tagged the casualties.

5. The maneuver consisted of a two-sided problem with one (1) division opposing another division. In each division, two (2) RCTs were committed and in each RCT, two (2) Infantry Battalions were placed on the line. The third RCT in each division was held in reserve until early afternoon and was then committed to relieve the RCT fighting in the Shaver Mountain Area. Thus, all Collecting Companies of the 343d Medical Group were able to participate in the problem.

6. <u>Operating Procedure and Statistics</u>: Since the Battalion Aid Stations were widely separated and the road network very poor, each of the committed Collecting Companies split into two (2) Collecting Company Sections and each operated independently from the Battalion Aid Station to the Clearing Company. Wherever possible 1/4 ton 4 x 4 vehicles equipped with improvised litter racks evacuated the casualties from the Battalion Aid Station to Forward Ambulance Loading Posts. In some cases where vehicular passage was not possible, litter bearer squads carried the casualties to a Collecting Point, from which site the evacuees were transported by low-silhouette vehicles to the Collecting Station. Since a Collecting Company Section supported each Aid Station, Collecting Point installations were not extensively used. In one case, casualties were

Incl. #2

[illegible] by the 1/4 ton 4 x 4 vehicle and transported to a "Warming Station". From this point, litter carry up a steep 850-900 foot hill was necessary and this task was expedited by the use of rope and sleds constructed from litters.

	Cases Treated	Evac	% Evac	Average Time of Evac To Coll Co	To Clr Co
86th Med Bn	151	134	88%	82 min	65 min
187th Med Bn	85	71	83½%	43 min	61 min
188th Med Bn	67	63	94%	125 min	70 min
489th Coll Co	39	33	85%	33 min	77 min
488th Coll Co	46	38	83%	52 min	47 min
488th Coll Co	33	33	100%	60 min	60 min
489th Coll Co	34	30	88%	196 min	80 min

The 487th Coll Co and 490th Coll Co did not arrive in position early enough to evacuate sufficient cases to warrant statistics.

The variations in the time element of evacuation could, in most cases, be attributed to the length and difficulties of the roads leading to the rear. In the case of the 489th Coll Co, the time of 196 min, required to evacuate from the Bn Aid Sta to the Coll Sta, was primarily due to the extremely arduous litter-sled haul up a steep 850-900 foot hill. While awaiting evacuation, the patients were sheltered in a "Warming Station" at the foot of the hill.

7. Deficiencies:

a. Liaison in general very unsatisfactory. Of all units only one section of the 488th Coll Co and the rear echelon liaison of the 188th Med Bn operated satisfactorily.

(1) Operating procedure of dispatching agents to the Bn Surgeons before going into position was not executed.

(2) Liaison agents in general were very vague about their duties regarding contact and the maintenace of communication.

(3) Liaison agents not well informed in orientation and map reading

(4) Liaison agents lacked resourcefulness and initiative in searching out pertinent information and using proper methods in forwarding it to the rear.

b. Small unit control and organization very weak.

(1) Organization of litter squads and the discipline of these squads during operation very weak.

(2) Organization of installations and their duties at these installations not well grasped by the enlisted personnel.

c. Leadership by junior officers and NCOs poor.

(1) Delegation of responsibility weak.

(2) In general, orders lacked force and were vague.

(3) Lack of initiative in expediting a given duty. The officers and NCOs were content to sit back and await developments instead of investigating the delays.

(4) Junior officers and NCOs not well oriented as to progress of maneuver.

(5) Very little evidence of planning by officers and NCOs during problem.

d. Collecting Stations in most of the cases too far to the rear.

(1) Poor planning on the part of some units in the judicial use of ambulances and 1/4 ton 4 x 4 vehicles

(2) Poor liaison and lack of aggressiveness resulted in many Collecting Stations moving too late.

e. Road discipline in general unsatisfactory.

(1) Vehicles assembled too closely together.

(2) Use of cover and concealment occurred only on scattered instances.

(3) Vehicles too slow in leaving roads to enter installations.

(4) Traffic jams and confusion on cross-roads in 2 instances when exposed to enemy fire.

f. Evacuation too slow in the initial phase of the maneuver. There was, however, decided improvement in the speed of evacuation and in the coordination of the participating elements as the problem progressed.

g. Adaptation of the methods of evacuation taught weak.

(1) Knot tieing demonstrated by the litter-bearers poor.

(2) Immobilization of patients on litters poor.

(3) Use of 4 man teams instead of 6 man teams on steep slopes or rough terrain common.

8. <u>Commendations</u>:

a. All drivers of the 343d Med Gp should be highly commended for the degree of proficiency, the alertness, and the care which they demonstrated throughout the maneuvers. The roads were long, rough, and treacherous

but these men negotiated them throughout the problem without a single mishap. They give evidence of fine basic training.

b. The morale and spirit of the enlisted men in general was excellent. They operated over extremely rugged terrain under adverse climatic conditions with unabated enthusiasm and they should be commended for the evacuation accomplished.

c. The 489th Coll Co should be lauded for successfully and expeditiously evacuating 100% of the casualties received. This accomplishment designates an intense interest and a conscientious unfailing endeavor in performing an assigned mission

d. The 489th Coll Co should be commended for the ingenuity shown in the construction of litter-sleds and for the arduous task performed in evacuating 16 casualties up a steep 850-900 foot hill. The execution of this duty indicated a strong morale, an excellent sense of responsibility, and an intense interest in the accomplishment of a duty.

e. The 343d Medical Group was presented with a difficult problem. The unit not only had to contend with the inclemencies of the weather but also had to overcome the obstacles presented by a rugged mountainous terrain in which there was a minimum of negotiable roads and trails. In spite of these handicaps, the Group evacuated 88% of the casualties tagged. This in itself is a praise-worthy accomplishment. The officers and men should be commended for their zeal and cooperation in fulfilling the task assigned to them.

MORRIS HERMAN,
Captain, MC.

JOHN K. MCNEALY, JR,
Captain, MC.

GROUP
FIVE

HEADQUARTERS, 343d MEDICAL GROUP
Office of the Commanding Officer

c/o Postmaster,
Elkins, West Virginia,
8 January 1944.

Subject: Comments on Mountain Training

To : Director, WVMA, Elkins, West Virginia

1. There are attached hereto comments from the 187th and 188th Medical Battalions relative to the training received by these units in the West Virginia Maneuver Area. These comments are concurred in.

2. The following additional comments are made with a view to their consideration in planning for training of similar type organizations in the future:

a. Information to units prior to arrival. Upon arrival in this area this headquarters was presented with a large number of memorandums pertaining to administrative requirements in this area. By the time these had been read, several reports, etc., were past due. If these requirements could be extracted from the memorandums and published as a standing operating procedure for the area, and presented to the units concerned prior to their arrival in the area, the directives therein could be much more effectively and expediciously complied with.

b. Acclimation. The period of training in the area with a base camp prior to going into the mountains was very beneficial to the personnel in that they were able to become acclimated to the weather before being exposed to the more rigorous weather of the mountains.

c. Seneca School. (1) A number of personnel were sent to this school during the training of the units in mountain evacuation. These officers and men missed this important instruction. Since in a medical unit the need for skilled personnel in climbing cliffs is not great, if possible this instruction should be given at a different time from that in mountain evacuation so that all personnel could get this more important experience. Otherwise, a small number should be taken from the unit for the school.

(2) Since the training at the Seneca School is hazardous, some form of recognition for completion of the course would seem appropriate. This would encourage men to complete the course and would tend to increase the confidence and morale among the graduates. A small medal, similar to those for other specialized personnel is considered highly desirable.

COPY RECORD

Incl 2

d. Bivouac. The bivouac on the mountain was both tactical and non-tactical. It is believed that during the winter period a non-tactical bivouac would be much more preferable. The personnel are absent from the area all during the day and return to a blacked-out camp at night, where they are unable to properly dry out their clothing, practice knot tying or any other desirable procedure. Since the objective of their presence in the bivouac is to obtain the maximum amount of special training, everything should be directed toward this objective.

e. Mountain Evacuation Training. (1) The organization for performing this instruction is entirely inadequate for properly handling a unit the size of a Medical Group. It is believed the two medical officers available can properly handle only two Companies at a time. The technical advisors who assisted them were qualified in the general instruction, but not particularly so in the technical procedure involved in mountain evacuation. In many instances one medical instructor endeavored to instruct a Battalion at a time, only a small portion of men could hear or see the instructor and the time was wasted by the remainder.

(2) If some arrangement could be made to give preliminary instruction to officers of the unit concerned, these officers could then more easily take the load of the instruction of their men, leaving the medical technical advisor to prepare demonstrations and supervise.

(3) A pamphlet showing the technique of the evacuation procedure to be demonstrated would be of definite assistance both prior to the instruction and after departure from the area.

f. Field Exercise. The tactical problem gave considerable experience to the units involved. The problem and the critique were of definite value in determining weak points within the units. It is believed that the problem could be improved by making the tactical situation more in accord with the probable movements of combat troops over the actual terrain. It is likely that, due to the difficulties of the terrain, such frequent movements would not have occured under actual conditions. When the movements are made fast, casualties are light whereas when the line is stopped, the casualties are usually greater. It is more likely that only two movements sufficient to require displacement of Collecting Stations would have occured during the period of the problem. This would have given more time for Collecting Units to organize and prepare a proper system of evacuation.

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AC RECORD
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3. The above remarks are made with the object to [illegible] the viewpoint of the unit being trained, and should [illegible] considered criticism in any way. The instruction as [illegible] was excellent and extremely valuable to medical [illegible] units. The instructor personnel were extremely [illegible]cient and cooperative.

/s/ Joe A. Bain,
/t/ JOE A. BAIN,
Colonel, MC,
Commanding.

7

HEADQUARTERS, 187TH MEDICAL BATTALION
Office of Operations and Training

C/o Postmaster
Elkins, W. Virginia
7 January 1944

SUBJECT: Comments on Mountain Training

TO : Director, WVMA, Elkins, West Virginia

THRU : Commanding Officer, 343d Medical Group,
C/o Postmaster, Elkins, West Virginia

1. The training program and its presentation by instructors, both officers and enlisted, was excellent; however the training area was far too small and the individual groups too large to receive the maximum of benefit from the instruction and application.

2. The problem was good, but it is felt that cases or casualties should be placed so as to utilize every method of evacuation taught at the training area; e.g., tree and cliff evacuation.

3. It is believed that a thorough reconnaissance, prior preparation, and coordination between umpires would have added realism and minimized confusion during the problem.

For the Commanding Officer:

s/ Thurmond P Hawkins
t/ THURMOND P HAWKINS
Capt, MAC
S-3

Incl #4

(17)

HEADQUARTERS, 188th MEDICAL BATTALION
Operations and Training Office

West Virginia Maneuver Area
c/o Postmaster, Elkins, W. Va.
7 January 1944

SUBJECT: Report on Mountain Training.

TO : Commanding Officer, 343d Medical Group
c/o Postmaster, Elkins, W. Va.

1. Forwarded herewith comments and observations made during the recent mountain training program which the 188th Medical Battalion completed over the period extending from 27 Dec 43 until 5 Jan 44.

2. The training which this unit received impressed everyone with the practical value of the course. The goal of physical hardening of men was attained and it has given us confidence that we can evacuate patients and take care of ourselves under extremely adverse conditions.

3. a. The schedule of training was carefully prepared. The training was progressive and the daily schedule was interspersed with different phases of training. Demonstrations and practical applications were stressed during the entire training program.

b. Demonstrations could be improved by using more instructors and demonstration teams. In a few instances the attention of the men was lost because they could not see the demonstration or hear the instructor.

c. The space provided for application was not entirely satisfactory. Additional space should be provided if Medical Groups are to be trained in this area.

4. Captain HERMAN and his staff of technical advisors are to be commended highly. They showed a keen interest in their work and were continuously instructing and observing our personnel in the training. All the instructors were very competent and well trained.

5. The tactical problem on 4 Jan 44 was not entirely satisfactory. The tactical situation was such that only in a few instances did the opportunity present itself to utilize the training which the Battalion had just received. The Officers felt that the rapid movement of the front line was inconsistent with the terrain. Signal communication from the Field Director to the Bn Command Post was delayed, due to the difficulty experienced by the operators in decoding and encoding messages. In one case the entire meaning of the message was lost in the above process.

For the Commanding Officer:

/s/ Arthur V. Nixon, Jr,
/t/ ARTHUR V. NIXON, JR,
1st Lt., Med Adm C
S-3

Incl #5

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Authority NND 887559
By NARA Date 7-11-07

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DIRECTOR'S HEADQUARTERS
West Virginia Maneuver Area
XIII Corps

Elkins, West Virginia
15 January 1944

SUBJECT: Training Status Report.

TO : Commanding General, XIII Corps, APO #463, Fort Du Pont, Delaware.

Inclosed herewith are five (5) copies of Training Status Report, 39th Special Service Company.

For the Director:

/s/ L. H. Berning
Major, AGD,
Asst Adj Gen.

1 Incl: Training Status Report, in quintuplet, of 39th Special Service Co.

353 1st Ind. /hmk

HEADQUARTERS XIII CORPS, Fort Du Pont, Delaware 22 JAN 1944

TO: The Director of Training, Army Service Forces, Washington 25, D.C.

For the Commanding General:

H. W. ORCUTT
Captain A.G.D.
Assistant Adjutant General

1 Incl: Training Status Report, in duplicate, of 39th Special Service Company. 3 copies w/drawn

G-3 coordinated

RECEIVED XIII CORPS JAN 22 1944

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Authority NND 887559
By NARA Date 7-11-07

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

RCG/rds

353 (GNMC)

8 February 1944.

SUBJECT: Mountain Training.

TO : Commanding General, 35th Infantry Division, Camp Butner, N.C.

1. General: The 35th Inf Div will be given Mountain Training by Regimental Combat Teams in the West Virginia Maneuver Area during the periods designated in par 2f below.

2. Training:

a. To familiarize individuals with mountainous terrain.

b. To harden troops physically and mentally.

c. To teach individuals and units from the squad to the regiment the technique of tactical operations in mountainous terrain.

d. Control:

Training will be prescribed by headquarters, XIII Corps, and controlled by the Director, WVMA.

e. Assault Climbing School: A selected group of officers and enlisted men from each Combat Team will be trained in assault climbing and mountaineering (Incl 1) and will precede the combat teams by approximately 10 days as indicated in par 2f. The individuals of this group will be returned to their units in time to assist the unit commander in individuals training and to assist the unit in cross-country operations. A roster of this group showing name, rank, ASN, and organization will be delivered to The Director, five (5) days prior to arrival of the group. Direct communication with The Director, XIII Corps Maneuvers, is authorized with references to time and place of reporting detachments for this training.

f. Participating Troops and Schedule: Elements of the Division will proceed to Elkins, West Virginia, and will receive training according to the following tentative schedule. Upon conclusion of training, troops will return to Camp Butner.

	CLOSE IN WVMA	TRAINING DATES (INCLUSIVE)
RCT 134	21 Feb	22 Feb - 7 Mar
Assault Climbing Group	10 Feb	11 Feb - 24 Feb

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	CLOSE IN WVMA	TRAINING DATES (INCLUSIVE)
RCT 137	13 Mar	14 Mar - 28 Mar
35th Rcn Tr		
Assault Climbing Group	2 Mar	3 Mar - 16 Mar
RCT 320	3 Apr	4 Apr - 18 Apr
127th FA Bn		
Assault Climbing Group	23 Mar	24 Mar - 6 Apr

Division Troops, except those that augment the Regimental Combat Teams above, will not be trained in the West Virginia Maneuver Area as a group or team.

3. Supply:

a. A depot for all classes of supply is established at Elkins, W Va.

b. Necessary installations and services will be provided in the Maneuver Area by XIII Corps to support the operations of troops undergoing training, as if such troops were operating in the field as part of an independent unit.

c. Detailed administrative instructions and plans for supply, evacuation, maintenance and communication are published as maneuver memoranda and will be forwarded under separate cover by this headquarters.

d. Each combat team will be required to subsist for three days during the training period on type "C" or type "K" rations, or a combination of both, in lieu of Types A and B.

e. Ammunition:

Ammunition for this training will be drawn after arrival in the Maneuver Area.

4. Movement of Troops:

a. It is directed that you issue the necessary instructions to move the elements of the 35th Inf Div with attached Div Trs from present station to Elkins, West Virginia and return to Camp Butner, NC, upon completion of training in accordance with the schedule in par 2f above. An advance detachment is required for each combat team and is to include the S-3s from the Inf Regt and each Bn and from the FA Bn. A representative from each company and battery is to be sent with the advance detachment. Advance detachment is to precede the main body of troops by forty-eight (48) hours. Direct communication is authorized with The Director, XIII Corps Maneuvers, in this respect.

b. Movements will be by rail and/or motor. Full advantage will be taken of available motor transportation for the movement of individuals and organizational equipment. (Track laying vehicles will be moved by rail).

c. Coordinate rail movements with RTO's at stations of origin. Rail movements, including entrainment and detrainment, under control CG, ASF.

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d. Rations will be taken by each element through and including two (2) days after arrival.

e. Equipment will be taken as directed in par 5 below.

f. Arrange with Post QM's at stations of origin for fuels and lubricants sufficient for the journey on all motor movements.

g. Reports:

(1) Report by wire the strength, method of travel, routes, number of vehicles (where applicable), time and date of departure, expected arrival time, and identity of each movement to the following:

CG's, Third & Fifth SvC
CG, XIII Corps
CO, Camp Butner, NC, or Dir Hq, WVNA, when either agency is at destination.

(2) Report actual arrival times to this headquarters by wire.

(3) Reports will use Greenwich Civil Time and unit designations.

h. Orders issued by you for the movement of these elements to Elkins, West Virginia, and reports of these movements will bear the classification RESTRICTED.

i. Attention directed following:

Sec IV, TM 38-205	Pars 12 & 18, AR 345-800
TC 101, WD, 8 Dec 42	Par 15, AR 345-900
Par 8, AR 55-130	Par 5, AR 40-1080, C3
Par 4, AR 55-145	

j. TDN. FSA 1-3200 P 433 -01, -02, -03, -04, -05, -07, -08 A 0425-24.

5. Clothing and Equipment:

Complete individual clothing and individual and organization equipment as prescribed in appropriate T/BA's, or T/E's will be taken to Maneuver Area.

6. Mail:

Mail address for units undergoing training will continue as the appropriate APO, Camp Butner, NC. You will make arrangements direct with The Director, XIII Corps Maneuvers, as to reshipment of mail from Camp Butner to troops in the Maneuver Area.

7. Motor Vehicle Preparation - Antifreeze:

All motor vehicles going to West Virginia will be prepared to withstand temperatures of 30° (degrees) below zero.

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By NARA Date 7-11-07

8. This directive confirms verbal orders given to Lt Col MADDREY A. SOLOMON, 35th Inf Div, G-3, by Major RAYMOND C. GARDNER, this headquarters, 1645, 4 Feb 44, directing the movement of the initial assault climbing group to WVMA.

By command of Major General PERSONS:

T. F. REEFE
Colonel, AGD
Adjutant General

1 Incl:
Mountain Assault Climbing

DISTRIBUTION:

Each General & Special Staff Section 1
Chief Clerk, AG Section 6
CO, 23d MRU (Mbl) 1
Director, WVMA 2
CG, 35th Inf Div 10

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Authority NND887559
By NARA Date 7-1-

INCLOSURE 1

MOUNTAIN ASSAULT CLIMBING

1. Selection of Personnel:

a. Previous directives from this headquarters have stressed the importance of training in the Mountain Assault Climbing School, Seneca, West Va, and have emphasized the importance of selecting officers and men temperamentally adaptable and physically qualified. These men should be selected on a volunteer basis, within the limitations of allotments to units, prior to making arbitrary assignments. Past records and reports indicate that apparently sufficient importance is not being given to selecting these men, resulting in a large number of replacements and loss of training.

b. Previous experience with other divisions has indicated that the best results are obtained when the following is read to all men prior to the selection of students for this school.

(1) This unit has been directed to detail a number of volunteers to attend the Mountain Assault Climbing School in the WVMA.

(2) This training is not dangerous and the instruction is given in progressive steps as the students become proficient. No one is required to do any climbing for which he is not prepared. No daredevils are desired, just men with average strength and common sense. Those men who have lived in in the country or mountains or who have devoted considerable time to hunting and climbing are better qualified to receive this training. This climbing becomes a sport after you become proficient, and will be enjoyed as thousands of other men have before you.

(3) This training will enable you to take ropes up steep mountain slopes and attach them, enabling the remainder of the unit to ascend and descend the mountain by the use of these ropes. The ability of the units to attain certain terrain heights will depend upon the skill of you few men. Our forces in foreign theaters of operations have already had occasion to use this training.

2. Division Personnel to Receive Mountain Assault Climbing Instructions:

OFFICERS

Division Staff		2
G-2 Section	1	
G-3 Section	1	
Medium Artillery, 155mm How		4
Bn Hq	1 total 1*	
Each Btry	1 total 3**	
Reconnaissance Troop		1

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3 Regimental Combat Teams 99
From each RCT

Regt Hq	1
Regt I&R Plat	1
Inf Bn (each 7)	21
AT Co.	1
Can Co	1
FA Bn	5
Engr Co (atchd)	1
Bn Med Sec (atchd)	1
Coll Co (atchd)	1
	33

Total from Division 106

ENLISTED MEN

Medium Artillery 19
Bn 155mm How (Opr & Comm Plats) . . . 7, total 7
(1 Surv & Instr Sgt, 2 Surv & Instr Men,
2 rad oprs, 2 wiremen & tel oprs)
Btry 155mm How (Btry detail) . . . . . 4, total 12
(1 NCO, 1 rad opr, 1 wireman and tel opr,
1 Surv & Instr Man)

Reconnaissance Troops 12
Scout Car Section (each 4)

3 Regimental Combat Teams 615
From each RCT

Regt I&R Plat	10
Rifle Co (each 10)	90#
Hv Wpns Co (each 10)	30
Can Co	5
AT Co	5
Bn 105mm How, Hq & Hq Btry (Oprs & Comm Plats)(2 rad oprs 2 wiremen & tel oprs, 1 surv & instr sgt, 3 surv & instr men)	8
Btry 105mm How (Btry detail) (each 4)(1 NCO, 1 rad opr, 1 wireman & tel opr, 1 surv & instr man)	12
Engr Co	10
Bn Med Sec	20
Coll Co	15
	205

Total from Division 646

* Bn S-2, Asst S-2 or Liaison Officer
** BC, RO or Exec
\# Should be scouts or equivalent in training.

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Authority NND 887559
By NARA Date 7-11-07

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HEADQUARTERS XIII CORPS
Fort Du Pont, Delaware

SUBJECT: Operation of GQ-2A Radio Controlled Targets.

TO : Commanding General, Army Ground Forces, Washington 25, D. C. (Attention: A. C. of S., G-3).

1. This report covers the period from 1 December (Month) 1943 to 1 January (Month) 1944 at West Virginia Maneuver Area, West Va., (Crew #6) (Post, Camp or Station)

2. Total number of hours targets were in the air for antiaircraft firing. 1 hour, 8 minutes.

3. Number of rounds of ammunition fired at targets during period reported on - classified by type of ammunition.

15,500 rounds of .30 caliber
22,000 rounds of .50 caliber

4. Number of targets actually shot down per month 6.

5. Average number of rounds fired at each target shot down 6,250.

6. General description of training activities involving use of these targets, including types of organizations and weapons involved.

Antiaircraft machine gun firing was conducted on machine guns caliber .50 and caliber .30 on tank destroyer and M-32 truck mounts. The following units fired at these targets:

628th Tank Destroyer Bn.
561st QM Railhead Co.
204th Ordnance MM Co.

7. Name, rank, serial number of Officer Controller.

ALFRED A. ZIEGS, 2nd Lt., Inf., 01017035

8. Total number of days during the month when at least two (2) targets were not available for operation None.

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9. General remarks on operating condition of equipment.

The area in which the targets were flown has an altitude of 3200 feet. The Officer Controller reports that due to this high altitude and windy and foggy trend of the weather some of the targets were crashed or grounded through no fault of the team and that the targets will rise to about 500 feet but it is hard to get them higher, particularly on windy days. Six (6) targets were shot down. This high casuality rate was due in part to the slower speed of the targets under these adverse conditions.

For the Commanding General:

1415. Subj: West Virginia Maneuver Training, XIII Corps

Col. J. F. Williams (Sp Projects) furnishes schedule activity XIII Corps training in W. Va. maneuver area:

Schedule of combat teams of 31st

167th is completed. 14 Sep - 27 Sep, incl
154th is completing, 28 Sep - 11 Oct 43.
155th -- 29 Oct - 11 Nov 43.

Schedule of combat teams of 77th

306th fr 13 Oct - 22 Oct 43 (will not interfere w/rifle marksmanship)
305th fr 20 Nov - 3 Dec 43.
307th fr 20 Dec - 2 Jan 44.

CUSHING/wrb/26 Oct 43

HEADQUARTERS ARMY GROUND FORCES

MEMO SLIP

File No:
Subject:

From	To	Date	Memoranda - Use full width if lengthy
G-3 Misc	G-3	6 May	**West Virginia Maneuver Area - Scheduled Training**
			(95 Inf Div 1 May - 1 July 1944)
			1. CT 378 3-18 May 1944
			1-7 May Small unit training.
			8 May Company and battery problems.
			9 May Company and battery problems. Platoon firing tests.
			10 May Bn CT Problem starts at 1300.
			11 May Bn CT Problem (continued)
			12 May Bn CT Problem ends at 1000. Critique at 1600.
			13 May RCT#1 starts at 0900.
			14 May Start crossing Blackwater Canyon at dark.
			15 May RCT#1 ends at 1000 followed immediately by RCT#2.
			16 May RCT#2
			17 May RCT#2 to include combat firing from 0800 to 1300. RCT#2 ends at 1300.
			18-23 May Mule School. Rock Climbing School.
			2. CT 379 23 May - 7 June
			Same cycle as above for CT 378 with minor changes to be announced. Combat firing: 6 June 0800-1300.

For inter-office use only - please use reverse side

AGF FORM NO. 2

(over)

DECLASSIFIED
Authority NND 730029
By AB NARA Date 9/26/02

MOVEMENT, ASSIGNMENT
and

ACTIVATION ORDERS

of

TANK DESTROYER UNITS

LT COL J. LEMP

CLASSIFIED
By NND 730029
NARA Date 9/26/02

RESTRICTED TD Br

HEADQUARTERS, ARMY GROUND FORCES
Army War College
Washington 25, D.C.

370.5/55(TD)(R)(28 Nov 43)GNGCT 28 November 1943.

SUBJECT: Transfer of 628th Tank Destroyer Battalion.

TO: Commanding General, XIII Corps.

1. It is desired that you issue necessary instructions to transfer 628th Tank Destroyer Battalion from temporary station in West Virginia Maneuver Area (permanent station, Camp Pickett, Virginia) to Fort Dix, New Jersey. Movement will be made on or about 5 December 1943.

2. This is a PERMANENT change of station.

3. Details of movement will be governed by Circular No. 102, WD, 1943, as amended by Section IV, Circular No. 189, WD, 1943, and letter, Hq AGF, 370.5/234 (R)(3 Sep 43)GNGCT, 3 September 1943, Subject: "Instructions Governing Domestic Troop Movements."

By command of LT. GEN. McNAIR:

J. R. DRYDEN,
Lt. Col., A.G.D.,
Ass't Ground Adjutant General.

DISTRIBUTION:
"A" & "H"

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Authority NND 735017
By SF NARA Date 7/10/07

UNIT JOURNAL

UNIT Division Ordnance Office FROM July 23, 1943

LOCATION Camp Pickett, Va. TO 1200 July 24, 1943

IN	OUT	SER. NO.	TIME ORIG.	INCIDENTS, MSGS., ORDERS, REPORTS	DISPOSITION
				July 23	
		1		Maj Nida attended conference of XIII Corps Ordnance personnel, XIII Corps Hq, Dupont, Del. A discussion of West Virginia maneuvers disclosed that the 3468th Ordnance Co would be at Elkins, W. Va., in the CCC Camp. Maj Bowman would be the Ordnance Officer and Director Hq at Elkins, W. Va. They will be the re-supply and the 3rd & 4th echelon maintenance support for the 728th Ord Co contact party. All T/BA equipment and spare parts will be taken to maneuver area. A general discussion on supply then proceeded and the fact was brought out that a great shortage of Ordnance spare parts existed at this time due to overseas shipments and it was emphasized that we must use every effort to conserve spare parts and supply. The 258th Ord Co is to be transferred to Pickett to enter on amphibious training. Ammunition was then discussed generally and the fact of what ammunition would be used in maneuver area had not as yet been finally determined. Capt. Camp, XIII Corps Munitions Officer will notify Maj Nida Monday 26 July of final determination.	
				July 24	
	1100	2		Made spot check 11 vehicles 229th FA.	Condition of vehicles found satisfactory
	1200	3		Prepared weekly ammunition report for XIII Corps.	Report submitted thru G-4

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Authority NND 735017
By SF NARA Date 7/10/07

UNIT JOURNAL

UNIT Division Ordnance Office FROM 0830 July 26, 1943

LOCATION Camp Pickett, Va. TO 1500 July 28, 1943

IN	OUT	SER. NO.	TIME ORIG.	INCIDENTS, MSGS., ORDERS, REPORTS	DISPOSITION
				July 26	
0830		4		Telephone conversation Maj Nida and Capt Camp XIII Corps Munitions Officer: According to orders of XIII Corps, each combat team will take into the maneuver area to be turned over to ammunition dump at Elkins, W. Va., the following ammunition: 201 rds, shell, HE, 105-mm, M1,w/fuze M48 60 rds, shell, HE, 105-mm, M1,w/fuze M54 99 rds, shell, HE, 105-mm, M1, 105, M3 162 rds, shell, HE, 81-mm, Mortar 36,000 rds, cal..30, ball 60,000 rds, cal..30, blank The first combat team will take in addition, 99,000 rds cal..30, ball. The medium artillery will take 249 rds complete, 155-mm how. 1,500 mines, AT, will be taken and placed in magazine.	- - - - - - -
				July 27	
1900		5		Held meeting with all Munitions Officers 28th Div. Discussed the handling of ammunition in the maneuver area and the importance of rendering proper reports.	- - - - - - -
				July 28	
	0730	6		Capt. Graham departed with detachment of Ordnance personnel for maneuver area.	- - - - - - -
1100		7		Orders received from XIII Corps to turn in excess Ordnance Equipment to 344th Ord Co as a result of re-organization of AT Co & Ord Co under new T/E.	This is being done.
1300		8		Made spot check 12 vehicles 103rd Engr.	Vehicles found in satisfactory condition.
1500		9		Made spot check 6 vehicles Q M Co.	Satisfactory.

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Authority NND 735017
By SF NARA Date 7/10/07

UNIT JOURNAL

UNIT Division Ordnance Officer FROM 1915, 31 August 1943.

LOCATION Camp Pickett, Virginia TO 1330, 3 September 1943

IN	OUT	SER. NO.	TIME ORIG.	INCIDENTS, MSGS., ORDERS, REPORTS	DISPOSITION
				31 August	
	1915	8		Maj Nida attended meeting called by Chief of Staff.	- - - - - -
				1 September	
	1330	9		Maj Nida attended meeting of General Courts-Martial.	- - - - - -
1630		10		Telephone conversation Maj Nida and Capt Camp, Munitions Officer, XIII Corps. Capt. Camp advised that 45,000 rds cal..45, ball, has been allotted to this Division. Capt. Camp requested that we locate all clover leaves that we can and notify 186th Ordnance so that they can take them to West Virginia Maneuver Area.	After thorough check of the Division found no clover leaves on hand. They had been turned in to Post.
				2 September	
	1300	11		Submitted Original List of Shortages for Ordnance Equipment, based on movement order, for units of the 28th Division, to G-4.	- - - - - - -
				3 September	
	1330	12		Maj Nida attended meeting of the General Courts-Martial.	- - - - - - -

1943

MAY - 1943

JUNE - 1943

JULY - 1943

AUGUST - 1943

SEPTEMBER - 1943

OCTOBER - 1943

NOVEMBER - 1943

DECEMBER - 1943

JANUARY - 1944

FEBRUARY - 1944

MARCH - 1944

APRIL - 1944

MAY - 1944

JUNE - 1944

JULY - 1944

AUGUST - 1944

SEPTEMBER - 1944

DESERT TRAINING CENTER
NO. 2
CALIFORNIA
19 Apr 43 - 17 Jul 43
IX CORPS
7 Armd Div
8 Mtz Div
33 Inf Div
77 Inf Div

SECOND ARMY
NO. 1
TENNESSEE
26 Apr 43 - 20 Jun 43
VII CORPS
5 Armd Div
79 Inf Div
81 Inf Div
101 A/B Div

THIRD ARMY
NO. 2
LOUISIANA
12 Apr 43 - 6 Jun 43
85 Inf Div
93 Inf Div

SECOND ARMY
NO. 2
TENNESSEE
5 Jul 43 - 23 Aug 43
III CORPS
10 Armd Div
80 Inf Div
83 Inf Div

THIRD ARMY
NO. 3
LOUISIANA
28 Jun 43 - 23 Aug 43
X CORPS
III ARMD CORPS(XIX CORPS)
11 Armd Div
31 Inf Div
88 Inf Div
95 Inf Div

AIRBORNE COMMAND
Alliance, Nebraska
1 Aug 43 - 15 Aug 43
1 A/B Brig

XIII CORPS
WEST VIRGINIA AND NORFOLK
2 Aug 43 to 30 Sep 43
20 Inf Div

DESERT TRAINING CENTER
NO. 3
CALIFORNIA
9 Jul 43 to 18 Oct 43
XV CORPS
9 Armd Div
85 Inf Div

DESERT TRAINING CENTER
NO. 3
CALIFORNIA
6 Aug 43 to 13 Nov 43
XV CORPS,
79 Inf Div
81 Inf Div

DESERT TRAINING CENTER
NO. 3
CALIFORNIA
13 Sep 43 to 13 Dec 43
XV CORPS
90 Inf Div
93 Inf Div

SECOND ARMY
NO. 3
TENNESSEE
13 Sep 43 - 8 Nov 43
IV ARMD CORPS (XX CORPS)
12 Armd Div
30 Inf Div
94 Inf Div
98 Inf Div

THIRD ARMY
NO. 4
LOUISIANA
20 Sep 43 - 15 Nov 43
VIII CORPS
84 Inf Div
99 Inf Div
102 Inf Div
103 Inf Div

IV CORPS
NO. 1
OREGON
13 Sep 43 - 8 Nov 43
91 Inf Div
96 Inf Div
104 Inf Div

XIII CORPS
WEST VIRGINIA AND NORFOLK
15 Oct 43 to 2 Jan 44
77 Inf Div

DESERT TRAINING CENTER
NO. 4
1 Nov 43 to 29 Jan 44
IV CORPS
11 Armd Div
95 Inf Div

DESERT TRAINING CENTER
NO. 4
CALIFORNIA
6 Dec 43 to 6 Mar 44
X CORPS
IV CORPS
80 Inf Div
104 Inf Div

SECOND ARMY
NO. 4
TENNESSEE
22 Nov 43 - 17 Jan 44
XI CORPS
14 Armd Div
35 Inf Div
87 Inf Div
100 Inf Div

THIRD ARMY
NO. 5
LOUISIANA
29 Nov 43 - 24 Jan 44
IX CORPS
9 Armd Div
86 Inf Div
97 Inf Div
89 Inf Div
(4)

AB-T/C Comd, Carolina
6-10 Dec 43, 11,17 AB Divs
53 TC Wing, 436,437 TC Ops
438, 439

AB-T/C Comd, Carolina
5-10 Jan 44
17 AB Div, 60 TC Wing,
438,439,440,441 TC Ops

AMPHIBIOUS TRAINING
San Luis Obispo
CALIFORNIA
1 Dec 43 to 1 May 44
81 Inf Div

SECOND ARMY
NO. 5
TENNESSEE
31 Jan 44 - 27 Mar 44
XII CORPS
XXII CORPS
17 A/B Div
26 Inf Div
78 Inf Div
106 Inf Div

FOURTH ARMY
NO. 6
LOUISIANA
7 Feb 44 - 3 Apr 44
XVIII CORPS
8 Armd Div
44 Inf Div
75 Inf Div
92 Inf Div

MOUNTAIN TRAINING
WEST VIRGINIA MANEUVER AREA
21 Feb 44 - 28 Mar 44
35 Inf Div

III CORPS
NO. 1
Hunter Liggett Mil Resv
CALIFORNIA
25 Feb 44 to 21 Apr 44
71 L Div
89 L Div

MOUNTAIN TRAINING
WEST VIRGINIA MANEUVER AREA
1 May 44 - 1 Jul 44
95 Inf Div

13 APR

NOTES FOR CONFERENCE AT AGF

RE: WVMA TRAINING AND OVERHEAD

1. Projected Training Objectives.

a. Assault Climbing School:
For selected personnel
14 days duration

b. Operations of Pack Unit:
For selected personnel
Approximately 10 days

c. Training of unit for period of 15 days.

2. Size of Assault Climbing School, Pack Unit Group and size of unit trained.

a. Assault Climbing School:
Group consists of approximately 350 officers and enlisted men selected from all units of the CT.
Precedes CT 15 days.
Available to unit first day of training.

b. Operations of Pack Unit:
4 men per company (Btry) CT.
Precedes CT approximately 10 days.
Available to unit first day of training.

c. At present and in the past one CT has been the training unit.

3. a. Assault Mountain Training Unit.

(1) The number of trained mountain specialists operating this school at present: 4 officers, 75 enlisted men.

(2) The addition of an experienced officer for administration (personnel, housing, and messing is desirable) See par 6 a (13).

(3) Increase is necessary if training group is increased, i.e., more than one CT (3 times for division).

b. Operation of Pack Unit.

(1) This unit is the 254th Pack Troop: 2 officers, 78 enlisted men, 301 animals. (One VC Officer is considered necessary).

Authority NND 730099
By JJ NARA Date 12/18/03

c. Unit Training:

(1) The direction of the training from plans to completion of series of exercises:

1 Training Officer
1 Asst Training Officer
23 Officers -- Tactical Advisors -- (See pars 4 c and 6 below).

4. Overhead, administration:

a. Director or Commanding Officer.

b. S-1, Adjutant, Comdr Hq Co, Prov, Agent FO.

c. S-3, all training to include supervision of training of units other than CT.

d. S-4:

(1) Normal supply and equipment, all units other than CT.

(2) Operation of supply and renovation of all mountain clothing.

(3) Issue and return of all mountain clothing and equipment to CT personnel.

(4) Operation of normal supply installations serving CT throughout entire stay in WVMA.

5. Service Troops:

a. Engineer Units: One (1) Engineer C Bn.

b. Quartermaster Units:

1 QM Bn: Hq & Hq Det
2 QM Trk Co's
1 QM Ldry Co
1 QM Depot Co

c. Medical Unit: One (1) Clearing Co (One (1) Bn for adm & tng).

d. Ordnance Units:

1 Ord Bn: Hq & Hq Det
1 Ord M Auto Maint Co
1 Plat, Ord Am Co

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By JB NARA Date 12/10/03

e. Signal Unit: One (1) Signal Det (Approximately 60 men) to operate and maintain the existing communication systems of WVMA. (Arr 25 Mar).

f. Hq Co, Prov: To contain not to exceed 3 officers (Lts). To be commanded by S-1 and consist of clerks, enlisted men with Assault Climbing School, chauffeurs and maintenance personnel, military police; with mess and supply personnel, and facilities for officer and enlisted messes.

6. Summary:

a. Officers (Exclusive of Assault Climbing School and Technical advisors):

(1)	Commanding Officer	Colonel
(2)	S-1, Adjutant, Comdr Hq Co, Agent FO	Major
(3)	Asst Adjutant, Lt Hq Co (Prov)	Lt
(4)	S-3, all training (See par 3 c)	Lt Col
(5)	Asst S-3 (See par 3 c)	Major
(6)	S-4	Major
(7)	Engineer Officer	Senior Present
(8)	Medical Officer	Senior Present
(9)	Ordnance Officer	Senior Present
(10)	Signal Officer	Senior Present
(11)	VC Officer	Captain
(12)	1 Lt, Hq Co, Mess & Adm Officer, Assault Climbing School (See par 3 a (2).	

b. (1) Assault Climbing School: 4 officers, 75 enlisted men.

(2) Technical Advisors: 23 Officers.

c. The enlisted complement to implement the activities of CO, WVMA: The present T/O with modifications.

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Authority NND 763029
By NARA Date 12/12/03

DECLASSIFIED
Authority NND 803119
By NS NARA Date 7-10-07

Rewritten LWT/hmk/287

file

23NOV 1943

23NOV 1943

SUBJECT: Visit to West Virginia Maneuver Area, 9-14 November 1943.

TO: Commanding General, XIII Corps, Fort Dupont, Delaware.

1. An officer from this headquarters visited West Virginia Maneuver Area 9-14 November 1943 to observe the Seneca School Detachment and the field exercises of the 155th Infantry Regiment and the 116th Field Artillery Battalion. The following comments are made constructively for your information and such action as you desire.

2. Command and Staff. The command post of the 155th Infantry Regiment was concealed well and vehicles in the vicinity were dispersed properly.

3. Infantry.

a. Aggressive night patrolling by the 1st Bn Combat Team, 155th Inf, with Btry A, 116th FA Bn, attached (Blue), determined the location of the Red Team B at 120730. Contact once gained was maintained until the completion of the problem at 131130. Officers and men were alert, knew the situation, and acted intelligently upon information gained from the enemy.

b. The 1st Plat, Antitank Company, and the 1st Plat, Cannon Company, had grouped their guns together in the same locality at 121030.

c. Red Team A, opposing 1st Bn Combat Team (Blue), defended its position in an excellent manner. Patrols were active during the night of 12-13 November 1943, withdrawals were made in an orderly manner, fox holes were dug continuously during the withdrawal.

d. 2d Bn Combat Team, 155th Inf (Blue) did not gain contact with Red Team A until 121420. Patrolling by the personnel of this combat team was neither aggressive nor thorough. Vehicles were jammed on a narrow trail and vulnerable to air attack at 121430.

e. The 3d Bn, 155th Inf was engaged in small unit training. A company in the attack problem was carried out by Co K in a satisfactory manner at 101030.

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Authority NND 803119
By MS NARA Date 7-10-09

3. Company commanders of Cos I, K, and L considered the two 2-hour periods of instruction in assault climbing extremely valuable.

4. Artillery.

a. Battery A, 116th FA (Blue) occupied an exposed position on the crest of a hill one mile north of Sully. There was little concealment. Artillery fires of this battery were marked, 121050.

b. Battery B, 116th FA was supporting the attack of the 2d Bn Combat Team (Blue) from a position 10,000 yards in rear of the front line. This battery had some concealment from leafless trees but the intervals between guns varied from 8 to 12 yards. No survey had been made. Basic data for simulated concentrations were obtained from an uncontrolled mosiac.

c. Battery C, 116th FA, supporting Red Team B, was in a position 3,000 yards north of Jennington at 130930. Guns, although camouflaged, were only 8 to 12 yards apart. Trail spades were not dug in; however, fox holes of gun crews were dug. The Battery CP was located in a command and reconnaissance truck 40 yards in front, and slightly to the right, of the battery position. Battery had registered and fired three missions at 120945.

5. Engineers. The construction of a 120-foot section of Bailey Bridge over Blackwater Creek was conducted efficiently by Co B, 106th Engr Bn, 101300-101400.

6. Supply and Evacuation. The practice of permitting the commanding officer, 27th Evacuation Hospital, to send 20 EM to the school for training in evacuation in the mountains is commendable.

7. Seneca Detachment.

a. The instruction of the Seneca Detachment was conducted efficiently in cold and inclement weather, 091300 - 091645.

b. Inspection of mess arrangements revealed a shortage of competent personnel in the kitchen of this Detachment, 091700.

c. Three days of tactical piton instruction in the assault school have been eliminated and three days of tactical problems involving practical application of free climbing have been substituted.

d. The Champe Rock Area of the Seneca Detachment is more protected from wind and weather than the Seneca Rock Area. It is believed that tactical instruction can be continued in this area until 10 January 1944.

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Authority NND 803119
By NS NARA Date 7-10-07

[illegible] Mr. Smith [illegible] is rendering valuable [illegible] by drying waterproofed sleeping bags and sleeping bag covers.

By command of LT. GEN. McNAIR:

DISPATCHED
AGF DIST. CTR. 23 NOV PM

(Signed) J. G. CHRISTIANSEN
J. G. CHRISTIANSEN,
Brig. Gen., G.S.C.,
Chief of Staff.

Copies sent to
Engineer
Signal
Chemical
Ordnance
Quartermaster

DECLASSIFIED
Authority NND 803119
By NS NARA Date 7-10-09

JACKMAN/ghs/474
34

W. Va

354.2(Observers 43)(13 NOV 194)GNGCT 83/10530

SUBJECT: Observations During Visit to West Virginia Maneuver Area, 25 October 1943.

TO: Commanding General, XIII Corps, Fort Dupont, Delaware.

1. Officers from this headquarters visited the West Virginia Maneuver Area, 25 October 1943, to observe RCT Exercise No. 2, conducted by the 306th Infantry Regiment and the 304th Field Artillery Battalion, 77th Division. The exercise was cancelled because of lack of visibility. However, the positions occupied by units were inspected. The following comments are made constructively for your information and such action as you may desire.

