U.S. Army BRAC 2005
Environmental Condition of Property Report
Newport Chemical Depot – Indiana

Volume I

October 2008

THIS PAGE WAS INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1-1
1.1 Site Description and Historical Use 1-1
1.2 Areas Assessed for Environmental Concern 1-2
1.3 Conclusions 1-3
2. PURPOSE 2-1
2.1 General 2-1
2.2 Scope 2-2
2.3 Limitations 2-2
2.4 Report Organization 2-2
3. SURVEY METHODOLOGY 3-1
3.1 Development of Study Sections 3-1
3.2 Visual Site Inspection 3-1
3.3 Aerial Photography Analysis 3-10
3.4 Records Review 3-12
3.4.1 Standard Environmental Record Sources 3-12
3.4.2 Additional Record Sources 3-13
3.5 Interviews 3-13
3.6 Data Management 3-14
4. PROPERTY DESCRIPTION 4-1
4.1 Installation Location and Description 4-1
4.2 Historical Land Use 4-2
4.3 Facility History 4-2
4.3.1 Process Descriptions (Industrial Facilities Only) 4-13
4.3.1.1 Heavy Water Production 4-14
4.3.1.2 VX Chemical Agent Production 4-15
4.3.1.3 RDX Manufacturing Area 4-15
4.3.1.4 TNT Manufacturing Area 4-16
4.3.2 Occupancy, Lease, and Easement History 4-16
4.3.2.1 Property Leases 4-16
4.3.2.2 Agricultural Leases 4-16
4.3.2.3 Timber Management 4-17
4.3.3 Range Operations 4-18
4.3.3.1 Small Arms Range 4-18
4.3.3.2 National Guard Training Area 4-19
4.3.3.3 Skeet Range 4-20
4.4 Installation Utilities (Historical and Current) 4-20
4.4.1 Water Systems 4-20
4.4.2 Wastewater Treatment, Industrial Sewers, and Sumps 4-21
4.4.2.1 Chemical Plant Area 4-21
4.4.2.2 RDX Manufacturing Area 4-21
4.4.2.3 TNT Manufacturing Area 4-21
4.4.3 Sanitary Sewers and Central Sewage Treatment Plant 4-22
4.4.4 Stormwater and Field Tile Systems 4-22
4.4.5 Electrical System 4-23
4.4.6 Heating Systems 4-23

TABLE OF CONTENTS (Continued)

4.5 Environmental Setting – Natural and Physical Environment 4-23
4.5.1 Climate 4-23
4.5.2 Topography 4-24
4.5.3 Surface Water Hydrology 4-24
4.5.4 Groundwater Hydrology 4-25
4.5.5 Geology and Soils 4-26
4.5.6 Demography and Land Use 4-26
4.6 Biological Resources 4-27
4.6.1.1 Flora 4-27
4.6.1.2 Fauna 4-28
4.7 Cultural Resources 4-28
4.8 Site Maps 4-29
4.9 Geographic Information System 4-29
5. ENVIRONMENTAL CONDITIONS 5-1
5.1 Environmental Permits and Licenses 5-1
5.1.1 RCRA Status 5-1
5.1.2 Solid Waste Permits 5-1
5.1.3 UST/AST Permits 5-2
5.1.4 NPDES Permits 5-2
5.1.5 Drinking Water Permits 5-2
5.1.6 Air Permits 5-2
5.1.7 NRC Licenses 5-3
5.2 Environmental Cleanup 5-4
5.2.1 Installation Restoration Program 5-4
5.2.1.1 Study Section 1 5-4
5.2.1.1.1 Night Soil Pits 5-4
5.2.1.2 Study Section 2 5-6
5.2.1.2.1 RDX Manufacturing Area 5-6
5.2.1.3 Study Section 3 5-6
5.2.1.3.1 Hazardous Waste Storage Building 5-7
5.2.1.4 Study Section 4 5-7
5.2.1.4.1 Red Water Ash Basins 5-7
5.2.1.4.2 RDX Burning Ground and Old Chemical Munitions Component Detonation Area 5-8
5.2.1.4.3 Gypsum Sludge Basins and Pollution Control Center Retention Pond 5-9
5.2.1.4.4 TNT Burning Ground 5-10
5.2.1.4.5 Sanitary Landfill 5-11
5.2.1.5 Study Section 5 5-12
5.2.1.5.1 TNT Manufacturing Area 5-12
5.2.1.5.2 TNT Acid Production Area 5-12
5.2.1.5.3 Pollution Control Center 5-12
5.2.1.6 Study Section 7 5-12
5.2.1.6.1 Decontaminated Waste Burial Ground 5-13
5.2.1.6.2 Demilitarization Incinerator/Scrap Yard 5-14
5.2.1.6.3 Closed Sanitary Landfill 5-15
5.2.1.6.4 Memorial Chapel RDX Dump 5-16
5.2.1.6.5 Construction Debris Dump 5-16

TABLE OF CONTENTS (Continued)

5.2.1.6.6 Sewage Treatment Plant....5-17
5.2.1.6.7 Little Raccoon Creek....5-17
5.2.1.7 Study Section 8....5-18
5.2.1.7.1 Chemical Plant Coal Ash Basin....5-18
5.2.1.7.2 RDX Acid Manufacturing Area....5-18
5.2.1.7.3 Removed USTs....5-20
5.2.1.7.4 Chemical Plant....5-20
5.2.1.7.5 Waste Oil Tank....5-23
5.2.1.7.6 Power House Coal Pile....5-23
5.2.2 Military Munitions Response Program....5-23
5.2.3 Compliance Cleanup....5-24
5.2.3.1 TNT Cooling Tower Sump....5-24
5.2.3.1.1 Sampling Activities....5-24
5.2.3.1.2 Removal Action....5-24
5.2.3.2 Ton Container Storage Area....5-25
5.2.3.3 Building 713....5-25
5.2.4 Previous Environmental Investigations....5-26
5.2.4.1 USAEHA, Water Quality Study, 1975....5-26
5.2.4.2 USATHAMA, Installation Assessment, 1979....5-26
5.2.4.3 USAEHA, Army Pollution Abatement Program Study, 1981....5-27
5.2.4.4 USAEHA, Management Plan for RCRA Groundwater Monitoring and Assessment Program, 1981....5-27
5.2.4.5 NAAP, Delisting Petition, 1983....5-27
5.2.4.6 USAEHA, Hazardous Waste Management Special Study, 1983....5-28
5.2.4.7 USAEHA, Investigation of Soil Contamination at the Open Burning Ground, 1984....5-28
5.2.4.8 USAEHA, Geohydrologic Study, 1985....5-28
5.2.4.9 EPIC, Installation Assessment, 1985....5-28
5.2.4.10 USAEHA, Evaluation of SWMUs at NAAP, 1986....5-28
5.2.4.11 USAEHA, AMC Explosive Reactivity Testing Program, 1987....5-28
5.2.4.12 Dames & Moore, SI Report, 1991....5-29
5.2.4.13 Dames & Moore, RI Report, 1991....5-29
5.2.4.14 Dames & Moore, RI Report – TNT Burning Ground, 1991....5-29
5.2.4.15 IDNR Inventory of Natural Areas and Rare Plant Species, 1994....5-29
5.2.4.16 Versar, Phase III RFI Report – RDX-MA Surficial Soils, 1998....5-29
5.2.4.17 SAIC, RFI for SWMUs NAAP-27 and NAAP-65, and Little Raccoon Creek, 2001....5-30
5.2.4.18 SAIC/ENTECH Team, RCRA Facility Investigation, 2003....5-30
5.2.4.19 SAIC, Long-Term Monitoring, Ongoing....5-30
5.2.4.20 SAIC, SWMUs NAAP-6 and NAAP-7 Follow-on RFI, 2004....5-30
5.2.4.21 TLI Solutions, Final Historical Records Review, 2007....5-33
5.3 Hazardous Substances....5-35
5.4 Petroleum and Petroleum Products....5-39
5.5 Polychlorinated Biphenyls....5-40
5.6 Asbestos-Containing Materials....5-41
5.7 Lead and Lead-Based Paint....5-45
5.8 Radioactive Material....5-45
5.9 Historical Landfills/Dumps....5-45

TABLE OF CONTENTS (Continued)

5.10 Explosives-Contaminated Structures 5-46
5.11 Radon 5-46
5.12 Pesticides 5-46
5.13 Other Identified Concerns 5-47
5.14 Identification of Uncontaminated Property 5-47
5.15 Description of Remaining Property 5-48
5.15.1 NEPA 5-48
5.16 Applicable Regulatory Compliance Issues 5-55
5.17 Adjacent Properties 5-58
6. CONCLUSIONS 6-1
7. CERTIFICATION 7-1
8. REFERENCES 8-1

LIST OF APPENDICES (Appendices are provided on the accompanying CD)

Appendix A. Building Inspection Forms
Appendix B. Site Photographs
Appendix C. State and Federal Database Reports, Maps, and Aerial Photographs
Appendix D. Title Search Document
Appendix E. Interview Forms
Appendix F. Radiological Historical Site Assessment

LIST OF FIGURES

Figure 2-1. Newport Chemical Depot Installation Location 2-3
Figure 3-1. Newport Chemical Depot Study Sections ..... end of section
Figure 3-2. Agricultural Lease Parcels 3-15
Figure 5-1. Buildings and SWMUs ..... end of section
Figure 5-2. Study Section 8 Layout 5-19
Figure 6-1. Property Categorization Flowchart 6-3
Figure 6-2. Property Categorization Map ..... end of section

LIST OF TABLES

Table 1-1. Non-Category 1 Property 1-4
Table 1-2. ECP Categories and Standard Map Colors 1-7
Table 1-3. Category 2, 3, 4, 5, and 7 Properties 1-8
Table 3-1. SWMUs at NECD 3-2
Table 3-2. AOCs at NECD 3-3
Table 3-3. Study Section Summary 3-4
Table 3-4. Buildings and Study Sections 3-6
Table 3-5. List of Interviews 3-14
Table 4-1. NECD Facility Acreage and Sources 4-1
Table 4-2. Description of Buildings 4-3
Table 4-3. Land Use Designations 4-11
Table 4-4. Installation Operation History 4-14
Table 5-1. IRP Sites Located at Newport Chemical Depot 5-5
Table 5-2. Previous Relevant Environmental Investigations 5-26
Table 5-3. Summary of Facility-wide RFI Report (2003) Recommendations 5-31
Table 5-4. Site Acreages and Modifications from the Final HRR (2007) 5-35
Table 5-5. Hazardous Materials Storage 5-36
Table 5-6. UST Information 5-39
Table 5-7. AST Information 5-40
Table 5-8. Asbestos Information 5-42
Table 5-9. ECP Categories and Standard Map Colors 5-48
Table 5-10. ECP Category 1 Parcel Descriptions and Acreage 5-49
Table 5-11. Non-Category 1 Property 5-52
Table 5-12. Negative Applicable Regulatory Compliance Issues 5-56
Table 6-1. ECP Categories and Standard Map Colors 6-1
Table 6-2. Summary of ECP Findings 6-4
Table 6-3. ECP Category 1 Parcel Descriptions and Acreage 6-13
Table 6-4. Non-Category 1 Property 6-16

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
1,2-DCB	1,2-Dichlorobenzene
1,3,5-TNB	1,3,5-Trinitrobenzene
1,4-DCB	1,4-Dichlorobenzene
2,4-DNT	2,4-Dinitrotoluene
2,6-DNT	2,6-Dinitrotoluene
2-A-4,6-DNT	2-Amino-4,6-Dinitrotoluene
ACM	Asbestos-containing Material
ACSIM	Assistant Chief of Staff for Installation Management
AEC	U.S. Atomic Energy Commission
AEDB-R	Army Environmental Database – Restoration
AM	Amplitude Modulation
AMC	Army Materiel Command
ANG	Air National Guard
AOC	Area of Concern
AOP	Ammonia Oxidation Plant
AP	Affirmative Procurement
AR	Army Regulation
ARPA	Archaeological Resources Protection Act
ASR	Archives Search Report
AST	Aboveground Storage Tank
BLS	Below Land Surface
BNA	Base/Neutral and Acid Extractable
BRAC	Base Realignment and Closure
BRRM	Base Redevelopment and Realignment Manual
CAA	Clean Air Act
CAMU	Corrective Action Management Unit
CBOD	Carbonaceous Biochemical Oxygen Demand
CCA	Chromated Copper Arsenate
CD	Compact Disc
CDB	Chemical Demilitarization Building
CDD	Construction Debris Dump
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CIL	Canadian Industries Limited
cis-1,2-DCE	Cis-1,2-Dichloroethene
CMA	(U.S. Army) Chemical Materials Agency
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
COC	Chemical of Concern
CPAB	Chemical Plant Coal Ash Basin
CPRB	Chemical Plant Retention Basin
CRM	Cultural Resources Manager
CSEPP	Chemical Stockpile Emergency Preparedness Program
CSL	Closed Sanitary Landfill

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
CTS	Cooling Tower Sump
CTT	Closed, Transferring, and Transferred
CURL	Cultural Resources
CV	Phosphonotionate
CWA	Clean Water Act
CWM	Chemical Warfare Material
D&R	Disposal and Reuse
DA	U.S. Department of the Army
DARA	Department of the Army Radiation Authorization
DARP	Department of the Army Radiation Permit
DCB	Dichlorobenzene
DCE	Dichloroethene
DERP	Defense Environmental Restoration Program
DI/SY	Demilitarization Incinerator/Scrap Yard
DMM	Discarded Military Munitions
DN	Denitration
DNT	Dinitrotoluene
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOPAA	Description of Proposed Action and Alternatives
du Pont	E.I. du Pont de Nemours and Company
DWBG	Decontaminated Waste Burial Ground
EA	Environmental Assessment
EBS	Environmental Baseline Survey
ECBC	Edgewood Chemical Biological Center
ecoCOPC	Ecological Chemical of Potential Concern
ECOP	Environmental Condition of Property (formerly used acronym)
ECP	Environmental Condition of Property
EDR	Environmental Database Resources, Inc.
EIS	Environmental Impact Statement
EM	Electromagnetic
EMPA	Ethyl Methylphosphonic Acid
EOD	Explosive Ordnance Disposal
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
EPIC	Environmental Photographic Information Center
EPCRA	Emergency Planning and Community Right-to-Know Act
EQCC	Environmental Quality Control Committee
ERDA	Energy Research and Development Administration
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
F&P	Finishing and Packaging
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FESOP	Federally Enforceable, State Operating Permit
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FMC	Food Machinery Corporation
FONSI	Finding of No Significant Impact

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
FPF	Former Production Facility
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
FY	Fiscal Year
GAC	Granular Activated Carbon
GIS	Geographic Information System
GOCO	Government-Owned/Contractor-Operator
gpm	Gallons per Minute
GPS	Global Positioning System
GS	Girdler-Spevack
GSA	General Services Administration
GSB	Gypsum Sludge Basin
HABS/HAER	Historic American Buildings Survey/Historic American Engineering Record
HI	Hazard Index
HMX	Cyclo-1,3,5,7-tetramethylene-2,4,6,8-tetranitramine
HQ	Hazard Quotient
HRR	Historical Records Review
ICRMP	Integrated Cultural Resources Management Plan
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IMPA	Isopropyl Methyl Phosphonic Acid
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pesticide Management Plan
IRP	Installation Restoration Program
ISWMP	Installation Solid Waste Management Plan
KB	2-Diisopropylaminoethanol
KV	Kilovolt
LBP	Lead-based Paint
LQG	Large Quantity Generator
LTM	Long-term Monitoring
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MACOM	Major Command
MC	Munitions Constituents
MCD	Memorial Chapel RDX Dump
MEC	Munitions and Explosives of Concern
MED	Manhattan Engineer District
MILES	Multi-Integrated Laser Engagement System
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
MNT	Mononitrotoluene
MPA	Methylphosphonic Acid
mph	Miles per Hour
MR	Munitions Response
MSDS	Material Safety Data Sheet
msl	Mean Sea Level
N&P	Nitrification and Purification
NAAP	Newport Army Ammunition Plant

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
NAC	Nitric Acid Concentration
NATR	Natural Resources
NE	Elemental Sulfur
NECD	Newport Chemical Depot
NECDF	Newport Chemical Agent Demilitarization Facility
NEPA	National Environmental Policy Act
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSCMP	Nonstockpile Chemical Materiel Project
NSP	Night Soil Pit
O&M	Operations and Maintenance
OCMCDA	Old Chemical Munitions Component Detonation Area
ORO	Operation Roving Osprey
OSHA	Occupational Safety and Health Act
OWS	Oil/Water Separator
P2	Pollution Prevention
PAB	Process Auxiliary Building
PAH	Polynuclear Aromatic Hydrocarbon
PAM	Pamphlet
Parsons	Parsons Infrastructure & Technology
PCB	Polychlorinated Biphenyl
PCC	Pollution Control Center
PCCRP	Pollution Control Center Retention Pond
pCi/L	picoCuries per Liter
PER	Programmatic Environmental Review
PETN	Pentaerythritol Tetranitrate
PHCP	Power House Coal Pile
PM-10	Particulate Matter 10 Microns in Diameter or Less
PM-NSCM	Program Manager for Non-Stockpile Chemical Materiel
PMCD	Program Manager for Chemical Demilitarization
PMECW	Program Manager for the Elimination of Chemical Weapons
PMP	Pesticide Management Plant
POC	Point of Contact
POL	Petroleum, Oils, and Lubricants
ppm	Parts per Million
PRG	Preliminary Remediation Goal
PWSID	Public Water System Identification
QA	Quality Assurance
QB	Ethyl 2-Diisopropylaminoethyl Methylphosphonate

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
RCRA	Resource Conservation and Recovery Act
RDX	Cyclo-1,3,5-trimethylene-2,4,6-trinitramine
RDX-BG	RDX Burning Ground
RDX-MA	RDX Manufacturing Area
RfD	Reference Dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RL	Reporting Limit
RMW	Regulated Medical Waste
ROD	Record of Decision
RQ	Reportable Quantity
RWAB	Red Water Ash Basin
SAIC	Science Applications International Corporation
SAR	Sulfuric Acid Regeneration
SAW	Squad Automatic Weapon
SBCCOM	U.S. Army Soldier and Biological Chemical Command
SDWA	Safe Drinking Water Act
SERA	Screening-level Ecological Risk Assessment
SHPO	State Historic Preservation Officer
SI	Site Investigation
SPCC	Spill Prevention, Control, and Countermeasure
STP	Sewage Treatment Plant
SVOC	Semivolatile Organic Compound
SW	Methylphosphorus Dichloride
SWAR	Solid Waste and Recycling
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered
TAR	Temporary Authorization Request
TC	Ton Container
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TCP	Traditionally Cultural Property
TDS	Total Dissolved Solids
TEPO	Triethyl Phosphate
TH	Phosphorus Trichloride
TLI	TLI Solutions
TMA	Toxic Maintenance Area
TNT	2,4,6-Trinitrotoluene
TNT-BG	TNT Burning Ground
TNT-CTS	TNT Cooling Tower Sump
TNT-MA	TNT Manufacturing Area
trans-1,2-DCE	Trans-1,2-Dichloroethene
TR	Diethyl Methylphosphonite
TRO	Diethyl Methylphosphonate
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
TSS	Total Suspended Solids

ACRONYMS AND ABBREVIATIONS

Acronym	Full Title
TVA	Tennessee Valley Authority
UB	Utility Building
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Command
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
UW	Universal Waste
UXO	Unexploded Ordnance
VCP	Voluntary Cleanup Program
VOC	Volatile Organic Compound
VSI	Visual Site Inspection
VX	O-ethyl-S-(2-diisopropylaminoethyl) Methyl Phosphonothiolate
WWII	World War II
XRF	X-Ray Fluorescence
ZS	Ethanol

DEFINITIONS

Term	Definition
Closure	All missions of the installation have ceased or have been relocated. All personnel positions (military, civilian, and contractor) have either been eliminated or relocated, except for personnel required for caretaking, conducting any ongoing environmental cleanup, and disposal of the base, or personnel remaining in authorized enclaves. In the context of this document, this may be referred to as "full closure."
Discarded Military Munitions	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 (10 U.S.C. 2710(e)(2)).
Disposal	Per Army Regulation (AR) 405-45, any authorized method of permanently divesting the Army of control of and responsibility for real estate and real property.
Environmental Baseline Survey	A process by which a characterization of the environmental condition of a facility or property is conducted. An environmental baseline survey (EBS) is required by the Army for the transfer or acquisition of real property and identifies potential cleanup requirements and liabilities. See definition for Environmental Condition of Property (ECP).
Environmental Condition of Property	A management approach for providing efficient and effective development of a comprehensive environmental condition/liability characterization for a facility or property. The ECP process applies industry best practices and standards, provides effective oversight and quality assurance (QA), and unifies the EBS and the munitions and explosives of concern (MEC) Archives Search Report (ASR) steps taken in prior Base Realignment and Closure (BRAC) rounds into a unified effort. The ECP assessment is based on the Initial Site Investigation (ISI) project approved by the Business Initiative Council (BIC). The Army's ECP Report meets the U.S. Department of Defense's (DOD's) ECP Report requirement.
Environmental Professional	The U.S. Environmental Protection Agency's (EPA's) All Appropriate Inquiry (AAI) Final Ruling states the definition of an Environmental Professional establishes a balance between the merits of setting a high standard of excellence for the conduct of all appropriate inquiries through the establishment of stringent qualifications for environmental professionals and the need to ensure that experienced and highly competent individuals currently conducting all appropriate inquiries are not displaced. In summary, the definition of environmental professional included in the final rule includes individuals who possess the following qualifications: Hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory and have the equivalent of three (3) years of full-time relevant experience; or Be licensed or certified by the Federal Government, a state, tribe, or U.S. territory to perform environmental inquiries as defined in Section 312.21 and have the equivalent of three (3) years of full-time relevant experience; or Have a Baccalaureate or higher degree from an accredited institution of higher education in science or engineering and the equivalent of five (5) years of full-time relevant experience; or Have the equivalent of ten (10) years of full-time relevant experience.

DEFINITIONS (Continued)

	The definition of "relevant experience" is "participation in the performance of environmental site assessments that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases to the subject property." The final rule retains the proposed requirement that environmental professionals remain current in their field by participating in continuing education or other activities and be able to demonstrate such efforts.
Excess Real Property	Per AR 405-45, any real property under the control of any Federal agency that the head of the agency determines is not required for agency needs and discharge of the responsibilities of the agency or the installation where the property is located. The excess status is assigned to the real property once a formal report of excess has been processed. Real property that has been determined excess to the U.S. Department of the Army (DA) must be screened with other DOD elements before it is excess to DOD.
Installation	Per AR 405-45, an aggregation of contiguous or near contiguous, common mission-supporting real property holdings under the jurisdiction of or possession controlled by the DA or by a state, commonwealth, territory, or the District of Columbia, and at which an Army unit or activity (Active, Army Reserve, or Army National Guard) is assigned. An installation is a single site or a grouping of two or more sites for the purposes of real property inventory control. The real property accountability officer is at the installation level.
Military Installation	Per Section 2910 of Title XXIX, Defense Base Closure and Realignment Act of 1990, as amended, the term "military installation" means a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of DOD, including any leased facility. This term does not include any facility used primarily for civil works, rivers and harbors projects, flood control, or other projects not under the primary jurisdiction or control of DOD.
Munitions Constituents	Any materials originating from UXO, discarded military munitions (DMM), or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710(e)(4)).
Munitions and Explosives of Concern	MEC distinguishes specific categories of military munitions that may pose unique explosives safety risks, including UXO, as defined in 10 U.S.C. 2710(e)(9); DMM, as defined in 10 U.S.C. 2710(e)(4); and munitions constituents (MC) (e.g., 2,4,6-trinitrotoluene [TNT], and cyclo-1,3,5-trimethylene-2,4,6-trinitramine [RDX]) as defined in 10 U.S.C. 2710(e)(4) present in high enough concentration to pose an explosive hazard.
Military Munitions	Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of DOD, the U.S. Coast Guard (USCG), the U.S. Department of Energy (DOE), and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; 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, demolition charges; and devices and components thereof.

DEFINITIONS (Continued)

	The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of DOE after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed (10 U.S.C. 2710(e)(3)(A and B)).
Real Property	AR 405-90: Real property consists of lands and improvements to land, buildings, and structures, including improvements and additions, and utilities. It includes equipment affixed and built into the facility as an integral part of the facility (such as heating systems), but not movable equipment (such as plant equipment). In many instances, this term is synonymous with "real estate."
Realignment	Any action that both reduces and relocates functions and DOD civilian personnel positions, but does not include a reduction in force resulting from workload adjustments, reduced personnel or funding levels, skill imbalances, or other similar cause. A realignment may terminate the DOD requirement for the land and facilities on part of an installation. That part of the installation shall be treated as "closed," and in the context of this document referred to as a "partial closure."
Unexploded Ordnance	Military munitions that (A) have been primed, fused, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause (10 U.S.C. 2710(e)(9)(A) through (C)).

1. EXECUTIVE SUMMARY

Science Applications International Corporation (SAIC) has prepared this Environmental Condition of Property (ECP) Report for the Newport Chemical Depot (NECD) military installation, hereafter referred to as "NECD." NECD is located in west-central Indiana. The NECD property covers approximately 7,136 acres. The purpose of this ECP is to establish a baseline of the environmental condition of property that can be used by the Army in decision-making activities associated with future real property transactions and to determine the environmental baseline condition of the property in preparation for a real property disposal.

The ECP assessment was developed in compliance with Chapter 8, Section 3 of the Base Redevelopment and Realignment Manual (BRRM) (U.S. Department of Defense [DOD] 4165.66-M, March 1, 2006); Army Regulation (AR) 200-1, *Environmental Protection and Enhancement,* February 21, 1997; U.S. Department of the Army (DA) Pamphlet (PAM) 200-1, *Environmental Protection and Enhancement,* January 17, 2002; and Section 120(h)(4) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

This section briefly describes the current and former uses of the installation and areas of potential environmental concern that were evaluated during the ECP process. Detailed information associated with the summary presented below is provided in the remaining portion of this document.

1.1 SITE DESCRIPTION AND HISTORICAL USE

The current mission of the installation is to safely prepare to close NECD. The ECP covers the 7,136-acre installation in Newport, Indiana. NECD is in Vermillion Township, Vermillion County, in west-central Indiana near the Wabash River. The nearest major municipalities are Terre Haute, Indiana, 32 miles to the south and Danville, Illinois, 32 miles to the northwest. NECD is located in a rural area of Vermillion County, where surrounding land use is almost exclusively cropland and forests. Population within a 4-mile radius of the installation is approximately 2,385 people.

NECD is a Government-owned/contractor-operated (GOCO) facility under the Army Materiel Command (AMC), and the U.S. Army Chemical Materials Agency (CMA) mission is supported at NECD. The installation occupies an area of 7,136 acres with easement rights in effect for an additional 1,400 acres. Within the installation there are 3,497 acres of forest and wildlife areas, prairie restoration and wetlands, and approximately 2,944 acres that were agriculturally leased in 2006. Within the installation there are 17.13 miles of fencing, 68.13 miles of road, 6 cemeteries, and approximately 164 buildings.

Active buildings include facilities formerly used to store the onsite chemical agent inventory, as well as administrative, security, and maintenance buildings used to support the military mission. Activities associated with the Newport Chemical Agent Demilitarization Facility (NECDF) mission have been constructed west of the site of the former O-ethyl-S-(2-diisopropylaminoethyl) methyl phosphonothiolate (VX) production plant in the east-central portion of NECD. The Manhattan Project's nuclear fission research included production of heavy water at what is now NECD. Inactive buildings include facilities associated with former production of 2,4,6-trinitrotoluene (TNT) and cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX).

Mason & Hanger is the operating contractor for NECD. Mason & Hanger is charged with the care, maintenance, security, surveillance, and safety of NECD. Mason & Hanger conducts no manufacturing processes and produces no products.

The Tennessee Valley Authority (TVA) previously represented the Program Manager for Non-Stockpile Chemical Materiel (PM-NSCM) and was responsible for the demolition of the former VX production area. TVA completed their mission on August 31, 2007. The mission of the Program Manager for the Elimination of Chemical Weapons (PMECW) was to safely destroy the NECD stockpile

while protecting the public, the workforce, and the environment. Parsons Infrastructure & Technology (Parsons) is the systems contractor for the PMECW.

National Guard troops were stationed at NECD following the September 11, 2001 attacks to provide additional security for the industrial stockpiles of the chemical nerve agent VX. The last National Guard unit left NECD in April 2004.

NECD was established in 1942 on approximately 22,000 acres as the Wabash River Ordnance Works, an RDX production facility. After World War II (WWII), the installation was reduced to approximately 7,097 acres. In addition to producing RDX, NECD's missions have included building and operating facilities for the production of heavy water for the U.S. Atomic Energy Commission (AEC), the production and storage of the chemical nerve agent VX, and the production of TNT. On October 4, 2006, 101 acres were transferred to the U.S. Coast Guard (USCG). The approximate current acreage of NECD, which includes the Ranney® wells and eastern railroad spur parcels, totals 7,136 acres. Section 4.1 provides details regarding the methodology used to determine the facility acreage.

1.2 AREAS ASSESSED FOR ENVIRONMENTAL CONCERN

The following information was obtained through a review of general property information, observation of neighboring properties, research of available historical information, interviews with knowledgeable parties, an environmental records search, and a site reconnaissance:

- ***Hazardous Substances***—Chemicals containing CERCLA hazardous substances would have been used and stored at the property in amounts necessary to support TNT, RDX, heavy water, and chemical agent VX production facilities at NECD. In addition, hazardous substances would have been used and stored in amounts necessary to support unit-level vehicle and building maintenance activities. Evidence suggests that hazardous substances may have been released at the sites summarized in Table 1-1. Hazardous substances such as batteries, solvents, paint, and adhesives are currently used for maintenance activities at NECD.
- ***Underground Storage Tanks/Aboveground Storage Tanks***—A total of six active underground storage tanks (USTs) and three active aboveground storage tanks (ASTs) are present at NECD. A total of 24 USTs and 17 ASTs have been at NECD. Information regarding leaking USTs/ASTs is summarized in Section 5.4.
- ***Non-UST/ASTs Petroleum Storage***—Petroleum is stored in small quantities at maintenance facilities throughout NECD. No known releases have occurred from non-UST/AST petroleum storage locations.
- ***Polychlorinated Biphenyls***—Polychlorinated biphenyl (PCB) contamination has occurred at Building 401A (Power House) and the Cooling Tower Sump (CTS). PCBs historically were stored in Building 729A (PCB/Hazardous Waste Storage Building). As of December 31, 2004, no PCB fluids were in storage and no PCB-contaminated equipment was in service or storage at NECD. Details are provided in Section 5.5.
- ***Asbestos-containing Materials***—A visual asbestos survey was completed in 1992. Many of the buildings and Richmond Magazines were found to contain asbestos-containing materials (ACMs). A substantial amount of asbestos was subsequently removed. In addition, asbestos burial areas were noted throughout the installation. Details are provided in Section 5.6.
- ***Lead-based Paint***—The majority of facilities and buildings at NECD were constructed before the DOD ban on the use of lead-based paint (LBP) in 1978 and are likely to contain one or more coats of such paint. In addition, some facilities constructed immediately after the ban also may contain LBP because inventories of such paints that were in the supply network were likely to have been used up at these facilities. No comprehensive sampling and analysis has been conducted for LBP. Additional details are provided in Section 5.7.

- ***Radiological Materials***—Sealed source radiological materials are currently in use in X-ray equipment at the medical clinic and in meters associated with chemical demilitarization activities. Low-level, sealed source radiological materials were historically used at NECD at the medical clinic, in lightning arrestors, radiac meters, munitions detectors, and chemical agent monitors. In addition, radiological materials may have been used at the Dana Heavy Water Plant. Additional details are provided in Section 5.8 and Appendix F.
- ***Radon***—All buildings tested for radon at NECD have had radon levels below the action level of 4 picocuries per liter (pCi/L). Additional details are provided in Section 5.11.
- ***Munitions, Explosives, and Chemical Warfare Material***—Potential explosive and chemical warfare material (CWM) contamination may have occurred due to the TNT, RDX, and chemical agent VX production facilities at NECD. Sites where a release to the environment may have occurred are summarized in Table 1-1.
- ***Adjacent Property***—The surrounding property at NECD is almost exclusively cropland and forests. No environmental concerns were noted during the visual site inspection (VSI) of adjacent property. Details are provided in Section 5.17.

1.3 CONCLUSIONS

To aid data collection, management, and retrieval, the property was divided into study sections. Section 3.1 provides an explanation and map of the study sections used for the ECP. Study Sections 9, 10, 11, 12, and 13 are classified as Category 1, an area or parcel of real property where no release or disposal of hazardous substances or petroleum products or their derivatives has occurred, including no migration of these substances from adjacent properties. Table 1-2 identifies the criteria applicable to each category. Exceptions to the Category 1 designation were applied to specific areas. These exceptions are summarized in Table 1-3. A large-scale map of NECD with designated property categories is included in Section 6.

Disclosure factors for munitions and explosives of concern (MEC), LBP, and ACM are excluded from the ECP categorization process. No buildings or structures are known to contain explosives contamination, but the remaining physical structures at the RDX Manufacturing Area (RDX-MA) and TNT Manufacturing Area (TNT-MA) may contain residual explosives. LBP is likely in or on buildings built prior to 1978 and it is possible to find LBP in or on buildings built after this date. ACM is likely in or on buildings built prior to 1989, but it is possible to find ACM in buildings built after this date. Although significant ACM surveys, testing, and abatement have occurred at NECD, not all identified or suspected ACM has been abated and it is likely that additional ACM may exist in unsurveyed structures and inaccessible portions of surveyed structures, as well as in identified burial areas.

Table 1-1. Non-Category 1 Property

Study Section	Site Name	Category	Reason
1	Richmond Magazines 33 and 47	7	Possible explosives contamination
1	Small Arms Range	7	Possible MC contamination
1	NSPs (SWMUs NAAP-1 and NAAP-2)	4	Historical burial of waste from latrines and decontaminated solid waste from the VX manufacturing process; RFI complete; listed as NFA in RCRA permit; LUCs in place
1	West Pine Tree Area	7	Possible burial area northeast of Richmond magazines and west of RDX-MA
2	RDX-MA (SWMU NAAP-3)	5	Historical production of RDX; RI and RFI complete; LTM ongoing; LUCs in place
3	RDX-MA Area F Parking Lot	7	Storage of filled TCs; no sampling conducted to date
3	Drums South of North Patrol Road	7	Disposal of drums; unknown contents
3	Former Skeet Range	7	Possible MC contamination
3	Batteries North of Railroad Bed	7	Metals from battery acid
3	Mason & Hanger Hazardous Waste Storage (Building 729B)	7	Possible release of hazardous chemicals
3	Parsons Hazardous Waste Storage (Building 729A)	7	Possible release of hazardous chemicals; closure will be performed by Parsons
3	Buildings 1401A and 1401B	7	Permitted hazardous materials storage; closure will be performed by NECD
3	Igloos	7	Permitted hazardous materials storage; closure will be performed by NECD
4	RWABs (SWMUs NAAP-29 through NAAP-32)	3	Basins historically contained wastewater, ash, and sludges resulting from the treatment of red water associated with TNT production in 1973-74; RI and RFI complete; listed as NFA in RCRA permit
4	RDX-BG and OCMCDA (SWMUs NAAP-33 and NAAP-64, respectively)	3	Burned waste RDX and waste explosives components of M23 land mines and M55 rockets at the RDX-BG; destruction of component parts from old chemical munitions was reported at the OCMCDA; RI and RFI complete; listed as NFA in RCRA permit
4	GSBs (SWMUs NAAP-34 through NAAP-36) and PCCRP (SWMU NAAP-49)	4	GSBs used to contain settled gypsum sludge produced by the neutralization of acidic wastewaters associated with TNT production; PCCRP received wastewaters from the PCC clarifiers, the GSBs' effluent, and water from the RWABs; RI and RFI complete; LUCs in place at GSBs; GSBs and PCCRP listed as NFA in RCRA permit
4	TNT-BG (SWMU NAAP-50)	5	Former burning ground for TNT-contaminated debris; RI, FS, and CMI complete; LTM ongoing; LUCs in place
4	Sanitary Landfill (SWMU NAAP-51)	3	Site closed in 1997; NFA in RCRA permit
5	Sulfuric Acid Spill in TNT Acid Area	7	Sulfuric acid release to the environment
5	Oleum Spill near Cull Avenue	7	Oleum release to the environment
5	Red Water Spill at TNT-MA	7	Red water release to the environment
5	TNT-MA (SWMUs NAAP-37 through NAAP-47)	3	Production of TNT; SI complete; listed as NFA in RCRA permit
5	Toluene Spill at TNT-MA	7	Toluene release to the environment
5	Underground Piping for Former Fuel Oil Tanks	7	Possible fuel oil in underground piping; petroleum odor reported
5	TNT-MA Acid Area (SWMUs NAAP-56 through NAAP-63)	3	Acid manufacturing; listed as NFA in RCRA permit

Table 1-1. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
5	Water Tower – South (Structure 4261)	7	Although peeling paint was not observed on the exterior of Structure 4261, LBP is suspected since the water tower was constructed in 1969
6	Drum Located North of Cull Ave, West of 12th Street Containing Black Tarry Material	7	Disposal of drum; unknown contents
6	Intermodal Storage Containers, PAB Tank Storage, and TMA Container Storage	7	Permitted hazardous materials storage; closure will be performed by NECD
7	Little Raccoon Creek Bank along DWBG	7	Buried debris
7	Little Raccoon Creek (AOC-N)	5	VOCs in the surface water; RFI complete; LTM ongoing
7	Drum Located on West Bank of Little Raccoon Creek, South of South Blvd. Containing Black Tarry Material	7	Disposal of drum; unknown contents
7	Area where Leaking Filled Munitions were Temporarily Buried	7	VX-related contamination; data gap – location is unknown
7	Mine Burial Area at Scrap Yard	7	Decontaminated mines may have been buried in this area; no subsurface samples collected/analyzed in this specific area
7	Burial Area 5 at DWBG	7	Potential VX-related contamination
7	DWBG (SWMUs NAAP-23 through NAAP-26 and NAAP-26A)	5	Historically used to dispose of decontaminated wastes associated with the production of agent VX; SI and RFI completed; LTM ongoing; LUCs in place
7	300-gallon Buried Tank (SWMU NAAP-54)	7	Tank may contain pyrophoric materials; corrective action required
7	DI/SY (SWMU NAAP-65)	4	Historically used to incinerate items once filled with chemical agent; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CSL (SWMU NAAP-27)	7	Historically used to dispose of construction debris from the TNT plant and office and shop waste; historical disposal of pesticide containers reported; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit; historical sampling parameters have not included pesticides
7	MCD (SWMU NAAP-28A)	4	Former site of a concrete batch plant; used for construction debris disposal; RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CDD (SWMU NAAP-28)	4	Historically was a disposal area; drums and various types of construction debris observed in the past; RFI complete; LUCs in unknown place; LTM complete
7	STP (SWMU NAAP-52)	7	Unknown integrity of sludge drying beds
7	DWBG Pine Tree Area	7	Possible construction debris burial area north of Old Burning Ground Road; burial of asbestos also is suspected
7	Asbestos Burial Area East of the MCD	7	Possible construction debris and asbestos burial in the area east of the MCD
7	Asbestos Burial Area West of the STP	7	Possible construction debris and asbestos burial in the area west of the STP
7	Asbestos Burial Area East of the Pine Trees and West of 1st Street	7	Possible construction debris and asbestos burial in the area east of the pine trees and west of 1st Street
8	Chemical Plant FPF	7	Potential release of VX-related contamination and solvents; known releases of DCBs

Table 1-1. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
8	RDX-MA Acid Area (SWMU NAAP-3A)	3	SI complete; listed as NFA in RCRA permit
8	CPRBs (SWMUs NAAP-10 through NAAP-12	4	Received waste from heavy water and VX production; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
8	Waste Oil Tank (SWMU NAAP-53)	4	AST formerly located near Building 716A had leaked; contaminated soil was removed; listed as NFA in RCRA permit
8	Removed USTs (SWMU NAAP-66)	2	Four different locations throughout the installation where five USTs were formerly located and had leaked; release assessment completed in 1998; listed as NFA in RCRA permit
8	CPAB (SWMU NAAP-67)	4	Historically used to accept coal ash from Building 401A Power House operations; RFI complete; LUCs in place; listed as NFA in RCRA permit
8	PHCP (SWMU NAAP-69)	3	Coal and coal slag stored on ground near Building 401A
8	Fire Training Pit (East of the Chemical Plant FPF)	7	Potential release of VOCs and SVOCs to the environment
8	Fuel Oil Spill at Former Railroad near West Chemical Plant (Southeast Corner of Former Building 103)	2	Fuel oil released to the environment; remediation occurred
8	Former Locomotive House (Former Building 718A) and Surrounding Area	7	Historical locomotive house; possible release of solvents and petroleum products to the environment; contaminated soil and surface water discovered in July 2000
8	Water Tower – North (Structure 510)	7	Flaking of LBP
8	Leaking Petroleum from 1,000-gallon UST in the Southern Portion of the RDX Acid Area Discovered in 2006 and excavated on 22 January 2007	2	Petroleum release to the environment; soil and groundwater sampling was conducted
8	Building 401A	7	PCB-contaminated concrete flooring exposed to the environment
8	Building 716A (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 716D (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 722A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 723A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 726C (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Asbestos Burial Area West of Building 401A	7	Possible construction debris and asbestos burial in the area west of Building 401A
8	Asbestos Burial Area North of Building 401A	7	Possible construction debris and asbestos burial in the area north of Building 401A.

Table 1-2. ECP Categories and Standard Map Colors

ECP Category	Total Acreage at NECD	Definition	Map Color
1	6,427.7	Areas in which no release or disposal of hazardous substances or petroleum products above de minimus quantities has occurred, and to which there has been no migration of such substances from adjacent areas.	White
2	0.3	Areas in which only release or disposal of petroleum products above de minimus quantities has occurred.	Blue
3	197	Areas in which release, disposal, or migration of hazardous substances has occurred, but in concentrations that do not require a removal or other remedial response.	Light Green
4	90	Areas in which release, disposal, or migration of hazardous substances has occurred, but all removal or other remedial actions necessary to protect human health and the environment have been taken.	Dark Green
5	300	Areas in which release, disposal, or migration of hazardous substances has occurred, and removal or other remedial actions are underway, but all required actions have not yet been taken.	Yellow
6	0	Areas in which release, disposal, or migration of hazardous substances has occurred, but required remedial actions have not yet been implemented.	Red
7	121	Areas that have not been evaluated or require additional evaluation.	Gray
Total	**7,136**		

Note: Some areas fall within the boundaries of a higher category property and are included in the total acreage of that higher category (e.g., Category 2 property acreage that is a subset of a Category 7 property is included in the Category 7 acreage).

Table 1-3. Category 2, 3, 4, 5, and 7 Properties

Study Section	Site Name	Reason
Category 2 Property		
8	Removed USTs (SWMU NAAP-66)	Four different locations throughout the installation where five USTs were formerly located and had leaked; release assessment completed in 1998; listed as NFA in RCRA permit
8	Fuel Oil Spill at Former Railroad near West Chemical Plant (Southeast Corner of Former Building 103)	Fuel oil released to the environment; remediation occurred
8	Leaking Petroleum from 1,000-gallon UST in the Southern Portion of the RDX Acid Area Discovered in 2006 and excavated on 22 January 2007	Petroleum release to the environment; soil and groundwater sampling was conducted
Category 3 Property		
4	RWABs (SWMUs NAAP-29 through NAAP-32)	Basins historically contained wastewater, ash, and sludges resulting from the treatment of red water associated with TNT production in 1973-74; RI and RFI complete; listed as NFA in RCRA permit
4	RDX-BG and OCMCDA (SWMUs NAAP-33 and NAAP-64, respectively)	Burned waste RDX and waste explosives components of M23 land mines and M55 rockets at the RDX-BG; destruction of component parts from old chemical munitions was reported at the OCMCDA; RI and RFI complete; listed as NFA in RCRA permit
4	Sanitary Landfill (SWMU NAAP-51)	Site closed in 1997; NFA in RCRA permit
5	TNT-MA (SWMUs NAAP-37 through NAAP-47)	Production of TNT; SI complete; listed as NFA in RCRA permit
5	TNT-MA Acid Area (SWMUs NAAP-56 through NAAP-63)	Acid manufacturing; listed as NFA in RCRA permit
8	RDX-MA Acid Area (SWMU NAAP-3A)	Acid manufacturing; SI complete; listed as NFA in RCRA permit
8	PHCP (SWMU NAAP-69)	Coal and coal slag stored on ground near Building 401A
Category 4 Property		
1	NSPs (SWMUs NAAP-1, NAAP-2)	Historical burial of waste from latrines and decontaminated solid waste from the VX manufacturing process; RFI complete; listed as NFA in RCRA permit; LUCs in place
4	GSBs (SWMUs NAAP-34 through NAAP-36) and PCCRP (SWMU NAAP-49)	GSBs used to contain settled gypsum sludge produced by the neutralization of acidic wastewaters associated with TNT production; PCCRP received wastewaters from the PCC clarifiers, the GSBs' effluent, and water from the RWABs; RI and RFI complete; LUCs in place at GSBs; GSBs and PCCRP listed as NFA in RCRA permit
8	Waste Oil Tank (SWMU NAAP-53)	AST formerly located near Building 716A had leaked; contaminated soil was removed; listed as NFA in RCRA permit
7	DI/SY (SWMU NAAP-65)	Historically used to incinerate items once filled with chemical agent; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
7	MCD (SWMU NAAP-28A)	Former site of a concrete batch plant; used for construction debris disposal; RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CDD (SWMU NAAP-28)	Historically was a disposal area; drums and various types of construction debris observed in the past; RFI complete; LUCs in place; LTM complete
8	CPRBs (SWMUs NAAP-10 through NAAP-12	Received waste from heavy water and VX production; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
8	Waste Oil Tank (SWMU NAAP-53)	AST formerly located near Building 716A had leaked; listed as NFA in RCRA permit
8	CPAB (SWMU NAAP-67)	Historically used to accept coal ash from Building 401A Power House operations; RFI complete; LUCs in place; listed as NFA in RCRA permit

Table 1-3. Category 2, 3, 4, 5, and 7 Properties (Continued)

Study Section	Site Name	Reason
Category 5 Property		
2	RDX-MA (SWMU NAAP-3)	Historical production of RDX; RI and RFI complete; LTM ongoing; LUCs in place
4	TNT-BG (SWMU NAAP-50)	Former burning ground for TNT-contaminated debris; RI, FS, and CMI complete; LTM ongoing; LUCs in place
7	Little Raccoon Creek (AOC-N)	VOCs in the surface water; RFI complete; LTM ongoing
7	DWBG (SWMUs NAAP-23 through NAAP-26 and NAAP-26A)	Historically used to dispose of decontaminated wastes associated with the production of agent VX; SI and RFI completed; LTM ongoing; LUCs in place
Category 7 Property		
1	Richmond Magazines 33 and 47	Possible explosives contamination
1	Small Arms Range	Possible MC contamination
1	West Pine Tree Area	Possible burial area northeast of Richmond Magazines and west of RDX-MA
3	RDX-MA Area F Parking Lot	Storage of filled TCs; no sampling conducted to date
3	Drums South of North Patrol Road	Disposal of drums; unknown contents
3	Former Skeet Range	Possible MC contamination
3	Batteries North of Railroad Bed	Metals from battery acid
3	Mason & Hanger Hazardous Waste Storage (Building 729B)	Possible release of hazardous chemicals
3	Parsons Hazardous Waste Storage (Building 729A)	Possible release of hazardous chemicals; closure will be performed by Parsons
3	Buildings 1401A and 1401B	Permitted hazardous materials storage; closure will be performed by NECD
3	Igloos	Permitted hazardous materials storage; closure will be performed by NECD
5	Sulfuric Acid Spill in TNT Acid Area	Sulfuric acid release to the environment
5	Oleum Spill near Cull Avenue	Oleum release to the environment
5	Red Water Spill at TNT-MA	Red water release to the environment
5	Toluene Spill at TNT-MA	Toluene release to the environment
5	Underground Piping for Former Fuel Oil Tanks	Possible fuel oil in underground piping; petroleum odor reported
5	Water Tower – South (Structure 4261)	Although peeling paint was not observed on the exterior of Structure 4261, LBP is suspected since the water tower was constructed in 1969
6	Drum Located North of Cull Ave, West of 12th Street Containing Black Tarry Material	Disposal of drum; unknown contents
6	Intermodal storage containers, PAB tank storage, TMA container storage	Permitted hazardous materials storage; closure will be performed by NECD
7	Little Raccoon Creek Bank along DWBG	Buried debris
7	Drum Located on West Bank of Little Raccoon Creek, South of South Blvd. Containing Black Tarry Material	Disposal of drum; unknown contents
7	Area where Leaking Filled Munitions were Temporarily Buried	VX-related contamination; data gap – location is unknown
7	Mine Burial Area at Scrap Yard	Decontaminated mines may have been buried in this area; no subsurface samples collected/analyzed in this specific area
7	Burial Area 5 at DWBG	Potential VX-related contamination
7	300-gallon Buried Tank (SWMU NAAP-54)	Tank may contain pyrophoric materials; corrective action required

Table 1-3. Category 2, 3, 4, 5, and 7 Properties (Continued)

Study Section	Site Name	Reason
Category 7 Property (Continued)		
7	CSL (SWMU NAAP-27)	Historically used to dispose of construction debris from the TNT plant and office and shop waste; historical disposal of pesticide containers reported; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit; historical sampling parameters have not included pesticides
7	STP (SWMU NAAP-52)	Unknown integrity of sludge drying beds
7	DWBG Pine Tree Area	Possible construction debris burial area north of Old Burning Ground Road; burial of asbestos also is suspected
7	Asbestos Burial Area East of the MCD	Possible construction debris and asbestos burial in the area east of the MCD
7	Asbestos Burial Area West of the STP	Possible construction debris and asbestos burial in the area west of the STP
7	Asbestos Burial Area East of the Pine Trees and West of 1st Street	Possible construction debris and asbestos burial in the area east of the pine trees and west of 1st Street
8	Chemical Plant FPF	Potential release of VX-related contamination and solvents; known releases of DCBs
8	Fire Training Pit (East of the Chemical Plant FPF)	Potential release of VOCs and SVOCs to the environment
8	Former Locomotive House (Former Building 718A) and Surrounding Area	Historical locomotive house; possible release of solvents and petroleum products to the environment; contaminated soil and surface water discovered in July 2000
8	Water Tower – North (Structure 510)	Flaking of LBP
8	Building 401A	PCB-contaminated concrete flooring exposed to the environment
8	Building 716A (Vehicle Maintenance Shop)	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 716D (Vehicle Maintenance Shop)	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 722A (Pesticide Storage Building)	Possible release of pesticides/herbicides
8	Building 723A (Pesticide Storage Building)	Possible release of pesticides/herbicides
8	Building 726C (Pesticide Storage Building)	Possible release of pesticides/herbicides
8	Asbestos Burial Area West of Building 401A	Possible construction debris and asbestos burial in the area west of Building 401A
8	Asbestos Burial Area North of Building 401A	Possible construction debris and asbestos burial in the area north of Building 401A

2. PURPOSE

This section discusses the general purpose of the ECP Phase I assessment. The general requirements necessary to prepare an ECP, the scope of the ECP based on the requirements, any assumptions made while conducting the ECP Phase I assessment, limitations of the ECP Report, and the report organization are included.

2.1 GENERAL

DOD recommended closure of NECD in 2005. The ECP assessment meets DOD requirement to prepare an ECP Report per DOD 4165.66-M, BRRM. The ECP assessment was conducted to collect reliable information regarding the environmental condition of the property to determine the property's suitability for outgrant or transfer, and to meet the requirements under AR 200-1, Environmental Protection and Enhancement. The information gathered during this assessment also will be used with the objective of assisting the Army, the General Services Administration (GSA), and the purchaser in making informed business decisions about the transfer of the property by reducing uncertainty regarding its environmental condition.

AR 200-1 requires an environmental baseline survey (EBS) be prepared to determine the environmental conditions of properties being considered for disposal. The policy guidance requiring the preparation of an ECP for property disposal is put forth in the Assistant Chief of Staff for Installation Management (ACSIM) memorandum entitled "Army Real Property Acquisition, Leases, Out-grants, and Disposal Transactions" signed on 15 March 2007. The ECP assessment was developed in compliance with Chapter 8, Section 3 of the BRRM (DOD 4165.66-M, March 1, 2006); AR 200-1, *Environmental Protection and Enhancement,* February 21, 1997*;* DA PAM 200-1, *Environmental Protection and Enhancement,* January 17, 2002*;* and CERCLA Section 120(h)(4).

This report is not intended to be a definitive investigation of all possible contamination at the subject property. No soil or groundwater was sampled at the property in conjunction with the ECP assessment.

According to the BRRM, the primary purposes of the ECP Report include the following:

- C8.3.1.1. Provide the Military Department with information it may use to make disposal decisions regarding the property.
- C8.3.1.2. Provide the public with information relative to the environmental condition of the property.
- C8.3.1.3. Assist in community planning for the reuse of Base Realignment and Closure (BRAC) property.
- C8.3.1.4. Assist Federal agencies during the property screening process.
- C8.3.1.5. Provide information for prospective buyers.
- C8.3.1.6. Assist prospective new owners in meeting the requirements under the U.S. Environmental Protection Agency's (EPA's) "All Appropriate Inquiry" regulations when they become final.
- C8.3.1.7. Provide information about completed remedial and corrective actions at the property.
- C8.3.1.8. Assist in determining appropriate responsibilities, asset valuation, and liabilities with other parties to a transaction.

The ECP Report was not prepared to satisfy a real property purchaser's duty to conduct an "all appropriate inquiry" to establish an "innocent purchaser defense" to CERCLA 107 liability. Any such

use of the ECP assessment by any party is outside the control of the Army and beyond the scope of the ECP. The Army, its officers, employees, or contractors make no warranties or representations that any ECP Report satisfies any such requirements for any party.

