1.0 INTRODUCTION

This report documents the results of the Phase II Remedial Investigation (RI) at Winklepeck Burning Grounds (WBG) at the U.S. Army Industrial Operations Command's (IOC's) Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (**Figure 1-1**). The Phase II RI was conducted under the U.S. Department of Defense (DOD) Installation Restoration Program (IRP) by Science Applications International Corporation (SAIC) and their subcontractors, under contract number DACA62-94-D-0029, Delivery Order No. 0060, with the U.S. Army Corps of Engineers (USACE), Louisville District. The Phase II RI was conducted in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 following work plans reviewed and commented on by the Ohio Environmental Protection Agency (OEPA).

This document summarizes the results of the Phase II RI field activities conducted in April and May 1998 at WBG. The field program, environmental setting, and nature and extent of contamination are discussed. Human health and ecological risk assessments were performed as part of the Phase II RI. Results of the data analysis and risk assessments are used to develop a revised conceptual model for WBG to support the investigation summary and conclusions that are the framework for decisions regarding future IRP actions at WBG.

1.1 PURPOSE AND SCOPE

The purpose of this RI Report is to describe the investigations conducted at WBG at RVAAP and to define the vertical and horizontal extents of contamination. The specific objectives of the Phase II RI are as follows:

- Characterize the physical environment of WBG and its surroundings to the extent necessary to define potential transport pathways and receptor populations and provide sufficient engineering data for preliminary screening of remedial action alternatives. This includes collection of additional facility-wide background soils and groundwater data to augment the Phase I RI background characterization.

- Characterize the nature and extent of contamination at WBG such that a baseline risk assessment can be conducted to evaluate the potential threats to human health and the environment and to develop Preliminary Remediation Goals (PRGs), if needed.

- Characterize the sources of contamination at WBG sufficient to evaluate remedial actions. Information on source locations, types and amounts, potential releases, physical and chemical properties of wastes present, and engineering characteristics will be evaluated.

Investigation-specific objectives were developed using the Data Quality Objective (DQO) approach presented in the *Facility-Wide Sampling and Analysis Plan (SAP) for Ravenna Army Ammunition Plant* (USACE 1996a).

The investigative approach to the Phase II RI at WBG involved a combination of field and laboratory activities to characterize the area of concern (AOC). Field investigation techniques included soil boring and sampling, monitoring well installation and groundwater sampling, aquifer testing, and surface water and sediment sampling. Colorimetric analyses of soils for 2,4,6-trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) were conducted in the field to support the determination of extent of explosives contamination. The field program was conducted in accordance with the *Facility-Wide SAP* (USACE 1996a) and the *SAP Addendum for the Phase II Remedial Investigation at Winklepeck Burning Grounds and Determination of Facility-Wide Background at RVAAP* (USACE 1998a).

