Final No Further Action Proposed Plan for
RVAAP-033-R-01 Firestone Test Facility Munitions Response Site
Version 1.0

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract No. W912DR-09-D-0005
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Prepared for:

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U.S. Army Corps of Engineers
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14. ABSTRACT

This No Further Action (NFA) Proposed Plan provides the public with information to comment upon the selection of the recommended response action for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site (MRS) at the former Ravenna Army Ammunition Plant under the Military Munitions Response Program. This NFA Proposed Plan presents the U.S. Army's preliminary recommendations concerning how best to address the Firestone Test Facility MRS where no munitions and explosives of concern (MEC) were found that may have resulted from historical activities associated with manufacturing, storing, transporting, testing, training, and/or disposal that occurred at the facility. The U.S. Army is issuing this NFA Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations 300). Implementation of the selected remedy for the MRS will also satisfy the requirements of the Ohio EPA Director's Final Findings and Orders.

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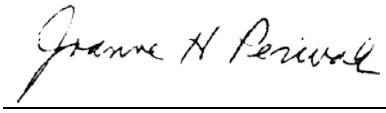
CONTRACTOR'S STATEMENT OF INDEPENDENT TECHNICAL REVIEW

CB&I Federal Services LLC has completed the *Final No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site*, Version 1.0, at the former Ravenna Army Ammunition Plant in Portage and Trumbull Counties, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy, principles, and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets customer's needs consistent with law and existing United States Army Corps of Engineers policy.

Reviewed/Approved by:  Date: May 6, 2015

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ARNG—Army National Guard
CB&I—CB&I Federal Services LLC
Ohio EPA—Ohio Environmental Protection Agency
RVAAP—former Ravenna Army Ammunition Plant
USACE—United States Army Corps of Engineers

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
AMEC	AMEC Earth and Environmental, Inc.
amsl	above mean sea level
AOC	area of concern
ARNG	Army National Guard
bgs	below ground surface
Camp Ravenna	Camp Ravenna Joint Military Training Center
CB&I	CB&I Federal Services LLC
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
COC	chemical of concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
Cr^{+3}	trivalent chromium
DGM	digital geophysical mapping
e^2M	engineering-environmental Management, Inc.
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
Final RI Report	*Final Remedial Investigation Report for RVAAP-033-R-01 Firestone Test Facility MRS, Version 1.0*
Final Work Plan	*Final Work Plan for Military Munitions Response Program Remedial Investigation Environmental Services*
FWCUG	facility-wide cleanup goal
HA	Hazard Assessment
HHRA	human health risk assessment
HHRAM	*RVAAP's Facility-Wide Human Health Risk Assessor Manual*
IRP	Installation Restoration Program
ISM	incremental sampling methodology
MC	munitions constituents
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
NFA	No Further Action
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
RI	Remedial Investigation
RVAAP	former Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
Shaw	Shaw Environmental & Infrastructure, Inc.
SI	Site Inspection
SRC	site-related chemical
TNT	trinitrotoluene
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S. Army	U.S. Department of the Army

1.0 INTRODUCTION

This *No Further Action Proposed Plan* is presented by the United States Department of the Army (U.S. Army) to involve the public in the remedy selection process for the RVAAP-033-R-01 Firestone Test Facility Munitions Response Site (MRS) requiring No Further Action (NFA) at the former Ravenna Army Ammunition Plant (RVAAP) in Portage and Trumbull Counties, Ohio (**Figure 1**). The U.S. Army, in consultation with the Ohio Environmental Protection Agency (Ohio EPA), is the lead agency for investigating, reporting, making remedial decisions, and taking remedial actions at the RVAAP. This NFA Proposed Plan presents the U.S. Army's preliminary recommendations concerning how best to address the Firestone Test Facility MRS where no munitions and explosives of concern (MEC) were found that may have resulted from historical activities associated with manufacturing, storing, transporting, testing, training, and/or disposal that occurred at the facility.

This NFA Proposed Plan provides the public with information to comment upon the selection of the recommended response action. The U.S. Army, in consultation with the Ohio EPA, will review and consider all comments during the 30-day public comment period. Therefore, the public is encouraged to review and comment on all recommendations presented in this NFA Proposed Plan.

The U.S. Army is issuing this NFA Proposed Plan as part of its public participation responsibilities under Section 117(a) of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), as amended by the *Superfund Amendments and Reauthorization Act of 1986* and Section 300.430(f)(2) of the *National Oil and Hazardous Substances Pollution Contingency Plan* (40 Code of Federal Regulations 300). Implementation of the selected remedy for the MRS will also satisfy the requirements of the *Director's Final Findings and Orders* (Ohio EPA, 2004).

This NFA Proposed Plan summarizes information that can be found in greater detail in the *Final Remedial Investigation Report for RVAAP-033-R-01 Firestone Test Facility MRS, Version 1.0* (CB&I Federal Services LLC [CB&I] 2014; hereafter referred to as the "Final RI Report"). The U.S. Army encourages the public to review this document to gain a more comprehensive understanding of the MRS and activities that have been conducted to date at the MRS under the Military Munitions Response Program (MMRP).

2.0 FACILITY AND MRS BACKGROUNDS

This section presents the descriptions and background history for the RVAAP and the Firestone Test Facility MRS presented in this NFA Proposed Plan.