2.2 SCOPE

The scope of work for the ECP requires general conformance with paragraph 15-6 of AR 200-1, Environmental Protection and Enhancement, dated February 21, 1997, and specific conformance with Chapter 8.3 of DOD 4165.66-M, BRRM, dated March 1, 2006.

The ECP covers the 7,136-acre NECD Army installation. NECD is in Vermillion Township, Vermillion County, in west-central Indiana near the Wabash River. The nearest major municipalities are Terre Haute, Indiana, 32 miles to the south and Danville, Illinois, 32 miles to the northwest. NECD is located in a rural area of Vermillion County, where surrounding land use is almost exclusively cropland and forests. A regional location map and a NECD location map is presented in Figure 2-1.

2.3 LIMITATIONS

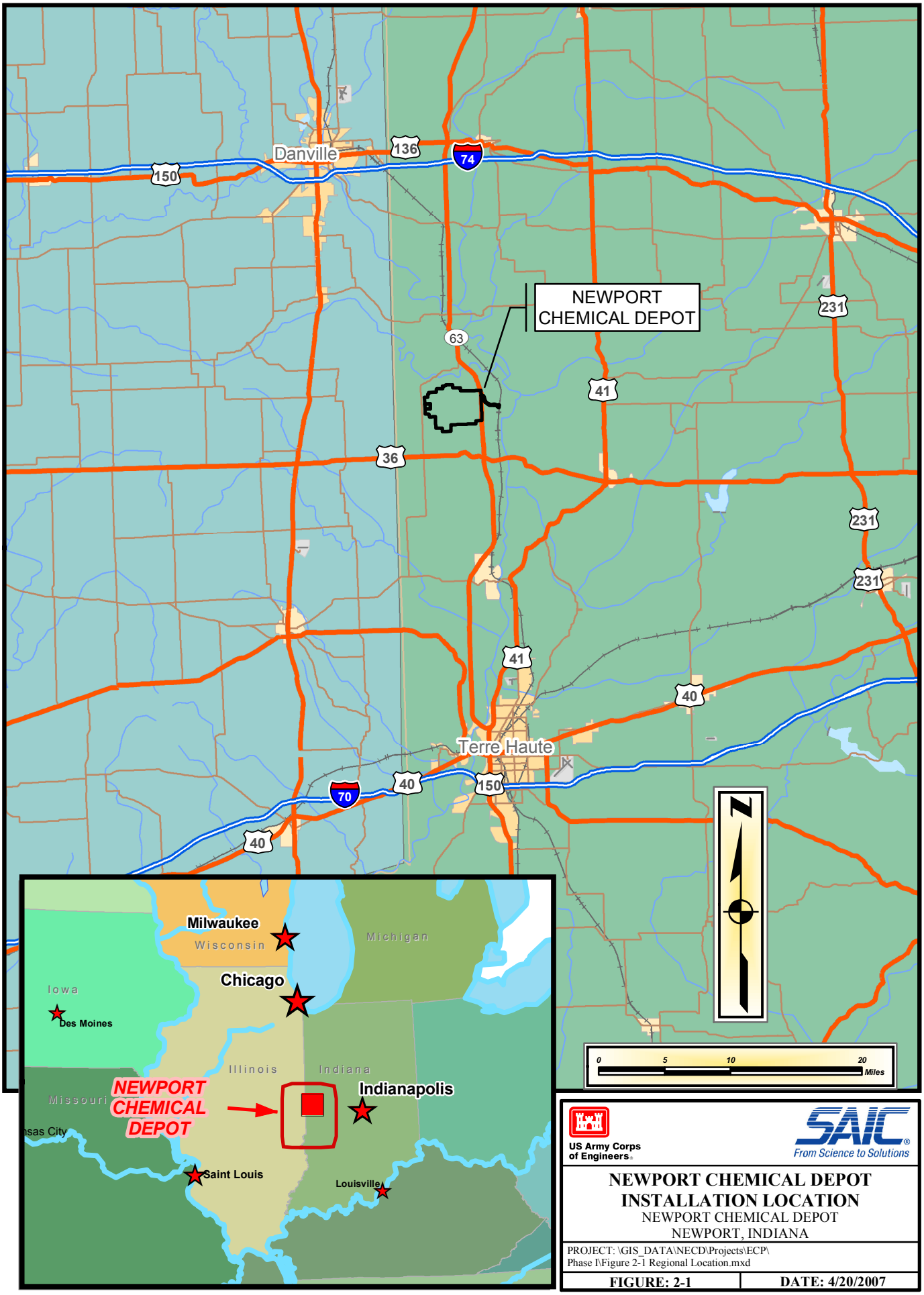
The ECP Report is a snapshot of the condition of the NECD facility at the time of the visual inspection and report. The report summarizes readily available information on the environmental conditions of, and concerns relative to, the land, facilities, and real property assets at NECD. The ECP assessment is based on the findings of the Historical Records Review (HRR) (TLI 2007), review of selected records, and a site reconnaissance conducted from January 29 through February 2, 2007. Environmental investigations, reports, and site historical documents reviewed in support of the ECP assessment are reflected within this ECP Report by reference. A complete list of references is provided in Section 8.

Not all property was fully accessible; however, a representative number of buildings was visually inspected during the site reconnaissance. Section 3.2 describes specific limitations encountered during the VSI.

2.4 REPORT ORGANIZATION

Section 3 describes the methods used to conduct the ECP assessment. Section 4 provides a description of NECD, including the installation location and description, the historical land use, installation history, installation utilities, natural and physical environment, and biological and cultural resources. Section 5 provides environmental conditions at the property, including environmental permits and licenses, environmental cleanup, previous environmental investigations, hazardous substances (including substances specified in 40 CFR 302.4, or acutely hazardous waste as defined in 40 CFR 261.30), petroleum products, PCBs, ACM, LBP, radioactive material, radon, other identified concerns, identification of uncontaminated property, a description of the remaining property, applicable regulatory compliance issues, and adjacent properties. Section 6 presents the conclusions of the ECP assessment. Section 7 provides approval of the ECP assessment. References are included in Section 8.

The appendices provide additional detail about environmental issues relating to the installation. Appendix A includes the building inspection forms. A complete set of site photographs is included in Appendix B. State and Federal database reports (i.e., the Environmental Database Resources, Inc. [EDR] Radius Atlas with GeoCheck, NEPACheck, aerial photographs, and topographs) are provided in Appendix C. A title search document is included in Appendix D. Interview reports are included in Appendix E. The Radiological Historical Site Assessment is included in Appendix F. All appendices are provided on the accompany compact disc (CD).


Danville
136
74
150
NEWPORT
CHEMICAL DEPOT
63
41
36
231
231
231
41
40
Terre Haute
40
150
70
40
0
5
10
20
Miles
Milwaukee
Wisconsin
Michigan
Chicago
Iowa
Des Moines
Illinois
Indiana
Missouri
NEWPORT
CHEMICAL
DEPOT
Indianapolis
Saint Louis
Louisville
US Army Corps
of Engineers
SAIC
From Science to Solutions
NEWPORT CHEMICAL DEPOT
INSTALLATION LOCATION
NEWPORT CHEMICAL DEPOT
NEWPORT, INDIANA
PROJECT: \GIS_DATA\NECD\Projects\ECP\
Phase I\Figure 2-1 Regional Location.mxd
FIGURE: 2-1
DATE: 4/20/2007

THIS PAGE WAS INTENTIONALLY LEFT BLANK

3. SURVEY METHODOLOGY

Methods employed in conducting the ECP Phase I assessment are outlined in this section. Development of study sections, the VSI, aerial photography analysis, records review, interviews, and data management are addressed below.

3.1 DEVELOPMENT OF STUDY SECTIONS

To aid data collection, management, and retrieval, the property was divided into study sections. Site information then was collected and organized by study section. Development of sections was based on the following considerations:

- Boundaries must be readily identifiable in the field
- Boundaries must correspond closely with those of properties destined for transfer to specific entities
- Boundaries must be of a manageable size for survey
- Study sections must encompass all of the installation property
- No land area can fall into more than one section
- Sections should correspond with existing solid waste management units (SWMUs)/Installation Restoration Program (IRP) sites.

Accordingly, section boundaries generally were designated at the center of roads or other manmade boundaries wherever possible. NECD was assigned Study Sections 1 through 13. Table 3-1 presents all SWMUs located at NECD with their corresponding study section and current status per the Resource Conservation and Recovery Act (RCRA) permit. Tale 3-2 presents all AOCs. Each study section is described briefly in Table 3-3. The buildings and their study section location are listed in Table 3-4. A more detailed description of the SWMUs located within each study section is provided in Section 5.2.1. Study section boundaries are shown in Figure 3-1, which is presented at the end of this section.

3.2 VISUAL SITE INSPECTION

A VSI involving a driving tour of the facility and its perimeter, as well as a systematic survey by vehicle and on foot through each section of the property, was conducted from January 29 to February 2, 2007. This was done to field-verify information produced in the document review and to identify potential environmental concerns. All roads on the facility accessible by two-wheel drive vehicle were driven during the VSI.

Of the 175 buildings and structures within the subject property, the survey team was able to inspect the interiors of 107 buildings. Thirty of the 52 Richmond Magazines in Study Section 1 were entered, which is representative of the group of similar buildings. Buildings not entered in Study Sections 3 through 8 were inaccessible (i.e., secured by Parsons due to sensitive operations or unsafe due to deteriorating condition). Information on the original and current use of these buildings was obtained through interviews with NECD personnel. The exteriors of all buildings without security concerns were inspected.

During the site reconnaissance, Universal Transverse Mercator (UTM) coordinates were determined for environmental findings. A global positioning system (GPS) unit (Trimble® GeoXT™ hand-held) was used to determine coordinates. This unit is capable of sub-meter accuracy.

The majority of the property inspected during the VSI did not contain issues of concern. Some areas did contain items of interest (e.g., railroad ties, drums, batteries) and are discussed in Section 5.13.

Table 3-1. SWMUs at NECD

SWMU Number	AEDB-R Number	NFA per RCRA Permit?	SWMU Name	Study Section
NAAP-1	NAAP-038	Y	NSP #1	1
NAAP-2	NAAP-038	Y	NSP #2	1
NAAP-3	**NAAP-001**	**N**	**RDX-MA**	**2**
NAAP-3A	NAAP-040	Y	RDX Acid Manufacturing Area	8
Chemical Plant				
NAAP-4	**NAAP-016**	**N**	**Detoxification Holding Basin**	**8**
NAAP-5	NAAP-015	Y	Waste Surge Tank FA-412	8
NAAP-6	**NAAP-014**	**N**	**Basin 30031**	**8**
NAAP-7	**NAAP-014**	**N**	**Basin 30025**	**8**
NAAP-8	NAAP-014	Y	Deep Well Surge Tank	8
NAAP-9	NAAP-014	Y	Deep Injection Well	8
NAAP-10	NAAP-016	Y	Basin 30007	8
NAAP-11	NAAP-016	Y	Basin 30008	8
NAAP-12	NAAP-016	Y	Basin 30009	8
NAAP-13	**NAAP-017**	**N**	**Bulk Storage Tank FA-303A**	**8**
NAAP-14	**NAAP-017**	**N**	**Bulk Storage Tank FA-303B**	**8**
NAAP-15	**NAAP-017**	**N**	**Bulk Storage Tank FA-351**	**8**
NAAP-16	**NAAP-017**	**N**	**Bulk Storage Tank FA-352**	**8**
NAAP-17	**NAAP-017**	**N**	**Bulk Storage Tank FA-353**	**8**
NAAP-18	**NAAP-017**	**N**	**Bulk Storage Tank FA-354**	**8**
NAAP-19	**NAAP-017**	**N**	**Bulk Storage Tank FA-355**	**8**
NAAP-20	**NAAP-017**	**N**	**Bulk Storage Tank FA-356**	**8**
NAAP-21	NAAP-017	Y	Chemical Plant Scrubber Towers	8
NAAP-22	NAAP-017	Y	Present Agent VX Storage Site (Bldg. 144) and Toxic Sump	8
NAAP-23	**NAAP-022**	**N**	**DWBG Site #1 (Burial Area 1, SE corner, 6 trenches)**	**7**
NAAP-24	**NAAP-022**	**N**	**DWBG Site #2 (Burial Area 2, near E Access road, 2 parallel trenches)**	**7**
NAAP-25	**NAAP-022**	**N**	**DWBG Site #3 (Burial Area 3, near easternmost trench, near road)**	**7**
NAAP-26	**NAAP-022**	**N**	**DWBG Site #4 (Burial Area 4, on NE end, near tributary)**	**7**
NAAP-26A	**N/A**	**N**	**DWBG Site #5 (Pit A, west side of site, near creek)**	**7**
NAAP-27	NAAP-033	Y	CSL	7
NAAP-28	**NAAP-025**	**N**	**CDD (south of CSL, NAAP-27)**	**7**
NAAP-28A	NAAP-025	Y	MCD (near Memorial Chapel Cemetery)	7
NAAP-29	NAAP-037	Y	RWAB #1 (a) and Sump (b) (North Basin)	4
NAAP-30	NAAP-037	Y	RWAB #2 (a) and Sump (b) (Middle Basin, received ash)	4
NAAP-31	NAAP-037	Y	RWAB #3 (a) and Sump (b) (South Basin, received ash)	4
NAAP-32	NAAP-037	Y	RWAB Runoff Holding Sump	4
NAAP-33	NAAP-023	Y	RDX-BG	4
NAAP-34	NAAP-032	Y	GSB #1 (North Basin, received sludge)	4
NAAP-35	NAAP-032	Y	GSB #2 (Middle Basin)	4
NAAP-36	NAAP-032	Y	GSB #3 (South Basin)	4
TNT Plant Area				
NAAP-37	NAAP-008	Y	TNT Production Line # 1, N&P Building (a) and F&P Building (b)	5
NAAP-38	NAAP-008	Y	TNT Production Line #2, and identical units as NAAP-37	5
NAAP-39	NAAP-008	Y	TNT Production Line #3, and identical units as NAAP-37	5
NAAP-40	NAAP-008	Y	TNT Production Line #4, and identical units as NAAP-37	5

Table 3-1. SWMUs at NECD (Continued)

SWMU Number	AEDB-R Number	NFA per RCRA Permit?	SWMU Name	Study Section
TNT Plant Area (Continued)				
NAAP-41	NAAP-008	Y	TNT Production Line #5, and identical units as NAAP-37	5
NAAP-42	NAAP-008	Y	TNT Wastewater Collection and Handling Area #1	5
NAAP-43	NAAP-008	Y	TNT Wastewater Collection and Handling Area #2	5
NAAP-44	NAAP-008	Y	TNT Wastewater Collection and Handling Area #3	5
NAAP-45	NAAP-008	Y	TNT Wastewater Collection and Handling Area #4	5
NAAP-46	NAAP-008	Y	TNT Wastewater Collection and Handling Area #5	5
NAAP-47	NAAP-008	Y	TNT Wastewater Treatment Facility	5
NAAP-48	N/A	Y	PCC	5
NAAP-49	NAAP-032	Y	PCCRP	4
NAAP-50	**NAAP-024**	**N**	**TNT-BG**	**4**
NAAP-51	N/A	Y	Present Sanitary Landfill	4
NAAP-52	N/A	Y	STP	7
NAAP-53	N/A	Y	Waste Oil Tank (near Building 716A)	8
NAAP-54	**N/A**	**N**	**Burial Site of 300-Gallon Chemical Sewer Tank**	**7**
NAAP-55	N/A	Y	Hazardous Water Storage Building 729A	3
TNT Acid Production Area				
NAAP-56	N/A	Y	Acid Tank Farm Drain	5
NAAP-57	N/A	Y	Sulfur and Ammonia Unloading Area Drain	5
NAAP-58	N/A	Y	Utilities and Shop Area Drain	5
NAAP-59	N/A	Y	TNT Laboratory Drains	5
NAAP-60	N/A	Y	TNT Acid Laboratory Drains	5
NAAP-61	N/A	Y	NAC and DN Facility Drains	5
NAAP-62	N/A	Y	AOP Facility Drains	5
NAAP-63	N/A	Y	SAR Facility Drains	5
Other				
NAAP-64	NAAP-023	Y	OCMCDA (in RDX-BG)	4
NAAP-65	N/A	Y	DI/SY (including “vanadium dump”) area	7
NAAP-66	N/A	Y	Areas of Removed USTs	8
NAAP-67	NAAP-016	Y	Coal Ash Basin	8
NAAP-69	N/A	Y	Former Coal Pile	8

Bolded rows = SWMUs that are not NFA per the permit.

Table 3-2. AOCs at NECD

AOC	NFA per RCRA Permit?	AOC Name	Study Section
AOC A	Y	Open Ditch Near the RDX Purification Process	2
AOC B	Y	Drainage Ditches Surrounding the Pollution Control Center	5
AOC D	**N**	**Tanks and Containers Inside Building 143 in the VX Production Facility**	**8**
AOC E	Y	Truck Transfer Stations	8
AOC J	Y	Building O159	8
AOC L	Y	Building 714A	8
AOC M	**N**	**Drainage Ditches Around the Chemical Plant Area**	**8**
AOC N	**N**	**Little Raccoon Creek**	**8**
AOC O	**N**	**101 PSA Valve Pit**	**8**
AOC P	**N**	**Sodium Hydroxide Tank**	**8**

Bolded rows = AOCs that are not NFA per the permit.

Table 3-3. Study Section Summary

Study Section	Acreage	Description
1	1,920.8	Study Section 1 is located in the north-west quadrant of the facility within the installation fence. Study Section 1 contains SWMUs NAAP-1 and NAAP-2 (the NSPs). The majority of this study section consists of agricultural lease areas. In the central portion of this study section are the 52 Richmond Magazines and a 4-acre plot of pine trees. There is a Small Arms Range in the north-central portion of this study section, just south of North Patrol Road. Study Section 1 contains significant hilly wooded areas that follow the Vermillion Creek tributaries. Jonathan Creek, a tributary of the Little Vermillion River, drains this portion of the installation. Minor portions of Study Section 1 contain wetlands. There are four cemeteries: Carmack Cemetery, Juliet Cemetery, Walnut Hill Cemetery, and Miller Cemetery. There are two Indiana Bat sites within this study section.
2	280.2	Study Section 2 is located in the north-central portion of the installation. Study Section 2 is SWMU NAAP-3, also known as the RDX-MA.
3	1,235.4	Study Section 3 is located in the eastern portion of the installation. This study section is composed primarily of wooded and agricultural areas. SWMU NAAP-55 (Hazardous Waste Storage Building [Building 729A]) is located in the northwest portion of Study Section 3. This study section also contains eight igloos and six warehouses. There is one Indiana Bat site and Burson Cemetery in Study Section 3. Little Raccoon Creek is located in the southern portion of this study section and an un-named creek is located in the northeast portion of this study section.
4	876	Study Section 4 is located in the southwestern corner of the facility, inside the fenced portion of the installation. The SWMUs contained within this study section are SWMUs NAAP-29, NAAP-30, and NAAP-31 (RWABs); NAAP-32 (Red Water Runoff Holding Sump); NAAP-33 and NAAP-64 (RDX-BG and OCMCDA); NAAP-34, NAAP-35, and NAAP-36 (GSBs); NAAP-49 (PCCRP); NAAP-50 (TNT-BG); and NAAP-51 (Sanitary Landfill). The property in this study section includes (in decreasing order of acreage) Prairie Restoration Areas, Agricultural Leases, LUCs, and wooded areas. There is one storage warehouse located within Study Section 4. An intermittent, headwaters tributary to Buck Creek drains this portion of the installation.
5	189.9	Study Section 5 is located in the south-central portion of the installation. This area includes the TNT-MA and the TNT-MA Acid Area. The SWMUs contained within this study section related to the TNT-MA include SWMUs NAAP-37, NAAP-38, NAAP-39, NAAP-40, NAAP-41, NAAP-42, NAAP-43, NAAP-44, NAAP-45, NAAP-46, NAAP-47, and NAAP-48 and consists of TNT Production Lines 1, 2, 3, 4 and 5; TNT Wastewater and Handling Areas #1, #2, #3, #4, and #5; the TNT Wastewater Treatment Facility; and the PCC (SWMU NAAP-48). The TNT Cooling Tower Sump also is located in this study section. SWMUs within this study section related to the TNT Acid Production Area include SWMUs NAAP-56 (Acid Tank Farm Drain); NAAP-57 (Sulfur and Ammonia Unloading Area Drain); NAAP-58 (Utilities and Shop Area Drain); NAAP-59 (TNT Laboratory Drains); NAAP-60 (TNT Acid Laboratory Drains); NAAP-61 (NAC and DN Facility Drains); NAAP-62 (AOP Facility Drains); and NAAP-63 (SAR Facility Drains). There are 28 buildings in this study section that once supported the manufacture of TNT. Two 500,000-gallon fuel oil storage tanks previously were in the study section. Study Section 5 is composed of agricultural lease areas, the TNT-MA, and the Acid Production Area.
6	618.3	Study Section 6 is located in the southeast quadrant of the installation. This study section is largely wooded and contains 10 warehouses, a storm shelter, and an administration building. The Former Smokeless Powder Plant was located in this study section; however, construction was never completed. There are no SWMUs in Study Section 6.

Table 3-3. Study Section Summary (Continued)

Study Section	Acreage	Description
7	323.5	Study Section 7 is in the southeast quadrant of the installation within the installation fence. The SWMUs contained within this study section include SWMUs NAAP-23, NAAP-24, NAAP-25, and NAAP-26 (DWBG Burial Areas); NAAP-26A (DWBG Pit A); NAAP-65 (DI/SY); NAAP-27 (CSL); NAAP-28A (MCD); NAAP-28 (CDD); NAAP-54 (300-Gallon Tank Burial Area); and NAAP-52 (STP). There is an area of pine trees east of the CSL and DI/SY. Pine trees also are located north and south of Old Burning Ground Road, east of the DWBG. There are several structures used to maintain the STP and one building used for sampling. This study section is largely wooded following Little Raccoon Creek and its tributaries. There are also agricultural lease areas and two Indiana Bat sites. The majority of the SWMUs in this study section have LUCs.
8	262.1	Study Section 8 is in the east-central portion of the installation. This study section contains the Chemical Plant. The SWMUs contained within this study section include SWMUs NAAP-10, NAAP-11, and NAAP-12 (CPRBs 30007, 30008, and 30009, respectively); NAAP-13 through NAAP-21 (Bulk Storage Tanks); NAAP-67 (CPAB); NAAP-3A (RDX Acid Manufacturing Area); NAAP-66 (Removed USTs); NAAP-4 (Detox Holding Basin); NAAP-5 (Waste Surge Tank); NAAP-53 (Waste Oil Tank); NAAP-22 (Present VX Storage Site and Toxic Sump); NAAP-6 (Basin 30031); NAAP-7 (Basin 30025); NAAP-8 (Deep Well Surge Tank); NAAP-9 (Deep Injection Well); and NAAP-69 (PHCP). NECDF operations are conducted within Study Section 8. The majority of Study Section 8 is industrial. There are also small wooded areas and agricultural lease areas. The property encompassed by SWMUs NAAP-10, NAAP-11, NAAP-12, and NAAP-67 have LUCs in place. There are 38 buildings in Study Section 8; 22 have been in use since the production of heavy water (constructed in the 1940s). These buildings are currently used for storage, equipment maintenance, or administrative purposes.
9	232.4	Study Section 9 is the portion of the installation that is outside the installation fence in the southwestern quadrant of the installation. This study section is primarily an agricultural lease area. A portion of this study section is also wooded, along Buck Creek. There are no SWMUs in Study Section 9.
10	680	Study Section 10 is located on the western side of the installation, outside the installation fence. The northern part of this study section previously was used by the National Guard for training exercises. The southern two-thirds of this study section are leased for agricultural use. There are no SWMUs in Study Section 10.
11	404.1	Study Section 11 is the northern most part of the installation that is located outside the installation fence. This study section is primarily wooded, along the creek beds of Vermillion Creek and its tributaries. Jonathan Creek runs through this study section. No SWMUs are located in this study section.
12	41.6	Study Section 12 is a tract of land that begins near the northeast boundary of the installation and follows an old railroad bed to the southeast, ending at Highway S 450 E. This area is primarily wooded, with some agricultural land. There is one Indiana Bat site in Study Section 12. No SWMUs are located in Study Section 12.
13	71.2	Study Section 13 is located east of the installation boundary and the railroad along the western side of the Wabash River. This area includes the Ranney® wells and three buildings associated with the wells. No SWMUs are located in Study Section 13.

Sources: SAIC 2003a, SAIC 2005d, and NECD 2006

Table 3-4. Buildings and Study Sections

Building Number	Building Name	Study Section
0103B6	Propane Air Station Building	8
00104C	Warehouse	6
00121A	Warehouse	6
00121B	Warehouse	6
00121C	Warehouse	6
000146	Magazine	8
000147	Magazine	8
00223A	Warehouse	6
00224B	Warehouse	4
00227A	Warehouse (tool crib)	6
00227B	Warehouse	6
00227C	Warehouse	6
00227D	Warehouse	6
00255A	Warehouse	6
000303	Vault	8
00308A	RDX SAR	8
00401A	Power House	8
00402A	Reservoir	8
00412A	Reservoir Pump House	8
000510	Water Tower	8
00617A	STP Sample Building	7
00701A	Building at Vehicle Gate 1	3
00702A	Telephone Exchange Building	8
00704A	Eng Service Office	8
00704F	Storage Building	8
000706	Maintenance Shop	8
0707BB	Office Building	8
00707C	Change House	8
0707CC	Guard Headquarters	8
00707E	Boiler Room	8
00709A	Fire Headquarters Building	8
00709C	Boiler Building	8
000710	Warehouse	8
000713	Warehouse	8
00713A	Procurement/Stores	8
00713B	Warehouse	8
00714A	Material Shed	8
000715	Maintenance Shop	8
00715A	Engineering/Housing Maintenance Shop	8
000716	Warehouse	8
00716A	Vehicle Maintenance Shop	8
00716D	Vehicle Maintenance Shop	8
00716F	Boiler House	8
00716G	Boiler House	8
00717A	Maintenance Building	8
00717B	Generator Building	8
00722A	Pesticide Storage Building	8

Table 3-4. Buildings and Study Sections (Continued)

Building Number	Building Name	Study Section
00722J	Saw Shed	1
00722S	Warehouse	8
00723A	Chemical Operations	8
00725A	Vehicle Parking and Storage	8
00726A	Storage Shed	8
00726B	Storage Shed	8
00726C	Storage Shed	8
00726D	Storage Shed	8
000729	TNT Pollution Control Area Maintenance Shop	5
00729A	Hazardous Waste Storage	3
00729B	Hazardous Waste Storage	3
00729C	Warehouse	3
00729D	Warehouse	3
00729E	Warehouse	3
00733C	Administrative Office at RDX Magazines	2
00733K	Emergency Vehicle Storage & Training Building	8
00738A	Warehouse	3
00739A	Warehouse	8
01401A	Warehouse	3
01401B	Warehouse	3
01401C	Warehouse	3
003001	Acid QA Lab & Office (TNT Lab/Office)	5
003005	Maintenance Warehouse	5
003008	Storage Shed	5
003022	Acid Manufacturing Plant	5
03036A	Propane/Air Station	8
03036B	Propane/Air Station	8
003063	Acid Manufacturing Plant	5
004011	Heat Plant Building	5
004041	Ranney® Well No. 1	13
004042	Ranney® Well No. 2	13
004043	Ranney® Well No. 3	13
004123	Water Supply Building	5
004261	Water Tank	5
004292	Odorizing N/G Pipeline Building	5
006047	Flammable/Liquid Gas Storage	5
006048	Dechlorination Building	7
006052	STP	7
006053	STP	7
006173	Blower Building	7
006174	Building Lift Station #1 Aux Pump	7
006178	Emergency Generator Building	7
006192	Acid Manufacturing Plant	5
007700	Administration	6
007702	Vehicle Storage	6
007705	Building at Vehicle Gate 4	3
007708	Building at Vehicle Gate 8	1

Table 3-4. Buildings and Study Sections (Continued)

Building Number	Building Name	Study Section
009011	Lab Building	5
009111	Change House	5
009531	Explosive Manufacturing Plant	5
009532	Explosive Manufacturing Plant	5
009533	Explosive Manufacturing Plant	5
009534	Explosive Manufacturing Plant	5
009535	Explosive Manufacturing Plant	5
009631	Finishing Equipment Room – F&P Line 1	5
009632	Finishing Equipment Room – F&P Line 2	5
009633	Finishing Equipment Room – F&P Line 3	5
009634	Finishing Equipment Room – F&P Line 4	5
009635	Finishing Equipment Room – F&P Line 5	5
009651	Box Unloading/Assembly – F&P Line 1	5
009652	Box Unloading/Assembly – F&P Line 2	5
009653	Box Unloading/Assembly – F&P Line 3	5
009654	Box Unloading/Assembly – F&P Line 4	5
009655	Box Unloading/Assembly – F&P Line 5	5
009811	Shipping/Receiving Facility	5
009812	Shipping/Receiving Facility	5
014171	Richmond Magazine 1	1
014172	Richmond Magazine 2	1
014173	Richmond Magazine 3	1
014174	Richmond Magazine 4	1
014175	Richmond Magazine 5	1
014176	Richmond Magazine 6	1
014177	Richmond Magazine 7	1
014178	Richmond Magazine 8	1
014179	Richmond Magazine 9	1
141710	Richmond Magazine 10	1
141711	Richmond Magazine 11	1
141712	Richmond Magazine 12	1
141713	Richmond Magazine 13	1
141714	Richmond Magazine 14	1
141715	Richmond Magazine 15	1
141716	Richmond Magazine 16	1
141717	Richmond Magazine 17	1
141718	Richmond Magazine 18	1
141719	Richmond Magazine 19	1
141720	Richmond Magazine 20	1
141721	Richmond Magazine 21	1
141722	Richmond Magazine 22	1
141723	Richmond Magazine 23	1
141724	Richmond Magazine 24	1
141725	Richmond Magazine 25	1
141726	Richmond Magazine 26	1
141727	Richmond Magazine 27	1
141728	Richmond Magazine 28	1

Table 3-4. Buildings and Study Sections (Continued)

Building Number	Building Name	Study Section
141729	Richmond Magazine 29	1
141730	Richmond Magazine 30	1
141731	Richmond Magazine 31	1
141732	Richmond Magazine 32	1
141733	Richmond Magazine 33	1
141734	Richmond Magazine 34	1
141735	Richmond Magazine 35	1
141736	Richmond Magazine 36	1
141737	Richmond Magazine 37	1
141738	Richmond Magazine 38	1
141739	Richmond Magazine 39	1
141740	Richmond Magazine 40	1
141741	Richmond Magazine 41	1
141742	Richmond Magazine 42	1
141743	Richmond Magazine 43	1
141744	Richmond Magazine 44	1
141745	Richmond Magazine 45	1
141746	Richmond Magazine 46	1
141747	Richmond Magazine 47	1
141748	Richmond Magazine 48	1
141749	Richmond Magazine 49	1
141750	Richmond Magazine 50	1
141751	Richmond Magazine 51	1
141752	Richmond Magazine 52	1
0A3200	Access Control Facility	3
0A3301	Igloo	3
0A3302	Igloo	3
0A3303	Igloo	3
0A3304	Igloo	3
0A3305	Igloo	3
0A3306	Igloo	3
0A3307	Igloo	3
0A3308	Igloo	3
0P3013	Entry Control Facility 2	8
00TC77	Building at Firing Range	1
0TC095	Storm Shelter	6

A reconnaissance of the base perimeter was conducted to evaluate adjacent property uses that could contribute to any environmental contamination detected onsite. The field team drove on roads along the perimeter to visually identify any contiguous properties that appeared, in the team's professional judgment, to have contamination that could migrate to the installation. Typical properties that could pose a contamination risk are dry cleaners, gas stations, and industrial facilities. The findings of the perimeter survey are presented in Section 5.17.

3.3 AERIAL PHOTOGRAPHY ANALYSIS

In 1985, the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) prepared an aerial photographic analysis of NECD that included aerial photographs dating as far back as 1950 (EPIC 1985). The EDR database search (EDR 2006c and 2006d) includes aerial photographs and historical topographs from 1952 to present (see Appendix C). The results of the 1985 USATHAMA aerial photography analysis are summarized below.

Study Section 1—The Night Soil Pits (NSPs) are visible in the 1950 aerial photograph. Two rectangular, flat features are shown as platforms. They measure 90 by 90 feet and 50 by 80 feet. Two small objects or structures are visible in the middle of the larger features. The access road to the site is overgrown, and the surrounding land is covered by shrubs. No changes are apparent in the 1955 aerial photograph. In the 1962 aerial photograph, the objects or structures on the rectangles are no longer present. Shrub growth around the site has become thicker. Areas immediately west and north of the site appear to show little or no vegetation. In the 1972 aerial photograph, the smaller rectangular feature is no longer visible. The second rectangle appears darker-toned and overgrown by vegetation. No access road is visible. The rectangular feature appears to be a rectangular pit filled with dark-toned standing liquid in the 1975 aerial photograph. The northern and western edges of this pit show possible scattered refuse. In the 1981 aerial photograph, the pit contains standing liquid. The west side of the pit now shows a shallow mound of light-toned, mottled material, approximately twice the width of the pit. The material extends to the edge of the standing liquid. An access path from the road is visible, but does not appear to be frequently used.

Study Section 2—The five production lines at the RDX Manufacturing Area (RDX-MA) are visible in the 1950 aerial photograph. No signs of spills or stains are visible. No changes are apparent in the 1955 or 1962 aerial photographs. In the 1972 aerial photograph, the RDX-MA appears to have been inactive for several years. Several buildings were removed, but the foundations are visible in the 1975 aerial photograph. Pipelines and some buildings are still intact. In the 1981 aerial photograph, the RDX-MA has the appearance of several years' inactivity. Several dark-toned areas have appeared around abandoned structures and lines. These dark areas probably represent new vegetation colonizing ground that was disturbed during the demolition of the RDX-MA in 1977.

Study Section 3—No significant features were noted by the Environmental Photographic Information Center (EPIC).

Study Section 4—The TNT Burning Ground (TNT-BG), Gypsum Sludge Basins (GSBs), and Red Water Ash Basins (RWABs) do not exist in the 1950 aerial photograph (these structures did not exist until the 1970s). The RDX Burning Ground (RDX-BG) appears active in the 1955 aerial photograph. Most of the site is covered by numerous access roads and shows light tones of sparse, recently disturbed vegetation. Two possible incinerators are visible at the RDX-BG, as well as two structures. An earthen berm was built at the south end of the RDX-BG. Dark-toned features may denote possible burning or burned material disposal. Two shallow trenches running east-west are also visible at the RDX-BG. In the 1962 aerial photograph, the RDX-BG has almost completely revegetated. The structures and roads are still in place, but one possible incinerator has been removed. In the 1972 aerial photograph, both burning grounds show signs of activity. The RDX-BG now contains a large area of light-toned refuse. The berm has been destroyed and apparently graded into two mounds, the function of which is unknown. One mound appears to hold a trench, and the other has dark material or vegetation on its top. The site generally appears to be scarred from grading. Southwest of the RDX-BG, the TNT-BG appears to have been constructed, but not yet used. A rectangular area is bounded by a fence and a larger, rectangular ditch. A ground scar, a building, and new access trails mark its recent activity, though no signs of burning are present. The GSBs, RWABs, and Pollution Control Center Retention Pond (PCCRP) are present, but empty. In the 1975 aerial photograph, the RDX-BG is inactive and almost completely revegetated. The TNT-BG is active; the road system has expanded onsite, and several unidentified

objects are stored inside the fence. A second building has been erected west of the first building. Several ground scars are present. The GSBs are filled with standing liquid. The western half of each RWAB is filled with light-toned material. The eastern half of each basin is dark and may contain standing liquid or dark-toned material. The RWAB drainage pond contains a dark-toned liquid. In the 1981 aerial photograph, the burning grounds are inactive. Revegetation is occurring at the western burning ground. Part of the RDX-BG, which was formerly covered with light-toned refuse, appears to have sparse vegetation. This may be due to recent grading or inhibition of plant growth. The PCCRP contains standing liquid. The northern GSB appears almost dry and contains material that varies from light to dark gray tones. The southern basin may contain standing liquid or sludge. The three RWABs appear as one large basin at this time. These basins are filled with a dark standing liquid, probably accumulated rain water. The amount of red water ash present is concealed by this liquid. The RWAB drainage pond also is filled, and there is a small ground scar west of the pond.

Study Section 5—The TNT Manufacturing Area (TNT-MA) is not visible in the 1950, 1955, or 1962 aerial photographs. In the 1972 aerial photograph, the site appears completely constructed, but is reportedly not yet operating. The TNT lines were in active manufacturing status from April 1973 to April 1974. A probable dark-toned ground stain is visible in the 1975 aerial photograph near the red water destruction area, where a red water spill allegedly occurred in 1973 or 1974. The 1981 aerial photograph shows that the site has been inactive for several years. The facilities appear unchanged, but vegetation around many parts of the TNT-MA appears cut back or removed. A ground stain and the location of an oleum spill are noted.

Study Section 6—No significant features were noted by EPIC.

Study Section 7—Several ground scars are visible in the area of the Closed Sanitary Landfill (CSL) in the 1950 aerial photograph. Probable open trenches are visible in the area of the landfill. The landfill area shows sparse vegetation. Light-toned refuse is piled at the southwestern corner of the Construction Debris Dump (CDD). In the 1955 aerial photograph, the landfill area is covered with more vegetation. Several ground scars remain visible, but are revegetating. The probable trenches are apparently filled and revegetated. Possible equipment and large objects are visible near the landfill area. Access roads to the DWBG are visible. Light-toned mounded material and burning cages for administrative waste are present. Light- and dark-toned refuse is piled throughout the CDD. Access roads to the Decontaminated Waste Burial Grounds (DWBG) have been established. Light-toned mounded material is present at the west end of the DWBG. Burning cages for administrative waste are present. In the 1962 aerial photograph, a dark-toned pit is visible in the northwest area of the DWBG. The area in general is heavily scarred. The piled refuse at the CDD appears to have been either graded or removed. The CDD area appears almost flat. Two ground scars and an access road are still visible. Revegetation is occurring throughout the CDD. In the 1972 aerial photograph, the landfill has expanded to the east, where a trench with refuse, a patch of disturbed ground, and a series of linear ground scars are visible. The possible equipment and large objects are no longer onsite. The western side of the DWBG is revegetating, but still appears scarred. A dark-toned area is visible along one access road. The pit has been filled. The landfill was reportedly closed in 1977. In the 1981 aerial photograph, scattered unidentified waste is visible in the western area and traces of old ground scars are prevalent throughout the eastern portion of the landfill. The DWBG and CDD areas are inactive and revegetating.

Study Section 8—A possible holding pond, coal storage, and cinder and fly ash disposal areas are evident in the 1950 aerial photograph, which is subsequent to the production of heavy water from 1943 to 1946. In the 1955 aerial photograph, the Chemical Plant is in active production of heavy water. Three holding ponds are visible south of the plant; these contain wastewater from heavy water production and the collection of boiler blowdown. Ground scars are visible near two buildings. Coal storage has grown in size, as has the cinder and fly ash disposal area. More buildings have been constructed on the eastern side of the site. An open storage area among the new buildings contains probable equipment and

vehicles. In the 1962 aerial photograph, the Chemical Plant is in active production of VX. New features onsite include VX filling, storage, assembly buildings, and VX storage tanks. The site appears inactive in the 1972 aerial photograph. Approximately 800 ton containers (TCs) of VX are in four rows of open storage on the western side of the site. The easternmost holding pond has been disturbed and freshly ditched into the adjacent tributary of Little Raccoon Creek. In the 1975 aerial photograph, the site remains inactive and the VX TC storage area has been censored on the imagery. The site remains inactive in the 1981 aerial photograph and no significant changes are noted.

Study Section 9—No significant features were noted by EPIC.

Study Section 10—No significant features were noted by EPIC.

Study Section 11—No significant features were noted by EPIC.

Study Section 12—No significant features were noted by EPIC.

Study Section 13—No significant features were noted by EPIC.

3.4 RECORDS REVIEW

The completion of the ECP Report is, in large part, the product of a review and compilation of existing documentation. The following section provides standard environmental record sources, as well as additional record sources.

3.4.1 Standard Environmental Record Sources

EDR conducted a search of state and Federal environmental databases for the NECD property and any listed sites within 1 mile of the NECD boundary (EDR 2006a). A search distance of 3 miles from the center of NECD was selected to ensure that all sites within 1 mile of the NECD boundary would be investigated. A list of databases searched is provided below and the complete search results are provided in Appendix C. No sites other than NECD were identified in the database search.

- Federal Databases
  - NPL (Superfund)
  - CERCLIS List
  - CERCLIS NFRAP List
  - Corrective Action Report List
  - RCRA TSDF List
  - RCRA Generators List
  - Emergency Response Notification System List
  - Hazardous Materials Information Reporting System
  - Engineering Controls Sites List
  - Sites with Institutional Controls
  - DOD Sites
  - FUDS
  - Brownfield Sites Listing
  - Superfund Consent Decrees
  - ROD Sites
  - Uranium Mill Tailings Sites
  - Open Dump Inventory
  - Toxic Chemical Release Inventory System
  - TSCA
  - FIFRA/TSCA Tracking System

  - Section 7 Tracking Systems
  - Integrated Compliance Information System
  - PCB Activity Database System
  - Material Licensing Tracking System
  - Mines Master Index File
  - Facility Index System/Facility Registry System
  - RCRA Administrative Action Tracking System
- State and Local Databases
  - State Hazardous Waste
  - State Brownfields
  - State Landfill and/or Solid Waste Disposal Site Lists
  - State Leaking UST List
  - State Registered UST List
  - State Registered AST List
  - State Spill Sites List
  - Manifest Data
  - Sites with Activity Use Limitations
  - State VCP List Site
  - Drycleaners List Sites
  - Permitted Sources and Emissions Listings
  - Tier 2 Facility Listing
  - Registered Bulk Fertilizer and Pesticide Storage Facilities.

3.4.2 Additional Record Sources

Reasonably accessible Army environmental documents were reviewed to investigate land uses at the site. Available information on past land uses and their potential impacts was assessed. The following additional documents and resources were reviewed as needed to supplement information that had been compiled previously in the HRR, Programmatic Environmental Review (PER), RCRA Facility Investigation (RFI), and the geographic information system (GIS) database:

- EPIC report
- PCB reports
- Pesticide reports
- Radiological assessments
- Environmental documents and files from the U.S. Army Environmental Command (USAEC) website
- County records
- Copies of permit applications.

3.5 INTERVIEWS

Several interviews of key facility employees were conducted to help identify environmental conditions at the installation. The interviews included topics of general environmental interest and specific areas of interest identified during the records review and VSI. Table 3-5 lists the interviews that were conducted. Agricultural lessees were interviewed to identify activities involving hazardous substances and petroleum products and their disposal on agricultural lease parcels. Figure 3-2 shows the agricultural lease parcels at NECD. Copies of the interview reports are included in Appendix E. Pertinent information regarding environmental impacts is included in Section 5. In addition to those

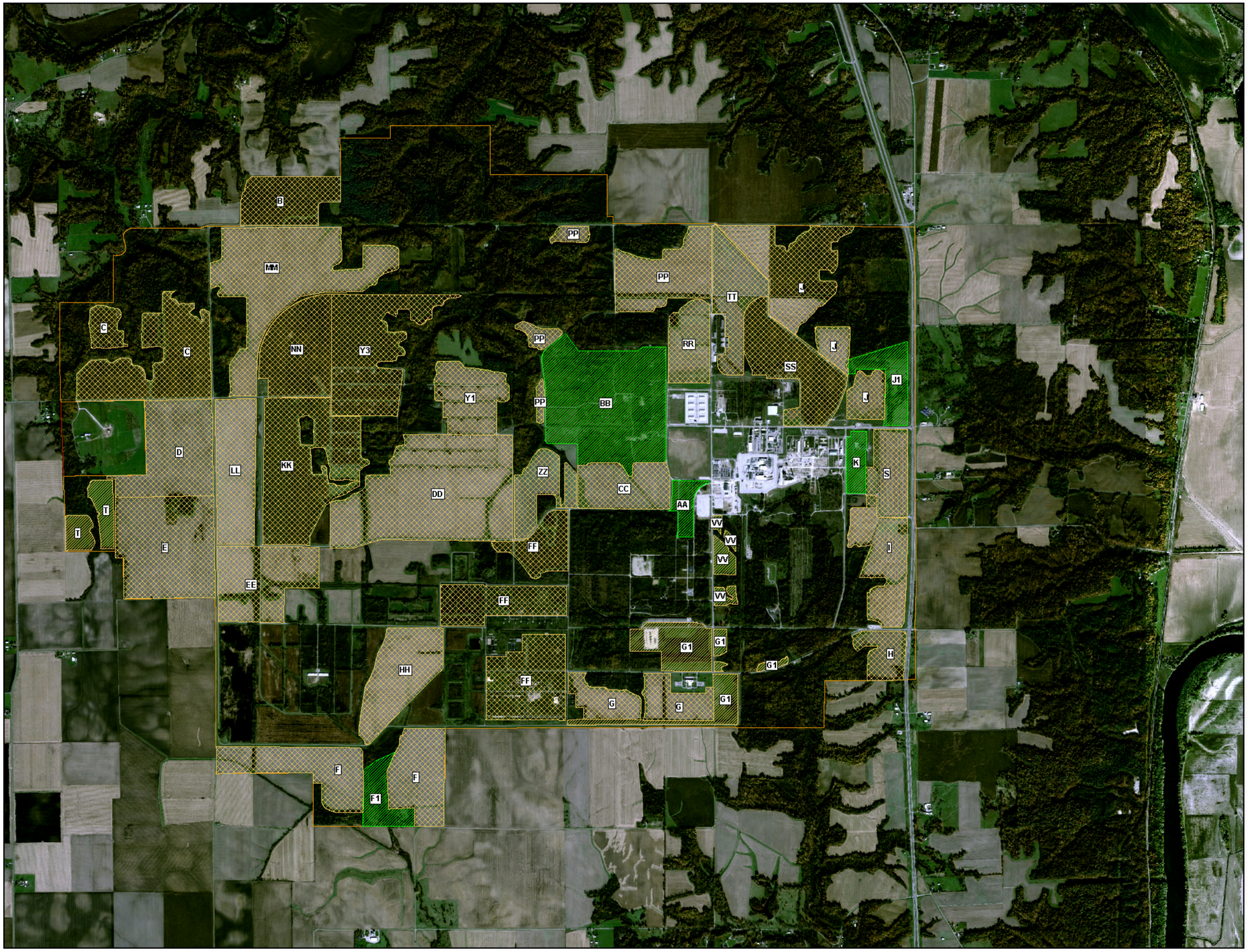
listed in Table 3-5, other personnel were contacted to discuss specific issues, and these contacts are referenced in this report where appropriate.

Table 3-5. List of Interviews

Title	Years Familiar with Study Sections
Former TVA Liaison Officer	45
Mason & Hanger Head Nurse	38
Mason & Hanger Facility Engineer	7
Mason & Hanger Utility Operator	38
Mason & Hanger Environmentalist	11
Mason & Hanger Environmental Manager	22
Mason & Hanger Utility Operator	36
Mason & Hanger Engineering Technician	38
Mason & Hanger Radiation Safety Officer	30
NECDF Environmental Engineer	2
Parsons Environmental Manager	10
NECDF Engineer	12
NECD Fire Chief	28
Agricultural Lease Holder	7
Agricultural Lease Holder	1
Agricultural Lease Holder	3
Agricultural Lease Holder	8
Agricultural Lease Holder	3

3.6 DATA MANAGEMENT

The environmental conditions at the installation were evaluated facility wide, and findings were compiled in an electronic database. The database is organized by study section and facility number, where appropriate. The building forms generated from this database are included in Appendix A. Photographs were taken of all facilities and any additional areas of concern. Photographs also are organized by study section and/or facility number. A complete set of site photographs is included in Appendix B. Interviews that were conducted with NECD employees were documented. Interview forms are organized by the last name of the interviewee. These forms are included in Appendix E.



Legend

- NECD Boundary
- US Coast Guard Boundary

AGRICULTURAL LEASES

- Grazing
- Hay
- Row Crop

Note: Lettering identifies the facilities agricultural lease parcel designations.

N

0.25 0.125 0 0.25 0.5 Miles

US Army Corps of Engineers.

SAIC From Science to Solutions

AGRICULTURAL LEASE PARCELS

NEWPORT CHEMICAL DEPOT
NEWPORT, INDIANA

PROJECT: \GIS_DATA\NECD\Projects\ECP\Phase I\Figure 3-2 Ag Leases.mxd

FIGURE: 3-2	DATE: 9/6/2007

Figure 3-1. Newport Chemical Depot Study Sections

(Oversized Figure: See file Figure 3-1.pdf on Accompanying CD)

4. PROPERTY DESCRIPTION

The environmental conditions at the installation, developed as described in Section 3, were evaluated facility wide, and findings were compiled in an electronic database. The database is organized by study section and facility number, where appropriate. This building forms generated from this database are included in Appendix A.

4.1 INSTALLATION LOCATION AND DESCRIPTION

NECD is located in Vermillion County in west-central Indiana. Vermillion County falls within the convergence of three major ecoregions of the United States. Southern Great Lakes Forests, once dominated primarily by mature stands of beech, maple, and other mesic species, historically covered land east of Vermillion County (Tetra Tech 2001). This ecoregion is also classified as the Eastern Corn Belt Plains, a classification that reflects the predominant land uses of the region today. To the north and west, vast expanses of tallgrass prairies and savanna woodlands once occupied the Central Forest/Grassland Transition Zone (Tetra Tech 2001). This area, known as the Central Corn Belt Plains, was subject to even more dramatic conversion to agricultural land use, leaving very few areas of undisturbed natural prairie or savanna communities. To the south, the more rugged terrain of the Interior River Lowlands contained Central Hardwoods Forests with a mosaic of forest species; these forests included species with more southern affinities on dry upland and seasonally flooded forest bottomlands in the drainages of the Wabash River. Vermillion County thus can be considered ecotonal between the tallgrass prairie/oak savanna region and the eastern deciduous forest (Hedge and Bacone 1994).

NECD currently occupies approximately 7,136 acres, most of which is enclosed by a fenced boundary. This acreage total, which differs from historically cited numbers, was determined in conjunction with the USACE Real Estate Division using the sources provided in Table 4-1. The property's main features include active and inactive buildings, roads, leased agricultural land, woodlands, and four streams.

Table 4-1. NECD Facility Acreage and Sources

NECD Facility Parcel	Acres	Source
Eastern Railroad Spur	41.6	1
Ranney® Well Parcel	71.2	2
Coast Guard	100.62	3, 4
NECD	7023.1	4, 5, 6, 7, 8
Total (including Coast Guard Parcel)	7236.5	
Total (excluding Coast Guard Parcel)	7135.9	

Sources:
1. NAAP Right of Way and Track Map 8/1/1942
2. USGS Quadrangle 1978
3. Interpretation of hand-drawn Mason & Hanger edits on USGS topo map
4. SAIC-collected satellite imagery 10/30/2003
5. Interpretation of supplied Mason & Hanger CAD maps
6. USACE Real Estate Investigation survey 8/9/1991 and 2007 discussions with USACE Real Estate Division
7. Indiana State Highway Commission Right of Way Plat 9/11/1972
8. T. Crowley, Jr. and Associates Survey 2/1991

Active buildings include facilities formerly used to store the onsite chemical agent inventory, as well as administrative, security, and maintenance buildings used to support the military mission. These buildings are described in Table 4-2 (note that in the table building numbers are shown preceded by the study section numbers). Information about building construction materials listed in Table 4-2 was obtained from historical property files. Information was updated based on the VSI. Activities associated with the NECDF mission have been constructed west of the site of the former VX production plant in the east-central portion of NECD. Inactive buildings include facilities associated with former production of TNT and RDX. Current land use designations are provided in Table 4-3. The acreage in Table 4-3 does not include Study Sections 12 and 13 and additional acreage outside the installation fence, since these areas have not been designated. The total facility acreage is listed as approximate; a survey would be required to obtain accurate boundary and acreage data. NECD is not an EPA National Priorities List (NPL) site and no sites within NECD have been designated as NPL sites.

4.2 HISTORICAL LAND USE

On a more local scale, NECD is located along the boundary between the Grand Prairie and Central Till Plains natural regions of Indiana (Homoya et al. 1985). The portions of these two natural regions at NECD are defined further as the Grand Prairie and Entrenched Valley sections of their respective region. Prior to European settlement and the modern development of west-central Indiana, vegetation within the Grand Prairie Section most likely consisted of extensive areas of tallgrass prairie dominated by species such as big bluestem, Indian grass, switchgrass, little bluestem, and side-oats gramma on well-drained to mesic sites (Homoya et al. 1985). Topographic swales, sloughs, and other landscape depressions on the uplands probably supported wet prairies dominated by species such as prairie cordgrass, big bluestem, bluejoint grass, and water parsnip. Oak savannas and open oak-hickory woodlands would have been found on drier sites and slopes, with closed forest communities restricted to protected mesic ravines and floodplains. Virtually all of the rich prairie soils in the area were converted to agricultural land uses during the period of European settlement (Hedge and Bacone 1994, Homoya et al. 1985); these areas are now used primarily for intensive production of corn, soybeans, and livestock. Historical practices of livestock grazing and clearing of timber for agriculture significantly reduced the extent and ecological integrity of savanna and woodlands across the region. Fire exclusion has fostered additional significant changes in the composition and structure of the remaining savannas and woodlands, a condition that has been exacerbated by invasions of nonnative species such as multiflora rose and bush honeysuckles.

A powder mill was in operation in the early 1900s on the west side of Opedee Road, straddling the railroad switch track running west to the Wabash Ordnance Plant 1 mile west (Study Section 12). An explosion occurred on May 4, 1904 and four mill employees were killed. All of the powder kegs stored in the building were consumed in the explosion and the surrounding weeds caught fire. The blaze was extinguished by local firefighters and the mill ceased operations after that fire.