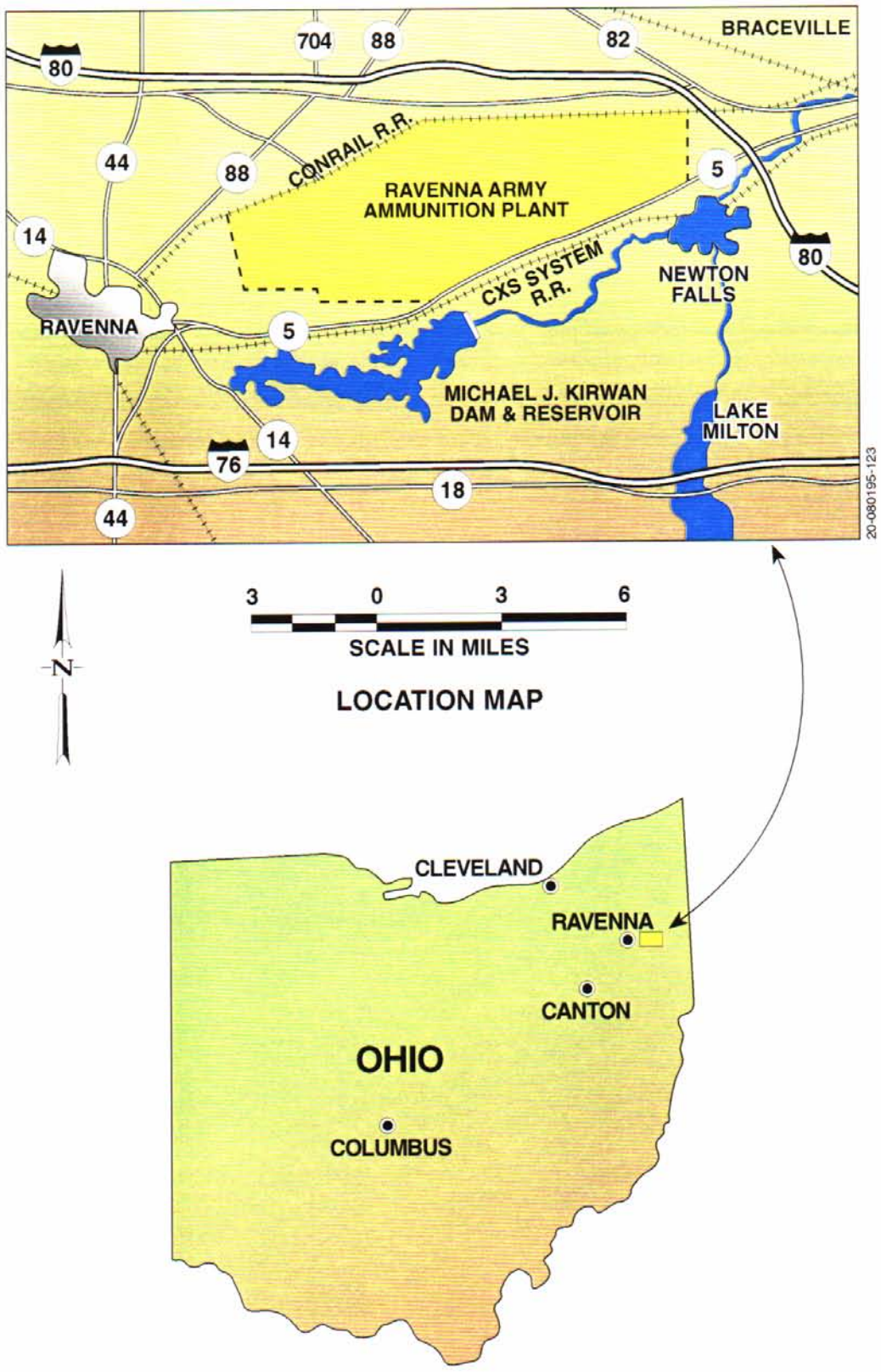

Figure 1-1. General Location and Orientation of RVAAP

Primary sources of contamination at WBG are residues from the open burning of explosives such as TNT; RDX; dinitrotoluene (DNT); associated metals (e.g., cadmium, chromium, lead, and mercury); and associated munitions processing wastes (e.g., used sawdust filter material, off-specification fuzes and boosters, etc.). In addition, the widespread use of aluminum-rich slag throughout the installation may account for some of the elevated metals (especially aluminum, barium, beryllium, and manganese).

1.2 DESCRIPTION, HISTORY, AND PREVIOUS INVESTIGATIONS

1.2.1 General Site Description

RVAAP is a government-owned, contractor-operated (GOCO) IOC facility. RVAAP is located in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 km (3 miles) east–northeast of the town of Ravenna and approximately 1.6 km (1 mile) northwest of the town of Newton Falls. The installation consists of 8668.3 ha (21,419 acres) contained in a 17.7-km (11-mile)–long, 5.6-km (3.5-mile)–wide tract bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; State Route 534 on the east; Garrettsville and Berry Roads on the west; and the CONRAIL Railroad on the north (see **Figures 1-1 and 1-2**). The land use surrounding the installation is primarily farmland with sparse private residences. The installation is surrounded by several more populous communities: Windham, which borders the installation to the north; Garrettsville, located 9.6 km (6 miles) to the northwest; Newton Falls, 1.6 km (1 mile) to the east; Charlestown, bordering the southwest; and Wayland, 4.8 km (3 miles) to the southeast.

The industrial operations at RVAAP consisted of 12 munitions assembly facilities referred to as "load lines." Load Lines 1 through 4 were used to melt and load TNT and Composition B 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 would be cleaned with water and steam. The liquid, containing TNT and Composition B, was known as "pink water" for its characteristic color. It 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. Potential contaminants in these load lines include lead compounds, mercury compounds, and explosives. Load Line 12 was used to produce ammonium nitrate for explosives and fertilizers prior to its use as a weapons demilitarization facility.

RVAAP had several areas used for the burning, demolition, and testing of munitions. These burning grounds consist of large parcels of open space or abandoned quarries. Potential contaminants at these AOCs include explosives, propellants, metals, waste oils and other chemicals, and sanitary waste.

RVAAP has been inactive since 1992. The only activities still being carried out from the wartime era are the storage of bulk explosives and the infrequent demolition of unexploded ordnance found at the installation. The Army is also overseeing the reclamation of miles of railroad track, telephone line, and steel beams and pipes that run throughout the facility, which will be reused or recycled. Also, all friable asbestos insulation in many buildings has been removed and demolition of excess buildings began in the summer of 1999.