2. The 306th Infantry Regiment.

a. Attached mortar and machine gun personnel from Company "M", 306th Infantry were bunched in the lee of a rock at the CP of Company "K". No officer was in evidence. Questioning of the senior non-commissioned officer of Company "K" revealed that he did not know the situation. (250945).

b. A heavy machine gun of Company "M", 306th Infantry was sitting in the open about 50 yards in rear of the line of departure. There was no cover nor concealment for gun or personnel. The squad leader was not present and the gunner had only a vague idea of the situation and his mission. (251000).

c. Men of Company "I" and Company "K" on line of departure were in groups and in many instances were standing up. While the fog and snow storm offered some concealment, their disposition and action made them vulnerable to an alert enemy. (251010).

d. Questioning of non-commissioned officers and men of the 3rd Battalion, 306th Infantry, indicated that the junior officers had not explained the situation fully to their men. (251030).

e. One gun of the Antitank Company, 306th Infantry, near Field Director's Headquarters, was well camouflaged, but equipment scattered nearby revealed the position. The muzzle of the gun was full of snow and ice. No attempt had been made to provide protection by means of shelter halves or muzzle cover. Men were huddled around a fire about 30 feet to the left of the

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(Ltr to CG, XIII Corps, dtd file 354.2(Observers 43)GNGCT, subj: Observations During Visit to W. Va. Maneuver Area, 25 Oct 43 - continued).

gun position. (251035).

3. The 304th Field Artillery Battalion. Batteries "A", "B", and "C" of the 304th Field Artillery Battalion were in position approximately 1700 yards in rear of line of departure. (251100-251130). The guns had been well emplaced and dug in; slit trenches were well constructed. Alternate positions had been prepared and surveyed. Registration had been completed the night before during a period of visibility. Questioning revealed that the artillery officers knew the situation and answered questions intelligently. Men and materiel presented an appearance of efficient neatness within the limitations imposed by snow and mud.

4. Miscellaneous. The graduation problem at the Assault Climbing School (Seneca Detachment) was carried out in an excellent manner. Maximum advantage was taken of concealed and covered routes of approach in the assault of the cliff.

By command of LT. GEN. McNAIR:

10 NOV 1943

A. MEREDITH
Major, A.G.D
Asst. Ground Adj. Gen.

13 NOV 1943

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G. G. F. DISTRIBUTION CENTER

Appd by CG, AGF 13 NOV 1943

G-40

REPRODUCED AT THE NATIONAL ARCHIVES

RG 407, Entry 427, Box 13925
95th Inf. Div, WWII Ops Reports 40-48

Breakdown and additions to Detailed Schedule and TM #6, for 1st Bn
Additions and Changes as below. All other instruction to be followed as in Schedule and TM #6.

Date and Hour	Place	Subject	Uniform and Equipment	Instructor	Personnel to Attend.	Remarks
Mon 12 Jun:						
1230-1700	Gladwin Rocks	Rock Climbing, stream crossing expedients	All climbing ropes, leggins, GI Shoes w/rubber soles, belt, canteen, raincoat, rucksack, packboard, Ind Arms	Capt Duncan and Sgt Teichner	D Co and Wpns Secs R Cos.	(D), (PW)
1900-2000	Bn Area near TA Tent	Knot tying, Packboard Instruction	All Bn packboards w/5 gal water cans am chests, full "C" Ration cases, MGs, Mortars, sleeping bags in cover, ¼" rope	Capt Duncan & Staff	All Officers & NCOs	(D), (PW)
Tues 13 Jun:						
0700-1000	Gladwin Rocks	Rock Climbing	Same as 1230-1700 Period On Monday	Sgt Teichner and Officers and NCOs	A & B Cos	(D), (PW) Entruck at 1st Bn Sign by 0715
1000-1130	Gladwin Rocks to Bivouac Area	Mt Marching	" " " " " " "	Officers & NCOs	A & B Cos	(PW)
1230-1700	Bn Area near TA Tent	Knot tying and Packboard Inst. Range Estimation	¼" rope, Packboards, 5 gal water cans am chests, full "C" ration cases, sleeping bag in cover, all MGs, Mortars, Individual arms, w/notebook and pencil.	Capt Duncan, Officers & NCOs	A & B Cos	(D), (PW)
0700-1130	Bn Area near TA Tent	" " " "	" " " " " " "	" " " "	C & D Cos	(D), (PW)
1230-1500	Gladwin Rocks	Rock Climbing	Same as for A & B Cos	Sgt Teichner and Officers and NCOs	C & D Cos	(D), (PW) Entruck at 1st Bn sign by 1230.
1500-1700	Gladwin Rocks to Bivouac Area	Mt Marching	Same as for A & B Cos	Officers & NCOs	C & D Cos	(PW)
1900-2000	Bn Area near TA Tent	Use of Equipment	Notebook and pencil	Capt Duncan	Entire Bn	(C), (D)
Wed 14 Jun:						
0700-1130	Jenningston Rocks	Mt marching, Rock Climbing	Same as Tues with all wpns and arms	Officers & NCOs	A, B, C Cos less Wpns Plats.	(PW) Hot Lunch at Jenninston R
1230-1330	" " " "	Piton Belays, Tension climbing, haul-lines	" " " " " " " "	Capt Watson	" " "	(D)

Date and Hour	Place	Subject	Uniform and Equipment	Instructor	Personnel to Attend.	Remarks
Wed Jun 14 Cont'd.						
1330-1530	Laurel Fork River	Stream crossing expedients	Same as Tuesday with all wpns and arms	Capt Duncan & Staff	A,B, C Cos less Wpns Plats	(D)
1530-1700	Laurel Fork to Bn Bivouac Area	Squad Problems	" " " " " " "	Officers & NCOs	" " "	(PW)
1900-2000	Bn Area near TA Tent	Mt march and Trail discipline. Critique of Wpns firing	Notebooks and pencils	Capt Duncan & Staff	Entire Bn	(C)
Thur Jun 15						
0700-1130	Jenningston Rocks	Mt marching and rock climbing	Same as for Rifle Cos Tues and Wed.	Officers & NCOs	"D" Co	(D), (PW)
1230-1700	Sully Area	Selection and occupation of positions	As desired by Co CO	Officers & NCOs	"D" Co	(PW)
Sat Jun 17						
0700------	Brown Mt	Co CT Firing exercises	Fatigues, leggins, Helmets, belts, canteens, All Arms, ammunition, extra water, rucksacks a/o packboards. Cold pack lunch.	Co COs	A, B, C Cos with Hvy Wpns attached	(PW) Companies after hot breakfast in field, entruck at Big Run on Jenningston-Red Cr Rd by 0700
Sun Jun 18	TA Tent	Umpiring Instruction	Notebooks and pencils	Capt Duncan	All Officers & NCOs designated Umpires For BCT & RCT Maneuvers	(C)

File: 395-Inf (377) 0.20
Misc. Hist. Info 377th Inf Reg 95th Inf Div
Source: RG 407 Entry 427 Box #13925 1943-45

Maneuver Training Schedule

Inf Reg 377th (3rd period ~~[illegible]~~ June 15-28) [illegible] 7
" 378th (1st period - May 1-20) [illegible] 8
379th (2nd period - May 21-June 9) [illegible]
920th Field art. BN (period 3) depart June 7 fr WVMA
358th " " " (period 1)
359th " " " (period 2) depart May 18 fr WVMA
360th " " " (period 2) " " " " "
320th Engineer BN Co. B 1st period
Co C 2nd period
Co. A 3rd period
320th Med. BN Co. B + Platoon Clearing Co. (period 1)
Co. C " " " " (period 2)
Co. A " " " " (period 3)
95th Recon Tk (period 3)
Service Units

RG 407, ENTRY 427, BOX 13925
95th INF. DIV, WWII OPS Reports 40-48

Special Projects Branch,
Training Division,
G-3 Section,
14 April 1944.

MEMORANDUM FOR GENERAL DONOVAN:

Subject: Schedule of Training Activities in WVMA for Units of the 95th Division.

1. The schedule of training activities in the West Virginia Maneuver Area is as listed below for units of the 95th Division.

	SENECA ROCK CLIMBING SCHOOL AND PACK ANIMAL SCHOOL		REGT. COMBAT TEAM	
UNIT	AR.	LV.	AR.	LV.
378 Inf	18 Apr	1 May	3 May	18 May
379 Inf	8 May	21 May	23 May	7 June
377 Inf	28 May	10 June	12 June	27 June

R. L. COOK

9

G-41

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Authority NND 730097
By [illegible] NARA Date 12/19/03

377-INF(305)-0.7 Jnl & file 77thInf Div 28...30 Nov 43

305th Inf Rgt

Training WVMA(West Va Maneuver area)

427

RG 407 Entry 427 Box 11669

G-42

[redacted]

UNIT JOURNAL

FROM _____ Date and hour

TO _____ Date and hour

JOURNAL

ORGANIZATION _____

PLACE WVMA

	FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
36	S-3 305	CO 2Bn		2000		1945	Scheme working as planned. Siege & fixed blocks as indicated. Alert Command for Red with arrival.	
37	G-O 305	CO "		1055		1055	Overlay showing location 305 CT and enemy information at 10	
38	S-3 305	CO 305	1108			1106	Seagrave reports Jelly attacking last high ground west of Red Creek. I will verify	
39	Lufler	CO 305	1108			1015	1st platoon of C&C and 1 AT gun wiped out. We proceeding on objective - overlay following	
40	CO 305 S-3	CO 2Bn	1075			1010	Issue & expend all blank ammunition immediately meeting enemy resistance in vicinity of [illegible] moving up 3x do not expect to be held up very long.	
41	2Bn	CO 305	1135					
						1230	Established Forward C.P. at 12 30 11/20/43	
42	S2 305	CO 305	1255			✓	Overlay from S2 2nd Bn	
43	CO CAT	CO 305	1320			1155	Enemy platoon Farr School Road. Jelly attacking two enemy platoons 45.7-641 and 45.9643. No contact 3d Bn.	
44	2Bn	CO 305	1320			1230	Captured 3 ambulances, AT gun and 3 jeeps we are continuing to advance.	
45	2Bn	CO 305	1325			✓	Problem is over at 1245 — Col Morrison	
46	S-3 305	CO 305	1325			✓	Problem #1 called off 1245.	

Problem terminated at 1305. Moved CP at 1400.

UNIT JOURNAL

JOURNAL

ORGANIZATION _____

PLACE _____

FROM _____
Date and hour

TO _____
Date and hour

FROM	TO	TIME IN	TIME OUT	SER NO	FILE DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
47 CO 305	CO 77		1705		✓	Overlay at end of problem	

UNIT JOURNAL

JOURNAL

ORGANIZATION _____

PLACE _____

FROM _____ Date and hour

TO _____ Date and hour

FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
8 Col Adair	CO 305	0935			0910	We have crossed Bruce Fork 0910	
		1030				Col Hunt + Harrison visited Rgt CP. Left at 1100	
9 Co 2nd Bn	CO 305	1120			0915	Present location Ridge + Advanced Ridge 3	
10		1100			1130	Now Crossing Rich Mt. Col. Adair	
11 CO 305 S-2	CO 77th		1200		1130	Blue crossed Bay fork (38.75-65.7) 0745. No red contact. Strong red positions, estimated one company at Jenkins Gap (Watch overlay)	
12 Col Adair	Co 305	1315			1315	Resting just West of Bay Fork.	
13 CO 305 S-3	CO 77th		1335		1330	Blue CP at 38.7-65.8 Blue act guard (40.5-66.4) at 1200 two red contact. White crossing rid at at 1130, No red contact. Estimate 1 red company at Jenkins Gap	
14 Col Hunt	Co 77		1432		1430	Overlay showing adv of 305 CT + Enemy Information	At 1400
						Col Conner visited S-3 Rgt at 1500	
15 CO 305	Col Hunt				1600	Are Kitchens to be released tonight?	

UNIT JOURNAL

FROM 28 Nov 43

TO

JOURNAL

ORGANIZATION 305th Combat Team

PLACE W. Va. Maneuver Area

	FROM	TO	DATE AND HOUR IN	DATE AND HOUR OUT	SER NO	TIME RATED	INCIDENTS, REQ, ACTS, ORDERS ETC.	ACTION TAKEN
							Regtl. Combat Team alerted at 2000 - 11-28-43	
1	X-2	A-1						
	305	305	2130			2100	Field Order #1 & Overlay	
2	W-6	S-2					By telephone - 2 Co. patrol (located Red)	
	305	305	2245			2245	concentration at fork which turns right at Jeanington at 2210. Estimated (1) Co.	
	W-6	S-2						
3	305	305	2245			2245	(Telephone) intelligence platoon reports from Rocky Mt. (no enemy)	
4	T-R	S-2					Report V-1 plat Engineers guarding Bridge. Located Everman	
	305	305	2330			2330	area 400 yds. East of Ogden Bridge on other side	
							no enemy patrols. Some Vehicle movement.	
5	B-2	S-2						
	305	305	0600			0300	Patrols report no enemy between our	
							positions and Dry creek. No indication of enemy	
							on East Bank	
6	[illegible]	[illegible]					1 jeep 3 Bn Hq Co Mgr. overturned, tires & [illegible]	
	305	305	0700			0347	Driver burned + Scottish Guards Tavern location of vehicle	
7	[illegible]	[illegible]						
	0720	305	0720			0827	3 Bn est. Bridgehead at 0745 across Dry Fork	

UNIT JOURNAL

FROM _____ Date and hour

TO _____ Date and hour

JOURNAL

ORGANIZATION _____

PLACE _____

	FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, TRACES, ORDERS ETC.	ACTION TAKEN
16	Cal Adv	Co 305	1745			1700	Preparing to move in night of action	
17	Cal Adv Dir	Co 305	1815			1805	At time company of tanks move to Jap for heavy weapons to bring up	
18	Bn Co WVMA	Co 305	1930			1845	Reports indicate unusual sporadic of Blood Ammunition - Check immediately on completion of issue 29/11/43	
19	Bn Co WVMA	Co 305	1900			1830	Bn Co. do not know that troops could not be transported in Vehicles (4.3) Blue Div	
20	Co 305	CG 77	1900			1430	Overlay showing advance of 305 CT - Enemy information AT 1400	
21	Co 305	R-1 R-1 305	1400			1740	Sign and Countersign sign taught as "Double Trouble"	
22	D WVMA	Co 305	1915			1845	Reports indicate night patrols of 2nd Bn not given opportunity to sleep next day.	Cal Morrison
23	B-6 305	Co 305	1930			1820	Col. Attacking Southward from 42.25 61.7 - 1730	
24	W-6 305	Co 305	1930			1845	Meeting Resistance on initial objective prisoners identified 302nd Co	Cal Adrian
25	W-6 305	Co 305	2000			1905	Further identification "D" Co.	

UNIT JOURNAL

FROM: Date and hour

TO: Date and hour

JOURNAL

ORGANIZATION _____

PLACE _____

	FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
26	Co F 305	Co 305	2020			1910	Taken objective - Ammunition needed DNC in NO 284 Await Orders — Co. 7 Co.	
27	W-6 305	Co 305	2400			2230	A Co. patrol pushed back at Dock - A Co. now occupies initial objective - will continue attack 0730	Col Odom
28	W-6 305	Co 305	2400			2245	afd. Enemy identification - Co. A. Road Block penetrated by Enemy truck column - Col Odom.	
29	W-6 305	Co 305	0800			0730	Contact made between Co K and 3 Bn.	
30	Co F	Co 305	0800			0800	Request for ammunition -	
31	Q M	Co 305	11/30/44 0015			11/29/44 2154	Information regarding movement to Richter	
32	2 Bn	Co 305	0900			0810	First Objective occupied; advancing on second objective	
33	2 Bn	Co 305	0910			0845	Meeting Regt Out post; approaching Chimney Rock	
34	Co D 305	Co L	[illegible]	1717		1715	Report to Regt S-3 Cent at once	
35	S-3 305	Co 3 Bn	[illegible]	1850		1840	Report Situation by radio at once.	

DBN-228-01

Hueta
628th TD Bn

15 March - 9 May 45

DECLASSIFIED
DOD Dir. 5200.9, Sept. 27, 1966
Gmd 12/6/65

WWII Operation Reports '40-48 Tank Destroyer
RG 407, Entry 427, Box 23581

DECLASSIFIED
Authority NND 735017
By AR NARA Date 9/26/02

The Amphibious training was successfully completed by the end of March 1943, and after a period of leaves and furloughs, during which time the Battalion received its first combat vehicles, 36 M-10 Tank Destroyers, the entire Battalion moved to Camp Rucker, Alabama, in May 1943. Just prior to moving, however, the Battalion furnished a small cadre of eight men to the 645th Tank Destroyer Battalion, all volunteers, who immediately left for overseas duty, the first members of the Battalion to enter combat.

At Camp Rucker an intensive period of M-10 driver training was initiated for all officers and enlisted men, and preparations commenced for the impending Tennessee Maneuver period which commenced July 4, 1943.

TENNESSEE MANEUVERS

Tennessee Maneuvers lasted until 28 August 1943, and furnished an excellent opportunity for the men to learn how to use the M-10's under various types of terrain, and simulated combat conditions. After the first few problems, the Battalion Billeting party and the Battalion Commanders party also learned how to avoid being captured a well learned lesson.

After completing Tennessee Maneuvers, the Battalion returned to Camp Rucker for a period of Artillery range practice, where both direct and indirect firing methods were taught and executed on the Camp Rucker range.

Early in October, 1943, the Battalion moved to Camp Pickett, Virginia, and then left for Camp Bradford, near Norfolk, Virginia, for a week of amphibious training which was principally devoted to the technique of loading LST's.

After Bradford the Battalion returned to Camp Picket and then within a peace time left for the West Virginia Maneuver Area, Arriving at a bivoac on top of Mt. Canaan near Davis, W. Virginia early in November 1943. The purpose of this assignment was threefold, first, to have experience in mountain driving, second, to become toughened to winter conditions, and third, to take another Army Ground Force test. In due time all three purposes were successfully fulfilled, as the Battalion lived on a mountain and were completely surrounded on all sides by the Blue Ridge mountain range, then almost immediately after the Battalion's arrival it snowed and continued to snow most of the remainder of the time there, and finally after spending days building a covenderay road over swamps the Battalion managed to move its M-10's to the firing range and successfully passed its AGF firing test. Inspite of these various and sundry difficulties, however, the hospitality of the people of Thomas and Davis, W. Virginia was such that the men of the Battalion will long carry a warm feeling in their hearts for West Virginia.

CAMP DIX, NEW JERSEY

The Battalion left West Virginia early in December 1943, and proceeded to Camp Dix, New Jersey, the last Camp in the United States before arrival at a Port of Embarkation Staging area. All heavy vehicles equipment was turned in, and new clothing issued, then after final leaves and furloughs over Christmas and New Years, the Battalion moved to Camp Shanks, N. Y. on 17 January 1944, awaiting shipment overseas on the Aquitania which left New York on 29 January 1944.

PACKINGTON PARK, ENGLAND

On arrival at Greyoch, Scotland on 6 February 1944, the Battalion moved by rail to Packington, England, located midway between Birmingham and Coventry, England.

792

770

WAR DEPARTMENT

THE ADJUTANT GENERAL'S OFFICE

WASHINGTON

(28852)
Master

History - VICTORY MD - 628th MD Bn

DO NOT REMOVE FROM THIS OFFICE

WAR DEPARTMENT RECORDS BRANCH, A.G.O.

HISTORICAL RECORDS SECTION

ROOM MB-858 PENTAGON

1941-19 May 45

TDBN628-0 TO TDBN628-Co(A)-0.2

WWII Operation Reports '40-'48 Tank destroyer

RG 407, Entry 427, Bx 23581

DECLASSIFIED
Authority NND 735017
By AB NARA Date 9/26/02

m 770

Arrival At Elkins, West Virginia, Nov. 1943

the 28th Infantry Division for intensive Amphibious Training in the wat of the Gulf of Mexico .

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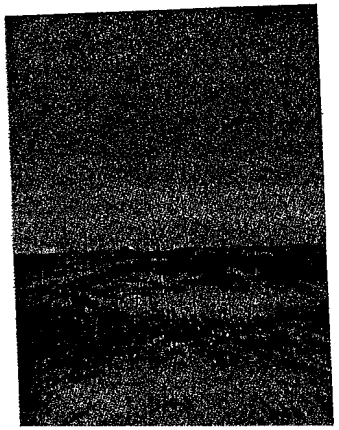

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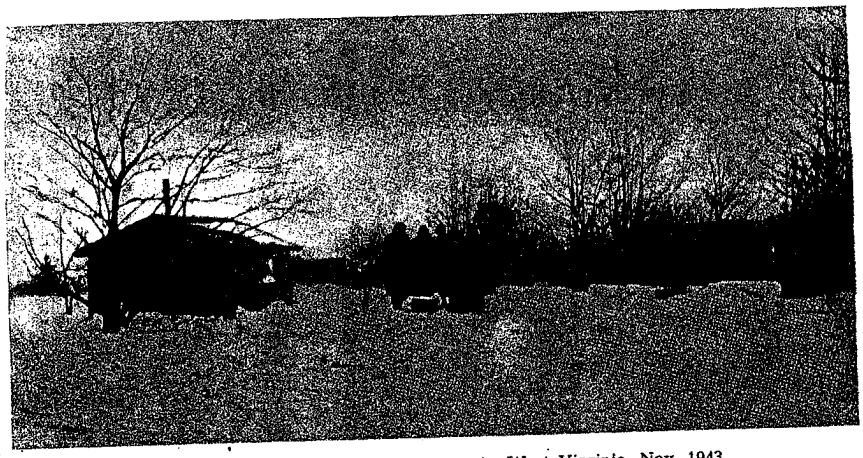

Battalion Bivouac Area Mt. Canaan, Davis, West Virginia, Nov. 1943

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Winterized Hut,
Mt. Canaan, W. Va. Dec. 1943

CAMP DIX, NEW JERSEY

The Battalion left West Virginia early in December 1943, and proceeded to Camp Dix, New Jersey, the last Camp in the United States before arrival at a Port of Embarkation staging area. All heavy vehicle equipment was turned in, and new clothing issued,

EPRODUCTION TAB

NAME

sist on an eighteen hour day including Sundays, for maintenance and inspection. Everyone mourned his departure after his brief stay.

A change of scene was in order again, so Camp Pickett it was. Here the first enemy engagement was fought and won. The battle was touch and go for a while, but with the employment of large sprays, the bed bugs were annihilated. Preparations were started for advance Amphibious Training to take place under the Navy at Camp Bradford.

In Bradford, it was difficult to get used to seeing so much blue around. We had lessons in who to salute, but here the Navy didn't seem to observe the custom. The K. P. was a pleasure, with only one job to do and plenty of goodies in the pastry shop. The meals were as delicious as any that could have been prepared by a gastronomical expert. Each meal was like an army Sunday dinner.

The climax of eating pleasure was the complete chicken dinner with lemon merringue pie served on the beach. This brought forth many queries as to transfers to the wet branch of service.

Too soon it was over and back to Camp Pickett, where this time weekend passes were granted. They were most welcomed and thoroughly appreciated by the men.

Here we go again, on the move as usual and a real change this time. For some reason it was

1st Lt. Floyd Springer
2nd Platoon Leader

S/Sgt. Wilbur Lowe
2nd Platoon Sgt.

Pvt. Graves, Pfc. Shafer, Pfc. Dignan, Pfc. Campbell, Pfc. Rawsky, Pfc. Greh, Pvt. Hahn, Pfc. Miller, Pfc. Flake, Pfc. O'Conner, Pfc. Murphy, 1st Lt. Springer, T/5 Sacus, Sgt. Levandoski, Sgt. Satchell, Pvt. Garrison, Pfc. Goodyke, S/Sgt. Lowe

DECLASS
Authority NM
By AR NAR

Pfc. Adams, Pvt. Abel, Pfc. Volpitta, T/5 Garmback, Pfc. Jackson, T/4 Watkins, T/5 Knight, Sgt. Carter, Pvt. Kent, Pfc. Thomas, S/Sgt. Asti, Pvt. Garbish, 2nd Lt. Crawford, Pfc. Martin, T/5 Wright, Pfc. Wierda, Pfc. Borowski, Sgt. Boyer

2nd Lt. Kenneth Crawford
3rd Platoon Leader

S/Sgt. John Asti
3rd Platoon Sgt.

the mountains of West Virginia, in the vicinity of the town of Davis. Not being able to move the vehicles through the goo and mud to our area, most of the equipment was humped the quarter mile. The deluxe quarters were of the winterized "Pup Tent" style ideal for October weather. A few boards for a floor and sides with a shelterhalf nailed on for a roof. It was nice to look over the valley and wish to be some other place. In two days time the clouds gave forth with an eight inch snowfall, this helped to plug the holes in the "homes", but in no other way added to comfort. About this time, the rear echelon wives, and civilian cars began to arrive. The folks in the near by towns did find places for sleeping, at least for the majority of the pioneer mountain dwellers. Then arose the question as to where reveille should be held, in town or at area.

In reflecting one shouldn't forget the "Hernandez Corduroy Road", built over the quagmire called a firing range. Most of the time was spent in digging out stuck vehicles, and needing a proverbial mine detector looking for those which sank. Returning in the evening to a good plate of delicious "C" Ration stew renewed the spent energy.

It wasnt the cook's fault if it froze in the mess kit before you could eat it. It wasn't rough either, when Wolfe could get his favorite home-town beer, and a twenty-five cent whisky ration card could be had. It was perhaps the most enjoyable

REPRODUCTION TAB

Skim ①

NAME

place the gang ever stayed. The folks in town really made up for all the inconveniences of the "Hill".

Recalling an incident of that location, the then Pvt. Ashby was detailed to sterilize the latrine. It was occupied at the time by an officer. Requesting that the person tarry not, but apply a bit more pressure, he said jokingly, "Better hurry up, sir, cause I'm gonna burn this place down." Ashby then went about the business of dumping a few gallons of gas into the hole. A little while later an embarrassed Pvt. reported to the same officer, "You all know that latrine screen we had sir?" "What do you mean had?" "Well sir", the man began "the wind blew, it caught on fire and burned up". No statement of charge was filed.

The next stepping stone on the way to combat, was Fort Dix in the wilds of New Jersey, in December. The Fort itself was a nice place, the usual barracks of white painted exterior. But that was not for us. Our place was some five miles past the civilized portion, in some abandoned CCC buildings. It was here we received the Company Commander who was to lead us through many months of combat. Lt. Doerr, was the man, and he just returned from Cavalry Reconnaissance School. Having been reared in a saddle, it perhaps was with some dejection he returned to a mechanized unit.

A new First Sergeant was chosen and he was Penberthy. Our Motor Sergeant met with a slight accident and he was replaced by the present Cumer. During our stay a new Mess Sergeant arrived to take the place of "Fritz" Schwertzfeger. He was Ex "Ranger", Al Klosewicz, and soon organized his mess deluxe. Here also the mystery arose over the disapperarence of some beef from the Kitchen. On the same line was the snacks of melted cheese sandwiches and beer in most platoons in the evening.

Furloughs were granted for the last time, and during the men's absence over the Christmas Holidays, the east coast was alerted. Those who were around, will remember the setting up of machine guns and such. And on the stroke of twelve, New Years Eve, 1944 the expected confinement went into effect.

At A Firing Position Near Pufferdorf, Germany, February, 1945

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Authority NND 887559
By NARA Date 7-11-07

HEADQUARTERS [illegible]
XI CORPS [illegible]
[illegible], West Virginia

29 October 1943

SPECIAL ORDERS)

NUMBER .... 7)

1. The tables listed below show the qualifications in firing of all members of this organization:

2. F - Familiarization completed.
Q - Qualification completed.
NF - Not Fired.
NQ - Prescribed Courses fired but not qualified.

3.

NAME	Sub M.G.	Carbine	.45 Cal Auto Pistol	Infiltration	Transition MG
Brig. Gen Hinds	F	F	90%	Q	21 F
Col Jenkins, Jr.	89%	188	87.8%	Q	24 F
Lt Col Eaton	93%	169	78.5%	Q	24 F
Major Murphy	NF	137	76%	Q	24 F
Major Niccoli	86%	193	89%	Q	24 Q
Capt Miller	NF	164	76%	Q	24 F
Capt. Ferris	78%	174	80%	Q	21 F
Capt Doherty	82%	176	77%	Q	24 F
Capt Wier	NF	168	80%	Q	24 F
Capt Smith	85%	176	86%	Q	24 F
Capt Tench	F	175	80%	Q	21 NF
1st Lt Cowdery	F	178	87%	Q	24 F
1st Lt Brown	F	158	90%	Q	21 NF
2nd Lt Peterson	89%	176	75%	Q	21 NF
2nd Lt Ball	F	187	86%	Q	24 Q
CWO Cummings	87%	165	84%	Q	24 F
		186	88.8%	Q	24 Q

4.

NAME	CARBINE	.45 Cal Auto Pistol	Transition	Infiltration	M.G.
M/Sgt. Carley	152	79%	Q		
M/Sgt. Hines	149	78%	Q		
M/Sgt. Ridenour	DS	DS	DS		
1st Sgt. Thresher	172	83%			
T/Sgt. Perry, H.E.	167	80%			
S/Sgt. Campione	148	NQ			
S/Sgt. Horton	147	65%			
S/Sgt. Lester	176	NQ			
S/Sgt. Levander	160	NQ	NQ	Q	
S/Sgt. Nutt	160	68%	Q		
S/Sgt. Wallesverd	158	72%			
S/Sgt. Andrus	150	90			
T/4 [illegible]	[illegible]	[illegible]			
T/4 Iacolone	[illegible]	[illegible]			
T/4th Segale	[illegible]	[illegible]			
T/4th Sigrist	[illegible]	[illegible]			
T/4th Collins, [illegible]	150	[illegible]			
T/4th [illegible]	[illegible]	[illegible]			
T/4th [illegible]	[illegible]	[illegible]			
T/4th [illegible]	158	[illegible]			
T/4th Perry, J. D.	[illegible]	[illegible]			
T/4th Sheehan	[illegible]	[illegible]			
T/4th West, [illegible] F.	146	[illegible]			

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By NARA Date 7-11-07

Special Order #7, par. 4 Cont'd

NAME	CARBINE	.45 Cal Auto Pistol	Transition	Infiltration	G.S.
Cpl. Brennan	140	F	Q	Q	
Cpl. DiRado	154	F	Q	Q	
Cpl. D'Ulisse	154	F	Q	Q	
Cpl. Krulce	149	F	Q	Q	
Cpl. Martin	162	F	Q	Q	
Cpl. Neff	164	F	Q	Q	
Cpl. Tetego	175	F	Q	Q	
T/5th. Birtolf	153	F	Q	Q	
T/5th. Geimake	184	F	Q	Q	
T/5th. Petretig	160	F	Q	Q	
T/5th. Doody	175	F	Q	Q	
T/5th. Ducklow	137	F	Q	Q	
T/5th. Hughes	135	F	Q	Q	F
T/5th. McClain	141	F	Q	Q	
T/5th. McClarren, WC	138	F	Q	Q	
T/5th. McClarren, WJ	139	F	Q	Q	
T/5th. Miller	140	F	Q	Q	
T/5th. O'Leary	162	F	Q	Q	
T/5th. West, H. N.	136	F	Q	Q	F
Pfc. Bell	Hosp	F	Hosp	Q	
Pfc. Bernatt	144	F	Q	Q	F
Pfc. Bledsoe	172	F	Q	Q	
Pfc. Cafferello	136	F	Q	Q	
Pfc. Capuano	153		Q	Q	
Pfc. Carpino	154	F	Q	Q	
Pfc. Jeffers	136	F	Q	Q	
Pfc. Ladra	NQ	F	Q	Q	
Pfc. Logee	NQ	F	Q	Q	
Pfc. Nestor	138	F	Q	Q	
Pfc. Norris	168	F	Q	Q	
Pfc. Sachtleben	153	F	Q	Q	
Pfc. Spear	169	F	Q	Q	
Pfc. Weldig	N.Q.	F	Q	Q	
Pfc. Wolski	169	F	Q	Q	
Pfc. Zachousky	156	F	Q	Q	F
Pfc. Zill	176	F	Q	Q	
Pvt. Boardwine	150	F	Q	Q	
Pvt. Brown	156	F	Q	Q	
Pvt. Butler	147	F	Q	Q	F
Pvt. Byrd	160	F	Q	Q	
Pvt. Canali	170	F	Q	Q	
Pvt. Card	179	F	Q	Q	
Pvt. Castle	169	F	Q	Q	
Pvt. Cherpack	DS	DS	DS	DS	DS
Pvt. Cherry	138	F	Q	Q	
Pvt. Ciardelli	Hosp	Hosp	Hosp	Hosp	Hosp
Pvt. Clark	150	F	Q	Q	
Pvt. Collins, M. L.	158	F	Q	Q	
Pvt. Garman	154	F	Q	Q	
Pvt. Graffius	N.Q.	F	Q	Q	
Pvt. Harris	168	F	Q	Q	
Pvt. Holoka	176	F	Q	Q	
Pvt. Kelly	163	F	Q	Q	
Pvt. Lescznske	173	F	Q	Q	
Pvt. Maiden	157	F	Q	Q	
Pvt. Marcks	135	F	Q	Q	
Pvt. Storz	150	F	Q	Q	
Pvt. Swirin	149	F	Q	Q	
Pvt. Solna	149	F	Q	Q	

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Authority NND887559
By NARA Date 7-11-07

11 Ball

HEADQUARTERS BATTERY
XIII CORPS ARTILLERY
Elkins, West Virginia

12 October 1943

SPECIAL ORDER)
NO ..... 6)

1. Under the provisions of AR 615-5, the following promotion is hereby announced, effective this date:

TO BE TECHNICIAN GRADE IV (TEMPORARY)
Vice T/4 MacGill Transferred

T/5 Victor R. Strachan 31233715 Hq Btry XIII Corps Arty

2. 2D LT ROBERT D. BALL, 01182054, Hq Btry XIII Corps Arty, is hereby aptd Cl "A" Agent Fin O for the purpose of making pmts to EM of Hq and Hq Btry XIII Corps Arty, for the month of October 1943.

WILLIAM M. PETERSON,
2d Lt, FA,
Commanding.

OFFICIAL:

William M. Peterson
WILLIAM M. PETERSON,
2d Lt, FA,
Commanding.

DISTRIBUTION:
CG AGF - 5
CG XIII Corps - 3
Director, WVMA - 3
CO Hq XIII Corps Arty - 2
CO Cp Pickett - 2
FD Cp Pickett - 2
FD WVMA - 2
Lt Ball - 5
Cpl Strachan - 3
Files - 5

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Authority NND 887559
By NARA Date 7-11-07

HEADQUARTERS BATTERY
XIII CORPS ARTILLERY
Elkins, West Virginia

8 October 1943

SPECIAL ORDER)

NO ..... 5)

1. Under the provisions of AR 615-5, the following reduction, without prejudice, is hereby announced, effective this date:

REDUCED TO PRIVATE GRADE VII

T/4 Lando L. Depretis	6814749	Hq Btry XIII Corps Arty

2. Under the provisions of AR 615-5, the following promotions are hereby announced, effective this date:

TO BE TECHNICIAN GRADE IV (TEMPORARY)
Vice T/4 Depretis Reduced

T/5 Louis A. DiBello	33362131	Hq Btry XIII Corps Arty

TO BE TECHNICIAN GRADE V (TEMPORARY)
Vice T/5 DiBello Promoted

Pvt Lando L. Depretis	6814749	Hq Btry XIII Corps Arty

STUART C. FERRIS,
Capt, FA,
Commanding.

OFFICIAL:

Stuart C. Ferris
STUART C. FERRIS,
Capt, FA,
Commanding.

DISTRIBUTION:
CG AGF - 5
CG XIII Corps - 3
Director WVMA - 3
CO Hq XIII Corps Arty - 2
Each EM above - 3
Files - 5

DECLASSIFIED
Authority NND 887559
By NARA Date 7-11-07

HEADQUARTERS BATTERY
XIII CORPS ARTILLERY
APO [illegible]

[illegible] 1944

SPECIAL ORDERS)
)
NUMBER 4)

1. Under the provisions of [illegible] the following promotions are hereby announced, effective [illegible]

TO BE SERGEANT (T/O [illegible])
Vice [illegible], promoted

Corporal James W. Horton 32[illegible]97 Hq Btry XIII Corps Arty.

TO BE CORPORAL (T/O [illegible])
Vice Corporal Horton, promoted

Pfc. Donald H. Brennan 32063039 Hq Btry XIII Corps Arty.

STUART C. FARRIS
Capt., [illegible]
Commanding

OFFICIAL:
STUART C. FARRIS
Capt., [illegible]
Commanding

DISTRIBUTION:
CG, CF -5
CG XIII CORPS, Inspect. Div. Pers. Div. -2
Director, Hq XIII Corps Arty., Files, -3
Hq XIII Corps Arty -1
Pa. El. concerned-1
Files-5

DECLASSIFIED
Authority NND 887559
By NARA Date 7-11-07

[illegible]

[illegible]
XIII Corps Artillery
Elkins, West Virginia

15 September 1943

(SPECIAL ORDER)

NUMBER 3)

1. The following named EM are hereby placed on SD with Mountain Training School, Seneca, W. Va. and will report to the CO thereof and upon completion of this temp dy they will rpt to their proper orgn. Hqs. Btry. Hqs., XIII Corps Arty.

Headquarters Battery, XIII Corps Arty.

T/5	McClain, Joseph C.	33166525	IN CHARGE
T/5	Bucklow, Thomas C.	17048591	
T/5	West, Harvey N.	20735842	
Pvt.	Graffius, Chester L.	33566906	
Pvt.	Lesczuske, Victor C.	33566955	

2. The following named O is hereby aptd Cl "A" Agent for the purpose of making pmts. to EM of Hq. Btry, XIII Corps Arty. for the month of September 1943:

William M. Peterson 2nd Lt. 0-1173741

STUART C. FERRIS
Captain, FA
Commanding

OFFICIAL: [signature]
STUART C. FERRIS
Captain, FA
Commanding

DISTRIBUTION:
CG AGF -5
CG XIII Corps, Tal Sect., Ft. Du Pont, Del -3
Hq XIII Corps Arty -1
FD Cp. Pickett, Va. -2
FD Elkins, W. Va. -2
CO Mountain Tng. Sch., Seneca, W. Va. -6
Lt. Peterson -5
Ea. EM concerned -2
Files -5

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DECLASSIFIED
Authority NND 807559
By NARA Date 7-11-07

[illegible]

HEADQUARTERS BATTERY
XIII CORPS ARTILLERY
APO [illegible]

[illegible] 1944

(SPECIAL ORDER)

NUMBER 2)

1. Under the provisions of AR 615-5, the following promotions are announced, effective this date:

TO BE SERGEANT, GRADE IV (TEMPORARY)
Vice [illegible] Vacancy

Technician 4th Grade Joseph S. Proctor, 33362[illegible], Headquarters, XIII Corps Arty.

TO BE TECHNICIAN, 4TH GRADE (TEMPORARY)
Vice Technician 4th Grade Proctor, Promoted

TECHNICIAN 5TH GRADE JESSE C. COLLINS 34009762 Hq Btry XIII Corps Arty.

STUART O. FERRIS
Captain, FA
Commanding

OFFICIAL:

Stuart O. Ferris

STUART O. FERRIS
Captain, FA
Commanding

-1-

DECLASSIFIED
Authority NND 887559
By NARA Date 7-11-07

FIELD ORDER
NUMBER 1
MAPS: USC&GS, 1/62,500

Hq., XIII Corps Arty
Beardon Knob, W. Va.
0800, 16 September 1943

1. a. A German Corps of two Divisions has moved SOUTH from PENNSYLVANIA. It now occupies a position generally between DAVIS and STONY RIVER DAM.

b. The XIII Corps holds a line as shown on Annex 1. XXXX The 76th Division will attack to the NORTH, along the crest and slopes of CABIN MOUNTAIN.

2. The XIII Corps Arty will occupy positions during the day of 16 Sept., and will support the attack of the XIII Corps at 0800, 17 September.

3. a. The 258th FA Group will be in general support of the 76th Division and will be available for OP missions. It will be prepared to fire missions on call after 170800.

b. Positions will be occupied between 0800 and 2000, 16 September.

c. No registration permitted. All missions will be fired on call.

d. Metro message will be furnished hourly on the hour from 0700 - 1200, 17 September, by SCR 284.

4. a. Corps Command
[illegible] have on hand four (4) rounds of ammunition.

[illegible] will be [illegible] to XIII Corps Arty CP by overlay as soon as [illegible]

b. Radio silence from 1600, 16 September, except SCR 284 to receive metro messages and Arty Hq - Group command nets (SCR 608).

c. Arty command net (SCR 608) opens 1200, 16 September. No other communication between Arty Hq and Group Hq except messenger.

By Command of Brigadier General CAMM:

JOHN M. JENKINS, JR.
Colonel, FA
Executive

[illegible]
[illegible] H. BARTON
[illegible], FA

Unit Jnl& file

Training 343

W W M A

305 Inf Rgt
305 CT

Restricted Classification
Removed Per
Executive Order 10501

RODUCED AT THE NATIONAL ARCHIVES

HEADQUARTERS, 305th CT
In the Field.

1 December 1943.

F.O. #1

1. a. Red forces hold high ground from BROWN MT to GARTH MT.

b. Blue Division, detraining at Kilsina, holds line BRAMMER KNOB (37.96) with small covering detachment (see overlay).

2. CT 305 attacks at 0830, 2nd December 1943, two battalions abreast (1st Bn on RIGHT; 2nd Bn on LEFT) on the RIGHT of the Blue Inf. to capture high ground approximately 1½ miles NORTH of LD and drive enemy to the NORTH.
Direction of attack, LD, and zones of advance (see overlay).

3. a. 1st Bn with 1st platoon of 302nd Engineers attached, from positions indicated on overlay, attacks on an 80 degrees driving enemy to NORTH and assisting 2nd Bn in capturing final objective.

b. 2nd Bn with 2nd platoon of 302nd Engineers attached, from positions indicated on overlay, attacks on an az. 20 degrees to capture the hostile position about 700 yds to the front, and to continue the attack on the final objective.

c. 3rd Bn will await orders in forward assembly positions (see overlay). It will prepare plans to envelop final objective from the RIGHT or LEFT, with especial attention to LEFT approach.

d. Cannon Co, from position on WEST slope of GARTH MT, will support the attack by fire from H-10 to H hour on the initial objective. At H hour fire will lift and the Company will be prepared to fire on call on final objective.

e. AT Co, from positions on WEST slope of GARTH MT, will initially destroy located enemy machine gun positions, and be prepared to repel an enemy mechanized counter-attack from the NORTH.

f. 302nd Eng (less 1st & 2nd platoons) - - Regimental reserve.

g. 302nd Medical Battalion (see overlay).

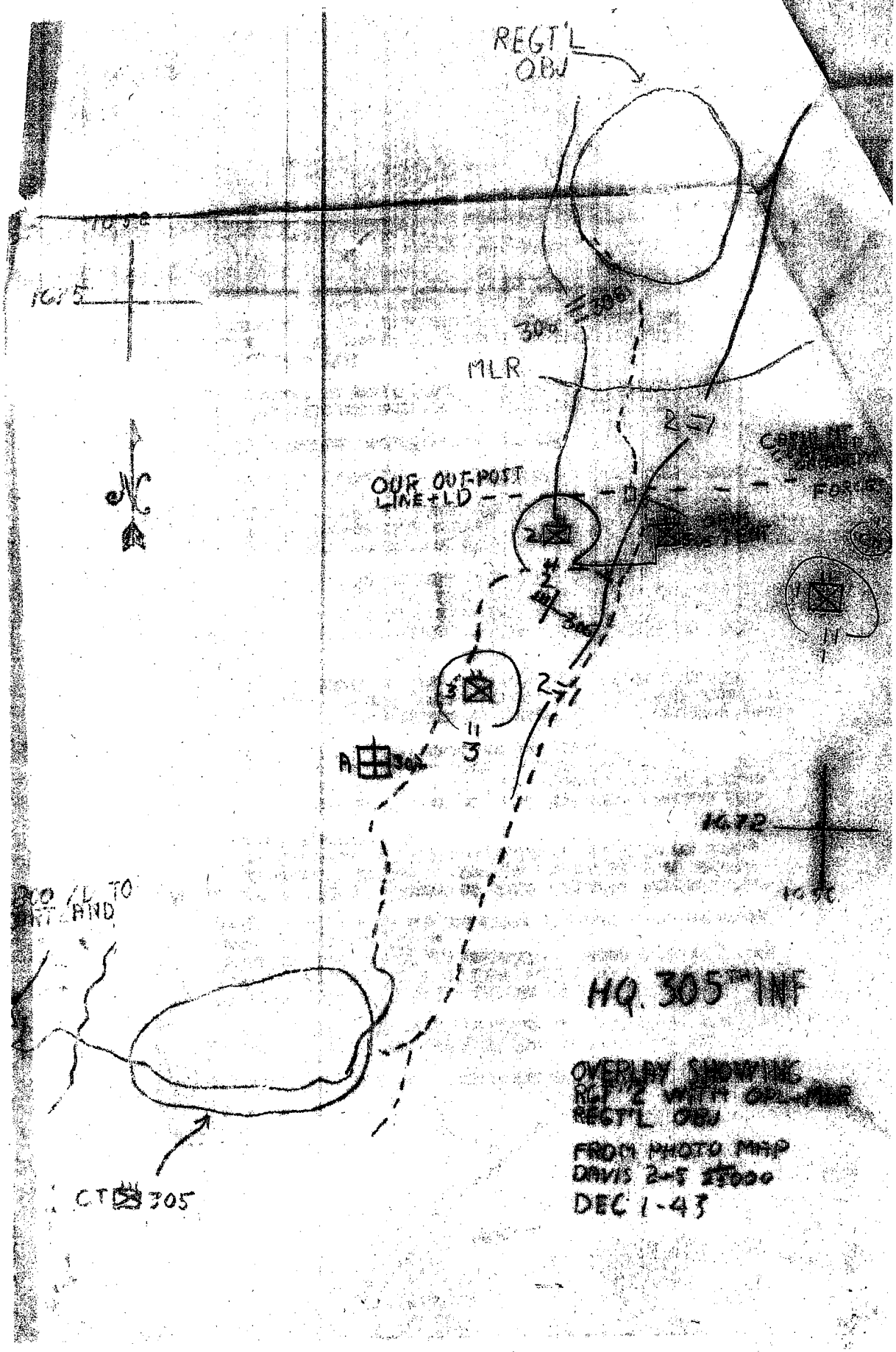
h. Elements will maintain contact from RIGHT to LEFT.
No movement of troops prior to CLOSE from bivouac area.

