



RECORD OF DECISION FOR PICA 020 GROUP OF SITES

PICATINNY ARSENAL NEW JERSEY

FINAL

JUNE 2008

TABLE OF CONTENTS

Section	Page
1.0 DECLARATION.....	1-1
1.1 SITE NAME AND LOCATION	1-1
1.2 STATEMENT OF BASIS AND PURPOSE	1-1
1.3 ASSESSMENT OF THE SITES	1-2
1.4 DESCRIPTION OF THE SELECTED RESPONSE ACTION: LAND USE CONTROLS	1-2
1.5 STATUTORY DETERMINATIONS.....	1-2
1.6 ROD DATA CERTIFICATION CHECK LIST.....	1-3
1.7 AUTHORIZING SIGNATURE.....	1-3
2.0 DECISION SUMMARY	2-1
2.1 SITE NAME, LOCATION, AND DESCRIPTION	2-1
2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES	2-1
2.2.1 Picatinny Site Background	2-1
2.2.2 PICA 020/Site 19 – Former Pyrotechnic Demonstration Range.....	2-1
2.2.3 PICA 092/Site 163 – Baseball Fields.....	2-2
2.2.4 PICA 088/Site 49 – Building 19 and Former Building 19-A, Former 90-Day Waste Accumulation Area	2-2
2.2.5 PICA 095/Site 86 – Building 12, Former Photo Processing Facility	2-2
2.2.6 PICA 099/Site 182 – Building 5, Former Arsenal Reproduction	2-3
2.2.7 PICA 100/Site 183 – Building 58, Former Arsenal Reproduction and Training.	2-3
2.2.8 PICA 070/Site 28 – Sewage Treatment Plant’s Former Sludge Beds	2-3
2.2.9 PICA 083/Site 44 – Building 39, Golf Course Maintenance Shop	2-4
2.2.10 PICA 036/Site 106 – Former Building 1010, Propellant Plant	2-4
2.2.11 PICA 105/Site 124 – Building 166, Propellant Testing.....	2-4
2.2.12 PICA 110/Site 141 – Building 429, Propellant Crushing	2-5
2.2.13 PICA 112/Site 143 – Building 436, Propellant Processing	2-5
2.2.14 PICA 118/Site 135 – Buildings 315 and 316, Metallurgical Laboratory and Former Laboratory.....	2-5
2.2.15 Enforcement Activities.....	2-6
2.3 COMMUNITY PARTICIPATION.....	2-6
2.4 SCOPE AND ROLE OF RESPONSE ACTION.....	2-7
2.5 SITE CHARACTERISTICS.....	2-7
2.5.1 Physical Characteristics.....	2-7
2.5.1.1 Physiography	2-7
2.5.1.2 Geology	2-8
2.5.1.3 Groundwater	2-8
2.5.1.4 Surface Water.....	2-9
2.5.1.5 Soils.....	2-9
2.5.1.6 Climate	2-9
2.5.1.7 Topography and Geology of the 13 Sites.....	2-9
2.5.2 Summary and Findings of Site Investigations	2-11
2.5.2.1 PICA 020/Site 19 Environmental Investigations	2-11
2.5.2.2 PICA 092/Site 163 Environmental Investigations	2-11
2.5.2.3 PICA 088/Site 49 Environmental Investigations	2-12
2.5.2.4 PICA 095/Site 86 Environmental Investigations	2-12
2.5.2.5 PICA 099/Site 182 Environmental Investigations	2-12

	2.5.2.6	PICA 100/Site 183 Environmental Investigations	2-13
	2.5.2.7	PICA 070/Site 28 Environmental Investigations	2-13
	2.5.2.8	PICA 083/Site 44 Environmental Investigations	2-13
	2.5.2.9	PICA 036/Site 106 Environmental Investigations	2-13
	2.5.2.10	PICA 105/Site 124 Environmental Investigations	2-13
	2.5.2.11	PICA 110/Site 141 Environmental Investigations	2-14
	2.5.2.12	PICA 112/Site 143 Environmental Investigations	2-14
	2.5.2.13	PICA 118/Site 135 Environmental Investigations	2-14
2.6		CURRENT AND POTENTIAL FUTURE LAND USES.....	2-15
2.7		SUMMARY OF SITE RISKS	2-16
	2.7.1	PICA 020/Site 19 Summary of Site Risks	2-17
	2.7.2	PICA 092/Site 163 Summary of Site Risks.....	2-17
	2.7.3	PICA 088/Site 49 Summary of Site Risks	2-18
	2.7.4	PICA 095/Site 86 Summary of Site Risks	2-18
	2.7.5	PICA 099/Site 182 Summary of Site Risks.....	2-19
	2.7.6	PICA 100/Site 183 Summary of Site Risks.....	2-19
	2.7.7	PICA 070/Site 28 Summary of Site Risks	2-19
	2.7.8	PICA 083/Site 44 Summary of Site Risks	2-20
	2.7.9	PICA 036/Site 106 Summary of Site Risks.....	2-20
	2.7.10	PICA 105/Site 124 Summary of Site Risks.....	2-20
	2.7.11	PICA 110/Site 141 Summary of Site Risks.....	2-21
	2.7.12	PICA 112/Site 143 Summary of Site Risks.....	2-22
	2.7.13	PICA 118/Site 135 Summary of Site Risks.....	2-22
2.8		REMEDIAL ACTION OBJECTIVES	2-36
2.9		PRINCIPAL THREAT WASTE	2-36
2.10		DESCRIPTION OF ALTERNATIVES	2-36
	2.10.1	Alternative 1: No Action	2-37
	2.10.2	Alternative 2: Implementation of Land Use Controls	2-37
2.11		COMPARATIVE ANALYSIS OF ALTERNATIVES.....	2-38
	2.11.1	Protection of Human Health and the Environment	2-38
	2.11.2	Compliance with Applicable or Relevant and Appropriate Requirements.....	2-39
	2.11.3	Long-term Effectiveness and Permanence	2-39
	2.11.4	Reduction in Toxicity, Mobility, or Volume through Treatment.....	2-39
	2.11.5	Short-term Effectiveness	2-39
	2.11.6	Implementability	2-39
	2.11.7	Cost.....	2-39
	2.11.8	State Acceptance.....	2-39
	2.11.9	Public Acceptance	2-39
2.12		SELECTED RESPONSE ACTION	2-40
	2.12.1	Summary of the Rationale for the Selected Response Action	2-40
	2.12.2	Detailed Description of the Implementation of Land Use Controls	2-41
	2.12.3	Summary of the Estimated Costs for the Selected Response Action.....	2-41
	2.12.4	Expected Outcomes of the Selected Response Action.....	2-42
2.13		STATUTORY DETERMINATIONS.....	2-42
	2.13.1	Protection of Human Health and the Environment	2-42
	2.13.2	Compliance with ARARs.....	2-42
	2.13.3	Cost Effectiveness.....	2-42
	2.13.4	Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable	2-43