1.2.2 Site Description and History

A detailed history of process operations and waste processes for each AOC at RVAAP is presented in the *Preliminary Assessment for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 1996b). The following is a summary of the history and related contaminants for WBG.

N 576,250

E 2,388,250

EAGLE CREEK

SAND CREEK

SAND CREEK

HINKLEY CREEK

WINKLEPECK BURNING GROUNDS

E 2,327,500

N 546,500

OHIO STATE PLANE (NAD83)

0 2000 4000 8000

SCALE: 1" = 4000'

LEGEND OF SITES:

1	RAMSDELL QUARRY LANDFILL	13	BLDG 1200 AND DILUTION/SETTLING POND	25	BLDG 1034 MOTOR POOL WASTE OIL TANK	37	PESTICIDE STORAGE BUILDING T-4452
2	ERIE BURNING GROUNDS	14	LOAD LINE 6, EVAPORATION UNIT	26	FUZE BOOSTER AREA SETTLING TANKS	38	NACA TEST AREA
3	DEMOLITIONS AREA #1	15	LOAD LINE 6, TREATMENT PLANT	27	BLDG 854-PCB STORAGE	39	LOAD LINE 5 / FUZE LINE 1
4	DEMOLITIONS AREA #2	16	QUARRY LANDFILL/FORMER FUZE & BOOSTER BURNING PITS	28	MUSTARD AGENT BURIAL SITE	40	LOAD LINE 7 / BOOSTER LINE 1
5	**WINKLEPECK BURNING GROUNDS**	17	DEACTIVATION FURNACE	29	UPPER AND LOWER COBBS POND COMPLEX	41	LOAD LINE 8 / BOOSTER LINE 2
6	C BLOCK QUARRY	18	LOAD LINE 12 PINK WASTE WATER TREATMENT	30	LOAD LINE 7 PINK WASTEWATER TREATMENT PLANT	42	LOAD LINE 9 / DETONATOR LINE
7	BLDG 1601 HAZARDOUS WASTE STORAGE	19	LANDFILL NORTH OF WINKLEPECK BURNING GROUND	31	ORE PILE RETENTION POND	43	LOAD LINE 10 / PERCUSSION ELEMENT
8	LOAD LINE 1 AND DILUTION/SETTLING POND	20	SAND CREEK SEWAGE TREATMENT PLANT	32	40 AND 60 MM FIRING RANGE	44	LOAD LINE 11 / ARTILLERY PRIMER
9	LOAD LINE 2 AND DILUTION/SETTLING POND	21	DEPOT SEWAGE TREATMENT PLANT	33	FIRESTONE TEST FACILITY	45	WET STORAGE AREA
10	LOAD LINE 3 AND DILUTION/SETTLING POND	22	GEORGE ROAD SEWAGE TREATMENT PLANT	34	SAND CREEK DISPOSAL ROAD LANDFILL	46	BUILDING'S F-15 AND F-16
11	LOAD LINE 4 AND DILUTION/SETTLING POND	23	UNIT TRAINING SITE WASTE OIL TANK	35	1037 BUILDING-LAUNDRY WASTEWATER SUMP	47	BUILDING T-5301 DECONTAMINATION
12	LOAD LINE 12 AND DILUTION/SETTLING POND	24	RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK	36	PISTOL RANGE	48	ANCHOR TEST AREA

49	CENTRAL BURN PITS	XX	CERCLA
50	ATLAS SCRAP YARD	XX	RCRA
51	DUMP ALONG PARIS-WINDHAM ROAD	XX	OTHER REGULATORY
			RAILROAD TRACKS
			FENCELINE
			PROPERTY BOUNDARY
			STREAM OR CREEK

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO
INSTALLATION MAP

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P. HOLM	REV. 2 / 03-12-01	/98026/DWGS/D23SITE

Figure 1-2. RVAAP Installation Map

The WBG (**Figure 1-3**) has been in operation since 1941 and consists of approximately 80.9 ha (200 acres). Recent activities were limited to a Resource Conservation and Recovery Act (RCRA) area at Burning Pad #37, an area of approximately 0.4 ha (1 acre). Prior to 1980, the burning was carried out in pits, pads, and sometimes on the roads. The pits consisted of areas bermed on three sides, approximately 15.2 × 22.9 m (50 × 75 ft) in size. The pads consisted of 6- × 12.2-m (20- × 40-ft) areas without berms. Burning was conducted on bare ground and the ash was abandoned on site. Scrap metal was reclaimed and taken to the Landfill North of WBG (RVAAP-19). Currently 70 burning pads have been identified from historical drawings and aerial photographs. Several buildings (1601, 1602, and 1603) and a Deactivation Furnace Area are also located within the WBG site (**Figure 1-3**).