2.1 Facility History

The RVAAP (Federal Facility ID No. OH213820736), now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in northeastern Ohio within Portage and Trumbull Counties and is approximately 3 miles east-northeast of the city of Ravenna. The facility is federally owned and is approximately 11 miles long and 3.5 miles wide. The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garret, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north; and State Route 534 to the east. In addition, the facility is surrounded by the communities of Windham, Garrettsville, Newton Falls, Charlestown, and Wayland (**Figure 1**).

Public Comment Period:
May 27, 2015, to June 26, 2015

Public Meeting:
The U.S. Army will hold an open house and public meeting to explain the NFA Proposed Plan. Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for 6:00 p.m., June 3, 2015, at the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio 44444.

Information Repositories:
Information used in selecting the conclusion is available online for public review at www.rvaap.org and at the following locations:

Reed Memorial Library
167 East Main Street
Ravenna, Ohio 44266
(330) 296-2827
Hours of operation:
9 a.m.–9 p.m. Monday–Thursday
9 a.m.–6 p.m. Friday
9 a.m.–5 p.m. Saturday
1 p.m.–5 p.m. Sunday

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282
Hours of operation:
10 a.m.–8 p.m. Monday–Thursday
9 a.m.–5 p.m. Friday and Saturday

The **Administrative Record File**, containing information used in selecting the preferred alternative, is available for public review at the following location:

Camp Ravenna Joint Military Training Center (Camp Ravenna)
Environmental Office
1438 State Route 534
Newton Falls, Ohio 44444
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

Administrative control of the 21,683-acre facility has been transferred to the U.S. Property and Fiscal Officer for Ohio and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a training site, Camp Ravenna. The restoration program involves cleanup of former production areas across the facility related to former operations under the RVAAP.

The RVAAP was constructed between 1940 and 1941 for depot storage and ammunition assembly/loading. During operations as an ammunition plant, the RVAAP was a government-owned and contractor-operated industrial facility. Industrial operations at the facility consisted of 12 munitions assembly facilities, referred to as "load lines." Load Lines 1 through 4 were used to melt and load 2,4,6-trinitrotoluene (TNT) and Composition B (mixture of TNT and Research Department Explosive) into large-caliber shells and bombs. The operations on the load lines produced explosive dust, spills, and vapors that collected on the floors and walls of each building. Periodically, the floors and walls were cleaned with water and steam. Following cleaning, the "pink water" waste water, which contained TNT and Composition B, was collected in concrete holding tanks, filtered, and pumped into unlined ditches for transport to earthen settling ponds. Load Lines 5 through 11 were used to manufacture fuzes, primers, and boosters. From 1946 to 1949, Load Line 12 was used to produce ammonium nitrate for explosives and fertilizers prior to use as a weapons demilitarization facility.

In 1950, the facility was placed in standby status and operations were limited to renovation, demilitarization, and normal maintenance of equipment, along with storage of munitions. Production activities were resumed from July 1954 to October 1957 and again from May 1968 to August 1972. In addition to production missions, various demilitarization activities were conducted at facilities constructed at Load Lines 1, 2, 3, and 12. Demilitarization activities included

disassembly of munitions and explosives melt-out and recovery operations using hot water and steam processes. Periodic demilitarization of various munitions continued through 1992.

In addition to production and demilitarization activities at the load lines, other facilities at the RVAAP include MRSs that were used for the burning, demolition, and testing of munitions. These burning and demolition grounds consist of large parcels of open space or abandoned quarries. Other areas of concern (AOCs) present at the facility include landfills, an aircraft fuel tank testing area, and various general industrial support and maintenance facilities (Science Applications International Corporation [SAIC], 2011).

2.2 MRS Historical Investigations

The following environmental investigations and/or reports have been completed for the Firestone Test Facility MRS under the MMRP:

- *Final Military Munitions Response Program Historical Records Review* (engineering-environmental Management, Inc. [e^{2}M], 2007)
- *Final Site Inspection Report* (e^{2}M, 2008)

The Firestone Test Facility was an approximately 1-acre area that consisted of three buildings and a pond located on the southeastern side of the Load Line #6 Fuze and Booster AOC. Load Line #6 is located in the south-central portion of the facility (**Figure 2**). Two of the buildings were used as a test chamber for tube-launched, optically-tracked, wire-guided missiles and Dragon missiles, while shaped charges were tested under water at the pond. Due to the classified nature of the research that was conducted at the Firestone Test Facility, there is little available information regarding the activities that occurred or how the tests were conducted (SAIC, 1996). The tests that were conducted were reportedly contained, which limited any release of MEC (e^{2}M, 2007). A third, smaller building was located adjacent to the pond that was used for testing shaped charges. The building, which measured 10 feet high and 10 feet square, was constructed of reinforced concrete and fitted with steel plates, and was surrounded by a barricade constructed of railroad ties. All three buildings have been removed, and the areas have been cleared of surface construction debris. Some buried construction debris is evident in the area around the pond due to mounded areas with rebar protruding through the ground surface. The MRS is 0.41 acres in size and is the location of the former building and area around the former test pond only. The MRS is currently undeveloped, vacant land with no improvements (CB&I, 2014). **Figure 3** presents the current MRS boundaries and cultural features that remain near the Firestone Test Facility MRS.

No MEC were found during the Site Inspection (SI) field activities; however, various subsurface anomalies were detected that were not verified during the SI. Surface soil samples for munitions constituents (MC) associated with munitions that may have been tested at the MRS were not collected around the former test chambers or pond during the SI, as chemical contamination in this area was being investigated under the Installation Restoration Program (IRP).