4.3 FACILITY HISTORY

On November 14, 1941, the War Department was granted authorization to purchase 21,986 acres near Newport, Indiana, along State Highway 63 to the Illinois state line in Vermillion County for the construction of an RDX production facility. The new plant was established on February 5, 1942 as the Wabash River Ordnance Works. The five-line RDX facility construction was completed in October 1943 by E.I. du Pont de Nemours and Company (du Pont), who also was contracted to operate the facility and produce the explosive compounds RDX and Compositions A, A2, A3, B, C2, C3, C4, and D2. Production was subsequently terminated and the facility was placed on standby status in September 1946.

During this period of buildup, authorization to construct a smokeless powder plant was received. However, the project was canceled and construction was halted in November 1942, just 5 months after beginning work, with the smokeless facility only 21 percent completed.

Table 4-2. Description of Buildings

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
1-00722J	Saw Shed	629	1942	Corrugated metal on a concrete foundation.
1-007708	Guard House at Vehicle Gate 8	80	1974	Cinder block on a concrete foundation.
1-014171	Richmond Magazine 1	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014172	Richmond Magazine 2	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014173	Richmond Magazine 3	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014174	Richmond Magazine 4	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014175	Richmond Magazine 5	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014176	Richmond Magazine 6	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014177	Richmond Magazine 7	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014178	Richmond Magazine 8	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-014179	Richmond Magazine 9	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141710	Richmond Magazine 10	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141711	Richmond Magazine 11	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141712	Richmond Magazine 12	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141713	Richmond Magazine 13	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
1-141714	Richmond Magazine 14	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141715	Richmond Magazine 15	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141716	Richmond Magazine 16	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141717	Richmond Magazine 17	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141718	Richmond Magazine 18	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141719	Richmond Magazine 19	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141720	Richmond Magazine 20	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141721	Richmond Magazine 21	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141722	Richmond Magazine 22	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141723	Richmond Magazine 23	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141724	Richmond Magazine 24	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141725	Richmond Magazine 25	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141726	Richmond Magazine 26	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141727	Richmond Magazine 27	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
1-141728	Richmond Magazine 28	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141729	Richmond Magazine 29	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141730	Richmond Magazine 30	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141731	Richmond Magazine 31	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141732	Richmond Magazine 32	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141733	Richmond Magazine 33	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141734	Richmond Magazine 34	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141735	Richmond Magazine 35	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141736	Richmond Magazine 36	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141737	Richmond Magazine 37	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141738	Richmond Magazine 38	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141739	Richmond Magazine 39	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141740	Richmond Magazine 40	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141741	Richmond Magazine 41	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
1-141742	Richmond Magazine 42	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141743	Richmond Magazine 43	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141744	Richmond Magazine 44	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141745	Richmond Magazine 45	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141746	Richmond Magazine 46	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141747	Richmond Magazine 47	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141748	Richmond Magazine 48	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141749	Richmond Magazine 49	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141750	Richmond Magazine 50	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141751	Richmond Magazine 51	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-141752	Richmond Magazine 52	1,603	1942	Concrete foundation floor, side and rear walls. Front walls are wood with asbestos sheeting and siding. Roof is gypsum rock sheeting laid on wooden rafters. Earth mounds against rear and side walls.
1-00TC77	Target Shed at Firing Range	140	1942	Corrugated steel on a concrete foundation.
2-00733C	Administrative Office at RDX Magazines	629	1942	Wood on a concrete foundation.
3-00701A	Guard House at Vehicle Gate 1	213	1952	Cinder block on a concrete foundation.
3-00729A	Hazardous Waste Storage	4,048	1942	Corrugated steel building with a wood beam roof on a concrete pad. The floor is impervious with an epoxy coating.
3-00729B	Hazardous Waste Storage	4,048	1942	Corrugated steel building on a concrete pad.
3-00729C	Warehouse	4,048	1942	Corrugated steel building on a concrete pad.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
3-00729D	Warehouse	4,048	1942	Corrugated steel building on a concrete pad
3-00729E	Warehouse	4,048	1942	Corrugated steel building on a concrete pad.
3-00738A	Warehouse	15,976	1942	Wood siding, concrete pad.
3-01401A	Warehouse	7,796	1942	Concrete floor and foundation.
3-01401B	Warehouse	7,796	1942	Concrete floor and foundation.
3-01401C	Warehouse	7,796	1942	Concrete floor and foundation.
3-007705	Guard House at Vehicle Gate 4	33	1974	Cinder block on a concrete foundation.
3-0A3200	Access Control Facility	1,046	2002	Concrete structure.
3-0A3301	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3302	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3303	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3304	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3305	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3306	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3307	Igloo	300	2002	Poured cement walls with corrugated steel frame.
3-0A3308	Igloo	300	2002	Poured cement walls with corrugated steel frame.
4-00224B	Warehouse	3,213	1942	Wood building on a concrete foundation. Debris at doorway blocked the entrance. Stairway separating from the building.
5-000729	TNT Pollution Control Area Maintenance Shop	800	1951	Concrete foundation.
5-003001	Acid QA Lab & Office (TNT Lab/Office)	9,644	1972	Yellow block on a concrete foundation. Many empty rooms and labs with some equipment remaining. All floor tiles have been removed. Roof leaking.
5-003005	Maintenance Warehouse	9,264	1972	Yellow block on a concrete foundation.
5-003008	Storage Shed	121	1972	Yellow block on a concrete foundation.
5-003022	Acid Manufacturing Plant	699	1973	Yellow block on a concrete foundation. Structure appears to be in the early stages of demolition.
5-003063	Acid Manufacturing Plant	400	1972	Yellow block on a concrete foundation. The structure appears to be intact; however, the field in which it stands is overgrown.
5-004011	Heat Plant Building	15,093	1973	Yellow block on a concrete foundation. Building has been cannibalized and some walls have been removed.
5-004123	Water Supply Building	2,295	1971	Yellow block on a concrete foundation with water supply piping in place.
5-004261	Water Tank	NA	1969	Water tank; exterior in good condition.
5-006192	Acid Manufacturing Plant	3,300	1971	Yellow block on a concrete foundation. East wall is missing. Structure appears to be in the early stages of demolition.
5-009011	Lab Building	1,352	1973	Yellow block on a concrete foundation. Lab equipment inside.
5-009111	Change House	11,634	1972	Yellow block on a concrete foundation, lockers and showers inside.
5-009531	Explosive Manufacturing Plant	600	1973	Concrete block walls on a concrete pad.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
5-009532	Explosive Manufacturing Plant	600	1973	Concrete block walls on a concrete pad.
5-009533	Explosive Manufacturing Plant	600	1973	Concrete block walls on a concrete pad.
5-009534	Explosive Manufacturing Plant	600	1973	Concrete block walls on a concrete pad.
5-009535	Explosive Manufacturing Plant	600	1973	Concrete block walls on a concrete pad.
5-009631	Finishing Equipment Room – F&P Line 1	1,200	1973	Concrete block walls on a concrete pad.
5-009632	Finishing Equipment Room – F&P Line 2	1,200	1973	Concrete block walls on a concrete pad.
5-009633	Finishing Equipment Room – F&P Line 3	1,200	1973	Concrete block walls on a concrete pad.
5-009634	Finishing Equipment Room – F&P Line 4	1,200	1973	Concrete block walls on a concrete pad.
5-009635	Finishing Equipment Room – F&P Line 5	1,200	1973	Concrete block walls on a concrete pad.
5-009651	Box Unloading/ Assembly – F&P Line 1	NA	1973	Concrete block walls on a concrete pad.
5-009652	Box Unloading/ Assembly – F&P Line 2	NA	1973	Concrete block walls on a concrete pad.
5-009653	Box Unloading/ Assembly – F&P Line 3	NA	1973	Concrete block walls on a concrete pad.
5-009654	Box Unloading/ Assembly – F&P Line 4	NA	1973	Concrete block walls on a concrete pad.
5-009655	Box Unloading/ Assembly – F&P Line 5	NA	1973	Concrete block walls on a concrete pad.
5-009811	Shipping/ Receiving Facility	1,936	1973	Wood building, concrete pad.
5-009812	Shipping/ Receiving Facility	1,936	1973	Wood building, concrete pad.
6-00104C	Warehouse	3,161	1942	Corrugated steel on a concrete foundation.
6-00121A	Warehouse	23,040	1942	Corrugated steel on a concrete foundation.
6-00121B	Warehouse	23,040	1942	Aluminum or steel siding on a concrete foundation.
6-00121C	Warehouse	23,040	1942	Aluminum or steel siding on a concrete foundation.
6-00223A	Warehouse	80,600	1942	Corrugated steel on a concrete foundation with fire walls, five bays.
6-00227A	Warehouse (Tool Crib)	4,500	1942	Corrugated steel on a concrete foundation with several compartments inside.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
6-00227B	Warehouse	4,500	1942	Corrugated steel on a concrete foundation with storage bins inside.
6-00227C	Warehouse	4,500	1942	Corrugated steel on a concrete foundation.
6-00227D	Warehouse	4,500	1942	Corrugated steel on a concrete foundation.
6-00255A	Warehouse	2,032	1942	Corrugated steel on a concrete foundation.
6-007700	Administration	39,031	1973	Two-story yellow block building with basement on a concrete foundation.
6-007702	Vehicle Storage	755	1973	Yellow block on a concrete foundation.
6-0TC095	Storm Shelter	1,254	1942	Concrete structure on a concrete foundation.
7-00617A	STP Sample Building	714	1974	Cinder block on a concrete foundation.
7-006048	Dechlorination Building	64	1974	Concrete block walls on a concrete pad.
7-006052	STP (inactive)	64	1977	Metal buildings on a concrete pad.
7-006053	STP	64	1977	Metal building on a concrete pad.
7-006173	Blower Building	480	1972	Concrete block walls on a concrete pad.
7-006174	Building Lift Station #1 Aux Pump	144	1974	Metal building on a concrete pad.
7-006178	Emergency Generator Building	320	1984	Concrete block walls on a concrete pad.
8-0103B6	Propane Air Station Building	1,385	1951	Corrugated steel on a concrete foundation.
8-000146	Magazine	1,068	1961	Concrete foundation, walls, and ceiling.
8-000147	Magazine	1,068	1961	Concrete foundation, walls, and ceiling.
8-000303	Vault Storage Building	1,890	1951	Cinder block on a concrete foundation.
8-00308A	RDX Sulfuric Acid Regeneration (SAR)	14,604	1943	Brick on a concrete foundation.
8-00401A	Power House	53,226	1942	Open steel frame structure with concrete floor.
8-00402A	Reservoir	59,428	1942	Steel siding on a concrete foundation. Two-story in-ground structure. Reservoir is 16.5 feet deep and holds 7.8 MG.
8-00412A	Reservoir Pump House	5,869	1942	Two-story brick/block structure on a concrete foundation.
8-000510	Water Tank	NA	1942	Water tank with heavy paint peeling on exterior.
8-00702A	Telephone Exchange Building	1,385	1942	One-story brick structure on a concrete foundation.
8-00704A	Eng Service Office	1,563	1942	Yellow shingled siding on a concrete foundation.
8-00704F	Storage Building	1,564	1942	Concrete building, concrete pad.
8-000706	Maintenance Shop	6,585	1942	Metal building, concrete pad.
8-00707C	Change House	3,239	1942	Yellow shingled siding with a tile floor.
8-00707E	Boiler Room	150	1995	Yellow concrete block, concrete pad, with a float roof.
8-0707BB	Office Building	3,200	1942	Yellow shingled siding. Leaking roof, interior ceiling damaged.
8-0707CC	Guard Headquarters	3,814	1942	Yellow shingled siding, concrete pad.
8-00709A	Fire Headquarters Building	2,580	1942	Yellow shingled siding on a concrete foundation.

Table 4-2. Description of Buildings (Continued)

Building Number	Building Name	Area (ft^2)	Year of Construction	Construction Materials
8-00709C	Boiler Building	124	1995	Cinder block on a concrete foundation.
8-000710	Warehouse	18,000	1951	Corrugated steel on a concrete foundation.
8-000713	Warehouse	7,200	1961	Corrugated steel on a concrete foundation.
8-00713A	Procurement/ Stores	16,080	1942	Metal building, concrete pad.
8-00713B	Warehouse	15,410	1942	Corrugated metal on wooden pylons, unstable condition.
8-00714A	Material Shed	6,497	1942	Concrete block.
8-000715	Maintenance Shop	7,280	1951	Corrugated steel on a concrete foundation.
8-00715A	Engineering/ Housing Maintenance Shop	2,700	1942	Yellow corrugated steel on a concrete foundation.
8-000716	Warehouse	3,600	1951	Corrugated steel on a concrete foundation.
8-00716A	Vehicle Maintenance Shop	5,560	1942	Yellow steel siding on a concrete foundation containing service equipment.
8-00716D	Vehicle Maintenance Shop	3,151	1942	Yellow shingled siding on a concrete foundation. Five bays.
8-00716F	Boiler House	150	1942	Concrete block, concrete pad, attached to Building 716A.
8-00716G	Boiler House	124	1995	Concrete block, concrete pad.
8-00717A	Maintenance Building	31,200	1942	Corrugated steel on a concrete foundation.
8-00717B	Generator Building	840	1995	Yellow block on a concrete foundation.
8-00722A	Pesticide Storage Building	1,200	1942	Yellow shingled siding on a concrete pad, mixing hood inside.
8-00722S	Warehouse	3,864	1942	Steel siding, shingled roof.
8-00723A	Chemical Operations	6,744	1942	Steel siding, concrete slab.
8-00725A	Vehicle Parking and Storage	11,392	1942	Open metal structure on pavement.
8-00726A	Storage Shed	124	1942	Corrugated metal on concrete pad.
8-00726B	Storage Shed	124	1942	Corrugated metal on concrete pad.
8-00726C	Storage Shed	124	1942	Concrete block on concrete pad.
8-00726D	Storage Shed	1,200	1971	Corrugated steel (three walls) on a concrete foundation.
8-00733K	Emergency Vehicle Storage & Training Building	12,800	1942	Yellow corrugated siding, concrete pad.
8-00739A	Warehouse	4,094	1942	Yellow shingled siding, concrete pad.
8-03036A	Propane/Air Station	400	1998	Metal on a concrete foundation.
8-03036B	Propane/Air Station	266	1998	Metal on a concrete foundation.
8-0P3013	Guard House at NECDF	2,000	2007	Concrete on a concrete foundation.
13-004041	Ranney® Well #1	163	1942	Concrete structure.
13-004042	Ranney® Well #2	163	1942	Concrete structure.
13-004043	Ranney® Well #3	163	1942	Concrete structure.

Table 4-3. Land Use Designations

Use Designation	Acres	Percent
Unimproved Grounds	6,338	91
Agricultural Outleasing	2,841	41
Forestry	2,098	30
Wetlands	213	3
Prairie Restoration Areas	336	5
Miscellaneous Wildlife Areas	850	12
Semi-improved Grounds	578	8
Improved Grounds	80	1
Total	**6,996**	**100**

Source: Mason & Hanger 2006a

Note: Acreage does not include property in Study Sections 12 and 13 or uncategorized property outside the installation fence.

As part of the Wabash River Ordnance Works during the 1943-44 timeframe, du Pont constructed and then operated a heavy water plant, which was part of the now famous "Manhattan Project." At the end of WWII in 1946, this plant also was placed on standby status. In addition, most of the land was sold after WWII and the installation was reduced to almost its present size.

In 1951, the Liberty Powder Defense Corporation of East Alton, Illinois, rehabilitated two of the five RDX lines. They produced RDX; Compositions A3, A4, C3, C4, and D2; M5A1 Blocks; and M37 Demolition Kits from August 1951 until March 1957. At the same time, du Pont constructed the heavy water plant, utilizing a Girdler-Spevack (GS) process, distillation process, and final electrolyte step. The heavy water plant was constructed in 1952 and manufactured heavy water until June 1957 (Mason & Hanger 1994).

No production occurred between 1957 and 1960 and, in 1961, Liberty Powder was liquidated and absorbed by its parent company, Olin Mathieson Chemical Corporation.

Between 1959 and 1961, the former site of the heavy water plant was partially razed and reconstructed for the manufacture of chemical agent VX and filling and assembly of M55 rockets and M23 mines by Food Machinery Corporation (FMC). This new area for the manufacture of chemical agent VX was known as the Newport Army Chemical Plant. VX is a lethal chemical agent. FMC manufactured chemical agent VX until 1968. On August 27, 1964, the Wabash River Ordnance Works and the Newport Army Chemical Plant were combined to form the Newport Army Ammunition Plant (NAAP).

On December 1, 1966, a permit was issued to the USCG to construct a LORAN-C Navigation System Facility on 101.2 acres outside the NAAP perimeter security fence on the west side of the installation.

As a result of the escalation in the Vietnam War, du Pont was contracted in April 1968 to design and procure production equipment for a five-line, Canadian Industries Limited (CIL) continuous process, TNT manufacturing facility. Construction began in late 1968 under the direction of the U.S. Army Corps of Engineers (USACE). Two contractors, Fegles Construction Company and C. & I. Girdler, began the work. However, these contracts were terminated and separate contracts were awarded to new contractors on a lump sum basis with USACE assuming full construction responsibilities in December 1969. Highway Electric performed most of the outside high-voltage electrical work. Chemico Corporation constructed the sulfuric acid regeneration (SAR) portion.

Meanwhile, in January 1969, FMC began transferring the chemical agent VX from bulk storage to TCs for shipment to offsite storage depots. However, in mid-1969, President Nixon issued a unilateral

decree halting production and transportation of chemical weapons, including the last two batches of VX produced at NECD. Filling operations were continued by du Pont, despite the moratorium, and the containers were placed in storage at a temporary onsite location.

By February 1973, construction of the TNT production facilities was nearly finished and start-up of production had begun. The Ammonia Oxidation Plant (AOP) for the production of weak nitric acid was brought online in February 1973, followed by the Nitric Acid Concentration (NAC) in March 1973, the TNT Production Line 1 in April 1973, and the SAR facility for the production of sulfuric acid and oleum in October 1973. Since there was a delay in startup of SAR until October 1973, sulfuric acid and oleum were shipped in to allow the TNT Production Line to start up in April 1973 (Mason & Hanger 1994).

TNT production was shifted to Line 2 until May 1974, at which time TNT production was terminated. The production and all associated support facilities were laid away in a high state of mobilization readiness.

After completing layaway operations, du Pont turned over standby mobilization operations to Uniroyal, Inc. in July 1975, at which point the du Pont contract was allowed to expire. The TNT facility was downgraded from a mobilization mission to modified caretaker status in May 1993.

From December 1976 through April 1977, the chemical agent VX in ton containers was moved from the outdoor storage lot to the Chemical Plant munitions fill building, Building 144, which was converted to a controlled storage facility to house the containers. This area was rehabilitated; modified; and provided with additional security, surety, and safety controls.

The Young and Posen Company of Cleveland, Ohio, completed salvage and demolition of 57 explosives-contaminated RDX production and production support buildings in 1977. All salable materials were salvaged and the remaining material was burned onsite in accordance with the condition of an open burning variance granted by the Indiana State Board of Health, Air Pollution Control Division (Mason & Hanger 1994).

Activities of the U.S. Department of Energy (DOE) and its predecessor agencies (the Manhattan Engineer District [MED], AEC and Energy Research and Development Administration [ERDA]) have not generally been subject to regulation by the Nuclear Regulatory Commission (NRC) or the associated licensing requirements. In addition, operations involving radium-226 and accelerator produced radionuclides were not subject to the authority of NRC until 2005 and 11(e)(2) byproduct materials (i.e., uranium mill tailings) were not subject to control by NRC until 1978. As such, NRC historical information would not be expected to include these types of activities. The Army controlled operations that were not subject to regulation by NRC were regulated using Department of the Army Radiation Permits (DARPs) and Department of the Army Radiation Authorizations (DARAs) issued pursuant to AR 385-11 and AMC Regulation 385-25.

In 1996, the installation's name was changed to Newport Chemical Depot to reflect the current operations and storage responsibilities. TVA operated a hot gas decontamination unit from 1997 to 1998 at the TNT area and destroyed explosive residue from the Former TNT Manufacturing Plant. In 1999, TVA was contracted to demolish the Former Chemical Agent VX Production Plant.

The NECDF systems contract was awarded to Parsons (originally the Parsons/Allied Signal Team) in February 1999 for the design, construction, operation, and closure of the pilot facility. The NECDF pilot facility included a chemical demilitarization building, supercritical water oxidation area, and associated support facilities adjacent to the existing chemical agent storage building (Building 144). Construction of the facility began in March 2000. The tentative schedule called for pre-operational testing to begin in 2002, with pilot testing of live agents to begin in March 2003. Environmental impacts of the pilot testing project were evaluated in an Environmental Impact Statement (EIS), *Pilot Testing of*

Neutralization/Supercritical Water Oxidation of VX Agent at Newport Chemical Depot, Indiana (U.S. Army 1998).

After September 11, 2001, Operation Roving Osprey (ORO) was initiated to build hardened structures for the storage of chemical agent VX. There was also a change in the VX neutralization process. The contract for design build of ORO was awarded to Mason & Hanger Group at the end of September 2001. Construction started in March 2002. Construction was completed at the end of September 2002. The TCs were moved from Building 144, a steel warehouse, to the eight igloos in October 2002. The fenced area of ORO covers approximately 11.1 acres (Mason & Hanger 2006b).

NECDF is designed for the sole purpose of destroying the chemical agent stored at NECD. The facility was completed in June 2003. In May 2005, Parsons began destroying NECD's stockpile of VX. NECD surpassed the 50-percent destruction milestone on April 26, 2007 (NECD 2007) and completed all destruction in August 2008.

The USCG permit area was transferred to the USCG effective October 4, 2006. This facility remains in operation at the present time. The USCG property is shown in Figure 3-1.

The most recent NECD operations include (SAIC 2003a):

- Storing the chemical agent VX in a safe and secure manner
- Participating in the Chemical Stockpile Demilitarization Program mandated by Congress
- Participating in the Nonstockpile Chemical Material Program (NSCMP), which includes the demolition of the former nerve agent VX production facility
- Participating in the Chemical Stockpile Emergency Preparedness Program (CSEPP)
- Conducting and maintaining an environmental compliance, investigation, and remediation program, and maintaining and conducting surveillance of installation facilities.

Important events in the facility's development, administration, and mission are presented in Table 4-4.

4.3.1 Process Descriptions (Industrial Facilities Only)

The military mission at NECD requires the storage, handling, use, and disposal of toxic, hazardous, and radioactive chemicals. Past manufacturing activities have resulted in known and suspected areas of environmental contamination, including soils, groundwater, surface waters, and structures. The Army has instituted an IRP at NECD to systematically identify, evaluate, and clean up sites that may have been contaminated by toxic, hazardous, or radioactive chemicals.

Potentially contaminated areas at NECD that have been investigated include the former RDX Burning Ground (RDX-BG) and RDX-MA, the former TNT-BG and TNT-MA, the GSBs and RWABs, the former chemical plant, the DWBG, CSL, NSPs, and the PCCRP. Until 1969, a deep well injection point was used to dispose of waste detoxification solution and wastewaters generated from equipment cleanup and industrial processes at the Chemical Plant. The well was deactivated in 1971 and, in 1985, it was plugged and abandoned in accordance with an EPA-approved closure plan.

Section 5.2 provides detailed information regarding the SWMUs associated with the following processes.

Table 4-4. Installation Operation History

Time Period	Activity
1942 – 1946	Installation established in 1942 on 22,000 acres as the Wabash River Ordnance Works. du Pont operated the facility to produce RDX, miscellaneous explosive compositions, red asbestos putty, nitric acid, and heavy water.
1944 – 1946	du Pont manufactured heavy water at the current chemical plant.
1946 – 1951	The RDX facility was placed on standby status and the installation was reduced to 7,098 acres. No production occurred at the site.
1951 – 1957	AEC reactivated the installation as the Dana Plant to produce heavy water; the Liberty Powder Defense Corporation rehabilitated and operated the RDX plant to produce nitric acid and miscellaneous explosive compositions.
1957 – 1960	The Liberty Powder Defense Corporation maintained the RDX plant in standby status. No production occurred at the site.
1960 – 1968	FMC constructed and operated the Newport Chemical Plant to produce the chemical warfare agent VX and fill M55 rockets, M23 mines, spray tanks, 8-inch projectiles, and artillery shells. The Wabash River Ordnance Works and the Newport Chemical Plant combined into Newport Army Ammunition Plant (1964).
1968 – 1972	The chemical plant was placed on standby status. No production occurred at the site.
1973 – 1974	du Pont constructed a five-line TNT production plant and operated two of the lines.
1975 – 1985	The TNT production plant was placed on standby status. Uniroyal, Inc. became the installation contractor and was responsible for surveillance and maintenance of installation and VX storage activities.
1986 – Present	Mason & Hanger Corporation became the installation contractor and is responsible for surveillance and maintenance of the installation and VX storage activities; the name of the installation was changed to Newport Chemical Activity in March 1995 and Newport Chemical Depot in November 1996; command of the installation is currently the responsibility of the CMA.
1997 – 1998	TVA operated a Hot Gas Decontamination Unit for the destruction of explosive residue remaining in the lines at the Former TNT Manufacturing Plant.
1999 – Present	TVA, under contract with Non-Stockpile Program Manager for Chemical Demilitarization (NS-PMCD), demolished the Former Chemical Agent VX Production Plant. Parsons under contract with Program Manager for the -Elimination of Chemical Weapons (PMECW) (formerly Program Manager for Chemical Demilitarization [PMCD]), is contracted to construct and operate NECDF to neutralize the chemical agent VX. Construction was completed in 2003 and all agent was neutralized by August 2008.

Sources: NECD 1996, SAIC 2003a, and Mason & Hanger 2006c

4.3.1.1 Heavy Water Production

The Manhattan Project's nuclear fission research included production of heavy water at what is now NECD. Facilities (the Dana Plant) were built at NECD under a heavy blanket of secrecy. Heavy water is deuterium-enriched water used as a moderator in some nuclear reactions. Heavy water was produced at NECD from 1944 until 1946 and from 1952 until 1957. Heavy water was produced in three steps: the GS process, distillation, and electrolysis. The byproducts of heavy water included hydrogen sulfide, which was burned off in a flare tower, and brine and sulfate salts, which were used to regenerate resins in the water treatment facility (TLI 2007).

The GS process involved a cascade of five stages operating at elevated pressure, the first stage of which contained four sets of towers in parallel. It was fed with specially treated water and it delivered product water containing 10 to 20 percent heavy water. This material was fed to the low-pressure four-stage distillation train that delivered product water containing 95 to 98 percent heavy water. This material was fed to the electrolytic plant for final concentration to required isotopic purity. From each process, a return of residue low in deuterium was made to the preceding step for reconcentration (DOE 1951).

Earthen retention basins were constructed to retain effluent water and prevent hydrogen sulfide from being carried into Little Raccoon Creek and the Wabash River (DOE 1952).

In 1958, after production of heavy water ended, the focus was on containing process gas within the GS units with minimum leakage. In 1959, the prime effort at the Dana Plant was to prepare and purge GS equipment of process gas by displacement with vaporized nitrogen (DOE 1959).

4.3.1.2 VX Chemical Agent Production

In late 1960, the Heavy Water Plant was partially razed and was reconstructed into a facility to produce the chemical nerve agent VX. VX was produced from 1961 until 1968. According to the 1985 EPIC Report, aerial photography analysis of 1962 imagery indicated that the area was in active production of VX. New features visible as part of the VX facility included VX filling, storage, and assembly buildings, as well as VX storage tanks (TLI 2007).

Agent VX is characterized as a quick acting nerve agent with a high-efficiency casualty rate. It is a persistent agent (i.e., it does not quickly evaporate under normal conditions). VX is a highly toxic lethal agent that acts as a cholinesterase inhibitor, causing rapid incapacitation and death. Agent VX, as designed under U.S. Army regulations, is a clear to slightly opaque liquid. It is odorless and tasteless with a freezing point of -59.8°F and a boiling point of 557.6°F (Material Safety Data Sheet [MSDS], dated March 15, 2006). The viscosity of VX agent is consistent with light mineral oil. Initial symptoms contracted from contact with agent VX include localized sweating and twitching when in percutaneous contact, and miosis and dimness of vision, runny nose, and tightness in the chest area when inhaled. Later symptoms are experienced from persistent contact to agent VX or when agent VX is ingested and may include nausea, lack of bowel and bladder control, diarrhea, weakness and physiological distress, difficulty breathing, and finally coma and death by cessation of breath (asphyxiation) (TLI 2007).

VX was produced at NECD in four steps. The initial step, Step 0 (high-temperature methylation), involved methane and phosphorus trichloride (TH) reacting at high temperatures to form methylphosphorus dichloride (SW). In Step I (esterification), SW generated from the initial reaction was combined with ethanol (ZS) to produce diethyl methylphosphonite (TR). The product of Step I was reacted with 2-diisopropylaminoethanol (KB) in Step II (transesterification), yielding ethyl 2-diisopropylaminoethyl methylphosphonite (QB). Building 140 was the Control Room for Steps 0, I, and II and Building 105 was the Instrument House. In the final reaction, Step III (sulfonation/isomerization), which was carried out in Building 143, QB was treated with elemental sulfur (NE) to form phosphonotionate (CV) followed by thermal isomerization to obtain the final resulting compound, VX agent (TLI 2007 and Personal Communication 2007b).

4.3.1.3 RDX Manufacturing Area

The RDX-MA consisted of five nitration lines designed to produce a total of 5,000,000 pounds of RDX per month. Nitric acid also was produced at the RDX facility. The process for producing RDX began with the nitration of hexamine, which created an RDX slurry containing approximately 15 percent suspended RDX at approximately 170°F. The slurry exited the cooler between 75° and 85°F and further cooling to between 60° and 70°F was achieved in the accumulator tank. The filtering cycle consisted of dropping cold RDX slurry onto a filter until filtrate was removed by suction. The process was repeated until 16 inches of RDX cake depth were achieved. Suction continued on the cake to remove nitric acid filtrate, which was pumped into the weak nitric acid tank for fortification by nitrogen oxides. RDX cake was washed to remove surface acid. The cake was combined in additional slurry with three times its weight of water and dropped into an agitated storage tank for pumping to the Boiling House. There, the resulting RDX compound was blended into several distinct compositions (A, A2, A3, B, C2, C3, and D2 in the 1940s; and A3, A4, C3, C4, D2, M5A1 block, and M37 demolition kits in the 1950s) using additives and explosives supplied by other ammunition plants. Aboveground piping was used to move

the material between buildings. From the filter house, batched RDX was transported along concrete walkways in buggy carts throughout the remaining production process (TLI 2007).

4.3.1.4 TNT Manufacturing Area

The TNT manufacturing plant was established in the early 1970s. The TNT Acid Area was built in 1972, but was used only for 1 year and operated until 1974. The TNT manufacturing plant in the 1970s was composed of five continuous production lines that protruded from the TNT Acid Area, including separate sulfuric and nitric acid production and storage areas, located directly to the south of the TNT-MA; however, only two lines actually were used for production (Lines 1 and 2). Construction of the plant along with all supporting facilities was completed in February 1973. The last major facility to be completed was the Pollution Control/Sellite Manufacturing facility adjacent to the SAR plant. Initial production plans indicated that 50 million pounds of TNT would be produced through April 1974. The plant only produced TNT between April 1973 and April 1974. After only 1 year of operation, the TNT manufacturing plant was placed on standby. The TNT manufacturing facilities were never again placed into operation (TLI 2007).

4.3.2 Occupancy, Lease, and Easement History

The following organizations hold easements on NECD property (TLI 2007):

- Board of Commissioners, Vermillion County (right-of-way for underground water pipeline) and Vermillion County (right-of-way for road)
- Panhandle Eastern Pipe Line Company (right-of-way for gas transmission line)
- Indiana Department of Transportation (right-of-way for roadway)
- Indiana Gas Company (right-of-way for gas pipeline)
- Indiana Department of Homeland Security (license for microwave communication tower is pending)
- USCG (right-of-way for road).

NECD owns a right-of-way to CSX Corporation's main line through a 2-mile spur along the Wabash River Valley. The right-of-way is the former site of the powder mill that exploded on May 4, 1904. Reports indicate that all of NECD's rails and ties were disposed of as excess property in 1999.

4.3.2.1 Property Leases

USCG permitted 101.2 acres at NECD in accordance with Army Permit No. DACA27-4-01-011 dated February 22, 2001. The USCG permit area was transferred to the USCG effective October 4, 2006. An Environmental Condition of Property (ECOP) was conducted in preparation for the transfer to USCG and the property was classified as Category 1. Category 1 properties are areas where no release or disposal of hazardous substances has occurred (including no migration of these substances from adjacent areas) (Mason & Hanger 2006a).

4.3.2.2 Agricultural Leases

The agricultural outleasing program at NECD has been in effect since 1943. The program provides the Army with a low-cost way to maintain unimproved grounds while supporting the sustainable management of soil and water resources. Outleasing also provides positive benefits for the local agricultural economy and generates a source of income that is used for the Army's conservation programs.

In 2007, NECD outleased 2,944 acres for agricultural production and grazing purposes. The acreage in the program has decreased from a high of 4,049 acres in 1992; since then, several erosion-prone and unproductive areas have been placed in the forestry program, restored to native prairie communities, or have had conservation buffers planted to conserve the Federally endangered Indiana Bat (*Myotis sodalis*). A total of 32 acres is outleased at the Ranney® Wells area. Leases are currently issued for 1 to 5 years. There are currently 32 leases (Tetra Tech 2001 and Mason & Hanger 2006a).

As NECD moves closer to completing its military mission, the periods of renewed leases may be shortened depending on the Army's needs and ultimate plans for retention of the installation. Leases are written in coordination with Natural Resources Conservation Service (NRCS) and are approved by natural resource professionals at the U.S. Army Joint Munitions Command. The leases then are advertised by the USACE, Louisville District every 5 years. The USACE, Louisville District administers the leases and enforces provisions of the leases through biannual inspections coordinated with the NECD Natural Resources Administrator.

Although some of the tracts border SWMUs or areas of concern (AOCs), the nine land tracts are considered Category 1 properties (i.e., areas where no release or disposal of hazardous substances or petroleum products has occurred [including no migration of these substances from adjacent areas]). EPA-registered pesticides have been used on these nine tracts of land in accordance with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) label directions. Use of EPA-registered pesticides has been the normal practice throughout the Midwest agricultural region and the Vermillion County agricultural region specifically. Therefore, potential for contaminant migration is the same as the potential would be throughout Vermillion County and the Midwest.

Tract AL-Y1 contains Richmond Magazines that were used previously to store explosives. Tract AL-FF is located interspersed around the TNT Acid Area buildings and TNT loading docks, as well as several other areas. Structures in this area are in the process of disposal and will continue to be disposed of during the term of the leases. National Environmental Policy Act (NEPA) documentation indicates LBP, asbestos, and mercury-containing fluorescent lamps have been used in the buildings.

The Indiana bat, a federally endangered species, has been found at NECD. Land acreage at NECD for agricultural purposes has been reduced to provide land for conservation buffers for the Indiana bat. NECD has worked with the U.S. Fish and Wildlife Service (USFWS) to resolve pesticide issues and a 66-foot-wide buffer strip for pesticide applications has been established between all agricultural fields and forested vegetation adjacent with potential foraging and roosting habitat. In addition, pesticide applications in gusty winds or when wind speeds exceed 5 miles per hour (mph) must be avoided along with ultra low-volume and mist pesticide applications. NECD has provided USFWS with a list of pre-approved pesticides that are acceptable for use in proximity to the Indiana bat (Earth Tech 2002).

4.3.2.3 Timber Management

Before NECD acquired private properties and constructed the installation in 1941, most timber harvesting on property now occupied by NECD was accomplished through a practice known as "high grading," which involves the selective harvesting of the most economically valuable species and best trees of best form, without regard for the residual structure or quality of the stand. Consequently, in 1941, many of the forest stands at NECD were of low vigor and consisted of poorly formed trees that were in poor health and of low commercial value. Active forest management at the installation began in 1967 in an effort to correct these unnatural and unhealthy stand conditions. From 1967 to 2004, approximately 2.6 million board feet were removed from NECD forest stands to improve the stocking rates of desirable species and to release individual trees with superior growth characteristics from undesired competition (Earth Tech 2002).

Forested areas now cover approximately 30 percent or approximately 2,083 acres of NECD. Reforestation at NECD has been accomplished through artificial plantings and natural regeneration of abandoned fields. Included are more than 420 acres that have been direct-seeded or planted with tree seedlings since 1966 (Earth Tech 2002).

The total volume of sawtimber on NECD is 4,878,260 board feet based on the forest inventory conducted in the spring of 2000. Annual growth is 3.7 percent for an estimated growth of 180,000 board feet of sawtimber per year. The estimated allowable harvest will be based on one half of the annual growth. The maximum harvest volume that will be considered over a 5-year planning period will be 450,000 board feet. The selection of individual trees for harvest is conducted by the USACE, Louisville District (Earth Tech 2002).

A limited local market also exists for firewood, and NECD currently permits cutting and collection of fallen timber for firewood (Earth Tech 2002).

4.3.3 Range Operations

The following sections present the information from the Phase 2 Range Inventory Report (e2M 2002) and the 2007 HRR (TLI 2007) regarding operational ranges as well as historical ranges.

4.3.3.1 Small Arms Range

According to the Range Inventory Report (e2M 2002), one operational range, the Small Arms Range, is located in the north-central portion of the installation and is 0.27 acres. The operational start date of this range was January 1, 1946. The range has been used for small arms munitions training and qualification since 1946.

As identified in the Range Inventory Report (e2M 2002), the types of munitions used at this range include .30 Ball M2 LKND, .38 Ball M41, 12 gauge shotgun NR7 ½ Shot, 5.56mm Ball (M16) 10/Clip, and 9mm Ball Pistol. A List of Buildings and Structures, dated June 30, 1964, indicates the presence of a target shed (Building TC-77) at the Pistol Range. Building TC-77 remains at the site.

The Installation Assessment (USATHAMA 1979) indicates that two firing ranges, one for pistols and the other for M16 rifles, were located onsite. These ranges were used by the security guards and technical escort personnel force for qualification firing. The NAAP Real Property Utilization Survey dated March 1986 depicts two ranges at the same location, although TLI, the HRR contractor, was not able to confirm the existence of the second range. Maps associated with the Real Property Utilization Survey depicted that the pistol range fired to the northwest and had a safety area that extended 5,249 feet. A portion of this safety area extended to the north of the installation boundary. The M-16 firing range fired to the southwest and had a safety area of 9,842 feet. A portion of this safety area extended to the west of the installation boundary (TLI 2007).

There were six firing points associated with the Small Arms Range. Records and Storage Department audits of ammunition were to be performed monthly to ensure inventory control, according to 1993 internal Mason & Hanger correspondence (Mason & Hanger 1993). In addition, according to Mason & Hanger internal memoranda dated 1992 and 2000, unaccounted for (found), spent, and unused cartridges have been collected and inventoried after every exercise at the Small Arms Range (TLI 2007).

According to the Installation Assessment (USATHAMA 1979), in the early 1970s, an area just south of the Small Arms Range was used to determine the vulnerability of TCs to small arms fire and small explosive charges. The HRR noted that the Security Training Coordinator for Mason & Hanger confirmed that proof-testing of clean and unused ton VX storage containers had been performed at the Small Arms Range. Proof-testing of TCs was generally believed to have been performed by members of the Explosive Ordnance Disposal (EOD) unit at NECD in the late 1960s or early 1970s. The HRR notes

that proof-testing was performed both by firing various caliber weapons at the containers and by detonating plastic explosives attached to the containers. The purpose of this activity was to test the vulnerability of the containers under various attack scenarios. The Security Training Coordinator stated that, in the fall of 2002, while conducting training exercises on post, members of the NECD security force located a TC in an area just south of the firing point for the Small Arms Range. This was brought to the attention of the NECD staff and, shortly thereafter, the container was removed (TLI 2007).

In 1993, reorientation of the direction of fire at the Small Arms Range was recommended to address concerns that small arms ammunition could possibly travel offsite at the northwest side of the installation. Modifications were made to allow for a reduced safety area danger zone (TLI 2007).

After September 11, 2001, the range was used for approximately 3 years by the National Guard members who were stationed at NECD. According to the Mason & Hanger Security Training Coordinator, weapons fired at the range by National Guard troops included both M16 and M249 Squad Automatic Weapon (SAW) rifles. As of 2006, all brass casings were to be collected and accounted for after any firing procedures at the range (TLI 2007).

In the fall of 2005, it was determined that in order to safely continue to use the Small Arms Range, the direction of fire had to be adjusted to prevent any possibility of rounds traveling beyond the installation boundary. As a result, the direction of fire for the Small Arms Range at NECD was adjusted to an azimuth of 212 degrees, which made the direction of fire south to southwest. This range adjustment ensured that rounds fired at the range would not travel beyond the installation boundary. In addition, a new berm was constructed behind the targets. The re-oriented firing range was then placed into use on May 1, 2006 (TLI 2007). No previous investigations have been conducted at the Small Arms Range.

4.3.3.2 National Guard Training Area

As a result of the research conducted by TLI for the HRR, the National Guard Training Area has been identified as a new operational range at NECD. The area consists of approximately 350 acres and is located along the northwestern boundary of the installation.

According to an interoffice letter dated April 7, 1988, the Indiana Air National Guard (ANG) from Terre Haute, Indiana, was scheduled to conduct training outside the perimeter fence on the northwestern portion of NECD on April 9 and 10, 1988. Training activities were to include the use of smoke grenades and blank ammunition for automatic weapons. According to the Mason & Hanger Natural Resources Administrator, these activities occurred outside the perimeter security fence, but within the installation boundary, between County Road 150 S and 200 S.

The 2nd Battalion of the Illinois National Guard (Danville) trained in the same area in 1996. According to a letter dated September 15, 1999, another field training activity was planned by two National Guard units; however, details regarding when and where the training was to occur were not indicated. In a letter dated December 10, 1999 to the 38th Support Battalion (Main) in Terre Haute, the Commander of NECD authorized the National Guard to use the installation property as a local training area. The letter indicated that no blank or live ammunition was permitted on the Depot. The dates listed for training in 2000 included January 8-9, February 5-6, March 4-5, March 25-26, August 19-20, and September 23-24. According to a Mason & Hanger memorandum, turkey hunting was to be prohibited in Hunt Area 5 on May 6 and 7, 2000, because of Illinois National Guard training.

The units were required to police the area for munitions before leaving, and they appeared to have done a thorough job according to the Natural Resources Administrator. The Cultural Resources Management Plan also states that various National Guard and Reserve units from Indiana and Illinois use NECD property for light infantry training. National Guard units were stationed at NECD following September 11, 2001, to provide additional security for the VX in storage. The last guard unit left NECD

in April 2004. According to the Security Manager, these units would have only participated in qualifications at the Small Arms Range and did not conduct any other training operations. Based on available information, no previous investigations have been conducted at the National Guard Training Area (TLI 2007).

4.3.3.3 Skeet Range

A skeet range was located to the northeast of the Chemical Plant area. The range appears on a map dated 1958 and based on the delineation of the range on this map, the Skeet Range encompassed approximately 0.13 acres. A security inspection of the Skeet Range trailer is noted in Guard Department shift logs dated March 13, 1975; July 7, 1975; and November 2, 1975. The log from March also notes that shooting was scheduled at the range in the afternoon. The HRR noted that the orientation of this range on the 1958 map makes it appear that firing may have been directed toward the adjacent road, which is unlikely (TLI 2007).

The Skeet Range reportedly was located near gate VG-1 (north gate), was installed for the use of one Commander, and operated for approximately 2 years. According to NECD personnel, it was used only during the 1970s (Personal Communication 2007g). However, because the range first appeared on a map dated 1958 and is noted in historical records from 1975, it is assumed the range could have been in use from the mid-1950s until the mid-1970s (TLI 2007).

4.4 INSTALLATION UTILITIES (HISTORICAL AND CURRENT)

The following sections describe each of the utility systems at NECD. The systems discussed include water, industrial sewers, sanitary sewers, stormwater management, and electricity.

4.4.1 Water Systems

The Ranney® Wells area, which supplies all water to NECD, is located on the bottomlands of the Wabash River Valley, approximately 2 miles from the eastern boundary of the installation. Three of six original wells are located on government property, of which only one has been rehabilitated and is currently active (Ranney® Well #3). The remaining three original wells still stand but are now owned by a private citizen. Seasonal flooding occurs in the Wabash River bottomlands and, in 1991, it was severe enough to knock over a pole-mounted electrical distribution line. The Indiana Department of Environmental Management (IDEM) classifies NECD as "groundwater not under influence of surface water." Water supply is available to sustain a relatively large pumping rate of 5,000 to 6,000 gallons per minute (gpm). NECD's current pumps can pump at a maximum rate of 590 gpm, which is necessary for potable and industrial use. The water from Ranney® Well #3 is pumped to a concrete reservoir (Facility 402A) that can hold more than 7 million gallons of water. The water supply is for all industrial processes, administrative facilities, and fire protection at NECD (Tetra Tech 2001 and Personal Communication 2007b).

NECD has a Community Drinking Water System, Public Water System Identification (PWSID) Number 5283014, and completes the water sampling and reporting required for Community Water Systems. The system consists of groundwater wells, pumps, storage tanks, and the covered reservoir. The water from the reservoir is not considered drinking water until it is chlorinated. No irrigation systems are present at NECD.

NECD sells raw water that comes from the reservoir to the Vermillion County jail, which is located on the east side of State Road 63 from the installation. The Vermillion County jail chlorinates their water and has their own community water system (Personal Communication 2007b).

4.4.2 Wastewater Treatment, Industrial Sewers, and Sumps

Operations at NECD produced multiple wastewater streams. The most significant sources of wastewater at NECD were the Chemical Plant Area, RDX-MA, and TNT-MA. The following sections provide details on the wastewater produced in each area. Section 5.2.1 provides additional details on the SWMUs.

4.4.2.1 Chemical Plant Area

Only treated waste from the production of agent VX was permitted to be discharged. After the wastes were detoxified in three basins within the plant (SWMUs NAAP-4, NAAP-6, and NAAP-7), the wastewaters were pumped down a Class I deep injection well. This well officially was deactivated in March 1971 and capped in December 1985 (Dames & Moore 1991b).

The Chemical Plant Retention Basins (CPRBs), SWMUs NAAP-10 through NAAP-12, were established circa 1950 within the Chemical Plant area to accept wastewater from boiler drains and the Chemical Plant Step III (production step) cooling water system (USAEHA 1986). SWMUs NAAP-10 and NAAP-11 received wastewater generated as part of the hydrogen sulfide method of heavy water production until 1957. The retention basins were designed to capture any suspended solids in the discharged wastewater. These residual materials would settle out, creating a sediment layer at the bottom of the basins. When the Chemical Plant was adapted for VX production, SWMUs NAAP-10 and NAAP-11 were used as VX retention basins to collect stormwater runoff and other drainage from the Chemical Plant facilities. SWMU NAAP-12 received wastewater from all Chemical Plant boiler blowdown activity, Chemical Plant cooling water, and wastewater from regeneration of zeolite water softeners with brine (SAIC 2003a). The CPRBs all were unlined (Dames & Moore 1991a).

4.4.2.2 RDX Manufacturing Area

In the RDX-MA, conveyance of wastewater and water for fire protection and production uses was conducted via ditches and underground piping, respectively. Open sewer ditches received wastewater from 59 individual buildings within the RDX-MA complex. Raw water resources were drawn from Ranney® water supply wells located along the western bank of the Wabash River (Study Section 13) (Dames & Moore 1991a).

4.4.2.3 TNT Manufacturing Area

TNT production resulted in five types of wastewater: red water, pink water, yellow water, acidic water, and casual water. All wastewater flowed from the nitrification and purification (N&P) buildings to the N&P settling tank area south of the buildings. Wastewater containing TNT was treated at the TNT Wastewater Treatment Facility (also called the Pollution Control Center [PCC]), which included the following units: a yellow water neutralization tank; two yellow water storage tanks; a soda ash mix tank; four pink water evaporation storage tanks; a pink water/neutralized wastewater evaporation system; red water storage tanks; a red water sump tank; seven red water destruction circulation tanks; seven red water destruction heat exchangers; seven red water destruction scrubber columns; seven red water destruction fly ash separators; seven red water destruction incinerator kilns; and three spill, leak, and rainwater collection sumps (TLI 2007).

Water from the drowning tanks and the N&P floor trenches was discharged to the acidic water settling tank, and floor washings from the sellite storage building, metering pump house, and utility building, in addition to the waste streams from the day storage tank and the fume absorption area, was piped to the casual water settling tank. These wastewaters were transferred from the settling tanks to the neutralization and storage area. The casual and TNT-free acidic water was pumped directly to the PCC.

In June 1973, NECD obtained National Pollutant Discharge Elimination System (NPDES) permit IN0003506 to discharge treated wastewater from TNT production to the Wabash River (TLI 2007).

4.4.3 Sanitary Sewers and Central Sewage Treatment Plant

Effluent discharges at NECD are regulated by NPDES permit IN0003506. Sanitary wastes at the installation are currently processed by a central sewage treatment plant (STP). STP water is discharged through a forcemain to the Wabash River. Permitted outfalls are currently located at the STP; at a discharge from the PCCRP that services the RWABs and GSBs; at the point of runoff from the former TNT-BGs; at a discharge point from the former TNT cooling tower; and at stormwater runoff from the CDD, RDX-MA, and DWBG.

A visual inspection of the STP (Study Section 7) was conducted during the ECP site visit. The sewage treatment process begins at the primary sewage collection point and primary sump pump. The system chlorinates and dechlorinates the discharge annually from April 1 to October 31. The STP has been in use since 1942. The NPDES permit for the STP specifies effluent limitations for 5-day carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), and total residual chlorine. The STP also has an emergency overflow outfall that discharges into Little Raccoon Creek; this discharge is subject to the same effluent limitations as the STP outfall to the pipeline.

The existing plant was designed to accommodate 3,000 people; with the closure of manufacturing operations at NECD, the current number of employees at the site is approximately 900. The size of the existing workforce is apparently too small to maintain the biological activity the activated sludge requires to digest organic wastes; the unused capacity limits the effectiveness of the STP in reducing suspended solids and chlorinating the wastewater effluent. A monthly report is required to be submitted to IDEM.

4.4.4 Stormwater and Field Tile Systems

Stormwater runoff at NECD is controlled by both manmade and natural surface drainage channels. Manmade structures include open drainage ditches, grassed waterways, drop inlets, drop spillways, and pipe culverts. Drainage ditches in areas of improved grounds at NECD are generally 4 feet wide and 3 feet deep with a 3 to 1 grade on side slopes and an average 1 percent rate of fall. All open drainage ditches are currently planted in tall fescue and mowed annually.

Stormwater discharges into Little Raccoon Creek are regulated under the current NPDES permit (IN 0003506). Drainage from the Chemical Plant, hazardous waste storage buildings, CDD, RDX-MA, DWBG, and shops area discharges into Little Raccoon Creek. NPDES sampling was conducted in conjunction with the Corrective Measures Implementations (CMIs) conducted at the CDD, RDX-MA, DWBG, and the former TNT Cooling Tower Sump (TNT-CTS), and results are provided in the completion reports (SAIC 2005a, 2005b, 2005c, and 2005e). No violations were noted.

NECD has prepared a Stormwater Pollution Prevention Plan (SWPPP) dated March 9, 2005, in accordance with the requirements of the NPDES permit. Samples of Little Raccoon Creek have been taken in accordance with the NPDES permit and requirements of the SWPPP. The NPDES permit and SWPPP also require monitoring and inspection of stormwater runoff and reporting to IDEM.

The NECDF, operated by Parsons, has NPDES general permits for the discharge of stormwater. There is no discharge of process wastewater.

Spill prevention and emergency response procedures are covered by each contractor's Spill Prevention, Control, and Countermeasure (SPCC) Plan and Spill Contingency Plan. Mason & Hanger and Parsons have specific procedures, schedules, and controls for their individual operations, as listed below:

- Mason & Hanger Corporation, SPCC Plan for NECD, August 5, 2005 (Mason & Hanger 2005c)
- Mason & Hanger Corporation, Spill Contingency Plan for NECD, February 28, 2005 (Mason & Hanger 2005d)
- Parsons, Newport Chemical Agent Disposal Facility SWPPP, September 2002 (Parsons 2002).

Many agricultural tracts currently under active management and former agricultural fields at NECD have field drain tile systems to improve soil drainage. NECD has maintained these systems and has installed new tile when necessary to support the agricultural outleasing program. Records of known drain/tile systems are maintained by the Natural Resources Administrator. However, not all locations of drain tile systems from before 1941 have been identified, particularly in old field areas no longer in active agricultural production.

4.4.5 Electrical System

NECD obtains its electrical power from public utilities. Existing 13.8 kilovolt (KV) distribution lines on the installation are owned by NECD and rated at 69 KV and 12.47 KV (Tetra Tech 2001). Onsite transformers are owned by NECD.

4.4.6 Heating Systems

Natural gas is the primary source of fuel at NECD, and it is used for hot water boilers for building heat. Fuel oil (No. 2 diesel) serves as backup for emergency generators in individual buildings and NECDF process areas (Tetra Tech 2001).

4.5 ENVIRONMENTAL SETTING – NATURAL AND PHYSICAL ENVIRONMENT

The following sections provide a description of the environmental setting at NECD. Climate, topography, hydrology, geology, demography, and land use are discussed.

4.5.1 Climate

NECD is located in a region characterized by a temperate continental climate with humid to subhumid moisture regimes, moderately cold winters, and long summers. Monthly average temperatures at Rockville, Indiana (approximately 20 miles east of Newport), range from 27°F in January to 76°F in July. Temperature extremes vary from less than 0°F in the winter to more than 90°F in the summer. The average annual temperature for Vermillion County is 51.6°F. The average relative humidity at noon is less than 58 percent in spring and approximately 69 percent in winter. Humidity is higher at night, with an average at 7 a.m. of approximately 83 percent. The percentage of possible sunshine is 71 percent in August and 39 percent in December.