4. Breakfast - 0500
Class I & III truck-head opens 0600, Cooner School.
Ammunition Dp 1½ miles north of Cooner School. Route of ammunition advance - axis of 1st Bn.
Evacuation Hospital - Stuart Park, Hgway 33.
Regimental aid station (see overlay)
Emergency signal for lifting overhead fire - amber star parachute.
Other Administrative Details later.

5. Radio silence until 0830.
Regimental CP (see overlay)
Axis of Signal Communication - axis of 1st Bn.
Battalions - will report CPs.

THOMAS
Colonel

OFFICIAL:


REGT'L OBJ
MLR
OUR OUTPOST LINE & LD
HQ. 305TH INF
OVERLAY SHOWING
REGT'L OBJ
FROM PHOTO MAP
DAVIS 2-5 1:5000
DEC 1-43
CT 305

UNIT JOURNAL

FROM 7-2-43
Date and hour

TO
Date and hour

JOURNAL

ORGANIZATION 305 CT

PLACE W. J. Ma

FROM	TO	TIME WITH IN	TIME WITH OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
	2nd Co					committed on left 1110	
14	Bn 305	1120			1115	L Co Pinned Down after advancing 100 yds K Co	
	2nd Co						
15	Bn 305	1120			1017	2nd Bn Has Expended all Ammunition	
	3	3 Bn				Flanks Following Plan B	
16	305 Co.	1120			1000	2nd Bn Pinned Down in M L R 3 Bn Moving around left	
	3/3 Co					flank of Objective 1035	
17	305	305	1140		1143	All Ammunition Expended can we resupply	
18	3-3 305	All units	1145		1145	Problem officially over at 1145	
19	3-3 305	Co 3 Bn		1157	1146	Report when all ammunition is replenished	

NAME OF OFFICER REC'D

OFFICIAL TITLE

RANK

NAME

ORGANIZATION

UNIT JOURNAL

JOURNAL

ORGANIZATION 305 Combat Team

FROM 12-1-43 - 2000
Date and hour

PLACE H.V.M.A.

TO
Date and hour

	FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
						2000	305th Combat Team Alerted at 2000-12-1-43	
1	S-3 305	S-1 305	1500			1500	Field Order #1 + Overlay	
2	S2 305	S1 305	1600			—	Counter Sign "Betty Grable"	
						0715	Moved out from C.P. at 0715-12-2-43	
						0750	Established new C P at 0750-12-2-43	
						0820	Artillery fire started at 0820	
						0835	Col. Langlois left CP for front.	
3	1st Bn	CO 305	0835			0835	Tel. 1st Bn reports attack jumped off at 0820	
						0832	Artillery fire Ceased at 0832	
4	2nd Bn	S2 305	0836			0830	81 mm 60 mm opened on Enemy Positions at 0820	
5	S2 3rd	S2 305	0850			0840	Right Flank Company advancing, crossed L.D. at 0830	

UNIT JOURNAL

JOURNAL

ORGANIZATION 305 C.T.

PLACE W.V.M.A.

FROM 12-2-43
Date and hour

TO
Date and hour

	FROM	TO	TIME IN	TIME OUT	SER NO	TIME DATED	INCIDENTS, MESSAGES, ORDERS ETC.	ACTION TAKEN
	2nd Bn	S2 305					(3) Right Flank Demolished by our troops	
6			0910			0910	Enemy formly Entrenched Pill Boxes	
						0920	Mortar Fire from C.P at 0820	
7	2nd Bn 305	S2 305	0949			0940	Easy - 3rd Plat. Enveloping Right Flank - M.G. moving R.F. To Engage Enemy 2nd Plat Moving Forward in support to 1st.	
8	2nd Bn	S2 305	1012			0958	Fox held up 700 yds from L.D. Support Committee	
9	"	"	1012			0950	Request Art. Fire on Shack Between Easy and Fox Cos.	
						1035	Artillery fire opened up at 1035 until 11 00	
10	3rd Bn	CO 305	1040			✓	3rd Bn Unable to Launch attack	
11	3rd Bn	CO 305	1105			✓	Attack launched at 1155	
12	3rd Bn	CO 305	1105			1050	Third Bn. C.P. located at 5-4. 4-74.6 K and L are advancing very slowly committing I & G around	
13	3rd Bn	CO 305	1120			✓	left flank P.I.M.M. Gun. respondes	

U.S. ARMY MILITARY HISTORY INSTITUTE

Presenting . . . .

THE 35TH INFANTRY DIVISION IN WORLD WAR II 1941-1945

The men who trained with the Santa Fe at Camp Rucker will long remember those days. The combat ranges and battle courses gave the men rigorous and thorough training. The division was taking shape as a top-notch fighting team.

By November 1943, the Santa Fe was considered sufficiently trained to participate in the Tennessee maneuvers. It was cold and wet and under the most unfavorable weather conditions the Division engaged in two months of realistic battle problems, two months of conditioning for combat that earned the 35th the commendation of the Second Army directors of the exercises.

Following the completion of the eight phases of the Tennessee maneuvers, the Division moved to Camp Butner, North Carolina, on 18 January 1944 for its final polishing. Combat Teams 134th and 137th went to West Virginia to attend cliff-scaling schools and take mountain training, in the West Virginia Maneuver Area. After four months of putting the finishing touches to its leashed potentialities, the units of the Santa Fe, during the first week of May, 1944, moved into the staging area at Camp Kilmer, New Jersey. A final, thorough inspection of the men and equipment by Port of Embarkation officials and the 35th was ready to sail, ready to assemble with the gathering Allied forces to uncork its power when the word was given to attack.

An Advance Detachment, under the command of Brigadier General Edmund B. Sebree, Assistant Division Commander, sailed from Fort Hamilton on 20 April aboard the SS Queen Elizabeth. The party consisted of 54 officers, one warrant officer and 69 enlisted men. The ship docked at Greennock, Scotland, on 27 April 1944.

Debarking the next day, the detachment entrained for a 21 hour ride to Okehampton where they remained from 30 April to 20 May making arrangements for the reception of the division.

Historical and Pictorial Review of the 28th Infantry Division in World War II

This is the combat story of the 28th Infantry Division in its untiring efforts to defeat the enemy which confronted it. It is the story of a typical American outfit—one of the great family of divisions which the American people sent forth against the foe in their pledge to uphold and defend the finer things of life without exception or compromise.

PUBLISHED 1946

NORMANDY ☆ NORTHERN FRANCE ☆

RHINELAND ☆ ARDENNES ☆

CENTRAL EUROPE ☆

[illegible] the division proceeded by train and motor to Camps Livingston and Beauregard, Louisiana. The area which had just been vacated by the 32nd Infantry Division was used by the 28th as the latter intensified its training. Upon triangularization of the division, the 229th Field Artillery Battalion was formed—a product of the old 7th Field Artillery Regiment.

From September to November 1942 the 28th participated in large-scale maneuvers in Louisiana and Texas held by the Third Army, then commanded by Lieutenant General Walter Krueger. Other units which engaged in these IV Corps maneuvers were the 38th Infantry Division, 7th Armored Division, 106th Cavalry Regiment, and 73rd Field Artillery Brigade.

* * *

In January 1943 the Keystone outfit moved to Camp Gordon Johnston, Florida. Major stress was placed upon shore-to-shore amphibious exercises. Training was conducted with the 3rd Engineer Amphibious Brigade under the control of Amphibious Training Command.

A tragedy struck the division as it trained along the Florida coast. Fourteen men of the Second Battalion 112th Infantry were drowned when a landing craft grounded on a sand bar at night during a severe March storm. The coxswain announced that the vessel had landed on the designated beach and the men rushed off the boat into the deep water.

Major General (later General) Omar N. Bradley, who had commanded the 28th since June of 1942, left in February of 1943 to take over II Corps, then in Tunisia. Major General Lloyd D. Brown assumed command of the division.

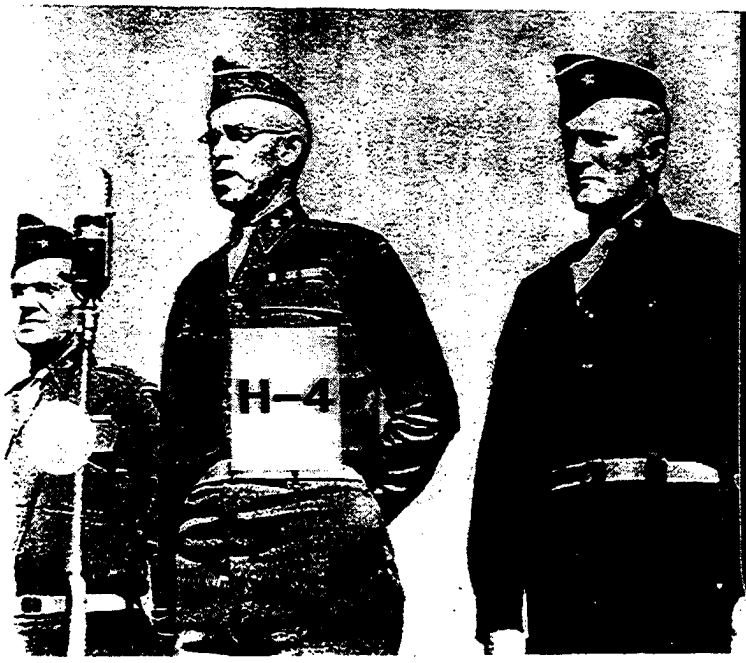
In June 1943 the division moved to Camp Pickett, Virginia. [illegible] Norfolk two weeks of ship-to-shore amphibious training [illegible]s conducted with the Navy in joint exercises in Chesapeake Bay under control of Amphibious Force Atlantic Fleet. In the hills of West Virginia the division later engaged in mountain operations.

Training in the proper use of camouflage proved useful in the hedgerows of France.

A series of rigid inspections followed for Keystone troops as they returned to Camp Pickett to prepare for overseas shipment. The advance detachment, numbering 30 officers and 30 enlisted men, staged at Fort Hamilton, New York. On September 18-19, they boarded the "Queen Mary" and headed for the British Isles.

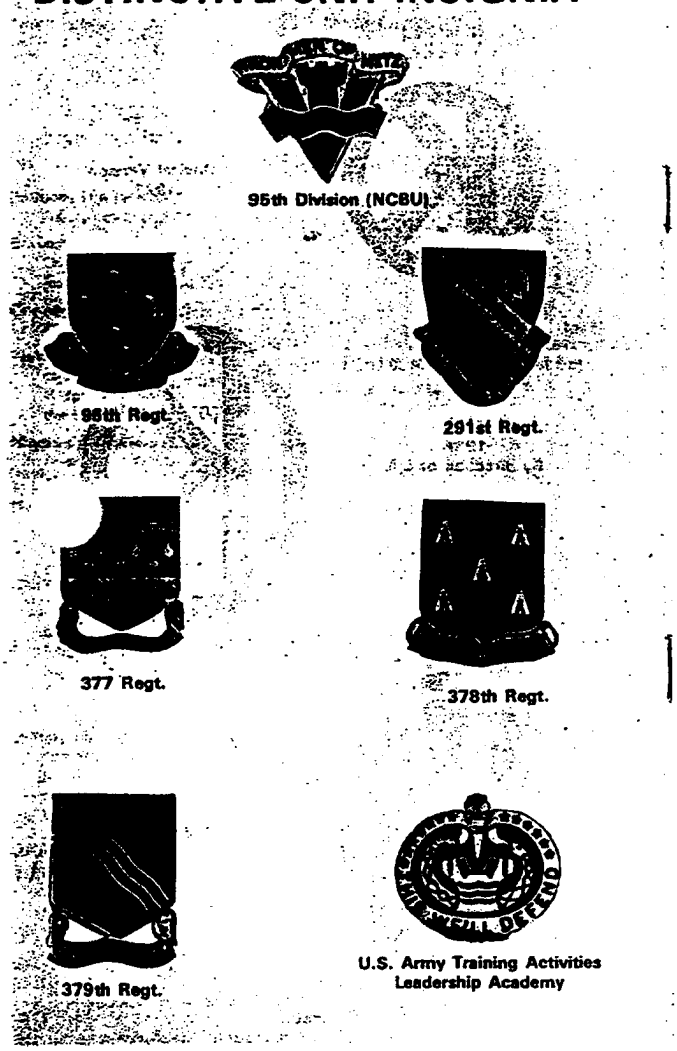
The main body of the division began leaving Camp Pickett ten days later. Staging was accomplished at Camp Miles Standish, outside Boston. Transports were boarded on October 8, on which date the convoy sailed.

Major General Omar N. Bradley, as Commanding General of the 28th Division (later commander of Twelfth Army Group) speaks to his officers and men. With him are Brigadier General Basil H. Perry, Division Artillery Commander (left) and Brigadier General Kenneth E. Buchanan, Assistant Division Commander.



Brigadier General (then Colonel) Truman C. Thorson, Commanding Officer 112th Infantry until July, 1943.

DISTINCTIVE UNIT INSIGNIA



BRAVEST OF THE BRAVE

IRONMEN OF METZ

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95th DIVISION (Tng)
HISTORY AND MISSION

Thirteen weeks of training were scheduled, beginning November 1. The scope of the desert area was such as to afford the Division its best training ground up to that time. For the first time, the Division could use live ammunition most of its training problems. Bangalore torpedoes boomed through the night as troops learned to blast gaps in field obstructions, while many other phases of field work were covered in the "swing shift" training periods. Close battle conditions were simulated with considerable realism during artillery rolling barrage demonstration, when infantry troops were progressively deployed 150 yards behind the artillery barrage and light aerial bombardment.

While the Division trained in the California desert, The Journal was increased in size to a six-page semi-monthly, an eight-page edition being published February 3, 1944; Miss Virginia Ference of Maple Heights, Ohio, was named "Miss Victory Division" in a Journal-sponsored contest; T/Sgt. M. George Vanicek wrote the winning entry in a Journal-conducted Division song-writing contest. Vanicek's song, "The 95th Marches On", was later published and copyrighted. "Prelude", a forty-page pictorial training history of the Division, was distributed to troops early in February. Late in December, 1943, General Dunkelberg left the Division for a new assignment in the Aleutians, being replaced as assistant Division commander by Brig. Gen. Don C. Faith, former commander of the Women's Army Corps. The Division was then directed to move to the Indiantown Gap Military Reservation, Pennsylvania.

Th[illegible]nced party arrived at Indiantown Gap, February 12, with the entire Div[illegible]ing into the new station February 25, having boarded trains in Cali[illegible] temperate winter climate, Division troops were not altogether prepared for the sub-zero weather that met then when they detrained in Pennsylvania. The weather couldn't chill the troops' enthusiasm for their new station, however, with the easy accessibility to several metropolitan areas (New York, Philadelphia, Washington, Baltimore) probably Indiantown Gap's leading virtue in their eyes.

Outstanding in the Division's latest training program was the series of exercises conducted in the West Virginia Maneuver Area. Besides combat teams, parts of all special troops units went through the mountain climbing exercises, while selected personnel attended the pack and assault schools. The pack schools afforded the Division's mule-skinners a chance at their trade. Seneca Rock offered a 928-foot climb or descent to the cliff scalers who hung Tarzan-like by their nylon ropes. "Rappels", "traverses" and "chimneys", among other terms, were added to the GI vernacular. The West Virginia training was generally regarded by veteran officers and enlisted men as the most rigorous single phase of training undertaken by the 95th Division.

The influx of new men was heavy at Indiantown Gap. The Division received 4000 troops from the drastically curtailed Army Specialized Training Program, half of this number being sent later to other units. Besides this total, 190 other enlisted men were added to the Division's rolls at its Pennsylvania station.

Late in March the 95th Division Artillery received a commendation for having attained the highest division artillery score in Army Ground Force battalion firing tests since the inauguration of a new form of tests in

November, 1943. Also in March, the Division newspaper made another advance, The Journal becoming a six-page weekly. A few weeks earlier, The Journal became a four-page weekly, marking an advance over the newspaper's previous hsitory when it had been an every-other-week publication.

April 1, Undersecretary of War Robert P. Patterson (later Secretary) visited the Divison on an inspection tour which lasted most of the day. After witnessing a cross-section of troops in their various training exercises, Mr. Patterson and his party reviewed the entire Division in a steady rain. To newspaper reporters present at the time, Mr. Patterson said, in part, "I am sure that dispatches from the battlefront will recall the 95th Division to my mind with the greatest pride." That rainy-day statement was to be fullfilled eight months later.

Late in April the Division's first boxing tournament on a team basis saw the 378th Infantry Regiment win the Class I (experienced) title and the 377th Infantry Regiment win the Class II (novice) trophy. Also late in April, The Journal jumped to an eight-page weekly, thus ranking among the largest divisional newspapers.

In early May, 1944, another change in the Division's command replaced General Maris, who moved up to the command of a corp artillery, as Division Artillery commander with Colonel Mark McClure. Colonel McClure had been Division G-3 at the time of the Division's activation. Three occasions in May and June put the 95th Division on display for the nearby and visiting public. A Mothers Day observance honored the mothers of seven Division men, drawn by lot from the seven major units. The mothers were guests of the Division for a three-day program which was featured by a radio broadcast and a review of the 379th Infantry Regiment. Sunday, May 28, the Division and the post were host to the governors of 37 states and the Virgin Islands, plus other nationally prominent politicos, who were attending the thirty-sixth annual Governors Conference held in nearby Hersey. Combat Team Seven was reviewed by the governors, who also witnessed a display of military equipment. June 15 was marked by the most spectacular demonstration of the fundamentals of foot-soldiering every staged by the Division. More than six thousand visitors beheld a four-hour exhibition as the Division's part in the first national observance of Infantry Day.

June and most of July found the 95th Division treading unmistakably toward an overseas movement. Personnel and equipment received equal attention. Speculation ended a few days before June 25, when an advance party left Indiantown Gap and sailed for the European Theater of Operations. June 29, the Division was on its way to battle, and most troops enjoyed their remaining respites in Pennsylvania and surrounding states. Units began moving to the staging area at Camp Miles Standish, Massachusetts, July 18 two trains daily, and all units had closed in by July 27.

Loud speakers warned troops as soon as they detrained that they were "now in a secret area." In the two weeks that followed, processing of clothing and equipment followed. A full round of lectures occupied all hands as they were advised about ship security, abandoning ship, censorship, finance, sanitation, conduct overseas and other pertinent subjects (including "gangplank fever"). Physical fitness was maintained through road marches, obstacle course-

HISTORY

OF THE

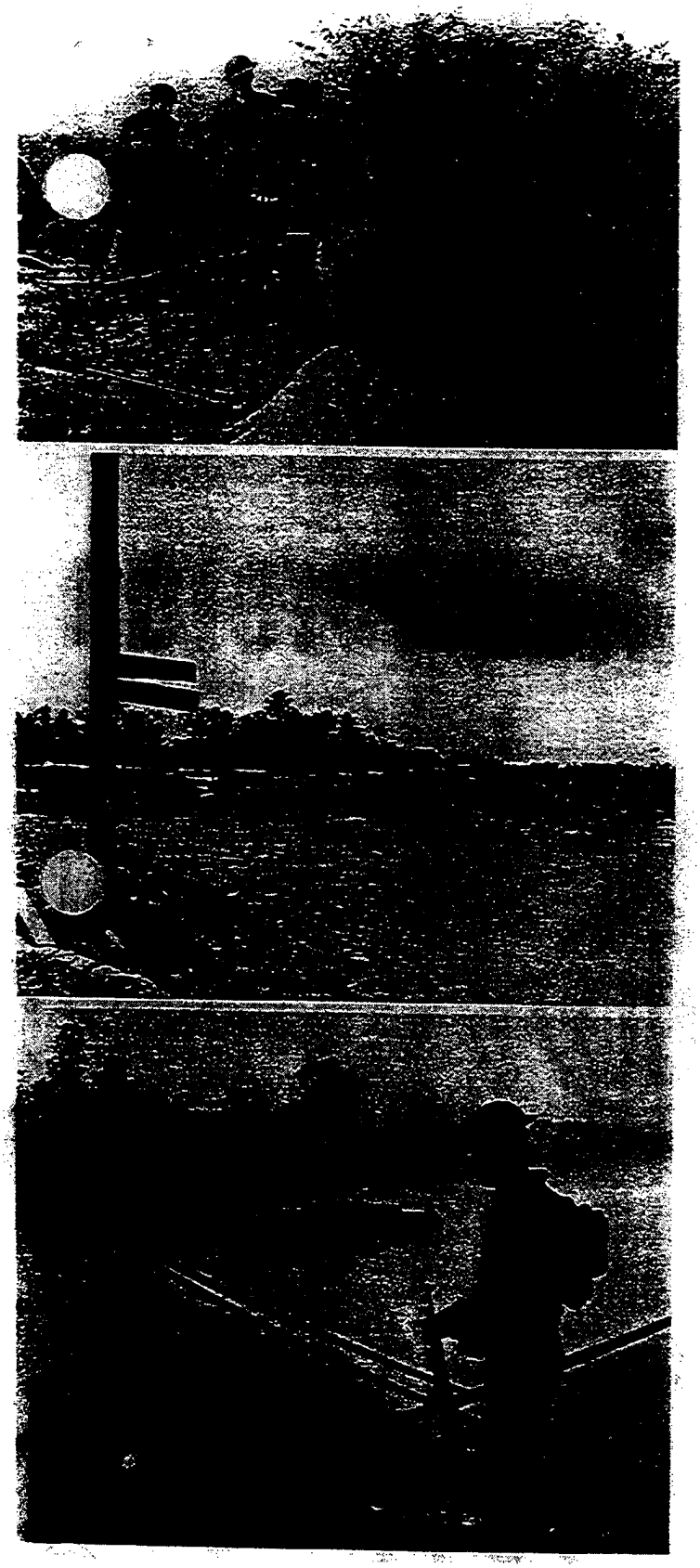
31ST INFANTRY DIVISION

IN TRAINING AND COMBAT

1940—1945

G-51

The Battery Press, Inc.
Nashville



s during the Carolina maneuvers. Top: Artillery in ..ion; Center: P.W. exchange; Bottom: Bridge guard.

honey) and realize the life we're living here is all luxury compared to the men in the very advanced posts."

Then, after three summers of fighting back and forth across the Sabine river, three years of being trained and, in turn, training, the Division was ordered to Camp Pickett, Va., an order which all knew was the vanguard of overseas shipment. Meanwhile, as units underwent mountain-training in the hills of West Virginia, practiced amphibious landings on the beaches of Virginia and Maryland and received once more a smattering of garrison-life at Camp Pickett, the 31st (Dixie) Division could look back on four years of distinguished service—officers and men from its components were performing well in every active War Theatre in the world. Its training contribution was truly immense; soon it was to demonstrate its own absorption of discipline, technical skill, and general "know how" passed on, for such a long time, to others.

In a summary of the Division's activities since induction in November of 1940, General Persons listed for General McNair, chief of Army Ground Forces, the training and accomplishments of the interim: juxtaposed against the required strength for an infantry division in enlisted men of 13,469 was the actual number trained by the Division—35,980. And so it went. 1608 soldiers had left its ranks to become officers via Officer Candidate Schools. Seven of its officers (four no longer with it) were Generals—three were required by an Infantry Division. The Division had been tested, more than once in most cases, by the Third Army, IV Corps, XV Corps, VIII Corps, and XIII Corps—no major unit of the Division had failed to pass any test. Nine and one half months had been spent in the field with many additional months transpiring in division, regimental and battalion problems. On two previous occasions the Division had reached full strength and completed prescribed training for combat, only to have the experience of being stripped of officers and men for other units. However, each obstacle had been accepted as a challenge and overcome—now it was pronounced ready.

General McNair commented that if the "31st Division does not perform outstandingly in battle, I shall be forced to believe that there is no merit in training, or that the training of the Army Ground Forces has been all wrong. . . I remember clearly the last time I saw it in the Louisiana maneuvers, in pouring rain, but with every man stepping along as though it were a summer day. It all is one more example of how a body of troops reflects the character and spirit of its commander. The 31st Division has a great commander, and I doubt not for a moment that no one realizes it better than the soldiers themselves."

With this stirring accolade, addressed to the Division and its commander, from one of the Army's finest Generals, the 31st was ready for combat. As a supply sergeant remarked at the time, "At last we're on the receiving end of things." Trucks which had been strained and mud-caked in Louisiana bogs, and battered and worn by West Virginia mountain-climbing were replaced by new—if "unshiny"—GI vehicles. Rifles, pistols, mortars, artillery

G-51

pieces, knives, forks, tent staves—all were exchanged for new if the owners considered it necessary. Searching medical examinations eliminated those men considered unfit for combat service. An atmosphere of "going places" permeated every barracks in the Division area—this was . The 31st was alerted in December of 1943 with first units sailing from Hampton Roads in January. By March the entire Division was on its way.

With the Division Commander spearheading the movement by air, the Division sailed due South; then, to the surprise of many a soldier who thought himself destined for European campaigns, the eleven jampacked transports performed an arc which carried up and through the Panama Canal—the 31st was directed toward Pacific waters. Meanwhile, in the snail-pace required for the weighted vessel to cross the man-hewn canal between Atlantic and Pacific, a last, long look at civilization, albeit tropical, was being had by the men of the DD. Convoys ended with exit from Atlantic waters and the long voyage was begun in earnest when "converted freighters" nudged into the great expanse of water that was the Pacific Ocean. The shortest time aboard ship for any unit was 35 days with some of the "plodders" combating seasickness and inertia for as long as 63 days.

The Division Commander arrived in Australia in a matter of days, weeks ahead of even the advance echelon, although he had not left the United States until half the Division had embarked. He proceded at once to General Douglas MacArthur's Brisbane headquarters from which . was detailed to the Sixth Army, commanded by Lt. Gen. Kreuger, former commanding general of the Third Army during two of the 31st Division's Louisiana maneuvers. The advance party moved to Oro Bay, New Guinea, followed by the diverted echelons who continued to come in, piecemeal, by battalion and detachment, throughout March until about mid-April when all units had arrived. All were glad to set foot on land again—even if that land was New Guinea.

Assigned initially to the I Corps, the Division was later reassigned to the XI Corps. Almost immediately units filed out of a divisional area which had become a showplace in thirty days after arrival for training in jungles captured months before at the cost of much American and Allied blood. Jungle undergrowth, it was found, was more close-knit than any ever encountered in the States, and the constant, though varying, screams of the wildlife lent even Pacific "mock" warfare a certain distinction. "Tested", upon conclusion of a three-weeks period, the Division was pronounced fit. Grading inspectors, in fact, gave the 31st the highest rating ever attained by a divisional unit of the XI Corps.

In addition to jungle training and day and night practice of amphibious landings, the 31st during its war-theatre indoctrination was given many assignments of an administrative nature. The Division unloaded all supplies designated for Oro's air base. On one occasion it was ordered, 48-hours in advance, to prepare a camp for 6,000 recruits. Later the mass billet was increased to 17,000 but the assignment was accomplished on time by engineers, and quartermaster troops, assisted by willing artillerymen and infantrymen.

On June 25, 1944, while the Division was busily engaged in night amphibious training operations, an order was received directing one combat team to proceed to Aitape; and the 124th Infantry Combat Team, which included the 124th Infantry, the 149th Field Artillery, a detachment of 106th Engineers, 106th Medical Battalion and Quartermaster troops with other attachments of special troops, was selected for this mission and alerted under the command of Brigadier General Joseph C. Hutchison. The movement to Aitape was by a combination of Liberty ships and LCI's.

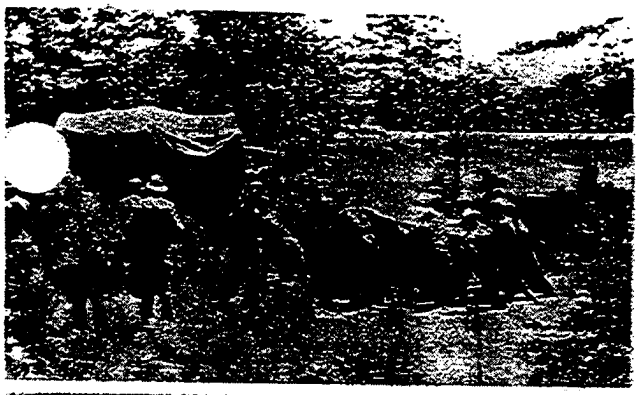
The information of the enemy indicated that the 20th, 41st and 51st Japanese Divisions were planning a desperate effort to regain control of the Aitape area, and American troops there needed reinforcements, for which mission the 124th Infantry Combat Team was selected. After loading on board the ships provided, which were as usual tremendously overcrowded, this force landed at Aitape without any major difficulties.

After landing, the combat team had sufficient time to make a reconnaissance of the area, and when the Japanese finally attacked, made a great contribution toward the defeat of the enemy. The fighting here was fierce and the troops of the 31st Division proved their mettle to the satisfaction of everyone. It was here that the GHQ observer reported that "the exploit of the 124th Infantry was possibly unparalleled in the history of military maneuver over this type of terrain." Major General Hall stated the action of the 3rd Battalion, 124th Infantry, was the best he had seen during the war, and commendations were received from Major General Gill of the 32nd Division, as well as from the Artillery Commander.

The remainder of the Division was alerted for movement to Hollandia and ships of all types were provided for loading; between June 26 and July 15 the Division was busily engaged in loading its personnel and equipment, all ships being terribly crowded, requiring many men to sleep on deck and all of them to eat in shifts. On July 14 the Commanding General was ordered to report to Sixth Army at Hollandia by air with certain members of the general staff. Arriving at Hollandia, General Krueger directed the Commanding General to divert the Division to the Toem-Sarmi-Wakde Island area and there to relieve the Sixth Infantry Division, assume command of the area with the mission of protecting the airport on Wakde Island, and the port and supply base at Maffin Bay. The Division Commander and staff proceeded by air to Wakde Island, and after reconnoitering the area, assumed command on July 18. Between the period of July 18 and September 11 the Division, less the 124th Infantry Combat Team, remained in this area.

The situation consisted of a perimeter about ten miles long, extending from a few hundred feet to about a mile from the Beach into the jungle. Vast quantities of sup-

G-51



Top: Louisiana maneuvers, 1943
Bottom: On the road, Camp Shelby, Miss.

Mountain training in West Virginia,

LOUISIANA MANEUVERS 1942

The Regiment, on July 26, again moved to Louisiana for maneuvers and this time under considerable handicap. At about the same time that the Third Battalion was leaving the Regiment the 156th Infantry was withdrawn from the Division for duty elsewhere. Thus the Division h five, rather than the normal nine infantry battalions s faced with the problem of maintaining its good reputation Higher headquarters directing the maneuvers pitted Divis Division without regard to strength in- equal under such conditions the Regiment was able its excellent record.

At the close of the maneuver the Regiment was required to send most of its personnel as replacements to units going overseas and retained only a skeleton organization. At the same time it was ordered to a new station at Camp Shelby, Mississippi and headquarters opened there September 20, 1942.

CAMP SHELBY, MISSISSIPPI

On September 23, the 154th Infantry was organized to replace the 156th Infantry and the Regiment sent one-third of its remaining officer and enlisted personnel to the new organization

Thus the Regiment, with one battalion remaining at Fort Sill, was forced to reorganize and begin almost anew, this time to train the people who were finally to go with it into combat.

Never was the shortage of arms and equipment a more serious problem than at this time. Two skeleton battalions the First and Second, were engaged in advanced training and new recruits as they arrived were placed in a provisional battalion for basic training. The number of M-1 rifles within the regiment was sufficient for only one battalion, Lee-Enfield rifles were available to arm another battalion. Bayonets could not be used on Lee-Enfield weapons and all troops undergoing bayonet training must be armed with the M-1 for that purpose. In other classes of weapons and equipment the situation was the same. Because of this situation it was necessary to exchange weapons and equipment between companies and battalions each night to meet the training requirements of the following day.

Despite shortages in trained personnel and in equipment the training program was soon operating smoothly and the development of the regiment as a combat unit continued satisfactorily.

Battalion combat tests, both offensive and defensive, were conducted by higher headquarters during the month of April and these were followed by Infantry-Artillery firing tests. All battalions made excellent records. The Third Battalion had returned to the Regiment and the new recruits, now finished with basic training, had been absorbed into the companies.

In May the Division began the "D" series maneuvers in south Mississippi and the 167th Infantry's performance was up to the usual standard. The men had been well fitted into a smooth working organization.

Ours To Hold It High

The History of the 77th Infantry Division in World War II

By
MEN WHO WERE THERE

WASHINGTON
INFANTRY JOURNAL PRESS

G-52

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First edition

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CHAPTER 4

From West Virginia to Chesapeake Bay

BY VARIOUS routes all elements of the 77th Division reached the eastern seaboard and were scattered among widely separated training areas. The Division Headquarters and Special Troops were established at Camp Pickett, Virginia. The training program called for each regimental combat team to receive three weeks each of mountain training, amphibious training, and marksmanship and combat exercises. The 306th Regimental Combat Team proceeded at once to the West Virginia Training Area near Elkins; the 305th moved to Indiantown Gap, Pennsylvania, to use the ranges there; and the 307th first moved to Indiantown Gap and then to Camp Pickett where it began amphibious training, and later continued it at Camp Bradford, Virginia and Solomons Island, Maryland. Subsequently, the combat teams of the Division rotated among the areas in order to receive each type of training.

Most of these camps provided such long-denied conveniences as real barracks, beds, hot showers, and mess halls. The Division had been in the field so long that there was some question as to whether or not the men were house-broken, but they managed without undue strain to re-adjust themselves to a degree of civilization.

Mountain training in West Virginia required strenuous maneuvering in that rugged country. Later, when the weather became really cold, winter training was provided as an extra dividend, officers and men fresh from the heat of the desert learned to use arctic sleeping bags, to sleep in the snow, and on occasion to anchor themselves to trees in order to wake up on the same slope on which they had retired. Even so they sweated under heavy packboards as they marched up mountain trails in freezing temperatures. They found that vehicles and weapons needed different treatment under cold-weather conditions. Meanwhile, selected men from each unit received practical instruction from experts in the various techniques of mountain climbing.

At Indiantown Gap and later at Camp Pickett new "Bull Dog Schools" were established. The name for these schools had been selected by General Bruce because one of the principal characteristics of the men of the Division seemed to be tenacity. Junior officers and men fired all types of weapons on all sorts of ranges, including a village with dummies which ingeniously appeared at windows and crossed streets; where explosive charges detonated, throwing up geysers of mud and water as the attackers approached. Tank hunting and destruction,

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attacks against fortified positions, night attacks, mines and booby traps and many other specialties were included in the curriculum.

Under Secretary of War Robert P. Patterson made a return visit to the Division at Indiantown Gap on 13 November 1943. He inspected the Honor Guard from Company F, 306th Infantry, and lunched with this, his World War I outfit. He made a whirlwind tour of training activities and ended by witnessing a realistic attack on a fortified position by a reinforced battalion of the 305th Infantry, now under the command of Colonel Vincent J. Tanzola.

Amphibious training began with lectures about boats, ships, shipboard life, and landing technique; then progressed through climbing down cargo nets suspended from platforms, to drills with real landing boats at Camp Bradford, Virginia. The troops were taught that a floor was a "deck," a latrine a "head," and a kitchen a "galley." Officers learned the mysteries of combat loading ships with the most possible materiél in the smallest possible space, the mysteries of master boat employment plans, boat assignment tables and landing diagrams. *Life Magazine* photographers returned for an article on landing craft and their uses. The 77th was not mentioned this time either, but the Division markings on the vehicles were visible in the published photographs.

The final stage in amphibious training was a cruise up the Chesapeake Bay to Solomons Island, Maryland. Transports were combat loaded with transportation, equipment, and dummy ammunition; and the battalion landing teams and regimental combat teams made practice landings, unloaded their equipment and supplies over the beaches, and advanced inland across country to seize or capture beachheads. At times these landings were conducted under severe weather and sea conditions. The 305th Regimental Combat Team made its final landing through rough water and in a temperature below freezing. The men, stiffened from a cold, wet ride in the landing craft, and with icicles forming on their helmets, waded ashore wet to the waist. Although those soaked and chilled were almost immediately evacuated to the ships as practice "casualties," many who were more than damp moved inland for a cold day and a bitter night of simulated warfare under tactical conditions which permitted no fires. Such occurrences were considered inherent in the training.

There were other features of the multi-ringed, Divisional training circus. Up at the A.P. Hill Military Reservation the .50 caliber machine-gun crews practiced on aerial targets. The 77th Reconnaissance Troop and selected Infantry scouts went to Fort Pierce, Florida, to receive instructions in Amphibious Reconnaissance and the use of rubber boats.

There they had additional physical conditioning and became experts with their ungainly, pneumatic craft.

The Division Artillery, now commanded by Brigadier General Isaac Spalding, participated in nearly all of the training with the infantry, and also had to pass the Army Ground Force Artillery tests conducted by the XIII Corps. These firing tests were started in West Virginia but were called off because of weather conditions. The tests were eventually successfully completed at Camp Butner, North Carolina.

There were many other tests. The Division was "hot" for overseas shipment and higher headquarters carefully scrutinized all of its activities including supply, administration, discipline, physical condition of officers and men, intelligence training and combat readiness. All officers were required to pass a practical test in map and compass reading. Officers and men considered for any reason unsuitable or unready for combat were transferred to other organizations. Some of these had literally worn themselves out in training the Division, just as a few had given their lives without ever leaving the United States. The 77th as it prepared for overseas shipment owed much to many officers and men who were no longer with it.

As the separate companies, separate battalions, and regiments of the Division moved between Pennsylvania, Virginia, Maryland and North Carolina, the men wearing the Liberty patch were in evidence in almost every village and town. This was heightened by the large number who obtained leaves, furloughs, and passes to get home for brief visits. The months back east did a great deal to raise the morale of the troops and prepare them for what lay ahead.

Throughout its training, the Division had come to take pride in building a reputation for leaving its camp and maneuver areas clean and thoroughly policed. As organizations departed from Camp Hyder, competition to receive a rating of "superior" on their abandoned areas was keen. The same was true as organizations left Indiantown Gap. Buildings and areas were inspected just prior to their departure by organization commanders, then by representatives of the Division, and finally by staff members of the post commander. The latter was very complimentary. The Solomons Island maneuver area consisted of leased civilian property. When the Division finally completed its training there, several days were spent in removing cans and rubbish from the beaches where children would play, thoroughly cleaning buildings, policing woods and fields, repairing farm fences, and filling fox holes throughout the entire area. The result was that not a single claim for damages was presented to the Claims Board. Also, the Division received a letter of commendation from the Commanding General, Third Service Com-

mand, citing it for the superior condition in which the area was left. A similar commendation was received from the War Department. All this, of course, was an indication of steadily increasing pride and discipline.

Other qualities which began to be quite marked at this time were the innate courtesy and the consideration for others which were widespread among the men. They had passed through the boisterous, exhibitionist stage common to all recruits, and had developed the common courtesy and reserved characteristics of trained soldiers. But fortunately, their completely American sense of humor had not lessened. The motto on the coat of arms of the 307th Infantry was "Clear the Way." The men of that regiment, after having to do most of the final policing of the Solomons Island beaches and maneuver area, suggested changing the regimental insignia to crossed brooms, but leaving the motto unrevised.

A full program of outdoor and indoor sports was somehow fitted into the training schedule, and the facilities for sports and recreation at Camp Pickett were utilized to capacity. The 1943 volley ball champions came from Headquarters Company, 305th Infantry, and that regiment also won the basketball crown. The 306th Infantry developed the outstanding boxing squad, and the 307th produced the winning officers' basketball team. The 902d Field Artillery Battalion won the softball championship. Dances, concerts and parties were given by various organizations during this period and from the Band came talented orchestras to suit any occasion.

It was about this time that General Bruce, because of his insistence that the troops wear leggings, helmet liners, and carefully police barracks and areas on leaving them, was given the affectionate nickname of "Old Man Leggings, Liners, and Landscape." It can now be disclosed that he took no little pride in this sobriquet.

By February the entire Division was assembled at Camp Pickett and struggling to master the requirements of POM (Preparation for Overseas Movement). There were "show-down" inspections to determine what clothing and equipment were lacking, and then more "show-downs" just to prove that what had recently been issued had not yet been lost. Everything had to be done at once; shots, shipment home of radios, cameras, and electric razors, writing of final non-censored letters, last-minute crawling through the mud of infiltration courses, dental checks, physical inspections, study of enemy weapons, and final farewell parties on and away from the post.

Of course, the whole movement was very "hush-hush," but railroad men living in near-by towns could have told and did tell when and where the trains would be made up, and where they would go. It

was generally known that the 77th was again headed west and that its fighting would be against the Japanese. Nevertheless, there was an air of mystery and suspense about the whole movement which was increased toward the end of February by the sudden, silent departure of an advance party.

The Division, now thoroughly familiar with the technique of transcontinental rail movements, efficiently and smoothly loaded out of Camp Pickett during the period 8-13 March. The troops were seasoned travelers and the trains were comfortable, so the five days of the trip across the American continent proved to be a pleasure jaunt. As the trains carrying unidentified troops paused along the routes, cities and towns which heretofore had been only names on maps came to mean Red Cross women and volunteer workers with coffee and doughnuts and cookies.

Most of the Division was processed through Camp Stoneman, California, near San Francisco, although a few supply elements took the northern route to Seattle, Washington. There was no lingering on the west coast. A fortunate few wangled short passes in San Francisco and had a quick look at Market Street, Chinatown and the Top of the Mark. But as fast as trains came in the troops received their final checking over, a few suggestions about censorship, and a day or two of light work. Then they marched to a steamer on the near-by Sacramento River for a short trip to the transports tied up at the docks in the city.

Nearly everyone was impressed, to a greater or lesser degree, by the signs on the Camp Stoneman dock; "Through These Portals Pass the Best Damn Soldiers in the World." And "The Army Ground Forces Trained You, the Services of Supply Equipped You, the Air Force Watches Over You. Now its up to You." As they stood on the decks of the river steamer the Band played "The Sidewalks of New York" and, as the vessel pulled out into the stream, "Over There."

It was corny and it was sentimental and some made sarcastic remarks about it, but there was a lump in the throat of each soldier.

HOLDING THE LINE

THE 51st ENGINEER COMBAT BATTALION AND THE BATTLE OF THE BULGE DECEMBER 1944 - JANUARY 1945

exercise on frozen Lake Champlain and built a30-foot-high timber trestle bridge.

The 51st stayed in New York through April, living in pup tents and putting ponton bridges across newly thawed lakes. In addition to bridge construction, the battalion conducted combined training exercises at platoon, company, and battalion levels, practicing combat firing, attack of a fortified area, combat in cities, mine laying and removal, and road construction.

In September 1943, the battalion started the long trek that eventually led to the Ardennes. A train ride ended at the XIII Corps maneuver area near Elkins, West Virginia, where the 51st participated in a 10-day exercise, with activities including construction of a road, a landing strip, and a Bailey bridge. In October, the battalion moved to Fort Dix, New Jersey, to prepare to go overseas. From there, the battalion's organizational equipment went to the Los Angeles Port of Embarkation, and the troops went to Hampton Roads, Virginia, and shipped out. While on the high seas, the battalion received orders to proceed to the Mediterranean Base Section, Oran, Algeria, for transshipment to India. The 51st debarked on 5 December at Oran but, with its equipment still headed from Los Angeles to Asia, received an unscheduled break in its training.

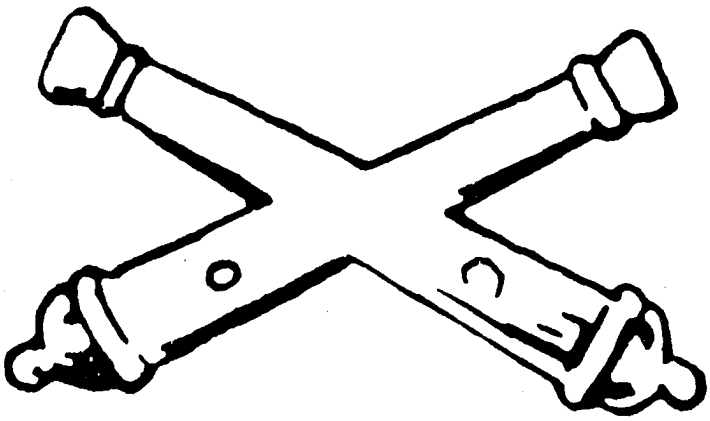
While the 51st waited in North Africa, the plans of the Allies changed. The 51st, along with four other engineer battalions awaiting movement to India, were ordered to England for the invasion of Europe. On 12 January 1944, the battalion left Casablanca on an eight-day voyage to Liverpool.

The 51st spent five months in England. The unit was assigned to the First Army under the command of General Omar N. Bradley.. Training resumed, with combined and specialist activities, including night operations and related bridge construction, Bailey and fixed bridge

THE MULES' LAST BRAY

World War II and U.S. Forest Service
Reminiscences

by H. L. "Lee" Hames



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Pictorial Histories Publishing Company
Missoula, Montana

California and on to the Aleutians without their mules. The men that did not go to the Aleutians were sent to Camp Carson at Colorado Springs, Colorado, to form the 607th, 608th and 609th BNS for the 71st Jungle Division. The organizations that moved to Camp Carson trailed their men, mules and equipment much as they would have to do overseas or in combat. Each commanding officer chose his route of travel so they went many different ways. The outfit I went with would pass near Cripple Creek, an old Colorado mining town. A few miles above the town we came upon a nice open meadow with a small creek meandering through it and it looked like an ideal spot to camp for the night. We pitched our tents and turned the mules loose to graze for awhile before graining them for the night. After a late supper and tying up the mules, we retired for the night, or so I thought.