One surface sample was collected using the incremental sampling methodology (ISM) at a suspected test range area that was located outside of the MRS but was added to the SI area following the e^{2}M historical records review. The sample was analyzed for target analyte list metals using U.S. Environmental Protection Agency (EPA) Method SW846 6010C and for explosives and propellants using EPA Method 8330B. No results for MC in the soil sample exceeded the EPA Preliminary Remediation Goals, which were the screening criteria at the time of the SI.

Following the SI field work, it was concluded that there was a potential for MEC around the perimeter and bottom of the pond and adjacent

to the former shaped charge test chamber building. It was recommended that these areas be further characterized to address the MEC concerns. Due to the lack of detected MC in the open area located outside of the MRS and that sampling investigations at the remaining portions of the MRS were being conducted under the IRP, additional characterization of MC at the MRS was not recommended following the SI field work (e^2M, 2008).

2.3 MRS Characteristics

The topography at the Firestone Test Facility MRS is relatively flat to gently sloping towards the natural drainage channel to the east and adjacent to the MRS. The ground surface elevation at the MRS is approximately 1,115 feet above mean seal level (amsl). Natural drainage at the MRS is towards the drainage ditch that runs along the eastern boundary of the MRS or the former man-made test pond.

The Firestone Test Facility MRS is located over the Mercer Member, and the bedrock elevation is approximately 1,100 feet amsl (MKM Engineers, Inc., 2007). The estimated depth to bedrock at the MRS is between 13 and 20 feet below ground surface (bgs) (SAIC, 2011).

The soil type at the Firestone Test Facility MRS is the Mahoning silt loam with 0 to 2 percent slope (SAIC, 2011). The Mahoning silt loam is characterized with medium to rapid runoff, severe seasonal wetness, and slow permeability. The average permeability of the Mahoning silt loam is 9.1×10^{-5} centimeters per second (U.S. Department of Agriculture et al., 1978).

A planning-level survey for wetlands was conducted for the facility, including the MRS, and no wetlands have been identified at the Firestone Test Facility MRS. No bogs, kettle lakes, or kames have been identified as being present within the MRS (AMEC Earth and Environmental, Inc. [AMEC], 2008). Perennial surface water at the Firestone Test Facility MRS is limited to the former test pond, which was formerly utilized for explosives testing.

Surface water at the northern and eastern portions of the MRS flows to the drainage ditch that runs along the eastern boundary of the MRS. Surface water at the southeast portion of the MRS enters the former man-made test pond or the drainage ditch.

The estimated groundwater flow direction at the MRS is to the east-southeast approximately 5 feet bgs in primarily sandy silt (MKM Engineers, Inc., 2007). Potentiometric data indicate the groundwater table occurs within the unconsolidated formation throughout the AOC that is collocated with the MRS (Environmental Quality Management, Inc., 2012).

Vegetation at the MRS has been influenced by man-made improvements associated with the former use of the MRS as a test area for shaped charges, and the vegetation community present at the Firestone Test Facility MRS is categorized as “other land” (AMEC, 2008). This category presumably refers to highly disturbed areas that do not support any particular plant community. Vegetation associated with aquatic and semiaquatic conditions (i.e., cattails) are present at the edges of the shaped charge test pond.

Biological inventories have not occurred specifically within the MRS boundary, although no confirmed sightings of federal- or state-listed species have been reported. Although there is the potential for federal, state-listed, or rare species to be within the MRS boundary, the potential is unlikely due to the minimal size of the MRS (Camp Ravenna, 2010).

Current activities at the Firestone Test Facility MRS include maintenance, environmental sampling, and natural resource management activities.

2.4 Remedial Investigation Results

Between May and August 2011, CB&I conducted the field work for the Remedial Investigation (RI) at the Firestone Test Facility MRS. The activities included a full coverage digital geophysical mapping (DGM) survey, an intrusive investigation of subsurface anomalies, an underwater tactile investigation within the former test pond. Sampling was conducted in environmental media at the MRS to verify that there was no MC present that represented risks to potential receptors. The sampling was conducted regardless of the recommendation in the SI phase that additional characterization for MC was not warranted.

The full-coverage DGM survey was conducted at the MRS during the RI field work to identify potential subsurface areas of MEC. No MEC were identified on the ground surface during the DGM survey or in the subsurface at anomaly locations that were selected for intrusive investigation (CB&I, 2014).

An underwater tactile investigation was performed at the former shaped charge test pond during the RI field work to examine for potential MEC items buried within the pond sediment. No MEC were found during the underwater investigation (CB&I, 2014).

Characterization for MC at the MRS during the RI included the evaluation of wet sediment samples that were collected from the former test pond, one surface soil sample that was collected from around the former test pond, and one surface water sample that was collected within the former test pond. The wet sediment samples were discrete (grab) samples along the edge of the pond, and the surface soil sample was collected using ISM. The surface water sample was a grab sample collected at the center depth (6 to 7 feet) of the pond.

The locations for the surface soil and sediment samples were specified in the *Final Work Plan for Military Munitions Response Program Remedial Investigation Environmental Services* (Shaw Environmental & Infrastructure, Inc. [Shaw], 2011); hereafter, referred to as the "Work Plan." The soil and sediment samples were analyzed for the following metals: aluminum, antimony, barium, cadmium, chromium (total and hexavalent), copper, iron, lead, mercury, strontium, and zinc using EPA Methods SW846 6010C/7471A/7196A; explosives by EPA Method SW846 8330B; nitrocellulose by EPA Method SW846 9056; total organic carbon by the Lloyd Kahn Method; and pH by EPA Method SW846 9045D.