January and February are typically the driest months of the year, averaging 2.4 inches of precipitation per month. The average seasonal snowfall is 24 inches, and during a normal winter, an average of 25 days have at least 1 inch of snow on the ground. Frost penetration during the winter ranges from 20 to 30 inches below land surface (BLS).

The area has a growing season of approximately 170 days. The last killing frost is typically around April 28, and the first killing frost occurs around October 15. Rainfall in the region is usually adequate during the growing season to support a diversified agricultural base. Most precipitation in the region occurs during the growing season, with June and July averaging approximately 4.4 inches of precipitation per month. A relatively even distribution of average annual precipitation throughout the year, coupled with spring rains, usually ensures good soil moisture into the summer. However, midsummer droughts may occur when evaporation from soils and crops exceeds rainfall for brief periods. Wet fields also often

delay spring planting, particularly on poorly drained soils that formerly supported native wet prairie communities.

Precipitation generally increases eastward from Vermillion County, creating more favorable growing conditions for forest communities (Hedge and Bacone 1994). NECD is located within a transitional zone where differences in soil moisture and precipitation produced a historical mix of prairie and forest ecosystems, with closed forest communities being more developed on north-facing slopes and mesic ravines (Earth Tech 2002).

Prevailing winds in the vicinity are generally from the southwest, with an average speed of approximately 12.3 mph during the winter and 7.8 mph during the summer. Winds are generally from the north and northwest during the winter months. Local wind speeds may be significantly higher during storm events or the passage of weather fronts. The Vermillion County climate is often quite variable because it is located in a transition area between the warm southern and the cool northern climates. Thunderstorms occur frequently during the summer months, averaging one storm every 4 days in an average season. West-central Indiana also lies in one of the most tornado-prone regions of the United States, with an average of five tornadoes per year occurring within a 56-mile radius of NECD. Tornadic storms in this region also have a higher probability of being more severe (Category 2 storms or higher) than in other parts of the Midwest. Significant damage may also occur from nontornadic winds in the region. Maximum sustained wind speeds at Indianapolis (approximately 70 miles east of NECD) have been recorded at 93 mph, which is higher than in any other midwestern city (Tetra Tech 2001).

4.5.2 Topography

The topography at NECD is flat, ranging from approximately 650 feet above mean sea level (msl) near the main entrance to the installation to 530 feet above msl in the drainage basin on the northwestern portion of the installation. The Ranney® Wells area (Study Section 13) is approximately 480 feet above msl (USGS 1964, 1978a, 1978b, and 1979). Most of the land surface is characterized by slightly undulating to nearly level upland lying at elevations between 620 and 640 feet (all elevations refer to the National Geodetic Vertical Datum [NGVD] of 1929). NECD lies within the Tipton Till Plain section of the Central Lowland Province of the United States. It is a nearly featureless glacial plain dissected by old and newer stream drainages, and dotted with glacial features such as end moraines. Several creeks flow through the installation, including Little Vermillion Creek and tributaries of Jonathan Creek, which flow off the installation in a northern direction; Little Raccoon Creek, which originates in the eastern portion of the installation and flows in a southerly direction off the installation; and southerly flowing Buck Creek located in the southwest portion of NECD. All of these creeks are tributaries of the Wabash River, which is located approximately 2 miles east of the installation (Earth Tech 2002).

4.5.3 Surface Water Hydrology

NECD lies within the western half of the Wabash River watershed. Surface runoff in the area of NECD flows into drainage ditches and creeks that empty into the Wabash River, located approximately 2 miles east of NECD. The Wabash River flows southwards between Indiana and Illinois, and empties into the Ohio River near the John T. Myers Locks and Dam near the Posey/Gallatin county border (Tetra Tech 2001). Spring Creek and the Big Vermillion River drain the north portion of Vermillion County, with the Little Vermillion River draining the central part. In the area of NECD, Little Raccoon, Norton, Feather, and Brouilletts Creeks provide drainage for the southern area of Vermillion County. Four principal watersheds are located on NECD (Earth Tech 2002).

Water resources at NECD consist of low-order, intermittent drainages leading to tributaries to the master stream, the Wabash River. The Buck, Little Raccoon, Little Vermillion, and Jonathan Creeks are the only perennial streams. Surface water in the southwestern portion of NECD drains to Buck Creek, which flows southeast to join the Wabash River at a point south of Montezuma. SWMU groups in the

Buck Creek watershed include the TNT-BG, RDX-BG, and the GSBs (but not the PCCRP). Surface water in the southeastern and central eastern portion of NECD drains toward Little Raccoon Creek, which flows south-southwest toward the Wabash River. Little Raccoon Creek and Buck Creek converge at State Road 63, 2 miles due west of Montezuma and flow southeast to converge with the Wabash River 0.875 miles south of Montezuma. SWMU groups in the Little Raccoon Creek watershed include the CDD, Memorial Chapel RDX Dump (MCD), DI/SY, CSL, DWBG, Chemical Plant, and the southern two-thirds of the RDX-MA. The far western portion of NECD drains to Jonathan Creek, which flows north along the western border of NECD to the Little Vermillion River. The NSPs are located in the Jonathan Creek watershed. The Little Vermillion River watershed encompasses the central, northern, and northeastern portions of NECD. Tributaries flow north, draining the PCCRP and the northern third of the RDX-MA. The tributaries join the Little Vermillion River north of NECD. From this point, the Little Vermillion River meanders east, along the northern edge of the town of Newport, to join the Wabash River approximately 1 mile east of the town of Newport. The Wabash River flows south toward Terre Haute (Earth Tech 2002).

NECD contains 213 acres of wetland habitat. This acreage amounts to 3 percent of the total land area. There are 24 miles of linear wetlands (USFWS 2001).

A 1999 survey of NECD (EarthSource 1999) identified 12.5 acres of jurisdictional wetlands or other waters of the United States as defined by the 1987 Corps of Engineers Wetlands Delineation Manual (TRY-87-1). Eight distinct sections of wetlands or wetland complexes were delineated during the survey. Both the east and west branches of Little Vermillion Creek were identified as waters of the United States that provide important buffers for water quality and valuable riparian habitat.

Soil types present at NECD suggest that the flat upland portions of the installation once supported significant areas of depressional, slough-swale wet prairie wetlands, within a matrix of tallgrass prairie (EarthSource 1999). Virtually all of these rich prairie soils were converted to agricultural land uses during European settlement of the region (Hedge and Bacone 1994; Homoya et al. 1985). The hydrology of the wetland soils (specifically, the Sable and Ragsdale series) found on the uplands have been extensively manipulated through surface ditches and subsurface drain tiles to improve soil drainage and support row crop production. Consequently, many of the fragmented wetlands that remain on NECD are remnants of much larger systems, and the current vegetation types reflect an alteration of the natural hydrology that is more favorable to the development of drier, forested, and scrub-shrub wetland communities (EarthSource 1999). Despite their fragmentation, wetland areas at NECD still perform important water quality functions and provide valuable habitat for wildlife and avifauna, such as the Virginia rail, wood duck, and sora (Chandler and Weiss 1994).

4.5.4 Groundwater Hydrology

Surficial and shallow groundwater occurs in discontinuous sand and gravel lenses and sandy zones in the glacial till at NECD. Water-bearing zones exist under confined conditions surrounded by impermeable glacial till and may be poorly connected to other localized surficial or shallow groundwater. Groundwater flow is mostly horizontal and dictated by areas of high topographic relief and the effect from the close proximity of streams and related tributaries that have eroded into the glacial till. In general, two major shallow groundwater basins, or watersheds, are located within NECD. The shallow groundwater in the southern and southeastern portions of NECD flows toward the south and southwest and discharges into tributaries of Little Raccoon Creek, which flows into the Wabash River at a point approximately 5 miles southeast of the NECD boundary. Shallow groundwater in the northern and western portions of the installation moves north toward Little Vermillion River and ultimately flows east of Newport to the Wabash River. Within these two watersheds, several shallow groundwater divides

exist, coincident with topographic highs, in the central and western areas of NECD (Dames & Moore 1991a).

4.5.5 Geology and Soils

This section provides information on the regional geology of Vermillion County and the geology that underlies NECD. This information is based on data from previous environmental investigations and reference documents, such as U.S. Geological Survey (USGS) documents.

NECD lies in the Central Lowland Plains physiographic division of the Central United States (USGS 1970). The facility is underlain by approximately 70 to 100 feet of unconsolidated glacial till (primarily a stratified ground moraine), capped by thin loess (wind deposited silt) that grades into morainal deposits along the escarpment formed by the Wabash River, approximately 2 miles to the east. The till is composed of poorly sorted clay, silt, sand, and minor gravel, and displays both vertical and lateral variability (Earth Tech 2002).

The glacial till was deposited by at least two Pleistocene ice sheets, during the Kansan and Wisconsinan stages, and comprises the major part of the Trafalgar Formation in Indiana. The Trafalgar Formation is composed of three members separated by thin (1 to 3 feet), frequently truncated sand and gravel deposits. From youngest to oldest, these members are the Snider Till, the Batestown Till, and the Glenburn Till. The younger till members are thinner and finer grained than the underlying older till members (USAEHA 1975).

The bedrock in Vermillion County lies near the edge of the Indiana Basin, and dips slightly toward the southwest. The uppermost consolidated bedrock unit below the glacial deposits is the Carbondale Group, composed of shale and sandstone of Pennsylvanian age, and ranging in thickness from approximately 10 to 100 feet. The Carbondale Group is part of the larger Allegheny Series; other groups of the series outcrop along the Big Vermillion and Wabash Rivers.

Underlying the Carbondale Group is the Raccoon Creek Group. Comprising the basal Pennsylvanian unit, the Raccoon Creek Group varies in thickness from 145 to more than 200 feet and is composed primarily of shale and sandstone, with thinner beds of limestone, clay, and coal. These Pennsylvanian units lie unconformably above Mississippian-age sedimentary rocks that, in turn, overlie a series of very thick Paleozoic formations, which extend more than 1 mile down to pre-Cambrian granites and metamorphic rocks (USAEHA 1975).

The Pennsylvanian bedrock units form part of the western limb of a vast anticline, the axis of which strikes in a north-south direction, thus causing bedrock to dip slightly to the southwest. No evidence of significant faulting in the NECD area exists (USAEHA 1975).

4.5.6 Demography and Land Use

The majority of the area surrounding NECD is agricultural cropland, woodlands, and pastures. Land use for the areas immediately adjacent to the installation is zoned agricultural (Vermillion County 1996). Nearby towns and cities include Newport, Montezuma, Dana, Clinton, and Cayuga. Land use in Vermillion County is heavily agricultural, with 119,318 acres or approximately 73 percent of the total land area of the county in farm production (U.S. Army 1998). Neighboring counties are also primarily agricultural, with more than 90 percent of Fountain County, Indiana to the north, and almost 89 percent of Edgar County, Illinois (to the southwest) in farms. Only 64 percent of Parke County, immediately east of Vermillion County, is in farms; however, the county is heavily forested with much rugged terrain unsuitable for row crops. By comparison, only 68 percent of Indiana and approximately 77 percent of Illinois are in agricultural production.

Land use on the installation is predominantly controlled by agricultural activities. Industrial and administrative activities and operations are concentrated in approximately 619 acres. Approximately 41 percent of the installation is leased for raising crops that may include corn, soybeans, pumpkins, black beans, grass/alfalfa, oats, canola, sunflowers, and wheat. Sixty-two acres are leased for grazing cattle (Mason & Hanger 1996 and Personal Communication 2007b). Six cemeteries are located on the installation originating prior to the U.S. Army's initial acquisition of NECD (USATHAMA 1979).

Prior to September 11, 2001, NECD had an annual deer hunting program that was available to civilians. From 1998 to 2001, NECD allowed a small game hunt for employees. Hunting was allowed in the facility woodlands and field areas, but was not permitted in NECD industrial areas (Mason & Hanger 2002). Only deer hunting by employees and handicapped persons and turkey hunting by employees has been allowed in Hunt Areas 1 through 13, Hunt Area 15, and the RDX area since September 11, 2001. Approval of small game hunting has been approved for employees for 2008 (Personal Communication 2007b).

The population of Vermillion County in 2005 was 16,562 persons with a population density of 65 persons per square mile according to U.S. Census survey data (U.S. Census Bureau 2005). Approximately 25 housing units were identified from 1981 aerial photographs (EPIC 1985) and topographic maps within 1 mile of NECD boundaries. Given that the average household size within Vermillion County is 2.44 persons, it is estimated that approximately 60 persons live within a 1-mile radius of NECD. Dana, a town of 598 residents (U.S. Census Bureau 2005), is located approximately 2 miles to the southwest of NECD. The town of Newport, located approximately 2 miles northeast of NECD, has a population of 679 (U.S. Census Bureau 2005). Other towns located near NECD include Cayuga (population 1,116), Montezuma (population 1,151), and Clinton (population 4,906) (U.S. Census Bureau 2005).

4.6 BIOLOGICAL RESOURCES

Natural resources on NECD are managed through the Integrated Natural Resources Management Plan (INRMP). The installation provides suitable habitat for a variety of species. Public access for wildlife viewing; nature photography; antler collection; and the gathering of edible fruits, mushrooms, nuts, and berries was allowed in Hunt Areas 10 through 14 until September 11, 2001. Hunting of deer, small game, and wild turkey also was previously allowed at NECD. Hunts were conducted to sustain healthy populations consistent with available habitat at the installation. Only deer hunting by employees and handicapped persons and turkey hunting by employees has been allowed in Hunt Areas 1 through 13, Hunt Area 15, and the RDX area since September 11, 2001. Approval of small game hunting is pending for employees in 2007. All hunters must comply with applicable state license requirements. Due to the limited amount of suitable aquatic habitat on the installation, hunting of migratory waterfowl is not permitted (Tetra Tech 2001 and Personal Communication 2007b).

4.6.1.1 Flora

NECD occupies an ecotone between the eastern deciduous forest and the tallgrass prairie. Several invasive plant species occur at NECD. Plants classified as noxious by the State of Indiana and that require control include Canada thistle, shattercane, bur cucumber, and Johnsongrass. A number of nonnative plants such as multifora rose, bush honeysuckles, Russian olive, and garlic mustard pose more serious threats to the ecological health of NECD plant communities. Garlic mustard was discovered in 1994 in the Jonathan Creek watershed in the northwestern corner of NECD. The negative impact of nonnative honeysuckle species and garlic mustard on native woodland flora, particularly spring geophytes, has been well-documented in the eastern United States (Tetra Tech 2001).

Virtually all of the wet-prairie and oak savanna vegetation on the uplands of NECD was converted to agricultural land uses during the settlement period. However, NECD also has restored more than 335

acres of tallgrass prairie communities in several areas in the southwestern portion of the installation; the restored prairies were once part of the pre-European settlement grasslands environment. Prairie restoration at NECD includes both establishment of new prairie areas and maintenance of recently planted sites (Mason & Hanger 2006a).

4.6.1.2 Fauna

Previous investigations and surveys have documented the presence of at least 35 mammal species representing 14 different families at NECD. Common species include white-tailed deer, coyotes, raccoons, striped skunks, eastern cottontail rabbits, opossums, and various small rodents. Installation personnel also have reported sightings of badgers, gray squirrels, and thirteen-lined ground squirrels; however, the presence of these species has not yet been confirmed in formal investigations.

Approximately 157 bird species have been documented at NECD, either on a permanent, transient, or migratory basis. Some of the more common species present on a year-round basis include American kestrels, blue jays, northern bobwhites, downy woodpeckers, northern flickers, horned larks, American crows, European starlings, American goldfinches, and song sparrows.

Fifteen species of reptiles (3 turtles, 2 lizards, and 10 snakes) have been documented at NECD. No Federal- or state-listed species have been observed on the installation to date. Eastern painted pond turtles and eastern box turtles are common at NECD; snapping turtles also are present, but are less abundant. Common snakes include black rat snakes and northern water snakes.

A total of 15 amphibian species have been documented at NECD. No Federal- or state-listed species have been observed at the installation. Common species include spring peepers, chorus frogs, American toads, and small-mouth salamanders. Suitable wetland habitat on the uplands at NECD is limited, which may be a factor in the diversity of species and numbers of individuals detected during herpetofauna surveys.

A total of 32 fish species, representing 8 families, occur within the streams of NECD or near the installation boundary; these species have been detected during various survey efforts over the past 25 years. No Federal- or state-listed species of fish have been observed during any previous surveys at NECD. No species of live mussels or their shells have been collected in NECD waters to date. Aquatic habitat at NECD does not currently support a sport fishery.

The Endangered Species Act (ESA) provides protection for species that are federally listed as threatened and endangered (T&E). There are six T&E species listed as EPA Endangered Species in the EPA Endangered Species Protection Program Database for Vermillion County, Indiana. The six threatened species include the bald eagle (bird), Indiana bat (mammal), white wartyback pearlymussel (clam), tubercled-blossom pearlymussel (clam), fanshell (clam), and ring pink mussel (clam). Bald eagles have been known to roost and build nests along the Wabash River near the Ranney® Wells area property. However, the bald eagle is only a transient visitor to the main installation (Tetra Tech 2001). According to NECD personnel, the fact that the Bald Eagle is a transient visitor is evident by sightings in the winter months, but not in the summer months. No new nests have been built on or near the installation in recent years (Personal Communication 2007h). Biological surveys have confirmed that the Indiana bat forages and roosts at NECD. No species of live mussels or their shells have been collected in NECD waters to date.

4.7 CULTURAL RESOURCES

NECD is a military installation encompassing 7,136 acres. Seventeen archaeological surveys have been conducted on the depot (including two on a utility easement to the Ranney® Wells) and 273 archaeological sites have been recorded. No archaeological resources have been nominated to the

National Register of Historic Places (NRHP). Inventory and evaluation of archaeological sites under Sections 106 and 110 of the National Historic Preservation Act (NHPA) are ongoing, and are undertaken on either a case-by-case basis or as funding permits (Earth Tech 2002 and Personal Communication 2007b).

According to the Final Integrated Cultural Resources Management Plan (Earth Tech 2002), the cultural/archaeological sites at NECD have been evaluated under the Archaeological Resources Protection Act (ARPA) of 1979 and the Archaeological and Historic Preservation Act of 1974. All structures at NECD were evaluated under the NHPA.

NECD currently has no buildings or structures eligible or potentially eligible for inclusion in the NRHP. Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Level IV documentation has been prepared for 42 buildings and structures. The documentation is archived at the Library of Congress, and a copy is on file in the office of the Cultural Resources Manager (CRM) (Earth Tech 2002). In 2004, the Indiana State Historic Preservation Officer (SHPO) concurred that no buildings or structures at NECD are eligible, and exempted them from any further Section 106 consultation requirements through 2009 (Personal Communication 2007b).

Further, in 2000, the USACE, Fort Worth District, completed a national historic context for WWII-era army ammunition storage magazines. The objective of the document was to present the themes and events that influenced the construction, modification, and use of ammunition storage magazines during WWII and the mobilization effort prior to this war. In addition to context, the document also presents a classification system for all ammunition storage magazines and a discussion of NRHP eligibility requirements. The study recommends that those installations with the most comprehensive array of the various magazine designs may be eligible for inclusion in the NRHP, but NECD was not among the potentially eligible installations (Earth Tech 2002).

Although NECD was not considered to be eligible for listing in the NRHP, it should be noted that the report indicated that, in rare instances, an installation may have had such an exceptional impact on a state of locality that it could be eligible for inclusion in the NRHP under other state or local themes; as of June 2001, the Indiana SHPO had not concurred with the findings of the report (Earth Tech 2002).

There have been no Traditional Cultural Properties (TCPs), Sacred Sites, or fossil remains identified at NECD. However, systematic inventory of TCPs, Sacred Sites, or fossil remains have not been undertaken (Earth Tech 2002).

4.8 SITE MAPS

The site maps and their location within the document are listed in the List of Figures. The maps that are included for the installation are the following:

- Figure 2-1. Newport Chemical Depot Installation Location Map
- Figure 3-1. Newport Chemical Depot Study Sections
- Figure 3-2. Agricultural Lease Parcels
- Figure 5-1. Buildings and SWMUs
- Figure 5-2. Study Section 8 Layout
- Figure 6-2. Property Categorization Map.

4.9 GEOGRAPHIC INFORMATION SYSTEM

NECD has a GIS in place. Systems are managed by the CMA, as well as the environmental restoration contractor, SAIC. Due to the ongoing demilitarization project, GIS layers are protected on a need to know basis.

THIS PAGE WAS INTENTIONALLY LEFT BLANK

5. ENVIRONMENTAL CONDITIONS

This section provides the results of the ECP Phase I assessment, including all database, record, and document searches and reviews. Known past environmental conditions and current environmental issues of concern are summarized in the following sections.

5.1 ENVIRONMENTAL PERMITS AND LICENSES

This section discusses the environmental permits and licenses held by NECD. Included in this section are RCRA status, solid waste permits, UST/AST permits, Indiana NPDES permits, drinking water permits, air permits, NRC licenses, and other permits/licenses.

5.1.1 RCRA Status

The most recent RCRA Hazardous Waste Permit was issued on January 5, 2006. NECD is currently operating under an IDEM Hazardous Waste Management Permit (EPA identification number IN1210022272). Hazardous waste is currently being generated at NECD from general maintenance operations, agent support operations, and decommissioning activities at the former production facility (FPF) and NECDF neutralization facility.

NECD's RCRA permit included two FPF waste storage units designated for storage of items generated during the dismantling and demolition of the former VX production plant and storage area. The waste storage units for the FPF include the Permitted Storage Area and the Autoclave Treatment Unit. The permitted storage areas in Buildings 143 and 144 have been RCRA closed and have never been used.

5.1.2 Solid Waste Permits

All solid waste generated at NECD is currently handled by Brickyard Landfill in Vermillion County in Danville, Illinois.

Two closed landfills are present onsite. These landfills are identified as the present sanitary landfill (SWMU NAAP-51) and the closed sanitary landfill (SWMU NAAP-27). SWMU NAAP-51 was permitted and in operation from 1981 to 1987. In 1988, IDEM issued a Special Waste Disposal Approval (Case No. 80096) to NECD responding to a request from the Army to dispose of 25 cubic yards of wastewater treatment plant sludge in the NECD sanitary landfill. The approval letter from IDEM was dated April 21, 1988 and expired on April 30, 1989. This site was closed in 1997 in accordance with Closure and Post-Closure Plans. SWMU NAAP-51 is regulated under a State of Indiana solid waste permit (NECD RCRA permit). Groundwater monitoring was scheduled to continue for 10 years after closure. However, on July 3, 2001, IDEM issued a letter to Mason & Hanger stating that the groundwater monitoring requirements for the 10-year post-closure period had been met and no further monitoring was necessary.

SWMU NAAP-27, the CSL, was in operation from 1950 through 1977. Facility operation records indicate that between 1970 and 1977, SWMU NAAP-27 was used to dispose of nonhazardous construction debris from the TNT plant, and office and shop waste with no salvage value. No records of the materials that were disposed of in this area prior to 1970 are available. Additional information regarding the CSL is provided in Section 5.2.1.6.3.

Regulated medical waste from medical facilities is generated at Building 7700. The medical waste is picked up weekly by a private contractor for appropriate disposal (Personal Communication 2007c).

5.1.3 UST/AST Permits

The NECD UST list shows that 24 current and former petroleum USTs, ranging in capacity from 300 to 12,000 gallons, have been located onsite. The USTs were used to contain gasoline, diesel, or fuel oil and are used for emergency generators and vehicles (Personal Communication 2007b). There are currently six active USTs at NECD that are regulated by IDEM. The tanks are described in Section 5.4. A total of 17 USTs have been closed.

The NECD AST database lists 17 current and former ASTs used onsite by Mason & Hanger. The ASTs ranged in capacity from 225 to 500,000 gallons. The ASTs were used to store fuel oil, propane, used oil, ethylene glycol, and diesel fuel. There are currently three active ASTs at NECD that contain diesel and support building operations. A propane station also is present at NECD. None of the current ASTs is regulated by IDEM (Personal Communication 2007b). The tanks are described in Section 5.4. A total of 13 ASTs have been closed.

Although the Parsons SPCC Plan (USACE 2002) identifies two USTs at NECDF, interviews with Mason & Hanger and Parsons personnel indicate that there are currently no USTs at NECDF (Personal Communication 2007a). The Parsons SPCC also lists six ASTs at NECDF; however, interviews with Mason & Hanger and Parsons personnel indicate that there are currently four ASTs (Personal Communication 2007a).

5.1.4 NPDES Permits

A NPDES permit (IN0003506) originally was assigned to the facility between 1969 and 1971 to monitor an outfall downgradient from the Chemical Plant. Currently, the permit addresses monitoring requirements for Outfall 001 (STP), Outfall 101 (Mixed STP and retention basin discharge) and Outfall 004 (TNT-BG runoff). The permit also identifies two outfalls that exclusively discharge stormwater runoff: Outfall 002, stormwater discharge to Little Vermillion Creek and Outfall 003, stormwater discharge to Little Raccoon Creek. NECD was issued a renewed NPDES permit on February 28, 2003 by IDEM (SAIC 2003a). A modification to the permit was instituted on September 14, 2003 to include Outfall 201, which was associated with the removal action discussed in Section 5.2.3.1.

In addition, the NECDF, controlled by Parsons, holds a NPDES permit (INR230020) regulating stormwater. This permit expires on May 14, 2009 (Personal Communication 2007a).

5.1.5 Drinking Water Permits

NECD has a Community Drinking Water System, PWSID Number 5283014, issued by IDEM. The system consists of groundwater wells, pumps, storage tanks, and a covered reservoir that provides water for industrial processes, administrative facilities, and fire protection.

5.1.6 Air Permits

Air emissions at NECD are regulated by Federally Enforceable, State Operating Permit (FESOP) F165-5470-00003, issued by IDEM. The most recent FESOP was issued on July 12, 2002. A permit renewal was submitted in October 2006 and is in the process of being reviewed. The permit includes allowances for miscellaneous fugitive emissions from road dust, small arms firing, and up to 70 acres of controlled prairie burns per year. Vermillion County and other areas within a 30-mile radius of NECD are in attainment of all Federal and state ambient air quality standards, except for eight sections of Clinton Township in the southern part of the county, which are in moderate nonattainment for particulate matter 10 microns in diameter or less (PM-10) due to their proximity to a coal mine.

The stationary source at NECD includes the following emission units and pollution control devices (IDEM 2006):

- Fifteen nonemergency generators
- Fourteen emergency generators
- Ten gasoline pumps (internal combustion engines)
- Five maintenance units (internal combustion engines).

In addition, four emergency generators, the TC enhanced steam decontamination unit in the Process Auxiliary Building (PAB), the agent neutralization process conducted in the Utility Building (UB) and the PAB, the pollutant emitting activities related to the Operations and Maintenance (O&M), one portable VacStar Vacuum/Pressure Wash Trailer, and one portable enclosed emergency personnel decontamination trailer are used at NECDF (IDEM 2006).

5.1.7 NRC Licenses

NECD does not hold any current NRC licenses. However, NECD contractors held NRC licenses in the past and radioactive commodities licensed by the AMC were possessed on the installation. No evidence has been identified to date of the existence of unsealed radioactive materials on NECD.

An investigation of NRC license documents failed to reveal use of any cesium-137 or other radioactive materials by USACE, although such use is plausible given that instruments containing sealed radiation sources are commonly used in soil moisture density testers, lead paint analyzers, and in laboratories in gas chromatographs. Based on telephone interviews with the NECD Radiation Safety Officer, sealed cesium-137 radiation sources were used within the VX Production Facility for three fill lines (M55 Rocket, M23 Land Mine, and M121A1/M256 Projectile) to verify compliance with applicable fill requirements for these munitions. It also was confirmed that cesium-137 sources were not used in the TNT or RDX facilities (Personal Communication 2006).

Documentation from 1968 notes that "The four Cesium 137 radioisotope sources were transferred to Mr. Robert Dean, Edgewood Arsenal. The Byproduct Licenses issued to FMC, NAAP, have been cancelled." (Inter-Office memorandum, Subject: Munitions Control Section Activities for the Month of August, 1968 dated September 6, 1968). Other documentation from 1968 confirms this information (Inter-Office memorandum, Subject: Monthly Report for August, 1968 Production Department, dated September 9, 1968). These sources were possessed under the authority of AEC Byproduct Material License 13-07499-01 and were assessed on June 27, 1967, and confirmed to not exhibit leakage (FMC 1967).

NRC Byproduct Material License 13-24726-02 was issued to Mason & Hanger Corporation pursuant to applications dated June 23, 1986 and January 8, 1992 to authorize possession of radioactive materials (americium-241 and nickel-63) contained within sealed sources in Army Chemical Agent Monitors and Improved Chemical Agent Monitors. The last inspection of activities conducted under this license was in 1992. This license was terminated on May 22, 2002 because duplicate licensing applied, as the items involved also were authorized by centralized Army Byproduct Material License 19-30563-01 issued by NRC Region I to the U.S. Army Soldier and Biological Chemical Command (SBCCOM), Aberdeen Proving Ground, Maryland.

Leak testing of sealed sources is mandated by Federal (and Army) regulations at the time of source manufacture and at 3- or 6-month intervals throughout their operational lives. This testing is to confirm that the sources are of the appropriate initial quality and do not degrade over time such that they present a potential contamination hazard. Routine periodic license compliance inspections performed by NRC and its predecessor, AEC, include reviews of leak test results to ensure that required testing has been performed and that sealed sources are not leaking. In addition, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) and its predecessor agency, the U.S. Army Environmental Hygiene Agency (USAEHA), have routinely performed radiological surveys of Army

activities possessing radioactive material for at least 40 years. Reviews of leak testing records are also an integral part of these radiation safety program evaluations.

Any sources determined to be leaking would be removed from service, investigated to find the reason for the leak, assessed to determine whether the leaking source resulted in contamination, and decontaminated as appropriate. The incident would be documented and formal notice of the incident would be provided through command channels to regulatory agencies such as NRC/AEC and EPA. Licenses (and DA permits and authorizations for items not subject to licensing by NRC/AEC) are not terminated until appropriate surveys have confirmed that all contamination has been remediated to applicable standards.

Given the requirements for leak testing of sealed sources, the relative rarity of leakage as evidenced by the FMC leak test confirming that sources were not leaking in 1967, and the absence of historical documentation to indicate that any sources leaked, it is highly unlikely that the sealed sources utilized at NECD resulted in contamination of the facility.

Activities of DOE and its predecessor agencies (MED, AEC, and ERDA) have not generally been subject to regulation by NRC or the associated licensing requirements. In addition, operations involving radium-226 and accelerator produced radionuclides were not subject to the authority of NRC until 2005 and 11(e)(2) byproduct materials (i.e., uranium mill tailings) were not subject to control by NRC until 1978. As such, NRC historical information would not be expected to include these types of activities. The Army controlled operations that were not subject to regulation by NRC were regulated using DARPs and DARAs issued pursuant to AR 385-11 and AMC Regulation 385-25.

5.2 ENVIRONMENTAL CLEANUP

This section includes previous and ongoing response actions required by DOD policy and other applicable regulations. The following sections evaluate the current status of the IRP, the Military Munitions Response Program (MMRP), compliance cleanup, and previous environmental investigations.

5.2.1 Installation Restoration Program

Numerous sites at NECD are being addressed through the IRP. As a result, these sites have been identified as IRP sites and have been assigned site identification numbers associated with the Army Environmental Database – Restoration (AEDB-R). In addition, cleanup activities have been conducted at NECD under RCRA. These sites have been identified as SWMUs and have been identified with site numbers. The following sections summarize the SWMUs located at NECD and are presented by study section. Figure 5-1, which is presented at the end of this section, shows the locations of the SWMUs at NECD. SWMUs NAAP-48a, NAAP-48h, and NAAP-56 through NAAP-58 are not delineated on the figure because they are piping and area-wide drains. No SWMUs are located within Study Sections 6, 9, 10, 11, 12, and 13. Table 5-1 provides a cross-reference between the AEDB-R designation and the RCRA SWMU designation.

5.2.1.1 Study Section 1

Two SWMUs (SWMUs NAAP-1 and NAAP-2) are within Study Section 1 and are discussed below. SWMUs NAAP-1 and NAAP-2 are also identified as AEDB-R NAAP-038.

5.2.1.1.1 Night Soil Pits

The NSPs are designated as SWMUs NAAP-1 and NAAP-2. They are in the northwest corner of NECD and consist of a 250- by 250-foot fenced burial area containing two pits (Dames & Moore 1991b). The site is fairly level with elevations ranging from approximately 629 to 635 feet above msl. The site slopes to the west/southwest toward creeks south and west of the site. Prior to the closure of the pits, they

were the dominant topographic feature at the site (Dames & Moore 1991b). Currently, there are no visible topographic features to identify the pit locations. The site was used in the 1940s to bury "night soils" from privies. In 1968, these pits were used for disposing of decontaminated solid waste from the VX manufacturing process. The decontaminated waste included decontaminated sludge from Chemical Plant settling basin 30025 (Dames & Moore 1991b). In 1977, rubble and other burned materials resulting from the razing of the RDX manufacturing facility also were disposed of in the NSPs (USATHAMA 1979). There is no record of when or how much "night soils" were placed into these pits.

Table 5-1. IRP Sites Located at Newport Chemical Depot

Study Section	AEDB-R Number	NFA per RCRA permit?	AEDB-R Title	SWMU Number	ECP Report Section
2	**NAAP-001**	**N**	**RDX-MA**	**NAAP-3**	**5.2.1.2.1**
5	NAAP-008	Y	TNT-MA	NAAP-37 through NAAP-47	5.2.1.5.1
8	**NAAP-014**	**N**	**Chemical Plant Agent-Free Area (CP, Steps 0, I, and II)**	**NAAP-6 through NAAP-9**	**5.2.1.7.4**
8	**NAAP-015**	**N**	**Chemical Plant Pre-Agent Manufacturing Facility**	**NAAP-5**	**5.2.1.7.4**
8	**NAAP-016**	**N**	**Chemical Plant Agent Area**	**NAAP-4; NAAP-10 through NAAP-12, NAAP-67**	**5.2.1.7.1, 5.2.1.7.4**
8	**NAAP-017**	**N**	**Chemical Plant Agent Manufacturing Facility**	**NAAP-13 through NAAP-22**	**5.2.1.7.4**
7	**NAAP-022**	**N**	**DWBG**	**NAAP-23 through NAAP-26**	**5.2.1.6.1**
4	NAAP-023	Y	RDX-BG	NAAP-33, NAAP-64	5.2.1.4.2
4	**NAAP-024**	**N**	**TNT-BG**	**NAAP-50**	**5.2.1.4.4**
7	NAAP-025	Y	Trenches at Old Concrete Plant	NAAP-28, NAAP-28A, NAAP-65A	5.2.1.6.4, 5.2.1.6.5
4	NAAP-032	Y	GSBs/PCCRP	NAAP-34 through NAAP-36, NAAP-49	5.2.1.4.3
7	NAAP-033	Y	CSL	NAAP-27	5.2.1.6.3
4	NAAP-037	Y	RWABs	NAAP-29 through NAAP-32	5.2.1.4.1
1	NAAP-038	Y	NSPs	NAAP-1, NAAP-2	5.2.1.1.1
8	NAAP-039	Y	Former UST Sites (5)	NAAP-66	5.2.1.7.3
8	NAAP-040	Y	RDX-MA Acid Facility	NAAP-3A	5.2.1.7.2
NA	NAAP-041	NA	Asbestos Dumpsite	None assigned	NA
NA	Not Applicable	NA	Not Applicable (SWMUs not associated with AEDB-R Number)	NAAP-48, NAAP-51 through NAAP-53, NAAP-55 through NAAP-63, NAAP-65, NAAP-66	NA

Bolded rows = IRP sites that are not NFA per the permit

Facility-wide RFI groundwater sampling results from one upgradient and two downgradient wells indicate that site-related metals concentrations that were an order of magnitude higher than their background mean were detected only in downgradient well NSP-03 (SAIC 2003a). No VX-related compounds were detected in the groundwater during the Facility-wide RFI or during earlier Site Investigation (SI) activities. The reported disposal of decontaminated solid waste from the VX manufacturing process at the NSPs has not impacted the groundwater at this SWMU. A deed notice currently exists to indicate the presence of the NSPs in this area. Based on these findings, the Army recommended no further action (NFA), other than implementation of land use controls (LUCs) for the NSPs (SAIC 2004a). This recommendation was

reviewed and accepted by IDEM in a letter dated January 9, 2004 (IDEM 2004a). The land use restriction at the NSPs prohibits excavation of soil or buried waste in the pit area (SAIC 2005d).

5.2.1.2 Study Section 2

Study Section 2 consists of the RDX-MA (SWMU NAAP-3 and AEDB-R NAAP-001). The RDX-MA is described below.

5.2.1.2.1 RDX Manufacturing Area

The RDX-MA is designated as SWMU NAAP-3. The RDX-MA comprises approximately 275 acres and is in the north-central portion of NECD. The complex was constructed in 1942 to manufacture explosives for use by the U.S. and allied militaries during WWII. Manufacture of explosives was conducted in 5 production lines composed of 80 manufacturing buildings and several additional support structures. Production of RDX occurred from October 1942 through September 1946, after which NECD was placed on standby status. Production once again commenced in August 1951 when 2 mothballed production lines comprising 59 buildings were rehabilitated (Dames & Moore 1991b). RDX production was suspended in March 1957 and NECD was placed on nonproduction status. In March 1977, the entire 275-acre RDX-MA complex was declared surplus and the buildings subsequently were burned. However, concrete building foundations, sewer ditches, and underground piping were left in place. This area has served as pasture for cattle grazing under a local lease agreement (Dames & Moore 1991b). The grazing season for this area typically was from July 1 to November 30 (Mason & Hanger 2001).

Soil—Based on the results of the baseline human health risk assessment presented in the Phase III RFI (Versar 1998), RDX was identified as the chemical of concern (COC) in soil. A Final Corrective Measures Study (CMS) for the RDX-MA was completed in July 2002 (SAIC 2002). The Final CMS proposed composting to treat soils contaminated with RDX. The target clean level for the RDX-MA CMI was established to be protective of the maintenance worker. CMI activities (i.e., remediation of RDX-contaminated soil by composting) have been completed. A total of 6,669 cubic yards of loose soil was excavated from the RDX-MA and transported to the TNT-BG for composting inside temporary buildings. The composted soil was returned to the RDX-MA to backfill the excavations.

Groundwater—For the RFI groundwater investigation, the RDX-MA was divided into the North RDX-MA, where the former Recrystallizer Building was located, and the South RDX-MA, where the former Wax House was located. The results of the groundwater investigation indicate that volatile organic compounds (VOCs) and explosives are present in groundwater near the former Recrystallizer Building and Boiler House. Groundwater contamination has not migrated north of the intermittent creek and contamination in downgradient wells decreased from 1991 to 1998. Metals were present at 1991 levels during the 1997-98 sampling. In the human health risk assessment, hypothetical exposure of residents to groundwater in the shallow unsaturated zone was responsible for risks exceeding regulatory targets. Groundwater cancer risks exceeded the target of 1×10^{-4} and noncancer hazard indices (HIs) exceeded the target of 1 for both the north and south exposure units. Groundwater modeling results (SAIC 2003a) indicate that there are no unacceptable human health or ecological risks from exposures to constituents discharging from groundwater to surface water. Based on these findings, the Army recommended no further investigation at the RDX-MA other than implementation of LUCs to prevent residential land use and groundwater use, and semi-annual groundwater monitoring (SAIC 2003a). A long-term monitoring plan, including groundwater and surface water monitoring at both the North and South RDX-MA, was approved by IDEM (SAIC 2005d and NECD 2006).

5.2.1.3 Study Section 3

The Hazardous Waste Storage Building (SWMU NAAP-55) is located within Study Section 3. This SWMU is discussed below.

5.2.1.3.1 Hazardous Waste Storage Building

The Hazardous Waste Storage Building (Building 729A) is designated as SWMU NAAP-55. The site is a container storage area that has been in operation from 1981 to the present (NECD 2006). This SWMU is listed as NFA in the 2006 RCRA permit (NECD 2006).

5.2.1.4 Study Section 4

The following SWMUs are within Study Section 4 and are discussed in this section:

- RWABs (SWMU NAAP-29 through NAAP-32 and AEDB-R NAAP-037)
- RDX-BG (SWMU NAAP-33 and AEDB-R NAAP-023)
- Old Chemical Munitions Component Detonation Area (OCMCDA) (SWMU NAAP-64 and AEDB-R NAAP-023)
- GSBs (SWMU NAAP-34 through NAAP-36 and AEDBR NAAP-032)
- PCCRP (SWMU NAAP-49 and AEDB-R NAAP-032)
- TNT-BG (SWMU NAAP-50 and AEDB-R NAAP-024)
- Sanitary Landfill (SWMU NAAP-51).

5.2.1.4.1 Red Water Ash Basins

The RWABs are designated as SWMUs NAAP-29 through NAAP-32. The RWABs are located in the south central area of NECD. The facility consists of three adjacent basins, each measuring approximately 250 by 300 by 18 feet, with a combined capacity of approximately 30 million gallons. Each basin is surrounded by a berm constructed of native clay, sand, and gravel, with lower berms between basins. A gap approximately 20 feet wide exists in the western berm at each basin to allow access. The lowest portions of these berm gaps remain several feet higher than the interior areas of the basin. The basins are lined with 2 feet of compacted soil and an approximately ½-inch-thick, asphalt impregnated, felt panel liner. A concrete sump in the northeast corner of each basin drains to the holding sump located northeast of the RWABs (SWMU NAAP-32). This holding sump is constructed below grade of native clay, sand, and gravel, and lined with a synthetic membrane liner. The holding sump measures 60 by 60 feet and the capacity is approximately 135,000 gallons. Discharges from the holding sump are piped south to the PCCRP (SWMU NAAP-49) (Dames & Moore 1991b).

The RWABs were used to contain wastewater, ash, and sludges resulting from the treatment of red water associated with TNT production in 1973-74. When the TNT plant was put on layaway status in 1974, the sumps in each basin were plugged to prevent runoff to the holding sump. Water was allowed to accumulate in the ash basins and stood at an average depth of 6 feet. In 1984, NECD was permitted to drain accumulated water to the holding sump from where it was pumped to the PCCRP. The sumps currently remain open, allowing conveyance of any accumulated rainwater to the holding sump and finally to the PCCRP (Dames & Moore 1991b).

Residual waste ash from the red water destruction process remains in the two southernmost basins. The north basin was not used for direct disposal of waste; however, all basin soils may have been exposed to the contaminated water from the south and middle basins because accumulated rainwater overflowed the intermediate berms between the basins (Dames & Moore 1991b).

The RWABs no longer contain surface water and were reclassified by EPA, Region 5 as landfill units. A Remedial Investigation (RI) was completed in December 1991. Low levels of contamination (VOCs and explosives) were detected in the sediment contents of the RWAB and in groundwater at the site; however, this does not represent a human or environmental threat. In July 1997, the ENTECH/SAIC

team submitted a Facility-wide RFI Work Plan that included a Phase III Release Characterization for Groundwater and a Phase II Release Assessment for Surface Water. The RFI implementation began in 1998 and was completed in 2000. The human health risk assessment determined that soil, sediment, and surface water risks do not exceed regulatory targets under all scenarios evaluated. SWMUs NAAP-29 through NAAP-32 are included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for these SWMUs in a letter dated January 9, 2004 (IDEM 2004a). These SWMUs do not require LUCs (NECD 2006).

5.2.1.4.2 RDX Burning Ground and Old Chemical Munitions Component Detonation Area

The RDX-BG and OCMCDA are designated as SWMUs NAAP-33 and NAAP-64, respectively. The RDX-BG occupies an area of 14.92 acres in the southwestern portion of NECD and consists of contiguous rectangles measuring 500 by 1,000 feet and 300 by 500 feet. The site reportedly was used sporadically from 1942 to 1946, 1951 to 1957, and 1968 to 1976. Materials burned at the site included waste RDX and waste explosives components of M23 land mines and M55 rockets. Waste explosives components from M23 land mines and M55 rockets were disposed of by the U.S. Army Technical Escort Detachment at the RDX-BG (SAIC 2003a).

In addition to the RDX-BG, destruction of component parts from old chemical munitions was reported at the OCMCDA. These parts were not contaminated by agent VX and were destroyed either by burning, detonation, or a combination of the two. The OCMCDA is considered to be the area where the explosives components from land mines and rockets were disposed of. Mines and rockets that were identified as leaking during their filling with chemical agent were decontaminated with chlorine water followed by neutralization with sodium hydroxide; decontamination occurred within Building 144. Leaking M23 mines and M55 rockets with explosive components were shipped to Edgewood Arsenal, Maryland, for disposal. Based on this information, it is not believed that chemical agent-contaminated M23 mines and M55 rockets were disposed of at the OCMCDA (SAIC 2003a).

In general, a comprehensive history is not available for the RDX-BG or OCMCDA. There is a lack of documentation on the previous site activities and the specific location at the site for activities that were conducted. The specific location of activities in the OCMCDA is thought to be either inside the RDX-BG itself or just north of the formerly fenced perimeter of the RDX-BG; however, no visual (aerial photographs) or analytical evidence of such activity was noted either during the initial reconnaissance of the area or after subsequent media sampling (SAIC 2003a).

The RI was completed in December 1991 by Dames & Moore. During the RI, carbon tetrachloride and trichloroethene (TCE) were detected in groundwater at concentrations that would present cancer risks over the 1×10^{-6} benchmark if groundwater onsite were used for drinking purposes. However, cancer risks under this unlikely scenario were still below 1×10^{-5} at that time (NECD 2006).

This site is now covered in grass. In July 1997, ENTECH/SAIC submitted a Facility-wide RFI Work Plan that included a Phase III Release Characterization for Groundwater. The RFI implementation began in 1998 and was completed in 2000. As noted in the Final RFI Report (SAIC 2003a), in the human health risk assessment, cancer risks, noncancer HIs, and blood lead levels were below regulatory targets for all receptors evaluated. Although the combined noncancer HIs for the residents were at or above the target of 1, the target organ HIs did not exceed 1 after segregation according to target organ.

Onsite soil screening of surficial soil samples was conducted to delineate the OCMCDA (located either inside or just north of the fenced perimeter of the RDX-BG). Ten percent of the surface soil samples were analyzed by the offsite laboratory to confirm onsite screening results. No explosives were detected during the soil screening and confirmatory program (SAIC 2003a).

SWMUs NAAP-33 and NAAP-64 are included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for this site in a letter dated January 9, 2004 (IDEM 2004a). These sites do not require any LUCs (NECD 2006).

5.2.1.4.3 Gypsum Sludge Basins and Pollution Control Center Retention Pond

The GSBs (SWMUs NAAP-34 through NAAP-36) and PCCRP (SWMU NAAP-49) are in the south-central area of NECD. Because of their close proximity to each other and similar functional relationships, these two SWMUs have been addressed as one SWMU group during the RI and Facility-wide RFI. The GSBs include three above-grade basins, each 10 feet deep and covering an area of 400 by 400 feet (3.67 acres) (USAEHA 1986). The basins are constructed with compacted native clay earthen berms with no membrane liner. They were intended to be used to contain settled gypsum sludge produced by the neutralization of acidic wastewaters associated with TNT production in 1973-74. Drainage occurs through a central overflow standpipe in each basin that flows by gravity through underground pipes to the PCCRP (Dames & Moore 1991b). The EPIC study identified standing liquid in all three basins in 1975 (EPIC 1985, as cited in Dames & Moore 1991b). Visual inspection of the basins in 1986 identified only the northernmost basin of the GSBs as containing gypsum sludge (USAEHA 1986). Currently, all three basins are drained and relatively dry.

The PCCRP is an in-ground basin constructed of clay, sand, and gravel, and is lined with fiber-reinforced asphaltic panels. The panels are separating and allowing the basin sides to erode. The PCCRP is 5 feet deep and covers an area of 275 by 275 feet (1.74 acres) (USAEHA 1986). During active operations in 1973-74, the PCCRP received wastewaters from the PCC clarifiers, as well as the GSBs' effluent. The PCCRP also received water from the RWABs during the 1974 TNT plant shutdown. In 1984, the water that had been collecting in the RWABs since 1974 (when the TNT plant shut down) was pumped to the PCCRP. The pond currently (1984 to present) accepts stormwater drainage from the RWABs, as well as the GSBs, providing a final settling point before the clarified effluent is pumped to Little Raccoon Creek (Dames & Moore 1991b).

Soil and groundwater sampling activities were conducted at the GSBs and PCCRP during three investigations at NECD: the 1991 RI, 1997-98 RFI, and 2000 Follow-on RFI. Sampling locations and analytical parameters were selected based on the history of the SWMUs and identified data gaps. Groundwater, surface/subsurface soil, sediment, and surface water samples were analyzed for the parameters most likely to be present at the SWMUs: VOCs, base/neutral and acid extractables (BNAs)/semivolatile organic compounds (SVOCs), metals, and explosives. VOCs, BNAs/SVOCs, and explosives were not detected in the soil at either SWMU during the 1987 USAEHA study, the 1991 RI, or the 1997-98 RFI. The concentrations of metals detected in the GSBs and PCCRP during the 1991 RI are consistent with background concentrations. Metals concentrations detected in soil in the northernmost GSB during the 2000 Follow-on RFI are all below their associated IDEM migration to groundwater criteria. Hexavalent chromium was not detected in the GSBs groundwater, GSBs soil, or PCCRP sediment samples during the 2000 Follow-on RFI, and all metals concentrations were below IDEM default closure levels (SAIC 2004a).

Elevated metals concentrations were detected in the groundwater during the 1997-98 RFI at concentrations that pose a potential future risk to human health. Human health risk assessment for the GSBs indicates cancer risks and noncancer HIs exceeding targets for the exposure of residents to groundwater in the shallow unsaturated zone. However, there is neither current nor future feasible use of the sampled shallow groundwater due to poor yield and low transmissivity. Groundwater modeling results indicate that iron and manganese would not be present in the nearest creek at concentrations above background for up to 500 years. In addition, the combined noncancer HI for the produce consumer is above the target. No risks were calculated for soil at the PCCRP and the risks due to groundwater exposure at the PCCRP are the same as for the GSBs because the groundwater underlying these two areas

was treated as a single exposure unit. Based on the rationale presented above, NFA, other than implementation of LUCs to restrict residential and agricultural land use at the GSBs and residential land use at the PCCRP, was recommended (SAIC 2004a).

SWMUs NAAP-34 through NAAP-36 and NAAP-49 are included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for these SWMUs in a letter dated January 9, 2004 (IDEM 2004a). SWMUs NAAP-34 through NAAP-36 are included in the NECD Land Use Control Implementation Plan (LUCIP) (SAIC 2005d). LUCs are in place at the GSBs. The PCCRP does not require any LUCs (NECD 2006).

5.2.1.4.4 TNT Burning Ground

The TNT-BG is designated as SWMU NAAP-50. The former burning ground for TNT-contaminated debris is in the southwestern portion of the installation. The TNT-BG encompasses approximately 4 acres. The entire TNT-BG is enclosed by a chain-link fence and is accessed by a locked gate on the north side of the SWMU.

Three burial trenches reportedly were used within the fenced TNT-BG to dispose of burned explosive residues, beginning in approximately 1973. The burial trenches reportedly included two trenches parallel to the west fence and one trench parallel to the south fence (A.T. Kearney 1987). The dimensions of the trenches parallel to the west fence were approximately 10 by 140 feet and 10 by 85 feet with a depth of approximately 7 feet. The trench parallel to the south fence was 25 by 175 feet with a depth of approximately 7 feet. The burial trench information was based on discussions with site personnel, review of records, aerial photographs, and 1988 geophysical surveying and soil boring data. The 1988 data were collected during an RI of the TNT-BG (Dames & Moore 1991b).

Various types of solid waste were brought to the TNT-BG for treatment (i.e., burning) and disposal during the mid-1970s. These materials included reject TNT, TNT residue from tanks and lines at the TNT production plant, contaminated floor sweepings, wood pallets, excelsior, oil or gasoline used to facilitate the burning, and contaminated debris from the inactive TNT plant during and after plant layaway in 1975. In addition, several thousand gallons of liquid containing dinitrotoluene (DNT) and mononitrotoluene (MNT) reportedly were poured directly into the trenches (Dames & Moore 1991b). Approximately 500 gallons of fuel oil also were added to the DNT and MNT liquid to facilitate burning the material. The fuel oil reportedly burned for 2 days; however, it is believed that combustion of the TNT and MNT liquid was not achieved (Personal Communication 2007f). Wastewater treatment sludge from the TNT wastewater collection and handling area sumps and tanks (SWMUs NAAP-42 through NAAP-46) was taken to the TNT-BG for burning and subsequent burial (A.T. Kearney 1987). In addition, an anecdotal report stated that a box of dynamite and a dynamite-contaminated wood floor may have been burned and disposed of at the TNT-BG (Mason & Hanger 1996).

Materials disposed of at the TNT-BG typically were stacked on wooden pallets on one of the two burn pads (the western pad was used more often) and subsequently set afire. After burning, the residue was bulldozed into a nearby trench for burial. Various reports indicate that burning may have been conducted occasionally in the trenches. Pallets stacked at the bottom were covered with the explosives-contaminated wastes, and oil or gasoline was added to start the burning, if necessary. As in any open burning operation, complete combustion was not always achieved (Dames & Moore 1991b).

The trenches reportedly were excavated by a bulldozer to depths of 5 to 7 feet BLS, with width equal to the width of the bulldozer blade (assumed to be approximately 8 feet). The trenches were opened progressively, as needed, beginning with the westernmost trench, and a segment was seldom open longer than 1 month before being backfilled. Reportedly, the trenches were not used after approximately 1975 (Dames & Moore 1991b).

Since 1980, four burns were conducted at the TNT-BG. The burns all were conducted directly on the ground surface. One burn was conducted in 1983 at two areas at SWMU NAAP-50 and three burns were conducted at one general area in 1986.