Some time around midnight a car drove into our camp looking for the officer in charge. The guard directed him to my tent. The driver was the Town Marshal of Cripple Creek and he had the only other officer in the outfit and two of our sergeants under arrest. It seems that the lieutenant and the sergeants had ridden into town on their mules. At first they had the bartender bring them a bottle of beer which they drank while sitting on their mules in the street. Someone suggested moving the party inside and the bartender allowed them to ride their mules through the swinging doors and up to the bar where they continued to drink while still on their mules. The party kept getting larger and wilder as more townspeople joined in. The lieutenant made some remark about always having a desire to shoot a dollar sign off a cash register. The bartender said, "there is a cash register, fire away," little realizing that the officer had a gun. The lieutenant pulled out his gun and shot the dollar sign. The Town Marshal had heard about the party in progress and had come to see what was going on. He arrived just as the cash register was being shot. He immediately placed the soldiers in custody and brought them into camp. I assured him that I would take control of the situation and he left the men with me. Someone in Cripple Creek had called the Military Police at Camp Carson so it was not long before a Lieutenant Colonel was at our camp. I explained the situation to the MP and told him that I needed the men to help move the mules on to Camp Carson and I would report to him as soon as we arrived. I had Summary Court Martial Authority within the unit so as soon as we reached Camp Carson I busted the sergeants back to privates, fined them two-thirds of one month's pay and restricted them to post for 30 days. I did everything that I could to keep them from getting a really severe punishment by a higher court martial and it worked as the MPs did not pursue it any further. I could not help the lieutenant. He was transferred to a trucking company in North Carolina and the incident was over.

At this same time the Quartermaster Corps activated some QM Pack Troops at Camp Carson. The 251st, 252nd, 253rd and 254th QM Pack Troops were activated. The 251st were black enlisted men and white officers commanded by a Captain Mimna who became a good friend of mine. The captain and his wife used to go to dinner at the officers club with my wife and me. The 251st went to Hawaii to run a pack school. The mission of the QM Pack Troops was to pick up supplies at the end of roads, railroads or air-drops and move them forward to the service units of the combat units.

About this time someone in the upper echelons of army planning decided that every division going overseas should have a certain number of personnel trained to pack mules in case the need should arise. Many of the units sent to the mountains of Europe, the jungles of Asia and the South Pacific lacked men who had been trained to pack. Due to this lack of trained personnel a new program was adopted.

Mule packing schools were set up on both coasts of the United States. Divisions leaving the west coast were to send their trainees to Camp Roberts in California and divisions leaving the east coast were schooled at Elkins, West Virginia.

I was selected because of my pre-army experience with cargo packing to be one of the officers that went to West Virginia. The 254th QM Pack Troop was selected to be the enlisted instructors because they also had many former civilian packers in their outfit. Three officers including myself, about 50 enlisted men and 300 head of mules plus eight horses and an unbelievable amount of equipment loaded onto the train at Camp Carson bound for West Virginia. We arrived at Hendricks, West Virginia, in the middle of the night expecting to have a place to unload. The Army officers in charge of the maneuver area were inexperienced in the handling of mules. There were no corrals or pens in which you could hold the stock after unloading.

Lieutenant Hames at the West Virginia manuever area and school for training mules, 1943.

For ramps, they had made some portable chutes using one-inch boards that immediately collapssed under the weight of the first few head of descending mules. Once they started to unload it was impossible to stop the torrent of mules coming out of the car. They came tumbling and jumping over each other and many escaped into the darkness. There were some good cowboys in the outfit that managed to rope some of the saddle horses with the aid of flashlights. Colonel Holman, who was in charge of the area, had come to watch the unloading. The colonel asked what I was going to do about the escaped mules. I assured him they would not go very far in the darkness in a strange place and we would gather them as soon as it was light. When daylight arrived we found the mules close by and had no difficulty in catching them. After fording a river we trailed the mules about 15 miles over some mountains to a flat along a branch of the Monongahela River where the army had established a tent camp for the school. The army engineers were busy building corrals for the mules and erecting tents for the men. A Lieutenant Haines, the engineer officer in charge of the building, was from Philipsburg, Montana, where I was born. He built us some good pole corrals, set up three large circus-type tents with center poles for class rooms. A very large tent was used as a mess hall for both instructors and students. Two other large tents were used as Officers Quarters and Administration. Rows of two-man pup tents were set up for enlisted instructors and students. Each enlisted man had to have his own toiletries and mess kit.

Classes were to be of four weeks duration. The first thing that has to be done in this type of training is to get the student over his fear of the animal. Most of the students had been selected because of having some animal background. Most of them were farm boys who had been around cows and some horses but none had ever been around a mule. Mules have a reputation for being stubborn, ill-tempered and unpredictable so the students ap-

proached them with utmost caution. For the first two days the men spent their time helping feed, water, brush, lead them around and anything else possible to get on friendly terms with the mules.

The army used a packsaddle that was designed more for transporting the 75mm Howitzer than it was for cargo packing. I was told that this saddle was first used right after World War I in the Philippine Insurrection and was designed by a Colonel Phillips, who patterned it after a German army pack saddle. We always referred to it as a Phillips. This saddle was adaptable to cargo packing but it was extremely heavy. Complete with breeching and breast collar, the saddle weighed 100 pounds without a load. The big advantage to the Phillips was that both Howitzers and cargo could be packed on it and the army had a uniform saddle that could be used at all locations. By doing some adapting on swinging load hitches and a kind of squaw hitch the Phillips could be used successfully for all types of cargo packing. We also used an adaptation of the old western diamond hitches. I particularly like the Triple Diamond for packing ammunition clover leaves. By using only one type of saddle the students had only one saddle to learn and we taught them only the simplest of hitches. Also, in case of damage to equipment, replacement parts could be salvaged from other saddles.

The army pack saddle was so designed that you could place three saddles upside down, end to end on a large waterproofed canvas, and lash them together. You could then fold the canvas over the saddles to create a boat similar to the Indian's buffalo robe, willow-framed bull boats used to cross the rivers of the west. This made quite a successful boat that could be used to ferry supplies and ammunition across rivers and lakes.

We also demonstrated two types of foreign saddles that they were most likely to encounter overseas if they were unable to get Phillips saddles. Probably the most widely used pack saddle in the world would be either the wooden sawbuck saddle or the iron-arch formed saddle. The sawbuck has two wooden crosses fastened to the front and rear of two wooden bars that are carved to fit the contours of the animals back. Loads are tied to these wooden crosses with the use of ropes and lash cinches that are placed around the loads in a pattern of diamond-shaped hitches. The iron formed arch saddles are similar to the sawbuck with the iron arches replacing the wooden crosses. This type of saddle is easy to cargo pack with using swinging load hitches but would not be adaptable to Howitzer packing without a lot of changes.

Instructions were given on the tying of different hitches and knots and their use in animal pack transportation. Preparation and cargoing of loads (especially the best ways of packing explosives and ammunition) were presented as being of the utmost importance.

Techniques in preparing night camps for an animal unit were stressed. Defense lines in a triangular shape with the mules picket lines in the center in case of night attack and possible evacuation was very important. All equipment must be stacked in a certain way and order so that a man could saddle, load and move out in total darkness without any lights.

The school was in existence for about three months with several divisions sending 500 men each through one month's training. Classes overlapped by starting every two weeks.

Our camp was right in the heart of the hillbilly moonshining mountains of West Virginia, about 100 miles from the U.S. capitol. We were surrounded by hillbillies who hardly knew anything of the outside world. If it had not been for the maneuver area being there they probably would not have known there was a war going on. Some of them admitted they had never been out of those mountains and had never even been more than 10 miles from where they were born.

It was not very long before white-lightning in glass canning jars began to appear in camp. I called the instructors together and gave them strict orders to keep their drinking to a minimum and to absolutely not allow any liquor to get into the hands of any of the students who were restricted to camp at all times. As long as the instructors performed their duties satisfactorily during the day I had no objection to a little off-duty drinking. One evening, Jones, the second cook, offered me a sip from a jar filled with a liquid that looked exactly like water. I took a small sip and swore that I was swallowing a ball of fire that burned all the way down to my toes. That was my first and last taste of white-lightning.

Several years after the war, I was visiting a man in Dalhart, Texas, who had been with us in West Virginia. From him I learned how the men had obtained their moonshine. A stable crew of 10 men slept in tents near the mule corrals. These men would get sugar (which was rationed at that time

and very hard for civilians to get) from the mess sergeant. The mess sergeant always ordered more sugar than he needed and I always hurriedly signed the requisition without really checking it. The corral crews would get the extra sugar from the mess sergeant, slip away from camp at night, and trade the sugar to moonshiners for whiskey. Without knowing it I really helped supply the men with white-lightning. All of the enlisted men in the outfit knew what was going on and shared in the booty.

From the Canadian Rockies in Alberta and British Columbia to the peaks of Colorado and New Mexico, I have seen a lot of the Rocky Mountains and I have also been over the Himalayas but I do not believe that any of them excel in the flowery beauty of the West Virginia mountains in the spring. There are so many flowering trees and bushes that the mountain sides are ablaze with color. The wild roses are particularly beautiful in patches that encompass several acres.

For a graduation excercise, the instructors took the students on a two-day field trip into the mountains making the students do all of the packing to demonstrate how much they had learned. The unit was then deactivated and the school closed.

The mules and equipment were to be returned to Camp Carson. The nearest place that we could load the mules was at a stockyard at Elkins, West Virginia, about 30 miles away. The mules were turned loose in a large herd to be trailed to Elkins. Sgt. Jack Taylor rode in front of the herd on a saddle horse, leading a horse that had a bell strapped around its neck. The mules single-filed up the road behind Taylor. Other instructors on horseback or saddle mule were interspersed at various points in the column. By the time we reached Elkins the column must have been over a mile in length. To reach the loading yards we had to go down a street in Elkins and across a river bridge. I was the last rider to cross the bridge which was lined with spectators. As I rode past two elderly men I heard one ask the other, "How many mules were there?" and the other replied, "Three thousand, I counted them one by one."

When the school was discontinued the 254th was deactivated. The enlisted men were sent to the China-Burma-India (CBI) Theater and the officers to different units. I went to the Army Remount at Fort Robinson, Nebraska, for a short time before going on to the CBI myself.

When I arrived at Fort Robinson, I was assigned to the Process and Issue section which was still receiving and placing mules with units in the field. The other work that was going on at the Remount at this time was receiving horses from Cavalry and Artillery units that were being mechanized. Several buyers were also scouring the countryside in search of mules for the army.

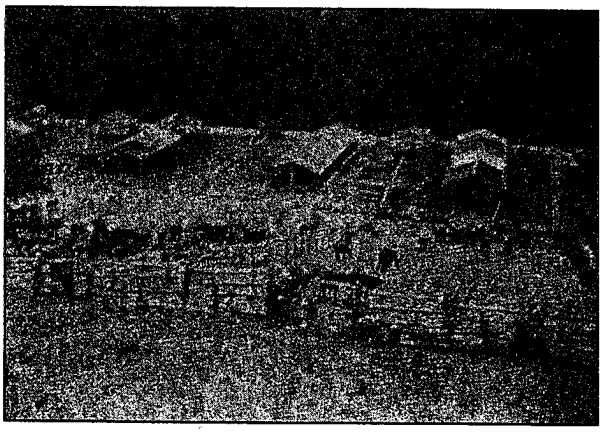
There were several thousand head of horses at Fort Robinson grazing in the large pastures on Soldiers Creek. Crews were constantly riding these pastures, corralling the animals for various purposes. Smaller saddle horses were sold to private purchasers. While I was there, Howard Raser and Glenn Robbins from Missoula, Montana, and a Rich Richter from Bozeman, Montana, bought several carloads of these smaller horses and shipped them to Montana for resale to ranchers. The L.L. Lilly Pharmaceutical Company bought quite a few loads of the larger horses that were shipped east. They were used to produce blood which was drawn on a daily basis. I was told that this horse blood was used in some way in the production of blood plasma.

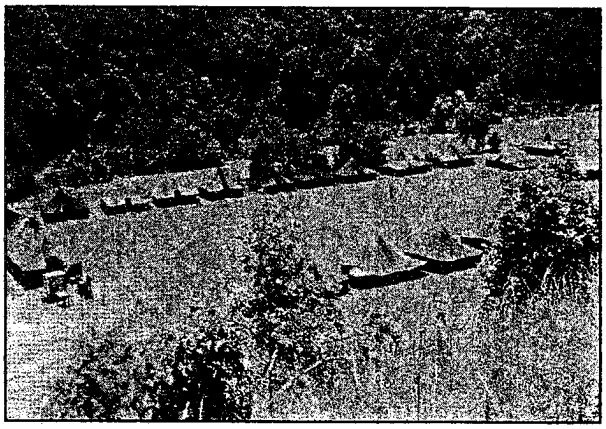
Fort Robinson is in the Sand Hills country of Nebraska and the horses grazing in the large pastures grew tremendously long hooves in a very short time. Every time a horse was corralled its feet had to be trimmed. This kept a fairly large crew busy just trimming hooves. Horses that were determined to be too old or no longer serviceable were sorted out and shipped east to canneries. Some of the meat went for pet food but I believe most of it ended up in cans of Spam and C Rations for the soldiers.

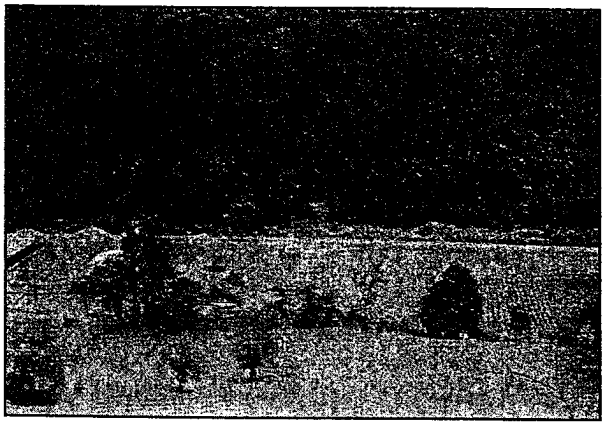
In addition to disposing of horses no longer needed, the Remount Service had buyers scouring the United States, Canada and Mexico for mules of all sizes. I have seen mules in the army that weighed as little as 600 pounds and as much as 1,400 pounds. Besides purchasing mules on the North American continent, mules were bought in Europe, Asia and Africa. Remounts were constantly receiving, training and issuing new mules to units that were being organized for packing. They had some good old western cowboy-types (civilians) and some top rodeo-ranch cowboys at Fort Robinson that did the breaking for the army. Most of the mules that I saw at the Remount arrived just barely broke to lead. The Remount was run more like a large ranch than an army post, no reveille, no drilling, no saluting, no retreat and no guard mounting. In fact, most of the enlisted men, some of the officers, and

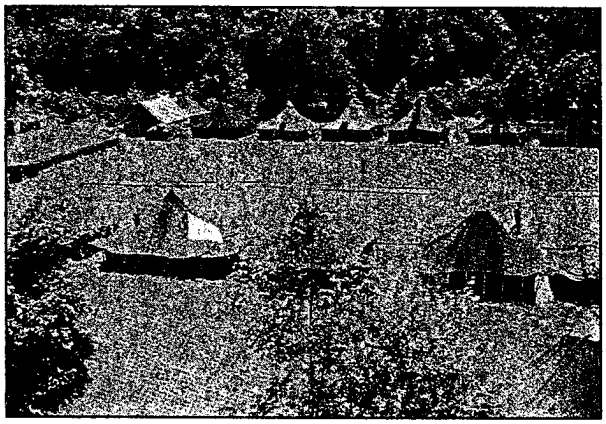
West Virginia Mule Camp

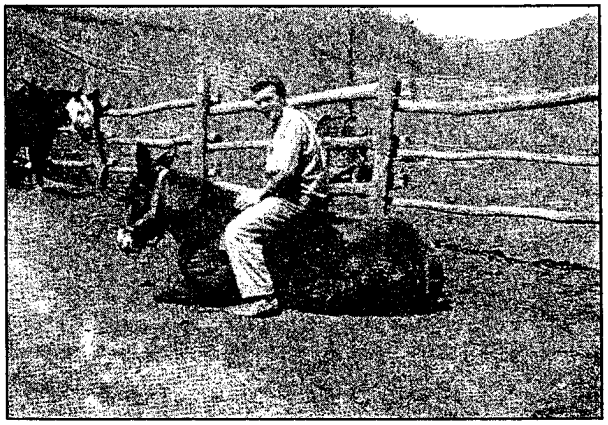
Courtesy Bob Downie, U.S. Army Veterinary Corps



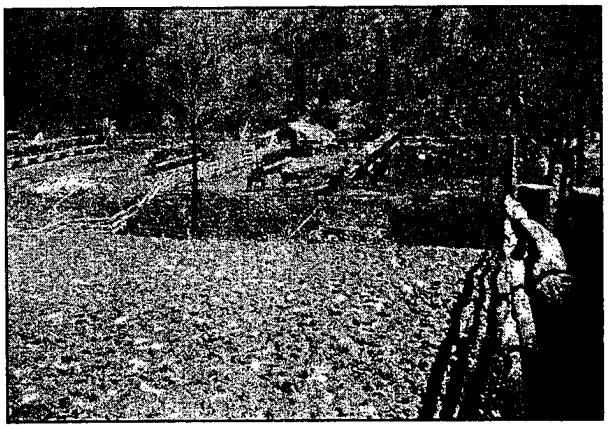






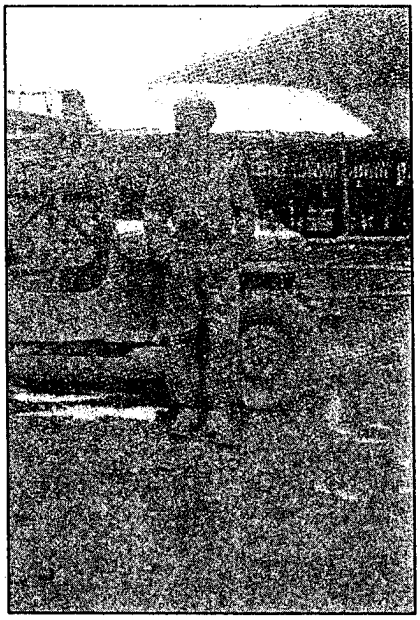


Bob Downie



West Virginia Mule Camp

COURTESY BOB DOWNIE, U.S. ARMY VETERINARY CORPS



Lt. H.L. Hames

Appendix H – Still Photography Records

STILL PHOTOGRAPHY BIBLIOGRAPHY

Duke Watson Photographs provided by Lowell Skoog

Peter Gabriel Photographs provided by New England Ski Museum, Jeff Leich, Executive Director

Photographs H21-H23 provided by Don Rice, local historian

All other photographs provided by Robert C. Whetsell, local historian

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Duke Watson

Photo Number:
H1

Direction:
Unknown

Comments:
View of Seneca Rock Climbing School Infantry Unit Encampment Area, date unknown

Photographer:
Duke Watson

Photo Number:
H2

Direction:
Unknown

Comments:
View of Rock Climbing walls located at the Seneca Rock Climbing School Encampment Area, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Peter Gabriel

Photo Number:
H3

Direction:
Unknown

Comments:
View of Seneca Rock Climbing School Encampment Area, date unknown

Photographer:
Peter Gabriel

Photo Number:
H4

Direction:
Unknown

Comments:
View of Seneca Rock Climbing School Encampment Area, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Duke Watson

Photo Number:
H5

Direction:
Unknown

Comments:
View of bridge constructed near Seneca Rock Climbing School Encampment Area, date unknown

Photographer:
Duke Watson

Photo Number:
H6

Direction:
Unknown

Comments:
View of bridge constructed near Seneca Rock Climbing School Encampment Area, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Peter Gabriel

Photo Number:
H7

Direction:
Unknown

Comments:
View of troop movement near Seneca Rocks, date unknown

Photographer:
Peter Gabriel

Photo Number:
H8

Direction:
Unknown

Comments:
View of troop training on Champe Rocks, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H9

Direction:
Unknown

Comments:
View of small arms firing range in Canaan Valley, WV, date unknown

Photographer:
Unknown

Photo Number:
H10

Direction:
Unknown

Comments:
View of trenches within the small arms firing range in Canaan Valley, WV, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H11

Direction:
Unknown

Comments:
View of Army personnel at the small arms firing range in Canaan Valley, WV, date unknown

Photographer:
Unknown

Photo Number:
H12

Direction:
Unknown

Comments:
View of Army personnel at the WVMA Impact Area (note 105-mm howitzer in the background), date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer: Unknown

Photo Number: H13

Direction: Unknown

Comments: View of members of the 95th Infantry Division at the WVMA Impact Area (note 105-mm howitzer round), date unknown

Photographer: Unknown

Photo Number: H14

Direction: Unknown

Comments: View of members of the 95th Infantry Division at the WVMA Impact Area with 105-mm howitzer, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H15

Direction:
Unknown

Comments:
View of 105-mm howitzer being fired at the WVMA Impact Area, date unknown

Photographer:
Unknown

Photo Number:
H16

Direction:
Unknown

Comments:
View of 44th Evacuation Hospital Unit Encampment located at Stuart Park, Fall 1943

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H17

Direction:
Unknown

Comments:
View of troop maneuver briefing in Sully, WV, date unknown

Photographer:
Unknown

Photo Number:
H18

Direction:
Unknown

Comments:
View of water filtration unit at the WVMA, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H19

Direction:
Unknown

Comments:
View of 94th Signal Battalion Encampment in Elkins, WV, date unknown

Photographer:
Unknown

Photo Number:
H20

Direction:
Unknown

Comments:
View of airfield located between Davis and Thomas, WV, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

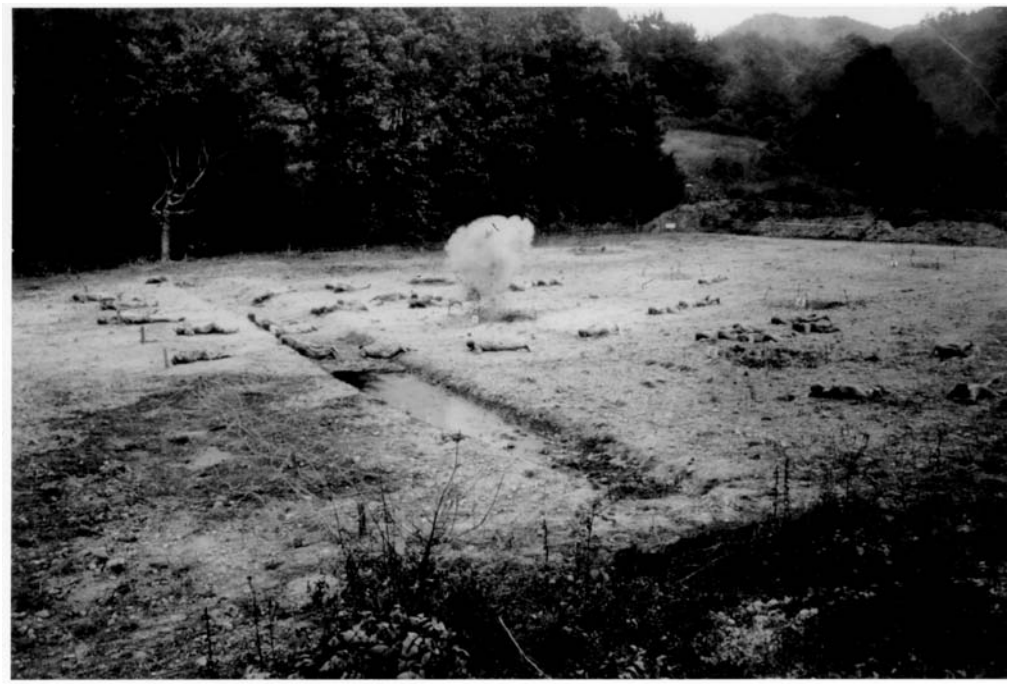
Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H21

Direction:
Unknown

Comments:
View of Dailey Infiltration Camp at the WVMA, date unknown



Photographer:
Unknown

Photo Number:
H22

Direction:
Unknown

Comments:
View of suspected engineer or quartermaster encampment located outside of Elkins, WV, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

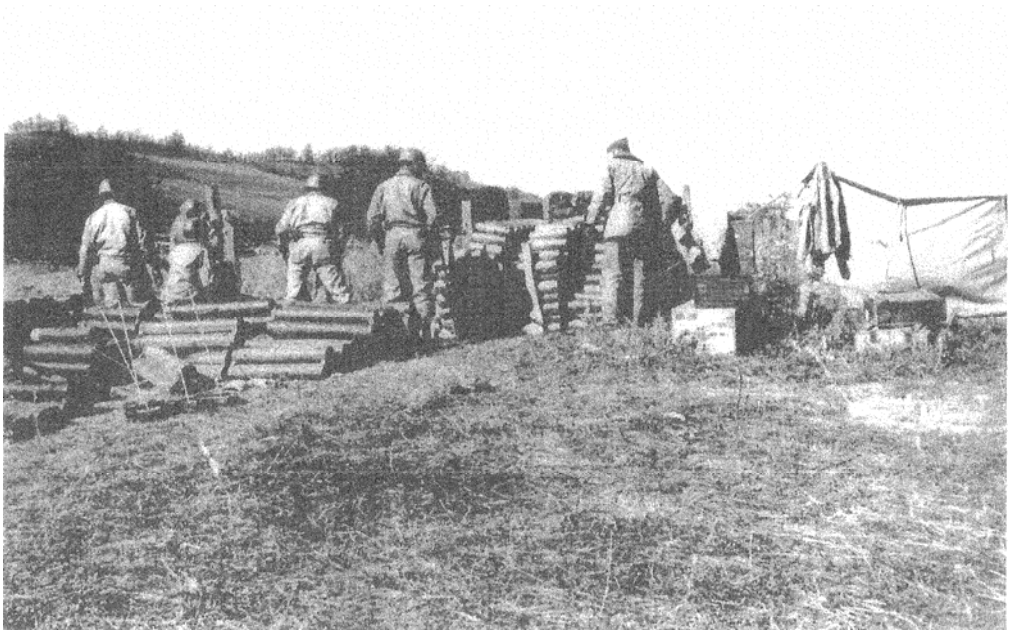
Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H23

Direction:
Unknown

Comments:
View of suspected Ammunition Depot outside of Elkins, WV, date unknown



Photographer:
Unknown

Photo Number:
H24

Direction:
Unknown

Comments:
View of Quarter Master Unit encampment located in Elkins, WV, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H25

Direction:
Unknown

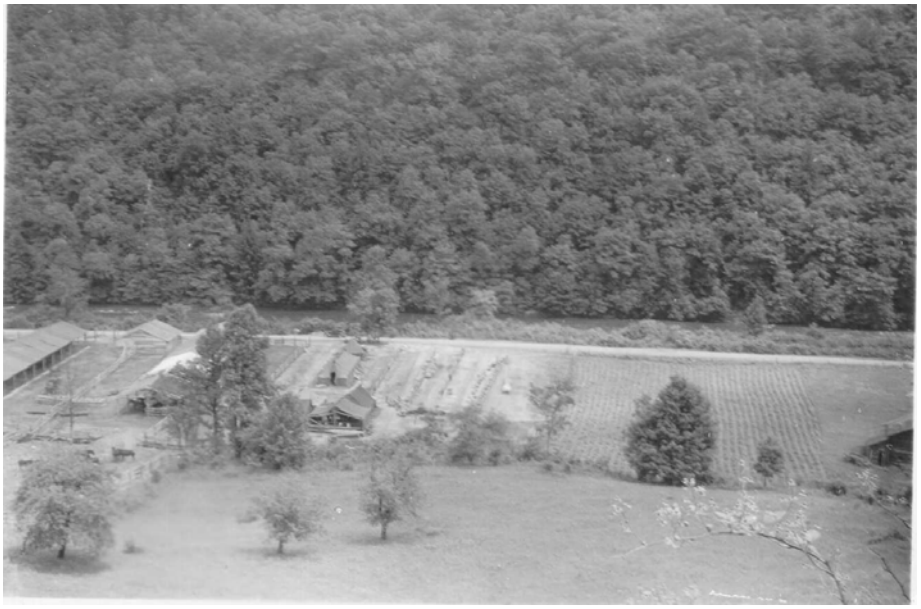
Comments:
View of Quarter Master truck lot located in Elkins, WV, date unknown

Photographer:
Unknown

Photo Number:
H26

Direction:
Unknown

Comments:
Aerial View of Mule School at the WVMA, date unknown



HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H27

Direction:
Unknown

Comments:
View of climbing walls located at Seneca Rocks Climbing School encampment (note water filtration unit and tent in background), date unknown

Photographer:
Unknown

Photo Number:
H28

Direction:
Unknown

Comments:
View of officer's tents located at the Seneca Rocks Climbing School encampment, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

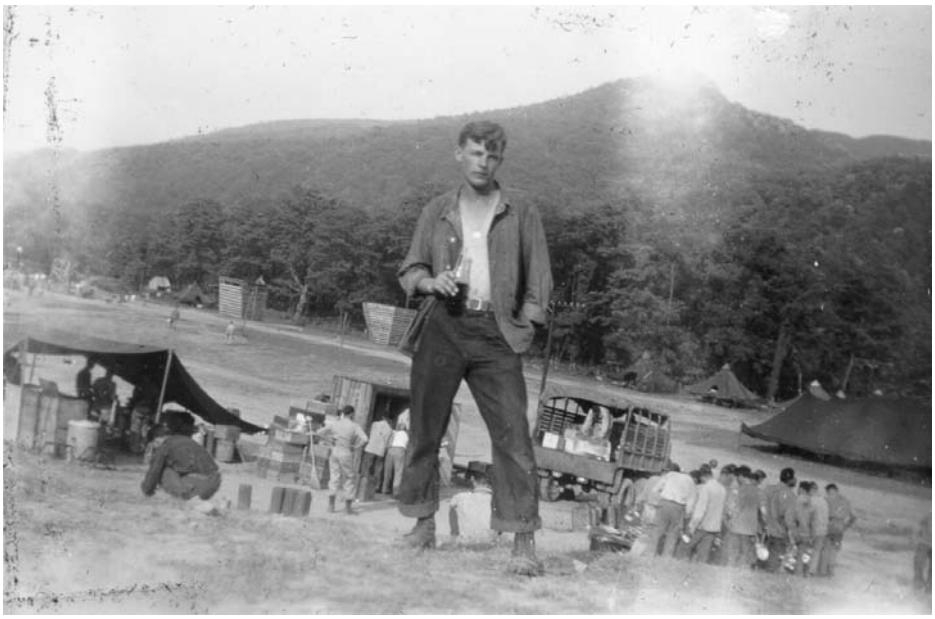
Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H29

Direction:
Unknown

Comments:
View of Army soldier with the Seneca Rocks Climbing School encampment in the background, date unknown



Photographer:
Unknown

Photo Number:
H30

Direction:
Unknown

Comments:
View of Laundry Unit encampment located at Bowden, WV, date unknown

HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

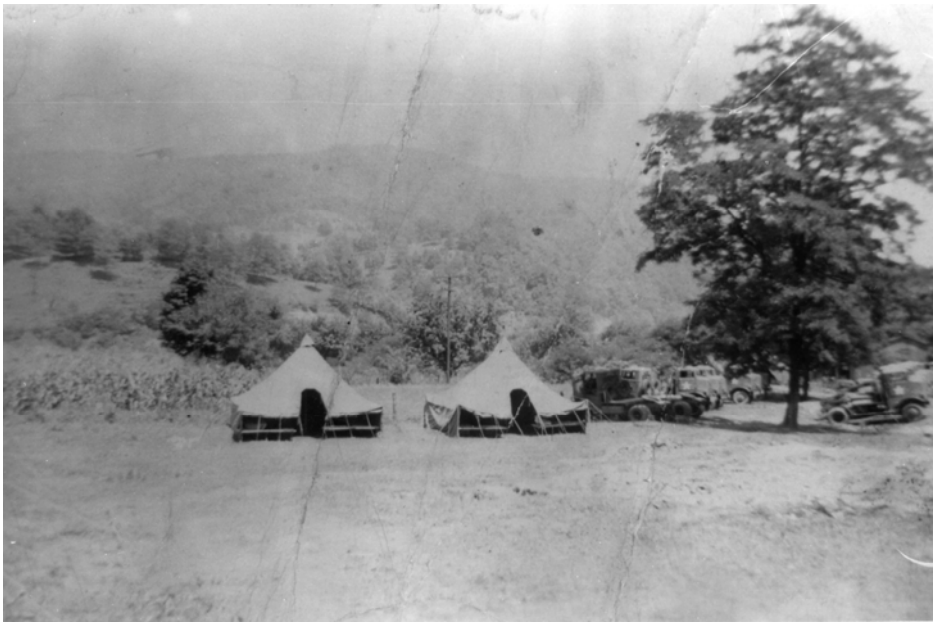
Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H31

Direction:
Unknown

Comments:
View of Laundry Unit encampment located in Bowden, WV (note truck storage area in background), date unknown

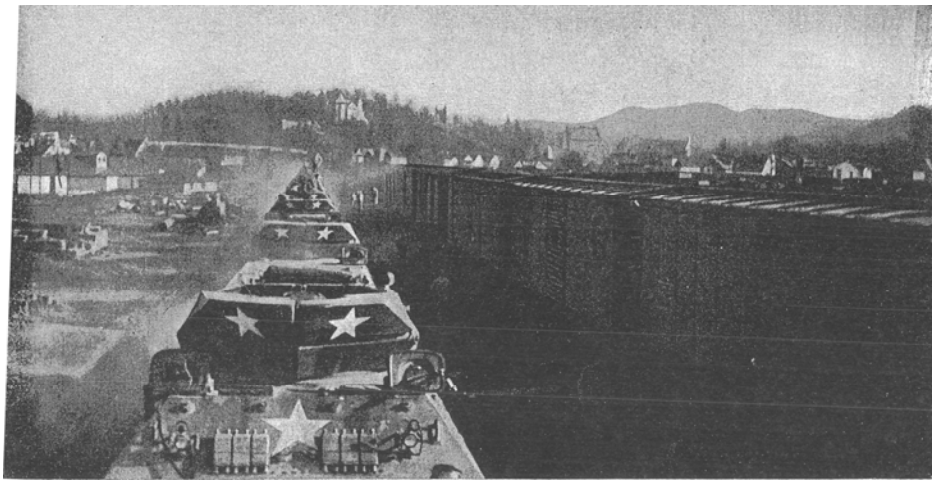


Photographer:
Unknown

Photo Number:
H32

Direction:
Unknown

Comments:
View of 628th Field Artillery Battalion railroading anti-tank destroyers into Elkins, WV. Date - Nov. 1943



HISTORICAL PHOTOGRAPHS OF THE WEST VIRGINIA MANEUVER AREA

Former West Virginia Maneuver Area Preliminary Assessment (G03WV0013)
US Army Corps of Engineers, Huntington District, Environmental and Remediation Section

Photographer:
Unknown

Photo Number:
H33

Direction:
Unknown

Comments:
View of M-10 "Wolverine similar to that used by the 628th FA Battalion in Canaan Valley, WV.

date unknown

Photographer:
Unknown

Photo Number:
H34

Direction:
Unknown

Comments:
Aerial view of the Mule School Training Area
Date - Nov. 1943

Appendix I – Maps and Drawings References

MAPPING BIBLIOGRAPHY

Map 1 – Real Estate Map for Entire West Virginia Maneuver Area, Baltimore District, US Army Corps of Engineers, 22 September 1950

Map 2 – Real Estate Map for the Impact Area at the West Virginia Maneuver Area, Baltimore District, US Army Corps of Engineers, 22 September 1950

Map 3 – Monongahela National Forest Map with impact area notations, Fort Worth National Archives, date unknown

Map 4 – Topographical Map with impact area notations, Fort Worth National Archives, date unknown

Map 5 – Lease Area of Impact Area at the West Virginia Maneuver Area, Fort Worth National Archives, date unknown

Historical USGS Topographical Mapping – US Geological Survey Topographical Quadrangle Maps 1922-27

Ammunition Depot Historical Topographical Maps, Environmental Data Resources Inc.

Dailey Firing Range Historical Topographical Maps, Environmental Data Resources Inc.

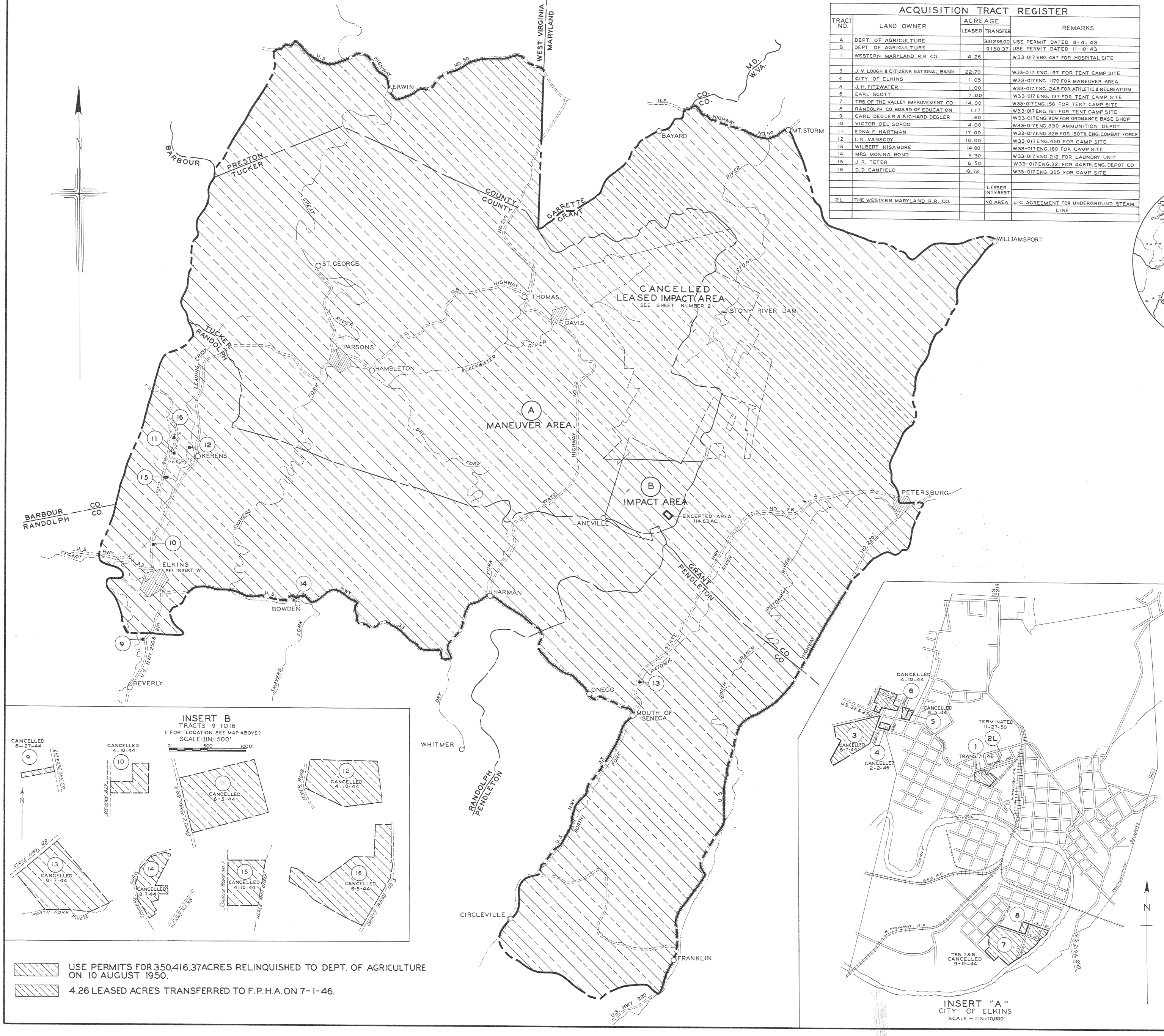
Northern Impact Area Historical Topographical Maps, Environmental Data Resources Inc.

Ordnance Base Shop Historical Topographical Maps, Environmental Data Resources Inc.

Southern Elkins Historical Topographical Maps, Environmental Data Resources Inc.

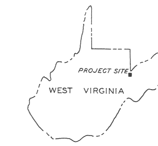
1945/1946 Aerial Photography provided by National Resource Conservation Service, Elkins, WV Field Office

1945/1946 Aerial Photography provided by US Forest Service, Monongahela National Forest

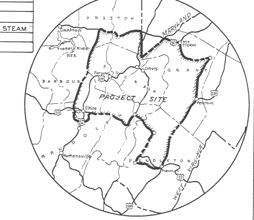


ACQUISITION TRACT REGISTER

TRACT NO.	LAND OWNER	ACREAGE LEASED	ACREAGE TRANSFER	REMARKS
A	DEPT. OF AGRICULTURE		341266.00	USE PERMIT DATED 8-4-43
B	DEPT. OF AGRICULTURE		9150.37	USE PERMIT DATED 11-10-43
1	WESTERN MARYLAND R.R. CO.	4.26		W33-017 ENG. 437 FOR HOSPITAL SITE
3	J. V. LOUGH & CITIZENS NATIONAL BANK	22.70		W33-017 ENG. 197 FOR TENT CAMP SITE
4	CITY OF ELKINS	1.05		W33-017 ENG. 1170 FOR MANEUVER AREA
5	J. H. FITZWATER	1.00		W33-017 ENG. 248 FOR ATHLETIC & RECREATION
6	EARL SCOTT	7.00		W33-017 ENG. 137 FOR TENT CAMP SITE
7	TRS. OF THE VALLEY IMPROVEMENT CO.	14.00		W33-017 ENG. 158 FOR TENT CAMP SITE
8	RANDOLPH CO. BOARD OF EDUCATION	1.17		W33-017 ENG. 161 FOR TENT CAMP SITE
9	CARL DEGLER & RICHARD DEGLER	.60		W33-017 ENG. 909 FOR ORDNANCE BASE SHOP
10	VICTOR DEL SORDO	4.00		W33-017 ENG. 330 AMMUNITION DEPOT
11	EDNA F. HARTMAN	17.00		W33-017 ENG. 326 FOR 150TH. ENG. COMBAT FORCE
12	I. N. VANSCOY	10.00		W33-017 ENG. 450 FOR CAMP SITE
13	WILBERT KISAMORE	14.80		W33-017 ENG. 160 FOR CAMP SITE
14	MRS. MONNA BOND	5.30		W33-017 ENG. 212 FOR LAUNDRY UNIT
15	J. R. TETER	6.50		W33-017 ENG. 321 FOR 448TH. ENG. DEPOT CO.
16	D. D. CANFIELD	18.72		W33-017 ENG. 355 FOR CAMP SITE
			LESSER INTEREST	
2L	THE WESTERN MARYLAND R.R. CO.		NO AREA	LIC. AGREEMENT FOR UNDERGROUND STEAM LINE



STATE INDEX



VICINITY MAP
STATUTE MILES
0 5 10 20 30

(TYPE) **FINAL**

PROJECT OWNERSHIP MAP

STATE WEST VIRGINIA

COUNTIES TUCKER, RANDOLPH, PENDLETON, PRESTON AND GRANT

DIVISION OHIO RIVER

DISTRICT LOUISVILLE
TO BALT. DIST. 7-1-70

2ND ARMY AREA

USING AGENCY ARMY GROUND FORCES

LOCATION OF PROJECT

50 MILES NE OF ELKINS, W. VA.

TRANSPORTATION FACILITIES

RAILROADS B&O.-W. MARYLAND R.R.

STATE ROADS 32, 4, 28

FEDERAL ROADS 50, 220, 33, 219

AIRLINES AMERICAN

-ACQUISITION-

TOTAL ACRES ACQUIRED 398973.06

ACRES FEE

ACRES TRANSF'D 350416.37

ACRES LEASED 48556.69
(ACRES LEASED THIS SHEET, 128.10)

ACRES LESSER INTERESTS LICENSE (1) NO AREA
(THIS SHEET)

-DISPOSAL-

TOTAL ACRES DISPOSED OF 398973.06

ACRES SOLD

ACRES LEASED TRANSF'D TO F.P.H.A. 4.26
(ACRES LEASED TRANSF'D THIS SHEET 4.26)

ACRES LEASED TERM. 48,552.43
(THIS SHEET 123.84)

ACRES RETRANSF'D. 350,416.37

ACRES LESSER INTERESTS TERM. LICENSE (1) NO AREA
(THIS SHEET)

ACRES NET OWNED

-LEGEND-

RESERVATION LINE

COUNTY LINE

ROADS

CITIES & TOWNS

LEASED AREA

STREAMS

RAILROADS

ACQUISITION AUTHORIZATION

RE-D	773	DATED	4-10-42
RE-D	2418	DATED	7-23-43
GEN. RE-D	2418A	DATED	7-28-43
GEN. RE-D	2418A	DATED	10-29-43
GEN. RE-D	2418B	DATED	12-8-43

USE PERMIT DATED 8-4-43 USED IN LIEU OF FORMAL DIRECTIVE.

USE PERMITS FOR 350,416.37 ACRES RELINQUISHED TO DEPT. OF AGRICULTURE ON 10 AUGUST 1950.

4.26 LEASED ACRES TRANSFERRED TO F.P.H.A. ON 7-1-46.

APPROVED	DATE	REVISIONS	BY
J.C. Eeder	7-26-50	DUE TO FINAL AUDIT	C.D.