According to reports from several former employees at RVAAP, some heavy artillery projectiles were melted out by being placed point side down on 7.6-cm (3-in.) channel irons. The channel irons were placed in a train configuration in a ditch along Road E. Fires were built around the channel irons using scrap wood, straw, and No. 2 fuel oil. A train of projectiles up to 609.6-m (2000-ft) long would sometimes be used in a ditch parallel to a road. The fire would cause the explosives to melt, flow out of the projectile, and burn. Some of the projectiles would explode and be ejected into the surrounding area as far as 152.4 to 182.9 m (500 to 600 ft), usually to the north side of the ditch. Many of the further flung projectiles are still in the field where they landed. In some instances, high-energy material such as black powder and explosives were also laid out in a string along a road and burned (U.S. Army Toxic and Hazardous Materials Agency 1978). Burning is also known to have occurred along Road D.

Prior to 1980, wastes disposed by burning included cyclonite (RDX), antimony sulfide, Composition B, lead oxide, lead thiocyanate, TNT, propellants (e.g., nitroglycerine, nitrocellulose, and nitroguanidine), black powder, sludge and sawdust from load lines, and domestic wastes. Also, small amounts of laboratory chemicals were routinely disposed of during production periods. Shrapnel and other metallic munitions fragments were allowed to remain on the site after detonation, as were possible residual explosives. Waste oil (hydraulic oils from machines and lubrication oils from vehicles) was disposed in the northeast corner of the burning ground until 1973. Ash from these areas was not collected (Jacobs Engineering 1989).

Since 1980, burns have been conducted in metal refractory-lined trays (with subsequent ash collection) set on top of a bed of slag, solely at Burning Pad #37. The trays consisted of 1/4-inch boiler plate, 1.2 m × 18.3 m × 25.4 cm (4 ft × 60 ft × 10 in.), and refractory lining. The trays are set on a pad of crushed slag in an area approximately 30.5 × 30.5 m (100 × 100 ft) in size. Ash residues were drummed and stored in Building 1601 on the west side of the WBG. In 1992, four monitoring wells [Open Burning Ground (OBG) 1 through 4] were installed at the active portion of the site (USAEHA 1992).

1.2.3 Previous Investigations

Five previous environmental investigations have been conducted in whole or in part at the WBG:

- Hazardous Waste Management Study No. 37-26-0442-84, *Phase 2 of AMC Open-Burning/Open-Detonation Grounds Evaluation, Ravenna Army Ammunition Plant* (USAEHA 1983);

- *Soils, Ground Water, and Surface Water Characterization for the Open Burning and Open Detonation Areas, Ravenna Army Ammunition Plant* (USAEHA 1992);

- *Phase I Remedial Investigation for 11 High-Priority Sites at the Ravenna Army Ammunition Plant* (USACE 1997a);

- *RCRA Field Investigation Report for Five Sites at RVAAP* (USACE 1998b); and

- *Soil Sample Analysis, Winklepeck Burning Grounds* (USACE 1997b).