2.13.5	Preference for Treatment as a Principal Element.....	2-43
2.13.6	Five-year Review Requirements.....	2-43
2.14	DOCUMENTATION OF SIGNIFICANT CHANGES.....	2-43
3.0	RESPONSIVENESS SUMMARY.....	3-1
3.1	PUBLIC ISSUES AND LEAD AGENCY RESPONSES.....	3-1
3.1.1	Summary of Comments Received During the Public Meeting on the Proposed Plan and Agency Responses.....	3-1
3.1.2	Summary of Comments Received During the Public Comment Period and Agency Responses.....	3-2
3.2	TECHNICAL AND LEGAL ISSUES.....	3-2
4.0	REFERENCES.....	4-1

LIST OF FIGURES

Figure

1-1	Picatinny Site Location Map
1-2	Picatinny RI Concept Plan Study Areas
1-3	Area C, Sites 19 and 163 Location Map
1-4	Area D, Sites 49, 86, 182, and 183 Location Map
1-5	Area E, Sites 28 and 44 Location Map
1-6	Area F, Sites 106, 124, 141, and 143 Location Map
1-7	Area G, Site 135 Location Map
2-1	Area C, Sites 19 and 163 Land Use Control Coverage Area
2-2	Area D, Sites 86, 182, and 183 Land Use Control Coverage Area
2-3	Area E, Site 28 Land Use Control Coverage Area
2-4	Area F, Sites 106, 124, 141, and 143 Land Use Control Coverage Area
2-5	Area G, Site 135 Land Use Control Coverage Area

LIST OF TABLES

Table

2.7-1	Site 19 Risk Characterization Summary
2.7-2	Site 163 Risk Characterization Summary
2.7-3	Site 86 Risk Characterization Summary
2.7-4	Site 28 Risk Characterization Summary
2.7-5	Site 106 Risk Characterization Summary
2.7-6	Site 124 Risk Characterization Summary
2.7-7	Site 141 Risk Characterization Summary
2.7-8	Site 143 Risk Characterization Summary
2.7-9	Site 135 Risk Characterization Summary

LIST OF ATTACHMENTS

Attachment

1	Certificate of Publication for Public Notices
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LIST OF ACRONYMS AND ABBREVIATIONS

AEDB-R	Army Environmental Database - Restoration
ANL	Argonne National Laboratory
AR	Army Regulation
ARAR	Applicable or Relevant and Appropriate Requirement
ARDEC	U.S. Army Armament Research, Development and Engineering Center
ARI 99	Phase I Additional RI Sites 22, 44, 61, 104, 122, 135, 141, and 145, IT Corporation, 1999
AST	aboveground storage tank
ATG	Allied Technology Group
AUF	Area Use Factor
BNA	base neutral/acid extractable
CAD	computer-aided design
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
DCSCC	NJDEP Direct Contact Soil Cleanup Criteria
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DSERTS	Defense Sites Environmental Restoration Tracking System
DRMO	Defense Reutilization and Marketing Office
DU	depleted uranium
ER, A	Environmental Restoration, Army
ERA	Environmental Risk Assessment
GIS	Geographic Information System
GPB	Green Pond Brook
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IDW	investigation-derived wastes
IFS	Integrated Facility System
IGWSCC	Impact to Groundwater Soil Cleanup Criteria
LUC	land use control
mg/kg	milligram per kilogram
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJNRDCSCC	New Jersey Non-Residential Direct Contact Soil Cleanup Criteria
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
O&M	Operation and Maintenance
PAERAB	Picatinny Arsenal Environmental Restoration Advisory Board
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PICA	Picatinny
PRG	Preliminary Remediation Goal
RA	Risk Assessment
RAO	Remedial Action Objective
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RG	remediation goal
RI	Remedial Investigation
RPO	Radiation Protection Office
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986

SI Site Investigation
TECUP..... Toxic Energetics Cleanup Program
USAAMC U.S. Army Armament, Munitions, and Chemical Command
USACE U.S. Army Corps of Engineers
USAEHA U.S. Army Environmental Hygiene Agency
USEPA..... U.S. Environmental Protection Agency
USGS U.S. Geological Survey
UST underground storage tank
VOC..... volatile organic compound

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Facility Name and Location: Picatinny, United States Army Installation Management Agency, Northeast Regional Garrison Office, Building 319, Picatinny, New Jersey 07806-5000. The facility is located as follows:

- Morris County
- Congressional District 11
- U.S. Environmental Protection Agency (USEPA) Region 2
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) - EPA ID# NJ3210020704

This Record of Decision (ROD) specifically addresses the soils at 13 sites located in five areas at Picatinny, which is located in Rockaway Township, Morris County, New Jersey (see Figure 1-1). The sites addressed in the ROD are as follows: two sites in Area C, Sites 19 and 163; four sites in Area D, Sites 49, 86, 182, and 183; two sites in Area E, Sites 28 and 44; four sites in Area F, Sites 106, 124, 141 and 143; and, one site in Area G, Site 135. Figure 1-2 presents the location of Areas C, D, E, F, and G at Picatinny. The Army maintains the Army Environmental Database - Restoration (AEDB-R) system [formerly the Defense Sites Environmental Restoration Tracking System (DSERTS)] for organizing all of the sites in the installation restoration program. In this database, the 13 sites covered in this ROD are designated PICA-020 (Site 19), PICA-092 (Site 163), PICA-088 (Site 49), PICA-095 (Site 86), PICA-099 (Site 182), PICA-100 (Site 183), PICA-070 (Site 28), PICA-083 (Site 44), PICA-036 (Site 106), PICA-105 (Site 124), PICA-110 (Site 141), PICA-112 (Site 143), and PICA-118 (Site 135).