DEPARTMENT OF THE ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE DISTRICT

DRAWN BY: C.D.
TRACED BY: C.D.
CHECKED BY:

REAL ESTATE

WEST VIRGINIA MANEUVER AREA

SUBMITTED BY: Dave E. Potter
CHIEF ENGINEER, REAL ESTATE

RECOMMENDED BY: C.B. Raymer
REAL ESTATE OFFICER

APPROVED BY: C. Bidgood DATE: 9-22-50
LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

OFFICE, CHIEF OF ENGINEERS, WASHINGTON, D.C.

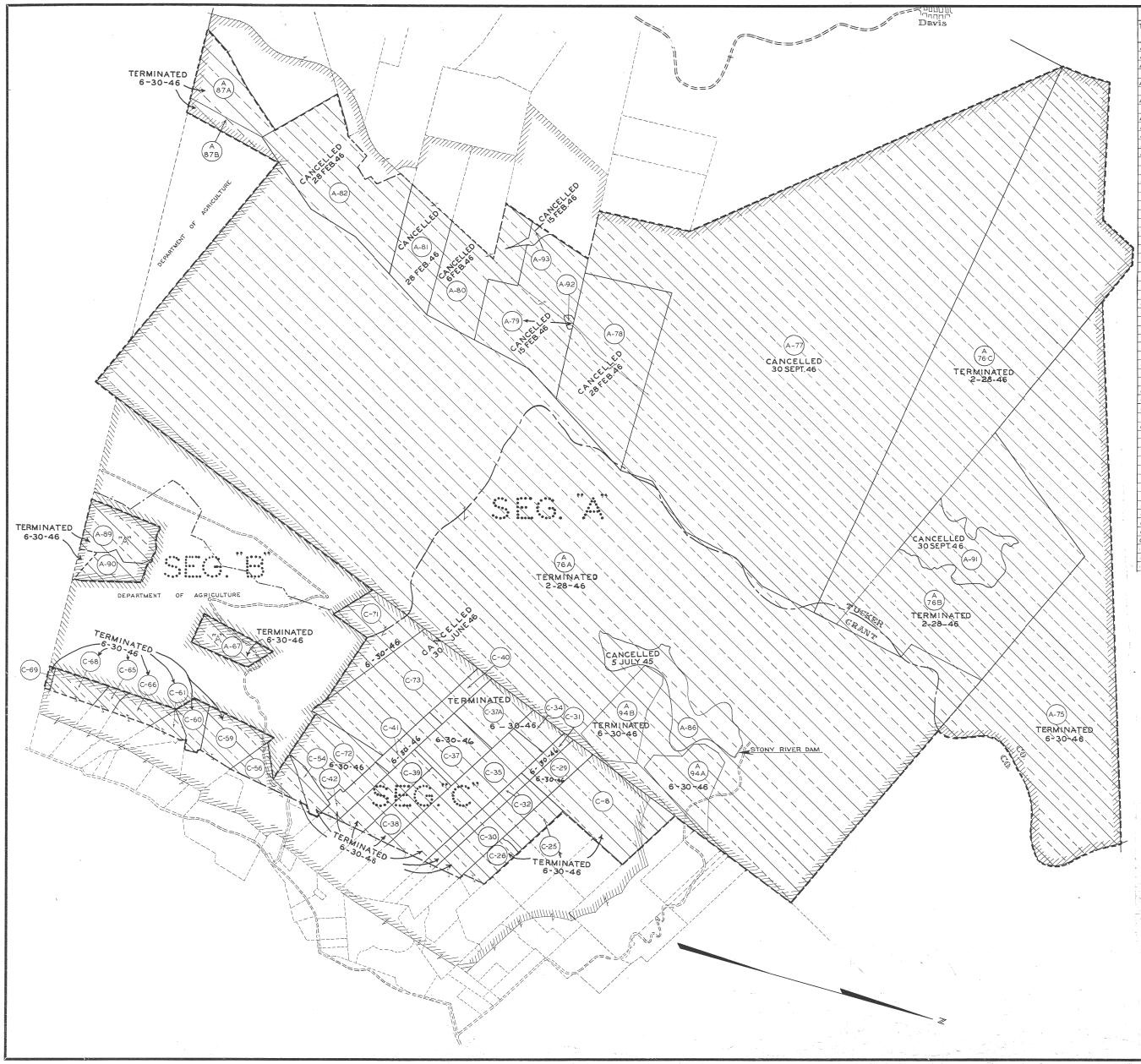
SCALE IN FEET
0 5280' 10560' 21120'

AUDITED

PROJECT NO. 3029

SHEET 1 OF 2 DRAWING NO. RE-LOU. 173-1

CLOSED



ACQUISITION TRACT REGISTER

TRACT NO	LAND OWNER	ACRES LEASED	REMARKS
A-67	VIRGIL F. STONESTREET	158.80	W 33-017 ENG 351
A-75	HARRY B. HERR ET AL	3830.00	W 33-017 ENG 1323
A-76A	THE W. VA. CENTRAL & PITTSBURG R.R.CO.		
	AND THE DAVIS COAL & COKE CO.	175.554	W33-017 ENG. 1403
A-76B	THE W. VA. CENTRAL & PITTSBURG R.R.CO.		
	AND THE DAVIS COAL & COKE CO.	2107.74	W33-017 ENG. 1403
A-76C	THE W. VA. CENTRAL & PITTSBURG R.R.CO.		
	AND THE DAVIS COAL & COKE CO.	3512.00	W33-017 ENG. 1403
A-77	W. VA. POWER & TRANSMISSION CO.	9523.37	W33-017 ENG. 439
A-78	TACY A. CARWELL	1082.00	W33-017 ENG. 347
A-79	WILLIE J. TROUT & JOHN R. HARPER	875.50	W33-017 ENG. 457
A-80	ALICE COFFMAN	553.60	W33-017 ENG. 364
A-81	ROSCOE C. BEALL ET UX	368.00	W33-017 ENG. 352
A-82	JASON HARMON ESTATE	935.20	W33-017 ENG. 918
A-86	WEST VIRGINIA PULP & PAPER CO.	474.71	W33-017 ENG. 2257
A-87A	THE W. VA. CENTRAL & PITTSBURG R.R.CO.		
	AND THE DAVIS COAL & COKE CO.	290.00	W33-017 ENG. 1403
A-87B	THE W. VA. CENTRAL & PITTSBURG R.R.CO.		
	AND THE DAVIS COAL & COKE CO.	1.34.00	W33-017 ENG. 1403
A-89	GEORGE ERVIN ROHRBAUGH	291.20	W33-017 ENG. 350
A-90	JOHN H. ROHRBAUGH & CLAUDIA A. ROHRBAUGH	140.00	W33-017 ENG. 349
A-91	W. VA. POWER & TRANSMISSION CO.	412.27	W33-017 ENG. 439
A-92	W. VA. POWER & TRANSMISSION CO.	6.64	W33-017 ENG. 439
A-93	W. VA. POWER & TRANSMISSION CO.	35.27	W33-017 ENG. 439
A-94A	PARSONS REALTY & MACHINERY CO.	309.00	W33-017 ENG. 459
A-94B	PARSONS REALTY & MACHINERY CO.	258.50	W33-017 ENG. 409
C-8	T. G. SMITH	505.00	W33-017 ENG. 348
C-25	W. C. HALTERMAN ESTATE	103.00	W 33-017 ENG. 365
C-26	MARGARET HALL & JEFF HALL	101.00	W 33-017 ENG. 346
C-30	CARROLL B. TYSON	240.00	W33-017 ENG. 455
C-32	C. J. BURGESS	112.00	W 33-017 ENG. 366
C-35	LILLIAN STOCKTON KLEIN	464.00	W33-017 ENG. 463
C-37	O. J. WEIMER ESTATE	230.00	W 33-017 ENG. 373
C-38	BESSIE WEIMER BERG	198.00	W33-017 ENG. 388
C-39	CARL E. WEIMER & JOHN B. WEIMER	208.00	W33-017 ENG. 370
C-41	A. J. WELTON ESTATE	118.00	W33-017 ENG. 344
C-42	J. EVERS EVANS ET UX	128.00	W 33-017 ENG. 369
C-54	WILLIE BURGESS & ARTHUR BARGER	78.75	W33-017 ENG. 363
C-56	HARRISON EVANS	150.00	W33-017 ENG. 361
C-59	AARON C. GOLDIZEN	200.00	W33-017 ENG. 354
C-60	ARLIE GOLDIZEN	101.00	W33-017 ENG. 362
C-61	DELPHIA BERG & BEN BERG	47.50	W 33-017 ENG. 367
C-65	ADAM H. EVANS	40.00	W 33-017 ENG. 360
C-66	EARL H. ROHRBAUGH ET UX	88.00	W 33-017 ENG. 371
C-68	M. E. GOLDIZEN	104.00	W 33-017 ENG. 358
C-69	M. K. BARGER	16.00	W 33-017 ENG. 359
C-71	CENTRAL TIE AND LUMBER CO.	592.00	W 33-017 ENG. 345
C-72	ABIJAH ROHRBAUGH	323.00	W33-017 ENG. 353
C-73	T. J. & J. B. GROVE ESTATE	784.00	W33-017 ENG. 372
C-29	UNKNOWN OWNER	128.00	CIVIL ACTION NO. 1919
C-31	UNKNOWN OWNER	62.00	CIVIL ACTION NO. 1919
C-34	UNKNOWN OWNER	96.00	CIVIL ACTION NO. 1919
C-37A	UNKNOWN OWNER	298.00	CIVIL ACTION NO. 1919
C-40	UNKNOWN OWNER	96.00	CIVIL ACTION NO. 1919

PROJECT OWNERSHIP MAP
(TYPE OF MAP)

STATE WEST VIRGINIA
COUNTY TUCKER & GRANT
DIVISION OHIO RIVER
DISTRICT LOUISVILLE TO BALT. DIST. 7-1-70
2 ND ARMY AREA
USING AGENCY ARMY GROUND FORCES
50 MILES N.E. OF ELKINS, W.VA.
MILES OF

TRANSPORTATION FACILITIES

B&O & WESTERN MARYLAND RAILROAD
28, 32, 42 & 90 STATE ROAD
U.S. 219 FEDERAL ROAD
AMERICAN AIRLINE

ACQUISITION
(THIS SHEET ONLY)

TOTAL ACRES ACQUIRED 48428.59
ACRES FEE SEP BY W.D.
ACRES LEASED TO W.D. 48428.59
ACRES TRANSFERRED TO W.D.
ACRES LESSER INTEREST

DISPOSALS

TOTAL ACRES DISPOSED 48428.59
ACRES LEASED TERM 48428.59
ACRES TRANSFERRED BY
ACRES LESSER INTEREST TERM

LEGEND

COUNTY LINE
PROPERTY LINE
SEGMENT LINE
ROADS
RAILROADS
STREAMS
LEASE LINE
SEVERANCE & ADJOINING TRACTS

SCALE
2 IN. = 1 MILE
¼ 0 ½ ¾ 1 MI.
2640' 5280'

DEPARTMENT OF THE ARMY
OFFICE OF THE DISTRICT ENGINEER
LOUISVILLE DISTRICT

REAL ESTATE
WEST VIRGINIA MANEUVER AREA

MILITARY RESERVATION

RECOMMENDED: Joseph M. Doyle DATE 10-13-43
APPROVED: O. B. Bridgford DATE 9-22-50
LT. COL., CORPS OF ENGINEERS, ACTING DISTRICT ENGINEER

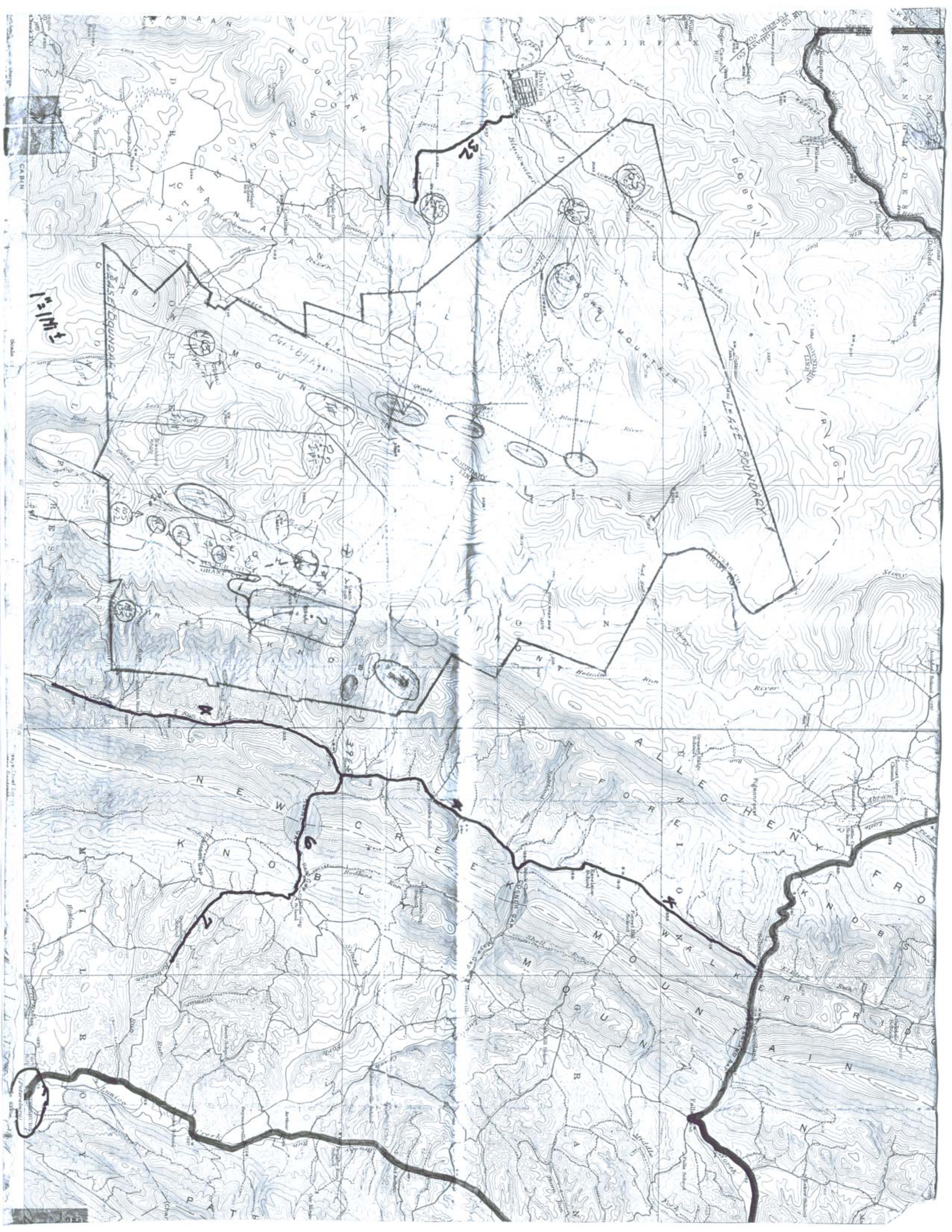
COMPILED: C.H.V. TRACED: R.G.D.&L.P.H. CHECKED: A.C.A.

DATE	BY	REVISIONS	APPROVED
7-26-50	C.D.	DUE FINAL AUDIT	J. C. Eckel

SHEETS: 2 OF 2 DRAWING NO. 12-LW-173-2

AUDITED
PROJECT NO. 3029

CLOSED

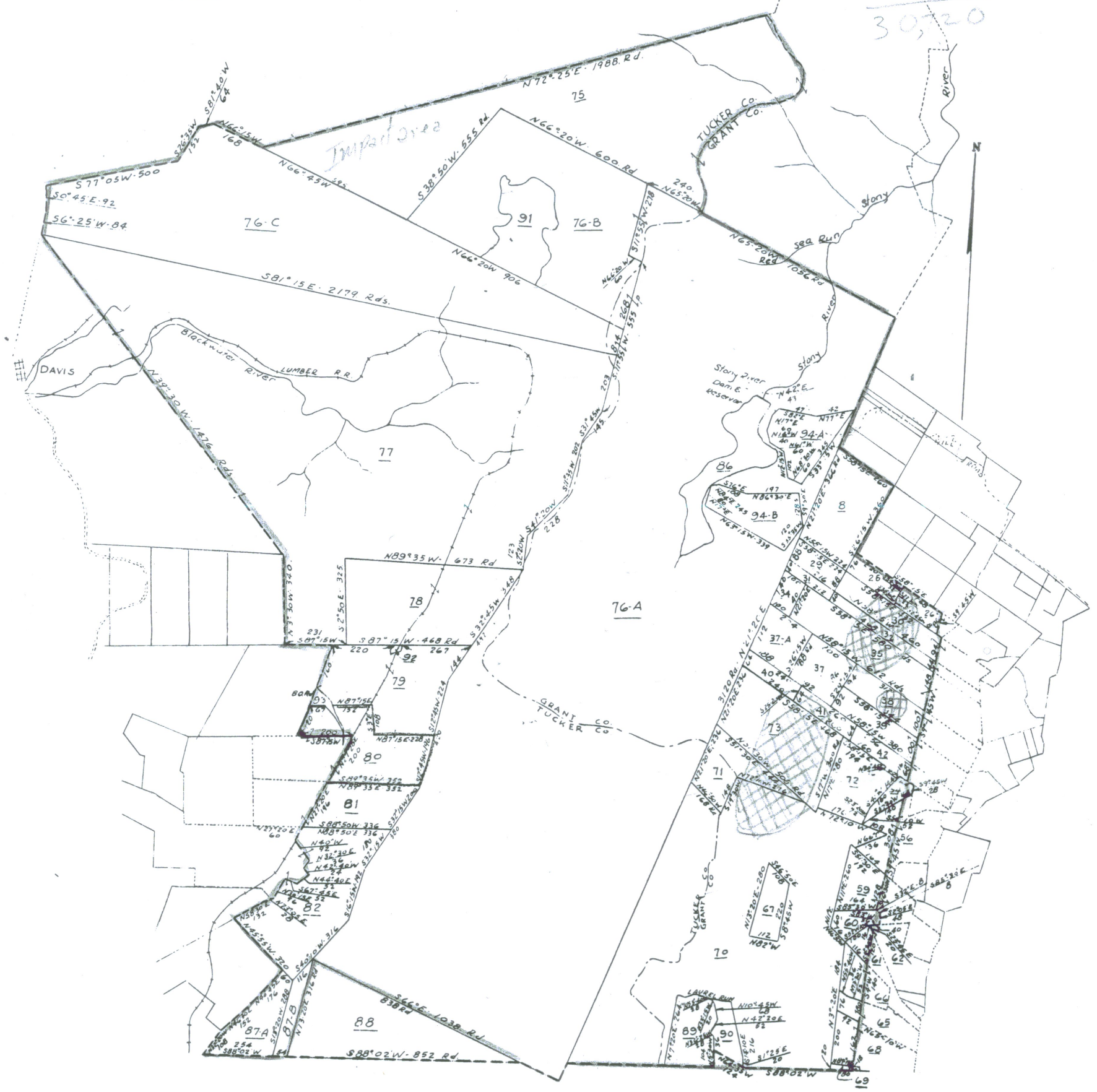


1"=1 Mi±
LEASE BOUNDARY
LEASE BOUNDARY
FAIRFAX
Davis
Canby
Beaver
Blackwater
River
Stony
River
Helmick
Run
ALLEGHENY
FRONT
NEW
CREEK
KNOBS
WALKER
MOUNTAIN

0 40
60
3840 acres
48 sq mi
640
920
288
30,720

LEASE AREA
IMPACT AREA
WEST VIRGINIA MANEUVER AREA
TUCKER & GRANT COUNTIES
ELKINS, WEST VIRGINIA

0 1/4 1/2 3/4 1 MILE



U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EARLE H. CLAPP, ACTING CHIEF
T. W. NORCROSS CHIEF, DIVISION OF ENGINEERING
MONONGAHELA
NATIONAL FOREST
POTOMAC RANGER DISTRICT
WEST VIRGINIA
1941
Scale
0 ½ 1 2 3 4 MILES
LEGEND
National Forest Boundary
Adjacent National Forest Bd'y
Ranger District Boundary
Lands Acquired and being Acquired
Good Motor Road
Poor Motor Road
Road not Passable to Motors
Trail
Abandoned Railway Grade
Game or bird refuge boundary
Improved Recreation Area
Triangulation Station
Permanent Lookout Station
Triangulation Sta. & Permanent Lookout Station
U.S. Highway Route
State Route Number
Forest Service Route Number
House, Cabin, or Other Building
Schoolhouse
Church
Emergency lookout or observation point
Supervisor's Headquarters, Elkins, W. Va.
District Ranger Station, Petersburg, W. Va.
CHEAT RANGER DISTRICT
GREENBRIER RANGER DISTRICT
GEORGE WASHINGTON NATIONAL FOREST
FLAT ROCK PLAINS GAME BREEDING AREA
4242 Acs Cleared By Lt. D. R. Ryan Nov. 1945
Dobbin Slashings
Impact
Blackbird Knob
Rohrbaugh Schemes
Red Cr Cabin
Shell Location
Meet Chas Breck Loneville
Sheriff Carl Weimer
Store Moysville 0830
Virgil Starcsfield
TO SCHERR 8¼ MILES
MAYSVILLE 1½ MILES
TO PETERSBURG 1½ MILES
TO CRABBOTTOM 1½ MILES
TO COVINGTON 67 MILES
TO SUGAR GROVE 1 MILE
TO HARRISONBURG 20 MILES
Spruce Knob
Seneca Rock
Franklin
Circleville
Hopeville
Upper Tract
Fort Seybert
Brandywine
Osceola
Gandy
Job
Harman (PO)
WEST VIRGINIA
VIRGINIA
PENDLETON CO
HIGHLAND CO
ROCKINGHAM CO
RANDOLPH CO
TUCKER CO
GRANT CO
POCAHONTAS CO
NAL OFFICE WASHINGTON D.C.
SERVICE AND OTHER SURVEYS
TRACED BY R.S. SHAW, 1940
1941 BY S.L.J.
Polyconic projection, North American datum
BOUNDARY OF MANEUVER AREA.
AREA COVERED BY FORESTRY PERMIT.

DEPARTMENT OF THE INTERIOR
ALBERT B. FALL, SECRETARY
U. S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

TOPOGRAPHY

STATE OF WEST VIRGINIA
I. C. WHITE
STATE GEOLOGIST

WEST VIRGINIA
PETERSBURG QUADRANGLE

ENGRAVED 1921 BY U.S.G.S.

C. H. Birdseye, Chief Topographic Engineer.
Frank Sutton, Geographer in charge.
Topography by E. L. Ireland, R. T. Evans, Roscoe Reeves, J. M. Rawls, R. C. Seitz, W. K. McKinley, and J. J. Murphy.
Control by E. L. McNair, F. L. Shalibo, and Walter McCrea.
Surveyed in 1919-1920.

SURVEYED IN COOPERATION WITH THE STATE OF WEST VIRGINIA.

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet.
Datum is mean sea level.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1920

Polyconic projection. North American datum.
5000 yard grid based upon U. S. zone system, B

W. VA.-VA.
PETERSBURG
Edition of 1922.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
REPRESENTED BY THE
GEOLOGICAL AND ECONOMIC SURVEY

WEST VIRGINIA
ONEGO QUADRANGLE

C.H. Birdseye, Chief Topographic Engineer.
Frank Sutton, Topographic Engineer in charge.
Topography by E.I. Ireland, R.C. Seitz, W.K. McKinley, and Roscoe Reeves.
Control by E.L. McNair, Walter McCrea, and F.L. Shalibo.
Surveyed in 1919-1920.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1920

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1963
MR 5372

SCALE 1:62500

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

Polyconic projection. 1927 North American datum
10,000-foot grids based on West Virginia (South) and West Virginia (North) rectangular coordinate systems
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

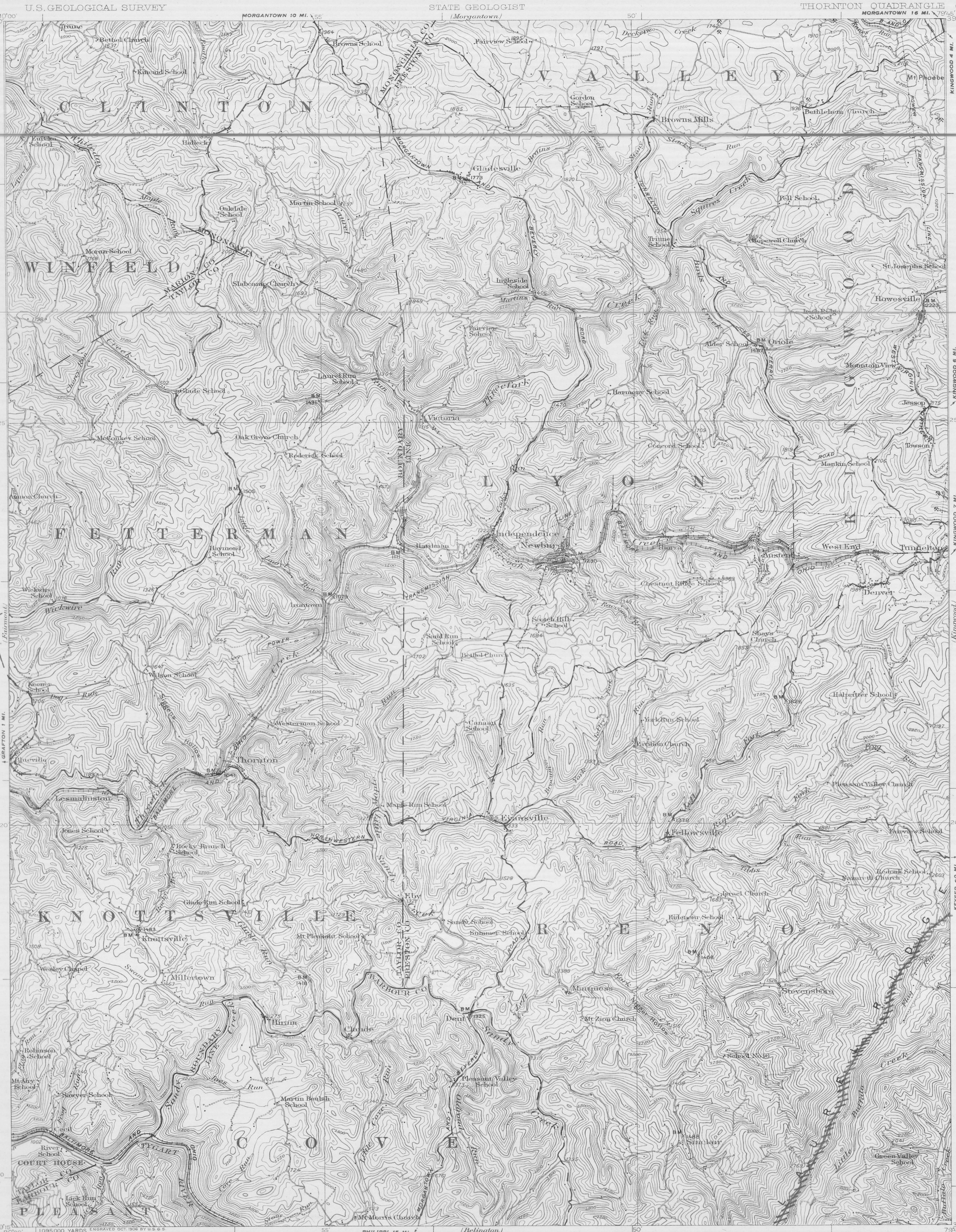
ONEGO, W. VA.
N 3845—W7915/15
1920

FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
I. C. WHITE
STATE GEOLOGIST

WEST VIRGINIA
THORNTON QUADRANGLE



ENGRAVED OCT. 1906 BY U.S.G.S.

H. M. Wilson, Geographer.
A. M. Walker, in charge of section.
Topography by A. M. Walker, W. N. Brown, and J. H. Sinclair.
Control by Sledge Tatum and C. A. Clunet.
Surveyed in 1904-1905.
Culture revised in 1923 by J. F. McBeth.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION 1925

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet.
Datum is mean sea level.

S W S
Brown

Polyconic projection. North American datum
5000 yard grid based upon U.S. zone system, B

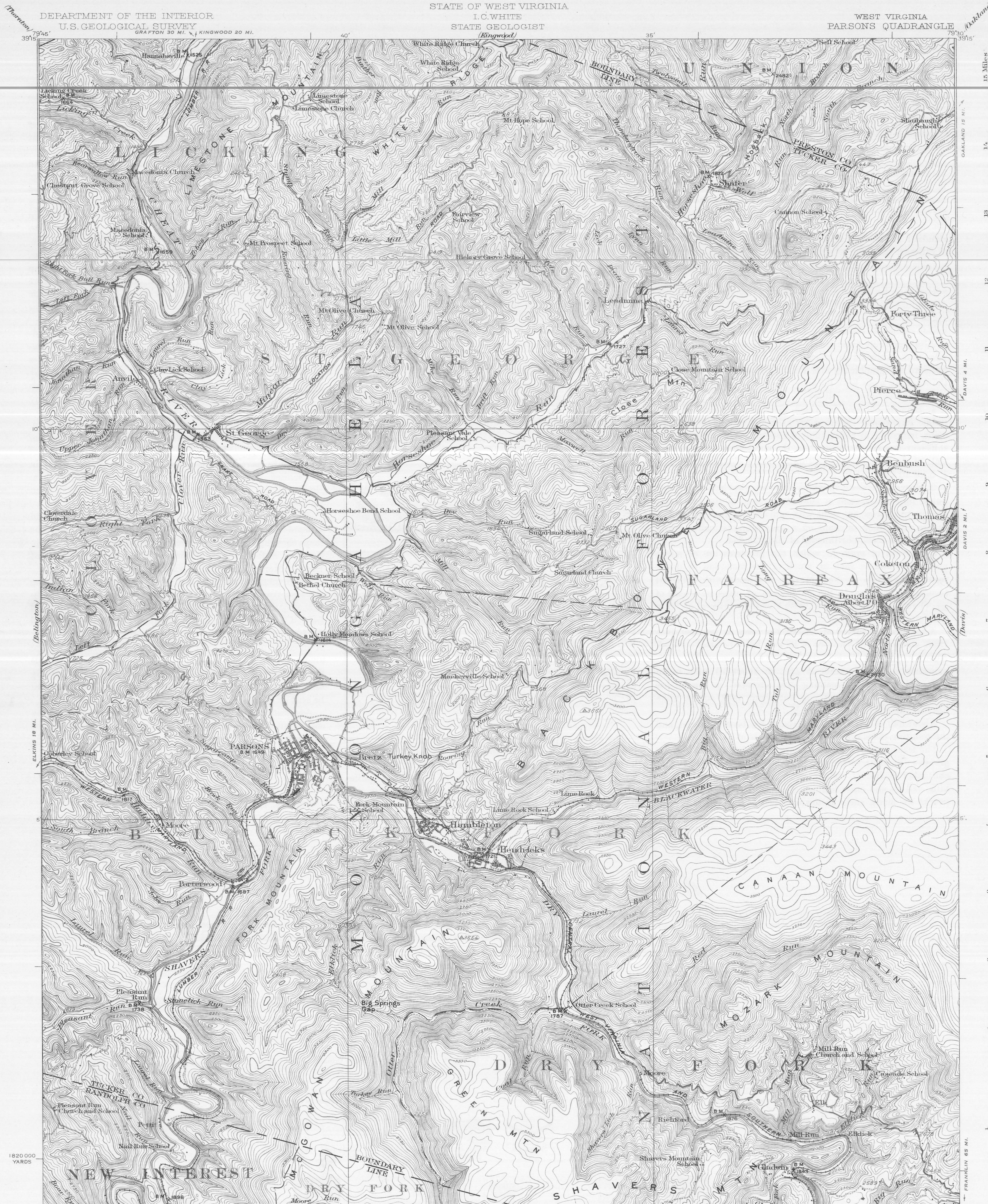
THROUGH ROUTES
SECONDARY ROUTES

THORNTON, W. VA.
Edition of 1926

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
I.C. WHITE
STATE GEOLOGIST

WEST VIRGINIA
PARSONS QUADRANGLE



H.M. Wilson, Geographer
A.M. Walker, in charge of section
Topography by A.M. Walker, J.I. Gayetty, and Hoyt L. Johnston
Assistants, J.R. McMillen, D.B. Reger, and R.A. Kiger
Control by Sledge Tatum, W.H. Lovell and J.H. Sinclair
Surveyed in 1905-1906
Culture revised in 1924 by G.E. Sisson

TRUE NORTH
MAGNETIC NORTH
4½°
APPROXIMATE MEAN DECLINATION, 1924

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

5000 0 5000 10000 15000 20000 Feet

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet
Datum is mean sea level

Polyconic projection. North American datum
5000 yard grid based upon U.S. zone system, B

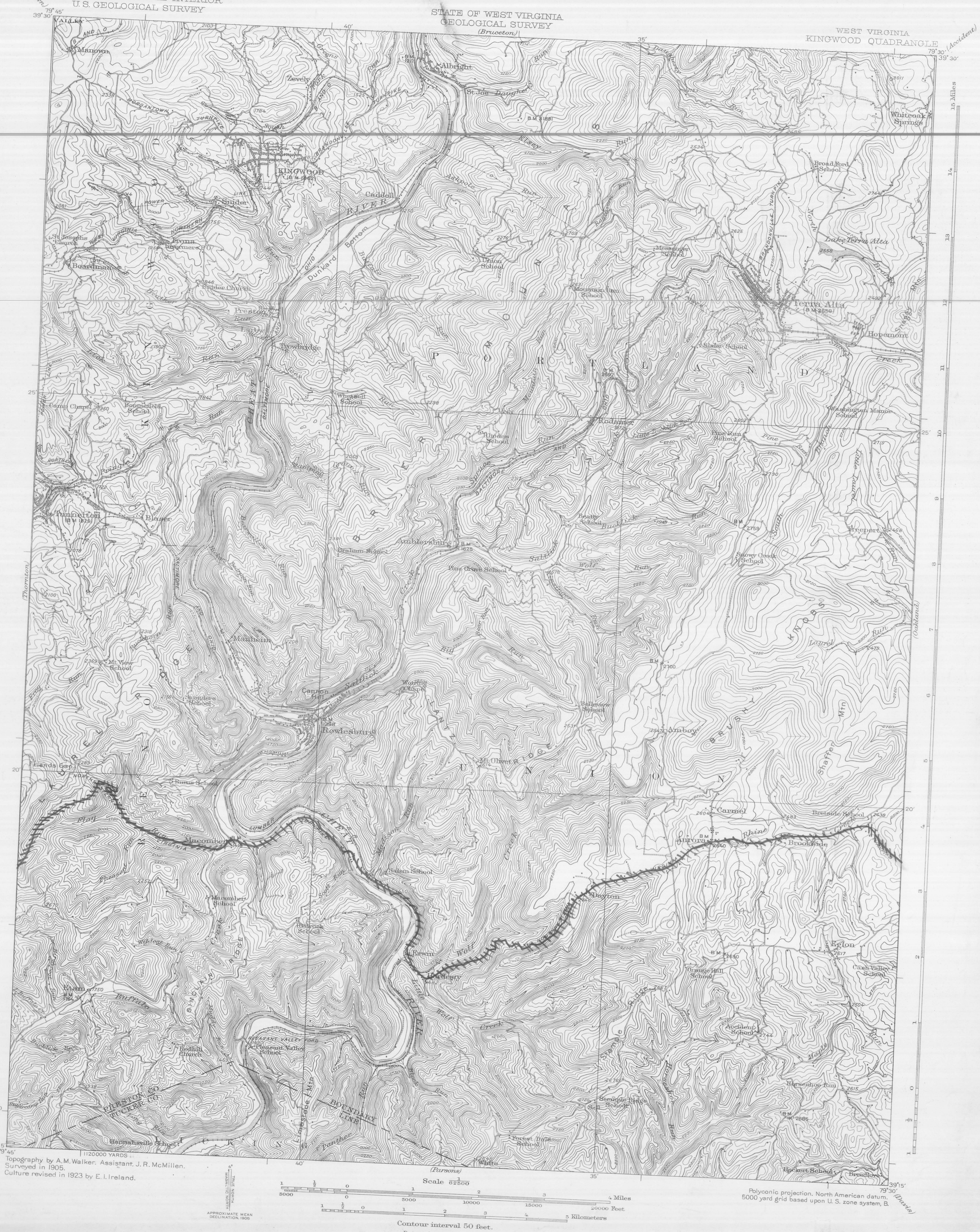
THROUGH ROUTES
SECONDARY ROUTES

PARSONS, W. VA.
Edition of 1926

DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
GEOLOGICAL SURVEY

WEST VIRGINIA
KINGWOOD QUADRANGLE



Topography by A. M. Walker. Assistant, J. R. McMillen.
Surveyed in 1905.
Culture revised in 1923 by E. I. Ireland.

Polyconic projection. North American datum.
5000 yard grid based upon U. S. zone system, B.

KINGWOOD, W. VA.
Edition of 1925.
reprinted 1932

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
I. C. WHITE
STATE GEOLOGIST

WEST VIRGINIA
HORTON QUADRANGLE

Topography by E. I. Ireland and R. C. Seitz.
Surveyed in 1916 and 1921-1922.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1922

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

5000 0 5000 10000 15000 20000 Feet

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet
Datum is mean sea level

Polyconic projection. North American datum.
5000 yard grid based upon U.S. zone system, B.

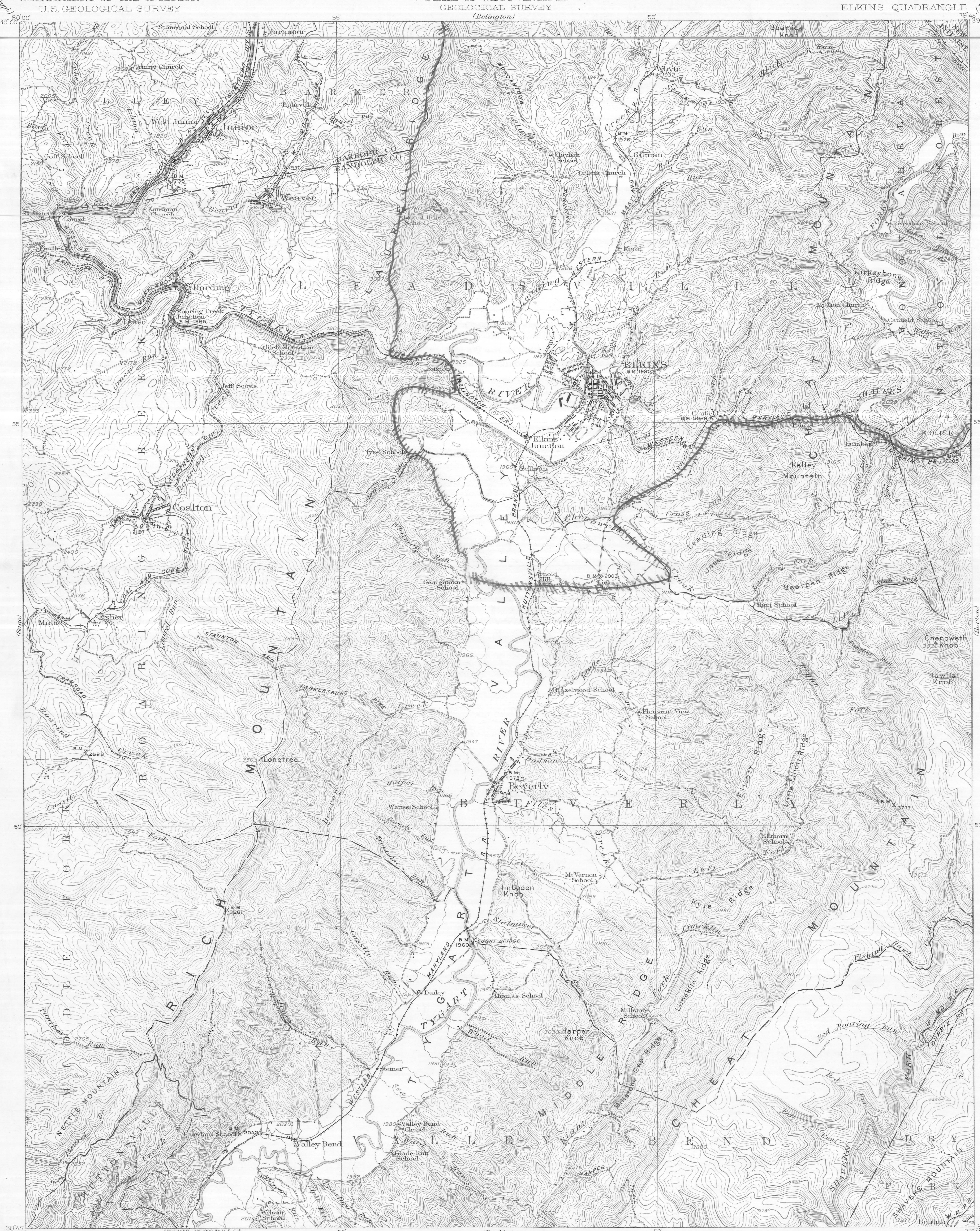
THROUGH ROUTES
SECONDARY ROUTES

HORTON, W. VA.
Edition of 1924

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
GEOLOGICAL SURVEY

WEST VIRGINIA
ELKINS QUADRANGLE



Frank Sutton, Geographer in charge.
Topography by T. Foster Slaughter, J.R. Eakin, and S.P. Floore.
Control by E.L. McNair, D.H. Baldwin, and J.H. Sinclair.
Surveyed in 1907.

SURVEYED IN COOPERATION WITH THE STATE OF WEST VIRGINIA.

ENGRAVED JAN. 1909 BY U.S.G.S.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION 1907.

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet.
Datum is mean sea level.

Edition of May 1909, reprinted 1929.
Polyconic projection. North American datum

ELKINS, W. VA.

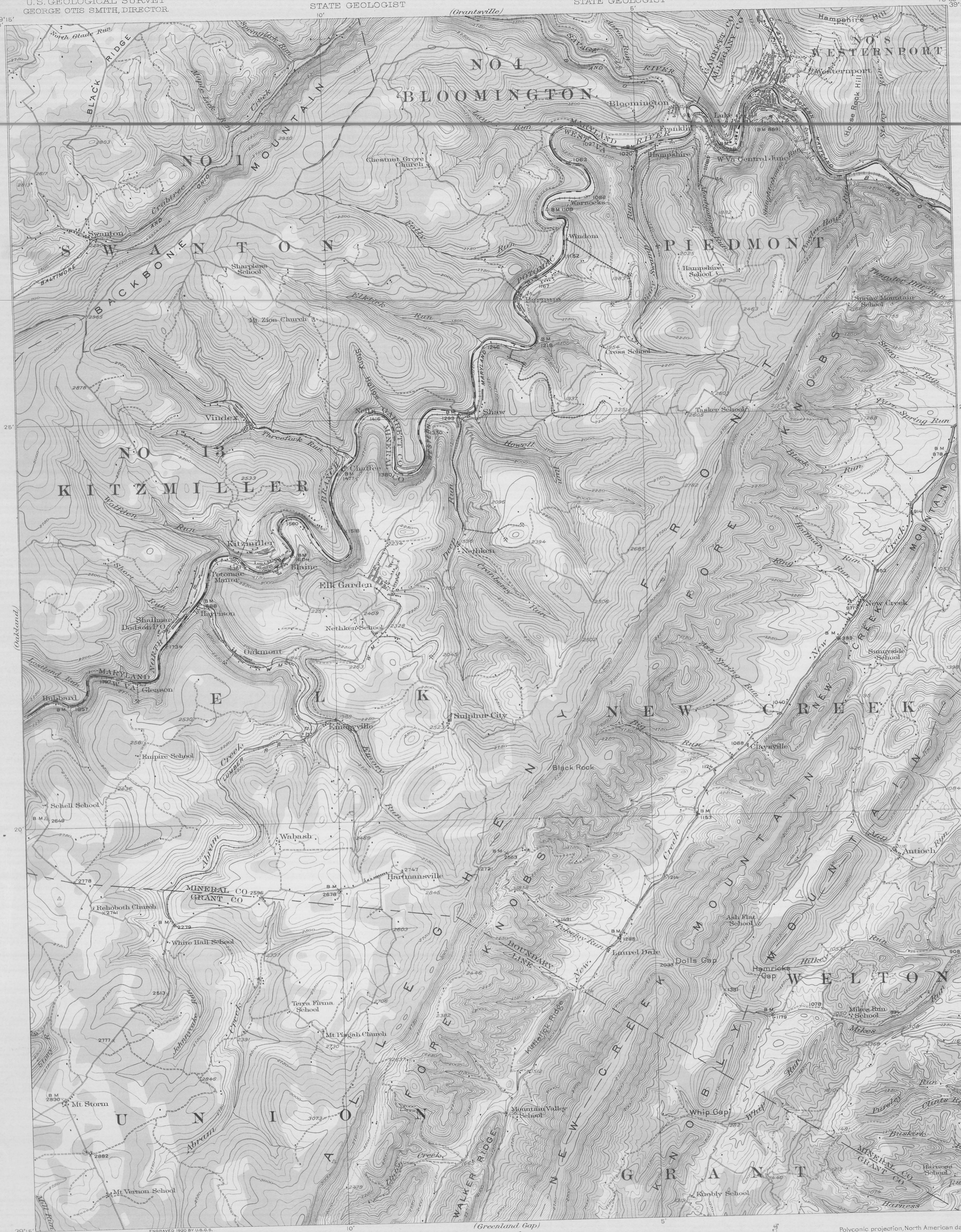
TOPOGRAPHY

DEPARTMENT OF THE INTERIOR
ALBERT B. FALL, SECRETARY
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

STATE OF WEST VIRGINIA
I.C. WHITE
STATE GEOLOGIST

STATE OF MARYLAND
EDWARD BENNETT MATHEWS
STATE GEOLOGIST

WEST VIRGINIA-MARYLAND
ELK GARDEN QUADRANGLE



ENGRAVED 1920 BY U.S.G.S.