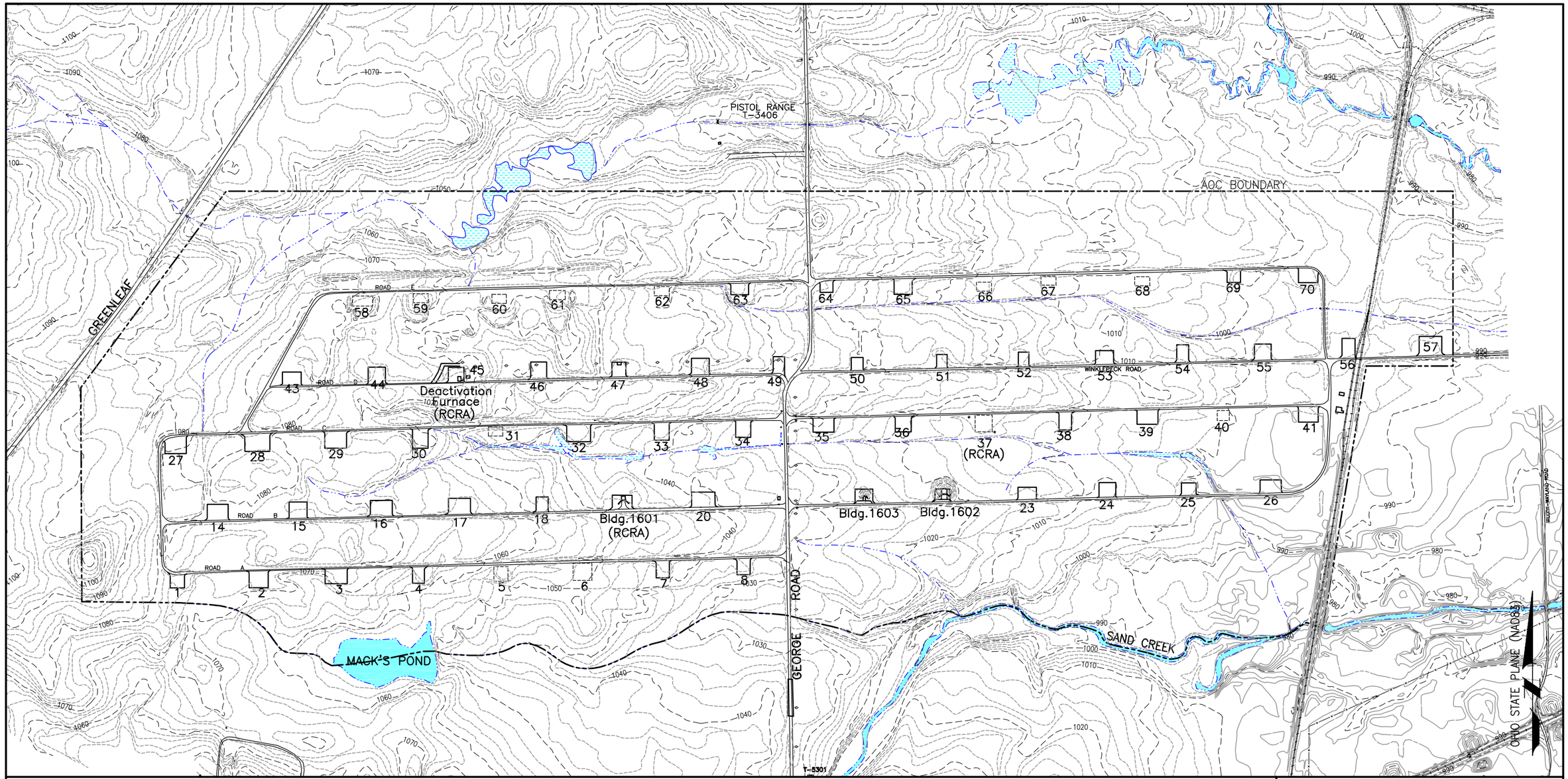

Figure 1-3. Map of Winklepeck Burning Grounds

Figure 1-4 presents a comprehensive overview of the locations previously sampled in these studies. The results of the previous investigations are presented in Appendix A of the *SAP Addendum for the Phase II RI at Winklepeck Burning Grounds and Facility-Wide Background Investigation at RVAAP* (USACE 1998a). While the Phase I RI's focus was on characterizing contamination in surface soils and sediments throughout WBG, the other studies focused on specific burning pads.

Seventy-nine discrete surface soil samples [0 to 0.6 m (0 to 2 ft)] were collected at or adjacent to each burning pad at WBG during the Phase I RI. In general, the Phase I RI data from WBG indicate surface soil contamination with explosives and metals in four discrete areas: on the south side of Pallet Road E East and E West, on the south side of Pallet Road C East (near Pads #37 and 38), and on the south of Pallet Road A West. Explosives were present at concentrations many times higher than the screening levels established for soils in the Phase I RI risk evaluation. The surface soil results corroborate historical information indicating these areas of the WBG were the most commonly used for burning of explosives. Inorganic chemicals such as lead, cadmium, and manganese were present above the Phase I RI screening levels in many of the samples. Distributions of these analytes roughly mimic those for explosives. Semivolatile organic compounds (SVOCs) such as polynuclear aromatic hydrocarbons (PAHs) were also present, as is expected in an area where open burning has occurred. Outside these four main areas, no explosives or high concentrations of metals were found. Soils at the Deactivation Furnace Area (Pad #45) and Building 1601 Hazardous Waste Storage were not sampled during the Phase I RI.

In the 13 sediment samples collected during the Phase I RI, trace amounts of explosives were detected in a few samples, but none exceeded screening levels. Metal contaminants in ditch sediments were much less widespread and present in lower concentrations than in the soil.