Area C covers approximately 126 acres and is located in the southern portion of Picatinny. Figure 1-3 presents the location of two sites in Area C, Sites 19 and 163. Area D covers approximately 89 acres and is located in the west-central portion of Picatinny. Figure 1-4 presents the location of four sites in Area D, Sites 49, 86, 182, and 183. Area E covers approximately 38 acres and is located in the southwest-central portion of Picatinny. Figure 1-5 presents the location of two sites in Area E, Sites 28 and 44. Area F covers approximately 77 acres and is located near the center of Picatinny. Figure 1-6 presents the location of four sites in Area F, Sites 106, 124, 141, and 143. Area G covers approximately 40 acres and is also located near the center of Picatinny. Figure 1-7 presents the location of one site in Area G, Site 135.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected response action for Sites 19, 163, 86, 182, 183, 28, 106, 124, 141, 143, and 135 located at Picatinny in Rockaway Township, New Jersey. The selected response action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Sites 49 and 44 were recommended for No Further Action in the Feasibility Study (ARCADIS, 2007) and are discussed briefly herein. This decision has been made by the Army and the U.S. Environmental Protection Agency (USEPA). The administrative record for the sites, which is available at the Picatinny Installation Program library, is located as specified in Section 2.3.

This ROD has been completed in accordance with A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents (USEPA, 1999) to the greatest extent possible. The New Jersey Department of Environmental Protection (NJDEP) concurs on the selected response action. However, NJDEP did not concur on this ROD because it did not agree with language describing their soil clean-up standards.

1.3 ASSESSMENT OF THE SITES

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened release of hazardous substances into the environment.

1.4 DESCRIPTION OF THE SELECTED RESPONSE ACTION: LAND USE CONTROLS

The response action for 11 of these sites is part of a comprehensive environmental investigation and remediation process currently being performed at Picatinny. The Army designated more than 150 site numbers to the buildings and surrounding land that supported former production operations. The Army further categorized the sites into 16 areas based on the potential for environmental contamination, called Area A (greatest potential) through Area P (least potential), to ensure systematic and prioritized investigation and cleanup of the sites. To further expedite the CERCLA investigative processes, the Army further prioritized Areas A through P into three phases: Phase I – Areas A through G, Phase II – Areas H through K, and Phase III – Areas L through P. This ROD addresses the selection of the response action for soils at Sites 19, 163, 86, 182, 183, 28, 106, 124, 141, 143, and 135 as part of the comprehensive environmental investigation and remediation process currently being performed at Picatinny. A response action is not required at Sites 49 and 44; however, as these sites were included in the Proposed Plan, they are included briefly herein. The feasibility study determined that these sites do not require any further action as they have received RCRA closure and the site data do not exceed relevant NJDEP or USEPA residential criteria.

Results of the environmental investigations have shown that the detected contaminant concentrations in soil at the sites are low, and in most cases below regulatory, risk-based cleanup criteria for industrial sites or less than Picatinny background concentrations. Based on this evaluation, the selected response action for these 11 sites consists of maintenance of existing Land Use Controls (LUCs). The Department of Defense (DOD) and EPA have agreed upon an approach for documenting LUC remedies. This approach is referred to as the “Navy Principles” (DOD, 2004). This ROD has been written in accordance with the Navy Principles. The actions described in this ROD are intended to eliminate the potential for human contact with contaminant concentrations that could cause unacceptable risks to human health at the sites. The remedial action will be considered complete upon agreement by the USEPA and the U.S. Army.

The U.S. Army will be responsible for maintaining the effectiveness of LUCs. The specifics of the design features of the LUCs and the specifics of implementing, reporting on and enforcing LUCs will be described in the Remedial Design.

1.5 STATUTORY DETERMINATIONS

The selected response action is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to this response action, and is cost effective. The response action does not satisfy the statutory preference for treatment as a principal element of the response action as treatment is not required to effectively protect human health and the environment from unacceptable exposures to chemicals present. Because this response action will result

in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unrestricted exposure, statutory reviews will be conducted every five years after initiation of remedial action to ensure that the response action is, or will be, protective of human health and the environment until such time that it may be determined that the sites qualify for unrestricted use.

1.6 ROD DATA CERTIFICATION CHECK LIST

The following information is included in the Decision Summary (Section 2.0) of this ROD. Additional information can be found in the Administrative Record for this site.

Criterion	Discussion	Page Number
Chemicals of Concern and Their Respective Concentrations	Included as Section 2.5.2	2-11
Baseline Risk Represented by the Chemicals of Concern	Included as Section 2.7	2-16
Cleanup Levels Established for Chemicals of Concern and the Basis for These Levels	Included as Section 2.8	2-35
How Source Materials Constituting Principal Threats will be Addressed	Included as Section 2.9	2-35
Current and Reasonably Anticipated Future Land Use Assumptions Used in Baseline Risk Assessment and ROD	Included as Section 2.6	2-15
Potential Land and Groundwater Use Available as a Result of the Selected Response Action	Included as Section 2.11.2	2-37
Estimated Capital, Annual Operation and Maintenance and Total Present Worth Costs, Discount Rate, and the Number of Years Over Which the Response Action Cost Estimates are Projected	Included as Section 2.11.3	2-38
Key Factors Leading to Selection of Selected Response Action	Included in Section 2.11	2-37

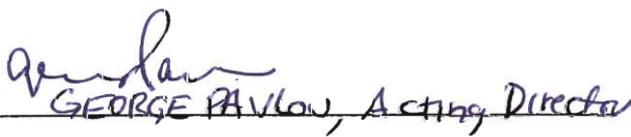
1.7 AUTHORIZING SIGNATURE



 John P. Stack
 Lieutenant Colonel, US Army
 Garrison Commander



 Date



 GEORGE PAVLOV, Acting Director
 Emergency and Remedial Response Division
 U.S. Environmental Protection Agency, Region 2



 Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

This ROD describes the selected action for soils at Sites 19, 163, 86, 182, 183, 28, 106, 124, 141, 143, and 135 of Picatinny in Rockaway Township, Morris County, New Jersey. Sites 49 and 44 are discussed briefly herein, although no response action is necessary at these sites. Picatinny is a National Priorities List (NPL) site and is registered under CERCLIS number NJ3210020704. The Army is the lead agency for CERCLA actions at these sites. USEPA Region 2 is the support agency with oversight responsibilities. Plans and activities are also being coordinated with appropriate state agencies, including the NJDEP. The funding for this action will be provided by the Environmental Restoration, Army (ER, A) account. The selected response action was chosen by the Army in partnership with the NJDEP and the USEPA Region 2. The selected response action is funded by the U.S. Department of the Army. The selected response action was selected in accordance with CERCLA as amended by SARA, the NCP, the Resource Conservation and Recovery Act (RCRA), and Army Regulation (AR) 200-1, Environmental Protection and Enhancement, as applicable. Evaluation of the human health Risk Assessment (RA) identified no risks to human health greater than 10^{-4} from soil under current and reasonably anticipated future exposure conditions at the 13 sites. The selected response action manages risk to acceptable levels for both human health and the environment, and is the final response action planned under current site conditions. The selected response action will ensure risks to human health and the environment remain within acceptable limits. The risk evaluations and site reviews are discussed in greater detail in the following sections.