The surface water sample was analyzed for the following metals: aluminum, antimony, barium, cadmium, calcium, total chromium, copper, iron, lead, magnesium, manganese, mercury, strontium, and zinc; explosives; and propellants by the aforementioned EPA SW846 methods. The surface water sample was also analyzed for polychlorinated biphenyls using EPA Method SW846 8082A, pesticides using EPA Method SW846 8081B, semivolatile organic compounds using EPA Method SW846 8270C, and volatile organic compounds using EPA Method SW846 8260B.

The MC sample results were evaluated using the RVAAP data screening process presented in the *Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant* (SAIC, 2010) that provides guidance for performing a statistical analysis of the results and as well as a comparison of the results against established facility-wide background value (inorganics only). The site-related chemicals (SRCs) that were retained for evaluation in the risk assessments included the following inorganics that exhibited concentrations above the applicable background levels: copper at an estimated concentration (i.e., "J" flagged) of 56.7 milligrams per kilogram (mg/kg) and cadmium at 0.25 mg/kg in surface soil; aluminum at 14,700 mg/kg, antimony at estimated concentrations of 0.72 and 0.98 mg/kg, cadmium at concentrations of 0.16 and 0.21 mg/kg, copper at concentrations of

34.3 and 50 mg/kg, and lead at 48.2 mg/kg in sediment; and chromium at an estimated concentration of 1.3 micrograms per liter (µg/L), copper at 10.8 µg/L, lead at an estimated concentration of 2.8 µg/L, and strontium at 42.5 µg/L in surface water (CB&I, 2014). The detected concentrations were considered to be low and were below the applicable risk screening levels. Further discussions of human and ecological risks are provided in more detail in Section 4.0.

3.0 SCOPE AND ROLE OF RESPONSE ACTION

Load Line #6, which is inclusive of the MRS, is federal property that is licensed to the OHARNG for future use as a military training site. The purpose of the RI field work was to evaluate for the presence of MEC and MC associated with the historical activities at the MRS in support of the intended future use. This NFA Proposed Plan addresses surface soil, sediment, and surface water at the MRS where the release of MC associated with shaped charges may have occurred. The selected remedy at any MRS must also be protective of groundwater, which is monitored under the facility-wide groundwater monitoring program and in accordance with the *Director's Final Findings and Orders* (Ohio EPA, 2004).

Due to former operations and the fact that the site is still being investigated under the IRP, the potential exists for non-MMRP chemicals of concern (COCs) or other non-munitions-related hazards to be present at the Firestone Test Facility MRS. Response actions associated with non-MMRP-related hazards will be addressed under the IRP and are not included in this NFA Proposed Plan.

4.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

The ISM surface soil and discrete sediment samples were collected at the Firestone Test Facility MRS to evaluate for the nature and extent of contamination associated with previous activities at the MRS and to determine whether or not there is unacceptable risk. The intent of the surface water sampling event was to evaluate options for investigating the test pond sediment, which included approved and controlled discharge to the ground surface or manual diving operations. The results of the surface water sample were also used for the purposes of the RI to characterize the nature and extent of contamination of the surface water in the pond and to determine if there is any unacceptable risk associated with that medium at the MRS. The results from the RI field work, including the data results for MC, were used to evaluate risk in terms of potential exposures associated with MEC and/or MC and evaluation of the potential transport pathways MEC and/or MC may take from a source to a receptor. Each pathway includes a source, activity, access, and receptor component with complete, potentially complete, or incomplete exposure pathways identified for each receptor.

Both a human health risk assessment (HHRA) and an ecological risk assessment (ERA) were performed to further evaluate the SRCs identified during the RI. The purpose of the HHRA was to evaluate whether site conditions may pose a risk to current or future human receptors. The ERA was conducted to evaluate the potential for adverse ecological effects to ecological receptors.

4.1 MEC Hazard Assessment

The *Interim Munitions and Explosives of Concern Hazard Assessment Methodology* (EPA, 2008) addresses human health and safety concerns associated with potential exposure to MEC at a MRS under a variety of site conditions, including various cleanup scenarios and land use assumptions. If an explosive hazard is identified, the MEC Hazard Assessment (HA) evaluation will include the information available for the MRS up to and including the RI field activities and provide a scoring summary for the current and future land-use activities. If no explosive hazard is found at the MRS, then there is no need to

calculate a MEC HA score since there are no human health safety concerns.

No MEC representing an explosive safety hazard at the Firestone Test Facility MRS were identified during RI field activities. Therefore, calculation of a MEC HA score was not warranted for the MRS and the MEC exposure pathways for all receptors at the MRS are incomplete.

4.2 Human Health Risk Assessment

The HHRA was prepared based on the RI data results using the streamlined approach to risk decision-making as described in the *Ravenna Army Ammunition Plant Final Position Paper for the Application and Use of Facility-Wide Cleanup Goals* (U.S. Army Corps of Engineers [USACE], 2012). The approach identifies chemicals of potential concern (COPCs) by comparing concentrations to background screening values, eliminating essential nutrients, and comparing site concentrations to the facility-wide cleanup goals (FWCUGs). The COCs are identified through additional screening of the COPCs by comparing site concentrations to specific FWCUGs and using a "Sum of Ratios" approach to account for cumulative effects.