A CMS completed in 1995 at the TNT-BG (SAIC 1995) proposed onsite composting as the recommended corrective measure alternative. The target cleanup levels for the COCs in soil (TNT, 2,4-dinitrotoluene [2,4-DNT], trinitrobenzene, RDX, 2-amino-4,6-dinitrotoluene [2-A-4,6-DNT], and pentaerythritol tetranitrate [PETN]) were established to be protective of off-post groundwater receptors. A composting Treatability Study was conducted from July 16 to August 25, 1998 by SAIC under a subcontract to ENTECH, Inc. Based on the results and recommendations of the Treatability Study, a conceptual design was prepared for the full-scale bioremediation of the explosives-contaminated soil from the TNT-BG (SAIC 2001a). The decision document indicating that onsite composting would be the selected remedy at the TNT-BG was executed in August 2001 (IDEM 2001). A Temporary Authorization Request (TAR) and Class 3 RCRA permit modification to allow for onsite treatment of soil were submitted to IDEM in April 2002. IDEM granted temporary authorization on April 30, 2002, and the RCRA permit modification designating the TNT-BG as a Corrective Action Management Unit (CAMU) was approved on February 5, 2003.

CMI activities (i.e., remediation of explosives-contaminated soil by composting) were conducted at the SWMU and all former structures (e.g., the burn cage) have been removed. Approximately 6,989 cubic yards of loose soil were remediated to meet the target cleanup levels. In addition, groundwater that collected in the soil excavations during the CMI was treated onsite using a carbon filtration unit before discharge to a tributary of Buck Creek (SAIC 2004b).

The TNT-BG was divided into three groundwater exposure units: TNT-BG North, TNT-BG Central, and TNT-BG Southeast. Results from the Facility-wide RFI indicate site-related contamination in the TNT-BG North exposure unit, although at concentrations near reporting limits (RLs) for SVOCs and metals. Contamination within the TNT-BG Central exposure unit was detected immediately downgradient from the three burial trenches within the fenceline of this SWMU. Contaminants detected previously during the RI (Dames & Moore 1991b) in BG-03, the well downgradient nearest the trenches, were confirmed at slightly lower concentrations than in 1991. Data for the wells in the TNT-BG Southeast exposure unit indicate lower concentrations of contamination than upgradient wells nearer the trenches, essentially defining the downgradient extent of contamination in the shallow saturated zone. In the human health risk assessment, hypothetical exposure of residents to groundwater in the shallow unsaturated zone is responsible for risks exceeding regulatory targets. Groundwater cancer risks exceeded the target for TNT-BG Central and TNT-BG Southeast exposure units and noncancer HIs exceeded the target at all three exposure units. LUCs to prevent residential land use at the SWMU and groundwater monitoring in conjunction with the CMI were recommended by the U.S. Army (SAIC 2003a). Groundwater monitoring activities are addressed in the TNT-BG Groundwater Technical Memoranda (SAIC 2003c, 2003d, 2004a, and 2004b). 2,4-DNT was the primary COC and long-term groundwater monitoring of the SWMU indicates that 2,4-DNT concentrations have decreased considerably since 1997.

SWMU NAAP-50 is included in the NECD LUCIP (SAIC 2005d). LUCs have been implemented; the LUCs at the TNT-BG include no residential or groundwater use (SAIC 2005d and NECD 2006).

5.2.1.4.5 Sanitary Landfill

The Sanitary Landfill (SWMU NAAP-51) was permitted and was in operation from 1981 to 1987. The site encompasses approximately 30 acres, but only a small portion, 0.67 acres, was used. This site was closed in 1997 in accordance with Closure and Post-Closure Plans. Groundwater monitoring was scheduled to continue for 10 years after closure. However, On July 3, 2001, IDEM issued a letter to Mason & Hanger stating that the groundwater monitoring requirements for the 10-year post closure

period had been met and no further monitoring was necessary. NECD was advised the groundwater monitoring wells could be abandoned (NECD 2006).

5.2.1.5 Study Section 5

The TNT-MA (SWMUs NAAP-37 through NAAP-47 and AEDB-R NAAP-008), TNT Acid Production Area (SWMUs NAAP-56 through NAAP-63) and PCC (SWMUs NAAP-48 and NAAP-49 as well as AEDB-R NAAP-032) are within Study Section 5 and are discussed below.

5.2.1.5.1 TNT Manufacturing Area

The TNT-MA consists of SWMUs NAAP-37 through NAAP-47. This site was in operation from 1973 to 1974 and consists of TNT Production Lines 1, 2, 3, 4 and 5; TNT Wastewater and Handling Areas #1, #2, #3, #4, and #5; and the TNT Wastewater Treatment Facility. Media of concern include the soil and groundwater. Ground elevation is nearly flat. During operation, a toluene spill occurred once and was reportedly cleaned up. Elevated concentrations of toluene have not been detected during groundwater monitoring at the TNT-MA.

In December 1991, Dames & Moore completed an SI report. According to the SI report, no analytes (excluding total metals) exceeded the health-based comparison values and there were no analytes selected as COCs in the soil. Low concentrations of explosives compounds, below health-based comparison values, were detected in groundwater during the SI. It has been concluded, however, that no significant impact from past operations at this site has occurred.

Equipment and lines within the facility were cleaned by hot gas decontamination, which TVA concluded in January 1999. The liquidation project concluded in November 1999 by Earth Tech. No contaminated process equipment remains. In January 2006, IDEM issued the RCRA permit renewal including this site as NFA (NECD 2006).

5.2.1.5.2 TNT Acid Production Area

The TNT Acid Production Area is within the TNT-MA. The SWMUs associated with the TNT Acid Production area are SWMUs NAAP-56 through NAAP-63, which are drains connected to a process sewer system that flows to SWMU NAAP-48, the PCC. These sites were in operation from 1971 to 1974 and include an Acid Tank Farm Drain, a Sulfur and Ammonia Unloading Area Drain, a Utilities and Shop Area Drain, TNT Laboratory Drains, TNT Acid Laboratory Drains, NAC and Denitration (DN) Drains, AOP Facility Drains, and SAR Drains. In January 2006, IDEM issued the RCRA permit renewal including this site as NFA (NECD 2006).

5.2.1.5.3 Pollution Control Center

The PCC (SWMU NAAP-48) was an Industrial Wastewater Treatment Plant and was in operation from 1971 to 1974. This unit neutralized weak acid waste streams and produced calcium sulfate, or gypsum. NECD will submit an NFA memorandum to IDEM seeking concurrence that this site is NFA (NECD 2006).

5.2.1.6 Study Section 7

The DWBG (SWMUs NAAP-23 through NAAP-26A and AEDB-R NAAP-022), DI/SY (SWMU NAAP-65), CSL (SWMU NAAP-27 and AEDB-R NAAP-033), MCD (SWMU NAAP-28A and AEDB-R NAAP-025), CDD (SWMU NAAP-28 and AEDB-R NAAP-025), and STP (SWMU NAAP-52) are within Study Section 7 and are discussed below.

5.2.1.6.1 Decontaminated Waste Burial Ground

The DWBG is on approximately 23 acres south of Little Raccoon Creek in the eastern portion of NECD and approximately 0.25 miles south of the Chemical Plant. The DWBG was split into east and west exposure units for risk assessment purposes. The DWBG contains at least four specific burial sites and three additional areas, including burn cages, Pit A, and an area reportedly containing a 300-gallon buried tank. These individual features account for the several SWMUs associated with the general DWBG area. The DWBG was reported to be active on a sporadic basis; documented use of the area was indicated in 1963, 1968, and 1974.

Of the SWMUs identified at the DWBG, the four burial sites are the best documented. The burial sites, which are identified as Burial Areas 1 through 4 (SWMUs NAAP-23 through NAAP-26, respectively), are composed of a series of trenches within which various production wastes and structural debris were deposited. The following discussion provides a brief overview of the known configuration and contents of each of the four areas.

Burial Area 1 (SWMU NAAP-23) is in the southern portion of the DWBG and includes six known trenches. The five northernmost trenches were used in 1968 to dispose of decontaminated wastes associated with the production of agent VX. These wastes included pipes, valves, gas masks, gloves, drums, and sample bottles. Other wastes, including weapons components, also may be present. The sixth, southernmost trench was used to dispose of drums containing polymerized urea from the decomposed agent VX stabilizer dicyclohexyl carbodiimide. These drums, however, reportedly were removed in the early 1970s and shipped to Edgewood Arsenal in Aberdeen Proving Ground, Maryland (Dames & Moore 1991b).

Burial Area 2 (SWMU NAAP-24) consists of two east-west burial trenches east of the burning cages. Posted signs at the foot of the trenches, dated June 1974, state that asbestos from Lines 1 and 2 of the TNT-MA are buried in these trenches. In addition, nitrobody-contaminated gaskets reportedly were buried in Burial Area 2. No records were available concerning the volume of waste in this unit (Dames & Moore 1991b).

Burial Area 3 (SWMU NAAP-25) is east of Burial Area 2 and consists of one north-south oriented trench that was used in 1974 to dispose of "sulfur wastes" that originated from the TNT-MA. No additional specifics concerning the waste were reported (Dames & Moore 1991b).

Burial Area 4 (SWMU NAAP-26) is in the northeastern corner of the DWBG and consists of one large trench. The waste reportedly placed into this area contained residues of a 1966-67 binary program (including VX production) that was terminated by fire and deflagration. In addition, asbestos waste from the heavy water production facility also reportedly was disposed of in this trench in 1963 (Dames & Moore 1991b).

The remaining features identified within the DWBG are not well-documented. The two burning cages at the center of the site were known to have been used to burn administrative wastes prior to 1970; subsequent usage, if any, is not documented. In addition, Pit A (SWMU NAAP-26A), which was identified in an historical aerial photographic interpretation survey, never was identified clearly as a disposal area. The final unit, the 300-gallon chemical tank (SWMU NAAP-54), never has been located, but it is reported to have been filled with phosphorus compounds, including potentially pyrophoric solids, that sometimes clogged the process equipment. The tank was reported to have been buried somewhere in the western portion of the site in approximately March 1961. Previous geophysical survey results indicate that a substantial amount of scrap metal, concrete rubble, compressed gas cylinders, and other debris were buried in this general area of the DWBG. SAIC conducted an interview with a former employee involved with the tank burial to further refine the tank's location. In December 2003, a supplemental geophysical survey was conducted and five potential anomalies were found in the surveyed area. Historical

information and the interpretation of the electromagnetic (EM) data refined the potential tank location to two of the anomalies, both of which are in the western portion of the DWBG (SAIC 2004b). Intrusive investigation to locate the tank was conducted in the spring of 2008; however, the tank was not found.

The surface soil in the western portion of the DWBG was identified as being contaminated with mercury. Mercury was identified as a COC for ecological receptors. No human health COCs were identified for future industrial land use at the DWBG (SAIC 2003b).

A CMS for soil at the DWBG was completed in May 2003 (SAIC 2003b). The CMS considered the corrective measure objectives and the physical site conditions and constraints (i.e., presence of surface and subsurface debris) in order to develop corrective measure alternatives for the DWBG. Following a detailed analysis of the corrective measure alternatives, the CMS proposed limited actions as the recommended corrective action measure alternative. A decision document for the preferred corrective measure alternative (i.e., limited actions) for the DWBG was reviewed and accepted by IDEM on June 27, 2003 (IDEM 2003a). As a result, a 1-foot-thick soil barrier, which is an engineering control to prevent ecological receptors from being exposed to the contaminated soil, was placed at the DWBG. Clearing for barrier placement began in September 2003 and final seeding occurred in May 2004 (SAIC 2005c).

To address groundwater and surface water VOC concentrations at the West DWBG, the long-term monitoring (LTM) program at the DWBG was implemented in accordance with the recommendations provided in the Groundwater Technical Memorandum (SAIC 2003e). Groundwater underlying the area of the West DWBG and vicinity currently is impacted by chlorinated solvents. Buried sources of the chlorinated solvents south of Pit A have not been definitively characterized. Historical groundwater data indicate that concentrations of TCE and chlorinated breakdown products have remained fairly consistent since 1997 and these chemicals continue to affect the groundwater quality south of the area of Pit A. In addition, the detection of TCE, dichloroethene (DCE), and vinyl chloride in surface water adjacent to the site confirms that groundwater COCs are discharging to Little Raccoon Creek. Because the historical groundwater and surface water data indicate the presence of solvent contamination, continued monitoring of the groundwater and surface water at the West DWBG is ongoing.

SWMUs NAAP-23 through NAAP-26, NAAP-26A, and NAAP-54 are included in the NECD LUCIP (SAIC 2005d). LUCs, including no intrusive activities, and no residential, agricultural, and groundwater use, have been implemented.

5.2.1.6.2 Demilitarization Incinerator/Scrap Yard

The DI/SY (SWMU NAAP-65) borders the western boundary of the CSL (SWMU NAAP-27) and covers approximately 5 acres. The topography at SWMU NAAP-65 ranges from 600 to 630 feet above msl. The DI/SY maintains the same northern and southern borders as the CSL, but is bordered directly to the west by Little Raccoon Creek. Seeps and springs in the northwestern and southwestern portions of the SWMU produce water that is introduced into Little Raccoon Creek through surface runoff.

A demilitarization incinerator formerly was located within the physical boundaries of SWMU NAAP-65 and along its southern boundary within a fenced area. According to personnel reports, demilitarization/decontamination items, such as defective, empty land mines once filled with chemical agent, were decontaminated in the early 1970s using a bleach wash (3X decontamination) at another site on the installation and then transferred to the incinerator. These empty mines were heated to 5X decontamination, leaving the casings intact, and then deposited in a landfill on the installation. No records are available that indicate whether the casings were disposed of at the CSL or when operations were conducted (NECD 1996). A 2003 personnel interview indicated that empty mine casings may have been buried onsite at the DI/SY (Mason & Hanger 2003a). The western boundary of the DI/SY is still used on a limited basis as a scrap yard. The demilitarization incinerator was removed from the facility in 2004, and the majority of the area has been overgrown with native grasses (SAIC 2004a).

An RI was completed in December 1991 by Dames & Moore. Contamination by organics, inorganics, and explosives was detected at moderate concentrations in the groundwater. COCs were identified as heavy metals, explosives, and volatiles in the soil and groundwater. SAIC conducted a Phase II Release Assessment for Soil and a Phase III Release Characterization for Groundwater at SWMU NAAP-65. SAIC issued a report for this SWMU in March 1997 (Dames & Moore 1991b).

Results from the groundwater RFI indicated that explosives, SVOCs, site-related metals, polynuclear aromatic hydrocarbons (PAHs), and VOCs were detected in multiple wells during more than one sampling event. The organic compounds detected in groundwater were detected at low concentrations (near the RLs), and no clear patterns or trends were evident. Metals concentrations exceeding background were randomly distributed across the site. RDX was detected in the groundwater, but no trend or source area was identified. Explosives, SVOCs, site-related metals, and VOCs were detected in the Scrap Yard soils. Three of the four detected explosives were at concentrations below their RLs. SVOCs were identified at low concentrations with no vertical migration and inconsistent spatial distribution and a limited number of VOCs were detected at low concentrations in the soils in the DI/SY area. Twenty-two metals were detected in the DI/SY soil samples at concentrations exceeding background.

Additional soil sampling activities were conducted at the DI/SY in November and December 2002 to determine whether lead contamination at the site was significant or widespread. The sampling locations were selected based on the history of the SWMU and identified data gaps. The sampling program was designed to determine the presence or absence of elevated lead concentrations in the surface soils. The lead X-ray fluorescence (XRF) and laboratory analysis results were well below the protective closure levels for construction and industrial workers (SAIC 2005d).

SWMU NAAP-65 was included in the NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for this SWMU in a letter dated January 9, 2004 (IDEM 2004a). The DI/SY is included in the NECD LUCIP (SAIC 2005d). LUCs, including no soil excavation and no residential, agricultural, and groundwater use, have been implemented (SAIC 2005d).

5.2.1.6.3 Closed Sanitary Landfill

The CSL is designated as SWMU NAAP-27 and occupies approximately 4 acres on the southeastern boundary of the installation. The topography at the CSL ranges from 600 to 630 feet above msl. The CSL is bordered to the east by federally leased agricultural land, to the north by a wooded area that separates the site from the former VX production plant, to the south by South Boulevard, and to the west by the DI/SY (SWMU NAAP-65).

Facility operation records indicate that between 1970 and 1977, the CSL was used to dispose of nonhazardous construction debris from the TNT plant and office and shop waste with no salvage value (Dames & Moore 1991b). No records of the materials that were disposed of in this area prior to 1970 are available. Aerial photographs taken of this area from 1940 through 1981 show disposal trenches excavated in a northwest-southeast direction. The waste disposal trenches within the landfill area were each approximately 8 to 10 feet long and 5 feet wide. The landfill was closed in 1977 and topped with cover material consisting of 3 feet of graded soil. The activities related to the CSL were confirmed during interviews with installation personnel (Dames & Moore 1991b).

Soil and groundwater investigations were conducted at the CSL to determine if past operations at the landfill had introduced chemical constituents in the soils and groundwater. Results from the groundwater investigation indicate that explosives, SVOCs, site-related metals, PAHs, and VOCs were detected in multiple wells during more than one sampling event (SAIC 2003a). The organic compounds in groundwater were detected at low concentrations (near the RLs), and no clear patterns or trends were evident. Metals were detected at concentrations exceeding background during all sampling events.

Metals concentrations exceeding background were randomly distributed across the site. RDX was detected in the downgradient wells; however, no trend or source area was identified. Groundwater modeling results (SAIC 2003a) indicated that the predicted concentration of RDX after mixing with the creek surface water was less than all applicable comparison criteria. No identifiable relationship exists between chemicals detected in the groundwater and those detected in the surface water/sediment sampling locations along Little Raccoon Creek, immediately downgradient from the CSL. Explosives, VOCs, SVOCs, and site-related metals were detected in soil samples from the CSL. Explosives, SVOCs, and a majority of the VOCs (31 of 34 samples) were detected at concentrations below the RL. Metals in soil generally were detected at varying concentrations across the site and identified inconsistently with depth. There is no trend evident to support identification of a contaminant source (SAIC 2005d).

Although risks to future residential receptors and produce consumers were identified in the risk assessment, no further investigation or remediation is required to address human health risks based on the assumption that future land use would remain nonresidential and institutional controls (i.e., LUCs) would be implemented to prevent contact with groundwater and prohibit excavation of and contact with waste materials and residential and agricultural land use. SWMU NAAP-27 is included in the NECD LUCIP (SAIC 2005d) and LUCs are being implemented. The CSL is listed as NFA in the RCRA permit. IDEM concurred with the NFA recommendation in a letter dated January 9, 2004 (IDEM 2004a).

5.2.1.6.4 Memorial Chapel RDX Dump

The MCD (SWMU NAAP-28A) is approximately 1,000 feet southwest of the CSL (SWMU NAAP-27). The MCD is the former site of a concrete batch plant. Little is known about this area, but during a site visit conducted on October 25 and 26, 1994, various types of construction debris, particularly large chunks of broken concrete, were seen on and projecting from beneath the surface of the MCD. In addition, a large mound within the MCD area was noted and may contain unspecified debris, including broken concrete and/or similar waste material that may have been pushed together and consolidated by earth-moving equipment. Concrete footings or piers also were noted projecting from the surface of this area (ENTECH/SAIC Team 1997).

During the 1997 RFI, site-related metals in the soil and groundwater and one SVOC in the groundwater were the only constituents detected during the Facility-wide RFI (SAIC 2003a). No investigations at this site were conducted prior to the RFI, and no trends were evident from the data from three groundwater sampling rounds completed during the RFI. Ecological risks to terrestrial species from exposure to metal COCs in soil were expected to be low. Human health risks did not exceed targets identified for soil or groundwater at the MCD, with the exception of produce consumer exposure to copper. Although copper was identified as the COC for the produce consumer, no further investigation or remediation was recommended to address this risk based on the assumption that future use of land for crop growing is unlikely, and LUCs would be implemented to ensure that the use of the land for agricultural purposes is prevented. The U.S. Army's recommendation was reviewed and approved by IDEM (IDEM 2004a). SWMU NAAP-28A is included in the NFA Memorandum (SAIC 2004a) and IDEM concurred with NFA for the MCD in a letter dated January 9, 2004 (IDEM 2004a). SWMU NAAP-28A also is included in the NECD LUCIP and LUCs, including no intrusive activities or agricultural use, have been implemented (SAIC 2005d and NECD 2006).

5.2.1.6.5 Construction Debris Dump

The CDD (SWMU NAAP-28) is on approximately 4.2 acres east of Little Raccoon Creek in the eastern portion of NECD and approximately 500 feet south of the CSL. Little is known about this disposal area, but various types of construction debris, particularly large chunks of broken concrete, were seen on and projecting from beneath the surface. Mounding in this area may have been the result of various waste materials being pushed together and consolidated by earth-moving equipment.

Surface and subsurface soil at this SWMU were identified as being contaminated with metals (arsenic and lead) and a PAH (benzo[a]pyrene). Lead, arsenic, and benzo(a)pyrene were detected at concentrations that pose risks to human health under future industrial land use, while lead also was identified as a COC for ecological receptors (SAIC 2003b).

A CMS for the CDD was completed in May 2003 (SAIC 2003b). The CMS considered the corrective measure objectives and the physical site conditions and constraints (i.e., presence of surface and subsurface debris and the need for creek bank stabilization) in order to develop corrective measure alternatives for the CDD. Following a detailed analysis of the corrective measure alternatives, the CMS proposed capping as the recommended corrective measure alternative. The cap would prevent potential human and ecological exposures to the contaminated material and reduce contaminant migration through dispersion and transport by infiltrating rainwater. A decision document for the preferred corrective measure alternative (i.e., capping) for the CDD was reviewed and accepted by IDEM on June 26, 2003 (IDEM 2003b).

As part of the CMI at the CDD, a cap was placed over approximately 1.2 acres of contaminated soil. Clearing of the area for the cap construction began in September 2003. The last soil was placed in April 2004. Initial seeding of the cap was completed in April 2004 and final seeding occurred in August 2004 after minor deficiencies were corrected (SAIC 2005b). The CDD CMI Completion Report was finalized in March 2005. SWMU NAAP-28 is included in the LUCIP (SAIC 2005d) and LUCs have been implemented. LUCs include no intrusive activities, or residential or agricultural use. LTM of the surface water was required at the CDD to monitor impacts due to potential stormwater/sediment runoff to Little Raccoon Creek. After collection of nine rounds of quarterly sampling, the Army and IDEM agreed to discontinue LTM at the CDD and all required remedial action at this SWMU is complete.

5.2.1.6.6 Sewage Treatment Plant

The STP is SWMU NAAP-52 and is currently permitted under a NPDES permit (IN 0003506) and has been in operation since the 1940s. The STP consists of a primary settling tank, three aeration tanks, a secondary settling tank, a chlorine contact tank, and four sludge drying beds (NECD 2006). The integrity of the sludge beds is not known.

5.2.1.6.7 Little Raccoon Creek

Little Raccoon Creek, referred to in the NECD RCRA Part B permit as AOC-N, originates in the vicinity of the Chemical Plant and flows south through the eastern portion of NECD. The Chemical Plant's close proximity to the creek made it favorable to construct a dam south of the Chemical Plant to form a holding basin or reservoir. According to plant employees, the dam was used to contain any spills or inadvertent releases from the plant from being discharged directly into the creek. The creek continues south until it exits the plant and flows into the Wabash River (SAIC 2003a). Little Raccoon Creek is primarily within Study Section 7; however, it extends to Study Section 8 and tributaries are within Study Sections 2 and 6.

The only identifiable trend of chemicals at elevated concentrations in the surface water and sediment that can be related to site activities is the presence of TCE and its degradation products (cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-dichloroethene [trans-1,2-DCE], and vinyl chloride) in the surface water near and downstream from the DWBG. There is no current exposure to the creek, and no future unacceptable risks to human health exist. Therefore, the RFI recommended NFA for surface water and sediment in Little Raccoon Creek (SAIC 2003a). However, ongoing LTM for the DWBG and RDX-MA includes sampling of the creek and creek tributaries in addition to the groundwater at the SWMUs.

5.2.1.7 Study Section 8

A map of Study Section 8 is provided in Figure 5-2. The following SWMUs are shown in Figure 5-2 and are discussed in this section:

- Chemical Plant Coal Ash Basin (CPAB) (SWMU NAAP-67 and AEDB-R NAAP-016)
- RDX Acid Manufacturing Area (SWMU NAAP-3A and AEDB-R NAAP-040)
- Removed USTs (SWMU NAAP-66)
- Chemical Plant (SWMUs NAAP-4 through NAAP-22 and AEDB-R NAAP-017)
- Waste Oil Tank (SWMU NAAP-53)
- Power House Coal Pile (PHCP) (SWMU NAAP-69).

5.2.1.7.1 Chemical Plant Coal Ash Basin

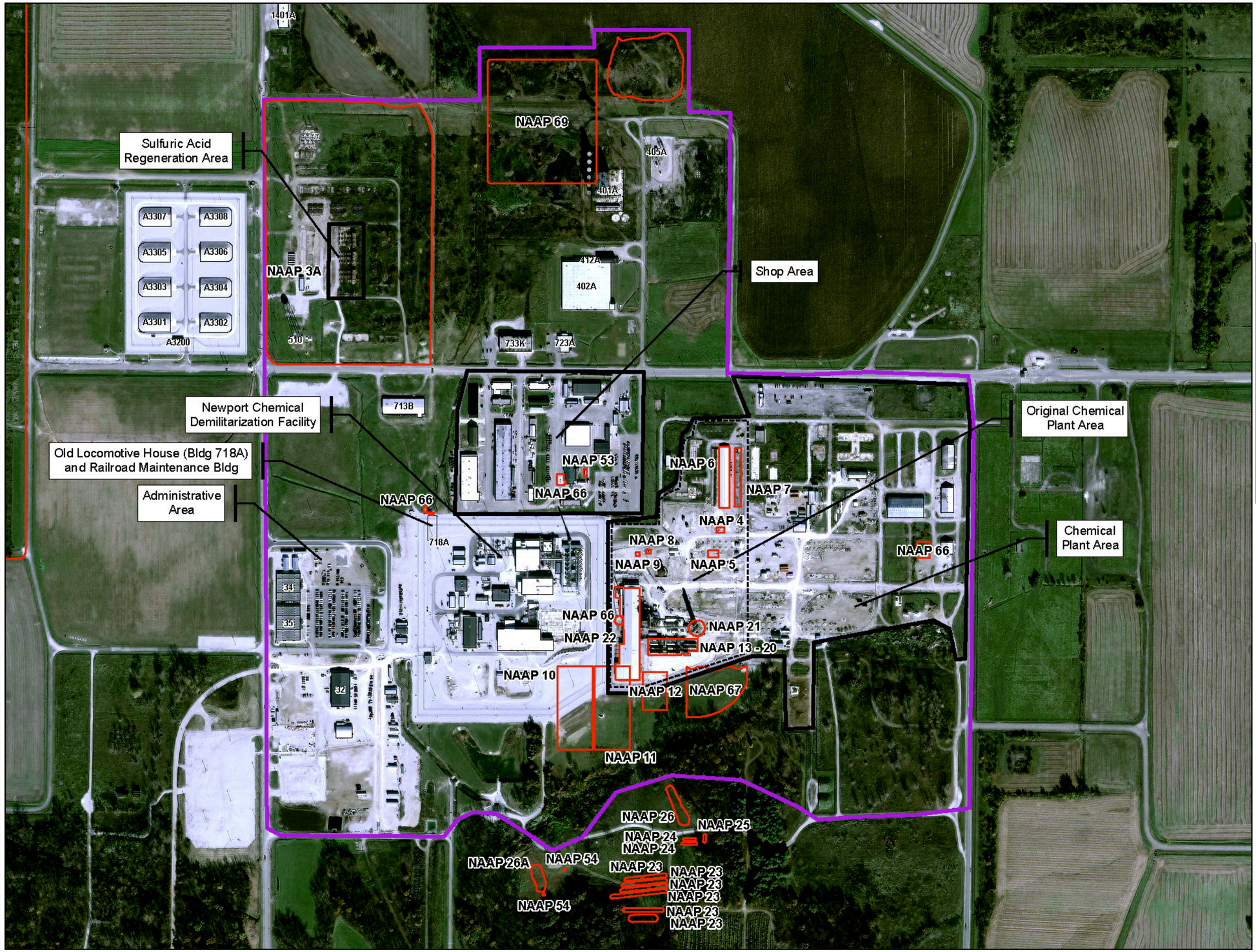
The CPAB (SWMU NAAP-67) was constructed in 1941 to accept coal ash from Building 401A Power House operations. The basin is approximately 100 feet east of SWMU NAAP-12 and measures approximately 250 by 300 by 6 feet deep (Dames & Moore 1991b). The basin accepted sluiced coal ash, a mixture of coal ash and water from Power House operations, and water that was pumped from Building 401A south to the basin. These discharged residual materials formed a sediment layer at the bottom of the basin. The Power House operated continuously between February 1942 and September 1946 and intermittently between August 1951 and March 1957 (SAIC 2003a).

During the 2001 RFI, 2 VOCs, 3 SVOCs, and 15 site-related metals were detected in the soil/sediment samples. Ecological risk to terrestrial receptors from soil exposure to metal ecological chemicals of potential concern (ecoCOPCs) was determined to be low. In the human health risk assessment, cancer risks were below regulatory targets for all receptors evaluated. The noncancer HIs were below regulatory targets for all receptors except the resident child exposed to subsurface soil in the future. Although resident exposure to iron in the subsurface soil is responsible for human health risks exceeding regulatory targets, the ingestion hazard quotient (HQ) for the residential child only slightly exceeds the target of 1, and the iron risk is uncertain and likely conservative because the reference dose (RfD) is provisional and based on nutritional requirements. SWMU NAAP-67 is included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for this SWMU in a letter dated January 9, 2004 (IDEM 2004a). SWMU NAAP-67 is included in the NECD LUCIP (SAIC 2005d). LUCs, including no agricultural, residential, or groundwater use, are being implemented (SAIC 2005d and NECD 2006).

5.2.1.7.2 RDX Acid Manufacturing Area

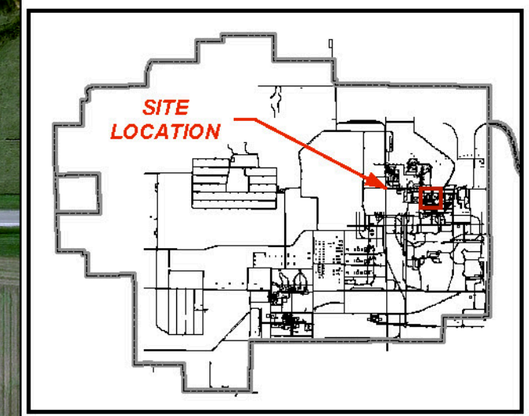
The RDX Acid Manufacturing Area (SWMU NAAP-3A) was in operation between 1942 and 1946 and 1951 and 1957. The site consisted of buildings and chemical process equipment comprising the acid production support facilities of the RDX-MA, and is located in the north-central portion of NECD. This area was identified in the 1979 Installation Assessment (USATHAMA 1979) as a potential area requiring investigation.

In December 1991, Dames & Moore completed an SI. Based on the completed SI, there were no COCs in the groundwater. Additional surface samples were collected and no COCs were identified (SAIC 2003a and NECD 2006). According to the 2005 NECD RCRA permit, a determination of NFA was granted to this site.



Legend

- SWMU Boundaries
- Study Section 8



KEY MAP
NOT TO SCALE

N

250 125 0 250 500 Feet

US Army Corps of Engineers

SAIC From Science to Solutions

STUDY SECTION 8
LAYOUT

NEWPORT CHEMICAL DEPOT
NEWPORT, INDIANA

PROJECT: \GIS_DATA\NECD\Projects\ECP\
Phase I\Figure 5-2 NECD Study Section 8 Layout.mxd

FIGURE: 5-2 | DATE: 9/6/2007

5.2.1.7.3 Removed USTs

SWMU NAAP-66 consists of the removed USTs. The USTs were in operation from 1941 to 1990. This SWMU represents four different locations throughout the installation where five USTs were formerly located. The tanks were removed by the installation in 1990, under the oversight of IDEM. During the process of removing the tanks, it was discovered that the tanks had leaked, thus requiring remedial action of the contaminated soil and groundwater at each site. Most of the tanks had not been in use since the early 1970s, and some not since the late 1950s. The COCs were petroleum, oils, and lubricants (POL) in the soil and groundwater. A Final SI for Risk Based Corrective Action for the RCRA RFI Release Assessment for SWMU NAAP-66 was completed in January 1998 and submitted to IDEM and EPA, Region 5. Region 5 approved the assessment report in October 1998 (NECD 2006). According to the 2005 NECD RCRA permit, a determination of NFA was granted to this site.

5.2.1.7.4 Chemical Plant

The Chemical Plant is approximately 160 acres and is located in the eastern portion of NECD. The former Dana Plant was chosen as the site for the Chemical Plant in July 1959. The Dana Plant was used for heavy water production from 1943 until 1946 and from 1952 until 1957. The Chemical Plant was used to produce VX chemical agent from 1961 until 1968. As of 1965, chemical facility capacity totaled 621,704 square feet for the industrial area and 69,973 square feet for the administrative area (TLI 2007). The following sections contain a general history of the use of the Chemical Plant. In addition, subsections are included that provide greater detail regarding the historical use and previous investigations at each IRP site associated with the Chemical Plant.

The area associated with the Chemical Plant has been sub-divided into several IRP sites, including the Chemical Plant Agent-Free Area, Chemical Plant Pre-Agent Manufacturing Facility, Chemical Plant Agent Area, and Chemical Plant Agent Manufacturing Facility. All of these IRP sites are within the Chemical Plant and, therefore, are discussed in this section.

The Chemical Plant Agent-Free Area includes the following SWMUs:

- SWMU NAAP-6: Basin 30031
- SWMU NAAP-7: Basin 30025
- SWMU NAAP-8: Deep Well Surge Tank
- SWMU NAAP-9: Deep Injection Well
- AOC-M: Drainage Ditches around the Chemical Plant.

The Chemical Plant Pre-Agent Manufacturing Facility includes the following SWMU:

- SWMU NAAP-5: Waste Surge Tank FA-12.

The Chemical Plant Agent Area includes the following SWMUs:

- SWMU NAAP-4: Detoxification Holding Basin
- SWMU NAAP-10: Basin 30007
- SWMU NAAP-11: Basin 30008
- SWMU NAAP-12: Basin 30009
- SWMU NAAP-67: CPAB (discussed in Section 5.2.1.7.1).

The Chemical Plant Agent Manufacturing Facility and VX Storage Tank Farm contain the following SWMUs:

- SWMU NAAP-13: Bulk Storage Tank FA-303A
- SWMU NAAP-14: Bulk Storage Tank FA-303B

- SWMU NAAP-15: Bulk Storage Tank FA-351
- SWMU NAAP-16: Bulk Storage Tank FA-352
- SWMU NAAP-17: Bulk Storage Tank FA-353
- SWMU NAAP-18: Bulk Storage Tank FA-354
- SWMU NAAP-19: Bulk Storage Tank FA-355
- SWMU NAAP-20: Bulk Storage Tank FA-356
- SWMU NAAP-21: Chemical Plant Scrubber Towers
- SWMU NAAP-22: Agent VX Storage Site (Building 144) and Toxic Sump.

The following sections summarize each area within the Chemical Plant.

Chemical Plant Agent-Free Area—This site is approximately 75 acres and is located in the eastern portion of NECD, within the Chemical Plant. The area includes the nonagent production areas of the VX production facility. The site includes prior production areas and waste treatment facilities, including the deep well and associated components.

Only treated waste from the production of agent VX was permitted to be discharged. After the wastes were detoxified in two basins within the plant (SWMUs NAAP-6 and NAAP-7), the wastewaters were pumped through filters to the Deep Well Surge Tank (SWMU NAAP-8). The filtrate stored in the surge tank was pumped to a Class I deep injection well (SWMU NAAP-9). This well officially was deactivated in March 1971 and capped in December 1985 (SAIC 2003a and TLI 2007).

Wastewater was pumped from the holding basin to Waste Surge Tank FA-412 prior to discharge into the primary settling basin 30031 (SWMU NAAP-6), where the suspended solids were allowed to settle. The primary settling basin measured 290 by 43 feet and was 7 feet deep. After the suspended solids were removed, the wastewater was filtered and injected into the subsurface through the deep well. Wastes from decontaminated spills also were placed in SWMU NAAP-6, and often contained sodium ethyl methylphosphonate and sodium diisopropyl-amino ethyl sulfone. The solids from SWMU NAAP-6 were moved to basin 30025 (SWMU NAAP-7) and allowed to dry. This basin measured 290 by 43 feet and was 2 feet deep. The dried solids were removed to the NSPs (SWMUs NAAP-1 and NAAP-2). Sampling of sediments in basins 30031 and 30025 in 1991 indicated the presence of elevated concentrations of 1,2-dichlorobenzene (1,2-DCB), 1,4-dichlorobenzene (1,4-DCB), and VX-related products (ethyl methylphosphonic acid [EMPA], methylphosphonic acid [MPA], QB, triethyl phosphate [TEPO], and diethyl methylphosphonate [TRO]) (SAIC 2007). Dichlorobenzene was found during excavation of a firewater line south of Building 143. SWMU NAAP-9 was officially deactivated in March 1971 and capped according to EPA standards in December 1985. The closure required displacement of all fluids currently in the well, filling the well with abandonment mud, and capping with concrete. SWMU NAAP-8, tank number FA 411B, was removed in August 1999. NECD will submit an NFA memorandum to IDEM regarding SWMU NAAP-9 seeking NFA concurrence (NECD 2006).

Chemical Plant Pre-Agent Manufacturing Facility—This site is a 15-acre fenced area in the Chemical Plant area in the eastern portion of the installation. The site was in operation from 1961 to 1968. Waste Surge Tank FA-412 (SWMU NAAP-5) was a hold tank with a 97,000-gallon capacity. From the holding basin, the wastewater was pumped to Waste Surge Tank FA-412 prior to discharge into the primary settling basin, where the suspended solids were allowed to precipitate. Waste Surge Tank FA-412 also was utilized as a recirculation tank for isolation and deposition of specific solutes in an aqueous solution. Initial waste deposited into the Deep Well was collected from Waste Surge Tank FA-412, which received liquid waste from all process areas (Steps 0, I, II, and III). On December 19, 2000, the Waste Surge Tank and all associated equipment were removed and destroyed. As of 2005, all remaining equipment in this area was in poor condition and severe corrosion was evident. According to the 2005 NECD RCRA permit, a determination of NFA was granted to this site (TLI 2007).

Chemical Plant Agent Area—The Chemical Plant Agent Area was the site of the final phase in VX production (Step III). This area is approximately 15 acres and is completely fenced in. The site contains the Detoxification Holding Basin (SWMU NAAP-4) and Chemical Plant Retention Basins 30007 (SWMU NAAP-10), 30008 (SWMU NAAP-11), and 30009 (SWMU NAAP-12) (TLI 2007).

Basins 30007, 30008, and 30009 were located directly south of the Chemical Plant and were established circa 1950 to accept wastewater from the Heavy Water Plant. After heavy water production was halted and the facilities were converted for VX production, basins 30007 and 30008 served as VX waste retention ponds. These same basins were later reutilized to accept wastewater from boiler drains and the Chemical Plant Step III cooling water system. According to Mason & Hanger, Basins 30007 and 30008 received wastewater generated as part of the hydrogen sulfide method of heavy water production from 1950 to 1957, and received wastewater from the Chemical Plant from 1961 to 1968. These two basins measured 192 feet by 436 feet by 10 feet deep and were capable of accepting 7,000 gpm with a retention time of 4.75 hours (NECD 1951).

As of 1979, the easternmost and smallest of the three basins (30009) was still active and received waste from boiler blowdown and wastewater from the regeneration of zeolite water softeners with brine. Basin 30009 was operational from approximately 1950 to 1980. Basin 30009 measured 138 feet by 208 feet by 10 feet deep and was capable of accepting 1,600 gpm with a retention time of 4 hours. Basin 30009 received wastewater from all Chemical Plant boiler blow down activity, Chemical Plant cooling water, and wastewater from regeneration of zeolite water softeners with brine. All three basins were unlined and have been filled in with borrow soil from an unknown location that was not associated with the past practices at these units (TLI 2007).

The basins were backfilled in the 1970s and are now covered with grass. Media of concern are in the soil and groundwater. In July 1997, SAIC submitted a Facility RFI Work Plan, which included a Phase III Release Characterization for Groundwater. The RFI implementation began in 1998 and was completed in 2002. SWMU NAAP-4 was demolished on September 28, 2000. Only samples from the liquid and sediment from inside the basin were collected. The NECD Report of the Destruction of SWMU NAAP-4 was issued in November 2001. SWMU NAAP-4 will require additional soil sampling for semivolatiles. SWMUs NAAP-10 through NAAP-12 are included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for these SWMUs in a letter dated January 9, 2004 (SWMU 2004a). SWMUs NAAP-10 through NAAP-12 are included in the NECD LUCIP (SAIC 2005d). LUCs, including no residential, agricultural, or groundwater use, are being implemented.

Chemical Plant Agent Manufacturing Facility—The Chemical Plant Agent Manufacturing Facility is located within the Chemical Plant area in the eastern portion of the installation. The site consists of the VX Storage Tank Farm, the former Agent VX Storage Site (Building 144) and Toxic Sump, and the Chemical Plant Scrubber Towers.

The VX Storage Tank Farm consists of SWMUs NAAP-13 through NAAP-20 (Bulk Storage Tanks FA-303A, 303B, 351, 352, 353, 354, 355, and 356, respectively). Tanks FA-303A and 303B were installed in 1951 for heavy water production with a capacity of 31,000 gallons each. Tanks 351, 352, 353, 354, 355, and 356 were installed in 1961 with a capacity of 50,000 gallons each. The tanks were used from initial production of VX agent in 1961 to 1969 when they were emptied. The VX Storage Tank Farm was located in the southwestern portion of the Chemical Plant Area, directly east of Building 144 and approximately 200 feet from a Chemical Plant dilution pond and 500 feet from Little Raccoon Creek. The tank farm consisted of eight aboveground cylindrical tanks with a combined capacity of 360,000 gallons. The tanks were situated within diked spill protection reservoirs. The bulk storage containers have been removed, decontaminated, demilitarized, and stored as scrap to be sold or otherwise disposed of (TLI 2007).

SWMU NAAP-21 consists of the Chemical Plant Scrubber Towers, which were demolished in July 2004 (NECD 2006).

SWMU NAAP-22 consists of the former VX Storage Area (Building 144). VX agent was stored inside Building 144 in carbon steel TCs from 1977 until 2002 when they were moved to an undisclosed location for security reasons.

According to the 2005 NECD RCRA permit, NFA is recommended for the Chemical Plant Scrubber Towers and the VX Storage Site (Building 144). In 2005 and 2006, the bulk storage tanks were cleaned and cut and taken offsite. Although the bulk agent storage tanks were decontaminated to 5X prior to disposal, the soil beneath the secondary containment will require additional investigation. Currently, all buildings associated with the Chemical Plant Agent Manufacturing Facility have been demolished and the resulting debris has been removed and appropriately disposed of. All basins utilized in catchment and retention of waste effluent produced as a result of VX production have been backfilled and are covered with soil (TLI 2007). Additional comprehensive investigation of the Chemical Plant is being conducted prior to transfer of the property.

5.2.1.7.5 Waste Oil Tank

The Waste Oil Tank near Building 716A is an AST designated as SWMU NAAP-53. The site was in operation from the 1970s to 1993. The 1,000-gallon tank contained used oil; solvents and PCBs were introduced into the tank, and the tank was managed as a hazardous waste tank until it underwent clean-closure in 1993. Tank removal and contaminated soil excavation were completed in February 1993. An IDEM letter dated October 14, 1993 states that IDEM received NECD's certification dated April 23, 1993, for partial closure for the 1,000-gallon waste oil tank. With the receipt of this certification, partial closure was completed as required by 40 CFR 265 Subpart G (NECD 2006). According to the 2005 NECD RCRA permit, a determination of NFA was granted to this site.

5.2.1.7.6 Power House Coal Pile

The PHCP is SWMU NAAP-69. The PHCP likely supported the Power House activities and was in use during the same period as the Power House (February 1942 through September 1946 and intermittently between August 1951 and March 1957). Installation blueprints show a coal storage area approximately 300 by 300 feet due west of the Power House (NECD 1951). There is no record of this area being lined or paved for coal storage. Exposed coal piles have the potential to release inorganic contaminants, such as arsenic, copper, lead, nickel, and zinc, to the environment. However, during the 2001 RFI, the concentrations of metals in soil were within the range of background soil concentrations. SWMU NAAP-69 is included in the NECD NFA Memorandum (SAIC 2004a). IDEM concurred with NFA for this SWMU in a letter dated January 9, 2004 (IDEM 2004a). LUCs are not required for SWMU NAAP-69 (NECD 2006).

5.2.2 Military Munitions Response Program

DOD established the MMRP under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and former military installations. MMRP eligible sites include sites other than operational ranges where UXO, DMM, or MC are known or suspected and the release occurred prior to September 30, 2002.

The Phase 2 Range Inventory Report for NECD, dated August 13, 2001, identified one operational range at the installation. The Final Phase 3 Closed, Transferring, and Transferred (CTT) Range/Site Inventory Report for NECD was issued in October 2002. Data collection efforts for NECD consisted of a site visit, research at the installation, and interviews of personnel at the installation. The Final Phase 3

CTT Range/Site Inventory Report identified four range inventory sites (the CSL, DWBG, RDX-BG, and TNT-BG), one of which later became eligible for the MMRP (the DWBG). The remaining three sites are being addressed under the IRP (TLI 2007).

As noted above, in the Final Range Inventory Report, the DWBG was listed as an IRP site and was, therefore, not eligible for the MMRP. The site was later evaluated as part of the Army's Inventory of Buried Chemical Warfare Material Sites on Active Army Installations. As a result of this inventory, the site was re-evaluated, and 0.15 acres were determined to be eligible for the MMRP (TLI 2007). Section 5.2.4.21 summarizes the conclusions about munitions response (MR) sites from the HRR.

5.2.3 Compliance Cleanup

Compliance issues associated with the TNT-CTS, TC Storage Area, and Building 713 are described below.

5.2.3.1 TNT Cooling Tower Sump

In late 1999, liquidation of the TNT acid plant began at NECD. The TNT Cooling Tower is located in the southwest portion of the installation within the TNT acid plant area in Study Section 5. The TNT Cooling Tower superstructure, a four-story building constructed primarily of chromated copper arsenate (CCA) treated wood, was demolished in June 2000, leaving in place an irregularly shaped concrete pit that served as a sump for the Cooling Tower. The sump consisted of three adjacent, rectangular structures. The depth of the sump varied between 8.5 and 11 feet, including the aboveground portion (SAIC 2005e).

5.2.3.1.1 Sampling Activities

The water in the TNT-CTS was sampled after the first thaw in early 2000; one PCB was detected at 7.7 µg/L. At the time of this sample collection, the source of the PCB contamination was unknown. However, in May 2000, five capacitors were found on the concrete pad covering the smaller of the sumps (the 16- by 33-foot sump). These capacitors were not identified during the facility inventory of PCB items conducted in 1981. Sampling of the capacitors indicated that they contained 100,000 parts per million (ppm) PCBs. Visible staining and wipe samples of the concrete pad under the capacitors determined that three of the five capacitors had leaked onto the concrete pad and into the pit. The capacitors have been removed. Sampling of the sump water was conducted by SAIC in October 2002 to confirm the historical results (SAIC 2005e).

5.2.3.1.2 Removal Action

The removal action activities associated with the CTS included characterizing the sump water to determine the presence of PCBs and metals, treating the water using a granular activated carbon (GAC) system, removing wood debris and nonwood related debris (i.e., sludge) from the sump for disposal at an offsite landfill, characterizing the concrete sump floor and sidewalls to determine the presence of PCBs, cleaning the aboveground concrete pad using TechXtract® to remove the PCBs from the concrete, sump cracking, collecting soil samples from beneath the concrete floor, and backfilling the sump with soil fill (SAIC 2005e).

Characterization of the sump water indicated that PCBs were the only COCs. The PCB-contaminated water was treated using a GAC treatment system and the treated water was discharged into Manhole MH-20 and subsequently into the Wabash River in accordance with the facility NPDES permit requirements. Approximately 428,600 gallons of PCB-contaminated water were treated to meet the regulatory criteria. The wood debris was removed from the sump pits using an excavator with an extended arm, placed into roll-offs, and sampled. Sludge remaining at the bottom of the sump was

consolidated and sampled. PCB concentrations in the wood debris and sludge were below 50 ppm and, therefore, met the requirements for disposal at a nonhazardous "Subtitle D" landfill. Approximately 480 cubic yards of wood debris and 30 cubic yards of sludge were removed from the sump and disposed of at the landfill. When water samples were collected from the sump in October 2002, the TNT-CTS was considered eight segments for the purpose of characterizing the sump water. Composite concrete core samples were collected from segments 1 through 4 of the CTS and sent to an offsite laboratory for PCB analysis. PCBs were either nondetect or below 50 ppm in the concrete sidewalls and floor of the sump segments. Segments 5 through 8 were not characterized based on the low levels of PCBs detected in Segments 1 through 4. Because the concrete pad above Segment 1 contained elevated PCB concentrations, the pad was cleaned using TechXtract®. After multiple cleaning cycles, the residual PCB concentrations in the pad were reduced to below 10 μg/100 cm^2 on the concrete surface and below 50 ppm in the bulk media. Soil samples were collected from beneath the concrete floor in Segments 6, 7, and 8 where floor cracks were observed. Soil characterization results confirmed that migration of PCBs into the subsurface soil did not occur. The sump cracking activity consisted of drilling a series of 1-inch holes and breaking up portions of the floor with a jackhammer to prevent the accumulation of water in the sump. To avoid potential future liabilities, the aboveground sump walls and the pad were collapsed in place and the sump was backfilled to grade with sand obtained from an onsite source (SAIC 2005e).

5.2.3.2 Ton Container Storage Area

On July 22, 2004, NECD received a Notice of Violation (NOV) (IDEM 2004b) based on an investigation conducted at NECD by IDEM on December 2 and 4, 2003. This NOV was based on a potential threat of release of hazardous waste into the environment from allowing FPF TCs to be stored in an inappropriate manner. The FPF TCs were rusted and were in a concrete containment area that contained approximately 12 to 20 inches of standing water. The corrective action in the Agreed Order (IDEM 2004b) included the removal, processing, transportation, and offsite recycling of the TCs followed by the decontamination of the concrete vaulted TC Storage Area to achieve the cleanup levels required for closure.

The removal processing, transportation, and offsite recycling of the TCs was completed by the Edgewood Chemical Biological Center (ECBC) in accordance with Section II.4 of the Agreed Order (IDEM 2004b). Decontamination of the TC Storage Area was completed by SAIC in September 2005. IDEM granted partial closure for the FPF TC Storage Area at NECD as required by 40 CFR 264 Subpart G on December 20, 2005.

5.2.3.3 Building 713

In 1989, 3X materials once located in the VX production facility were moved into Building 713 for temporary storage. In November 2004, NECD submitted a Self-Disclosure of items located in Building 713. Storage of these materials in a noncompliant area resulted in an Agreed Order with IDEM. The waste was removed and disposed of in 2004 and 2005. In 2006, Building 713 was decontaminated in accordance with the *Hazardous Waste Partial Closure Plan for Building 713 3X Material Storage Area* (Mason & Hanger 2005a). This work was conducted pursuant to Section II.5 of the Agreed Order received from IDEM in May 2005 (IDEM 2005).

Closure activities included sweeping the concrete floor, repairing/sealing damaged areas of the concrete, pressure washing, rinsing, and sampling the floor rinsate. Closure activities were completed in 2006. The Final Closure Report was submitted to and approved by IDEM on November 27, 2006 (Personal Communication 2007b).

5.2.4 Previous Environmental Investigations

Previous environmental investigations at NECD began in the mid-1970s to evaluate, characterize, and assess environmental conditions in support of the DOD IRP. Key investigations conducted at NECD are summarized in Table 5-2 and described further in the following subsections.

Table 5-2. Previous Relevant Environmental Investigations

Investigation	Reference
Water Quality Study	USAEHA 1975
Installation Assessment	USATHAMA 1979
Environmental Assessment of NAAP Operations	AARCOM 1980*
Army Pollution Abatement Study	USAEHA 1981a
Management Plan for RCRA Groundwater Monitoring and Assessment Program	USAEHA 1981b
Delisting Petition	NAAP 1983
Hazardous Waste Management Special Study	USAEHA 1983
Investigation of Soil Contamination at the Open Burning Ground	USAEHA 1984
Geohydrologic Study	USAEHA 1985
Installation Assessment	EPIC 1985
Evaluation of Solid Waste Management Units at NAAP	USAEHA 1986
Explosive Reactivity Testing Program	USAEHA 1987
SI Report – Night Soils Pits, TNT Manufacturing Area, Chemical Plant, Decontaminated Waste Burial Ground, Little Raccoon Creek	Dames & Moore 1991b
RI Report – Red Water Ash Basins, Gypsum Sludge Basins/Pollution Control Center Retention Pond, RDX Burning Ground, RDX Manufacturing Area, Closed Sanitary Landfill	Dames & Moore 1991a
RI Report – TNT Burning Ground	Dames & Moore 1991c
Inventory of Natural Areas and Rare Plant Species	Hedge and Bacone 1994
Endangered, Threatened, and Special Concern Fishes, Amphibians, Reptiles, and Mammals of NAAP	ISU 1994
Phase III RFI Report – RDX Manufacturing Area Surficial Soils	Versar 1998
RFI for SWMUs NAAP-27 and NAAP-65, and Little Raccoon Creek	SAIC 2001b
Facility-wide RFI	SAIC 2003a
Long-term Monitoring at the TNT BG, RDX-MA, DWBG	SAIC, on-going
SWMU NAAP-6/7 Follow-on RFI	SAIC 2007
Final Historical Records Review	TLI 2007

* No information available for this study.