Picatinny is located approximately four miles north of the Town of Dover in Rockaway Township, Morris County, New Jersey. The location of Picatinny is presented on Figure 1-1. Some of the nearby populous areas are Morristown, Morris Plains, Parsippany, Troy Hills, Randolph Township, and Sparta Township. The Picatinny land area consists of 6,491 improved and unimproved acres. Picatinny is situated in an elongated classic U-shaped glacial valley, trending northeast-southwest between Green Pond Mountain and Copperas Mountain on the northwest and an unnamed hill on the southeast (Sims, 1958). Most of the buildings and other facilities at Picatinny are located on the narrow valley floor or on the slopes along the southeast side.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Picatinny Site Background

Picatinny is owned and operated by the U.S. Army and was a major source of munitions for World War I, World War II, the Korean War, and the Vietnam Conflict. During those periods, Picatinny was involved in the production of explosives, rocket and munition propellants, pyrotechnic signals and flares, fuzes, and metal components. Currently, the primary mission of Picatinny is research, development, and engineering of munitions and weapons.

2.2.2 PICA 020/Site 19 – Former Pyrotechnic Demonstration Range

Site 19 covers 5.5 acres and is located south of the Shinkle Road and South Brook Road intersection. Site 19 was a tree-covered wetland that was filled in during the late 1940s and early 1950s by installing two drainage ditches and land filling with construction debris and borrow pit material. In 1963, the entire site had been filled and land filling activities ceased. This area has not been used as a pyrotechnic demonstration area since the early 1970s. The surface of Site 19 is flat and consists primarily of hard-

packed dirt and gravel. The site is bordered by a gravel road and Green Pond Brook (GPB), which runs parallel to the site. The drainage ditches drain into GPB.

Two buildings are located on Site 19, Buildings 1180 and 1186. The area between the buildings was used for testing tanks and other armored vehicles in the past. Building 1180 is a 50-foot-high steel tower constructed in 1948. The tower has been used for various tests, including track technology testing for an M60 Full Tracked Combat Tank and for the candle power determination of M26 flares. Building 1186 was constructed in 1966 and used as a pyrotechnic view stand. Since 1980, it has been used to store miscellaneous non-hazardous items.

During the implementation of the Phase I Remedial Investigation (RI) in 1992 and 1993, Site 19 was temporarily used for storage of drums containing investigation-derived wastes (IDW) such as drill cuttings and personal protective equipment. At the time, the site also contained a decontamination pad for drill rigs. After completion of the remedial investigation, the decontamination pad and all drums were removed. Site 19 is currently unused.

2.2.3 PICA 092/Site 163 – Baseball Fields

Site 163 consists of two baseball fields and a playground located immediately north of the intersection of Spicer Avenue and Klanderman Lane. Site 163 is approximately 400 feet by 800 feet, and is relatively flat with slight slopes to the west and southwest. The Argonne National Laboratory (ANL) RI Concept Plan (ANL, 1991) reported that unknown materials might have been disposed in pits at Site 163 or at Site 176 (a Little League Baseball Field in Area L). In addition, as reported in the Argonne RI concept plan in 1991, dredged material from GPB was spread on the baseball fields or potentially disposed of in pits and was suspected of potentially containing contaminants. As part of the remedial investigation, the Army looked for evidence of these pits and found none. Currently, the Army continues to use the baseball fields.

2.2.4 PICA 088/Site 49 – Building 19 and Former Building 19-A, Former 90-Day Waste Accumulation Area

Site 49 consists of Building 19, the former location of Building 19-A, and the surrounding grounds. The site covers approximately 0.51 acres and is located between Second and Third Avenues, northwest of Second Street. Building 19 was constructed in 1918 as a flammable materials storehouse and in the 1990s was also used as a training facility for high-reliability soldering. Wastes generated at that time included soldering flux, Freon, lead oxide, and oil. Up until a 1991 RCRA Closure Investigation and subsequent removal, the generated waste solvents were placed in drums and stored in adjacent Building 19-A (the Former 90-Day Waste Accumulation Area). Building 19-A was a small shed located near Building 19. During renovation of Building 19 in October 1991, Building 19-A was removed from its foundation and placed elsewhere on Picatinny. According to the Picatinny master planning Integrated Facility System (IFS), Building 19 is currently identified as an electronic storage building.

2.2.5 PICA 095/Site 86 – Building 12, Former Photo Processing Facility

Site 86 consists of Building 12 and is located at the intersection of Phipps Road and Fourth Street. Activities at Building 12 ended in 2000. Building 12 was constructed in 1977 and became a study site because of the hazardous chemicals handled during photo processing. Spent photo processing solutions were transferred to the Defense Reutilization and Marketing Office (DRMO) facility at Picatinny for metal

recovery. Building 12 operations also generated scrap film and oil/water wastes that were stored in metal containers at Building 12 and then collected by a waste contractor for off-site disposal. An estimated maximum of 100 gallons of spent solution and 15 gallons of waste oil were generated per month (Phase 1 RI, Dames and Moore, 1998). According to the Picatinny master planning IFS, Building 12 is currently identified as housing an information processing system.

2.2.6 PICA 099/Site 182 – Building 5, Former Arsenal Reproduction

Site 182 consists of Building 5, which is located on First Avenue southwest of the intersection with Farley Avenue. Building 5 was constructed in 1918 and was used to store flammable materials. In the 1990s, the building housed the reproduction shop for Picatinny. Recently, the northern end of Building 5 was used for computer-aided design (CAD) services; the southern end contained two photo processing units that were used until 1992. Each photo processing unit used a different system to manage wastes. One unit was directly connected to a silver recovery unit, whereas wastes from the second unit accumulated in 5-gallon containers and were then transferred to the DRMO, Building 314 for silver recovery. The maximum waste inventory at Building 5 during a three-month period was six 5-gallon containers of spent photochemicals. Spill response logs and environmental and safety files indicate no spills or releases at Building 5. Exemption from the RCRA Part B permit was claimed for the photo processing units as reported in the Phase 1 RI (Dames and Moore, 1998). According to the Picatinny master planning IFS, Building 5 is currently identified as the plant utility building and energy maintenance control system.