The U.S. Army Environmental Hygiene Agency (USAEHA) study of the Open Burning Grounds (1983) evaluated surface soils [0 to 15 cm (0 to 6 in.)] at Pads # 37, 38, 39, 40, 52, 58, 59, 60, 65, 66, and 67, and the Road D Ditch for explosives and selected metals. Their findings indicated the presence of explosives in high concentrations at Pad #37, and in lesser concentrations at Pads #38, 52, 59, 60, 66, and 67, and the Road D Ditch. Concentrations of metals such as cadmium and lead were measured from liquid extractions from the soils and were generally low.

The USACE Cold Regions Research and Engineering Laboratory (CRREL) conducted soil sampling at Pads #37 and 67 (USACE 1997b) to demonstrate the usability of field colorimetric analyses for detecting explosives in soils. Three depth intervals were sampled, and soils were analyzed for explosives using both conventional analytical methods and colorimetric analyses. Metals were analyzed by standard methods for samples from Pad #67 only. The results indicate high concentrations of explosives in surface and subsurface soils at both pads, as well as high lead concentrations at Pad #67.

The RCRA Field Investigation conducted in November 1997 included the collection of soil samples and two slag samples at the Deactivation Furnace Area and Building 1601 Hazardous Waste Storage. Only the two samples collected inside the Deactivation Furnace Area RCRA unit boundary were analyzed for chemical constituents. The samples collected at Building 1601 were analyzed for geotechnical properties only. Target Analyte List (TAL) metals and explosives were analyzed in samples collected to a depth of 10 ft below ground surface (bgs) at the Deactivation Furnace Area. No explosives or propellants were identified in the soils. Arsenic and zinc appeared to be present in surface soils at concentrations greater than their natural abundance in soils. The slag samples contained high concentrations of metals. The glacial tills beneath the Deactivation Furnace Area were found to be at least 43 ft thick. Saturated zones were present in unconsolidated sand lenses at both locations, at 9.6 and 12 ft bgs.

PISTOL RANGE
T-3406

AOC BOUNDARY

SEE INSET

SEE INSET

SEE INSET

Deactivation Furnace

Bldg.1601

Bldg.1603

Bldg.1602

(RCRA)

WINKLEPECK ROAD

GEORGE ROAD

SAND CREEK

MACK'S POND

OHIO STATE PLANE (NAD83)

0 250 500 1000
SCALE: 1" = 500'

5 PAD LOCATION WITH ID
APPROXIMATE LOCATION OF PAD
POND
BEAVER DAM POND
PHASE I R.I. SAMPLE STATION (1996)
USAEHA SAMPLE STATION (1983)
USACE/CRREL SAMPLE STATION (1997)
RCRA SAMPLE STATION (1997)
RCRA MONITORING WELLS (see inset for Pad 37)
SLAG SAMPLE LOCATION (see inset for Pad 45)

INSET - PAD 45

INSET - PAD 37

USACE 1997b INVESTIGATION SAMPLE LOCATION

INSET - PAD 67

0 50 100 200
SCALE: 1" = 100'

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO
WINKLEPECK BURNING GROUNDS

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P. HOLM	REV. 1/07-26-99	98026/DWGS/D23HIST

Figure 1-4. Sampling Points from Previous Investigations

Groundwater monitoring results are available from 15 rounds of groundwater sampling from the four wells (OBG-1, -2, -3, and -4) at the RCRA-regulated OBG at Pad #37. The four wells were installed for the purpose of detection monitoring of the RCRA unit (USAEHA 1992), and have been sampled 15 times since 1992. Data from these wells are included in this RI report, are discussed in Section 4, and included in Appendix F. Two sampling events were conducted in 1992, and quarterly sampling events have been conducted each year thereafter, to monitor contamination in groundwater resulting from the RCRA unit. Filtered and unfiltered metal samples were collected. Monitoring wells were installed on the north, south, east, and west perimeters of the OBG at Pad #37 in 1992 (**Figure 1-4**). The wells were completed and screened in unconsolidated material at the top of bedrock, a weathered shale and sandstone. Well depths range from 19 to 23 ft bgs. OBG-1 is considered the upgradient well. Groundwater flows from west to east, according to the most recent water level measurements (1998).

Groundwater at the OBG has exhibited low concentrations of RDX and 1,3,5-trinitrobenzene (TNB) in the upgradient well as well as in the downgradient wells, but these occurrences have been intermittent. Some metals, such as selenium and arsenic, have been present above the maximum contaminant limits (MCLs) for drinking water in more than one sampling round, but their occurrences have not followed any trend or pattern.