5.2.4.1 USAEHA, Water Quality Study, 1975

USAEHA conducted a water quality study in which surface water samples were collected from several streams and bodies of water at NECD, including approximately ½ mile northwest of the RDX-MA on a tributary that leads to Little Vermillion River, approximately ½ mile southeast of the RDX-MA on a tributary to Little Raccoon Creek, the headwaters of Little Raccoon Creek, the tributary that flows northward from the RWABs, wastewater from the PCCRP, and the intermittent stream that passes near the TNT-BG. Results indicated the presence of phosphates, chloride, sulfates, nitrate, and sodium at several locations, as well as elevated levels of hardness, alkalinity, and total dissolved solids (TDS). The report concluded that the causes were not attributable to site activities related to NECD's mission.

5.2.4.2 USATHAMA, Installation Assessment, 1979

Several areas of NECD were evaluated in the USATHAMA Installation Assessment to determine the potential for release of waste materials to the environment during their operating history. The report identified the RDX-MA as an area where operations during production of RDX may have released

contaminants to the environment, and stated that explosives contamination potentially may exist around and under foundations of the buildings in the RDX-MA that have been demolished. The report also mentioned that spills had occurred at the former Wax House (southeast portion of the RDX-MA) and former Recrystallizer Building (north-central portion of the RDX-MA). At the DWBG, the report concluded that some of the wastes buried were certified as being decontaminated by "wipe tests"; however, the specific wastes that were tested are unknown. The RWAB area was identified as having potential contamination based upon site records, personnel interviews, and onsite inspections, although the report indicated that there was a low potential for contaminant migration to occur via groundwater or surface water runoff. The assessment concluded that a low probability of chemical or explosive waste contaminant migration via surface water or groundwater existed for the RDX-BG. The study also concluded that a low probability of chemical and explosive waste contamination (via groundwater or surface water) existed at the GSBs and PCCRP.

5.2.4.3 USAEHA, Army Pollution Abatement Program Study, 1981

During this study, 15 monitoring wells were installed to allow for the future monitoring of potential groundwater contamination under the USAEHA RCRA Groundwater Monitoring and Assessment Program and to provide water level data to determine the groundwater flow direction. Four wells were installed at the RWABs, seven at the GSBs, and four at the TNT-BG. Physical testing of soils was conducted on samples collected during drilling activities. Geologic descriptions of the material in the well boring indicated that the soils are heterogeneous glacial tills.

5.2.4.4 USAEHA, Management Plan for RCRA Groundwater Monitoring and Assessment Program, 1981

The initial purpose of this plan was to assess the presence, extent, and degree of groundwater contamination at the RWABs, GSBs and PCCRP, and TNT-BG on a quarterly basis. An extensive amount of groundwater quality information has been collected during this program and, in 1991, as part of the RI, the data were evaluated to determine if past practices had contaminated the groundwater (Dames & Moore 1991a). Sampling at the RWABs initially was conducted quarterly until 1983, when the sampling frequency was reduced to semi-annually. Downgradient monitoring well RW-14 was found to contain manganese, inorganic sulfate, and sodium at concentrations higher than upgradient well RW-12. 2,4-DNT and 2,6-dinitrotoluene (2,6-DNT) were detected once in 1987 in RW-14 at 108 and 265 µg/L, respectively.

The quarterly monitoring program was initiated at the GSBs and PCCRP with the analysis of the groundwater from the seven existing monitoring wells. By the end of 1982, the frequency of sampling had been reduced to semi-annually. The list of analytes included RCRA indicator parameters, phenol, pesticides, inorganics, and explosives.

5.2.4.5 NAAP, Delisting Petition, 1983

The delisting petition was an attempt to delist waste generated in the production of TNT and related processes. Wastes sent to the RWABs and the gypsum sludge in the northern GSB and PCCRP were included in the petition. Soil/sludge samples were collected from the three RWABs in 1983. The analytical results indicated that the soils were nonreactive. Although no explosives were detected in the southern basin, identical concentrations of 2,4-DNT, 2,6-DNT, and TNT were detected in the soil/sludge samples from the middle and northern basins. A composite sample from the PCCRP was collected and analyzed by the extraction procedure (EP) Toxicity procedure for metals and other parameters. Some metals and explosives were detected at significant concentrations. The wastes were not delisted after the regulatory agencies had reviewed the data.

5.2.4.6 USAEHA, Hazardous Waste Management Special Study, 1983

Ten shallow borings were drilled to 18 inches BLS at locations around the perimeter of the western and eastern burn pads at the TNT-BG. The soil samples collected were not hazardous on the basis of the characteristics of EP Toxicity for heavy metals content. No explosives were detected in these surficial soils. Additional subsurface soil sampling was recommended to define the horizontal and vertical extent of explosives in the soil below 18 inches BLS.

5.2.4.7 USAEHA, Investigation of Soil Contamination at the Open Burning Ground, 1984

This study, which was conducted in response to the USAEHA 1983 study, included drilling 20 soil borings and collecting and analyzing 100 subsurface soil samples at the TNT-BG. The analytical results of this study concluded that explosives contamination was originating from a burial trench located to the southwest of the western burn pad. The study recommended that a supplemental subsurface investigation be conducted to identify the extent of contaminant migration in groundwater at the TNT-BG.

5.2.4.8 USAEHA, Geohydrologic Study, 1985

This study at the TNT-BG was conducted in response to the previous investigation (USAEHA 1984). The study involved drilling and installing 12 additional monitoring wells, which were identified as BG-5 through BG-16. The study also involved groundwater elevation measurements and chemical analysis. Based on analytical data from the new wells, the study recommended that the source of the explosives contamination (the burial trench) be properly removed and disposed of. The study also recommended the continued quarterly monitoring of wells for explosives and organics.

5.2.4.9 EPIC, Installation Assessment, 1985

The USATHAMA EPIC Installation Assessment presented the results of aerial photographic analyses of NECD. Aerial photographs of NECD spanning several decades were used to determine and/or confirm the operational history of the facilities onsite. The results of this study for USATHAMA, as well as additional aerial photographic interpretation by ENTECH, helped focus the field investigation portion of the Facility-wide RFI.

5.2.4.10 USAEHA, Evaluation of SWMUs at NAAP, 1986

This study was conducted to review the adequacy of historical data for the SWMUs included as part of the facility's RCRA Facility Assessment in support of NAAP's RCRA Part B permit. The evaluation was to identify and fill any existing data gaps. The study concluded that of the 17 SWMUs evaluated, only the RDX-BG and CSL required further investigation to determine if a contaminant release to groundwater had occurred. The study recommended the installation of upgradient and downgradient monitoring wells. No further investigation was recommended for the remaining SWMUs.

5.2.4.11 USAEHA, AMC Explosive Reactivity Testing Program, 1987

The study was conducted to determine the reactivity of soils and waste. Samples were collected from the RWABs, GSBs, and TNT-BG SWMU groups. At the RWABs, none of the samples collected from the basins and sump was found to be reactive or hazardous (based on an EP Toxicity test). Cyclo-1,3,5,7-tetramethylene-2,4,6,8-tetranitramine (HMX) and TNT were detected in the northern and southern basin samples. RDX also was detected in the northern RWAB. Samples from the GSBs were not reactive and did not contain detectable concentrations of explosives. At the TNT-BG, no samples were found to be reactive or hazardous (based on EP Toxicity tests). TNT was detected in all four samples from this area, and HMX was detected in one residue sample collected from the burn cage.

5.2.4.12 Dames & Moore, SI Report, 1991

An SI was conducted as part of the discovery phase of the Army's IRP (Dames & Moore 1991b). SWMUs studied in this investigation included the NSPs, TNT-MA, Chemical Plant, DWBG, and Little Raccoon Creek AOC. Specific activities undertaken as part of this investigation included the installation, sampling, and analysis of monitoring wells, and the sampling and analysis of surface water, sediment, surface soil, and subsurface soil. Results and conclusions from this report provided a basis for activities conducted under the Facility-wide RFI.

5.2.4.13 Dames & Moore, RI Report, 1991

Two phases of RI activities were conducted at the RDX-MA, RWABs, RDX-BG, and GSBs SWMU groups to supplement existing data, better define the nature and extent of contamination, and assess the contamination sources. Phase I field activities were initiated in January 1988 and completed in August 1988 (Dames & Moore 1991a). Phase II activities were conducted from September 1990 through January 1991. Phase I RI activities included the installation, sampling, and analysis of monitoring wells. Phase II RI activities included the installation, sampling, and analysis of additional monitoring wells; surface water and sediment sampling and analysis; surface and subsurface soil sampling and analysis; geophysical surveys; and soil gas surveys. Results and conclusions from this report provided a basis for activities conducted under the Facility-wide RFI.

5.2.4.14 Dames & Moore, RI Report – TNT Burning Ground, 1991

The facility investigation was designed to supplement the previously collected data to define better the contamination source and the extent of contaminant migration at the TNT-BG (Dames & Moore 1991c). Data collection also was designed to provide input to the CMS. Specific activities included the installation of shallow monitoring wells; topographic surveying of existing and new monitoring wells and the collection of surface water and sediment samples at new locations to facilitate groundwater elevation contouring and to assess groundwater-surface water interaction; geophysical surveys; drilling of soil borings to confirm trench locations and the extent of downgradient, subsurface soil contamination; and installation of two deep groundwater wells. The investigation identified explosives (1,3,5-trinitrobenzene [1,3,5-TNB] and RDX) in the soil at concentrations causing a human health risk. The report recommended the evaluation of remedial alternatives for the site soil and continued site monitoring of existing groundwater monitoring wells.

5.2.4.15 IDNR Inventory of Natural Areas and Rare Plant Species, 1994

The Indiana Department of Natural Resources (IDNR), Division of Nature Preserves, conducted species inventories of the vegetation and natural areas within NECD as part of a 1994 field study (Hedge and Bacone 1994). This study identified various plant species and deciduous hardwood trees in the forested areas of NECD. The Hedge and Bacone (1994) study confirmed the presence of the same vegetation reported in the 1979 Installation Assessment (USATHAMA 1979).

5.2.4.16 Versar, Phase III RFI Report – RDX-MA Surficial Soils, 1998

A Phase III investigation of the surficial soils at the RDX-MA was conducted in support of NECD's RCRA Part B permit. The overall objective of the RFI was to identify "hot spots" and areas contaminated by explosives, organics, and metals, and to assess the nature of contamination in shallow subsurface soils above the groundwater table at the RDX-MA. Four phases of field investigation were conducted during the Facility-wide RFI. During the first two phases, RDX was identified as the explosive COC, with 13 areas targeted for additional sampling during the third and fourth phases based on analytical results and previous investigations conducted in 1991 to delineate the horizontal and vertical RDX contamination. Of these 13 areas, 9 were determined to contain concentrations of RDX exceeding

screening levels. The CMS for the report recommended offsite landfilling of contaminated soils or onsite treatment via composting to reduce potential future risk of exposure (Versar 1998).

5.2.4.17 SAIC, RFI for SWMUs NAAP-27 and NAAP-65, and Little Raccoon Creek, 2001

This RFI included the investigation of soil and groundwater at SWMUs NAAP-27 and NAAP-65 and investigation of surface water and sediment at Little Raccoon Creek. The results of this investigation also were documented in the Facility-wide RFI discussed below.

5.2.4.18 SAIC/ENTECH Team, RCRA Facility Investigation, 2003

The Facility-wide RFI was conducted to fulfill the requirements outlined in the May 1993 EPA Hazardous Waste Management Permit for NECD and the April 1993 IDEM Hazardous Waste Management Permit. Under the IDEM permit, required Facility-wide RFI activities were to include sampling and related field activities at 30 SWMUs and 2 AOCs.

A baseline human health risk assessment was conducted as part of the Facility-wide RFI to determine the potential for adverse effects associated with exposure to chemicals present at the 30 SWMUs and 2 AOCs under investigation. Baseline risks are the risks to human health and the environment in the absence of remediation or institutional controls at the site.

A screening-level ecological risk assessment (SERA) also was conducted to evaluate the risk to plants, animals, and the environment from current and future exposure to contamination. SERAs were conducted for the South Chemical Plant, PHCP, CPAB, DWBG, Little Raccoon Creek, CSL, DI/SY, CDD, MCD, RDX-BG, RWABs, GSBs, and PCCRP.

The Facility-wide RFI summarized the nature and extent of contamination, results of the human health and ecological risk assessments, results of the chemical transport estimates, and associated recommendations for exposure units within each of the 11 SWMU groups. Exposure units within each SWMU group were defined to support the risk assessments and were based on observed or assumed patterns of receptor behavior, historical activities, and the nature and extent of contamination. Table 5-3 presents the recommendations for each exposure unit within the 11 SWMU groups.

5.2.4.19 SAIC, Long-Term Monitoring, Ongoing

SAIC has been contracted by USACE to perform LTM at four sites, and groundwater modeling to support monitored natural attenuation (MNA) decisions at sites contaminated with explosives and chlorinated solvents. SAIC is conducting semi-annual LTM for 2,4-DNT and other explosives at the TNT-BG, RDX and carbon tetrachloride at the RDX-MA, and chlorinated solvents at the DWBG. The CDD surface water was sampled for lead through January 2007.

SAIC is preparing technical memoranda for all sampling events. These memoranda document the groundwater and surface water sample results and update the groundwater and creek model predictions, plume maps, time plots, and comparisons of model results and actual concentrations. The analytical and modeling results are used to support MNA and/or cessation of sampling.

5.2.4.20 SAIC, SWMUs NAAP-6 and NAAP-7 Follow-on RFI, 2004

Following the Final RFI Report (SAIC 2003a), additional field investigation was required by IDEM at SWMUs NAAP-6 (Basin 30031) and NAAP-7 (Basin 30025) to investigate the potential presence of residual VX-related products, 1,2-DCB, and 1,4-DCB in soil and groundwater directly beneath the settling basins. Conclusions and recommendations resulting from this field investigation were presented in the SAIC NECD Technical Memorandum, SWMUs NAAP-6 and NAAP-7 (SAIC 2007) and are summarized below.

Table 5-3. Summary of Facility-wide RFI Report (2003) Recommendations

Study Section	SWMU Group/ Exposure Unit	Recommendations
1	NSPs (SWMUs NAAP-1 and NAAP-2)	**Groundwater**—NFA.
2	RDX-MA (SWMU NAAP-3): North RDX-MA	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented; monitor groundwater in conjunction with future soil remediation. Collect surface water samples from the Little Vermillion Creek tributary to validate model results.
	South RDX-MA	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented; monitor groundwater in conjunction with future soil remediation. Sampling may be required if Little Vermillion Creek tributary samples do not validate model results.
8	Chemical Plant Area: North Chemical Plant (SWMUs NAAP-4, NAAP-6, NAAP-7, and AOC-M North)	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented. **Soil, Sediment, and Surface Water**—NFA. **Source Investigation**—After liquids and solids are removed from SWMUs NAAP-6 and NAAP-7, sample beneath basins to confirm lack of migration.
	South Chemical Plant (SWMUs NAAP-10 through NAAP-12, NAAP-67, and AOC-M South)	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented. **Soil and Sediment**—NFA. **Surface Water**—NFA. **Sediment**—Although there are some data supporting the presence of adverse effects in the upper reaches of Little Raccoon Creek near the South Chemical Plant, these impacts could not be attributed to any specific contaminants in sediment. Human health risks do not exceed targets.
8	CPRBs (SWMUs NAAP-10 through NAAP-12)	**Groundwater**—NFA. **Soil**—NFA.
8	CPAB (SWMU NAAP-67)	**Soil**—NFA.
8	PHCP (SWMU NAAP-69)	**Soil**—NFA.
5	DWBG: West DWBG (SWMUs NAAP-23 through NAAP-26)	**Groundwater**—An additional round of groundwater sampling at six wells is recommended to determine if VOC concentrations have decreased or increased since the 1998 sampling. An additional well is recommended to be installed west of Little Raccoon Creek to determine if contaminants have migrated beneath the creek. Further action decisions should be based on these results. **Soil**—Delineate the southern extent of mercury contamination and conduct CMS to evaluate removal of mercury; institutional controls (i.e., LUCs) are recommended to ensure agricultural use of the land is prevented. **Source Removal**—Locate and excavate UST.
	East DWBG (SWMU NAAP-26A and NAAP-54)	**Groundwater**—No further investigation or remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use and intrusive activities are prevented. **Soil**—NFA.

Table 5-3. Summary of Facility-wide RFI Report (2003) Recommendations (Continued)

Study Section	SWMU Group/ Exposure Unit	Recommendations`
7	Little Raccoon Creek (AOC-N)	**Sediment and Surface Water**—NFA.
	CSL (SWMU NAAP-27) and DI/SY (SWMU NAAP-65)	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented. **Soil**—No further investigation or remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential and agricultural land uses and intrusive activities are prevented.
	CDD and MCD: CDD (SWMU NAAP-28)	**Groundwater**—NFA. **Soil**—Additional sampling to determine the eastern extent of lead contamination. CMS for soil to evaluate source removal of metals (particularly lead) and PAHs to reduce human health and ecological risks.
	MCD (SWMU NAAP-28A)	**Groundwater**—NFA **Soil**—No further investigation or remediation; institutional controls (i.e., LUCs) are recommended to ensure agricultural land use is prevented.
4	RWABs (SWMUs NAAP-29 through NAAP-32)	**Groundwater**—NFA. **Sediment and Surface Water**—NFA. **Soil**—NFA.
	RDX-BG: RDX-BG (SWMU NAAP-33) OCMCDA (SWMU NAAP-64)	**Groundwater**—NFA. **Soil**—NFA. **Soil**—NFA.
	GSBs (SWMU NAAP-34) and PCCRP (SWMU NAAP-49)	**Groundwater**—No further investigation or groundwater remediation under current and likely future land uses; institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented. **GSBs Soil**—No further investigation or remediation; institutional controls (i.e., LUCs) are recommended to ensure agricultural land use is prevented. **PCCRP Soil**—NFA.
	TNT-BG (SWMU NAAP-50): TNT-BG Sediment and Surface Water	**Sediment and Surface Water**—Monitoring is recommended in conjunction with the corrective measure.
	TNT-BG North	**Groundwater**—Institutional controls (i.e., LUCs) are recommended to ensure residential land use is prevented; monitor groundwater in conjunction with the TNT-BG trench and surface soil remediation and excavation water treatment.
	TNT-BG Central	**Groundwater**—A plume study and revised groundwater model are recommended based on the 2,4-DNT transport analysis. In addition, monitor groundwater in conjunction with the TNT-BG trench and surface soil remediation and excavation water treatment.
	TNT-BG Southeast	**Groundwater**—No further investigation or remediation under current and likely future land uses; monitor groundwater in conjunction with the TNT-BG trench and surface soil remediation and excavation water treatment.

Residual VX-related products and dichlorobenzenes (DCBs) (fluoroacetic acid, isopropyl methyl methylphosphonic acid [IMPA], MPA, 1,2-DCB, and 1,4-DCB) were detected in soil and groundwater underlying the former settling and drying basins (SWMUs NAAP-6 and NAAP-7) in the North Chemical Plant Area. Concentrations of detected chemicals in both soil and groundwater were higher and more widespread beneath SWMU NAAP-6 than beneath SWMU NAAP-7. In conjunction with the Army and IDEM, SAIC developed preliminary remediation goals (PRGs) for the sampled chemicals (SAIC 2007). The recommendations for SWMUs NAAP-6 and NAAP-7 are provided below.

SWMU NAAP-6—All sampled parameters other than chloroacetic acid were detected in samples collected from SWMU NAAP-6. Fluoroacetic acid and MPA are the two detected chemicals that exceed at least one relevant PRG. Concentrations of these chemicals in soil and groundwater indicate that migration through the soil column to groundwater has already occurred. Because the source of these contaminants has been removed and because soil concentrations are below all relevant direct contact PRGs, the focus of any future actions should be on groundwater.

A transport estimate was calculated for MPA because this chemical was detected consistently in the SWMU NAAP-6 groundwater. Because only the groundwater directly below the basins was sampled, groundwater sampling is recommended southwest of SWMU NAAP-6 to ensure that MPA is limited to the area immediately below the SWMU. (Although VX-related products were detected in groundwater during the 1997-98 RFI, MPA and fluoracetic acid were not detected.) Groundwater modeling would then be appropriate to confirm that fluoroacetic acid and MPA would not migrate to receptors at concentrations of concern. These activities will be planned and conducted in conjunction with IRP-related investigations at the Chemical Plant.

SWMU NAAP-7—Because concentrations of COCs were not detected above relevant PRGs or RLs, NFA was recommended for SWMU NAAP-7. The data do not indicate that there has been any consequential release from this SWMU.

5.2.4.21 TLI Solutions, Final Historical Records Review, 2007

TLI Solutions (TLI) conducted an HRR to document historical and other known information for the MR sites at NECD to supplement the inventory information and to support BRAC. The following conclusions were presented in the HRR:

- Subsequent to the October 2002 Final Range Inventory Report, the Army conducted an inventory of buried CWM sites. In this inventory, 0.15 acres of the DWBG were determined to be eligible for the MMRP based on the potential for munitions components to be present in one of the trenches within this site. Based on information identified during the development of this HRR, five of the trenches within Burial Area 1 were found to potentially contain munitions components. In addition, these five trenches within Burial Area 1 and the trench in Burial Area 4 may potentially contain VX-contaminated materials. Therefore, the DWBG MR site (SWMU NAAP-002-R-01) was modified to contain 1.54 acres.
- In the October 2002 Final Range Inventory Report, the CSL was composed of 4 acres. Based on information obtained in the development of the HRR, the site has been modified to include 8 acres. This acreage includes both the CSL and the DI/SY.
- One operational range was identified during Phase 2 of the Range Inventory. This site was identified as the Small Arms Range and is composed of 0.27 acres. As of the date of the Final HRR, this range was still operational.
- As the result of research conducted for the HRR, one additional operational range was identified. This site was identified as the National Guard Training Area and consists of 351.33 acres located along the northwestern boundary of the installation. This area has been used

since 1988 by National Guard units from Indiana and Illinois for training activities. Munitions used during training include smoke grenades and blank ammunition.

- Four sites were identified during Phase 3 of the Range Inventory. These sites were the CSL, composed of 4 acres; the DWBG, composed of 22.7 acres; the RDX-BG, composed of 14.9 acres; and the TNT-BG, composed of 4 acres. These sites were all identified as being IRP eligible in the Range Inventory, with the exception of the 1.54 acres of the DWBG discussed above as MMRP eligible. These sites and their associated AEDB-R numbers and acreages are summarized in Table 5-4.
- As the result of the research conducted for the HRR, two additional potential MR sites were identified and include the Multi-Integrated Laser Engagement System (MILES) Training Area and the Skeet Range. The MILES Training Area is currently utilized as a training area for Mason & Hanger security personnel and is located on the eastern portion of the installation and the former TNT-MA. Approximately 880 acres are available for use by the security personnel to conduct the training. The Skeet Range was located at NECD to the northeast of the Chemical Plant Area and was used beginning in approximately 1958. The site encompasses approximately 0.76 acres. These sites and their associated acreages are summarized in Table 5-4.
- An additional eight IRP sites that have a potential explosive or CWM hazard were identified as a result of the HRR. These sites include the NSPs, Chemical Plant, RDX-MA, TNT-MA, GSBs/PCCRP, RWABs, and Trenches at the Old Concrete Plant. These sites and their associated AEDB-R numbers and acreages are provided in Table 5-4.
- Little Raccoon Creek received waste effluent generated from a variety of activities conducted at NECD. This site could potentially contain an explosive or CWM hazard. This site was identified by the installation as AOC-N.
- One storage area that may potentially contain an explosive hazard was identified as a result of the HRR. This is the Richmond Magazine Area, which includes 52 Richmond Magazines that have been in use since 1947 for various storage requirements, most notably, storage of explosives and ammunition.
- The following sites have been listed as Response Complete in AEDB-R: the NSPs, the RDX-MA Acid Facility, the TNT-MA, the Chemical Plant Pre-Agent Manufacturing Facility, the Chemical Plant Agent Area, the Chemical Plant Agent Manufacturing Facility, the GSBs/PCCRP, and the RWABs.
- Although the majority of the buildings associated with explosives and CWM production have been removed at NECD, the HRR noted that the remaining physical structures also may present issues regarding explosive and CWM hazards. It is not uncommon for structures involved in the manufacture of explosives or CWM to have explosive or CWM residue embedded in the walls, ceilings, duct work, and equipment located within the building. In addition, the concrete and lead slabs, areas around expansion joints in the floors, piping and/or utilities located in or under the slab, and the area under the slab itself may contain residual explosives or CWM that present a potential explosive or CWM hazard. This issue was made evident during the dismantling of the Chemical Plant, as VX contamination was identified in various components of the buildings. Any and all of these materials should be evaluated during building renovation or demolition, and prior to disposal of any materials.
- Additional locations at NECD also may present explosive or CWM hazards, including sumps, basins, tanks, burial areas, and the Deep Well. This issue was made evident during the removal of Basin 30031, as degradation products from VX were found in the concrete of the basin and in the soils below. The Deep Well has been sealed and capped. In addition, based on a trip report from 1962, it appears that filled, rejected rockets may have been buried as a temporary measure until the items could be demilitarized. The historical documents do not indicate where the burial activities occurred.

Table 5-4. Site Acreages and Modifications from the Final HRR (2007)

Site Name	AEDB-R Number	Range Inventory Acreage	Modified Acreage	Comments
DWBG	NAAP-022 (IRP) NAAP-022-R-01 (MR)	22.7 (IRP) 0.15 (MR)	1.54 (MR)	This site was modified to include five trenches, rather than one.
CSL	NAAP-033	4.0	8.0	This site was modified to include the DI/SY.
TNT-BG	NAAP-024	4.0	N/A	None
Small Arms Range	N/A	0.27	N/A	This is an operational range. The orientation of the firing direction for this range has been modified; however, the associated acreage has remained the same.
NSPs	NAAP-038	N/A	1.5	This site is listed as Response Complete.
RDX-MA RDX-MA Acid Facility	NAAP-001 NAAP-040	N/A	275	This site is composed of two IRP sites. SWMU NAAP-040 is listed as Response Complete.
TNT-MA	NAAP-008	N/A	55	This site is listed as Response Complete.
Chemical Plant Chemical Plant Agent-Free Area Chemical Plant Pre-Agent Manufacturing Facility Chemical Plant Agent Area Chemical Plant Agent Manufacturing Facility VX Storage Areas	 NAAP-014 NAAP-015 NAAP-016 NAAP-017	N/A	160	This site is composed of four IRP sites. SWMUs NAAP-015 through NAAP-017 are listed as Response Complete.
Trenches at Old Concrete Plant	NAAP-025	N/A	4	None
GSBs/PCCRP	NAAP-032	N/A	54.1	This site is listed as Response Complete.
RWABs	NAAP-037	N/A	9	This site is listed as Response Complete.
Little Raccoon Creek	N/A	N/A	N/A	Little Raccoon Creek AOC-requires further corrective action at this time.
Richmond Magazine Storage Area	N/A	N/A	287.6	None
National Guard Training Area	N/A	N/A	350	This is an operational training area.
MILES Training Area	TBD	N/A	880	This is a potential MR site.
Skeet Range	TBD	N/A	0.076	This is a potential MR site.

5.3 HAZARDOUS SUBSTANCES

Hazardous substances such as batteries, solvents, paint, and adhesives (in amounts less than their RQs) are currently used for maintenance activities at NECD. The installation submits Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II Reports on an annual basis. The hazardous materials found during the VSI of buildings are summarized in Table 5-5. In addition to the

buildings included in Table 5-5, Buildings 729A, 729B, 1401A, and 1401B are used for storage of hazardous materials; however, no materials were noted during the site visit. Potential environmental concerns with former use and hazardous substances presently at NECD are discussed below by study section.

Table 5-5. Hazardous Materials Storage

Building	Shop	Containment	Hazardous Substances	Spills
8-000706 – Maintenance Shop	Metal/ wood shop	55-gallon drums	Aerosol cans	None observed
8-000713 – Warehouse	General	5,005 lbs.	Calcium Hypochlorite (HTH)	None observed
8-00412A – Reservoir Pump House	Outside	Storage building, tanks	Chlorine	None observed
8-0707CC – Guard Headquarters	General	Flammables cabinet	Oils, paint, solvents, Brake-Free	None observed
8-00716A – Vehicle Maintenance Shop	General	Flammables cabinet	Paint, oil, thinner, transmission fluid cleaning fluid	Evidence of minor oil spills on floor
8-00716D – Vehicle Maintenance Shop	General	Wooden pilot on floor	Batteries	Evidence of oil/solvent spills on floor
8-00716D – Vehicle Maintenance Shop	General	Flammables cabinet	Lighter fluid, paint, deicer, lubricants	Evidence of oil/solvent spills on floor
8-00716D – Vehicle Maintenance Shop	General	Flammables cabinet	Oil, lube, gasoline, transmission fluid	Evidence of oil/solvent spills on floor
8-00722A – Pesticide Storage Building	General	Storage locker	Advance Dual Choice ant bait and Contrac Blox rodenticide	None observed
8-00722A – Pesticide Storage Building	General	Flammables cabinet	Ant bait, mosquito bait, roach bait and traps, mouse and rat bait	None observed
8-00722A – Pesticide Storage Building	General	Flammables cabinet	Wasp spray, mosquito fog, glue traps, rodent traps	None observed
8-00723A – Chemical Operations	Change rooms	Steel cans	Aerosols – cleaners	None observed
8-00723A – Chemical Operations	Laundry	Plastic container	Bleach	None observed
8-00723A – Chemical Operations	Mask Testing Room	Flammables cabinet	2-Butanone and Isopropyl alcohol	None observed
8-00726A – Storage Shed	General	Tanks	Acetylene	None observed
8-00726B – Storage Shed	General	Tanks	Chlorine	None observed
8-00726D –Storage Shed	General	Cylinders	Gasoline	None observed
8-00733K – Emergency Vehicle Storage & Training Building	General	Steel tank	Diesel	None observed
8-00733K – Emergency Vehicle Storage & Training Building	General	Plastic containers/boxes	Bleach for laundry	None observed

Study Section 1—The magazines in Study Section 1 (Buildings 1417-1 through 1417-52) were used for the storage of RDX components and TNT products. After RDX manufacturing activities ceased, only the first eight of these magazines (48, 47, 46, 45, 44, 43, 42, and 41), beginning in the southeast corner and running west along the first row, were used to store TNT products during the period of TNT production (1973 and 1974). In addition, the U.S. Marine Corps (USMC) stored ammunition in Magazines 49, 50, 51, and 52 prior to 1976. In 1976, USMC transferred the ammunition to Magazines 26, 27, 29, and 30. Magazine 41 was used for less than 90-day hazardous waste storage.

The magazines were observed during the VSI and storage of plastic sheeting, ceramic pieces, metal banding, and wooden pallets is occurring in Magazines 16, 22 through 32, and 34 through 39. In addition, a white, powdery residue was observed in Magazine 33. All of the Richmond Magazines have two floor gutters that lead to the exterior of each magazine (NECD 2006).

According to installation personnel, all 52 Richmond Magazines have been inspected. Facilities 1417-31, 1417-32, 1417-33, and 1417-40 were inspected on February 23 and 24, 1995 and on February 27, 1995. These four magazines were inspected visually for any suspect areas, with suspect areas qualitatively analyzed by Webster's Reagent indicator tests. Magazines 1417-31 and 1417-32 had stains on the floor that tested positive for explosives. Magazine 1417-33 had a crystalline material on the floor that tested positive for explosives. Magazine 1417-40 had equipment and packaged parts that were labeled "1X" and tested positive for explosives. Disposal actions for these four magazines are discussed in the Environmental Assessment entitled, "The Removal and Disposal of the TNT Facility," dated August 1995 (NECD 1995).

Equipment and packaged parts in Magazine 1417-40 were removed from the magazine and disposed of. The floors in Magazines 1417-31, 1417-32, and 1417-33 were cleaned with a sodium sulfite (Sellite) solution and confirmed negative of explosives, again qualitatively analyzed by Webster's Reagent indicator tests (Personal Communication 2007d).

Historical burial of hazardous waste at the NSPs in Study Section 1 is discussed in Section 5.2.1.1.

Study Section 2—Historical production of RDX at SWMU NAAP-3 is discussed in Section 5.2.1.2.

Study Section 3—Hazardous materials and hazardous waste are stored in Buildings 729A and 729B. Hazardous waste storage at Buildings 729A and 729B is managed by Parsons and Mason & Hanger, respectively. Prior to transfer, Building 729A will be cleaned in accordance with the RCRA permit; Building 729B is not included in the RCRA permit (Personal Communication 2007b).

Buildings 1401A and 1401B are permitted hazardous waste storage areas.

Based on interviews with NECD employees (Personal Communication 2007b), hazardous materials and hazardous waste recently were stored in igloos (Buildings A3301 through A3308 in Study Section 3). Based on the date of construction (2002), the lack of floor drains, and feedback from facility personnel, it was determined that no pathway for release exists from the igloos into the environment. The igloos are managed by Mason & Hanger and will be cleaned per the RCRA Hazardous Waste permit prior to transfer.

According to historical documentation (TLI 2007), TCs containing VX were stored in the RDX-MA Area F parking lot from 1968 to 1976. During the VSI, batteries were found north of the railroad bed in Study Section 3. Approximately 12 rusted drums were found during the VSI scattered in the area south of North Patrol Road. The drums were partially buried and the contents of the drums are unknown.

Study Section 4—The RWABs (SWMUs NAAP-29 through NAAP-32), RDX-BG (SWMU NAAP-33), OCMCDA (SWMU NAAP-64), GSBs (SWMUs NAAP-34 through NAAP-36),

PCCRP (SWMU NAAP-49), TNT-BG (SWMU NAAP-50), and Sanitary Landfill (SWMU NAAP-51) are discussed in Section 5.2.1.4.

Study Section 5—It was noted during an interview for the HRR that the TNT-MA produced more red water than could be processed by all seven kilns in the Red Water Treatment Facility. A tank truck that was being used to hold red water at the end of Line 1 overflowed, spilling red water onto the ground (TLI 2007). Based on an interview conducted during the VSI, the location of the spill was identified as being between the former N&P Building and the settling basin (Personal Communication 2007d).

Historical records indicate that an oleum line broke near Cull Avenue (Study Section 5) in 1973. The spilled oleum was neutralized with soda ash. A toluene spill also occurred at the TNT-MA (Buildings 9511 and 9512) in 1973 (TLI 2007). Based on interviews with NECD personnel, sulfuric acid spills occurred in the 1970s at the TNT Acid Area (Personal Communication 2007d).

Historical production of TNT at SWMUs NAAP-37 through NAAP-47 is discussed in Section 5.2.1.5.

Study Section 6—During the VSI, a rusted drum containing black tarry material was identified in Study Section 6. The drum was partially buried in the area north of Cull Avenue and west of 12th Street.

Intermodal storage containers, PAB tank storage, and TMA container storage are in this study section; these are permitted hazardous waste storage areas.

Study Section 7—During the VSI, a rusted drum containing black tarry material was identified in Study Section 7. The drum was partially buried in the area south of South Boulevard on the west bank of Little Raccoon Creek. Significant debris (e.g., crushed drums, pipes, metal scrap, and hoses) also was noted along the east side of Little Raccoon Creek in the DWBG area.

Historical activities involving disposal of decontaminated wastes associated with the production of VX (SWMUs NAAP-23 through NAAP-26) is discussed in Section 5.2.1.6. Based on an interview with a utility operator, a previously unidentified DWBG trench was used for the disposal of VX agent in 1970. VX sample bottles were emptied into a Toxic Sink in the Building 143 Demilitarization Room. The emptied bottles were containerized in 50 55-gallon drums and the drums were buried in the DWBG trench (approximately 10 feet deep). After depositing material into the trench, the material was buried; 300 to 500 gallons of fuel oil were added to ensure a hot fire. The trench was backfilled with soil after cooling Personal Communication 2007e).

The following SWMUs are discussed in Section 5.2.1.6:

- 300-gallon buried tank (SWMU NAAP-54)
- DI/SY (SWMU NAAP-65)
- CSL (SWMU NAAP-27 and AEDB-R NAAP-033)
- MCD (SWMU NAAP-28a and AEDB-R NAAP-025)
- CDD (SWMU NAAP-28 and AEDB-R NAAP-025)
- STP (SWMU NAAP-52).

Study Section 8—NECDF operations include <90-day hazardous waste storage and treatment units for the neutralization of nerve agent VX and >90-day hazardous waste container storage. The neutralization portion of the process takes place inside the UB. Storage tanks for hydrolysate and spent caustic and hypochlorite decontamination solutions are located inside the UB and PAB. All tanks inside the UB and PAB are within secondary containment. The spent hypochlorite decontamination solution is loaded into tank trucks from storage tanks in the PAB. The hydrolysate is loaded into intermodal containers. Short-term (<90 days) drum storage of secondary hazardous wastes is located at various locations in the UB, PAB, Lab, and the Chemical Demilitarization Building (CDB). RCRA permitted

hazardous waste container storage areas are located in the toxic maintenance area (TMA) within the UB and in two of the TC storage igloos. Approximately 30 gallons of agent were released in 2005; the spill was contained on the floor of the Tox Cube and cleaned up (Personal Communication 2007a).

On July 10, 2000, contaminated soil and surface water were discovered in the area just south of AA Street at the location of a box culvert installation (near former Building 718A). Reports indicated PAH contamination and a creosote odor. Discolored soil was removed until there was no longer an odor (Personal Communication 2007b).

The following SWMUs are discussed in Section 5.2.1.7:

- CPAB (SWMU NAAP-67 and AEDB-R NAAP-016)
- RDX Acid Manufacturing Area (SWMU NAAP-3A and AEDB-R NAAP-040)
- Removed USTs (SWMU NAAP-66)
- Chemical Plant (SWMUs NAAP-4 through NAAP-22 and AEDB-R NAAP-017)
- Waste Oil Tank (SWMU NAAP-53)
- PHCP (SWMU NAAP-69).

5.4 PETROLEUM AND PETROLEUM PRODUCTS

USTs containing gasoline and diesel are used at NECD for emergency generators and vehicles. Table 5-6 provides information regarding all permitted USTs in use at the time of the VSI. The gasoline and diesel USTs meet Federal requirements for leak detection and corrosion protection.

Table 5-6. UST Information

Building Number	Tank Size	Contents	Install Date	Status
3-0A3200 – Access Control Facility	1,000	Diesel	2002	Active
5-003005 – Maintenance Warehouse	550	Fuel oil	1992	Closed January 2002/removed
8-000706 – Maintenance Shop	1,000	Gasoline	1941	Closed 1990/removed
8-000710 – Warehouse	3,000	Diesel	1941	Removed 1990
8-000710 – Warehouse	8,000	Gasoline	1941	Removed 1990
8-00716A – Vehicle Maintenance Shop	1,000	Gasoline/waste oil	1941	Closed 1989/removed
8-00716A – Vehicle Maintenance Shop	10,000	Gasoline	1993	Active
8-00716A – Vehicle Maintenance Shop	10,000	Diesel	1993	Active
8-00716A – Vehicle Maintenance Shop	12,000	Gasoline	1972	Closed October 1994/removed
8-00716A – Vehicle Maintenance Shop	10,000	Gasoline	1941	Closed December 1989/removed
8-00723A – Chemical Operations	1,000	Fuel oil	1981	Removed
8-Entry Control Facility (O-M-3204)	500	Fuel oil	2003	Active
8-Former Building 144	1,000	Fuel oil	1991	Closed August 2006/removed

A 1,000-gallon petroleum UST in the southern portion of the RDX acid area was removed in January 2007. The tank was used during RDX production. A crack in the return pipe was found. At the time of the tank removal, soil was discolored and there was a petroleum odor. Soil and groundwater sampling was conducted; IDEM gave approval for the soil to be left in place (Personal Communication 2007b).

Based on an interview with a NECD Fire Department employee, a fire training pit in Study Section 8 was used in the late 1960s. There is a depression in the ground at the former location south of Building 710 and west of the sand pit. Diesel and gasoline were burned during training exercises (Personal Communication 2007f).

Motor pools/repair shops at the Chemical Plant (Study Section 8) include Buildings 715A, 716A, and 716D. Buildings 715A and 716A have been used for vehicle maintenance and Building 716D has been used as a wash rack. Minor oil spills were noted on the floors during the VSI; however, there was no evidence of releases to the environment.

On January 16, 1980, an oil spill occurred at the #2 fuel oil storage tank on the southeast corner of the Chemical Plant Boiler House. Approximately 450 gallons overflowed from one of the tanks onto the ground adjacent to the tanks. The oil pooled under the tanks and then flowed approximately 100 feet westward through the ditch at the fenceline along the south side of the Boiler House. A smaller quantity of oil flowed southward and into a sump approximately 20 feet from the spill site.

Minor oil spills were reported at the TNT-MA. Oil spills occurred from the pump at the Water Supply Building (Building 4123). Oil spills also were reported at TNT Lines 1 and 2 (Buildings 9531 and 9532) (Personal Communication 2007b).

Oil/water separators (OWSs) were discovered during the construction of NECDF in Study Section 8. Three unlined basins and a Former Locomotive House (Former Building 718A) also were in this location. Petroleum-contaminated soil was removed before construction was completed in 2003 (Personal Communication 2007a).

A release of 50 to 100 gallons of fuel from a standby diesel generator occurred in 2003 at NECDF. Contaminated soil was removed; however, the extent of remediation is unknown (TLI 2007 and Personal Communication 2007a).

Table 5-7 provides information regarding all petroleum ASTs currently in use at NECD. None of the ASTs was observed to be leaking at the time of the VSI.

According to NECD personnel, the underground piping for two former 500,000-gallon fuel tanks in the TNT Acid Area was not drained when the tanks were removed. A petroleum odor has been reported in the vicinity (Personal Communication 2007b).

Table 5-7. AST Information

Building Number	Tank Size	Contents	Secondary Containment	Status
8-000710 – Warehouse	240	Diesel	Double wall	Active
8-00412A – Reservoir Pump House	225	Diesel	Double wall	Active
8-00733K – Emergency Vehicle Storage & Training Building	240	Diesel	Double wall	Active

5.5 POLYCHLORINATED BIPHENYLS

PCB Annual Reports from 1996 and 2004 were reviewed. According to the 1996 survey, PCB equipment was removed from service in 1996. Three capacitors, one transformer, and one switch remained in service in 1996. According to the 2004 survey, PCB or PCB-contaminated equipment was no longer in service (Mason & Hanger 1997 and 2005b).

During 1994, wipe samples were collected from concrete surfaces of Building 401A. Building 401A is an old power house that was in operation from 1942 to 1957. PCB samples were analyzed using EPA SW-846, Method 8082, at a detection limit of 1 ppm. Laboratory analytical results indicated that the concrete was contaminated with PCBs. Aroclor 1260 was the primary PCB found. In August 1999, sampling and analysis of PCB-contaminated concrete at Building 401A was conducted to verify the sample results and to categorize materials in the concrete floor slab for disposal. Of the 34 concrete core

samples analyzed, 22 contained detectable concentrations of PCB Aroclor 1260. Of the 22 samples found to contain detectable levels of PCBs, 11 were found to be above 1 ppm. Nine of the 11 were on the east side of Building 401A floor, over the basement area. The other two samples containing detectable levels were on the northwest side, under the coal crushers. The portion of the concrete floor that is above the regulatory threshold of 50 ppm is required to be disposed of in an approved PCB disposal facility (Mason & Hanger 2003b).

PCB waste previously was stored at Buildings 729A, 729B, and 729C. In October 1994, a 55-gallon steel drum containing transformer oil ruptured while personnel were attempting to move the drum onto a pallet in Building 729A. The concentration of the PCBs in the transformer oil was >50 ppm and <500 ppm. Approximately 5 gallons of transformer oil spilled onto the floor. The floor is impervious and is constructed of concrete with an epoxy coating. The spill encompassed an area of approximately 64 square feet. The spill was cleaned up and confirmation samples proved that the cleanup operations were sufficient to comply with 40 CFR Part 761 (NECD 2004).

Removal of PCB contamination was conducted at the TNT-CTS. Section 5.2.3.1 describes the removal action.

5.6 ASBESTOS-CONTAINING MATERIALS

An asbestos survey was completed in 1992. A substantial amount of asbestos was removed and a subsequent survey was conducted in 2003. The results of the 2003 assessment are provided in Table 5-8. Asbestos findings were from visual inspections only. There has not been a predemolition inspection on any of these buildings.

Asbestos burial areas were noted throughout the installation. Construction debris also may be present in these areas. These areas are described below (Personal Communication 2007b):

- Asbestos was buried along the stretch of Little Raccoon Creek from the CDD to the DWBG (Study Section 7)
- Rubble from the deconstruction of the RDX-MA and asbestos from the heavy water plant was disposed of in Trench 4 at SWMU NAAP-26 (the DWBG) (Study Section 7)
- Asbestos from the RDX-MA was buried at the CDD (SWMU NAAP-28) (Study Section 7)
- Possible construction debris and asbestos burial in the area east of the MCD (Study Section 7)
- Possible construction debris and asbestos burial in the area west of the STP (Study Section 7)
- Possible construction debris and asbestos burial in the area south of Old Burning Ground Road and east of the CSL and DI/SY; burial of asbestos also is suspected (Study Section 7)
- Possible construction debris and asbestos burial in the area east of the planted pine trees and west of 1st Street (Study Section 7)
- Construction debris was buried within a fenced area (approximately 138,053 square feet) north of the Power House (Building 401A) and west of the ash/coal piles (Study Section 8)
- A pipe buried south of Building 144 was found to contain asbestos (Study Section 8)
- Possible construction debris and asbestos burial in the area west of Building 401A (Study Section 8).

Friable asbestos associated with tree roots from cleared trees stockpiled at the CDD and DWBG was removed in August 2007.

Table 5-8. Asbestos Information

Study Section/ Building Number	Building Name	Asbestos Status	Location if Present
1-014171	Richmond Magazine 1	Present	Sheeting, siding, and between roof rafters
1-014172	Richmond Magazine 2	Present	Sheeting, siding, and between roof rafters
1-014173	Richmond Magazine 3	Present	Sheeting, siding, and between roof rafters
1-014174	Richmond Magazine 4	Present	Sheeting, siding, and between roof rafters
1-014175	Richmond Magazine 5	Present	Sheeting, siding, and between roof rafters
1-014176	Richmond Magazine 6	Present	Sheeting, siding, and between roof rafters
1-014177	Richmond Magazine 7	Present	Sheeting, siding, and between roof rafters
1-014178	Richmond Magazine 8	Present	Sheeting, siding, and between roof rafters
1-014179	Richmond Magazine 9	Present	Sheeting, siding, and between roof rafters
1-141710	Richmond Magazine 10	Present	Sheeting, siding, and between roof rafters
1-141711	Richmond Magazine 11	Present	Sheeting, siding, and between roof rafters
1-141712	Richmond Magazine 12	Present	Sheeting, siding, and between roof rafters
1-141713	Richmond Magazine 13	Present	Sheeting, siding, and between roof rafters
1-141714	Richmond Magazine 14	Present	Sheeting, siding, and between roof rafters
1-141715	Richmond Magazine 15	Present	Sheeting, siding, and between roof rafters
1-141716	Richmond Magazine 16	Present	Sheeting, siding, and between roof rafters
1-141717	Richmond Magazine 17	Present	Sheeting, siding, and between roof rafters
1-141718	Richmond Magazine 18	Present	Sheeting, siding, and between roof rafters
1-141719	Richmond Magazine 19	Present	Sheeting, siding, and between roof rafters
1-141720	Richmond Magazine 20	Present	Sheeting, siding, and between roof rafters
1-141721	Richmond Magazine 21	Present	Sheeting, siding, and between roof rafters
1-141722	Richmond Magazine 22	Present	Sheeting, siding, and between roof rafters
1-141723	Richmond Magazine 23	Present	Sheeting, siding, and between roof rafters
1-141724	Richmond Magazine 24	Present	Sheeting, siding, and between roof rafters
1-141725	Richmond Magazine 25	Present	Sheeting, siding, and between roof rafters
1-141726	Richmond Magazine 26	Present	Sheeting, siding, and between roof rafters
1-141727	Richmond Magazine 27	Present	Sheeting, siding, and between roof rafters
1-141728	Richmond Magazine 28	Present	Sheeting, siding, and between roof rafters
1-141729	Richmond Magazine 29	Present	Sheeting, siding, and between roof rafters
1-141730	Richmond Magazine 30	Present	Sheeting, siding, and between roof rafters
1-141731	Richmond Magazine 31	Present	Sheeting, siding, and between roof rafters
1-141732	Richmond Magazine 32	Present	Sheeting, siding, and between roof rafters
1-141733	Richmond Magazine 33	Present	Sheeting, siding, and between roof rafters
1-141734	Richmond Magazine 34	Present	Sheeting, siding, and between roof rafters
1-141735	Richmond Magazine 35	Present	Sheeting, siding, and between roof rafters
1-141736	Richmond Magazine 36	Present	Sheeting, siding, and between roof rafters
1-141737	Richmond Magazine 37	Present	Sheeting, siding, and between roof rafters
1-141738	Richmond Magazine 38	Present	Sheeting, siding, and between roof rafters
1-141739	Richmond Magazine 39	Present	Sheeting, siding, and between roof rafters
1-141740	Richmond Magazine 4	Present	Sheeting, siding, and between roof rafters
1-141741	Richmond Magazine 41	Present	Sheeting, siding, and between roof rafters
1-141742	Richmond Magazine 42	Present	Sheeting, siding, and between roof rafters
1-141743	Richmond Magazine 43	Present	Sheeting, siding, and between roof rafters
1-141744	Richmond Magazine 44	Present	Sheeting, siding, and between roof rafters
1-141745	Richmond Magazine 45	Present	Sheeting, siding, and between roof rafters
1-141746	Richmond Magazine 46	Present	Sheeting, siding, and between roof rafters
1-141747	Richmond Magazine 47	Present	Sheeting, siding, and between roof rafters
1-141748	Richmond Magazine 48	Present	Sheeting, siding, and between roof rafters

Table 5-8. Asbestos Information (Continued)

Study Section/ Building Number	Building Name	Asbestos Status	Location if Present
1-141749	Richmond Magazine 49	Present	Sheeting, siding, and between roof rafters
1-141750	Richmond Magazine 50	Present	Sheeting, siding, and between roof rafters
1-141751	Richmond Magazine 51	Present	Sheeting, siding, and between roof rafters
1-141752	Richmond Magazine 52	Present	Sheeting, siding, and between roof rafters
3-00701A	Guard House at Vehicle Gate 1	Present	Floor tile
3-00729A	Hazardous Waste Storage	Present	Coating on metal siding
3-00729B	Hazardous Waste Storage	Present	Coating on metal siding
3-00729C	Warehouse	Present	Coating on metal siding
3-00729D	Warehouse	Present	Coating on metal siding
3-00729E	Warehouse	Present	Coating on metal siding
3-01401A	Warehouse	All ACM removed	NA
3-007705	Guard House at Vehicle Gate 4	Present	Tile
4-00224B	Warehouse	All ACM removed	NA
5-003001	Acid QA Lab & Office (TNT Lab/Office)	All ACM removed	NA
5-003005	Maintenance Warehouse	Present	Hot water storage tank in Utility Room
5-003022	Acid Manufacturing Plant	All ACM removed	NA
5-003063	Acid Manufacturing Plant	All ACM removed	NA
5-004011	Heat Plant Building	All ACM removed	NA
5-004123	Water Supply Building	All ACM removed	NA
5-006192	Acid Manufacturing Plant	No ACM present	NA
5-009011	Lab Building	All ACM removed	NA
5-009111	Change House	No ACM present	NA
5-009531	Explosive Manufacturing Plant	All ACM removed	NA
5-009532	Explosive Manufacturing Plant	All ACM removed	NA
5-009533	Explosive Manufacturing Plant	All ACM removed	NA
5-009534	Explosive Manufacturing Plant	All ACM removed	NA
5-009535	Explosive Manufacturing Plant	All ACM removed	NA
5-009631	Finishing Equipment Room – F&P Line 1	No ACM present	NA
5-009651	Box Unloading/Assembly – F&P Line 1	No ACM present	NA
5-009652	Box Unloading/Assembly – F&P Line 2	No ACM present	NA
5-009653	Box Unloading/Assembly – F&P Line 3	No ACM present	NA
5-009654	Box Unloading/Assembly – F&P Line 4	No ACM present	NA
5-009655	Box Unloading/Assembly – F&P Line 5	No ACM present	NA
5-009811	Shipping/Receiving Facility	No ACM present	NA
5-009812	Shipping/Receiving Facility	No ACM present	NA
6-00121A	Warehouse	All ACM removed	NA
6-00121B	Warehouse	Present	Mastic, Galbestos coating on metal siding
6-00121C	Warehouse	Present	Coating on metal siding

Table 5-8. Asbestos Information (Continued)

Study Section/ Building Number	Building Name	Asbestos Status	Location if Present
6-00223A	Warehouse	Present	Roofing
6-00227A	Warehouse (Tool Crib)	No ACM present	NA
6-00227B	Warehouse	No ACM present	NA
6-00227C	Warehouse	No ACM present	NA
6-00227D	Warehouse	No ACM present	NA
6-00255A	Warehouse	No ACM present	NA
6-007700	Administration	Present	Floor Tile
6-007702	Vehicle Storage	No ACM present	NA
7-006053	STP	No ACM present	NA
8-000146	Magazine	No ACM present	NA
8-000147	Magazine	No ACM present	NA
8-000303	Vault Storage Building	No ACM present	NA
8-000706	Maintenance Shop	All ACM removed	NA
8-000710	Warehouse	No ACM present	NA
8-000713	Warehouse	No ACM present	NA
8-000715	Maintenance Shop	All ACM removed	NA
8-000716	Warehouse	No ACM present	NA
8-00401A	Power House	Present	Boilers
8-00402A	Reservoir	No ACM present	NA
8-00412A	Reservoir Pump House	All ACM removed	NA
8-00704A	Eng Service Office	All ACM removed	NA
8-00707C	Change House	Present	Shingles and floor tile
8-00707E	Boiler Room	No ACM present	NA
8-00709A	Fire Headquarters Building	No ACM present	NA
8-00713B	Warehouse	No ACM present	NA
8-00714A	Material Shed	All ACM removed	NA
8-00715A	Engineering/Housing Maintenance Shop	Present	Transite siding
8-00716A	Vehicle Maintenance Shop	No ACM present	NA
8-00716D	Vehicle Maintenance Shop	Present	Shingles
8-00716F	Boiler House	No ACM present	NA
8-00722A	Pesticide Storage Building	Present	Shingles
8-00723A	Chemical Operations	All ACM removed	NA
8-00725A	Vehicle Parking and Storage	Present	Siding
8-00726A	Storage Shed	No ACM present	NA
8-00726B	Storage Shed	No ACM present	NA
8-00726C	Storage shed	No ACM present	NA
8-00733K	Emergency Vehicle Storage & Training Building	No ACM present	NA
8-00739A	Warehouse	Present	Siding
8-0707BB	Office Building	Present	Shingles
8-0707CC	Guard Headquarters	All ACM removed	NA
13-004041	Ranney® Well #1	Present	Insulation on the piping
13-004042	Ranney® Well #2	Present	Insulation on the piping
13-004043	Ranney® Well #3	No ACM present	NA

NA – Not Applicable

5.7 LEAD AND LEAD-BASED PAINT

The majority of all facilities and buildings at NECD were constructed before the DOD ban on the use of LBP in 1978 and are likely to contain one or more coats of such paint. In addition, some facilities constructed immediately after the ban also may contain LBP because inventories of such paints that were in the supply network were likely to have been used up at these facilities.