2.2.7 PICA 100/Site 183 – Building 58, Former Arsenal Reproduction and Training

Site 183 consists of Building 58 and is located on First Avenue at the intersection of Fourth Street. Building 58 was constructed for lumber storage in 1937 and was also used for general administration and office space. In 1971, Building 58 was listed as a printing plant; it subsequently ceased operations in October 1993. In the 1990s, Building 58 was unoccupied. The entire building was gutted and renovated for use as a non-hazardous warehouse for Building 12 (northern end) and administrative offices (southern end). According to the Picatinny master planning IFS, Building 58 is currently identified as organization classroom and administrative service.

Historically, photo processing produced an estimated 110 gallons of spent developer and 6 gallons of fixer annually (ANL, 1991). Photo processing wastes were stored in 5-gallon plastic containers, which were transferred to the DRMO, Building 314.

2.2.8 PICA 070/Site 28 – Sewage Treatment Plant's Former Sludge Beds

Site 28 consists of inactive sewage sludge beds and an active sewage treatment plant. The sludge beds are located on the west side of Building 80. Building 80 is located alongside GPB in the southern portion of Area E. The sludge beds served the Picatinny main sewage treatment plant located in Building 80 with capacity of 400,000 gallons per day. The Building 80 sewage treatment plant was designed to provide primary physical treatment, secondary biological treatment, and tertiary chlorination treatment of sanitary wastewater, and remains operational today.

Sludges generated at the treatment plant were de-watered utilizing a series of four sand filters, (referred to as the sludge beds). The sludge beds occupied an area of approximately 9,500 square feet. The leachate collected from the sludge beds was mixed with influent wastewater and re-circulated into the sewage treatment plant. During the late 1960s, the treatment plant was modified and the sludge beds

were removed from service. After the sludge beds were decommissioned, sludge generated at the treatment plant was transported to an off-site solid waste disposal facility. According to the Picatinny master planning IFS, Building 80 is identified as a sewage lift station.

2.2.9 PICA 083/Site 44 – Building 39, Golf Course Maintenance Shop

Site 44 consists of Building 39 and is located at the intersection of First Street and Dunn Avenue. Records indicate Building 39 was used as an experimental propellant building and housed a deluge system in 1929, a storage magazine in 1940, a maintenance shop in 1956, and has been used to maintain and house golf course maintenance equipment since 1981.

Small quantities of pesticides and herbicides were stored, mixed, and transferred to maintenance equipment in the building until 1988. Rinse water from mixing and container rinsing was discharged to the ground at the edge of the asphalt parking lot on the south side of Building 39. Building 160 was constructed as a central pesticide storage and mixing area, thus terminating all pesticide storage and mixing at Building 39.

An underground storage tank (UST) for storing gasoline was installed southeast of Building 39 in the early 1980s and may also have been used for waste oil storage. The UST was removed from service in late 1989 and was replaced with an aboveground storage tank (AST) in 1993. Currently, oil, grease, and solvent wastes generated at Building 39 are placed in 55-gallon drums and removed by contractors for off-site disposal. According to the Picatinny master planning IFS, Building 39 is currently identified as engineering maintenance.

2.2.10 PICA 036/Site 106 – Former Building 1010, Propellant Plant

Site 106 covers 0.22 acres in the eastern corner of Area F where former Building 1010, a propellant plant, was demolished between 1979 and 1991.

Picatinny personnel reported that Building 1010 was also used as an acid recovery area and that some of the storage tanks and polychlorinated biphenyl (PCB)-based transformers reportedly leaked. When the building was destroyed as part of the Toxic Energetics Cleanup Program (TECUP), the transformers were reportedly overturned and their contents spilled onto the ground. After the building was demolished, all debris was buried on site. The validity of this information was examined during the remedial investigation performed in 1993 and 1994. The area was thoroughly investigated for PCB contamination and buried contamination and nothing significant was discovered. According to the Picatinny master planning IFS, Building 1010 is currently identified as rock storage area. Use of this site for rock storage has been approved by USEPA.

2.2.11 PICA 105/Site 124 – Building 166, Propellant Testing

Site 124 covers 1.7 acres in the southern portion of Area F near Kibler Road and includes Building 166 and a nearby transformer station, TR 166. Building 166 is a one-story rectangular building, 48 x 58 feet, constructed in 1930.

Building 166 was originally called the Test Conditioning Chamber and was used as a test chamber for accelerated aging of propellants. It was still used for this purpose into the 1990s as well as propellant storage and was called a General Purpose Laboratory (U.S. Army Corps of Engineers [USACE] historic

structures inventory, 1993). Other waste generated at the site included approximately 30 pounds per month of propellant. Operation in the building intermittently produced approximately 0.1 gallon/hour of propellant wastewater which was sent to the Burning Grounds for disposal (Foster Wheeler, 1991). According to the Picatinny master planning IFS, Building 166 is currently identified as a laboratory test building.

2.2.12 PICA 110/Site 141 – Building 429, Propellant Crushing

Site 141 consists of Building 429 and is located on 13th Avenue, northeast of the intersection of Ninth Street. Building 429 was constructed in 1942 for uses including a chemistry laboratory, ammunition surveillance, propellant processing, and propellant property testing. In 1994, Building 429 became inactive.

Building 429 operations generated approximately 1 pound of propellant waste per month. Explosive-contaminated wash-down water from propellant crushing operations may have been discharged to a trough that ran along the west side of the building and discharged onto the ground. According to the Picatinny master planning IFS, Building 429 is currently identified as a propulsion system building.

2.2.13 PICA 112/Site 143 – Building 436, Propellant Processing

Site 143 consists of Building 436 and covers 0.51 acre in the northwestern portion of Area F. Building 436 is located on Thirteenth Avenue, 400 feet southwest of Picatinny Lake, and was built in 1948. It has been used as a propellant processing plant since it was built (ANL, 1991). Explosive wastes generated from its operation were destroyed at the Burning Ground. According to the Picatinny master planning IFS, Building 436 is currently identified as a propulsion system building.

2.2.14 PICA 118/Site 135 – Buildings 315 and 316, Metallurgical Laboratory and Former Laboratory

Site 135 consists of Buildings 315 and 316, and is located at the intersection of Seventh Street and Eleventh Avenue. Records indicate Building 315 was constructed prior to 1905 and has been used as a sodium nitrate storehouse, as offices of the engineering division, as research and development laboratories, as physical sciences workshops, and as metallurgical laboratories. Metallurgical laboratory activities have been conducted at Building 315 for at least the past 25 years.