1.2.4 Regulatory Status of AOCs at RVAAP

A Phase I RI of 11 high-priority AOCs, including WBG, was completed in January 1997 following the CERCLA approach at RVAAP (**Figure 1-5**). **Figure 1-2** shows the locations of these AOCs. The other sites evaluated in the Phase I RI were as follows:

- Demolition Area #2 (RVAAP-04),
- Load Line 1 and its dilution/settling pond (RVAAP-08),
- Load Line 2 and its dilution/settling pond (RVAAP-09),
- Load Line 3 and its dilution/settling pond (RVAAP-10),
- Load Line 4 and its dilution/settling pond (RVAAP-11),
- Load Line 12 and its dilution/settling pond (RVAAP-12),
- Building 1200 and its dilution/settling pond (RVAAP-13),
- Load Line 12 Pink Wastewater Treatment Plant (RVAAP-18),
- Landfill North of WBG (RVAAP-19), and
- Upper and Lower Cobbs Ponds (RVAAP-29).

A risk evaluation of the Phase I RI sampling results was performed to determine the potential magnitude of risk to human health associated with contamination detected at each AOC. This was accomplished by (1) identifying inorganic chemicals that were present above background screening levels, (2) identifying risk-based and applicable or relevant and appropriate requirement (ARAR)-based screening levels for each contaminant detected at least once above background criteria in each sampled medium at each AOC, and (3) comparing site-related concentrations to action levels to determine if site conditions warranted additional characterization or action.

The Phase I RI data were used to re-prioritize the original 11 AOCs for further study, using DOD's Relative Risk Site Evaluation (RRSE) Methodology. The WBG, Demolition Area #2, and Load Lines 1, 2, 3, 4, and 12, were assigned the highest priority, principally because of concentrations of explosives and inorganic compounds above screening levels in the surface soils and/or sediments. The remaining AOCs were assigned medium or low priorities (USACE 1997a).