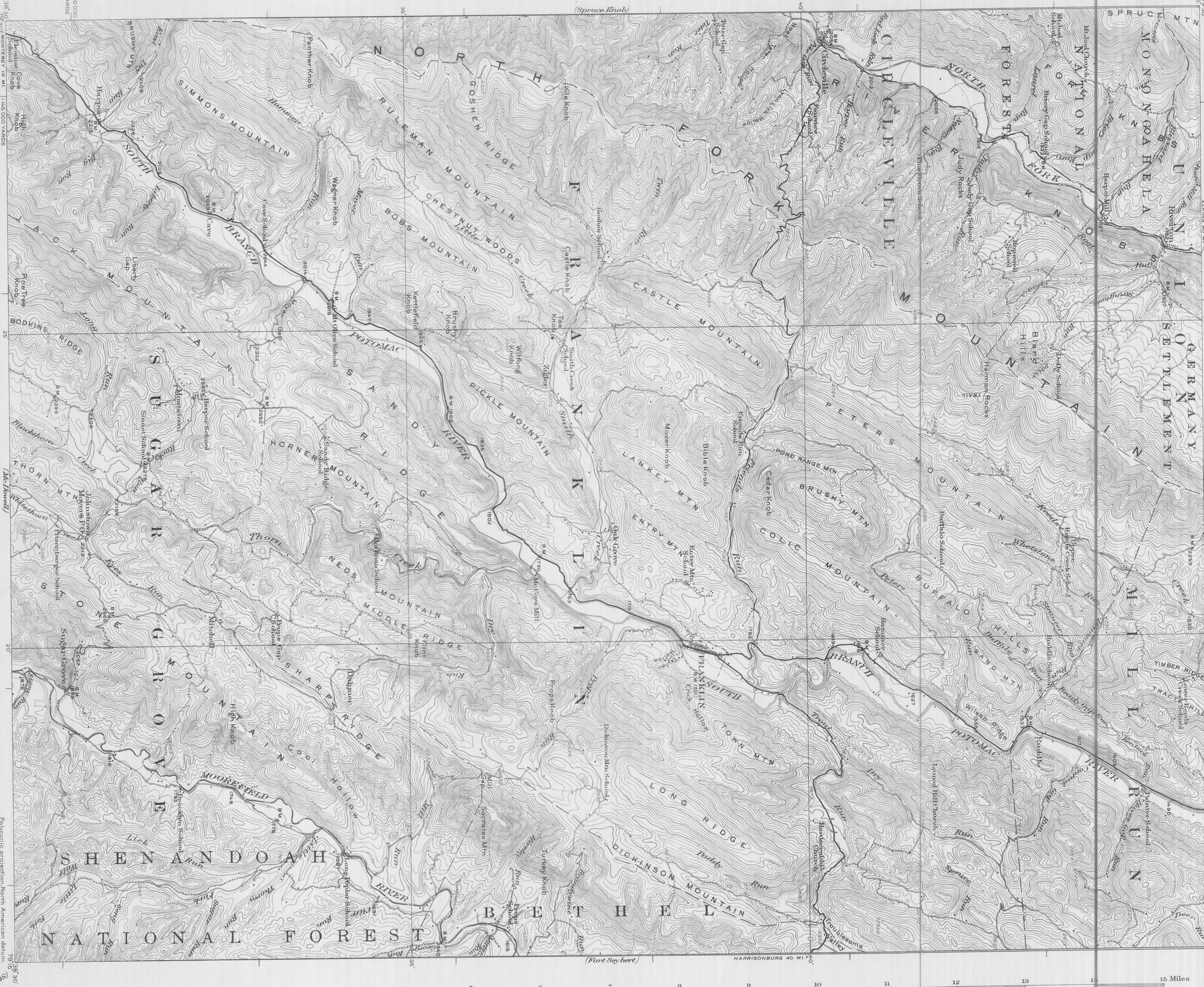
R.B. Marshall, Chief Geographer.
Frank Sutton, Geographer in charge.
Topography by E.I. Ireland, J.I. Gayetty, W.C. Hall, M.J. Gleissner, and A.T. Munson.
Control by U.S. Coast and Geodetic Survey, Baltimore and Ohio Railroad, Geo. T. Hawkins, J.B. Metcalfe, Jr., H.H. Hodgeson, E.E. Harris, K.F. Maxcy, and Walter McCrea.
Surveyed in 1898, 1899, 1916, and 1919.

Polyconic projection, North American datum.

Contour interval 50 feet.
Datum is mean sea level.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1919

ELK GARDEN
Edition of 1922.


DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
STATE OF WEST VIRGINIA
I.C.WHITE
STATE GEOLOGIST
WEST VIRGINIA
(PENDLETON COUNTY)
CIRCLEVILLE QUADRANGLE
MONTEREY 10 MI.
Topography by E.Ireland, J.P.Harrison, and H.R.Kilmer.
Surveyed in 1921-1922
Polyconic projection. North American datum.
5000 yard grid based upon U.S. zone system, B
Contour interval 50 feet
Datum is mean sea level
CIRCLEVILLE, W.VA.
Edition of 1924.
SHENANDOAH NATIONAL FOREST
GERMANY SETTLEMENT
MONONGAHELA NATIONAL FOREST
CIRCLEVILLE MOUNTAIN
NORTH FORK
SOUTH BRANCH
POTOMAC RIVER
SIMMONS MOUNTAIN
RULEMAN MOUNTAIN
GOSHEN RIDGE
CHESTNUT WOODS
BOBS MOUNTAIN
CASTLE MOUNTAIN
PETERS MOUNTAIN
PICKLE MOUNTAIN
LANKEY MTN
BRUSHY MTN
COLIC MOUNTAIN
BUFFALO
GAP MTN
TIMBER RIDGE
TRACY HILL
LONG RIDGE
DICKINSON MOUNTAIN
TOWN MTN
FRANKLIN
BETHEL
HORNER MOUNTAIN
NEDS MOUNTAIN
MIDDLE RIDGE
SHARP RIDGE
MOOREFIELD
BODKINS RIDGE
JACKMOUNTAIN
THORN MTN
STONE MOUNTAIN
SPRUCE MTN
(Spruce Knob)
(Monterey)
(Stuarton)
(Mc Dowell)
(Fort Seybert)
(Petersburg)
(Onego)
(Honaker)
HARRISONBURG 40 MI.
PETERSBURG 22 MI.
FLKINS 40 MI.
Scale 62500
Contour interval 50 feet
Datum is mean sea level
Kilometers
Miles
Feet
THROUGH ROUTES
SECONDARY ROUTES
MAGNETIC NORTH
TRUE NORTH
APPROXIMATE MEAN DECLINATION, 1922

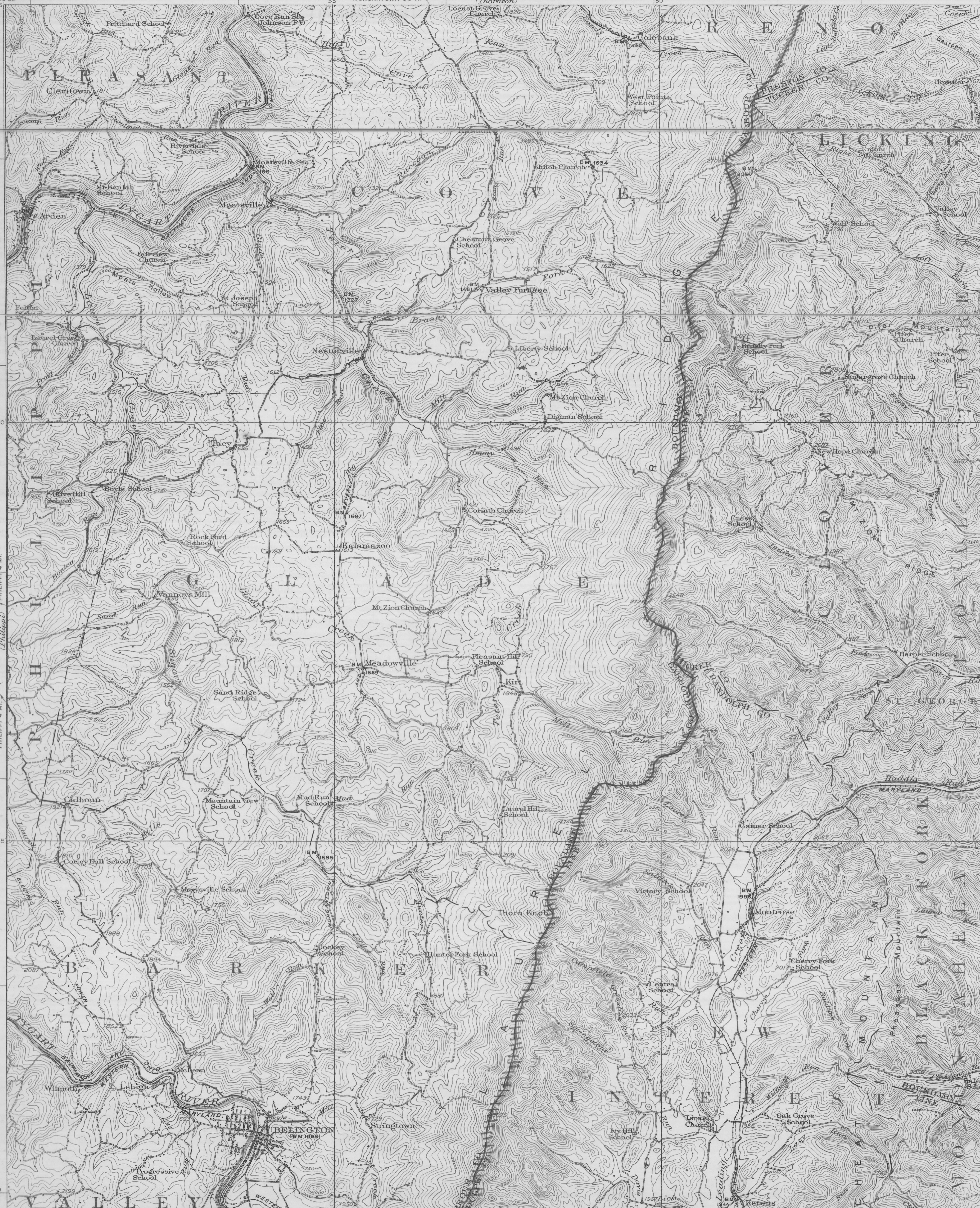
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF WEST VIRGINIA
I. C. WHITE
STATE GEOLOGIST

WEST VIRGINIA
BELINGTON QUADRANGLE

(Fairmont) (Thornton) (Kingwood)

80°00′ 39°15′ 55′ MORGANTOWN 35 MI. 50′ 79°45′ 39°15′



1820000 YARDS

39°00′ 80°00′ 1095000 YARDS ELKINS 12 MI. 55′ (Elkins) 50′ ELKINS 6 MI. 79°45′ 39°00′

(Sago) (Beverly) $\frac{1}{125000}$

PHILIPPI 4 MI. (Philippi) PARSONS 6 MI. (Parsons)

H. M. Wilson, Geographer
A. M. Walker, in charge of section
Topography by A. M. Walker and Hoyt L. Johnston, Assistant, J. R. McMillen
Control by Sledge Tatum and J. H. Sinclair
Surveyed in 1905
Culture revised in 1925 by E. I. Ireland and G. E. Sisson

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1925

Scale $\frac{1}{62500}$

1 ½ 0 1 2 3 4 Miles

5000 0 5000 10000 15000 20000 Feet

1 ½ 0 1 2 3 4 5 Kilometers

Contour interval 50 feet
Datum is mean sea level

Polyconic projection. North American datum
5000 yard grid based upon U.S. zone system. B

THROUGH ROUTES
SECONDARY ROUTES

BELINGTON, W. VA.
Edition of 1927

EDR Historical Topographic Map Report

Northern Impact Area
Camp 70 Road
Davis, WV 26260

Inquiry Number: 2026123.4

September 11, 2007

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Rd
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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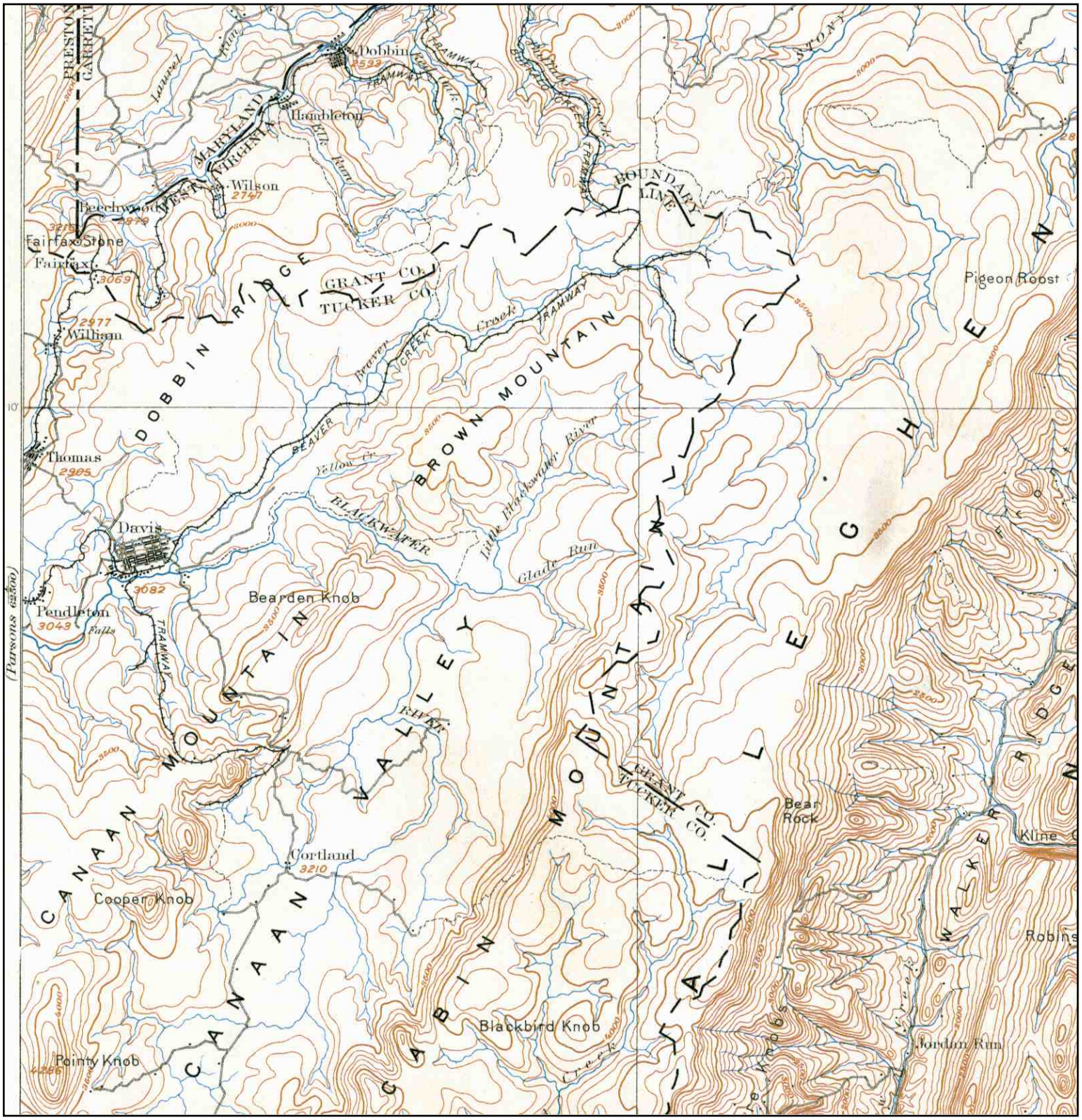
Historical Topographic Map

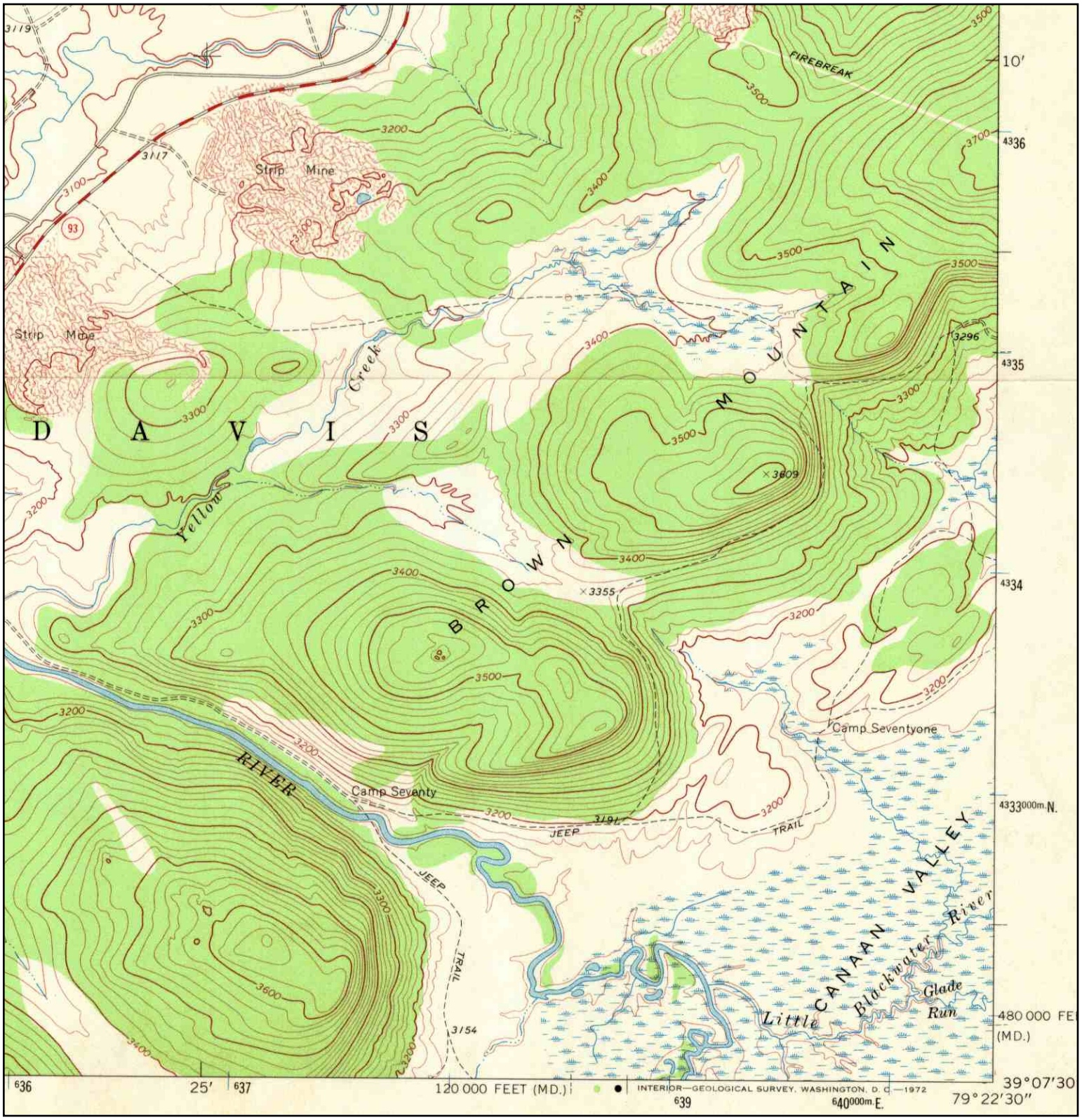


N	TARGET QUAD NAME: PIEDMONT MAP YEAR: 1895 SERIES: 30 SCALE: 1:125000	SITE NAME: Northern Impact Area ADDRESS: Camp 70 Road Davis, WV 26260 LAT/LONG: 39.1361 / 79.4017	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026123.4 RESEARCH DATE: 09/11/2007

Historical Topographic Map

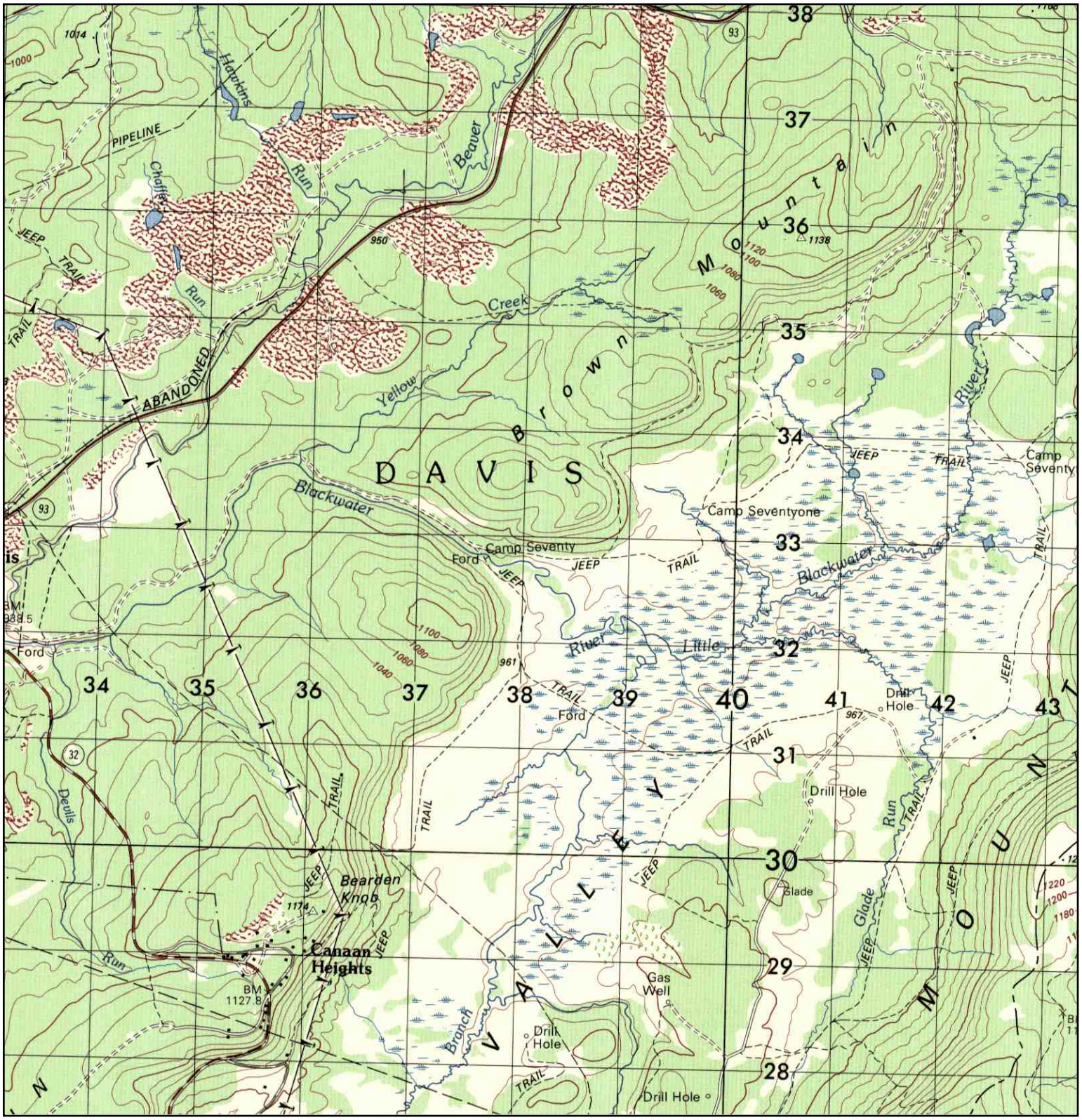
N	TARGET QUAD NAME: DAVIS MAP YEAR: 1921 SERIES: 15 SCALE: 1:62500	SITE NAME: Northern Impact Area ADDRESS: Camp 70 Road Davis, WV 26260 LAT/LONG: 39.1361 / 79.4017	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026123.4 RESEARCH DATE: 09/11/2007

Historical Topographic Map



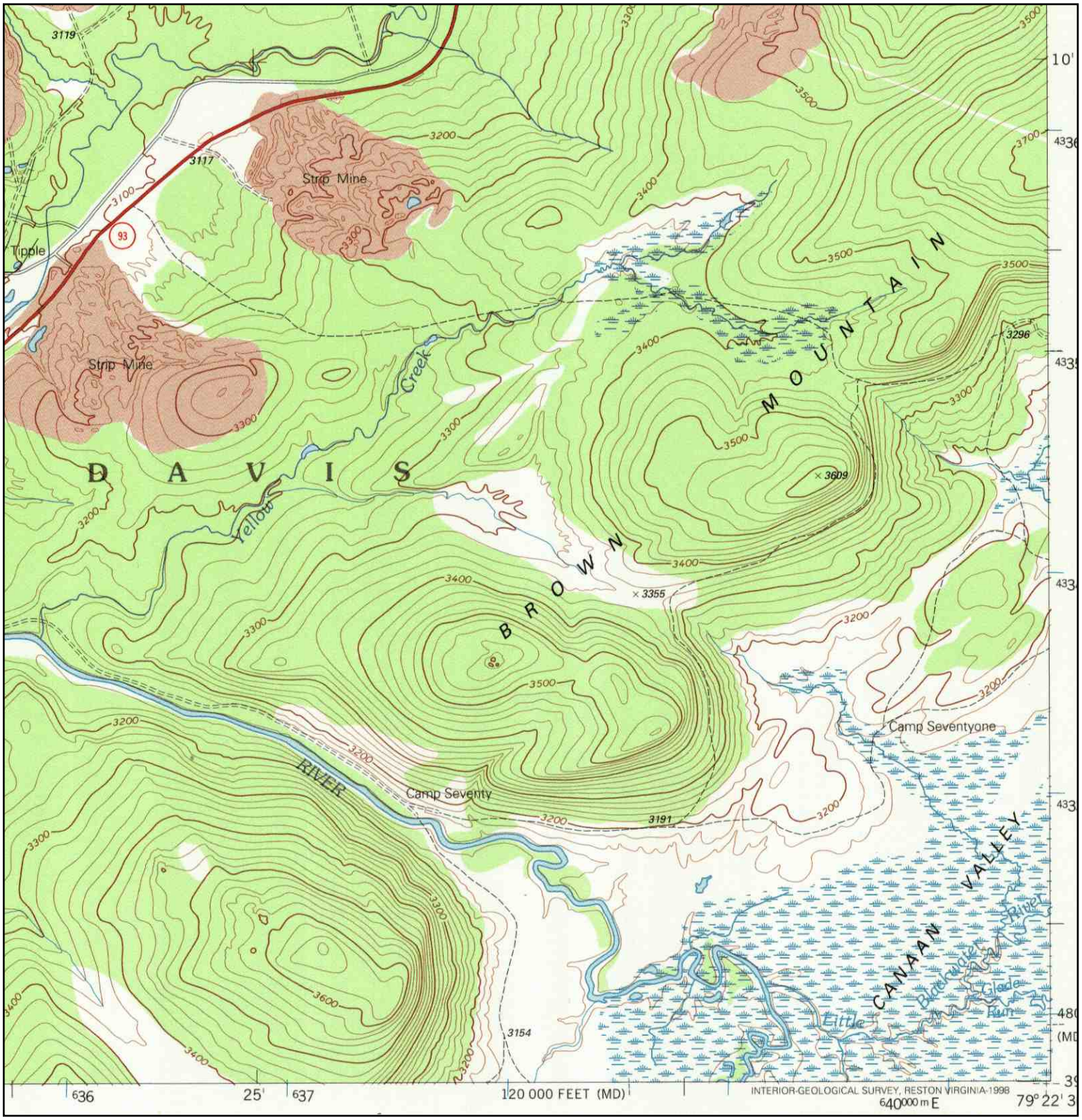
N	TARGET QUAD NAME: DAVIS MAP YEAR: 1967 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Northern Impact Area ADDRESS: Camp 70 Road Davis, WV 26260 LAT/LONG: 39.1361 / 79.4017	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026123.4 RESEARCH DATE: 09/11/2007

Historical Topographic Map



N	TARGET QUAD NAME: DAVIS MAP YEAR: 1978 SERIES: 15 SCALE: 1:50000	SITE NAME: Northern Impact Area ADDRESS: Camp 70 Road Davis, WV 26260 LAT/LONG: 39.1361 / 79.4017	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026123.4 RESEARCH DATE: 09/11/2007

Historical Topographic Map



N	TARGET QUAD NAME: DAVIS MAP YEAR: 1995 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Northern Impact Area ADDRESS: Camp 70 Road Davis, WV 26260 LAT/LONG: 39.1361 / 79.4017	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026123.4 RESEARCH DATE: 09/11/2007

EDR Historical Topographic Map Report

Elkins Quarter Master Unit
Henry Avenue
Elkins, WV 26241

Inquiry Number: 2024428.4

September 10, 2007

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Rd
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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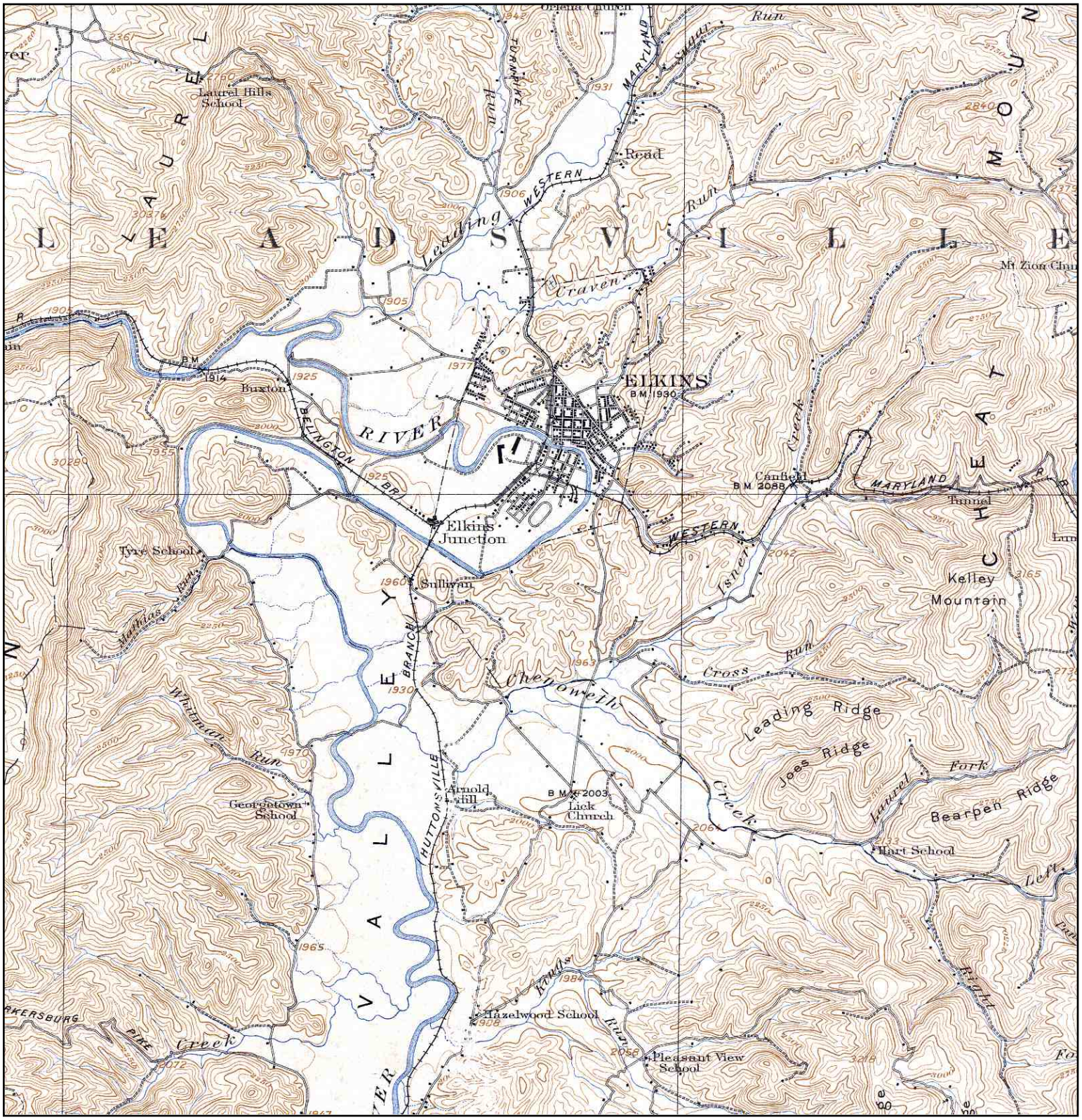
Historical Topographic Map

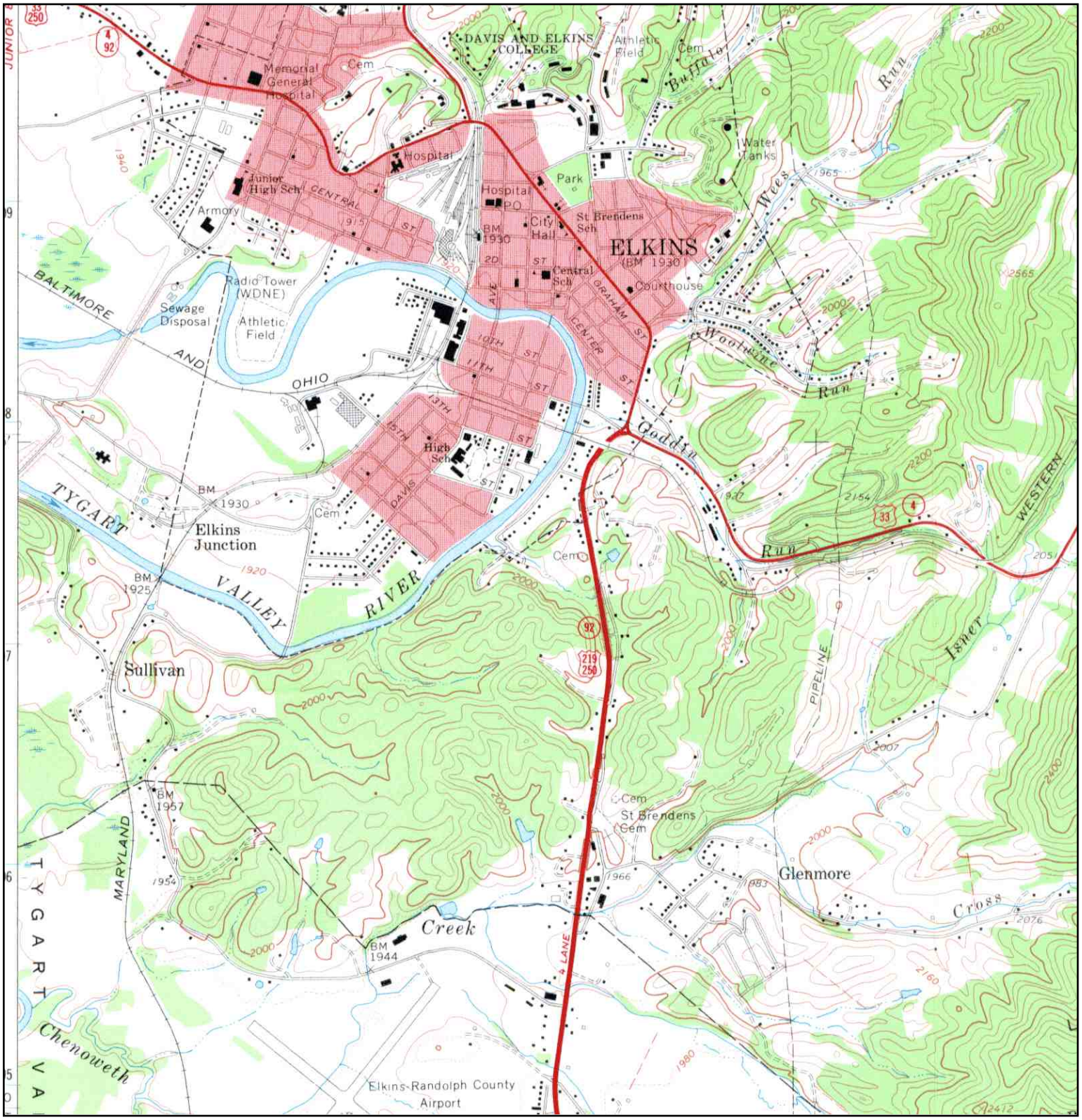
N	TARGET QUAD NAME: BEVERLY MAP YEAR: 1892 SERIES: 30 SCALE: 1:125000	SITE NAME: Elkins Quarter Master Unit ADDRESS: Henry Avenue Elkins, WV 26241 LAT/LONG: 38.9145 / 79.8504	CLIENT: U.S. Army Corps of Engineers CONTACT: Nickolas McHenry INQUIRY#: 2024428.4 RESEARCH DATE: 09/10/2007

Historical Topographic Map



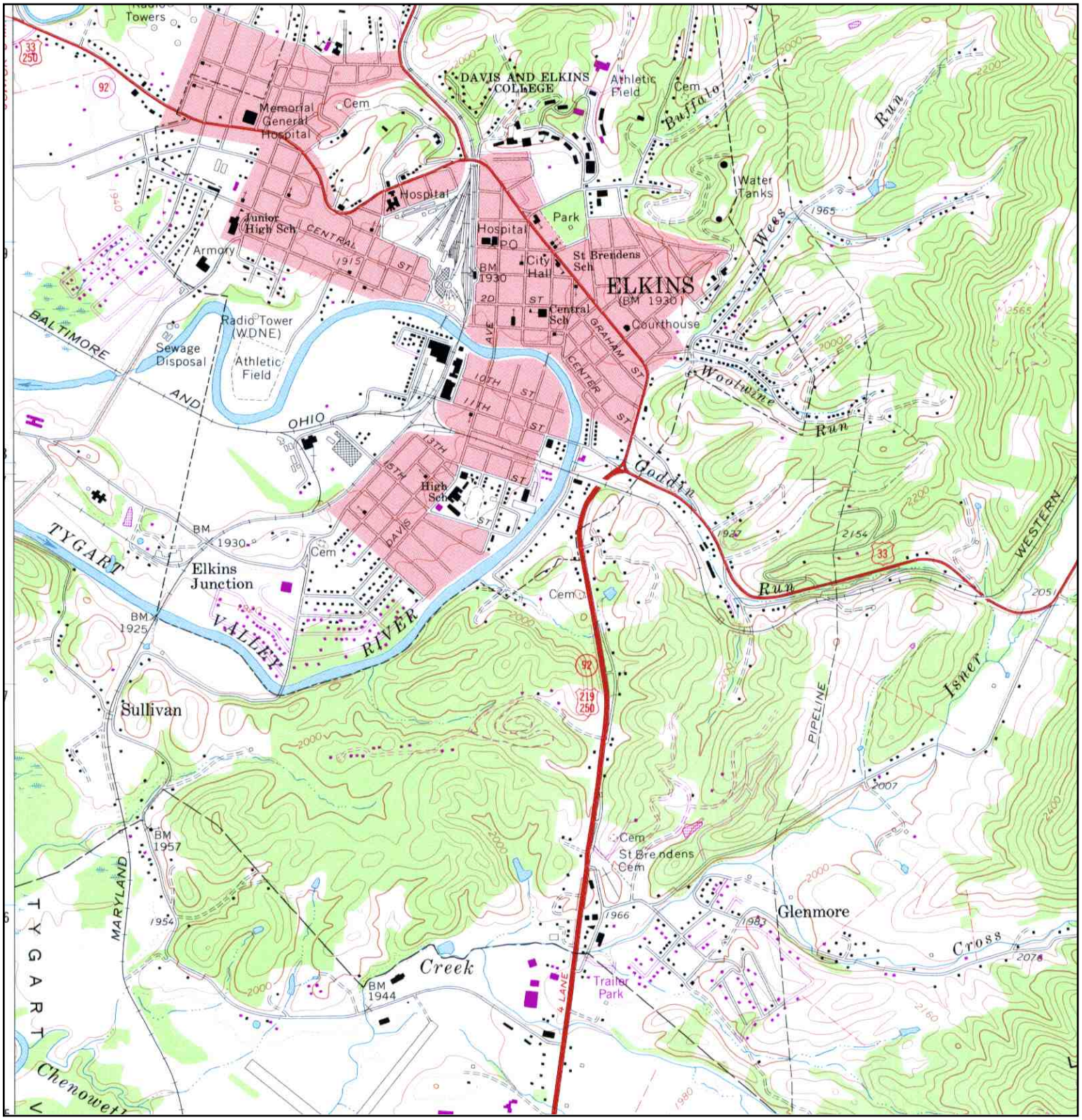
N	TARGET QUAD NAME: ELKINS MAP YEAR: 1909 SERIES: 15 SCALE: 1:62500	SITE NAME: Elkins Quarter Master Unit ADDRESS: Henry Avenue Elkins, WV 26241 LAT/LONG: 38.9145 / 79.8504	CLIENT: U.S. Army Corps of Engineers CONTACT: Nickolas McHenry INQUIRY#: 2024428.4 RESEARCH DATE: 09/10/2007

Historical Topographic Map



N	TARGET QUAD NAME: ELKINS MAP YEAR: 1969 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Elkins Quarter Master Unit ADDRESS: Henry Avenue Elkins, WV 26241 LAT/LONG: 38.9145 / 79.8504	CLIENT: U.S. Army Corps of Engineers CONTACT: Nickolas McHenry INQUIRY#: 2024428.4 RESEARCH DATE: 09/10/2007

Historical Topographic Map



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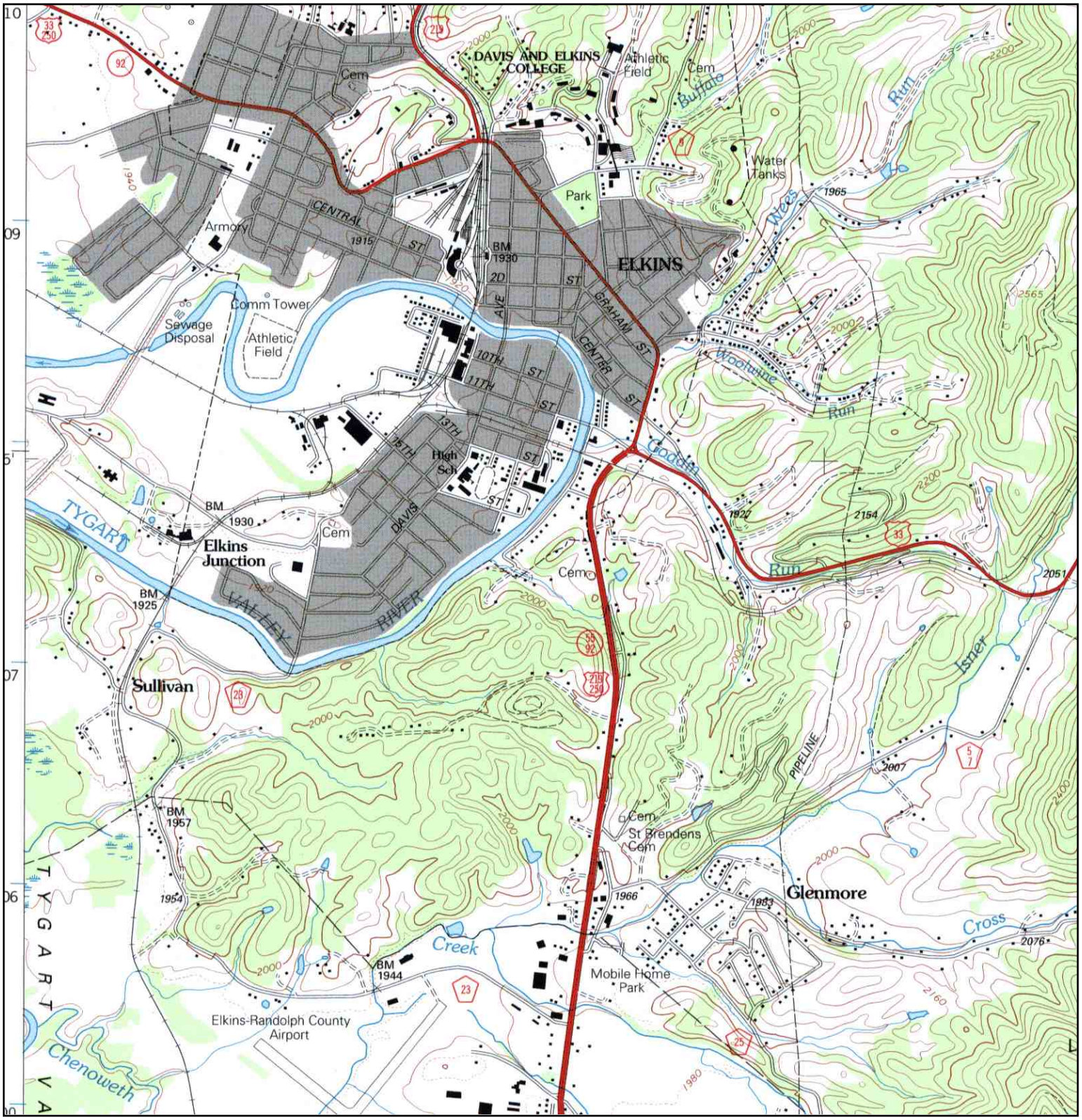

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Ordnance Base Shop
US Highway 219/250
Beverly, WV 26241

Inquiry Number: 2026162.4

September 11, 2007

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Historical Topographic Map

N	TARGET QUAD NAME: ELKINS MAP YEAR: 1909 SERIES: 15 SCALE: 1:62500	SITE NAME: Ordnance Base Shop ADDRESS: US Highway 219/250 Beverly, WV 26241 LAT/LONG: 38.8731 / 79.8581	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026162.4 RESEARCH DATE: 09/11/2007