An Environmental Baseline Study (USAAMC, 1993) conducted on Building 315 in November 1993 identified the following waste streams: oily material, solvents, mixed acids, etching solutions, resins, wastewater contaminated with depleted uranium (DU), and sulfur-based cutting fluids. Chromic acid wastewater and waste hydraulic oil were sent to an off-site hazardous waste disposal facility by a contractor delegated by the operation support command at Rock Island.

An undated Picatinny memorandum addressed DU contamination in the corrosion laboratory, hot machine shop, metallographic laboratory, and mechanical testing area of Building 315. The memorandum identified DU chips and fines as contaminants in the hot machine shop. In addition, the metallographic laboratory generated wastewater contaminated with DU and mixed waste (DU contaminated chromic acid). Until 1992, the DU wastewater was piped to holding tanks located within the DU wastewater holding tank room. The DU wastewater was decanted in one tank and discharged into another tank where it was tested for chemical content and radioactive concentration. The wastewater was

then either discharged into the sewer system or disposed as low-level radioactive waste. However, in 1992, the wastewater holding tank system was shut down, and later in 1994 was disposed of as low-level radioactive waste. After 1992, the DU wastewater generated at Building 315 was stored in 30-gallon polydrums within the building and disposed as low-level radioactive waste to an off-site disposal facility. After completion of the tank removal, an "as left" survey was performed. No radiological contamination was observed above the Nuclear Regulatory commission (NRC) license requirements. According to the Picatinny master planning IFS, Building 315 is currently identified as a metallurgical laboratory.

Records indicate Building 316 was constructed in 1907 as a sodium nitrate storehouse, and has also been used as a shop automation laboratory, a plasma equipment building, a uranium laboratory, a physical sciences facility, and, most recently, a metallurgy laboratory. During the summer of 1994, the building underwent decontamination and renovations. In 1996, floor drains and piping were removed that had tested positive for radiological contamination. The piping was removed inside and outside of the building until no radiation was detected in excess of NRC license requirements. Confirmatory samples were also collected from the pipe trench and shown to be below criteria. In 1998 the NRC released Building 316 for unrestricted use. This release removed restrictions previously imposed by the NRC and the Picatinny Radiation Protection Office (RPO).

The building is now used as centralized storage of hazardous materials required for Picatinny activities. It is called Hazmart Pharmacy. According to the Picatinny master planning IFS, Building 316 is currently identified as the Hazmart.

2.2.15 Enforcement Activities

No formalized enforcement activities have occurred at Sites 19, 163, 49, 86, 182, 183, 28, 44, 106, 124, 141, 143, and 135; however, Picatinny is working in cooperation with the USEPA and NJDEP to apply appropriate remedies which will preclude the necessity of formalized enforcement such as Notices of Violation.

2.3 COMMUNITY PARTICIPATION

The 13 sites have been the topic of presentations to the Picatinny Arsenal Environmental Restoration Advisory Board (PAERAB). PAERAB members have provided comments regarding the proposed remedial alternative. A courtesy copy of the Proposed Plan was given to the PAERAB's co-chair and a complimentary copy was offered to any PAERAB member who requested it. A final Proposed Plan for Sites 19, 163, 49, 86, 182, 183, 28, 44, 106, 124, 141, 143, and 135 was completed and released to the public in June 2001 at the information repositories listed below:

Picatinny Installation Restoration Program Office
Building 319
Picatinny, NJ 07806

Rockaway Township Library
61 Mount Hope Road
Rockaway Township, NJ 07866

Morris County Library
30 East Hanover Avenue
Whippany, NJ 07981

Multiple newspaper notifications were made to inform the public of the start of the comment period, solicit comments from the public, and announce the public meeting. The notifications were run in the Star Ledger on June 14 and 20, 2001 and in the Daily Record on June 14-15, 2001. A public comment period was held from Thursday, June 14, 2001 to Friday, July 13, 2001 during which comments from the public were received. A public meeting was held on June 21, 2001 to inform the public about the proposed response action for the 13 Sites and to seek public comments. At this meeting, representatives from the U.S. Army, NJDEP, USEPA, and USACE were present to answer questions about the site and alternatives under consideration. After the completion of the public comment period, work on the Record of Decision was not immediately initiated due to a disagreement between the DOD and EPA regarding the methodologies of documenting land use/institutional control remedies. This disagreement has been resolved and the content of this ROD reflects the agreed-upon method for documenting a LUC response action. A Feasibility Study was prepared in 2007 documenting the response action selection process including demonstration that No Further Action was necessary for two of the 13 sites (Sites 49 and 44). For consistency with the public noticed Proposed Plan, these two sites are discussed briefly herein.

2.4 SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the selection of the response action for soils at 11 sites at Picatinny. Remedial actions for soil at these 11 sites are addressed in a manner consistent with the NCP. Two sites which require no further action are discussed in this ROD as well.

In 1988, Picatinny tasked Argonne National Laboratory (ANL) to develop a RCRA/CERCLA conceptual RI plan to address both human health and environmental risks for the entire Picatinny facility. It was reported in the final plan that 175 sites contained potential human health or environmental concerns. The sites were grouped into 16 study areas, Areas A through P. The 16 study areas were developed on the basis of geographic location and operational history, and were prioritized with respect to the need for RI activity. EPA Region 2 and NJDEP have approved the grouping of sites and prioritization. Fifteen areas were subsequently placed into three groups, designated Phases I, II and III, to further prioritize environmental activities. All 13 sites addressed in this ROD are located in Phase I Areas: C, D, E, F, and G. Area A was to be immediately addressed by environmental activities and, as a result, is the only stand-alone area, exclusive of Phases I, II, and III. Phase I areas consist of Areas B through G. Phase II areas consist of Areas H through K. Phase III areas consist of Areas L through P. Figure 1-2 presents the location of the five Areas in which the 13 sites are located in relation to the ANL Final RI Concept Plan Areas. Figures 1-3 through 1-7 present location maps for each area containing one of the 13 sites. The response action presented in this ROD can effectively be completed separately from actions required at the remaining areas, as well as from the remaining media (e.g., groundwater) present at the sites.

2.5 SITE CHARACTERISTICS

2.5.1 Physical Characteristics

2.5.1.1 Physiography

Picatinny is located in Morris County in northern New Jersey. U.S. Interstate 80 connects Picatinny with New York City, approximately 40 miles to the east and the Delaware Water Gap and Pennsylvania to the west. Route 287 is the primary north-south route, connecting I-80 with I-78.