The HHRA evaluates the intended Representative Receptor for the future land use at each of the MRSs where sampling for MC occurred during the RI field work. The Representative Receptor for the future land use, in conjunction with the evaluation of the Resident Receptor (Adult and Child) for Unrestricted Land Use, forms the basis for identifying COCs in the RI. Evaluation for Unrestricted (Residential) Land Use is performed to assess for baseline conditions and the no action alternative under CERCLA, and as outlined in the *RVAAP's Facility-Wide Human Health Risk Assessor Manual* (USACE, 2005; hereafter referred to as the "HHRAM"). The facility has defined exposure scenarios for the identified receptors that are presented in the HHRAM (USACE, 2005).

The Firestone Test Facility MRS will be used for military training. The National Guard Trainee and the Engineering School Instructor were chosen as the Representative Receptors for this future land use (USACE, 2005).

Surface soil for the Resident Receptor (Adult and Child) is defined as 0 to 1 foot bgs, and surface soil for both the National Guard Trainee and the Engineer School Instructor is evaluated from 0 to 4 feet bgs. The facility-defined wet sediment exposure depth for the human receptors is 0 to 0.5 feet (6 inches) bgs and is consistent with the sample depth of the sediment samples that were collected during the RI field activities (SAIC, 2010).

Aluminum in sediment was the only SRC identified as a COPC during the first screening step. The COC evaluation of aluminum in sediment was performed and concluded that aluminum is not considered a COC and is not likely to pose risks to human receptors. In summation, none of the MC-related SRCs were determined to pose risks to likely human receptors, including the Resident Receptor (Adult and Child), and Unrestricted Land Use was achieved for MC at the Firestone Test Facility MRS. Therefore, the MC exposure pathways for all human receptors at the Firestone Test Facility MRS are incomplete.

Since the RI was initiated before the finalization of the U.S. Army's Technical Memorandum (Army National Guard, 2014), modifications to the HHRA specified in the technical memorandum were not required for the RI. Specifically, the RI still included an assessment of risks to a formerly used human health receptor (the Engineering School Instructor) and did not include the Commercial Industrial Land Use using the Industrial Receptor. Furthermore, evaluation for the Industrial Receptor is not required when the MC results for Unrestricted Land Use are achieved.

4.3 Ecological Risk Assessment

The ERA process at the facility includes characterizing the ecological communities in the vicinity of the MRS, determining the particular SRCs that are present, identifying pathways for receptor exposure, and estimating the magnitude of the likelihood of potential adverse effects to identified receptors. The ERA process is consistent with the process described in the EPA *Ecological Risk Assessment Guidance for Superfund* (1997) and the Ohio EPA *Ecological Risk Assessment Guidance Document* (2008) and also follows the facility Unified Approach (USACE, 2011) to ERAs established at MRSs under environmental investigation at the facility. The ecological receptor species selected for evaluation in the ERAs for the MRSs where data were collected for the evaluation of MC were identified in the *RVAAP Facility-Wide Ecological Risk Assessment Work Plan* (USACE, 2003).

Several metals were identified as chemicals of potential ecological concern (COPECs) in surface soil, sediment, and surface water at the Firestone Test Facility MRS. Copper was present in all three media at slightly elevated concentrations, which suggests that it may be an actual MC related to the MRS's previous history as a test area for shaped charges. Antimony and cadmium were identified as COPECs in soil and sediment. Aluminum and lead were identified as COPECs in sediment only. Chromium, in its trivalent form (Cr^{+3}), was identified as a COPEC in surface soil only.

Given the conservativeness of the ERA and the low overall concentrations detected, the potential that exposure to the COPECs identified to adversely impact populations of ecological receptors at the Firestone Test Facility MRS was considered to be very low and not pose a concern to ecological receptors. No final COPECs were identified for any media, and no further investigation or action was considered necessary at the Firestone Test Facility MRS for ecological purposes. The exposure pathways for all ecological receptors at the Firestone Test Facility MRS are incomplete.

5.0 CONCLUSIONS AND RECOMMENDATIONS

No evidence of MEC was found at the Firestone Test Facility MRS during the RI field work that was conducted under the MMRP. The MRS was further evaluated for MC at locations specified in the Final Work Plan (Shaw, 2011), and no COCs or COPECs that presented potential risks to human or environmental receptors were found. Based on these results, no risk associated with exposures to MEC or MC is present and the U.S. Army, in consultation with the Ohio EPA, is recommending NFA under the MMRP for the Firestone Test Facility MRS. This recommendation is not a final decision. The U.S. Army, in consultation with the Ohio EPA, will select the remedy for the MRS after reviewing and considering all comments submitted during the 30-day public comment period.

6.0 COMMUNITY PARTICIPATION

Public participation is an important component of the remedy selection. The U.S. Army, in coordination with Ohio EPA, is soliciting input from the community on the preferred alternative. The comment period extends from May 27, 2015, to June 26, 2015. This period includes a public meeting at which the U.S. Army will present this NFA Proposed Plan. The U.S. Army will accept oral and written comments at this meeting.