No comprehensive sampling and analysis has been conducted for LBP. The following buildings have documented lead paint:

- Study Section 3 – Building 729A
- Study Section 5 – Building 3005
- Study Section 6 – Building 121A, 7700, and 7702
- Study Section 8 – Building 412A, 704A, 707C, 707CC, 715A, 716A, 716D, 723A, 725A, and 739A.

LBP is suspected for buildings at NECD constructed prior to 1978. Structure 4261 (Study Section 5) and Structure 510 (Study Section 8) are water towers. During visual inspection, heavy paint peeling was observed on the exterior of Structure 510 and paint chips were observed on the ground beneath Structure 510. Although peeling paint was not observed on the exterior of Structure 4261 during the VSI, LBP is suspected, since the water tower was constructed in 1969 for the production of TNT.

5.8 RADIOACTIVE MATERIAL

SAIC has evaluated available evidence involving the use of radioactive materials at NECD. Based on the Historical Radiological Site Assessment provided in Appendix F, radioactive materials possessed at NECD are known to include sealed sources containing cesium 137, nickel-63 and americium-241. There is no record to indicate that any such sealed sources exhibited leakage exceeding the regulatory threshold that could reasonably contribute to the potential for radiological contamination of the facility. No records have been found to indicate that unsealed radioactive materials existed at NECD. Operation of heavy water plants to include the Atomic Energy Commission's P-9 Pilot Plant and Dana Heavy Water Plant were reviewed to evaluate the potential for use of unsealed radioactive materials.

Review of available information indicates that it is unlikely that the operation of these facilities involved the use of unsealed radioactive materials and thus would have had the potential to impact the environment on the installation. X-radiography devices used at NECD would not result in residual radioactivity.

5.9 HISTORICAL LANDFILLS/DUMPS

NECD has two former sanitary landfill sites: the CSL and the Sanitary Landfill. NECD also has four known dump sites: the DWBG, MCD, CDD, and NSPs.

The CSL is designated as SWMU NAAP-27 and is discussed in Section 5.2.1.6.3. The Sanitary Landfill is designated as SWMU NAAP-51 and is discussed in Section 5.2.1.4.5. The DWBG contains four specific burial sites (SWMUs NAAP-23 through NAAP-26) and three additional areas, including burn cages, Pit A (SWMU NAAP-26A), and an area reportedly containing a 300-gallon buried tank (SWMU NAAP-54). The DWBG area is discussed in Section 5.2.1.6.1. The MCD is SWMU NAAP-28A and is discussed in Section 5.2.1.6.4. The CDD is SWMU NAAP-28 and is discussed in Section 5.2.1.6.5. The NSPs are designated as SWMUs NAAP-1 and NAAP-2 and are discussed in Section 5.2.1.1.1. According to the 2006 RCRA permit, the RWABs (SWMUs NAAP-29 through NAAP-32) were reclassified by EPA Region 5 as landfill units. The RWABs are discussed in Section 5.2.1.4.1.

A 1973 Solid Waste Survey (USAEHA 1973) noted that improper disposal of pesticide containers was occurring in the land disposal site. Based on the cited period of usage (beginning in 1971) and size (4 acres), it is assumed that this land disposal site was the CSL. The survey notes that waste material was being buried at depths in contact with groundwater and recommendations were made to remedy this practice.

The 1973 Solid Waste Survey also notes that approximately 50 pounds per week of solid waste from the dispensary (e.g., paper, plastic, bandages, syringes) were accepted at the land disposal site. In addition, as noted above, used pesticide containers were being placed in plastic bags and buried in the land disposal site. The survey indicated that this practice should stop and provided appropriate disposal methods for pesticide containers. The survey also noted the quantities of pesticides onsite at the time of the site visit (more than 400 pounds of solid pesticides and 700 gallons of liquid pesticides, plus 169 aerosol cans) (USAEHA 1973).

During personnel interviews, it was noted that material may have been buried in areas at NECD where pine trees had subsequently been planted (Personal Communication 2007i). Planted pine tree areas were observed in Study Section 1, northeast of the Richmond Magazines and west of the RDX-MA (designated the West Pine Tree Area). No additional information was provided to indicate the type of material buried or the year(s) of activity.

5.10 EXPLOSIVES-CONTAMINATED STRUCTURES

No buildings or structures are known to contain explosives contamination; however, because explosives were produced onsite, the remaining physical structures at the RDX-MA and TNT-MA may contain residual explosives. Specifically, the containment building near Building 9011 was used to store TNT and is potentially contaminated with explosives. Equipment at the TNT-MA underwent hot gas decontamination by TVA and liquidation by Earth Tech and are not believed to have potential for the presence of residual CWM (Personal Communication 2007b).

5.11 RADON

NECD conducted a radon survey and radon was not found to be a concern in any of the buildings tested (NECD 2004). The Federal EPA Radon Zone for Vermillion County is 1, which indicates an average indoor radon level greater than 4 pCi/L (EDR 2006a). Based on Federal Area Radon Information for zip code 47928, the average radon activity for a first floor living area is 2.6 pCi/L (EDR 2006a).

5.12 PESTICIDES

According to the 1977 Installation Pest Management Program Survey (No. 61-0518-77), insecticides, rodenticides, and fungicides were stored in the maintenance shop area in Building 726C and herbicides were stored in Building 723A. The storage rooms also were used for pesticide formulation and equipment storage. Deficiencies were found in pesticide storage and formulation facilities and procedures, pesticide usage procedures, and pesticide disposal practices. Deficiencies were mostly of a health concern issue. However, the report did note that rinse water from pesticide containers and portable pesticide dispersal equipment was washed down the drain and/or poured on the ground at the site where the rinsing occurred in both buildings (USAEHA 1977). Pesticide formulation is known to have occurred outside Building 726C and there is a possibility of pesticide/herbicide contamination outside both buildings. The survey recommended that proper disposal techniques be implemented (USAEHA 1977).

By 1988, pesticides were stored in the pesticide shop, Building 722A. In the 1988 Installation Pest Management Program Review (No. 16-61-0536-88), there were no environmental concerns noted regarding the application of pesticides by installation personnel. It was recommended that operations on agriculturally leased lands be closely monitored (USAEHA 1988).

In the 1990 Pesticide Management Survey (No. 61-0540-90), it was noted during hygiene surveys that contamination from pesticide spills was present on pallets holding pesticide containers inside the building. By the 1993 Pesticide Management Survey (No. 61-61-A11P-93), this deficiency was no longer evident. There is no pathway for release to the environment from Building 722A (USAEHA 1990).

Currently, all pesticides are stored in Building 722A. This building was observed during the VSI. All containers are stored upright with secondary containment in a secure cage.

5.13 OTHER IDENTIFIED CONCERNS

Other concerns were noticed during the VSI that do not likely require further investigation, but should be addressed as housekeeping issues. There were large piles of utility poles observed in Study Section 7, west of Little Raccoon Creek, just south of South Boulevard. In addition, there are piles of railroad ties (spaced approximately every 25 feet) in Study Section 3, along the former railroad bed north of Burson Cemetery. There was one pile of railroad ties east of Little Raccoon Creek and north of South Boulevard. There were large cylindrical cement structures that may have been built to support tanks found in Study Section 7 near the south gate entrance and just north of Burson Cemetery in Study Section 3. These structures could pose a safety hazard.

Asbestos burial areas were noted in Study Sections 7 and 8 (see Section 5.6). Based on interviews with NECD personnel, construction debris also may have been buried in these locations.

Several concerns were identified during the VSI that require further investigation. Approximately a dozen 55-gallon drums were observed in a wooded area south of North Patrol Road in Study Section 3. In addition, batteries were noted north of an old railroad bed in Study Section 3. A 55-gallon drum containing black tarry material was noted in Study Section 6 north of Cull Avenue and west of 12th Street. Another 55-gallon drum containing black tarry material was observed on the west bank of Little Raccoon Creek, south of South Boulevard in Study Section 7. Significant debris (e.g., crushed drums, pipes, metal scrap, and hoses) was noted at Study Section 7 along the east side of Little Raccoon Creek in the DWBG area.

In addition, there could be residual explosives in the foundations/walls at the RDX-MA and TNT-MA. The RDX-MA contains many concrete foundations and the TNT-MA contains buildings and structures. The RDX-MA buildings were burned in 1977 and there were many explosions during this process (Personal Communication 2007b).

Based on an interview with a NECD Fire Department employee, a fire training pit in Study Section 8 was used in the late 1960s. There is a depression in the ground at the former location south of Building 710 and west of the sand pile. Diesel and gasoline were burned during training exercises (Personal Communication 2007f).

A powder mill was in operation in the early 1900s on the west side of Opedee Road, straddling the railroad switch track running west to the Wabash Ordnance Plant 1 mile west (Study Section 12). An explosion occurred on May 4, 1904 and four mill employees were killed. All of the powder kegs stored in the building were consumed in the explosion and the surrounding weeds caught fire. The blaze was extinguished by local firefighters and the mill ceased operations after that fire. Information regarding the incident does not indicate a need for investigation in this area.

5.14 IDENTIFICATION OF UNCONTAMINATED PROPERTY

Study Sections 9, 10, 11, 12, and 13 are classified as Category 1, an area or parcel of real property where no release or disposal of hazardous substances or petroleum products or their derivatives has occurred, including no migration of these substances from adjacent properties. This property includes mostly forested and agricultural areas outside the installation fence. Category definitions are provided in

Table 5-9. ECP Category 1 parcel descriptions and acreage are provided in Table 5-10. Descriptions of non-Category 1 property is included in the following section. Graphic identification of the property is provided in Section 6.

5.15 DESCRIPTION OF REMAINING PROPERTY

Table 5-11 lists the non-Category 1 property at NECD. Disclosure factors for MEC, LBP, and ACM are excluded from the ECP categorization process. LBP is likely in or on buildings built prior to 1978 and it is possible to find LBP in or on buildings built after this date. ACM is likely in or on buildings built prior to 1989, but it is possible to find ACM in buildings built after this date.

5.15.1 NEPA

In order to comply with NEPA for disposal of installation property, DOD must comply with regulations in 40 CFR 1500-1508 developed by the Council on Environmental Quality (CEQ) and service-specific NEPA regulations. These regulations define the NEPA process for examining the potential impacts to the environment that may result from Federal actions, in this case the decision to dispose of BRAC installation property and facilities to either public or private users. In preparing these analyses, reasonable reuse alternatives are identified and characterized for each BRAC installation. Environmental impacts associated with each alternative are disclosed, along with a preferred course of action. This disclosure analysis typically occurs through the development and finalization of an EA or an EIS.

Table 5-9. ECP Categories and Standard Map Colors

ECP Category	Total Acreage at NECD	Definition	Map Color
1	6,427.7	Areas in which no release or disposal of hazardous substances or petroleum products above de minimus quantities has occurred, and to which there has been no migration of such substances from adjacent areas.	White
2	0.3	Areas in which only release or disposal of petroleum products above de minimus quantities has occurred.	Blue
3	197	Areas in which release, disposal, or migration of hazardous substances has occurred, but in concentrations that do not require a removal or other remedial response.	Light Green
4	90	Areas in which release, disposal, or migration of hazardous substances has occurred, but all removal or other remedial actions necessary to protect human health and the environment have been taken.	Dark Green
5	300	Areas in which release, disposal, or migration of hazardous substances has occurred, and removal or other remedial actions are underway, but all required actions have not yet been taken.	Yellow
6	0	Areas in which release, disposal, or migration of hazardous substances has occurred, but required remedial actions have not yet been implemented.	Red
7	121	Areas that have not been evaluated or require additional evaluation.	Gray
Total	**7,136**		

Note: Some areas fall within the boundaries of a higher category property and are included in the total acreage of that higher category (e.g., Category 2 property acreage that is a subset of a Category 7 property is included in the Category 7 acreage).

Table 5-10. ECP Category 1 Parcel Descriptions and Acreage

Study Section	Cat. 1 Acreage	Description
1	1,913.4	Study Section 1 is located in the northwest quadrant of the facility within the installation fence. Study Section 1 contains SWMUs NAAP-1 and NAAP-2 (NSPs). The majority of this study section consists of Agricultural Lease areas. In the central portion of this study section are the 52 Richmond Magazines and a 4-acre plot of pine trees. There is a Small Arms Range in the north-central portion of this study section, just south of North Patrol Road. Study Section 1 contains significant hilly wooded areas that follow the Vermillion Creek tributaries. Minor portions of Study Section 1 contain wetlands. There are four cemeteries: Carmack Cemetery, Juliet Cemetery, Walnut Hill Cemetery, and Miller Cemetery. There are two Indiana Bat sites within this study section. Study Section 1 property is designated as Category 1 with the exception of the west pine tree area (Category 7), Small Arms Range (Category 7), and NSPs (Category 4). In addition, Buildings 722J, 7708, TC77, and the magazines, with the exception of Richmond Magazines 33 and 47 (Category 7), are designated as Category 1.
2	0	Study Section 2 is located in the north-central portion of the installation. Study Section 2 is SWMU NAAP-3, also known as the RDX-MA. Study Section 2 does not include any Category 1 property; the RDX-MA is Category 5 property.
3	1,232.1	Study Section 3 is located in the eastern portion of the installation. This study section is composed primarily of wooded and agricultural areas. SWMU NAAP-55 (Hazardous Waste Storage Building [Building 729A]) is located in the northwest portion of Study Section 3. This study section also contains eight igloos and six warehouses. There is one Indiana Bat site and Burson Cemetery in Study Section 3. Little Raccoon Creek is located in the southern portion of this study section, and an unnamed creek is located in the northeast portion of this study section. The RDX-MA Area F Parking Lot; drums south of North Patrol Road; the Former Skeet Range; batteries north of railroad bed; Buildings 729A, 729B, 1401A, 1401B, and the igloos are Category 7, and the remaining Study Section 3 property is Category 1. In addition, Buildings 701A, 729C, 729D, 729E, 738A, 1401C, 7705, and A3200 are Category 1.
4	779.7	Study Section 4 is located in the southwestern corner of the facility, inside the fenced portion of the installation. The SWMUs contained within this study section are SWMUs NAAP-29, NAAP-30, and NAAP-31 (RWABs); NAAP-32 (Red Water Runoff Holding Sump); NAAP-33 and NAAP-64 (RDX-BG and OCMCDA); NAAP-34, NAAP-35, and NAAP-36 (GSBs); NAAP-49 (PCCRP); NAAP-50 (TNT-BG); and NAAP-51 (Sanitary Landfill). The property in this study section includes (in decreasing order of acreage) Prairie Restoration Areas, Agricultural Leases, LUCs, and wooded areas. There is one storage warehouse located within Study Section 4. Study Section 4 property is designated as Category 1 with the exception of the RWABs (Category 3), RDX-BG and OCMCDA (Category 3), GSBs and PCCRP (Category 4), TNT-BG (Category 5), and Sanitary Landfill (Category 3). In addition, Building 224B is Category 1.
5	41.5	Study Section 5 is located in the south-central portion of the installation. This area includes the TNT-MA and the TNT-MA Acid Area. The SWMUs contained within this study section related to the TNT-MA include SWMUs NAAP-37, NAAP-38, NAAP-39, NAAP-40, NAAP-41, NAAP-42, NAAP-43, NAAP-44, NAAP-45, NAAP-46, NAAP-47, and NAAP-48 and consist of TNT Production Lines 1, 2, 3, 4 and 5; TNT Wastewater and Handling Areas #1, #2, #3, #4, and #5; the TNT Wastewater Treatment Facility; and the PCC. The TNT-CTS also was located in this study section. SWMUs within this study section related to the TNT Acid Production Area include SWMUs NAAP-56 (Acid Tank Farm Drain), NAAP-57 (Sulfur and Ammonia Unloading Area Drain), NAAP-58 (Utilities and Shop Area Drain), NAAP-59 (TNT Laboratory Drains), NAAP-60 (TNT Acid Laboratory Drains), NAAP-61 (NAC and DN Facility Drains), NAAP-62 (AOP Facility Drains), and NAAP-63 (SAR Facility Drains). There are 28 buildings in this study section that once supported the manufacture of TNT. Study Section 5 also includes Agricultural Lease areas. Study Section 5 is Category 1 with the exception of the sulfuric acid spill area (Category 7), oleum spill near Cull Avenue (Category 7), red water spill at the TNT-MA (Category 7), TNT-MA (Category 3), toluene spill at the TNT-MA (Category 7), underground piping for former fuel oil tanks (Category 7), TNT-MA Acid Area (Category 3), and Structure 4261 (Water Tower) (Category 7). In addition, all 28 buildings in this study section are designated as Category 1.

Table 5-10. ECP Category 1 Parcel Descriptions and Acreage (Continued)

Study Section	Cat. 1 Acreage	Description
6	616.1	Study Section 6 is located in the southeast quadrant of the installation. This study section is largely wooded and contains 10 warehouses and 3 buildings (Buildings 7700, 7702, and TC095). The Former Smokeless Powder Plant was located in this study section, but was never completed. There are no SWMUs in Study Section 6. Study Section 6 is designated as Category 1 with the exception of the drum located north of Cull Avenue and west of 12th Street (Category 7) and intermodal storage containers, PAB tank storage, and TMA container storage (Category 7). In addition, all 10 warehouses and Buildings 7700, 7702, and TC095 are designated as Category 1.
7	239	Study Section 7 is in the southwest quadrant of the installation within the installation fence. The SWMUs contained within this study section include SWMUs NAAP-23, NAAP-24, NAAP-25, and NAAP-26 (DWBG Burial Areas); NAAP-26A (DWBG Pit A); NAAP-27 (CSL); NAAP-28 (CDD); NAAP-28A (MCD); NAAP-52 (STP); NAAP-54 (300-gallon Tank Burial Area); and NAAP-65 (DI/SY). There is an area of pine trees east of the CSL and DI/SY that is a suspected construction debris/asbestos burial area. Pine trees also are located north and south of Old Burning Ground Road, east of the DWBG. There are several structures used to maintain the STP and one building used for sampling. This study section is largely wooded following Little Raccoon Creek and its tributaries. There are also Agricultural Lease areas and two Indiana Bat sites. The majority of the SWMUs in this study section have LUCs. Study Section 7 is Category 1 with the exception of Little Raccoon Creek bank along the DWBG (Category 7), Little Raccoon Creek (Category 5), the drum located on the west bank of Little Raccoon Creek and south of South Boulevard (Category 7), the area where leaking filled munitions were temporarily buried (Category 7), the mine burial area at the Scrap Yard (Category 7), the Burial Area 5 at the DWBG (Category 7), the DWBG (Category 5), the 300-gallon buried tank (Category 7), the DI/SY (Category 4), the CSL (Category 7), the MCD (Category 4), the CDD (Category 4), the STP (Category 7), the east pine tree area (Category 7), and three suspected construction debris and asbestos burial areas (Category 7). In addition, the buildings and structures associated with the STP are designated as Category 1.
8	176.6	Study Section 8 is in the east-central portion of the installation. This study section contains the Chemical Plant. The SWMUs contained within this study section include NAAP-3A (RDX Acid Manufacturing Area); NAAP-4 (Detox Holding Basin); NAAP-5 (Waste Surge Tank); NAAP-6 (Basin 30031); NAAP-7 (Basin 30025); NAAP-8 (Deep Well Surge Tank); NAAP-9 (Deep Injection Well); NAAP-10, NAAP-11, and NAAP-12 (Chemical Plant Retention Basins 30007, 30008, and 30009, respectively); NAAP-13 through NAAP-21 (Bulk Storage Tanks); NAAP-22 (Present VX Storage Site and Toxic Sump); NAAP-53 (Waste Oil Tank); NAAP-66 (Removed USTs); NAAP-67 (CPAB); and NAAP-69 (PHCP). The majority of Study Section 8 is industrial. There are also small wooded areas and Agricultural Lease areas. The property encompassed by SWMUs NAAP-10, NAAP-11, NAAP-12, and NAAP-67 have LUCs in place. There are 43 buildings in Study Section 8; 30 have been in use since the production of heavy water (constructed in the 1940s). These buildings currently are used for storage, equipment maintenance, or administrative purposes. Study Section 8 is Category 1 with the exception of the Chemical Plant Former Production Facility (Category 7), RDX-MA Acid Area (Category 3), CPRBs (Category 4), Removed USTs (Category 2), Waste Oil Tank (Category 4), CPAB (Category 4), PHCP (Category 3), fuel oil spill at the former railroad (Category 2), Former Locomotive House (Category 7), Leaking 1,000-gallon UST (Category 2), and two suspected construction debris and asbestos burial areas (Category 7). In addition, all buildings and structures within Study Section 8 are designated as Category 1 with the exception of Structure 510, Building 401A, Building 716A, Building 716D, Building 722A, Building 723A, and Building 726C, which are Category 7.
9	232.4	Study Section 9 is the portion of the installation that is outside the installation fence in the southwestern quadrant of the installation. This study section is primarily an Agricultural Lease area. A portion of this study section also is wooded, along Buck Creek. There are no SWMUs in Study Section 9. The entire Study Section 9 is Category 1 property.
10	680	Study Section 10 is located on the western side of the installation, outside the installation fence. The northern part of this study section was used by the National Guard for training exercises. The southern two-thirds of this study section are leased for agricultural use. There are no SWMUs in Study Section 10. The entire Study Section 10 is Category 1 property.

Table 5-10. ECP Category 1 Parcel Descriptions and Acreage (Continued)

Study Section	Cat. 1 Acreage	Description
11	404.1	Study Section 11 is the northernmost part of the installation that is located outside the installation fence. This study section is primarily wooded, along the creek beds of Vermillion Creek and its tributaries. Jonathan Creek runs through this study section. No SWMUs are located in this study section. The entire Study Section 11 is Category 1 property.
12	41.6	Study Section 12 is a tract of land that begins near the northeast boundary of the installation and follows an old railroad bed to the southeast, ending at Highway S 450 E. This area is primarily wooded, with some agricultural land. There is one Indiana Bat site in Study Section 12. No SWMUs are located in Study Section 12. The entire Study Section 12 is Category 1 property.
13	71.2	Study Section 13 is located east of the installation boundary and the railroad along the western side of the Wabash River. This area includes the Ranney® wells and three buildings associated with the wells. No SWMUs are located in Study Section 13. The entire Study Section 13 is Category 1 property.

AOP – Ammonia Oxidation Plant
CDD – Construction Debris Dump
CPAB – Chemical Plant Coal Ash Basin
CPRB – Chemical Plant Retention Basin
CSL – Closed Sanitary Landfill
DI/SY – Demilitarization Incinerator/Scrap Yard
DN – Denitration
DWBG – Decontaminated Waste Burial Ground
GSB – Gypsum Sludge Basin
LUC – Land Use Control
MCD – Memorial Chapel Dump
NAC – Nitric Acid Concentration
NSP – Night Soil Pit
OCMCDA – Old Chemical Munitions Component Detonation Area
PCC – Pollution Control Center
PCCRP – Pollution Control Center Retention Pond
PHCP – Power House Coal Pile
RDX-BG – RDX Burning Ground
RDX-MA – RDX Manufacturing Area
RWAB – Red Water Ash Basin
SAR – Sulfuric Acid Regeneration
STP – Sewage Treatment Plant
SWMU – Solid Waste Manufacturing Unit
TNT-BG – TNT Burning Ground
TNT-CTS – TNT Cooling Tower Sump
TNT-MA – TNT Manufacturing Area
UST – Underground Storage Tank
VX – O-ethyl-S-(2-diisopropylaminoethyl) methyl phosphonothiolate

Elements of the general process for preparing a Disposal and Reuse EIS for BRAC installations are as follows:

- ***EA***—Provides the decision maker with sufficient evidence and analysis for determining whether a Finding of No Significant Impact (FONSI) or EIS should be prepared.
- ***FONSI***—A document that states why an action will not significantly affect the environment, thus voiding the requirement for an EIS; the FONSI includes a summary of the EA and notes any related environmental documents.
- ***Description of Proposed Action and Alternatives (DOPAA)***—A document that describes the activities that must be analyzed in the EIS, including any proposed community reuse plan for the installation; the DOPAA also may serve as the basis for the EIS statement of work.
- ***Notice of Intent (NOI)***—A public notice that an EIS will be prepared and considered.
- ***Scoping***—A public meeting conducted in the vicinity of the installation to determine the scope of the environmental issues to be addressed, and identify areas for detailed analysis in the EIS.
- ***Draft EIS***—A document published for public review and comment containing data on the proposed action and alternatives and an interdisciplinary analysis of related environmental impacts. (Interested parties have 45 days to review and comment on the Draft EIS. During this comment period, a public hearing is conducted to explain Draft EIS findings and receive oral comments.)

Table 5-11. Non-Category 1 Property

Study Section	Site Name	Category	Reason
1	Richmond Magazines 33 and 47	7	Possible explosives contamination
1	Small Arms Range	7	Possible MC contamination
1	NSPs (SWMUs NAAP-1 and NAAP-2)	4	Historical burial of waste from latrines and decontaminated solid waste from the VX manufacturing process; RFI complete; listed as NFA in RCRA permit; LUCs in place
1	West Pine Tree Area	7	Possible burial area northeast of Richmond magazines and west of RDX-MA
2	RDX-MA (SWMU NAAP-3)	5	Historical production of RDX; RI and RFI complete; LTM ongoing; LUCs in place
3	RDX-MA Area F Parking Lot	7	Storage of filled TCs; no sampling conducted to date
3	Drums South of North Patrol Road	7	Disposal of drums; unknown contents
3	Former Skeet Range	7	Possible MC contamination
3	Batteries North of Railroad Bed	7	Metals from battery acid
3	Mason & Hanger Hazardous Waste Storage (Building 729B)	7	Possible release of hazardous chemicals
3	Parsons Hazardous Waste Storage (Building 729A)	7	Possible release of hazardous chemicals; closure will be performed by Parsons
3	Buildings 1401A and 1401B	7	Permitted hazardous materials storage; closure will be performed by NECD
3	Igloos	7	Permitted hazardous materials storage; closure will be performed by NECD
4	RWABs (SWMUs NAAP-29 through NAAP-32)	3	Basins historically contained wastewater, ash, and sludges resulting from the treatment of red water associated with TNT production in 1973-74; RI and RFI complete; listed as NFA in RCRA permit
4	RDX-BG and OCMCDA (SWMUs NAAP-33 and NAAP-64, respectively)	3	Burned waste RDX and waste explosives components of M23 land mines and M55 rockets at the RDX-BG; destruction of component parts from old chemical munitions was reported at the OCMCDA; RI and RFI complete; listed as NFA in RCRA permit
4	GSBs (SWMUs NAAP-34 through NAAP-36) and PCCRP (SWMU NAAP-49)	4	GSBs used to contain settled gypsum sludge produced by the neutralization of acidic wastewaters associated with TNT production; PCCRP received wastewaters from the PCC clarifiers, the GSBs' effluent, and water from the RWABs; RI and RFI complete; LUCs in place at GSBs; GSBs and PCCRP listed as NFA in RCRA permit
4	TNT-BG (SWMU NAAP-50)	5	Former burning ground for TNT-contaminated debris; RI, FS, and CMI complete; LTM ongoing; LUCs in place
4	Sanitary Landfill (SWMU NAAP-51)	3	Site closed in 1997; NFA in RCRA permit
5	Sulfuric Acid Spill in TNT Acid Area	7	Sulfuric acid release to the environment
5	Oleum Spill near Cull Avenue	7	Oleum release to the environment
5	Red Water Spill at TNT-MA	7	Red water release to the environment
5	TNT-MA (SWMUs NAAP-37 through NAAP-47)	3	Production of TNT; SI complete; listed as NFA in RCRA permit
5	Toluene Spill at TNT-MA	7	Toluene release to the environment
5	Underground Piping for Former Fuel Oil Tanks	7	Possible fuel oil in underground piping; petroleum odor reported
5	TNT-MA Acid Area (SWMUs NAAP-56 through NAAP-63)	3	Acid manufacturing; listed as NFA in RCRA permit

Table 5-11. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
5	Water Tower – South (Structure 4261)	7	Although peeling paint was not observed on the exterior of Structure 4261, LBP is suspected since the water tower was constructed in 1969
6	Drum Located North of Cull Ave, West of 12th Street Containing Black Tarry Material	7	Disposal of drum; unknown contents
6	Intermodal Storage Containers, PAB Tank Storage, and TMA Container Storage	7	Permitted hazardous materials storage; closure will be performed by NECD
7	Little Raccoon Creek Bank along DWBG	7	Buried debris
7	Little Raccoon Creek (AOC-N)	5	VOCs in the surface water; RFI complete; LTM ongoing
7	Drum Located on West Bank of Little Raccoon Creek, South of South Blvd. Containing Black Tarry Material	7	Disposal of drum; unknown contents
7	Area where Leaking Filled Munitions were Temporarily Buried	7	VX-related contamination; data gap – location is unknown
7	Mine Burial Area at Scrap Yard	7	Decontaminated mines may have been buried in this area; no subsurface samples collected/analyzed in this specific area
7	Burial Area 5 at DWBG	7	Potential VX-related contamination
7	DWBG (SWMUs NAAP-23 through NAAP-26 and NAAP-26A)	5	Historically used to dispose of decontaminated wastes associated with the production of agent VX; SI and RFI completed; LTM ongoing; LUCs in place
7	300-gallon Buried Tank (SWMU NAAP-54)	7	Tank may contain pyrophoric materials; corrective action required
7	DI/SY (SWMU NAAP-65)	4	Historically used to incinerate items once filled with chemical agent; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CSL (SWMU NAAP-27)	7	Historically used to dispose of construction debris from the TNT plant and office and shop waste; historical disposal of pesticide containers reported; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit; historical sampling parameters have not included pesticides
7	MCD (SWMU NAAP-28A)	4	Former site of a concrete batch plant; used for construction debris disposal; RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CDD (SWMU NAAP-28)	4	Historically was a disposal area; drums and various types of construction debris observed in the past; RFI complete; LUCs in unknown place; LTM complete
7	STP (SWMU NAAP-52)	7	Unknown integrity of sludge drying beds
7	DWBG Pine Tree Area	7	Possible construction debris burial area north of Old Burning Ground Road; burial of asbestos also is suspected
7	Asbestos Burial Area East of the MCD	7	Possible construction debris and asbestos burial in the area east of the MCD
7	Asbestos Burial Area West of the STP	7	Possible construction debris and asbestos burial in the area west of the STP
7	Asbestos Burial Area East of the Pine Trees and West of 1st Street	7	Possible construction debris and asbestos burial in the area east of the pine trees and west of 1st Street
8	Chemical Plant FPF	7	Potential release of VX-related contamination and solvents; known releases of DCBs

Table 5-11. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
8	RDX-MA Acid Area (SWMU NAAP-3A)	3	SI complete; listed as NFA in RCRA permit
8	CPRBs (SWMUs NAAP-10 through NAAP-12	4	Received waste from heavy water and VX production; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
8	Waste Oil Tank (SWMU NAAP-53)	4	AST formerly located near Building 716A had leaked; contaminated soil was removed; listed as NFA in RCRA permit
8	Removed USTs (SWMU NAAP-66)	2	Four different locations throughout the installation where five USTs were formerly located and had leaked; release assessment completed in 1998; listed as NFA in RCRA permit
8	CPAB (SWMU NAAP-67)	4	Historically used to accept coal ash from Building 401A Power House operations; RFI complete; LUCs in place; listed as NFA in RCRA permit
8	PHCP (SWMU NAAP-69)	3	Coal and coal slag stored on ground near Building 401A
8	Fire Training Pit (East of the Chemical Plant FPF)	7	Potential release of VOCs and SVOCs to the environment
8	Fuel Oil Spill at Former Railroad near West Chemical Plant (Southeast Corner of Former Building 103)	2	Fuel oil released to the environment; remediation occurred
8	Former Locomotive House (Former Building 718A) and Surrounding Area	7	Historical locomotive house; possible release of solvents and petroleum products to the environment; contaminated soil and surface water discovered in July 2000
8	Water Tower – North (Structure 510)	7	Flaking of LBP
8	Leaking Petroleum from 1,000-gallon UST in the Southern Portion of the RDX Acid Area Discovered in 2006 and excavated on 22 January 2007	2	Petroleum release to the environment; soil and groundwater sampling was conducted
8	Building 401A	7	PCB-contaminated concrete flooring exposed to the environment
8	Building 716A (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 716D (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 722A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 723A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 726C (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Asbestos Burial Area West of Building 401A	7	Possible construction debris and asbestos burial in the area west of Building 401A
8	Asbestos Burial Area North of Building 401A	7	Possible construction debris and asbestos burial in the area north of Building 401A.

- ***Final EIS***—A revision of the Draft EIS based on comments received that contains a description of the proposed action and alternatives, including the No-Action alternative, a description of the environment that would be affected by the proposed action and alternatives, and a description of the potential environmental consequences of the proposed action and alternatives.
- ***Disposal and Reuse (D&R) Record of Decision (ROD)***—A concise summary for publication in the Federal Register of the decision made by the DOD service component from among the alternatives in the Final EIS.

A search of NEPA databases was undertaken to determine if historical structures, archaeological sites, traditional cultural properties, or T&E species are present at NECD (EDR 2006b). Cultural and natural resources must be protected from any actions that may adversely affect them. The following records were searched:

- Natural Areas
  - Officially designated wilderness areas
  - Officially designated wildlife preserves, sanctuaries, and refuges
  - Wild and scenic rivers
  - Endangered species
  - Critical habitats for threatened or endangered species, fish, and wildlife
- Landmarks, Historical, and Archaeological Sites
  - Historic places
  - Indian religious sites
  - Scenic trails
- Floodplain, Wetlands, and Coastal Zone
  - Flood plain management
  - Wetlands protection
  - Coastal zone management
- Federal Communications Commission (FCC) and Federal Aviation Administration (FAA) Sites Map
  - Cellular
  - Tower
  - Antenna registration
  - Amplitude modulation (AM) tower
  - FAA digital obstacle file
  - Airport landing facilities
  - Electric power transmission line data
  - Excessive radio frequency emission.

The NEPA Check report was generated by EDR. The complete NEPA report is included in Appendix C.

5.16 APPLICABLE REGULATORY COMPLIANCE ISSUES

The negative applicable regulatory compliance findings are summarized in Table 5-12. The latest inspection was a 2005 Environmental Performance Assessment System (EPAS) audit. All negative applicable regulatory compliance issues have been resolved except four that are in process or awaiting funding.

Table 5-12. Negative Applicable Regulatory Compliance Issues

Location	Compliance Issue	Finding Year	Regulation[1]	Class of Compliance Issue[2]	Date of Correction
Red Ash Sludge Beds and GSBs	Two SWMUs slated for cleanup, also had been identified as wetlands in the National Wetlands Inventory, but had not been assessed under USACE regulatory program guidelines for 404 permit requirements.	1995	NATR	III	3//15/1996
Installation-wide	EAs/FONSIs did not receive a legal review prior to Commander's signature.	1995	NEPA	III	1/1/1996
Installation-wide	Technical specifications for pest control contracts were not being forwarded to AEC, as the MACOM PMP, for technical review and approval prior to solicitation for bids.	1995	FIFRA	III	2/22/1996
Caustic Soda Tank Near Building 101	The secondary containment area for the 250,000-gallon caustic soda tank was emptied by an automatic pump.	1995	CWA	III	1/4/1996
Installation-wide	The installation-wide asbestos survey required formal updating.	1995	CAA	III	9/30/1996
Installation-wide	The asbestos program manager required additional and/or updated training.	1995	TSCA	III	8/30/1996
STP	A sewage sludge permit application had not been submitted.	1995	CWA	I	5/15/1996
7700 Chem Lab	Wastewater effluent samples were not stored at the required preservation temperature.	1995	CWA	I	12/20/1995
Operating Contractor Staff	The person inspecting facilities for cross-connections was not trained in cross-connection identification.	1995	SDWA	III	3/11/1996
Building 7700	The cultural resources manager requires training and his/her job description and performance standards should reflect cultural resource management responsibilities.	1999	CURL	III	5/17/2000
Building 7700	The installation's ICRMP requires completion.	1999	CURL	I	5/31/2002
Building 7700	Existing curation agreements for archaeological artifacts require additional information.	1999	CURL	I	6/29/2000
Building 722A	Notation of an open drum, and two corroded containers.	1999	OSHA	III	7/10/2000
Building 7700	The installation INRMP requires completion.	1999	NATR	III	8/28/2001
Building 7700	The ESMP for the Indiana bat requires completion.	1999	NATR	I	8/1/1999
Building 7700	The IPMP requires revision.	1999	FIFRA	III	8/1/2000
Building 7700	There has been an increase in pesticide usage between FY93 and FY98.	1999	FIFRA	III	7/13/2000
Building 7700	The pesticide subcontractor was conducting improper mixing practices at the pesticide mixing building (Building 722A).	1999	FIFRA	III	6/29/2000
Installation-wide	NECD did not maintain an accurate inventory of all tank systems.	1999	RCRA	III	8/5/1999
Environmental Files	Stormwater runoff from the hazardous waste storage facility no longer had NPDES permit coverage.	1999	CWA	I	9/30/2000
Building 716D	A washrack discharged to a storm drain.	1999	CWA	I	7/13/2000
Tank 510 & Water Distribution System	NECD inadequately maintained water storage facilities and did not have an organized water main flushing program.	1999	SDWA	I	7/11/2000

Table 5-12. Negative Applicable Regulatory Compliance Issues (Continued)

Location	Compliance Issue	Finding Year	Regulation[1]	Class of Compliance Issue[2]	Date of Correction
Water Service	NECD had no record to show that its water customer, the county jail, had tested two containment backflow protection devices at the regulatory required frequency.	1999	SDWA	I	9/23/1999
Building 7700	Contractors are making management and control decisions regarding cultural resources, rather than acting in an advisory capacity. In addition, cultural resource contractors are signing official installation correspondence to the SHPO.	2005	CURL	III	11/14/2005
Building 7700	Communication among internal offices dealing with historical resources needs improvement.	2005	CURL	III	5/2/2006
Building 7700	Government-to-government relationships with Native American groups have not been established per 36 CFR 800.2(D).	2005	CURL	I	11/14/2005
Building 7700	The installation is not conducting internal conservation self-assessments.	2005	CURL	III	11/14/2005
Building 7700	There is no designated CRM.	2005	CURL	III	10/19/2005
Building 7700	36 CFR 79.8 and Appendix B state that curation agreements must contain specific information and be signed by the Federal agency official.	2005	CURL	I	10/20/2005
Building 7700	The installation has not prepared an ISWMP.	2005	RCRA	III	In Process
Building 7700	The installation does not input solid waste and recycling information into the DOD SWAR database.	2005	RCRA	III	3/13/2006
Building 7700	The installation has not initiated an AP Program.	2005	P2	I	In Process
MULT	Improper storage of solid wastes. The majority of the solid waste containers are unsecured or in a deteriorated condition.	2005	RCRA	III	11/30/2005
DW System	Inadequate flushing of the distribution system.	2005	SDWA	III	Cost Estimate Submitted 5/31/2006 Unfunded
MULT	Overfill alarm requirements are not met.	2005	RCRA	I	5/2/2006
Building 144	Emergency generator UST does not meet release detection requirements.	2005	RCRA	III	10/27/2005
Building 7700	Improper disposal of hazardous waste at Medical. Expired hazardous waste epinephrine is disposed of into the sanitary sewer.	2005	RCRA	I	11/14/2005
Building 7700	The installation does not have a P2 Plan.	2005	P2	I	5/3/2006
TSD	The containment building is not closed in accordance with closure requirements for 90-Day Hazardous Waste Storage Areas. The four (4) Mason & Hanger 90-Day Hazardous Waste Storage Areas will be documented as closed.	2005	RCRA	I	3/20/2006
Building 717A	Data used for waste determination of abrasive blast is not available.	2005	RCRA	I	9/27/2005
Building P3045	Improper storage/management of RMW.	2005	RCRA	I	4/21/2006
TVA	Inaccurate/incomplete emergency coordinator list.	2005	RCRA	I	5/3/2006
Facility 510	The exterior coating of the water storage tower is in poor condition.	2005	SDWA	III	Unfunded
Building 7700	An EA/EIS has not been performed on the installation master plan and current mission.	2005	NEPA	I	11/14/2005
Building 7700	Environmental staffing is not sufficient to prevent compliance deficiencies.	2005	Program Mgmt	III	3/13/2006

Table 5-12. Negative Applicable Regulatory Compliance Issues (Continued)

Location	Compliance Issue	Finding Year	Regulation[1]	Class of Compliance Issue[2]	Date of Correction
Building 7700	Appropriate personnel are not attending the EQCC meetings.	2005	Program Mgmt	III	11/14/2005
Building 143	TSDF hazardous waste containment buildings do not meet design requirements.	2005	RCRA	I	11/14/2005
Building 706	Improper management of satellite accumulation area.	2005	RCRA	I	11/14/2005
Building 706	UW lamps were improperly managed.	2005	RCRA	I	3/13/2006
TVA12	Containers of hazardous waste are open when waste is not being added.	2005	RCRA	I	11/14/2005
FPF TSD	Inaccurate/incomplete emergency coordinator list.	2005	RCRA	I	3/13/2006
TVA1	The containment building is not closed in accordance with closure requirements for 90-Day Hazardous Waste Storage Areas.	2005	RCRA	I	5/3/2006
TVA Mobile Lab	Satellite accumulation area is not appropriately managed.	2005	RCRA	I	11/14/2005
Building 706	Used oil containers are not labeled.	2005	RCRA	I	11/14/2005
Area 101	Illegible labels on hazardous waste containers.	2005	RCRA	I	11/14/2005
TVA12	No accumulation start dates for hazardous waste at the 90-day site.	2005	RCRA	I	9/23/2005
Building 7700	An EA is not being prepared when necessary.	2005	NEPA	I	11/14/2005

[1] CAA – Clean Air Act
CURL – Cultural Resources
CWA – Clean Water Act
FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act
NATR – Natural Resources
NEPA – National Environmental Policy Act
OSHA – Occupational Safety and Health Act
RCRA – Resource Conservation and Recovery Act
SDWA – Safe Drinking Water Act
TSCA – Toxic Substances Control Act
[2] I – State/Federal compliance issue
III – Army compliance issue (and Best Management Practices)

5.17 ADJACENT PROPERTIES

EDR conducted a search of state and Federal environmental databases for the NECD property and any adjacent properties within 1 mile of the property boundary (EDR 2006a). The findings of the database search yielded no structures of environmental concern within a 1-mile radius of NECD. The EDR search results are provided in Appendix C.

As shown in Appendix C, the only property within the search distance of NECD was NECD itself. The DOD list consists of federally owned properties administered by DOD that have an area greater than or equal to 640 acres (EDR 2006a).

The USCG permitted 101 acres at NECD in accordance with Army Permit No. DACA27-4-01-011 dated February 22, 2001. The permit area was transferred to USCG effective October 4, 2006. An ECOP was conducted in preparation for the transfer to USCG and the property was classified as Category 1. This property was not evident in the EDR because it became an adjacent property in late 2006. During the VSI of adjacent properties, agricultural and forested acres were observed. These areas are not believed to have potential for environmental impact to NECD.

Figure 5-1. Buildings and SWMUs

(Oversized Figure: See File Figure 5-1.pdf on Accompanying CD)

THIS PAGE WAS INTENTIONALLY LEFT BLANK

6. CONCLUSIONS

Property category codes are used to indicate the degree of contamination associated with the subject property. Table 6-1 identifies the criteria applicable to each. The property categorization flow chart in Figure 6-1 provides information on how categories are assigned. A map of NECD with designated property categories is presented in Figure 6-2, which is presented at the end of this section. The ECP assessment findings facility matrix of NECD is shown in Table 6-2. This matrix includes summaries of the ACM, LBP, storage tanks, hazardous substances, petroleum products, PCBs, radiological material, radon, and MEC releases at each building, structure, and IRP site. Each building, structure, and IRP site is assigned a property category code.

Table 6-1. ECP Categories and Standard Map Colors

ECP Category	Total Acreage at NECD	Definition	Map Color
1	6,427.7	Areas in which no release or disposal of hazardous substances or petroleum products above de minimus quantities has occurred, and to which there has been no migration of such substances from adjacent areas.	White
2	0.3	Areas in which only release or disposal of petroleum products above de minimus quantities has occurred.	Blue
3	197	Areas in which release, disposal, or migration of hazardous substances has occurred, but in concentrations that do not require a removal or other remedial response.	Light Green
4	90	Areas in which release, disposal, or migration of hazardous substances has occurred, but all removal or other remedial actions necessary to protect human health and the environment have been taken.	Dark Green
5	300	Areas in which release, disposal, or migration of hazardous substances has occurred, and removal or other remedial actions are underway, but all required actions have not yet been taken.	Yellow
6	0	Areas in which release, disposal, or migration of hazardous substances has occurred, but required remedial actions have not yet been implemented.	Red
7	121	Areas that have not been evaluated or require additional evaluation.	Gray
Total	**7,136**		

Note: Some areas fall within the boundaries of a higher category property and are included in the total acreage of that higher category (e.g., Category 2 property acreage that is a subset of a Category 7 property is included in the Category 7 acreage).

Study Sections 9, 10, 11, 12, and 13 are classified as Category 1, an area or parcel of real property where no release or disposal of hazardous substances or petroleum products or their derivatives has occurred, including no migration of these substances from adjacent properties. ECP Category 1 parcel descriptions and acreage are provided in Table 6-3. Noncategory 1 property is summarized in Table 6-4.

Disclosure factors for MEC, LBP, and ACM are excluded from the ECP categorization process. LBP is likely in or on buildings built prior to 1978 and it is possible to find LBP in or on buildings built after this date. ACM is likely in or on buildings built prior to 1989, but it is possible to find ACM in buildings built after this date.

The following data gap issues were identified during the ECP assessment:

- It was reported in the HRR (TLI 2007) that leaking filled munitions were temporarily buried somewhere at the facility. The location has not been determined nor has this practice been confirmed.
- No information could be located regarding how radiological waste was handled at the former hospital/infirmary (Former Building 703).
- The Army requested information from the U.S. Department of Labor regarding the compensation of six former workers at the Dana Heavy Water Plant. Due to Privacy Act requirements, the U.S. Department of Labor was unable to provide the information.
- Asbestos construction materials and LBP are present in many buildings. Although significant visual ACM surveys, testing, and abatement has occurred at NECD, not all remaining identified or suspected ACM has been abated and it is likely that additional ACM may exist in unsurveyed structures and inaccessible portions of surveyed structures.
- Additional information is required regarding the analysis of yellow soil south of Building 144. Reports indicate that the soil was analyzed for toxicity characteristic leaching procedure (TCLP) metals, TCLP VOCs, TCLP SVOCs, phosphorus, and sulfur in December 1999. Soil was sampled and removed. Details concerning the circumstances that initiated this investigation are needed.