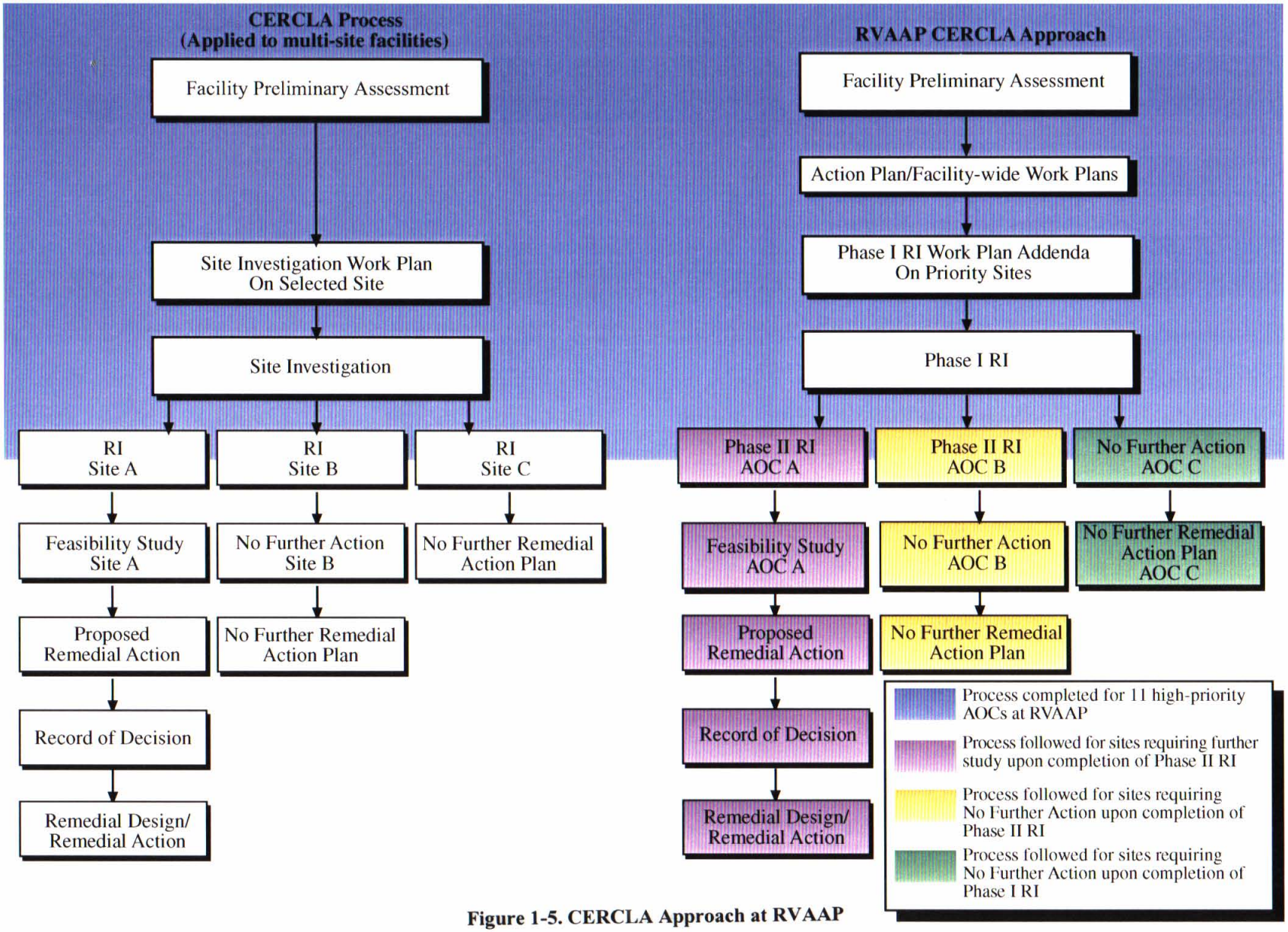

Figure 1-5. CERCLA Approach at RVAAP

Figure 1-5 presents the approach to implementing the CERCLA process under the guidance of the IRP. Priorities for environmental restoration at CERCLA AOCs at RVAAP are based on their relative potential threat to human health and the environment (e.g., based on their RRSE score). The Phase I RI determined the order of priority of future funding and, thus, future investigations for the original 11 high-priority AOCs. The next step in the process is a site-specific RI, designated a Phase II RI, for each of the highest-priority sites. The purpose of the Phase II RI is to determine nature and extent of contamination in environmental media so that quantitative human health and ecological risk assessments can be performed. Depending on the outcome of the risk assessments, an AOC will either require no further action or will be the subject of a Feasibility Study (FS) to evaluate remedial options and future actions.

In 1998, 13 new AOCs were identified based on RVAAP records search and site walkovers. These have been ranked by (via their RRSE score) the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) and entered into the IOC database system (DSERTS). Other AOCs were ranked as high-priority AOCs based on RRSE scoring from USACHPPM limited investigation. The high-priority AOCs are targeted for Phase I RIs in future funding cycles. Phase I RIs for medium- and low-priority AOCs will follow after completion and investigation of all high-priority AOCs. All AOCs will follow the CERCLA process in order of priority as funding is available.

Currently three RCRA-regulated units are in the process of closure at WBG. These are the Deactivation Furnace Area, Building 1601 Hazardous Waste Storage, and OBG Pad #37. Since the submittal of the Phase I RI Report (USACE 1997a), closure plans have been accepted by OEPA for all three of these sites. Additional sampling of surface and subsurface soils at the Deactivation Furnace Area and Building 1601 in support of closure activities was conducted in the fall of 1997 (USACE 1998b). Following agency approval of the closure plans, final closure activities began in 1998. These consist of the following:

- Pad #37 (OBG) - Closed summer of 1998; summary of closure activities submitted to OEPA in February 1999; closure certification is currently pending.

- Building 1601 - Closed summer of 1998; summary of closure activities submitted to OEPA in February 1999; closure certification is pending.

- Development of a work plan for the removal of structures and contaminated soils at the Deactivation Furnace Area. Based on the Phase II RI background sampling results reported herein, the closure plan is currently under revision to develop remediation standards.

1.3 REPORT ORGANIZATION

This Phase II RI Report is organized to meet OEPA requirements in accordance with U.S. Environmental Protection Agency (EPA), CERCLA Superfund process, and USACE guidance. The report consists of an Executive Summary, Sections 1.0 through 10.0, and supporting appendices. Section 1.0 describes the purpose and organization of this report, and provides a description and history of WBG. Section 2.0 presents the specific Phase II RI objectives and methodologies used for data collection and describes the approach to analytical data management and the laboratory programs. Section 3.0 describes the physical setting of the study area, including the geology, hydrology, climate, population, and ecological resources. Section 4.0 presents the data generated during the Phase II RI and discusses the nature and extent of contamination at WBG. Section 5.0 deals with the fate and transport of the contaminants of concern. Section 6.0 consists of a baseline human health risk assessment, and Section 7.0 consists of an ecological risk assessment, both of which use data generated in the Phase I and Phase II RIs. Section 8.0 summarizes the results and conclusions, Section 9.0 presents the recommendations, and Section 10.0 provides a list of referenced documents used to support this Phase II RI.

Appendixes (A through L) to the Phase II RI Report for WBG contain supporting data collected in the Phase II RI. The appendices consist of boring logs, well construction diagrams, analytical data tables, a data quality assessment, field colorimetry results, a quality assurance summary, risk assessment data tables, and other detailed information used to make interpretations presented herein.