Picatinny, which was once a rural ordnance production and research center, is now encircled by cities and towns with urban expansion along the Interstate 80. Neighboring communities include to the south

Mount Hope, Rockaway Borough, Rockaway Township, Wharton, Dover, and Denville; to the east Lake Telmark and Hibernia; to the north Jefferson Township; and to the west, Hurdtown, Lake Hopatcong, and Mount Arlington. Morris County has a current population of over 421,000 residents, and has a diversified economy with almost 3,000 private sector establishments.

Regional Topography: Picatinny is located in the New Jersey Highlands, a subdivision of the Appalachian Highlands physiographic province (USGS, 1986). The New Jersey Highlands consist of a 12-18 mile wide band between the Piedmont province to the east and the Valley and Ridge provinces to the west. The area is characterized by broad, rounded, or flat-topped northeast-southwest trending ridges, and deep, generally narrow valleys that are controlled by similarly trending northeast-southwest folds and faults in the underlying bedrock.

Local Topography: Picatinny is situated in a classic elongated U-shaped glacial valley trending northeast-southwest, between Green Pond Mountain and Copperas Mountain on the northwest and an unnamed hill on the southeast. Picatinny surface elevations range between 1,280 feet above mean sea level (msl) along the crest of Green Pond Mountain on the west to just under 700 feet msl where GPB leaves the facility to the south.

2.5.1.2 Geology

Regional Geology: Picatinny lies within the Dover mining district, an 80-square-mile area of the New Jersey Highlands. The New Jersey Highlands are composed of Precambrian basement rocks and lower Paleozoic age rocks. The Highlands older Precambrian age basement rocks are unconformable, overlain by up to several hundred feet of Paleozoic quartzite, dolomite, and conglomerate. Pleistocene glaciation has deposited a veneer of unconsolidated sediments over the region, generally thin or absent on ridges and slopes, and up to 200 feet thick in the valleys.

Local Geology: Four bedrock formations underlie Picatinny. In age from oldest to youngest, these are the Precambrian basement rocks and three lower Paleozoic sedimentary formations – the Hardyston Quartzite, the Leithsville Dolomite, and the Green Pond Conglomerate. The unconsolidated surficial deposits are composed of Pleistocene glacial deposits and minor amounts of recent alluvium.

2.5.1.3 Groundwater

The principal source of groundwater in the Green Pond Valley is found in the stratified drift deposits filling the valley floor. The low-permeability and the steep slopes of Green Pond Mountain and Copperas Mountain restrict infiltration of precipitation in these mountains. As a result, most precipitation flows overland and into the highly permeable stratified drift deposits in the valley center. The small amount of precipitation that enters Green Pond and Copperas Mountains flows down through shallow fractures to the glacial sediments in the valley.

The principal aquifers in the Picatinny region are located in stratified drift deposits found in the valley areas. Production wells in the stratified drift average 500 gallons per minute in the general area surrounding Picatinny. Conversely, the bedrock aquifer is infrequently used for production wells because of limited fracture occurrence and generally low hydraulic conductivity. Regionally, fractures in the Precambrian basement present an important, yet limited groundwater source, particularly where the glacial stratified drift deposits are thin or non-existent. As bedrock groundwater production is fracture-

controlled and highly variable, yield from large-diameter wells in the bedrock average less than 100 gallons per minute. However, domestic bedrock wells that yield only a few gallons per minute are common in the region.

2.5.1.4 Surface Water

The eastern New Jersey Highlands, which include Picatinny, are located in the Passaic River drainage basin. Surface water flows generally southwest down the valleys, jogs eastward at water gaps in the ridges, and eventually discharges via the Passaic River into Newark Bay and the Atlantic Ocean. Surface water on Picatinny generally flows, via a number of small, unnamed drainages and ditches, down to the valley axis, and then to the southwest via GPB and Burnt Meadow Brook. Green Pond Brook is the principal drainage of Picatinny and had a mean flow rate of 26.5 cubic feet per second in 1986 as measured at the Wharton stream gauging station, just south of Picatinny and about one mile upstream of the confluence with the Rockaway River. The Rockaway River continues flowing eastward from the GPB confluence for about 12 miles to the Boonton Reservoir, an 8.5-billion-gallon reservoir operated by Jersey City Water Works. The Rockaway River had a mean flow rate of 232 cubic feet per second in 1986, as gauged at the inlet to the Boonton Reservoir. The Rockaway River continues to flow toward the southeast before merging with the Passaic River approximately six miles to the east of Boonton reservoir.

The northeast portion of Picatinny is drained by Burnt Meadow Brook, which discharges into Lake Denmark. Lake Denmark is an irregularly shaped, manmade lake, approximately 3,000 feet wide at its widest point by about 7,000 feet long, with a maximum depth of 20 feet. Burnt Meadow Brook continues from Lake Denmark and discharges into GPB approximately 1,000 feet to the west.

2.5.1.5 Soils

The natural soils at Picatinny are predominately derived from glacial deposits and are acidic and highly permeable. In general, the soils on the rocky slopes of the valley are composed mostly of stony loam and sandy clay loam, whereas the soils in the central valley contain loam, silt, sand, and gravel pan soils, with muck and peat developing in swampy areas.

2.5.1.6 Climate

Northern New Jersey has a continental temperate climate controlled by weather patterns from the continental interior. Prevailing winds blow from the northwest from October to April and from the southwest from May to September. The average monthly temperature ranges from a high of about 72° F in July to a low of about 27° F in January and February. The average date of the last freeze is May 2 and the first freeze is October 8. Average annual precipitation at the Boonton monitoring station located approximately five miles east of Picatinny is 48 inches and is evenly distributed throughout the year.

2.5.1.7 Topography and Geology of the 13 Sites

The 13 sites addressed in this ROD are located in Picatinny within Areas C, D, E, F, and G, as designated in the ANL RI Concept Plan (ANL 91). Figure 1-2 presents the location of Areas C, D, E, F, and G in Picatinny.

Area C: The western half of Area C is flat as it forms the floodplain of GPB; elevations range from 685 to 695 feet msl. The eastern half of Area C rises onto a ridge to an elevation of approximately 895 feet msl.

Drainage ditches that carry water into GPB control surface water runoff in the floodplains. Surface water runoff on the eastern half of Area C flows to the western floodplains.

Area C geology consists of Precambrian Biotite Gneiss, Leithsville Dolomite and Hardyston Quartzite, which are overlain by glacial sediments. The thickness of the glacial sediments ranges from 0 along the eastern ridge where the Precambrian Biotite Gneiss crops out, to 210 feet near the center of the valley.