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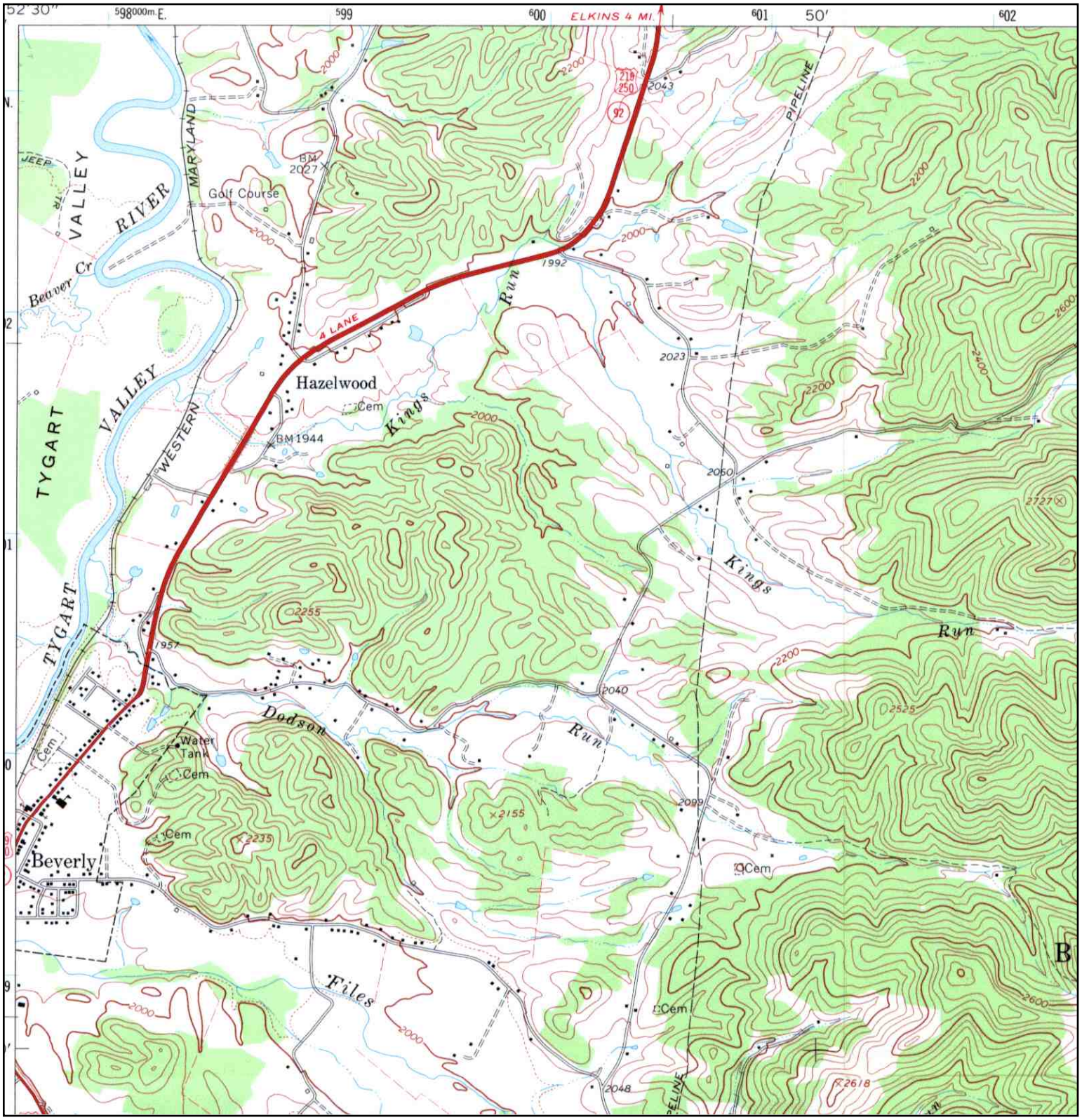

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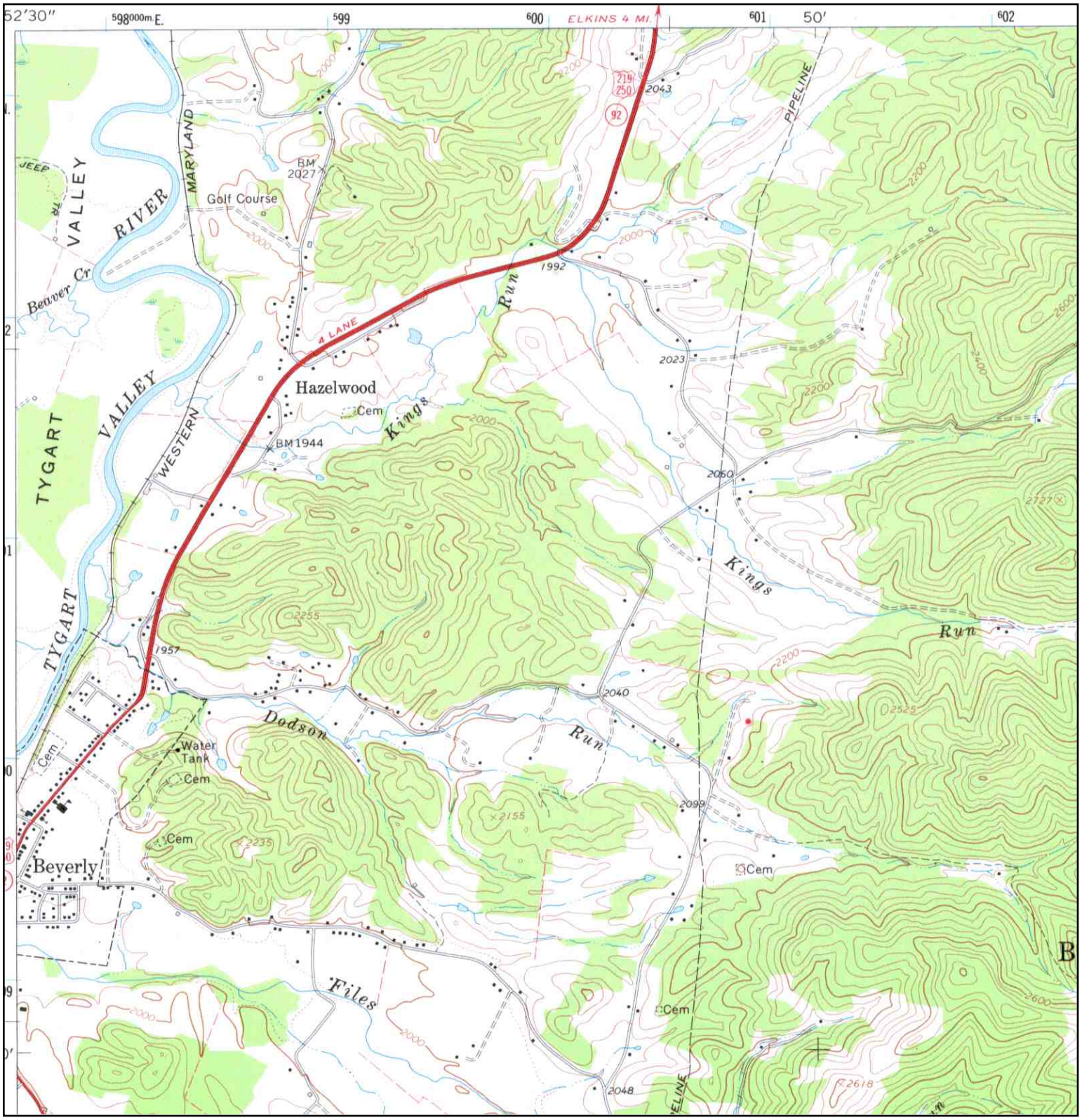

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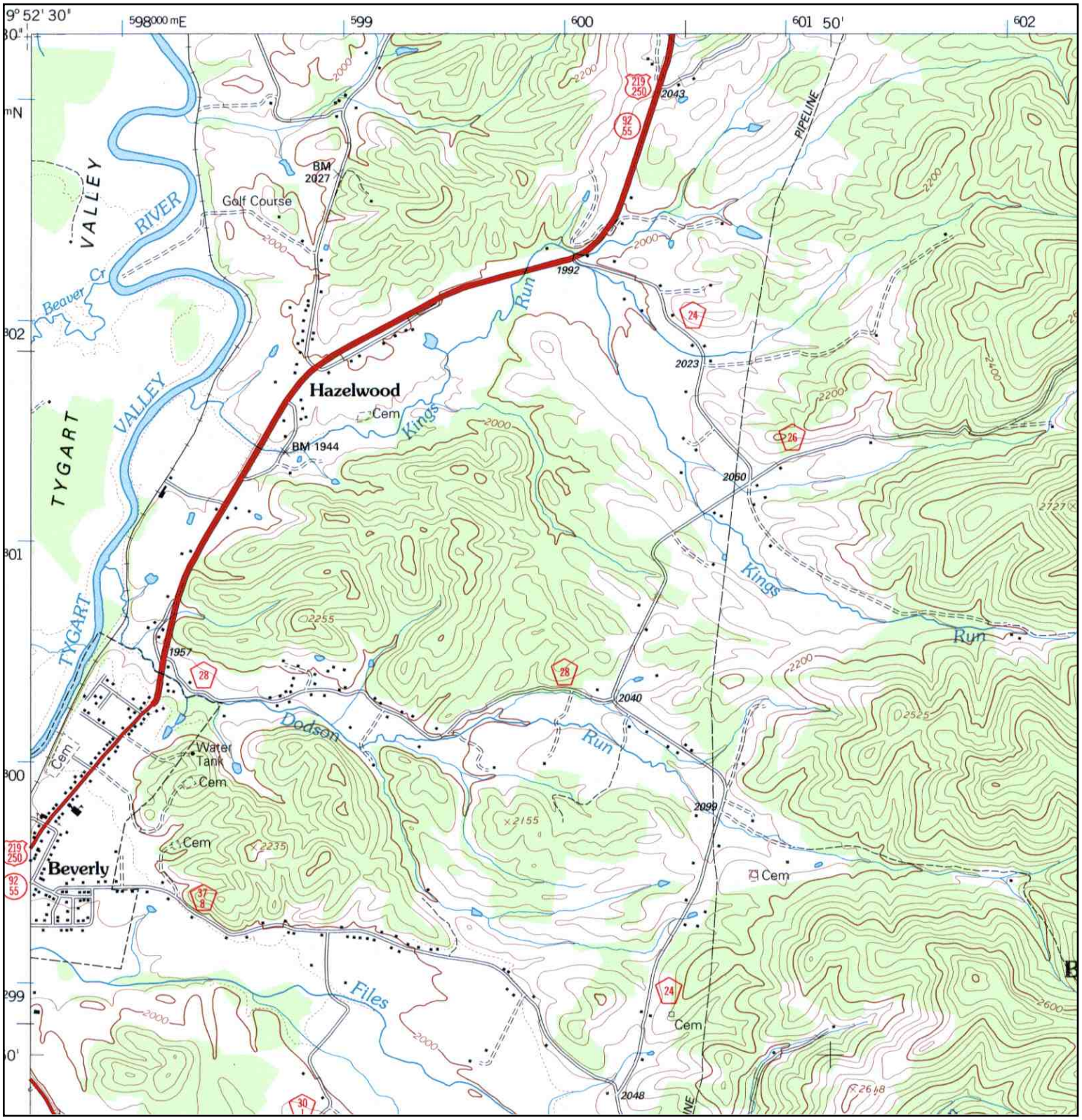

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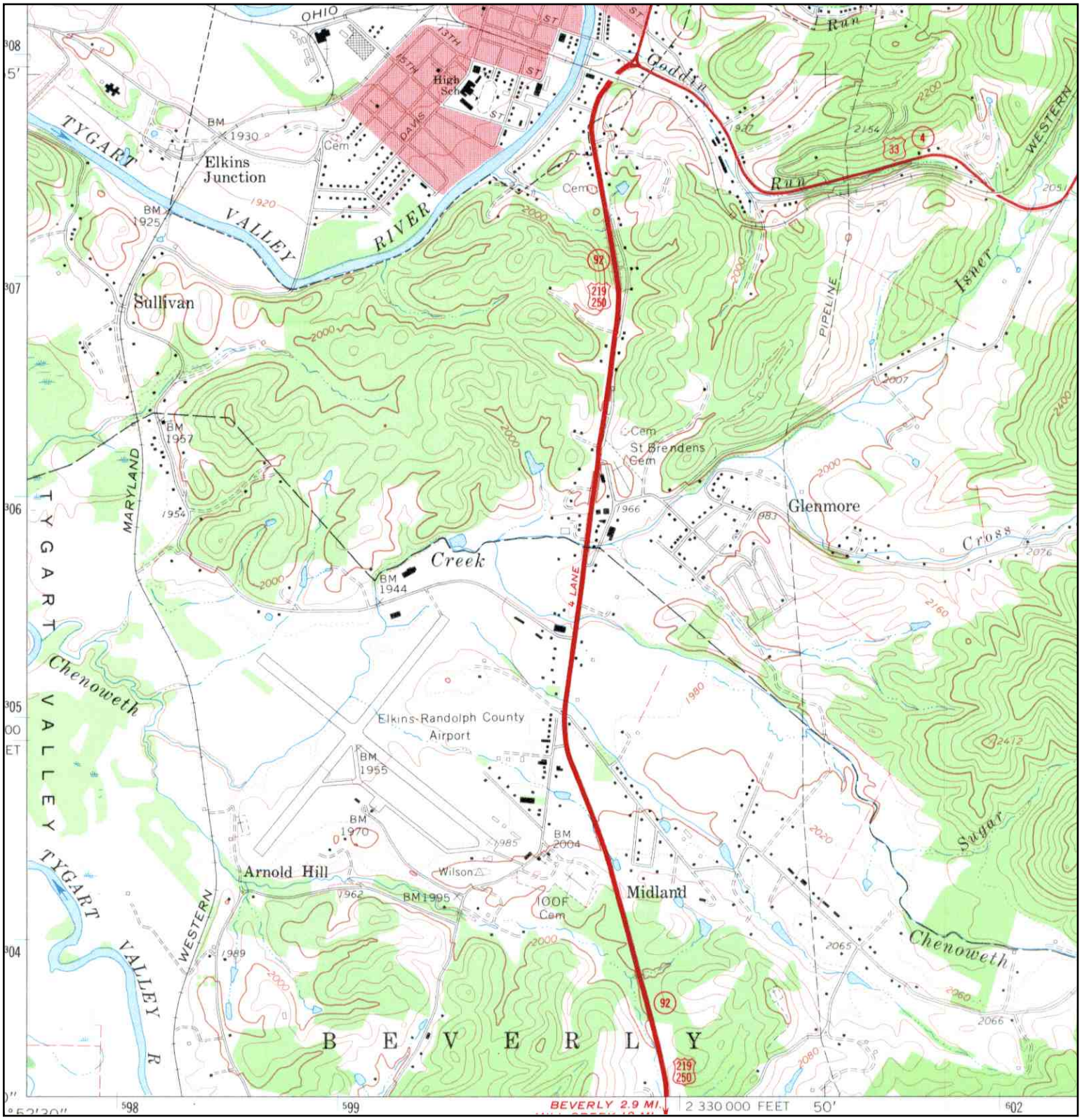

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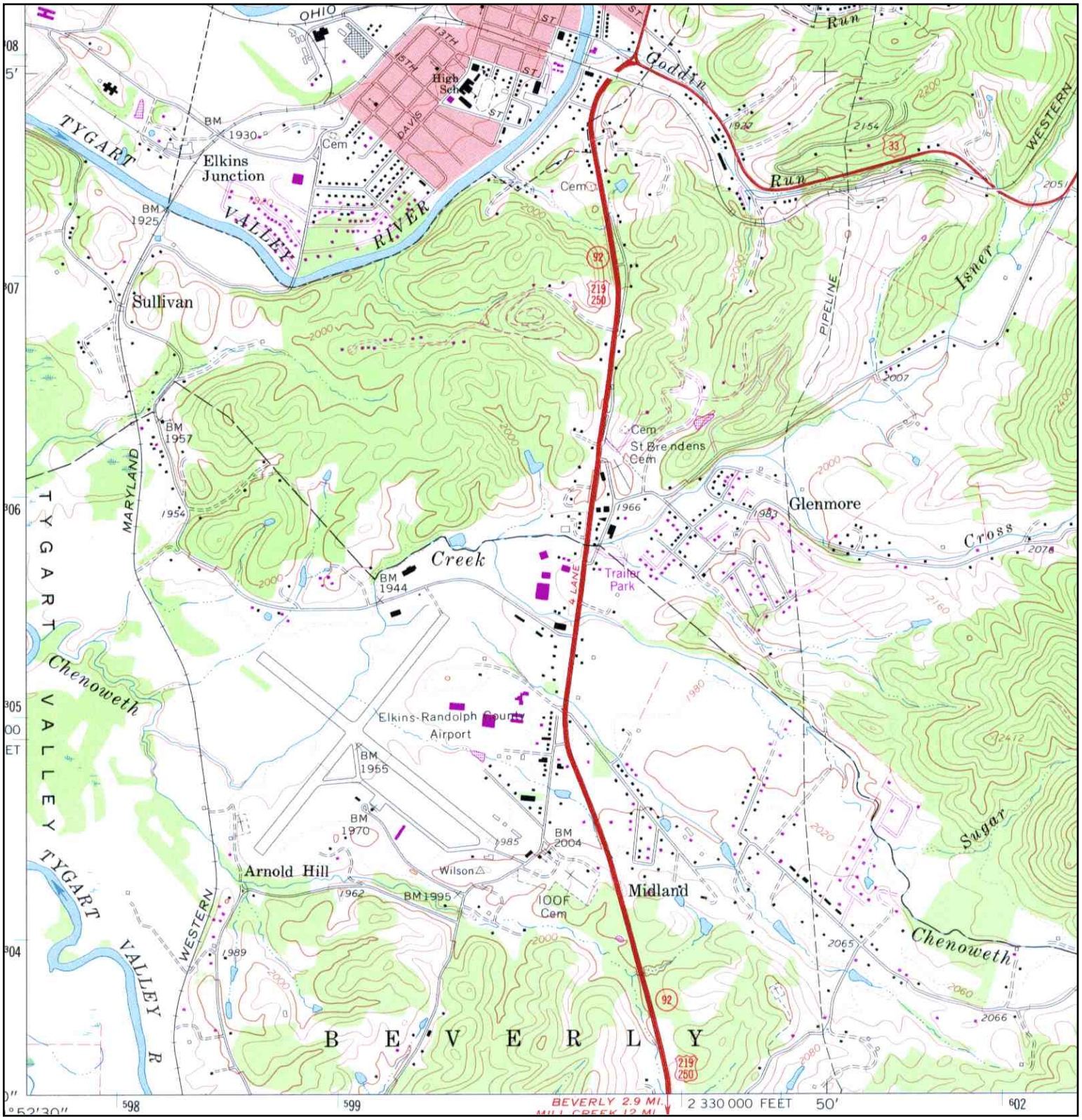

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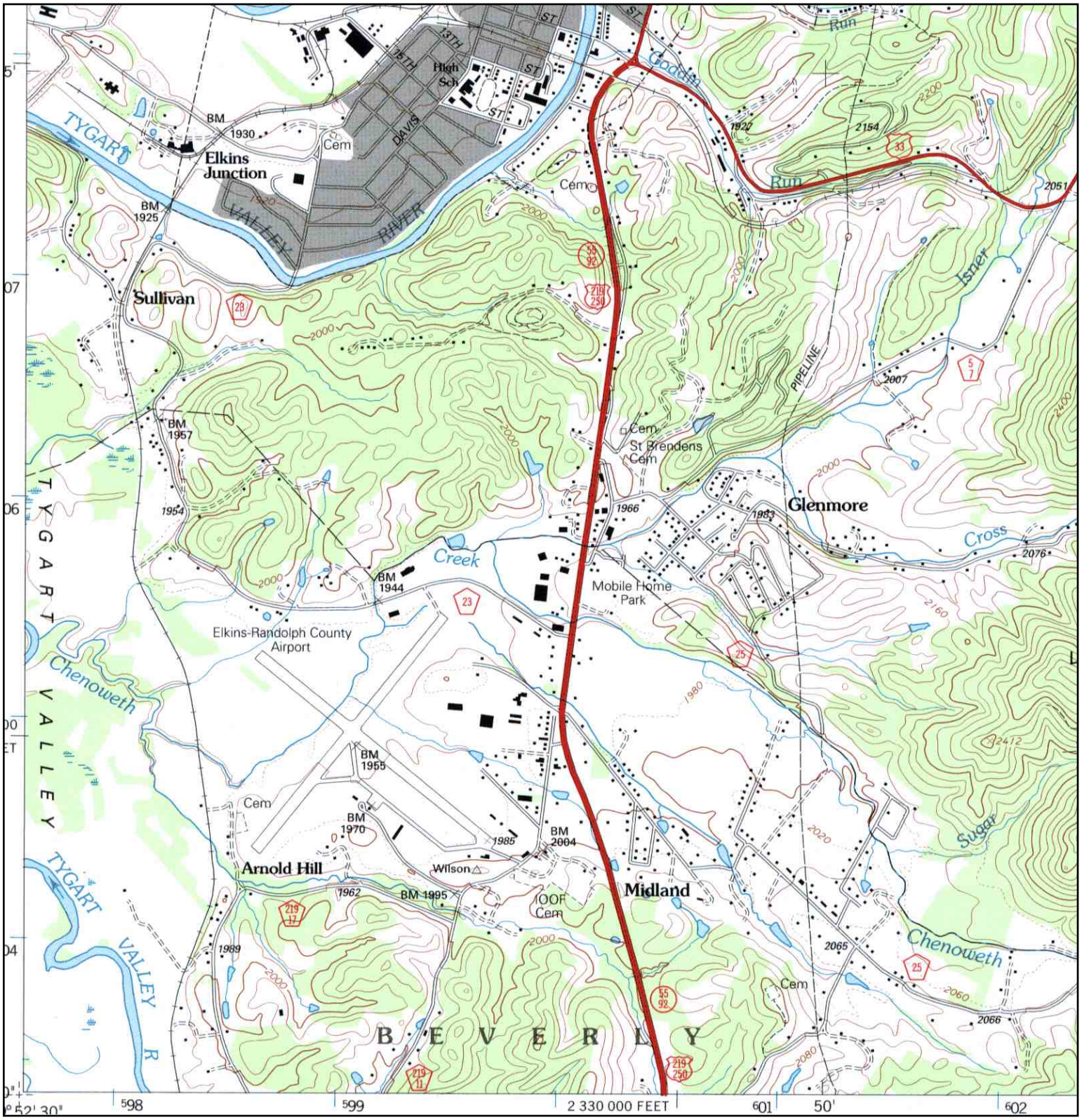

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EDR Historical Topographic Map Report

Dailey Firing Range
Back Road (Route 38)
Dailey, WV 26253

Inquiry Number: 2024427.4

September 10, 2007

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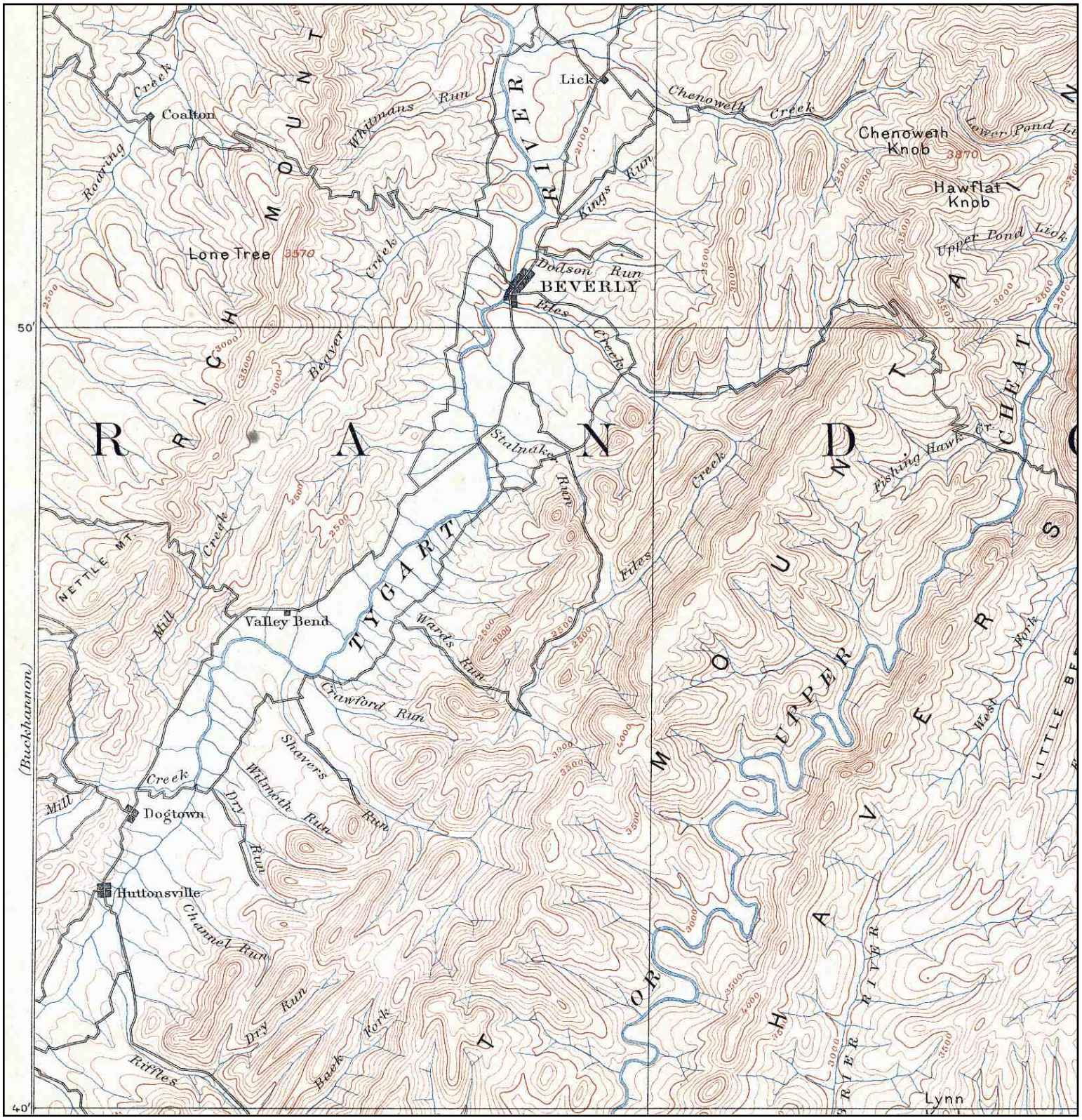

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Historical Topographic Map

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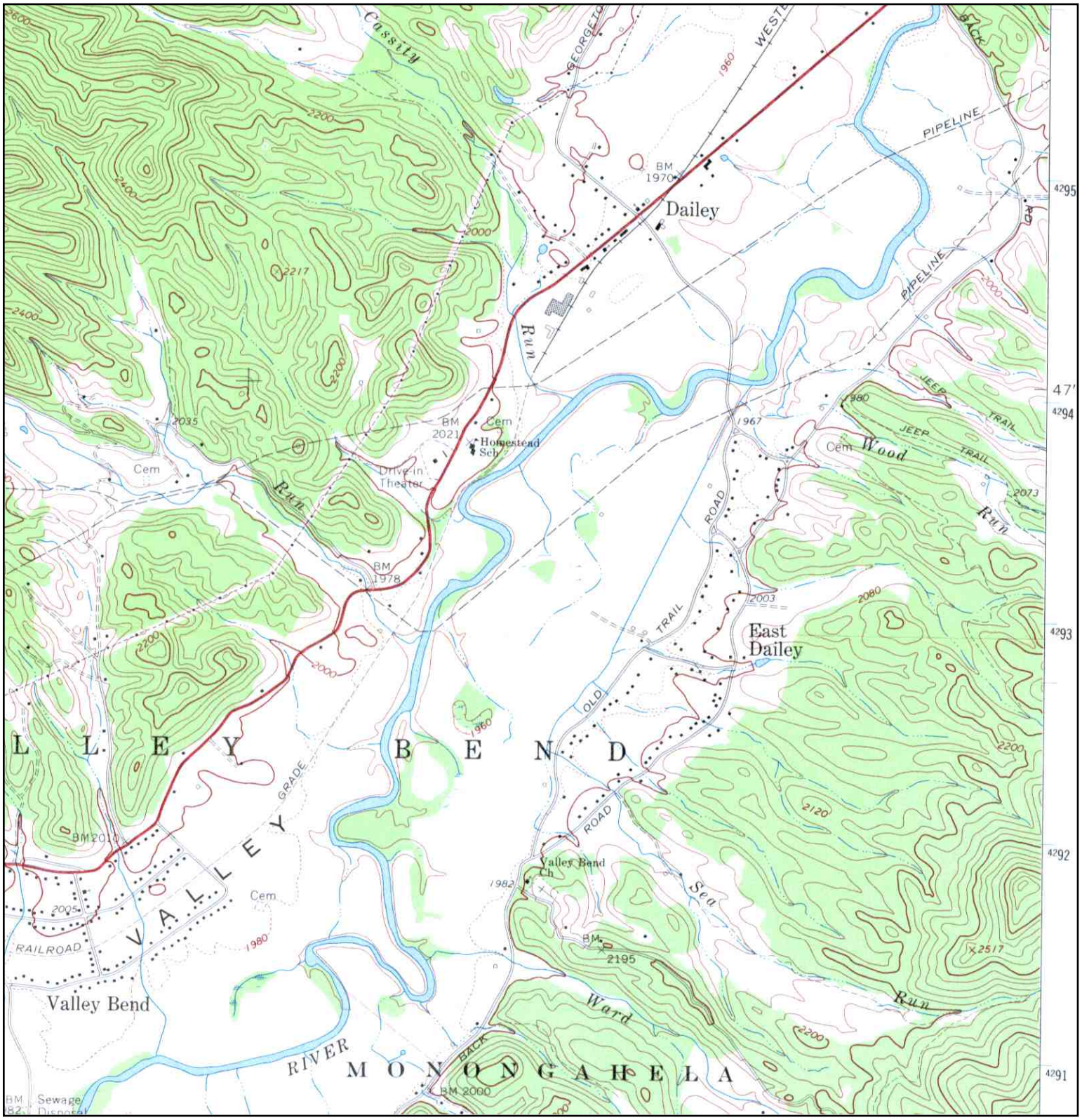

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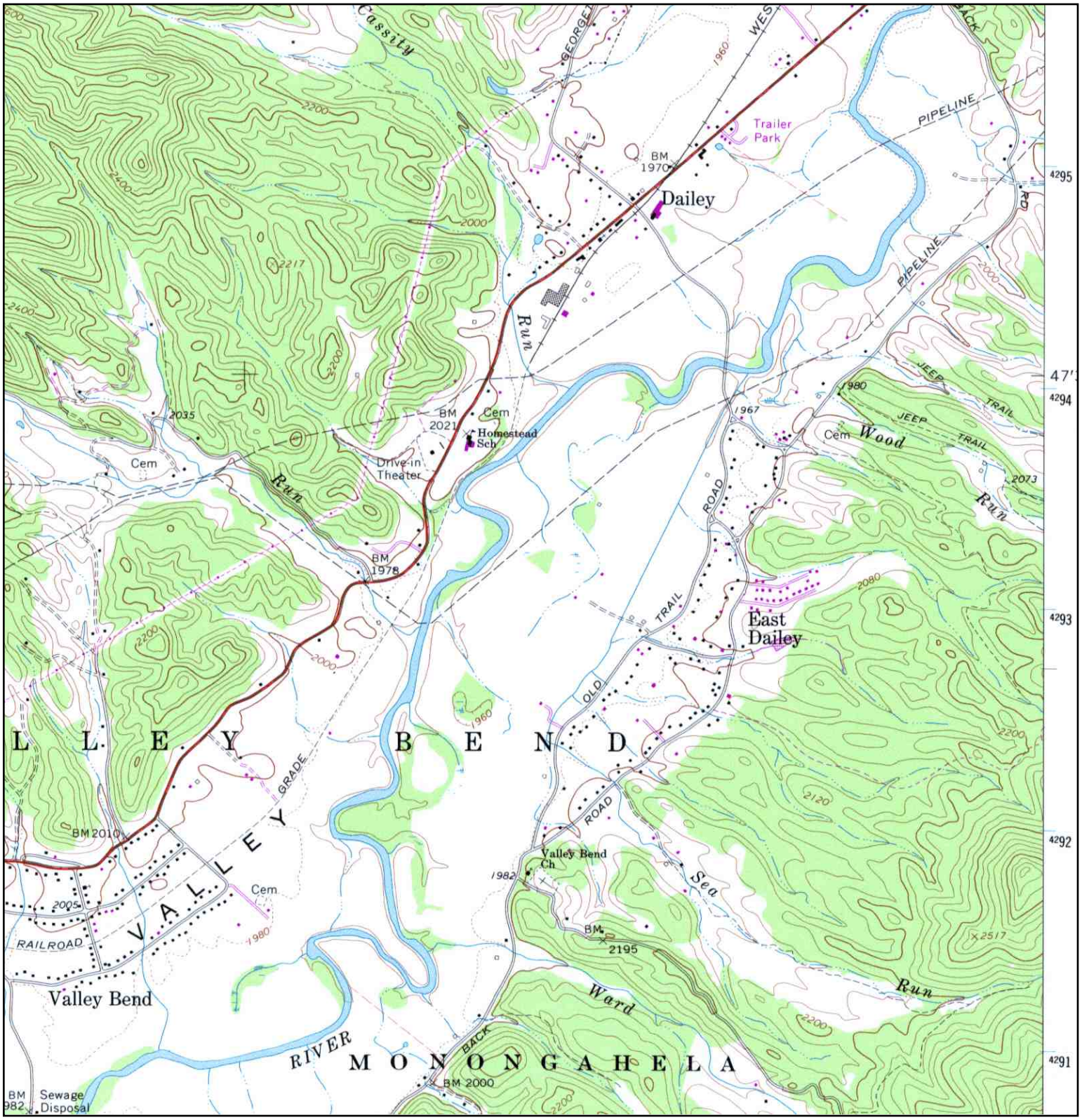

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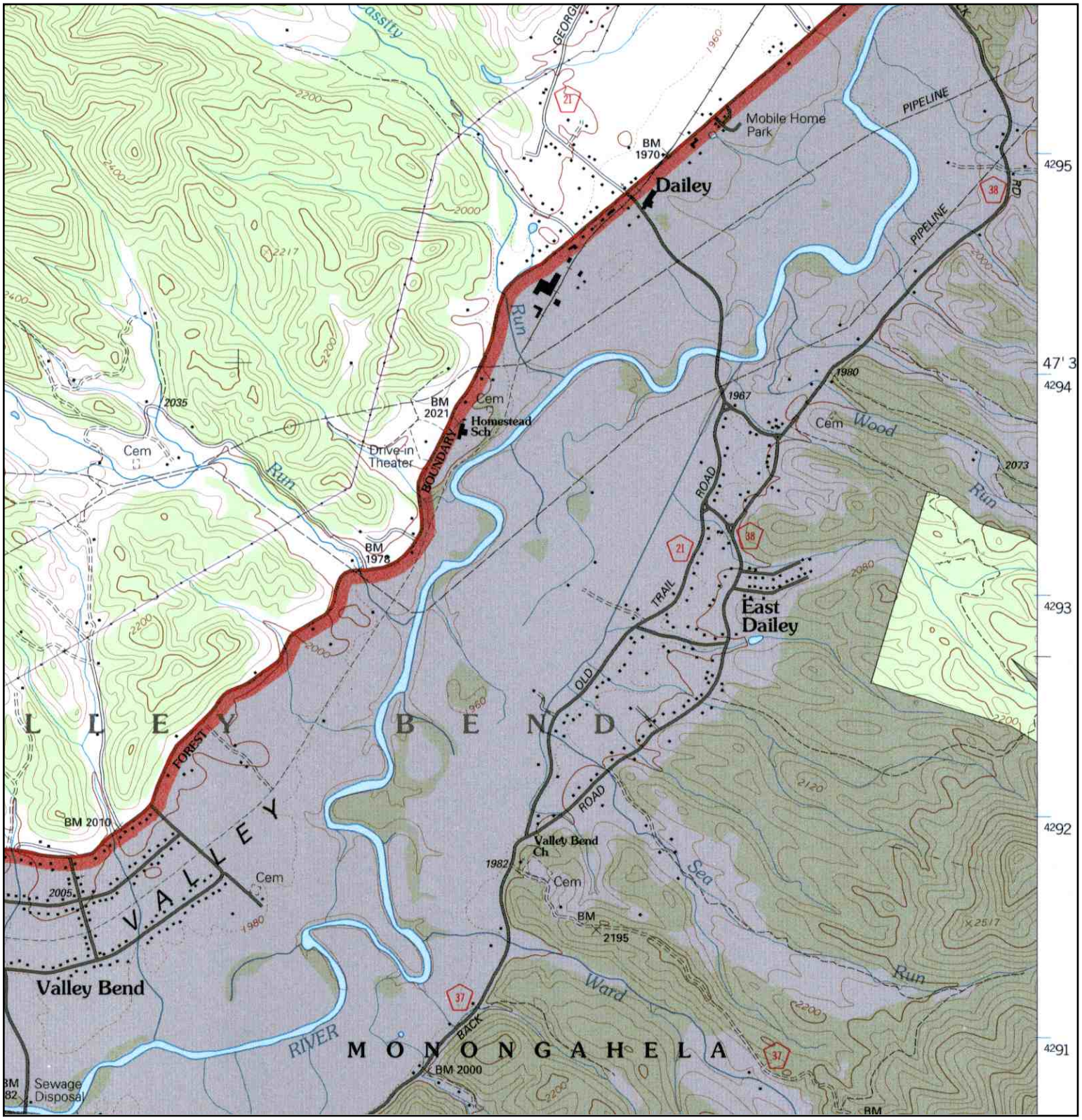

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Ammunition Depot
US Highway 219/250
Beverely, WV 26241

Inquiry Number: 2026150.4

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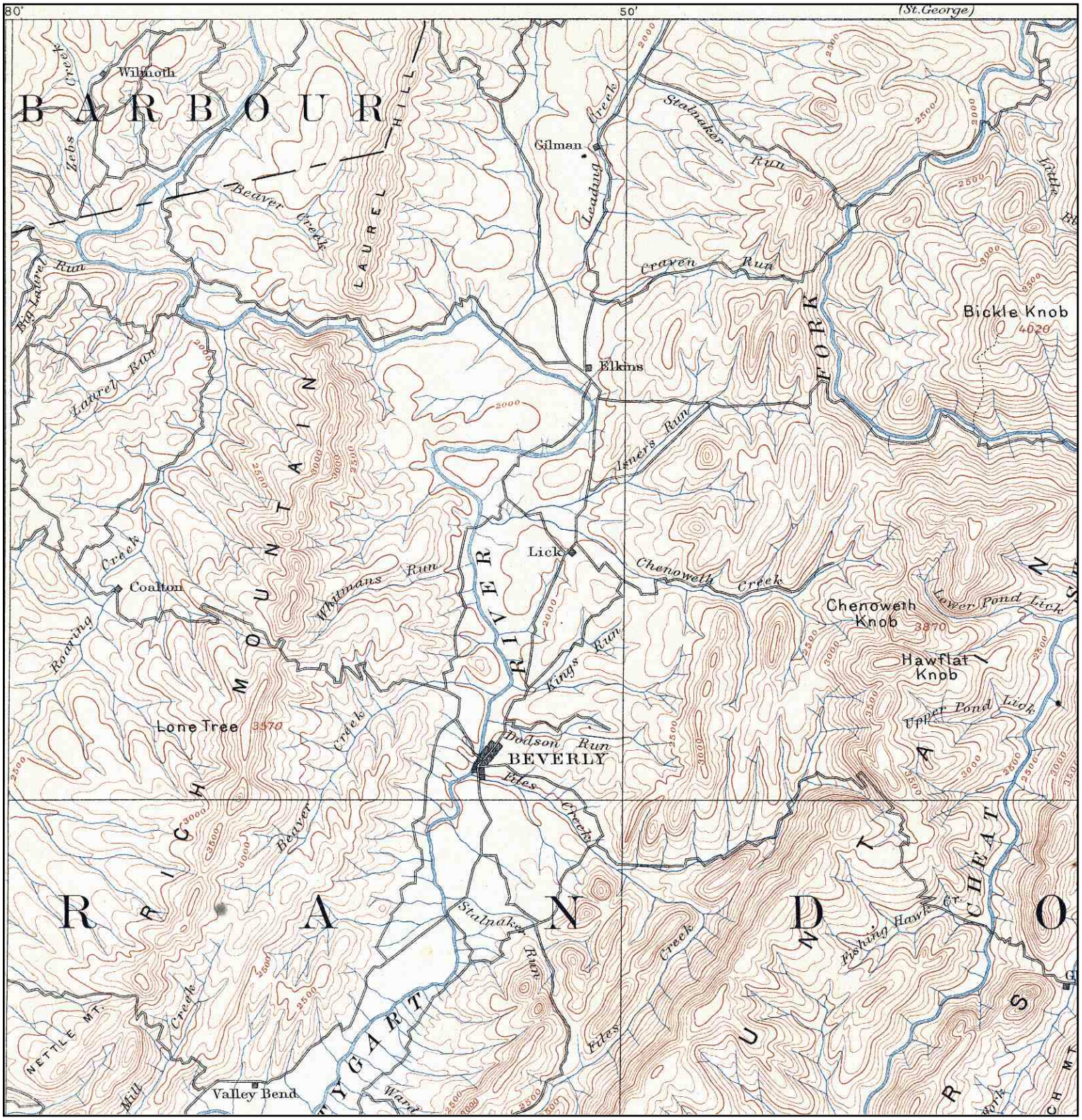

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Historical Topographic Map

N	TARGET QUAD NAME: ELKINS MAP YEAR: 1909 SERIES: 15 SCALE: 1:62500	SITE NAME: Ammunition Depot ADDRESS: US Highway 219/250 Beverely, WV 26241 LAT/LONG: 38.9436 / 79.855	CLIENT: U.S. Army Corps of Engineers CONTACT: Nick McHenry INQUIRY#: 2026150.4 RESEARCH DATE: 09/11/2007

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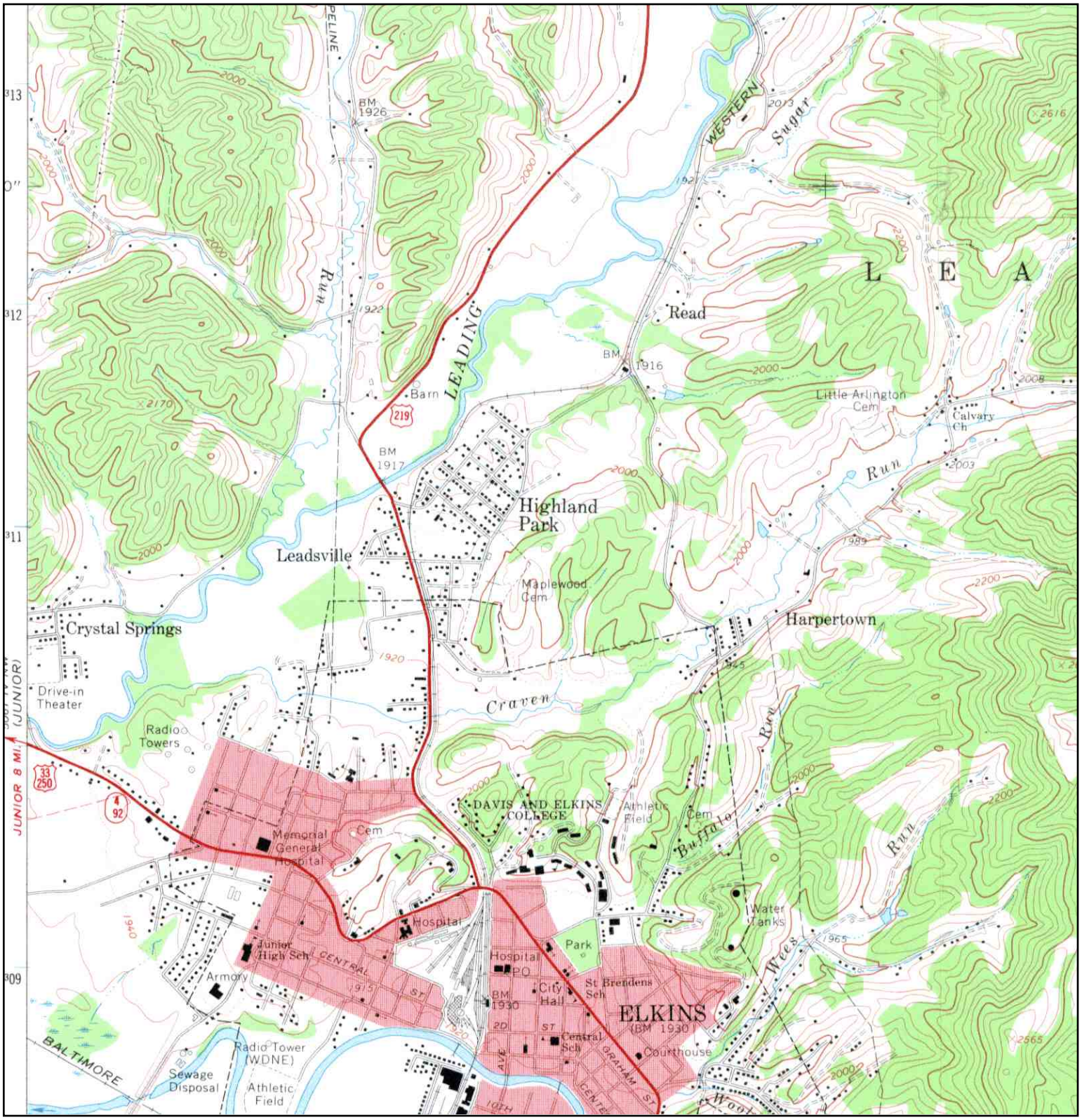