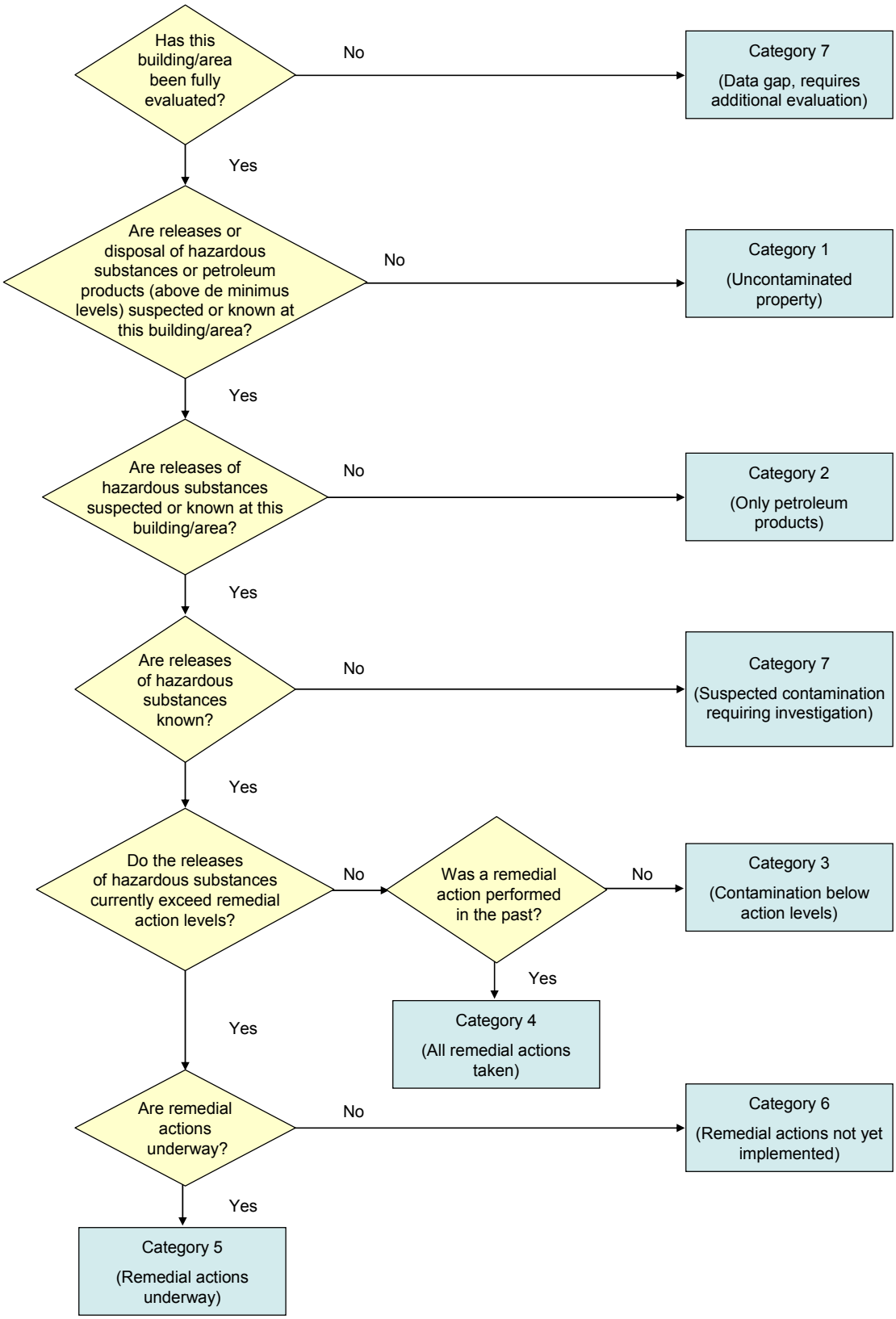


Figure 6-1. Property Categorization Flowchart

Table 6-2. Summary of ECP Findings

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
Study Section 1									
Small Arms Range	7	S	A	A	A	A	A	A	N
NSPs (SWMUs NAAP-1 and NAAP-2)	4	V	N	A	S	S	A	A	N
West Pine Tree Area	7	S	N	N	S	S	A	A	N
1-00722J – Saw Shed	1	N	N	A	A	S	A	A	A
1-007708 – Guard House at Vehicle Gate 8	1	N	N	A	S	S	A	A	A
1-014171 – Richmond Magazine 1	1	N	N	A	V	S	A	A	N
1-014172 – Richmond Magazine 2	1	N	N	A	V	S	A	A	N
1-014173 – Richmond Magazine 3	1	N	N	A	V	S	A	A	N
1-014174 – Richmond Magazine 4	1	N	N	A	V	S	A	A	N
1-014175 – Richmond Magazine 5	1	N	N	A	V	S	A	A	N
1-014176 – Richmond Magazine 6	1	N	N	A	V	S	A	A	N
1-014177 – Richmond Magazine 7	1	N	N	A	V	S	A	A	N
1-014178 – Richmond Magazine 8	1	N	N	A	V	S	A	A	N
1-014179 – Richmond Magazine 9	1	N	N	A	V	S	A	A	N
1-141710 – Richmond Magazine 10	1	N	N	A	V	S	A	A	N
1-141711 – Richmond Magazine 11	1	N	N	A	V	S	A	A	N
1-141712 – Richmond Magazine 12	1	N	N	A	V	S	A	A	N
1-141713 – Richmond Magazine 13	1	N	N	A	V	S	A	A	N
1-141714 – Richmond Magazine 14	1	N	N	A	V	S	A	A	N
1-141715 – Richmond Magazine 15	1	N	N	A	V	S	A	A	N
1-141716 – Richmond Magazine 16	1	N	N	A	V	S	A	A	N
1-141717 – Richmond Magazine 17	1	N	N	A	V	S	A	A	N
1-141718 – Richmond Magazine 18	1	N	N	A	V	S	A	A	N
1-141719 – Richmond Magazine 19	1	N	N	A	V	S	A	A	N

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
1-141720 – Richmond Magazine 20	1	N	N	A	V	S	A	A	N
1-141721 – Richmond Magazine 21	1	N	N	A	V	S	A	A	N
1-141722 – Richmond Magazine 22	1	N	N	A	V	S	A	A	N
1-141723 – Richmond Magazine 23	1	N	N	A	V	S	A	A	N
1-141724 – Richmond Magazine 24	1	N	N	A	V	S	A	A	N
1-141725 – Richmond Magazine 25	1	N	N	A	V	S	A	A	N
1-141726 – Richmond Magazine 26	1	N	N	A	V	S	A	A	N
1-141727 – Richmond Magazine 27	1	N	N	A	V	S	A	A	N
1-141728 – Richmond Magazine 28	1	N	N	A	V	S	A	A	N
1-141729 – Richmond Magazine 29	1	N	N	A	V	S	A	A	N
1-141730 – Richmond Magazine 30	1	N	N	A	V	S	A	A	N
1-141731 – Richmond Magazine 31	1	N	N	A	V	S	A	A	N
1-141732 – Richmond Magazine 32	1	N	N	A	V	S	A	A	N
1-141733 – Richmond Magazine 33*	7	S	N	A	V	S	A	A	S
1-141734 – Richmond Magazine 34	1	N	N	A	V	S	A	A	N
1-141735 – Richmond Magazine 35	1	N	N	A	V	S	A	A	N
1-141736 – Richmond Magazine 36	1	N	N	A	V	S	A	A	N
1-141737 – Richmond Magazine 37	1	N	N	A	V	S	A	A	N
1-141738 – Richmond Magazine 38	1	N	N	A	V	S	A	A	N
1-141739 – Richmond Magazine 39	1	N	N	A	V	S	A	A	N
1-141740 – Richmond Magazine 40	1	N	N	A	V	S	A	A	N
1-141741 – Richmond Magazine 41	1	N	N	A	V	S	A	A	N
1-141742 – Richmond Magazine 42	1	N	N	A	V	S	A	A	N
1-141743 – Richmond Magazine 43	1	N	N	A	V	S	A	A	N

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
1-141744 – Richmond Magazine 44	1	N	N	A	V	S	A	A	N
1-141745 – Richmond Magazine 45	1	N	N	A	V	S	A	A	N
1-141746 – Richmond Magazine 46	1	N	N	A	V	S	A	A	N
1-141747 – Richmond Magazine 47*	7	S	N	A	V	S	A	A	S
1-141748 – Richmond Magazine 48	1	N	N	A	V	S	A	A	N
1-141749 – Richmond Magazine 49	1	N	N	A	V	S	A	A	N
1-141750 – Richmond Magazine 50	1	N	N	A	V	S	A	A	N
1-141751 – Richmond Magazine 51	1	N	N	A	V	S	A	A	N
1-141752 – Richmond Magazine 52	1	N	N	A	V	S	A	A	N
1-00TC77 – Target Shed at Firing Range	1	N	N	A	S	S	A	A	N
Study Section 2									
RDX-MA (SWMU NAAP-3) and AOC-A	5	R	N	A	A	A	A	A	N
2-00733C – Administrative Office at RDX Magazines	1	N	N	A	S	S	A	A	A
Study Section 3									
RDX-MA Area F Parking Lot	7	S	N	A	A	A	A	A	A
Drums South of North Patrol Road	7	S	N	N	A	A	A	A	N
Former Skeet Range	7	S	N	A	A	A	A	A	N
Batteries North of Railroad Bed	7	S	N	A	A	A	A	A	A
3-00701A – Guard House at Vehicle Gate 1	1	N	N	A	V	S	A	A	A
3-00729A – Hazardous Waste Storage	7	S	N	V	V	V	A	A	N
3-00729B – Hazardous Waste Storage	7	S	N	S	V	S	A	A	N
3-00729C – Warehouse	1	N	N	S	V	S	A	A	A
3-00729D – Warehouse	1	N	N	A	V	S	A	A	A
3-00729E – Warehouse	1	N	N	A	V	S	A	A	A
3-00738A – Warehouse	1	N	N	A	A	S	A	A	A
3-01401A – Warehouse	7	S	N	A	V	S	A	A	A
3-01401B – Warehouse	7	S	N	A	R	S	A	A	A
3-01401C – Warehouse	1	N	N	A	S	S	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
3-007705 – Guard House at Vehicle Gate 4	1	N	N	A	V	A	A	A	A
3-0A3200 – Access Control Facility	1	N	N	A	A	A	A	A	A
3-0A3301 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3302 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3303 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3304 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3305 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3306 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3307 – Igloo	7	N	A	A	A	A	A	A	A
3-0A3308 – Igloo	7	N	A	A	A	A	A	A	A
Study Section 4									
RWABs (SWMUs NAAP-29 through NAAP-32)	3	V	N	A	A	A	A	A	N
RDX-BG and the OCMCDA (SWMUs NAAP-33 and NAAP-64, respectively)	3	V	S	A	A	A	A	A	N
GSBs (SWMUs NAAP-34, NAAP-35, and NAAP-36) and PCCRP (SWMU NAAP-49)	4	V	N	A	A	A	A	A	N
TNT-BG (SWMU NAAP-50)	5	R	V	A	A	A	A	A	N
Sanitary Landfill (SWMU NAAP-51)	3	S	N	A	S	S	A	A	N
4-00224B – Warehouse	1	N	N	A	R	S	A	A	A
Study Section 5									
Sulfuric Acid Spill in TNT Acid Area	7	V	N	A	A	A	A	A	N
Oleum Spill near Cull Avenue	7	V	N	A	A	A	A	A	N
Red Water Spill at TNT-MA	7	V	N	A	A	A	A	A	N
TNT-MA Property (SWMUs NAAP-37 through NAAP-47)	3	V	N	A	A	A	A	A	N
Toluene Spill at TNT-MA, B9511 and 9512	7	V	N	A	A	A	A	A	N
Underground Piping for Former Fuel Oil Tanks	7	N	S	A	A	A	A	A	N
TNT-MA Acid Area Property (SWMUs NAAP-56 through NAAP-63)	3	S	N	A	A	A	A	A	N
5-000729 – TNT Pollution Control Area Maintenance Shop	1	N	N	A	S	S	A	A	N
5-003001 – Acid QA Lab & Office (TNT Lab/Office)	1	N	N	A	R	S	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
5-003005 – Maintenance Warehouse	1	N	N	A	V	V	A	A	A
5-003008 – Storage Shed	1	N	N	A	N	N	A	A	A
5-003022 – Acid Manufacturing Plant	1	N	N	A	R	S	A	A	A
5-003063 – Acid Manufacturing Plant	1	N	N	A	R	S	A	A	A
5-004011 – Heat Plant Building	1	N	N	A	R	S	A	A	A
5-004123 – Water Supply Building	1	N	S	A	R	S	A	A	A
5-004261 – Water Tower	7	S	N	A	A	S	A	A	A
5-006192 – Acid Manufacturing Plant	1	N	N	A	A	S	A	A	A
5-009011 – Lab Building	1	N	N	A	R	S	S	A	S
5-009111 – Change House	1	N	N	A	A	S	A	A	A
5-009531 – Explosive Manufacturing Plant	1	N	N	A	R	S	A	A	S
5-009532 – Explosive Manufacturing Plant	1	N	S	A	R	S	A	A	S
5-009533 – Explosive Manufacturing Plant	1	N	S	A	R	S	A	A	A
5-009534 – Explosive Manufacturing Plant	1	N	N	A	R	S	A	A	A
5-009535 – Explosive Manufacturing Plant	1	N	N	A	R	S	A	A	A
5-009631 – Finishing Equipment Room – F&P Line 1	1	N	N	A	A	S	A	A	S
5-009632 – Finishing Equipment Room – F&P Line 2	1	N	N	A	N	S	A	A	S
5-009633 – Finishing Equipment Room – F&P Line 3	1	N	N	A	N	S	A	A	A
5-009634 – Finishing Equipment Room – F&P Line 4	1	N	N	A	N	S	A	A	A
5-009635 – Finishing Equipment Room – F&P Line 5	1	N	N	A	N	S	A	A	A
5-009651 – Box Unloading/ Assembly – F&P Line 1	1	N	N	A	A	S	A	A	A
5-009652 – Box Unloading/ Assembly – F&P Line 2	1	N	N	A	A	S	A	A	A
5-009653 – Box Unloading/ Assembly – F&P Line 3	1	N	N	A	A	S	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
5-009654 – Box Unloading/ Assembly – F&P Line 4	1	N	N	A	A	S	A	A	A
5-009655 – Box Unloading/ Assembly – F&P Line 5	1	N	N	A	A	S	A	A	A
5-009811 – Shipping/ Receiving Facility	1	N	N	A	A	S	A	A	S
5-009812 – Shipping/Receiving Facility	1	N	N	A	A	S	A	A	S
Study Section 6									
Drum Located North of Cull Avenue, West of 12th Street, Containing Black Tarry Material	7	S	N	N	N	N	A	A	N
Intermodal storage containers, PAB tank storage, TMA container storage	7	S	N	A	A	A	A	A	A
6-00104C – Warehouse	1	N	N	A	S	S	A	A	A
6-00121A – Warehouse	1	N	N	A	R	V	A	A	A
6-00121B – Warehouse	1	N	N	V	V	S	A	A	A
6-00121C – Warehouse	1	N	N	A	V	S	A	A	A
6-00223A – Warehouse	1	N	N	A	V	S	A	A	A
6-00227A – Warehouse (Tool Crib)	1	N	N	A	A	S	A	A	A
6-00227B – Warehouse	1	N	N	A	A	S	A	A	A
6-00227C – Warehouse	1	N	N	A	A	S	A	A	A
6-00227D – Warehouse	1	N	N	A	A	S	A	A	A
6-00255A – Warehouse	1	N	N	A	A	S	A	A	A
6-007700 – Administration	1	A	A	A	V	V	V	A	A
6-007702 – Vehicle Storage	1	N	N	A	A	V	A	A	A
6-0TC095 – Storm Shelter	1	N	N	A	S	S	A	A	A
Study Section 7									
Little Raccoon Bank Along DWBG	7	S	S	N	S	S	A	A	N
Drum Located on West Bank of Little Raccoon Creek, South of South Boulevard Containing Black Tarry Material	7	S	N	N	N	N	A	A	N
Mine Burial Area at Scrap Yard	7	S	N	A	A	A	A	A	N
Burial Area 5 at DWBG	7	S	N	N	N	N	A	A	N
DWBG (SWMUs NAAP-23 through NAAP-26 and NAAP-26A)	5	V	S	N	V	A	A	A	N
300-Gallon Buried Tank (SWMU NAAP-54)	7	S	N	A	A	A	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
DI/SY (SWMU NAAP-65)	4	V	N	A	A	A	A	A	N
CSL (SWMU NAAP-27)	7	V	S	N	S	S	A	A	N
MCD (SWMU NAAP-28A)	4	V	N	N	S	S	A	A	N
CDD (SWMU NAAP-28)	4	R	N	N	S	S	A	A	N
STP (SWMU NAAP-52) Property	7	S	A	A	A	A	A	A	A
Little Raccoon Creek (AOC-N)	5	V	N	A	A	A	A	A	N
Asbestos Disposal Area at First Street and Burning Ground Road	1	S	N	N	V	S	A	A	N
DWBG Pine Tree Area	7	S	N	N	S	S	A	A	N
Asbestos Burial Area East of the MCD	7	S	N	N	S	S	A	A	N
Asbestos Burial Area West of the STP	7	S	N	N	S	S	A	A	N
Asbestos Burial Area East of the Pine Trees and West of 1st Street	7	S	N	N	S	S	A	A	N
7-00617A – STP Sample Building	1	N	N	A	A	S	A	A	A
7-006048 – Dechlorination Building	1	N	N	A	A	S	A	A	A
7-006052 – STP	1	N	N	A	A	S	A	A	A
7-006053 – STP	1	N	N	A	A	S	A	A	A
7-006173 – Blower Building	1	N	N	A	A	S	A	A	A
7-006174 – Building Lift Station #1 Auxiliary Pump	1	N	N	A	A	S	A	A	A
7-006178 – Emergency Generator Building	1	N	N	A	A	S	A	A	A
Study Section 8									
FPF Property at Chemical Plant	7	S	S	N	A	A	A	A	N
RDX-MA Acid Area	3	S	N	A	S	S	A	A	N
Leaking Petroleum from 1,000-gallon UST in the Southern Portion of the RDX Acid Area	2	N	S	A	A	A	A	A	A
CPBRs (SWMUs NAAP-10 through NAAP-12)	4	V	N	A	A	A	A	A	N
Removed USTs (SWMU NAAP-66)	2	N	V	A	A	A	A	A	A
Waste Oil Tank (SWMU NAAP-53)	4	R	V	A	A	A	A	A	A
CPAB (SWMU NAAP-67)	4	V	N	A	A	A	A	A	N
PHCP (SWMU NAAP-69)	3	V	N	A	A	A	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
Fire Training Pit (East of the Chemical Plant FPF)	7	S	S	A	A	N	A	A	A
Fuel Oil Spill at Former Railroad near West Chemical Plant (Southeast Corner of Former Building 103)	2	N	R	A	A	A	A	A	A
Former Locomotive House (Former Building 718A) and Surrounding Area	7	S	S	N	A	A	A	A	N
PCB Release Outside Building 401A	7	S	N	S	A	A	A	A	A
Asbestos Burial Area North of Building 401A	7	S	N	N	V	S	A	A	N
Asbestos Burial Area West of Building 401A	7	S	N	N	S	S	A	A	N
NECDF Buildings	1	N	N	A	A	A	V	A	A
8-0103B6 – Propane Air Station Building	1	N	N	A	A	S	A	A	A
8-000146 – Magazine	1	N	N	A	A	S	A	A	N
8-000147 – Magazine	1	N	N	A	A	S	A	A	N
8-000303 – Vault Storage Building	1	N	N	A	A	S	A	A	A
8-00308A – RDX Sulfuric Acid Regeneration (SAR)	1	N	N	A	A	A	A	A	A
8-00401A – Power House	1	N	N	V	V	S	A	A	A
8-00402A – Reservoir	1	N	N	A	A	S	A	A	A
8-00412A – Reservoir Pump House	1	N	N	A	R	V	A	A	A
8-000510 – Water Tower	7	S	N	A	A	V	A	A	A
8-00702A – Telephone Exchange Building	1	N	N	A	A	S	A	A	A
8-00704A – Eng Service Office	1	N	N	A	R	V	A	A	A
8-00704F – Storage Building	1	N	N	A	A	S	A	A	A
8-000706 – Maintenance Shop	1	N	N	A	R	S	A	A	A
8-00707C – Change House	1	N	N	A	V	V	A	A	A
8-00707E – Boiler Room	1	N	N	A	A	S	A	A	A
8-00709A – Fire Headquarters Building	1	N	N	A	A	V	A	A	A
8-00709C – Boiler Building	1	N	N	A	A	S	A	A	A
8-000710 – Warehouse	1	N	N	A	A	S	A	A	A
8-000713 – Warehouse	1	N	N	A	A	S	A	A	A
8-00713A – Procurement Stores	1	N	N	A	A	S	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-2. Summary of ECP Findings (Continued)

Building/Structure/ Site Number	Property Category	Hazardous Substances Releases	Petroleum Releases	PCBs	Asbestos	LBP	Radiological	Radon	MEC
8-00713B – Warehouse	1	N	N	A	A	S	A	A	A
8-00714A – Material Shed	1	N	N	A	R	S	A	A	A
8-000715 – Maintenance Shop	1	N	N	A	R	S	A	A	A
8-00715A – Engineering/ Housing Maintenance Shop	1	N	N	A	V	V	A	A	A
8-000716 – Warehouse	1	N	N	A	V	S	A	A	A
8-00716A – Vehicle Maintenance Shop	7	S	S	A	A	V	A	A	A
8-00716D – Vehicle Maintenance Shop	7	S	S	A	V	V	A	A	A
8-00716F – Boiler House	1	N	N	A	A	S	A	A	A
8-00716G – Boiler House	1	N	N	A	A	A	A	A	A
8-00717A – Maintenance Building	1	N	N	A	A	S	A	A	A
8-00717B – Generator Building	1	N	N	A	A	A	A	A	A
8-00722A – Pesticide Storage Building	7	S	N	A	V	S	A	A	A
8-00722S – Warehouse	1	N	N	A	A	S	A	A	A
8-00723A – Chemical Operations	7	S	N	A	R	V	V	A	A
8-00725A – Vehicle Parking and Storage	1	N	N	A	V	V	A	A	A
8-00726A – Storage Shed	1	N	N	A	A	S	A	A	A
8-00726B – Storage Shed	1	N	N	A	A	S	A	A	A
8-00726C – Storage Shed	7	S	N	A	A	S	A	A	A
8-00726D – Storage Shed	1	N	N	A	S	S	A	A	A
8-00733K – Emergency Vehicle Storage & Training Building	1	N	N	A	A	S	A	A	A
8-00739A – Warehouse	1	N	N	A	V	V	A	A	A
8-0707BB – Office Building	1	N	N	A	V	S	A	A	A
8-0707CC – Guard Headquarters	1	N	N	A	R	V	A	A	A
8-03036A – Propane/Air Station	1	N	N	A	A	A	A	A	A
8-03036B – Propane/Air Station	1	N	N	A	A	A	A	A	A
8-0P3013 – Guard House at NECDF	1	N	N	A	A	A	A	A	A
Study Section 13									
13-004041 – Ranney® Well #1	1	N	N	N	V	S	A	A	A
13-004042 – Ranney® Well #2	1	N	N	N	V	S	A	A	A
13-004043 – Ranney® Well #3	1	N	N	N	A	S	A	A	A

Note: Buildings and structures in the TNT-MA and RDX-MA may contain residual explosives contamination; however if this contamination is believed wholly contained within the buildings/structures, it did not result in a Category 7 designation

* If Building 1-141733 (Richmond Magazine 33) and Building 1-141747 (Richmond Magazine 47) test positive for explosives, MEC in the remaining magazines in Study Section 1 would be suspected

V – Verified; S – Suspected; N – Not Suspected; A – Absent; R – Removed/Remediated

Table 6-3. ECP Category 1 Parcel Descriptions and Acreage

Study Section	Cat. 1 Acreage	Description
1	1,913.4	Study Section 1 is located in the northwest quadrant of the facility within the installation fence. Study Section 1 contains SWMUs NAAP-1 and NAAP-2 (NSPs). The majority of this study section consists of Agricultural Lease areas. In the central portion of this study section are the 52 Richmond Magazines and a 4-acre plot of pine trees. There is a Small Arms Range in the north-central portion of this study section, just south of North Patrol Road. Study Section 1 contains significant hilly wooded areas that follow the Vermillion Creek tributaries. Minor portions of Study Section 1 contain wetlands. There are four cemeteries: Carmack Cemetery, Juliet Cemetery, Walnut Hill Cemetery, and Miller Cemetery. There are two Indiana Bat sites within this study section. Study Section 1 property is designated as Category 1 with the exception of the west pine tree area (Category 7), Small Arms Range (Category 7), and NSPs (Category 4). In addition, Buildings 722J, 7708, TC77, and the magazines, with the exception of Richmond Magazines 33 and 47 (Category 7), are designated as Category 1.
2	0	Study Section 2 is located in the north-central portion of the installation. Study Section 2 is SWMU NAAP-3, also known as the RDX-MA. Study Section 2 does not include any Category 1 property; the RDX-MA is Category 5 property.
3	1,232.1	Study Section 3 is located in the eastern portion of the installation. This study section is composed primarily of wooded and agricultural areas. SWMU NAAP-55 (Hazardous Waste Storage Building [Building 729A]) is located in the northwest portion of Study Section 3. This study section also contains eight igloos and six warehouses. There is one Indiana Bat site and Burson Cemetery in Study Section 3. Little Raccoon Creek is located in the southern portion of this study section, and an unnamed creek is located in the northeast portion of this study section. The RDX-MA Area F Parking Lot; drums south of North Patrol Road; the Former Skeet Range; batteries north of railroad bed; Buildings 729A, 729B, 1401A, 1401B, and the igloos are Category 7, and the remaining Study Section 3 property is Category 1. In addition, Buildings 701A, 729C, 729D, 729E, 738A, 1401C, 7705, and A3200 are Category 1.
4	779.7	Study Section 4 is located in the southwestern corner of the facility, inside the fenced portion of the installation. The SWMUs contained within this study section are SWMUs NAAP-29, NAAP-30, and NAAP-31 (RWABs); NAAP-32 (Red Water Runoff Holding Sump); NAAP-33 and NAAP-64 (RDX-BG and OCMCDA); NAAP-34, NAAP-35, and NAAP-36 (GSBs); NAAP-49 (PCCRP); NAAP-50 (TNT-BG); and NAAP-51 (Sanitary Landfill). The property in this study section includes (in decreasing order of acreage) Prairie Restoration Areas, Agricultural Leases, LUCs, and wooded areas. There is one storage warehouse located within Study Section 4. Study Section 4 property is designated as Category 1 with the exception of the RWABs (Category 3), RDX-BG and OCMCDA (Category 3), GSBs and PCCRP (Category 4), TNT-BG (Category 5), and Sanitary Landfill (Category 3). In addition, Building 224B is Category 1.
5	41.5	Study Section 5 is located in the south-central portion of the installation. This area includes the TNT-MA and the TNT-MA Acid Area. The SWMUs contained within this study section related to the TNT-MA include SWMUs NAAP-37, NAAP-38, NAAP-39, NAAP-40, NAAP-41, NAAP-42, NAAP-43, NAAP-44, NAAP-45, NAAP-46, NAAP-47, and NAAP-48 and consist of TNT Production Lines 1, 2, 3, 4 and 5; TNT Wastewater and Handling Areas #1, #2, #3, #4, and #5; the TNT Wastewater Treatment Facility; and the PCC. The TNT-CTS also was located in this study section. SWMUs within this study section related to the TNT Acid Production Area include SWMUs NAAP-56 (Acid Tank Farm Drain), NAAP-57 (Sulfur and Ammonia Unloading Area Drain), NAAP-58 (Utilities and Shop Area Drain), NAAP-59 (TNT Laboratory Drains), NAAP-60 (TNT Acid Laboratory Drains), NAAP-61 (NAC and DN Facility Drains), NAAP-62 (AOP Facility Drains), and NAAP-63 (SAR Facility Drains). There are 28 buildings in this study section that once supported the manufacture of TNT. Study Section 5 also includes Agricultural Lease areas. Study Section 5 is Category 1 with the exception of the sulfuric acid spill area (Category 7), oleum spill near Cull Avenue (Category 7), red water spill at the TNT-MA (Category 7), TNT-MA (Category 3), toluene spill at the TNT-MA (Category 7), underground piping for former fuel oil tanks (Category 7), TNT-MA Acid Area (Category 3), and Structure 4261 (Water Tower) (Category 7). In addition, all 28 buildings in this study section are designated as Category 1.

Table 6-3. ECP Category 1 Parcel Descriptions and Acreage (Continued)

Study Section	Cat. 1 Acreage	Description
6	616.1	Study Section 6 is located in the southeast quadrant of the installation. This study section is largely wooded and contains 10 warehouses and 3 buildings (Buildings 7700, 7702, and TC095). The Former Smokeless Powder Plant was located in this study section, but was never completed. There are no SWMUs in Study Section 6. Study Section 6 is designated as Category 1 with the exception of the drum located north of Cull Avenue and west of 12th Street (Category 7) and intermodal storage containers, PAB tank storage, and TMA container storage (Category 7). In addition, all 10 warehouses and Buildings 7700, 7702, and TC095 are designated as Category 1.
7	239	Study Section 7 is in the southwest quadrant of the installation within the installation fence. The SWMUs contained within this study section include SWMUs NAAP-23, NAAP-24, NAAP-25, and NAAP-26 (DWBG Burial Areas); NAAP-26A (DWBG Pit A); NAAP-27 (CSL); NAAP-28 (CDD); NAAP-28A (MCD); NAAP-52 (STP); NAAP-54 (300-gallon Tank Burial Area); and NAAP-65 (DI/SY). There is an area of pine trees east of the CSL and DI/SY that is a suspected construction debris/asbestos burial area. Pine trees also are located north and south of Old Burning Ground Road, east of the DWBG. There are several structures used to maintain the STP and one building used for sampling. This study section is largely wooded following Little Raccoon Creek and its tributaries. There are also Agricultural Lease areas and two Indiana Bat sites. The majority of the SWMUs in this study section have LUCs. Study Section 7 is Category 1 with the exception of Little Raccoon Creek bank along the DWBG (Category 7), Little Raccoon Creek (Category 5), the drum located on the west bank of Little Raccoon Creek and south of South Boulevard (Category 7), the area where leaking filled munitions were temporarily buried (Category 7), the mine burial area at the Scrap Yard (Category 7), the Burial Area 5 at the DWBG (Category 7), the DWBG (Category 5), the 300-gallon buried tank (Category 7), the DI/SY (Category 4), the CSL (Category 7), the MCD (Category 4), the CDD (Category 4), the STP (Category 7), the east pine tree area (Category 7), and three suspected construction debris and asbestos burial areas (Category 7). In addition, the buildings and structures associated with the STP are designated as Category 1.
8	176.6	Study Section 8 is in the east-central portion of the installation. This study section contains the Chemical Plant. The SWMUs contained within this study section include NAAP-3A (RDX Acid Manufacturing Area); NAAP-4 (Detox Holding Basin); NAAP-5 (Waste Surge Tank); NAAP-6 (Basin 30031); NAAP-7 (Basin 30025); NAAP-8 (Deep Well Surge Tank); NAAP-9 (Deep Injection Well); NAAP-10, NAAP-11, and NAAP-12 (Chemical Plant Retention Basins 30007, 30008, and 30009, respectively); NAAP-13 through NAAP-21 (Bulk Storage Tanks); NAAP-22 (Present VX Storage Site and Toxic Sump); NAAP-53 (Waste Oil Tank); NAAP-66 (Removed USTs); NAAP-67 (CPAB); and NAAP-69 (PHCP). The majority of Study Section 8 is industrial. There are also small wooded areas and Agricultural Lease areas. The property encompassed by SWMUs NAAP-10, NAAP-11, NAAP-12, and NAAP-67 have LUCs in place. There are 43 buildings in Study Section 8; 30 have been in use since the production of heavy water (constructed in the 1940s). These buildings currently are used for storage, equipment maintenance, or administrative purposes. Study Section 8 is Category 1 with the exception of the Chemical Plant Former Production Facility (Category 7), RDX-MA Acid Area (Category 3), CPRBs (Category 4), Removed USTs (Category 2), Waste Oil Tank (Category 4), CPAB (Category 4), PHCP (Category 3), fuel oil spill at the former railroad (Category 2), Former Locomotive House (Category 7), Leaking 1,000-gallon UST (Category 2), and two suspected construction debris and asbestos burial areas (Category 7). In addition, all buildings and structures within Study Section 8 are designated as Category 1 with the exception of Structure 510, Building 401A, Building 716A, Building 716D, Building 722A, Building 723A, and Building 726C, which are Category 7.
9	232.4	Study Section 9 is the portion of the installation that is outside the installation fence in the southwestern quadrant of the installation. This study section is primarily an Agricultural Lease area. A portion of this study section also is wooded, along Buck Creek. There are no SWMUs in Study Section 9. The entire Study Section 9 is Category 1 property.
10	680	Study Section 10 is located on the western side of the installation, outside the installation fence. The northern part of this study section was used by the National Guard for training exercises. The southern two-thirds of this study section are leased for agricultural use. There are no SWMUs in Study Section 10. The entire Study Section 10 is Category 1 property.

Table 6-3. ECP Category 1 Parcel Descriptions and Acreage (Continued)

Study Section	Cat. 1 Acreage	Description
11	404.1	Study Section 11 is the northernmost part of the installation that is located outside the installation fence. This study section is primarily wooded, along the creek beds of Vermillion Creek and its tributaries. Jonathan Creek runs through this study section. No SWMUs are located in this study section. The entire Study Section 11 is Category 1 property.
12	41.6	Study Section 12 is a tract of land that begins near the northeast boundary of the installation and follows an old railroad bed to the southeast, ending at Highway S 450 E. This area is primarily wooded, with some agricultural land. There is one Indiana Bat site in Study Section 12. No SWMUs are located in Study Section 12. The entire Study Section 12 is Category 1 property.
13	71.2	Study Section 13 is located east of the installation boundary and the railroad along the western side of the Wabash River. This area includes the Ranney® wells and three buildings associated with the wells. No SWMUs are located in Study Section 13. The entire Study Section 13 is Category 1 property.

AOP – Ammonia Oxidation Plant
CDD – Construction Debris Dump
CPAB – Chemical Plant Coal Ash Basin
CPRB – Chemical Plant Retention Basin
CSL – Closed Sanitary Landfill
DI/SY – Demilitarization Incinerator/Scrap Yard
DN – Denitration
DWBG – Decontaminated Waste Burial Ground
GSB – Gypsum Sludge Basin
LUC – Land Use Control
MCD – Memorial Chapel Dump
NAC – Nitric Acid Concentration
NSP – Night Soil Pit
OCMCDA – Old Chemical Munitions Component Detonation Area
PCC – Pollution Control Center
PCCRP – Pollution Control Center Retention Pond
PHCP – Power House Coal Pile
RDX-BG – RDX Burning Ground
RDX-MA – RDX Manufacturing Area
RWAB – Red Water Ash Basin
SAR – Sulfuric Acid Regeneration
STP – Sewage Treatment Plant
SWMU – Solid Waste Manufacturing Unit
TNT-BG – TNT Burning Ground
TNT-CTS – TNT Cooling Tower Sump
TNT-MA – TNT Manufacturing Area
UST – Underground Storage Tank
VX – O-ethyl-S-(2-diisopropylaminoethyl) methyl phosphonothiolate

Table 6-4. Non-Category 1 Property

Study Section	Site Name	Category	Reason
1	Richmond Magazines 33 and 47	7	Possible explosives contamination
1	Small Arms Range	7	Possible MC contamination
1	NSPs (SWMUs NAAP-1 and NAAP-2)	4	Historical burial of waste from latrines and decontaminated solid waste from the VX manufacturing process; RFI complete; listed as NFA in RCRA permit; LUCs in place
1	West Pine Tree Area	7	Possible burial area northeast of Richmond magazines and west of RDX-MA
2	RDX-MA (SWMU NAAP-3)	5	Historical production of RDX; RI and RFI complete; LTM ongoing; LUCs in place
3	RDX-MA Area F Parking Lot	7	Storage of filled TCs; no sampling conducted to date
3	Drums South of North Patrol Road	7	Disposal of drums; unknown contents
3	Former Skeet Range	7	Possible MC contamination
3	Batteries North of Railroad Bed	7	Metals from battery acid
3	Mason & Hanger Hazardous Waste Storage (Building 729B)	7	Possible release of hazardous chemicals
3	Parsons Hazardous Waste Storage (Building 729A)	7	Possible release of hazardous chemicals; closure will be performed by Parsons
3	Buildings 1401A and 1401B	7	Permitted hazardous materials storage; closure will be performed by NECD
3	Igloos	7	Permitted hazardous materials storage; closure will be performed by NECD
4	RWABs (SWMUs NAAP-29 through NAAP-32)	3	Basins historically contained wastewater, ash, and sludges resulting from the treatment of red water associated with TNT production in 1973-74; RI and RFI complete; listed as NFA in RCRA permit
4	RDX-BG and OCMCDA (SWMUs NAAP-33 and NAAP-64, respectively)	3	Burned waste RDX and waste explosives components of M23 land mines and M55 rockets at the RDX-BG; destruction of component parts from old chemical munitions was reported at the OCMCDA; RI and RFI complete; listed as NFA in RCRA permit
4	GSBs (SWMUs NAAP-34 through NAAP-36) and PCCRP (SWMU NAAP-49)	4	GSBs used to contain settled gypsum sludge produced by the neutralization of acidic wastewaters associated with TNT production; PCCRP received wastewaters from the PCC clarifiers, the GSBs' effluent, and water from the RWABs; RI and RFI complete; LUCs in place at GSBs; GSBs and PCCRP listed as NFA in RCRA permit
4	TNT-BG (SWMU NAAP-50)	5	Former burning ground for TNT-contaminated debris; RI, FS, and CMI complete; LTM ongoing; LUCs in place
4	Sanitary Landfill (SWMU NAAP-51)	3	Site closed in 1997; NFA in RCRA permit
5	Sulfuric Acid Spill in TNT Acid Area	7	Sulfuric acid release to the environment
5	Oleum Spill near Cull Avenue	7	Oleum release to the environment
5	Red Water Spill at TNT-MA	7	Red water release to the environment
5	TNT-MA (SWMUs NAAP-37 through NAAP-47)	3	Production of TNT; SI complete; listed as NFA in RCRA permit
5	Toluene Spill at TNT-MA	7	Toluene release to the environment
5	Underground Piping for Former Fuel Oil Tanks	7	Possible fuel oil in underground piping; petroleum odor reported
5	TNT-MA Acid Area (SWMUs NAAP-56 through NAAP-63)	3	Acid manufacturing; listed as NFA in RCRA permit

Table 6-4. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
5	Water Tower – South (Structure 4261)	7	Although peeling paint was not observed on the exterior of Structure 4261, LBP is suspected since the water tower was constructed in 1969
6	Drum Located North of Cull Ave, West of 12th Street Containing Black Tarry Material	7	Disposal of drum; unknown contents
6	Intermodal Storage Containers, PAB Tank Storage, and TMA Container Storage	7	Permitted hazardous materials storage; closure will be performed by NECD
7	Little Raccoon Creek Bank along DWBG	7	Buried debris
7	Little Raccoon Creek (AOC-N)	5	VOCs in the surface water; RFI complete; LTM ongoing
7	Drum Located on West Bank of Little Raccoon Creek, South of South Blvd. Containing Black Tarry Material	7	Disposal of drum; unknown contents
7	Area where Leaking Filled Munitions were Temporarily Buried	7	VX-related contamination; data gap – location is unknown
7	Mine Burial Area at Scrap Yard	7	Decontaminated mines may have been buried in this area; no subsurface samples collected/analyzed in this specific area
7	Burial Area 5 at DWBG	7	Potential VX-related contamination
7	DWBG (SWMUs NAAP-23 through NAAP-26 and NAAP-26A)	5	Historically used to dispose of decontaminated wastes associated with the production of agent VX; SI and RFI completed; LTM ongoing; LUCs in place
7	300-gallon Buried Tank (SWMU NAAP-54)	7	Tank may contain pyrophoric materials; corrective action required
7	DI/SY (SWMU NAAP-65)	4	Historically used to incinerate items once filled with chemical agent; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CSL (SWMU NAAP-27)	7	Historically used to dispose of construction debris from the TNT plant and office and shop waste; historical disposal of pesticide containers reported; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit; historical sampling parameters have not included pesticides
7	MCD (SWMU NAAP-28A)	4	Former site of a concrete batch plant; used for construction debris disposal; RFI complete; LUCs in place; listed as NFA in RCRA permit
7	CDD (SWMU NAAP-28)	4	Historically was a disposal area; drums and various types of construction debris observed in the past; RFI complete; LUCs in unknown place; LTM complete
7	STP (SWMU NAAP-52)	7	Unknown integrity of sludge drying beds
7	DWBG Pine Tree Area	7	Possible construction debris burial area north of Old Burning Ground Road; burial of asbestos also is suspected
7	Asbestos Burial Area East of the MCD	7	Possible construction debris and asbestos burial in the area east of the MCD
7	Asbestos Burial Area West of the STP	7	Possible construction debris and asbestos burial in the area west of the STP
7	Asbestos Burial Area East of the Pine Trees and West of 1st Street	7	Possible construction debris and asbestos burial in the area east of the pine trees and west of 1st Street
8	Chemical Plant FPF	7	Potential release of VX-related contamination and solvents; known releases of DCBs

Table 6-4. Non-Category 1 Property (Continued)

Study Section	Site Name	Category	Reason
8	RDX-MA Acid Area (SWMU NAAP-3A)	3	SI complete; listed as NFA in RCRA permit
8	CPRBs (SWMUs NAAP-10 through NAAP-12	4	Received waste from heavy water and VX production; RI and RFI complete; LUCs in place; listed as NFA in RCRA permit
8	Waste Oil Tank (SWMU NAAP-53)	4	AST formerly located near Building 716A had leaked; contaminated soil was removed; listed as NFA in RCRA permit
8	Removed USTs (SWMU NAAP-66)	2	Four different locations throughout the installation where five USTs were formerly located and had leaked; release assessment completed in 1998; listed as NFA in RCRA permit
8	CPAB (SWMU NAAP-67)	4	Historically used to accept coal ash from Building 401A Power House operations; RFI complete; LUCs in place; listed as NFA in RCRA permit
8	PHCP (SWMU NAAP-69)	3	Coal and coal slag stored on ground near Building 401A
8	Fire Training Pit (East of the Chemical Plant FPF)	7	Potential release of VOCs and SVOCs to the environment
8	Fuel Oil Spill at Former Railroad near West Chemical Plant (Southeast Corner of Former Building 103)	2	Fuel oil released to the environment; remediation occurred
8	Former Locomotive House (Former Building 718A) and Surrounding Area	7	Historical locomotive house; possible release of solvents and petroleum products to the environment; contaminated soil and surface water discovered in July 2000
8	Water Tower – North (Structure 510)	7	Flaking of LBP
8	Leaking Petroleum from 1,000-gallon UST in the Southern Portion of the RDX Acid Area Discovered in 2006 and excavated on 22 January 2007	2	Petroleum release to the environment; soil and groundwater sampling was conducted
8	Building 401A	7	PCB-contaminated concrete flooring exposed to the environment
8	Building 716A (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 716D (Vehicle Maintenance Shop)	7	Vehicle maintenance shop for 65 years; floor drains and floor integrity may be compromised
8	Building 722A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 723A (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Building 726C (Pesticide Storage Building)	7	Possible release of pesticides/herbicides
8	Asbestos Burial Area West of Building 401A	7	Possible construction debris and asbestos burial in the area west of Building 401A
8	Asbestos Burial Area North of Building 401A	7	Possible construction debris and asbestos burial in the area north of Building 401A.

Figure 6-2. Property Categorization Map

(Oversized Figure: See file Figure 6-2.pdf on Accompanying CD)

THIS PAGE WAS INTENTIONALLY LEFT BLANK

7. CERTIFICATION

All information/documentation provided accurately reflects the condition of the property. This report meets the DOD requirements for completion of an ECP Report.

Cathy Collins BRAC Environmental Coordinator NECD	Joan Jackson Environmental Engineer U.S. Army Environmental Command

THIS PAGE WAS INTENTIONALLY LEFT BLANK

8. REFERENCES

40 CFR 264. 2004. Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart G (Closure and Post Closure). January.

A.T. Kearney, Inc. 1987. Preliminary Preview Report. U.S. Army Newport Facility, Newport, Indiana. October.

Chandler, C.R., and R.A. Weiss. 1994. Avifauna of the Newport Army Ammunition Plant with Emphasis on Endangered, Threatened and Candidate Species. Ball State University. September 28.

Dames & Moore. 1991a. Remedial Investigation Report: Red Water Ash Basins, Gypsum Sludge Basins/Pollution Control Center Retention Pond, RDX Burning Ground, RDX Manufacturing Area, Closed Sanitary Landfill, Newport Army Ammunition Plant. Prepared for the U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland. December.

Dames & Moore. 1991b. Site Investigation Report of Night Soil Pits, TNT Manufacturing Area, Chemical Plant, Decontaminated Waste Burial Ground, and Little Raccoon Creek, Newport Army Ammunition Plant.

Dames & Moore. 1991c. Remedial Investigation Report, TNT Burning Ground, Newport Chemical Depot, Newport, Indiana.

DOE (U.S. Department of Energy). 1951. Authorization Request, E.I. Du Pont De Nemours & Company, Letter Contract No. AT (07-2)-1.

DOE. 1952. Dana Plant Engineering and Design History, U.S. Atomic Energy Commission. September.

DOE. 1959. Dana Plant History, January 1, 1958 through June 30, 1959. June.

EarthSource. 1999. "Wetlands Management Plan for Newport Chemical Depot, Newport, Indiana." Prepared for Mason & Hanger Corporation. June.

Earth Tech. 2002. Final Integrated Cultural Resources Management Plan for the Newport Chemical Depot, Indiana 2002-2006. May.

EDR (Environmental Database Resources, Inc.). 2006a. Radius Atlas with GeoCheck. NECD, Indiana. December 20.

EDR. 2006b. NEPACheck Report. NECD, Indiana. December 20.

EDR. 2006c. USGS Aerial Photography Priority 4 Package. NECD, Indiana. December 27.

EDR. 2006d. Historical Topographic Map Report. NECD, Indiana. December 21.

e2M (engineering-environmental Management, Inc.). 2002. Final CTT Range/Site Inventory Report, Newport Chemical Depot, Indiana. October.

ENTECH/SAIC Team. 1997. Newport Chemical Depot Facility-wide RCRA Facility Investigation. Final Sampling and Analysis Plan. Prepared for the U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland. July.

EPIC (Environmental Photographic Interpretation Center). 1985. Installation Assessment for Newport Army Ammunition Plant. TS-PIC-85001. U.S. Environmental Protection Agency.

FMC (Food Machinery Corporation). 1967. FMC Corporation memorandum by Mr. Robert D. Brannon, dated June 29, 1967, Subject: "Memorandum regarding radioactive sealed leak test performed on the mine filling machines on June 27, 1967."

Hedge, C.L. and J.A. Bacone. 1994. Inventory of Natural Areas and Rare Plant Species within the Newport Army Ammunition Plant. Division of Nature Preserves, Indiana Department of Natural Resources.

Homoya, M.A., D.B. Abrell, J.R. Aldrich, T.R. Post. 1985. The natural regions of Indiana. Indiana Academy of Science. 94: 245-268.

IDEM (Illinois Department of Environmental Management). 2001. Correspondence from IDEM regarding the RCRA Corrective Action TNT-BG Decision Document, Newport Chemical Depot, Newport, Indiana.

IDEM. 2003a. Correspondence from IDEM regarding the RCRA Corrective Action Decontaminated Waste Burial Ground Remediation Decision Document, Newport Chemical Depot, Newport, Indiana. June 26.

IDEM. 2003b. Correspondence from IDEM regarding the RCRA Corrective Action Construction Debris Dump Remediation Decision Document, Newport Chemical Depot, Newport, Indiana. June 26.

IDEM. 2004a. Correspondence from IDEM regarding the NFA Memorandum for NECD SWMUs, Newport Chemical Depot, Newport, Indiana. January 9.

IDEM. 2004b. Agreed Order, Commissioner of the Department of Environmental Management (Complainant) vs. Newport Chemical Depot (Respondent), Case No. 2004-13720-H. July.

IDEM. 2005. Agreed Order, Commissioner of the Department of Environmental Management (Complainant) vs. Newport Chemical Depot (Respondent), Case No. 2005-14481-H. May 24, 2005.

IDEM. 2006. Federally Enforceable State Operating Permit (FESOP) Renewal, Office Of Air Quality, Newport Chemical Depot, Newport, Indiana. September.

ISU (Indiana State University). 1994. Survey of Endangered, Threatened, and Special Concern Fishes, Amphibians, Reptiles, and Mammals of the Newport Army Ammunition Plant.

Mason & Hanger. 1993. Internal correspondence regarding weapons and ammunition safety from R.A. Stokes.

Mason & Hanger. 1994. Plant History through 1994. Word file.

Mason & Hanger. 1996. Letter from Mason & Hanger Plant Manager, D.A. Lichtenberger to Major William S. Schaff, Jr., NECD, regarding agricultural use, deer hunting program, and future land use of Newport Chemical Depot. December 17.

Mason & Hanger. 1997. 1996 PCB Annual Report. Newport Chemical Depot, Newport, Indiana. June.

Mason & Hanger. 2000. Correspondence from W.H. Rennels regarding internal audit of ammunition. June 20.

Mason & Hanger. 2001. E-mail communication from Tammy Haug, Mason & Hanger, to Lisa Jones-Bateman, SAIC. August 2.

Mason & Hanger. 2002. Communication from Tammy Haug regarding current agricultural use, deer hunting program, and NPDES permit of Newport Chemical Depot. June 4.

Mason & Hanger. 2003a. Personal interview between Ron Henton, Mason & Hanger Corporation, and Lisa Jones-Bateman and John Carter, SAIC. February 26.

Mason & Hanger. 2003b. Removal of PCB-Contaminated Concrete From Building 401A. Newport Chemical Depot, Newport, Indiana. February.

Mason & Hanger. 2005a. Newport Chemical Depot Hazardous Waste Partial Closure Plan for Building 713 3X Material Storage Area. December.

Mason & Hanger. 2005b. 2004 PCB Annual Report. Newport Chemical Depot, Newport, Indiana. June.

Mason & Hanger. 2005c. Spill Prevention, Control, and Countermeasures Plan, Newport Chemical Depot, Newport, Indiana. August.

Mason & Hanger. 2005d. Spill Contingency Plan. Newport Chemical Depot, Newport, Indiana. February.

Mason & Hanger. 2006a. Phillip Cox Comments On Draft ECP authored by USAEC.

Mason & Hanger. 2006b. Mike McKee e-mail to Tammy Haug dated January 10, 2006 regarding review of Draft ECP.

Mason & Hanger. 2006c. ECOP for the Proposed Transfer of Property from NECD to the United States Coast Guard. September 1.

NAAP (Newport Army Ammunition Plant). 1983. Petition to Amend 40 CFR Part 261. Miscellaneous correspondence.

NECD (Newport Chemical Depot). 1951. Engineering Drawing D-G-124-4. Plot Plan of Dana Plant Showing Joint Facilities. Sanitary-Storm-Ash Lines. July 18.

NECD. 1995. The Removal and Disposal of the TNT Facility, Newport, Indiana. August.

NECD. 1996. Facility History and Chronology, provided by Kevin Rudduck, NECD. October.

NECD. 2004. Environmental Baseline Survey for the Proposed Transfer of Hazardous Waste Storage Building, Facility Number 729A, Newport Chemical Depot, Newport, Indiana. April.

NECD. 2006. NECD RCRA permit #IN1210022272. November.

NECD. 2007. News Release: Newport Chemical Depot Reaches 50-Percent VX Destruction. April 27.

Parsons. 2002. Stormwater Pollution Prevention Plan, Newport Chemical Agent Disposal Facility. September.

Personal Communication. 2006. Personal communication with Mason & Hanger Radiation Safety Officer, November 13-15.

Personal Communication. 2007a. Personal communication with NECDF personnel (Parsons and Mason & Hanger). January.

Personal Communication. 2007b. Personal communication with Mason & Hanger Environmentalist. January through August.

Personal Communication. 2007c. Personal communication with Mason & Hanger Head Nurse. January.

Personal Communication. 2007d. Personal communication with Mason & Hanger Environmental Manager. January through March.

Personal Communication. 2007e. Personal communication with Mason & Hanger Utility Operator. January through March.

Personal Communication. 2007f. Personal communication with NECD Fire Inspector. January.

Personal Communication. 2007g. Personal Communication with TVA Liaison Officer. January.

Personal Communication. 2007h. E-mail communication with Mason & Hanger Natural Resources Administrator. June.

Personal Communication. 2007i. Personal Communication with Public Outreach Office Senior Communications Manager. July.

Ricketts, T.H. et al. 1999. *Terrestrial Ecoregions of North America. A Conservation Assessment.* Island Press. Washington, D.C.

SAIC (Science Applications International Corporation). 1995. Corrective Measures Study, Newport Chemical Activity, Final Report. September.

SAIC. 2001a. Final Newport Chemical Depot Conceptual Design: Bioremediation of TNT Burning Ground. July.

SAIC. 2001b. RFI for SWMUs NAAP-27, NAAP-65, and Little Raccoon Creek, Newport Chemical Depot, Newport, Indiana.

SAIC. 2002. Final RDX Manufacturing Area Corrective Measures Study, Newport Chemical Depot, Newport, Indiana. July.

SAIC. 2003a. RCRA Facility Investigation Report, Final, Volumes 1 & 2, Newport Chemical Depot, Newport, Indiana. August.

SAIC. 2003b. Final Construction Debris Dump and Decontaminated Waste Burial Ground Corrective Measures Study, Newport Chemical Depot, Newport, Indiana. September.

SAIC. 2003c. RDX Manufacturing Area Corrective Measure Implementation Construction, Operation, and Maintenance Plan, Final. Newport Chemical Depot, Newport, Indiana. October.

SAIC. 2003c. TNT Burning Ground Groundwater Monitoring Program, Technical Memorandum. Newport Chemical Depot, Newport, Indiana. July.

SAIC. 2003d. TNT Burning Ground Groundwater Monitoring Program, Second Round of Sampling, Technical Memorandum. Newport Chemical Depot, Newport, Indiana. November.

SAIC. 2003e. Final Groundwater Technical Memorandum, West DWBG, Newport Chemical Depot, Newport, Indiana. Prepared for the U.S. Army Corps of Engineers. October.

SAIC. 2004a. NFA Memorandum, Final. Newport Chemical Depot, Newport, Indiana. June.

SAIC. 2004b. TNT Burning Ground CMI Closure Report, Final. Newport Chemical Depot, Newport, Indiana. January.

SAIC. 2005a. RDX Manufacturing Area Corrective Measure Implementation Completion Report, Draft. Newport Chemical Depot, Newport, Indiana. February.

SAIC. 2005b. Decontaminated Waste Burial Ground Corrective Measure Implementation Completion Report, Draft Final. Newport Chemical Depot, Newport, Indiana. March.

SAIC. 2005c. Construction Debris Dump Corrective Measure Implementation Completion Report, Draft Final. Newport Chemical Depot, Newport, Indiana. March.

SAIC. 2005d. Newport Chemical Depot, Land Use Control Implementation Plan. October.

SAIC. 2005e. TNT-CTS Removal Action Completion Report, Draft. Newport Chemical Depot, Newport, Indiana. April.

SAIC. 2007. Technical Memorandum, SWMUs NAAP-6 and NAAP-7, North Chemical Plant Area, Final. Newport Chemical Depot, Newport, Indiana. February.

Tetra Tech. 2001. Integrated Natural Resources Management Plan 2001-2005. August.

TLI (TLI Solutions). 2007. Final Historical Records Review, Newport Chemical Depot, Newport, Indiana. May.

Tribune Star. 2007. Article entitled, "Army Considers Nerve Agent Options after DuPont Exit," by Rick Callahan. February 2.

U.S. Army. 1998. Environmental Impact Statement: Pilot Testing of Neutralization/Supercritical Water Oxidation of VX Agent at Newport Chemical Depot, Indiana.

U.S. Census Bureau. 2005. U.S. Census Bureau website. http://www.census.gov/

USACE (U.S. Army Corps of Engineers). 2002. Spill Prevention, Control, and Countermeasures Plan, Newport Chemical Agent Disposal Facility. October.

USAEHA (U.S. Army Environmental Hygiene Agency). 1973. Solid Waste Survey Number 26-001-74. Newport Army Ammunition Plant, Indiana. August 13-17, 1973.

USAEHA. 1975. Water Quality Engineering Special Study No. 24-026-73/75, Water Quality Study. Newport Army Ammunition Plant: Newport, Indiana.

USAEHA. 1977. Installation Pesticide Management Program Survey No. 61-01518-77. March.

USAEHA. 1981a. U.S. Army Pollution Abatement Program Study, Installation of Monitoring Wells, Newport Army Ammunition Plant, Newport, Indiana, June 15-23.

USAEHA. 1981b. U.S. Army Management Plan for RCRA Groundwater Monitoring and Assessment Program, Newport Army Ammunition Plant, Indiana.

USAEHA. 1983. Phase 2, Hazardous Waste Management Special Study No. 39-26-0147-83. DARCOM Opening-Burning/Open Detonation Grounds Evaluation, Newport Army Ammunition Plant, Newport, Indiana, February 22 – March 4, 1982.

USAEHA. 1984. Investigation of Soil Contamination at the Open Burning Ground, Hazardous Waste Study No. 37-26-0326-84, Newport Army Ammunition Plant, October 5-11.

USAEHA. 1985. Geohydrologic Study No. 38-26-0470-85.

USAEHA. 1986. Evaluation of Solid Waste Management Units at Newport Army Ammunition Plant, Newport, Indiana. Ground-Water Consultation No. 38-26-1367-8b. U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground, Maryland. July.

USAEHA. 1987. Results for Newport Army Ammunition Plant, Newport, Indiana, AMC Testing Program.

USAEHA. 1988. Installation Pesticide Management Program Review No. 16-61-0356-88. February.

USAEHA. 1990. Pesticide Management Survey No 16-61-0540-90. June.

USATHAMA (U.S. Army Toxic and Hazardous Materials Agency). 1979. Installation Assessment of Newport Army Ammunition Plant, Records Evaluation Report No. 133. January.

USDA (U.S. Department of Agriculture). 1978. Soil Survey of Vermillion County, Indiana.

USFWS (U.S. Fish and Wildlife Service). 2001. Wetlands Inventory Report, Newport Chemical Depot, Vermillion County, Indiana. October.

USGS (U.S. Geological Survey). 1964. 7.5 Minute Series (Topographic). Newport, Indiana quadrangle. Photorevised 1980. With State of Indiana Department of Natural Resources.

USGS. 1970. The National Atlas of the United States of America.

USGS. 1978a. 7.5 Minute Series (Topographic). Dana quadrangle, Indiana. Photorevised 1980; photoinspected 1983. With State of Indiana Department of Natural Resources.

USGS. 1978b. 7.5 Minute Series (Topographic). Montezuma, Indiana quadrangle. With State of Indiana Department of Natural Resources.

USGS. 1979. 7.5 Minute Series (Topographic). Scotland, Indiana quadrangle. With State of Indiana Department of Natural Resources.

Vermillion County. 1996. Vermillion County Zoning Map. Vermillion County Courthouse. Newport, Indiana.

Versar. 1998. Phase III RFI Report, RDX Manufacturing Area, Surficial Soils, Newport Chemical Depot, Newport, Indiana. March 18.