6.1 Public Comment Period

The 30-day comment period is from May 27, 2015, to June 26, 2015, and provides an opportunity for public involvement in the decision-making process for the proposed action. The public is encouraged to review and comment on this NFA Proposed Plan. All public comments will be considered by the U.S. Army and Ohio EPA before selecting a remedy. During the comment period, the public

is encouraged to review documents pertinent to the Firestone Test Facility MRS. This information is available at the Information Repositories and online at www.rvaap.org. To obtain further information, contact the Camp Ravenna Environmental Office.

6.2 Public Meeting

The U.S. Army will hold an open house and public meeting on this NFA Proposed Plan on June 3, 2015, at 6:00 p.m., at the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio 44444, to accept comments. This meeting will provide an opportunity for the public to comment on the proposed action. Comments made at the meeting will be transcribed.

6.3 Written Comments

If the public would like to comment in writing on this NFA Proposed Plan or other relevant issues, please deliver comments to the U.S. Army at the public meeting or mail written comments (postmarked no later than June 26, 2015).

POINT OF CONTACT FOR WRITTEN COMMENTS

Camp Ravenna Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444

6.4 U.S. Army Review of Public Comments

The U.S. Army will review the public's comments as part of the process in reaching a final decision for the most appropriate action to be taken. The Responsiveness Summary, a document that summarizes the U.S. Army's responses to comments received during the public comment period, will be included in the Record of Decision. The U.S. Army's final choice of action will be documented in the Record of Decision. The Record of Decision will be added to the RVAAP Administrative Record and Information Repositories.

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GLOSSARY OF TERMS

Administrative Record: This is a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record is used to select the preferred alternative. It is available for public review at the Camp Ravenna Environmental Office; call (330) 872-8003 for an appointment.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA): This federal law was passed in 1980 and is commonly referred to as the Superfund Program. It provides for liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous waste release sites that endanger public health or the environment.

Chemical of Concern (COC): A chemical substance specific to an area of concern that potentially poses significant human health risks. COCs are typically further evaluated for remedial action.

Chemical of Potential Ecological Concern (COPEC): A chemical substance specific to an area of concern that potentially poses significant ecological risks. COPECs are typically further evaluated for remedial action.

Complete Pathway: Complete pathways imply potential risks or hazards that may exist and need to be addressed by managing the pathway.

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 (UXO), 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.

Incomplete Pathway: No risk or hazard associated with the pathway. No further data required to confirm the pathway is incomplete.

Military Munitions Response Program (MMRP): A Department of Defense program consisting of actions necessary to ensure protection of human health, welfare, and the environment from the hazards associated with MEC and MC at locations impacted by historical military activities.

Munitions Constituents (MC): Any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

Munitions and Explosives of Concern (MEC): A munitions or explosive that may pose an explosive safety risk because it either did not function as designed, was discharged and/or abandoned, or is an explosive constituent. MEC includes UXO, DMM, and explosive constituents of munitions present in high enough concentrations to pose an explosive hazard.

Munitions Response Site (MRS): Any area on a defense site that is known or suspected to contain MEC or MC.

National Contingency Plan: The National Oil and Hazardous Substances Pollution Contingency Plan. These CERCLA regulations provide the federal government the authority to respond to the problems of abandoned or uncontrolled hazardous waste disposal sites as well as to certain incidents involving hazardous wastes (e.g., spills).

Potentially Complete Pathway: Data needs determine if the pathway is complete. If the pathway is determined to be incomplete, there is no risk or hazard. If the pathway is determined to be complete, a potential risk or hazard exists.

Proposed Plan: This CERCLA document provides the public with information necessary to participate in the selection of a remedy. It is designed to solicit public comment on a preferred alternative before a ROD is established.

Record of Decision (ROD): A legal record signed by the U.S. Army following

coordination and concurrence with the Ohio EPA as per a June 10, 2004, agreement between the two parties. It describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, responses to comments, and the estimated cost of the remedy.

Remedial Investigation (RI): A CERCLA investigation that involves sampling environmental media, such as air, soil, and water, to determine the nature and extent of contamination and to calculate human health and environmental risks that result from the contamination.

Responsiveness Summary: A section of the ROD where the U.S. Army documents and responds to written and oral comments received from the public about the Proposed Plan.