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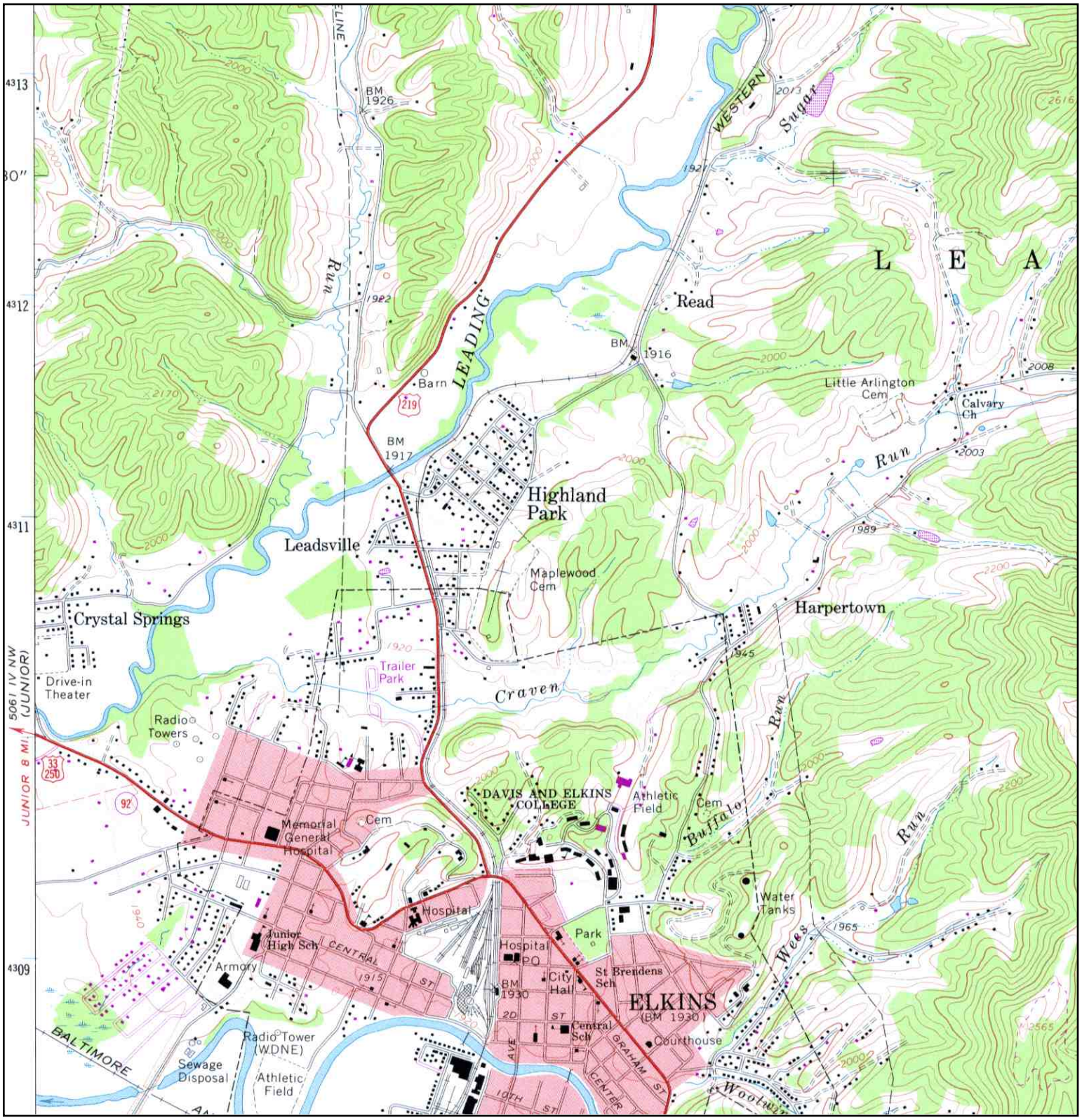

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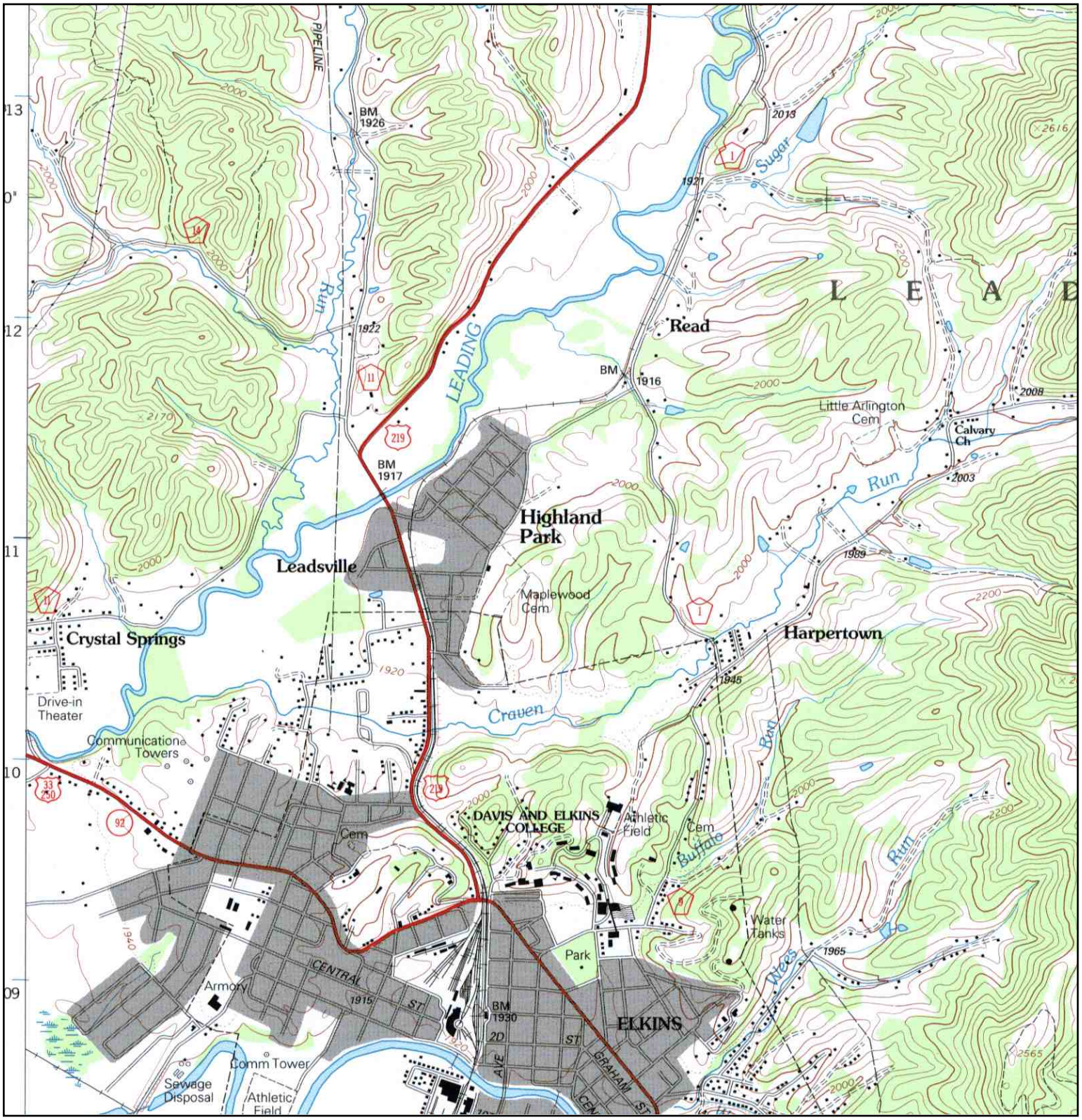

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Appendix J – Interviews

INTERVIEW SUMMARIES WITH ARMY PERSONNEL

Name: Duke Watson
Phone Number: (206) 363-8866
Relation to Site: 10th Mountain Division – Mountain Training Center
Time/Date: 8 August 2007

Results of Interview:

- Mr. Watson spent six months at the West Virginia Maneuver Area (12/43 – 6/44). At the time he was an instructor with the Mountain Training Center (MTC) of the 10th Light Division (later became the 10th Mountain Division). The MTC was responsible for general training in mountainous terrain. Mr. Watson spent his first two months at the WVMA as being an advisor with the general mountain troop maneuvers. The next four months were spent as being the senior officer at the Seneca Climbing School.

- Mr. Watson recounted some general information about the troop maneuvers for the first two months he was there. He stated that the troop maneuvers were meant to teach generally flat land regiments how to operate in mountains conditions. One flat land regiment, out of a larger division, at a time would come to the WVMA. The regiment would spend approximately 3 weeks with instructors at the WVMA. Mr. Watson stated that the regiments would be assigned 3 problems over the three week period. These problems would teach the regiments map orientation skills, field reconnaissance, and infantry tactics in mountainous terrain. There would be "A&B Team" problems giving offensive and defensive strategies. The maneuvers generally took place around the towns or Sully, Alpena, Gladwyn, Jenningston, and Elk, WV. Mr. Watson he vividly remembered the town of Elk as being the "center of the maneuvers". Training officials would be connected to the equivalent within the infantry regiment. They were attached to guide the commander through the maneuvers. Mr. Watson served as a maneuvers liaison for three regiments.

- Engineering units attached to the larger regiments were taught how to build bailey bridges across mountainous streams. Medical units attached to larger regiments were also in the area but Mr. Watson did not have any recollection of their activities. Officers and enlisted men that applied to attend the rock climbing school immediately reported there when the regiment arrived at the WVMA.

- When asked about the Impact Area of the WVMA, Mr. Watson stated that mortars were integrated in each Infantry Regiment. Each infantry battalion had an ordnance company with heavy mortars and medical groups. Each Infantry Regiment also had a weapons platoon that consisted of light mortars and light machine guns. Mr. Watson did not have any recollection of artillery (105-mm and 155-mm howitzers). He did not believe that they had a connection to the infantry regiment.

- Concerning the rock climbing school, Mr. Watson stated that the officers at the school consisted of one main officer with two men underneath him. Mr. Watson was given instructions to take over the climbing school and tighten the reigns of the men who serve there. David Brower and Raffi Bedayan served as his assistants. There was also as many as 60 enlisted men that would assist the officers in running the climbing school. He stated that there was a maintenance company attached to the climbing school. He stated there was a small motor pool (6x6 trucks and jeeps) stationed at the climbing school. He stated that he remembered there being 55-gallon drums of gasoline and oil stationed at the maintenance area that were used for these vehicles. He did not believe there were USTs or ASTs at this location. This site was located at the intersection of Route 219 and the access road to the camp area. He stated that there were no garbage dumps at the site (campsite or maintenance area). He said there were strict orders for environmental cleanliness due to the public's reaction to the Tennessee Maneuvers.

- Pack mule school was also located in the area of Gladwyn. It was attached to the 10th Light Division. This was a separate entity and Mr. Watson knew it was there but didn't know many details about the site.

- Nick McHenry asked Mr. Watson about the tank destroyer unit that was in Canaan Valley. Mr. Watson said that tank destroyer units were created in 1942-43. Mr. Watson did not have any knowledge of the tank destroyer unit being in this area.

- Nick McHenry asked Mr. Watson about the infiltration unit and medical evacuation sites. Mr. Watson did not have any knowledge of these units.

Name: John Tucciarone
Phone Number: (706) 829-2052
Relation to Site: Son of member of the 258th Field Artillery Battalion
Time/Date: August 30, 2007

Results of Interview:

- Father was at the WVMA from mid- to late 1943.

- His unit used self propelled and tractor towed 155-mm howitzers.

- The new headquarters for this unit is at Kingsbridge Armory in the Bronx, NY.

Name: Wandie Broomhall
Phone Number: (207) 364-8315
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Was in the Mountain Training School, but did not serve at the WVMA.

- Mentioned that the mountain training school consisted of the following entities: Mule school, rock climbing school, mountaineering training, ski school.

- Gave some possible contacts that served at WVMA.

Name: Dave Conger
Phone Number: (208) 726-3440
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Was in the Mountain Training School, but did not serve at the WVMA.

- Gave some possible contacts that served at WVMA.

Name: Bob Bradley
Phone Number: (303) 443-2537
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 4, 2007

Results of Interview:

- Was in the Mountain Training School, and served at the WVMA the last two weeks of its existence (June 1944). Served as a rock climbing school instructor at Champe and Seneca Rocks. Only remembered a small amount about the climbing school.

Name: Jack Kappler
Phone Number: (206) 283-8679
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Was in the Mountain Training School, and served at the WVMA for a couple of months starting in June 1943. Served as a rock climbing school instructor at Seneca Rocks.

Name: Robert Ball
Phone Number: (603) 823-5277
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Served as a rock climbing school instructor at Seneca Rocks. Could not remember much about the site other than rattlesnake encounters on Seneca Rocks.

Name: James Nussbaum
Phone Number: (206) 232-2796
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 29, 2007

Results of Interview:

- Served as a rock climbing school instructor at Seneca Rocks. Spent one year at the site from 1943-44. Trained 13 divisions in rock climbing during his stay at the school.

- Served as a referee for some of the maneuvers training.

Name: John Jennings
Phone Number: (970) 487-3766
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Served as a rock climbing instructor for 2-3 months.

- Remembered walking from the officer camp to Seneca Rocks. Remembered they closed the camp in May/June 1944.

Name: Norm Lindjham
Phone Number: (541) 389-2676
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 29, 2007

Results of Interview:

- Served as a rock climbing school instructor at Seneca Rocks from May 1943 through June 1944. Also, assisted with the operation of a PX at night.

- Remembered trucks taking the officers/regiments from the encampment to the rocks.

- Remembered the rifle range in Canaan Valley. Had photos of the range that he just recently gave to Denis Hagen at the 10th Mountain archives in Denver.

Name: Dick Willington
Phone Number: (970) 856-7160
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 30, 2007

Results of Interview:

- Served as a rock climbing school instructor at Seneca Rocks from June 1943 through June 1944.

- Remembered the students at the rock climbing school camped in a field between officer's camp and the highway.

- Remembered trash was hauled away by truck.

- Vaguely remembered shooting at the rifle range.

Name: John Nadwondy
Phone Number: (973) 762-3872
Relation to Site: Served with the 77th Infantry Division
Time/Date: August 30, 2007

Results of Interview:

- Served as an infantryman in the 77th infantry division, 305th combat team. Spent the winter of 1943 at the WVMA. Was taught orientation skills in wooded areas along with problem solving.

- Remembered camping on the tops of mountains and the bitter cold. Remembered tying jeeps to wenches and pulling them (along with 75-Franch and 105-mm howitzers) in the mountains. Brother-in-law was in the artillery unit of the 77th ID. Remembered the infantry division had ¼-ton trucks and 3/4-ton ammunition trucks that would bring ammunition to the troops.

- Remembered coming into Elkins, going to Kerens to bivouac, then to the Sully area for the maneuvers.

Name: John Hawkins
Phone Number: (208) 938-8676
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Served 9-10 months as a rock climbing instructor at Seneca Rocks (October 1943 – June/July 1944). Stated that the WVMA was set up to train detached groups from major East coast divisions.

- Remembered having to call Elkins Maintenance Companies for transportation. Remembered that the camp had electricity running to the tents. Latrines were hand dug outhouses and pit toilets.

Name: Robert Meservey
Phone Number: (617) 441-7844
Relation to Site: Member of the 10th Mountain Division
Time/Date: August 2, 2007

Results of Interview:

- Served as a rock climbing school instructor at Seneca Rocks and also served as liaison in troop maneuvers. Remembered the infantry divisions would come to Elkins and get taught mountain training including how to maneuver fast moving rivers, map reading and compass training. Did not see ammunition or firing. Remembered observing the creation of a mountain road.

Name: Dr. Irvin Gordon
Phone Number: (609) 921-8863
Relation to Site: Member of 179th Engineer Combat Battalion
Time/Date: 29 August 2007

Results of Interview:

- I served as a member of the 179th Engineer Combat Battalion. On 10 February 1944 arrived in Elkins. I remember being stationed at the Alpena Base Camp for service for the engineer combat battalion. On 17 March, participated in the Thomas Maneuvers with the 35th Infantry Division. On 28 March, Mr. Gordon left for Fort Dix.

Name: Professor Nathan Shoehalter
Phone Number: (510) 528-8350
Relation to Site: Private First Class at the WVMA, 95th Infantry Division
Time/Date: 29 August 2007

Results of Interview:

- Medic, private first class, at the time of the WVMA, serving for the 95th Infantry Division, assigned to a Combat Team. Arrived in the WVMA in June 1944, just before D-Day.

- Mission at the WVMA was to pick up wounded soldiers in combat simulations. Cut down saplings for use as runners, and had to carry wounded men out of the wilderness.

- Following the WVMA, his combat team was shipped to Indiantown Gap, PA.

INTERVIEW SUMMARIES WITH LOCAL RESIDENTS

Name: Chip Chase
Phone Number: (304) 866-4706
Relation to Site: Local resident in vicinity of Impact Area
Time/Date: 29 August 2007

Results of Interview:

- Has lived in Canaan Valley for ~27 years. Owns a cross country ski resort in the area. Does extensive hiking and cross country skiing in the area around Weiss and Bald Knobs.

- Has found what he thinks was an army stove and other miscellaneous items while on hiking or cross country ski trips. He has never seen any UXO while in the area.

Name: Dick Harr
Phone Number: (304) 866-4226
Relation to Site: Local resident in Canaan Valley
Time/Date: 20 August 2007

Results of Interview:

- Has lived in Canaan Valley for his entire life (~85 years). Mr. Harr was not in the area during World War II due to his enrollment in the Army, but he knows several people who were and does know of some Army activities that did happen in the area.

- Mr. Harr remembered a UXO find on the Bowman-Carwell Farm in the vicinity of Courtland (he believed it was a 105-mm howitzer round but wasn't sure). He stated that an EOD unit came to their farm and detonated the UXO. This find was approximately in 1947.

- Mr. Harr remembered that a relative had let the Army use their property for use as a bivouac while the soldiers were in the area for troop maneuvers. This property was located on Back Hollow Road near Canaan Valley State Park.

- Mr. Harr provided the names and phone numbers of local residents that may also have information about the Army's use of the area during World War II.

Name: Dorothy Thompson & Sarah Fletcher (daughter)
Phone Number: (304) 866-2732
Relation to Site: Local resident in Canaan Valley
Time/Date: 21 August 2007

Results of Interview:

- Mrs. Thompson has lived in Canaan Valley since she was a teenager (~70 years). Mrs. Thompson was living in the Courtland area of Canaan Valley during the time of the Army's use. Mrs. Fletcher had not been born at the time of World War II.

- Mrs. Thompson remembered some of the troops parachuting into the valley near the Buena Rifle Range. They also set up a bivouac area near the Blackwater River in this general area. She did not know where the plane took off from that the soldiers jumped from. She remembered this was in close proximity to their family farm.

- Se stated that the current Timberline Road (area near the Buena Rifle Range) was built by the Army during the maneuvers. She also confirmed the location of the firing range, and that only rifles were fired there.

- Mrs. Thompson also provided several names and phone numbers of people who can provide further information of troop activities in Canaan Valley.

Name: Tom Bonner
Phone Number: (304) 866-4392
Relation to Site: Local resident near Mule School
Time/Date: 13 September 2007

Results of Interview:

- Mr. Bonner indicated that whatever the Army needed in the area they took.

- Mr. Bonner indicated that the Army paid the property owner for whatever disturbance was made on the property (i.e. filling in foxholes, berms, etc).

- Mr. Bonner did not know of any burial pits in the area.

- When the Army left the area, they left the corral for the mule school. The railings were left, but the buildings and tents were removed. The mule school was located on 2 acres in the valley bottom and 2 acres on the side of the hill. There is no sign of the camp at this time (agricultural field).

- Mr. Bonner stated that Raven Rocks in the area was used by Infantry Division and would climb up and rappel down the rocks.

Name: Norman Black
Phone Number: (304) 567-2711
Relation to Site: Local resident whose family farm was used by the Army.
Time/Date: 13 September 2007

Results of Interview:

- Mr. Black stated that the Army would shoot .30 caliber machine gun blanks on his property. There were "mounds" of spent shells on their property. Mr. Black still had some of the shells that his family found. The Army also left field telephone lines all over the property.

- Mr. Black stated that the firing of howitzers (105-mm) took place on (or close to) Jordan Run Road. HE stated that they set up around Jordan Run someplace between Forest Road 75 and Forest Road 19.

- He also stated that 1,000 troops marched through his property at one time. They practiced firing machine guns at each other. They all had arms bands on which indicated red/blue team maneuvers.

- Jeeps and 2 ½ ton trucks were the only vehicles he remembered seeing but he didn't remember how they were fueled.

Name: Barbara Carroll
Phone Number: (304) 636-2701
Relation to Site: Local resident, father, Carl Degler, owned body shop used as Ordnance Base Shop
Time/Date: 29 August 2007

Results of Interview:

- Father, Carl Degler, owned the body shop that was converted into the Ordnance Base Shop. She and the rest of the family relocated to Baltimore, MD during the war years.

- Her husband's father worked for a fuel distribution company in Elkins during the timeframe of the WVMA. He remembered vividly that the company his father worked for was contracted by WVMA personnel to supply fuel to the WVMA. He stated that the fuel would go from railroad tanker cars to his company's fuel storage tanks. When the WVMA was in need of fuel, his father would fill up a tanker truck and take fuel to the supply point located near Dornblazer's Refrigerator Plant (known at that time as the WVMA Depot). The tanks were located northwest of the plant along the railroad. He had no other recollection of where the fuel went from that central supply location.

Name: Steve Shafer
Phone Number: (301) 334-5378
Relation to Site: Local resident from the area around the WVMA Impact Area. Also worked at the Stony River Mining Operation
Time/Date: 29 August 2007

Results of Interview:

- I've hunted the area from Stoney River Reservoir every year since 1968. I owned a hunting camp east of the old reservoir (which was drained in 1992). From 1980 through February 2006 I worked for the coal company that conducted mining operations at the site of the old reservoir. I never personally saw or heard tell of other miners finding ordnance in or around the reservoir. When I was younger I conducted surveying for the Western Maryland Railroad in the area that is now Dolly Sods, Bear Rocks and Stack Rocks.

- About 20-25 years ago I was hunting in the area West-Southwest of Stack Rocks and I came across a piece of ordnance. The metal had deteriorated to a point that the ordnance was oozing a yellowish substance. That was the only encounter Mr. Shafer could recall with ordnance. This incident was not reported to authorities and Mr. Shafer did not recall what type of ordnance it might have been..

- A friend of mine was a lumberjack that conducted a lot of work on Brown Mountain. He said on several occasions that he encountered shrapnel in trees that were cut down. Most of the occurrences that I remember from his stories occurred ½ - 1 mile North of the Little Blackwater River.

Appendix K – MRSPP Tables

Bearden Knob Firing Range
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Bearden Knob Firing Range

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001309 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

Preliminary Assessment (PA) research showed that the Bearden Knob Firing Range was utilized by the 628th Tank Destroyer Battalion from 6 Nov until 8 Dec 1943. The site was used as a 105-mm and 155-mm howitzer firing range; radio controlled targets were fired on by 0.30 and 0.50-caliber machine guns on tank destroyers. M-10's were also utilized on the firing range (PA, Section 4.2, TANK DESTROYER BATTALION, pg. 35; Sec. 4.2.1.1, pg. 44; Sec. 4.2.1.2, pg. 46; Sec. 4.3, pg. 53; Sec. 4.4, pg. 56; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; App. G, Documents G-22, G032, G-35, G-43 & G-44; App. H, Photos H32 and H33; App. I, Map 4; App. R, Plate 12).

Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hikers and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.
PA, Section 4.2, TANK DESTROYER BATTALION, pg. 35; Sec. 4.2.1.1, pg. 44; Sec. 4.2.1.2, pg. 46; Sec. 4.3, pg. 53; Sec. 4.4, pg. 56; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; App. G, Documents G-22, G032, G-35, G-43 & G-44; App. H, Photos H32 and H33; App. I, Map 4; App. R, Plate 12. The original MRSPP for this proposed project had a 30 rating on this table based upon historical evidence of the site. See the TAG Review comments in Appendix O of the WVMA Preliminary Assessment for the reasoning behind the change in this table and subsequent change in the final priority value from the original score of 2 to the current score of 3.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

PA, Section 4.2, TANK DESTROYER BATTALION, pg. 35; Sec. 4.2.1.1, pg. 44; Sec. 4.2.1.2, pg. 46; Sec. 4.3, pg. 53; Sec. 4.4, pg. 56; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; App. G, Documents G-22, G032, G-35, G-43 & G-44; App. H, Photos H32 and H33; App. I, Map 4; App. R, Plate 12.

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

There have been rocket finds near Yellow Creek and on Cabin Mountain a 105-mm howitzer round (PA, Sec. 4.2.1.3, pg. 47; App. I, Map 4; App. R, Plate 22).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is located on public and private land, a majority of which is owner by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The property is located on public and private land, a majority of which is owner by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Tucker County as 16 people per square mile; PA, Sec. 8.1.2, pg. 67.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the PA determined that there are approximately 16 to 25 inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that the area is located on public and private land, a majority of which is owner by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **<u>the single highest score</u>** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

A portion of the MRS is located in the Canaan Valley National Wildlife Refuge.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	25	**35**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	**40**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**15**
Population Near Hazard	Table 7	4	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			**90**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**B**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**3**	

Brown/Cabin Mountain Firing Ranges
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Brown/Cabin Mountain Firing Ranges

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001310 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

Mapping found during Preliminary Assessment (PA) research showed that the Brown Mountain Firing Range was utilized as a 60-mm and 81-mm mortar firing range and the Cabin Mountain Firing Range was utilized as a 105-mm and 155-mm howitzer firing range from 1943-44. Historical newspaper articles noted 0.30 caliber machine gun fire was also reported in these areas. 3.25-inch rockets were found in 2006 near Yellow Creek in the vicinity of Brown Mountain and a 105-mm howitzer round was found on Cabin Mountain. (PA, Sec. 4.2, pg. 34; Sec. 4.2.1.1, pg. 44; Sec. 4.2.1.2, pg. 45-46; Sec. 4.3, pg. 53; App. H, Photos H12–H15; App. I, Map 4; App. R, Plates 15 and 22; App. T, pg. 25-27; App. V)

Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hikers and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

PA research showed that Brown and Cabin Mountains were used as 60-mm and 81-mm mortar and 105-mm and 155-mm howitzer firing ranges and .30 caliber machine gun firing was noted. 3.25-inch rockets were found in 2006 near Yellow Creek in the vicinity of Brown Mountain and a 105-mm howitzer round was found on Cabin Mountain.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

PA research showed that Brown and Cabin Mountains were used as 60-mm and 81-mm mortar and 105-mm and 155-mm howitzer firing ranges and .30 caliber machine gun firing was noted. 3.25-inch rockets were found in 2006 near Yellow Creek in the vicinity of Brown Mountain and a 105-mm howitzer round was found on Cabin Mountain.

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

From November to December 2006, three 3.25-inch rockets were found near Yellow Creek in the vicinity of Brown Mountain. In April 2007, a 105-mm howitzer round was found near Cabin Mountain (PA, Sec. 4.2.1.3, pg. 48; App. T, pg, 25-27).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is located on private and public land that is open to the public. The majority of the land is owned by the Canaan Valley Institute and the US Fish and Wildlife Service, as the Canaan Valley National Wildlife Refuge.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

According to research performed during preparation of the Preliminary Assessment, The property is located on private and public land that is open to the public. The majority of the land is owned by the Canaan Valley Institute and the US Fish and Wildlife Service, as the Canaan Valley National Wildlife Refuge.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Tucker County as 16 people per square mile; Preliminary Assessment, Section 8.1.2, pg. 68.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**2**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the Preliminary Assessment determined that there are approximately 6 to 10 inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that the area is a national wildlife refuge, part of the Canaan Valley National Wildlife Refuge, owned by the US Fish and Wildlife Service and the Canaan Valley Institute. Residential structures are located within 2 miles of the MRS.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **<u>the single highest score</u>** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

The MRS is located on property that is part of the Canaan Valley National Wildlife Refuge.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	25	**35**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	**40**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**13**
Population Near Hazard	Table 7	2	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			**88**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**B**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**3**	

Buena Small Arms Firing Range
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Buena Small Arms Firing Range

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001311 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

Research conducted for the Preliminary Assessment (PA) for WVMA/Dolly Sods, shows the presence of a small arms firing range and a potential grenade range at this property. (PA, Sec. 3.4.4, pg. 29; Sec. 4.2, Training of Infantry Division Combat Teams, pg. 33; Sec. 5.1, Aerial Photography, pg. 59; Sec. 5.4, pg. 63; App. G; App. M, Photos M65 and M66; App. R, Plate 15; App. T, pg. 17, noted as "Cortland Range")

Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hikers and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**2**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided. Research conducted for the Preliminary Assessment (PA) for WVMA/Dolly Sods, shows the presence of a small arms firing range and a potential grenade range at this property. (PA, Sec. 3.4.4, pg. 29; Sec. 4.2, Training of Infantry Division Combat Teams, pg. 33; Sec. 5.1, Aerial Photography, pg. 59; Sec. 5.4, pg. 63; App. G; App. M, Photos M65 and M66; App. R, Plate 15; App. T, pg. 17, noted as "Cortland Range"). The original MRSPP for this proposed project had a 30 rating on this table based upon historical evidence of the site. See the TAG Review comments in Appendix O of the WVMA Preliminary Assessment for the reasoning behind the change in this table and subsequent change in the final priority value from the original score of 4 to the current score of 7.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

Research conducted for the Preliminary Assessment (PA) for WVMA/Dolly Sods, shows the presence of a small arms firing range and a potential grenade range at this property. (PA, Sec. 3.4.4, pg. 29; Sec. 4.2, Training of Infantry Division Combat Teams, pg. 33; Sec. 5.1, Aerial Photography, pg. 59; Sec. 5.4, pg. 63; App. G; App. M, Photos M65 and M66; App. R, Plate 15; App. T, pg. 17, noted as "Cortland Range").

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

Research conducted for the Preliminary Assessment (PA) for WVMA/Dolly Sods, shows the presence of a small arms firing range and a potential grenade range at this property. (PA, Sec. 3.4.4, pg. 29; Sec. 4.2, Training of Infantry Division Combat Teams, pg. 33; Sec. 5.1, Aerial Photography, pg. 59; Sec. 5.4, pg. 63; App. G; App. M, Photos M65 and M66; App. R, Plate 15; App. T, pg. 17, noted as "Cortland Range"). Historical photographs and aerial photography present evidence for use of the site as a small arms firing range and potential grenade range, but there is no confirmed presence of munitions. The original MRSPP for this proposed project had a 30 rating on this table based upon historical evidence of the site. See the TAG Review comments in Appendix O of the WVMA Preliminary Assessment for the reasoning behind the change in this table and subsequent change in the final priority value from the original score of 5 to the current score of 7.

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is located on public land that is owned by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

According to research performed during preparation of the PA, the property is located on public land that is owned by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Tucker County as 16 people per square mile; PA, Sec. 8.1.2, pg. 67.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the PA determined that there are 26 or more inhabited structures within 2 miles of the boundary of the MRS. The Canaan Valley National Wildlife Refuge is also located at this MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that residential structures were located within 2 miles of the MRS. The Monongahela National Forest is also in proximity of this MRS.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **<u>the single highest score</u>** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

According to research performed during preparation of the PA, the property is located on public land that is owned by the US Fish & Wildlife Service and is the Canaan Valley National Wildlife Refuge.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	2	**12**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	1	**16**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**16**
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			**44**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**F**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**7**	

Dailey Infiltration Camp
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Dailey Infiltration Camp

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001305 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

Based upon research conducted for the Preliminary Assessment (PA) for WVMA/Dolly Sods, the infiltration camp was built by the 150th Engineering Combat Battalion and consisted of an obstacle course, small arms firing range and potential grenade range from 1943-44 (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74). App. H, Photo H21 shows troops conducting training with simulated or smoke rounds around them. App. R, Plate 12 shows an historical aerial photo of the site. The range is currently much the same as it was at the time of range operation, except for significant tree and underbrush growth; berms and "foxholes" are still visible.

Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hunters and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**20**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.
Ref. PA for WVMA/Dolly Sods, (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74); App. H, Photo H21; App. R, Plate 12; Small arms range; evidence of smoke rounds; potential use as a hand grenade range. The original MRSPP for this proposed project had a 30 rating on this table based upon historical evidence of the site. See the TAG Review comments in Appendix O of the WVMA Preliminary Assessment for the reasoning behind the change in this table and subsequent change in the final priority value from the original score of 4 to the current score of 5.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

PA for WVMA/Dolly Sods, (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74); App. H, Photo H21; App. R, Plate 12; Small arms range; evidence of smoke rounds; potential use as a hand grenade range.

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

PA for WVMA/Dolly Sods, (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74); App. H, Photo H21; App. R, Plate 12). Small arms range; evidence of smoke rounds; potential use as a hand grenade range, but there is no confirmed presence of munitions.

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. According to research performed during preparation of the PA, the property is located on public land that is owned by the US Dept. of Agriculture and managed by the US Forest Service (Monongahela National Forest) (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74); App. H, Photo H21; App. R, Plate 12). Access to the MRS is obtained by crossing through private property.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. According to research performed during preparation of the PA, the property is located on public land that is owned by the US Dept. of Agriculture and managed by the US Forest Service (Monongahela National Forest) (PA, Sec. 3.4, pg. 26; Sec. 4.2, pg. 33, 42; Sec. 5.1, pg. 59; Sec. 5.4, pg. 62; Sec. 8.2, pg. 74); App. H, Photo H21; App. R, Plate 12). Access to the MRS is obtained by crossing through private property.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 US census lists the population density of Randolph County at approximately 26 people per square mile.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the Preliminary Assessment determined that there are 26 or more inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that residential structures were located within 2 miles of the MRS and that portions of the MRS lie within the Monongahela National Forest.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**3**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

The MRS is located on property that is within the Monongahela National Forest and ecological resources are present.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	20	**30**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	5	**18**
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**14**
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	3	
EHE MODULE TOTAL			**62**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	**D**
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**D**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**5**	

Fore Knobs-Bear Rocks Firing Ranges
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Fore Knobs-Bear Rocks Firing Ranges

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001308 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

The Fore Knobs/Bear Rocks Firing Range was utilized during the WVMA activities from 1943-44 as a 105-mm and 155-mm howitzer practice firing range. Mr. Steve Shaffer, in an interview for the PA (App. J) stated he found ordnance near Stack Rocks. (PA, WVMA, Sec. 4.2.1.1, pg. 43-44; Sec. 4.2.1.2, pg. 45-46; Sec. 4.3, pg. 52-53; Sec. 4.4, pg. 60; Sec. 5.1, pg. 60; Sec. 5.4, pg. 62; App. I, Map 4; App. J, Steve Shaffer Interview; App. R, Plates 15 and 22; App. T, pg. 42; App. V)
Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hikers and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided. Ref.

The Fore Knobs/Bear Rocks Firing Range was utilized during the WVMA activities from 1943-44 as a 105-mm and 155-mm howitzer practice firing range. Mr. Steve Shaffer, in an interview for the PA (App. J) stated he found ordnance near Stack Rocks. (PA, WVMA, Sec. 4.2.1.1, pg. 43-44; Sec. 4.2.1.2, pg. 45-46; Sec. 4.3, pg. 52-53; Sec. 4.4, pg. 60; Sec. 5.1, pg. 60; Sec. 5.4, pg. 62; App. I, Map 4; App. J, Steve Shaffer Interview; App. R, Plates 15 and 22; App. T, pg. 42; App. V)

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Fore Knobs/Bear Rocks Firing Range was utilized during the WVMA activities from 1943-44 as a 105-mm and 155-mm howitzer practice firing range. (PA, WVMA, Sec. 4.2.1.1, pg. 43-44; Sec. 4.2.1.2, pg. 45-46; Sec. 4.3, pg. 52-53; Sec. 4.4, pg. 60; Sec. 5.1, pg. 60; Sec. 5.4, pg. 62; App. I, Map 4; App. J, Steve Shaffer Interview; App. R, Plates 15 and 22; App. T, pg. 42; App. V)

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**25**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

In 1999, a 105-mm howitzer HE round was discovered by Human Factors Applications, a contractor for The Nature Conservancy, during a clearance of the area around Bear Rocks. Mr. Steve Shaffer, in an interview for the PA (App. J) stated he found ordnance near Stack Rocks. (PA, Sec. 8.2, pg. 73; App. J, Steve Shaffer Interview; App. R, Plate 22; App. V).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is located on private property including the Nature Conservancy's 477 ac. Bear Rocks Preserve (PA, Sec. 3.3, pg. 23)

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

According to research performed during preparation of the Preliminary Assessment, the land is privately owned, including the Nature Conservancy's 477 ac. Bear Rocks Preserve.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Tucker County as 16 people per square mile (PA, Sec. 8.1.2, pg. 67).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the Preliminary Assessment determined that there are approximately 16 to 25 inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that the area contains a recreational area, part of which is the Bear Rocks Preserve, owned and operated by the Nature Conservancy. There are residential dwellings to the east within 2 miles of the impact and firing areas.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

The MRS is adjacent to the Monongahela National Forest (MNF). Ecological and cultural resources were documented during previous MMRP removal actions at the adjacent Dolly Sods Wilderness Area in 1997-98 and it is presumed similar resources are present in this portion of the MNF. The project area contains the Bear Rocks Preserve.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	25	**35**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	**40**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**15**
Population Near Hazard	Table 7	4	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			**90**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**B**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**3**	

Maneuver Area
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Maneuver Area

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001307 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

This maneuver area was developed for use in the WVMA from 1943-44, near Gladwyn, Sully, Jenningston, Red Creek, and Dry Fork, WV. The area is confirmed to have existed based upon Preliminary Assessment research, including historical photos, USACE Common Ops reports, interviews and other information that was obtained. PA research showed use for rock climbing exercises, troop maneuver problems and potential mortar firing. Potential mortar firing is based on mortar transportation canisters that were found near the Otter Creek Wilderness Area. (PA, Sec. 4.2, pg. 33, 34, Table 4.1; Sec. 4.3, pg. 51; App. G, Doc. G-22; App. I, Map 1; App. R, Plates 3 and 14)

Description of Pathways for Human and Ecological Receptors:

The most likely pathway is direct contact to human and ecological receptors. The potential for soil, sediment, surface water and groundwater exposure have not been evaluated.

Description of Receptors (Human and Ecological):

Human receptors include hikers and visitors in the area and residents who reside near to the site. Ecological receptors would include those expected to live in hilly, wooded areas, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

This maneuver area was developed for use in the WVMA from 1943-44, near Gladwyn, Sully, Jenningston, Red Creek, and Dry Fork, WV. PA research showed use for rock climbing exercises, troop maneuver problems and potential mortar firing. Potential mortar firing is based on mortar transportation canisters that were found near the Otter Creek Wilderness Area. (PA, Sec. 4.2, pg. 33, 34, Table 4.1; Sec. 4.3, pg. 51; App. G, Doc. G-22; App. I, Map 1; App. R, Plates 3 and 14).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

This maneuver area was developed for use in the WVMA from 1943-44, near Gladwyn, Sully, Jenningston, Red Creek, and Dry Fork, WV. PA research showed use for rock climbing exercises, troop maneuver problems and potential mortar firing Potential mortar firing is based on mortar transportation canisters that were found near the Otter Creek Wilderness Area. (PA, Sec. 4.2, pg. 33, 34, Table 4.1; Sec. 4.3, pg. 51; App. G, Doc. G-22; App. I, Map 1; App. R, Plates 3 and 14).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

This maneuver area was developed for use in the WVMA from 1943-44, near Gladwyn, Sully, Jenningston, Red Creek, and Dry Fork, WV. PA research showed use for rock climbing exercises, troop maneuver problems and potential mortar firing Potential mortar firing is based on mortar transportation canisters that were found near the Otter Creek Wilderness Area. (PA, Sec. 4.2, pg. 32-40; Table 4.1; Sec. 4.2.1.2, pg. 47; Sec. 4.4, pg. 55; Sec. 5.1, pg. 61; App. G, Doc. G-22; App. I, Map 1; App. R, Plates 3 and 14)

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is located on private and public land, which is predominantly owned by the US Department of Agriculture and managed by the US Forest Service.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The property is located on private and public land, which is predominantly owned by the US Department of Agriculture and managed by the US Forest Service.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Tucker County as 16 people per square mile; Preliminary Assessment, Section 8.1.2, pg. 67.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the Preliminary Assessment determined that there are approximately 16 to 25 inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that a portion of the area is a park and recreational area, part of the Monongahela National Forest, owned by the US Dept. of Agriculture and operated by the US Forest Service.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**3**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

A portion of the MRS property is part of the Monongahela National Forest (MNF) and ecological resources are present or known to be present in other MNF areas such as the Dolly Sods Wilderness Area.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	5	**10**
Source of Hazard	Table 2	5	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	5	**20**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**10**
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	4	
Ecological and /or Cultural Resources	Table 9	3	
EHE MODULE TOTAL			**40**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**F**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)					

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				**7**	

Ammunition Depot
MRSPP Tables

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: WVMA Ammunition Depot

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Davis (Tucker, Grant, Preston, Pendleton, and Randolph Counties), West Virginia

Site Name (RMIS ID)/Project Name (Project No.)/FFID: Proj. No. G03WV001306 (pending)/ FFID WV9799F3460

Date Information Entered/Updated: 13 January 2009

Point of Contact (Name/Phone): Nickolas L. McHenry (304) 399-5909

Project Phase (check only one):

✓ PA	❑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
❑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

A Real Estate Property Lease Map obtained during Preliminary Assessment (PA) research showed an ammunition depot a few miles north of the WVMA headquarters in Elkins, WV. This depot is confirmed to have existed based upon historical photos, USACE Common Operations reports, WVMA Administrative and Supply Plan, interviews and other historical information obtained during PA research. Rounds suspected to have been fired during the 1943 to 1944 military training included 60-mm, 81-mm and 4.2" Mortar; 3.25-inch Rocket; 37-mm and 57-mm anti-tank gun round; 105-mm and 155-mm howitzer rounds; and .30 caliber and .50 caliber small arms rounds (PA, WVMA, Sec. 3.3, pg. 21; Sec. 3.4.5, pg. 29; Sec. 4.2, pg. 39; Sec. 4.2.2, pg. 49; Table 4.2; Sec. 5.4, pg. 63, App. F; App. H, Photo H-23; App. R, Plate 6).

Description of Pathways for Human and Ecological Receptors:

Direct contact to human receptors to MMRP which could be buried at the former ammunition depot site. No evidence of MEC was observed on the ground surface during the site visit, nor was any evidence of such burial discovered during PA research.

Description of Receptors (Human and Ecological):

Receptors would most likely include local residents and small, domestic animals since the site is in an urban location.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**15**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.
Ref., PA, WVMA/Dolly Sods; site documented as ammunition supply depot (PA, WVMA, Sec. 3.3, pg. 21; Sec. 3.4.5, pg. 29; Sec. 4.2, pg. 39; Sec. 4.2.2, pg. 49; Table 4.2; Sec. 5.4, pg. 63, App. F; App. H, Photo H-23; App. R, Plate 6).
The original MRSPP for this proposed project had a 30 rating on this table based upon historical evidence of the site. See the TAG Review comments in Appendix O of the WVMA Preliminary Assessment for the reasoning behind the change in this table and subsequent change in the final priority value from the original score of 5 to the current score of 7.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazard known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**2**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

Ref., PA, WVMA/Dolly Sods; site documented as ammunition supply depot (PA, WVMA, Sec. 3.3, pg. 21; Sec. 3.4.5, pg. 29; Sec. 4.2, pg. 39; Sec. 4.2.2, pg. 49; Table 4.2; Sec. 5.4, pg. 63, App. F; App. H, Photo H-23; App. R, Plate 6).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

Ref., PA, WVMA/Dolly Sods; site documented as ammunition supply depot (PA, WVMA, Sec. 3.3, pg. 21; Sec. 3.4.5, pg. 29; Sec. 4.2, pg. 39; Sec. 4.2.2, pg. 49; Table 4.2; Sec. 5.4, pg. 63, App. F; App. H, Photo H-23; App. R, Plate 6).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

There are no barriers preventing access to any portion of the MRS. The property is privately owned.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

According to research performed during preparation of the Preliminary Assessment, the land is privately owned.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**1**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The 2006 census lists the population density of Randolph County as 27 people per square mile.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Review of topographic maps obtained for research during preparation of the PA determined that there are approximately 16 to 25 inhabited structures within 2 miles of the boundary of the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

The site visit that was performed for the Preliminary Assessment confirmed that residential structures were located within 2 miles of the MRS.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

Based upon the site visit for the PA, there are no ecological or cultural resources present at this MRS. Site is located in a rural setting.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	15	**17**
Source of Hazard	Table 2	2	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	5	**20**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	1	**10**
Population Near Hazard	Table 7	4	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			**47**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**F**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Research that was performed for the Preliminary Assessment showed that this MRS is not suspected to contain CWM; therefore, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**NO KNOWN OR SUSPECTED CWM HAZARD**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		No Known or Suspected CWM Hazard		No Known or Suspected MC Hazard	
		MRS or ALTERNATIVE PRIORITY		**7**	