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

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FIGURES

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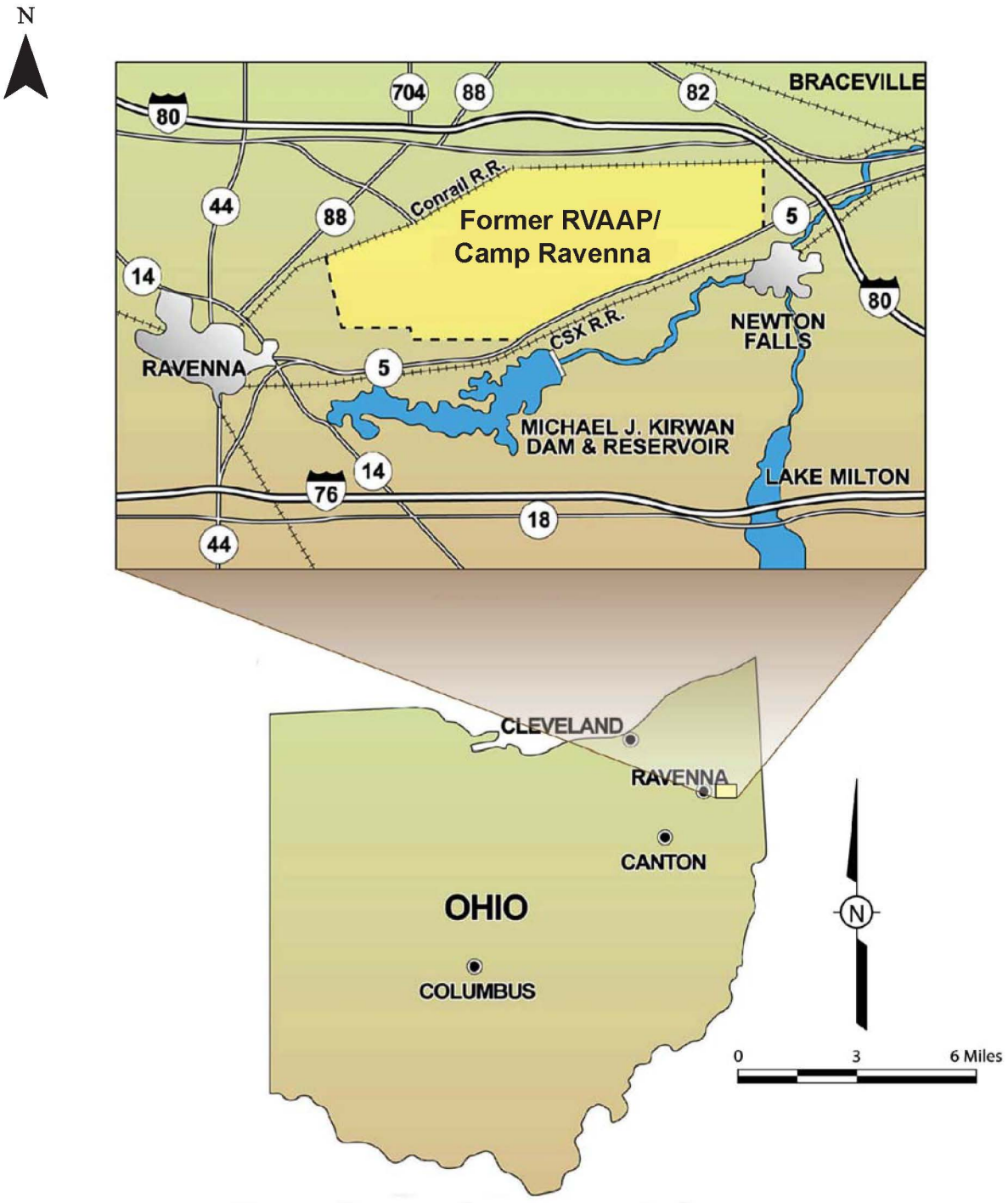

Note:
The Scale is for the Upper Map Only
Showing the Former RVAAP/Camp Ravenna Location

U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FORMER RVAAP/CAMP RAVENNA
PORTAGE AND TRUMBULL COUNTIES, OHIO

CB&I Federal Services LLC
150 Royall Street
Canton, MA 02021

H:\MMRS\Ravenna\GIS Documents\Project Maps\MMRPRIFS\RIFS LoadLine1\April 2014 Rev1\RVAAP LL1 001 Fig1 1 SiteLoc r1.mxd: Analyst: gwt: Date: 4/25/2014 3:03:15 PM

FIGURE 1 INSTALLATION LOCATION MAP

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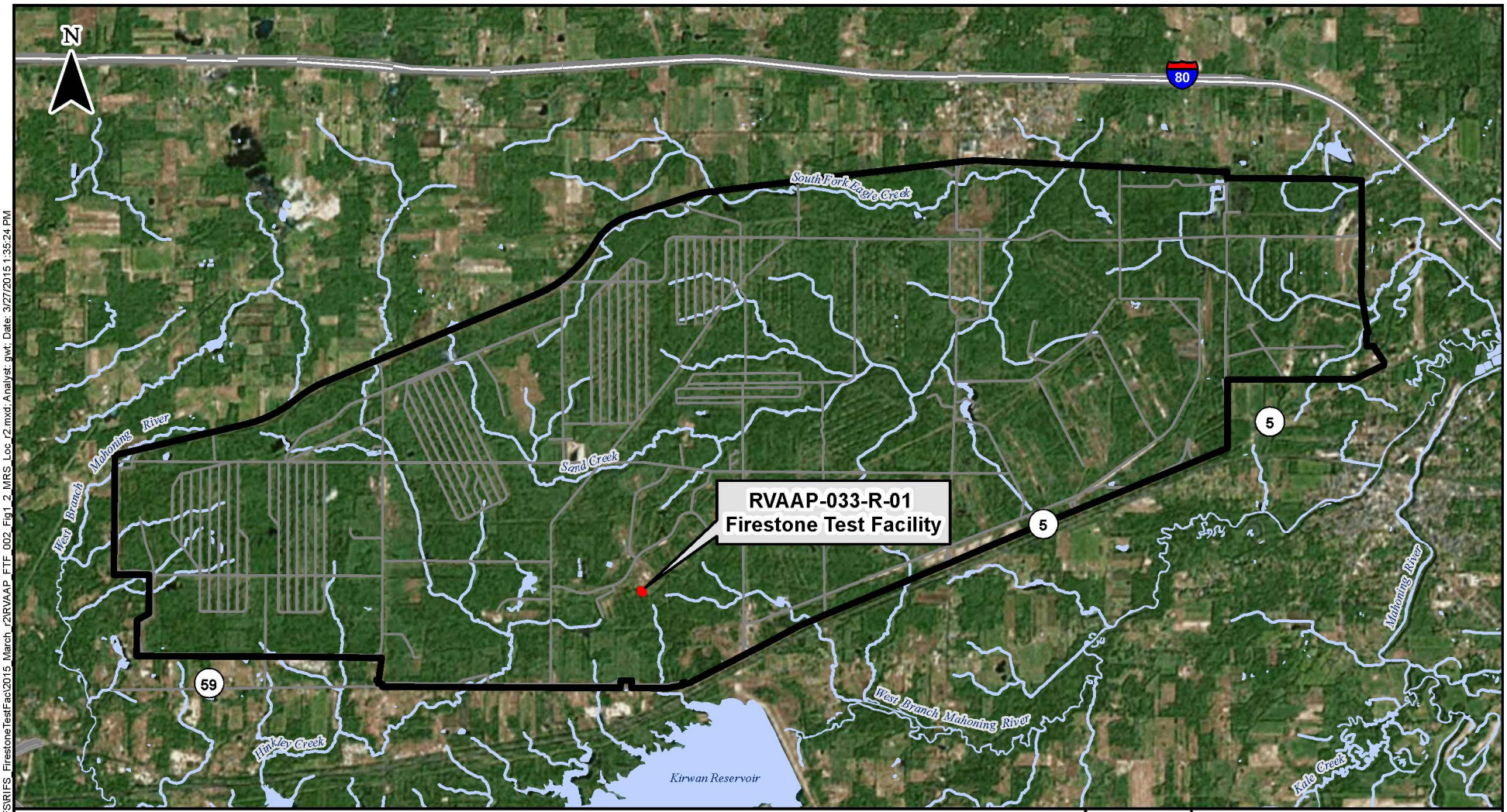

FIGURE 2 MRS LOCATION MAP

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FIGURE 3 SITE FEATURES MAP

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OHIO EPA CORRESPONDENCE

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OhioEPA

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

April 14, 2015

Mr. Mark Leeper, P.G., MBA
Army National Guard Directorate
Environmental Programs Division
ARNG-ILE-CR
111 South George Mason Drive
Arlington, VA 22204

Re: **US Army Ravenna Ammunition Plt RVAAP**
Remediation Response
Plans
Remedial Response
Portage County
267000859209

Subject: **Approval for the "Draft No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site Version 1.0," Former Ravenna Army Ammunition Plant, Ravenna, Ohio, Dated March 31, 2015 (Work Activity No. 267-000859-209)**

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) has received and reviewed the document entitled, "Draft No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site Version 1.0," dated March 31, 2015. This document, received by Ohio EPA's NEDO on April 1, 2015, was prepared by CB&I Federal Services LLC.

Ohio EPA has reviewed this documentation and has no comments. As a result, the "Draft No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site Version 1.0" is approved in this version. Please add the dates in which the public meeting will take place in the final version, and note that the work activity number has changed to reflect the progression of the project. When sending documents pertaining to the proposed plan for the Firestone Test Facility Munitions Response Site in the future please use the 267-000859-209 numerical identification as shown above.

Northeast District Office • 2110 East Aurora Road • Twinsburg, OH 44087-1924
www.epa.ohio.gov • (330) 963-1200 • (330) 487-0769 (fax)

If you have any questions or concerns, please do not hesitate to contact me at (330) 963-1235.

Sincerely,

Nicholas Roope
Site Coordinator
Division of Environmental Response and Revitalization

NCR/nvr

cc: Gregory F. Moore, USACE, Louisville District
Katie Tait/Kevin Sedlak, Camp Ravenna Environmental Office, Newton Falls
Haney/Harris, Camp Ravenna Environmental Office, Vista Sciences

ec: Rod Beals, Ohio EPA, NEDO, DERR
Justin Burke, Ohio EPA, CO, DERR
Andrew Kocher, Ohio EPA, NEDO, DERR

OhioEPA

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

May 18, 2015

Re: US Army Ravenna Ammunition Plt RVAAP Remediation Response Plans Remedial Response Portage County 267000859209

Mr. Mark Leeper, P.G., MBA
Army National Guard Directorate
Environmental Programs Division
ARNG-ILE-CR
111 South George Mason Drive
Arlington, VA 22204

Subject: Approval of the "Final No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site Version 1.0," Former Ravenna Army Ammunition Plant, Ravenna, Ohio: Dated May 6, 2015 (Work Activity No. 267-000859-209)

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) has received and reviewed the, "Final No Further Action Proposed Plan for RVAAP-033-R-01 Firestone Test Facility Munitions Response Site Version 1.0," dated May 6, 2015. This document received by Ohio EPA's NEDO on May 7, 2015, was prepared by CB&I Federal Services, LLC. Ohio EPA concurs with this remedy. Additional remedial investigation will be completed in the future under the installation restoration program.

If you have any questions or concerns, please do not hesitate to contact me at (330) 963-1235.

Sincerely,

Nicholas Roope, Site Coordinator
Division of Environmental Response and Revitalization

NCR/nvr

cc: Gregory F. Moore, USACE
Haney/Harris, Vista Sciences
Katie Tait/Kevin Sedlak, Newton Falls

ec: Rod Beals, NEDO, DERR
Andrew Kocher, NEDO, DERR
Justin Burke, Ohio EPA, CO, DERR

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