Area D: Area D is flat with elevations ranging from approximately 695 to 715 feet msl. Surface water runoff is minimal, as precipitation on the golf course and other undeveloped grassy portions of Area D infiltrates into the ground. Storm drains leading to Bear Swamp Brook before it reaches GPB control surface water runoff.

Area D geology consists of the Leithsville Dolomite, which is overlain by glacial sediments. Glacial sediments range in thickness from approximately 100 to 250 feet. Recent swamp deposits occur in the northwest portion of Area D and are represented by organic clays and muck up to 5 feet thick.

Area E: As a result of moderate land development, the topography of Area E is nearly flat, with an approximate elevation of 695 feet msl. Surface water runoff is significant along the paved parking areas and roads in the northern portion of Area E, which is more developed than the southern portion. Infiltration is predominant in the western and southern portions, which contain more grassy and unpaved areas. In the northern portion of Area E storm sewer lines collect storm water, which then discharges to open drainage channels that join GPB. Surface runoff from the southern portion of Area E tends to follow natural drainage paths to GPB.

Area E geology consists of the Leithsville Dolomite which is overlain by glacial sediments. The thickness of the glacial sediments ranges from 195 to 205 feet. Recent swamp deposits occur sporadically in low-lying areas and range from 0 to 3 feet thick. The swamp deposits may have had a greater extent as these deposits may have been excavated and replaced by artificial fill material in developed areas of Area E.

Area F: The northwestern and central portions of Area F are essentially flat and lie in the valley region of Picatinny, with an approximate elevation of 690 to 700 feet above msl. Elevations increase to the north and east to approximately 725 to 755 feet msl. Area F is moderately developed with paved, grassy, and marshy areas. Surface water flows from higher elevations to the flatter valley regions and is partially controlled by storm drains in developed areas that drain into GPB or its tributaries.

Area F geology consists of Precambrian Biotite Gneiss, Hardyston Quartzite, and Leithsville Dolomite, which are overlain by glacial sediments. Glacial sediment thickness varies from 40 feet along the northeast boundary of Area F to 90 feet in the center of the valley, with the thickest section of approximately 120 feet in the central portion of Area F, near Building 176. Recent Holocene swamp deposits occur at the surface along the flood plains of GPB and its tributaries, and range in thickness from approximately a few feet up to 30 to 35 feet in thickness. Soils and swamp deposits in Area F have been extensively modified by artificial fill as a result of land development and construction activities.

Area G: Area G is situated in a nearly flat valley region of Picatinny between GPB and Bear Swamp Brook. The topography in Area G ranges from approximately 690 to 710 feet msl. Surface water runoff in

Area G flows directly towards GPB, except in the southern portion of Area G where runoff first drains to a wetland area and then towards GPB.

Area G geology consists of the Leithsville Dolomite, which is overlain by glacial sediments. Glacial sediment thickness varies from 60 feet along the northwest boundary of Area G to 95 feet in the center of the valley. The thickest glacial sediments occur along the southwest boundary of Area G, where the thickness is estimated to be 135 feet. Holocene swamp deposits occur along the flood plains of GPB and its tributaries. These deposits consist of organic silt and clay and range in thickness from approximately a few feet to 30 to 35 feet. The surficial soils and the swamp deposits in Area G have been extensively modified by artificial fill as a result of land development and construction activities.

2.5.2 Summary and Findings of Site Investigations

In the following sections, the comparison of the soil data from each site to the NJDEP Direct Contact Soil Cleanup Criteria (DCSCC) and USEPA Region 9 Preliminary Remediation Goals (PRGs) is discussed.

2.5.2.1 PICA 020/Site 19 Environmental Investigations

Three environmental investigations were conducted at Site 19: a U.S. Geological Survey (USGS) Geophysical Survey in 1986, a Site Investigation (SI) in 1989, and the 1998 Phase 1 RI. Of relevance to this ROD is the work conducted as part of the 1989 SI and the 1998 Phase 1 RI.

Potential soil contaminants have been identified for Site 19 based on sample data, but most are present at low concentrations. Beryllium was detected from one sample at a concentration of 1.58 milligrams per kilogram (mg/kg), which exceeded the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (non-residential use criteria) of 1 mg/kg at the time the sample was collected. The current NJDEP non-residential use criterion for beryllium is 2 mg/kg. Arsenic was detected from two samples within one boring at concentrations of 24.4 and 20.6 mg/kg, which exceed associated NJDEP non-residential use criteria of 20 mg/kg. Human health risk levels for Site 19 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks). All other detected constituents are present at concentrations below NJDEP non-residential use criteria in both surface and subsurface soils.

Two potential contamination source areas have been identified for Site 19 and neighboring Site 34 (Lower Burning Ground). Site 19 contained metallic debris piles including helicopter wreckage and a pile of telephone poles. The presence of metallic debris on-site may have been the source of the metals detected in sampled media, and the pile of telephone poles could be the source of polycyclic aromatic hydrocarbons (PAHs). Site 34 (located only a few hundred feet to the south) has conducted burning activities both currently and in the past, and this burning may also be the source of the PAH, dioxin, and furan compounds detected in soil and sediment at Site 19.

2.5.2.2 PICA 092/Site 163 Environmental Investigations

Two environmental investigations were conducted at Site 163, the U.S. Army Environmental Hygiene Agency (USAEHA) Soil Investigation and Health RA in 1991 and the 1998 Phase 1 RI. No constituents were detected above NJDEP screening criteria and background concentrations in any of the samples collected as part of these investigations. However, concentrations of arsenic, sodium, and heptachlor epoxide in surface soil exceed the Region 9 PRGs. While the detected concentrations of arsenic and

sodium are below background concentrations, heptachlor epoxide does not have a background concentration for comparison. Therefore the site is included in the response action outlined in this ROD.

2.5.2.3 PICA 088/Site 49 Environmental Investigations

A RCRA Closure Verification Investigation was conducted in 1991 for Building 19A. Prior to the RCRA closure activities, NJDEP stated in a letter dated December 13, 1990, that closure activities were no longer necessary at Building 19 due to building renovations. In addition, a construction site clearance was conducted during the planning of an addition to Building 19. Soil data from the site clearance was forwarded to NJDEP and USEPA on April 23, 1997. The site clearance data do not exceed EPA Region 9 residential PRGs. In addition, Site 49 data was summarized from information contained in the RCRA Closure Verification Investigation, Building 19A, 1991.

Prior to the RCRA closure activities, NJDEP stated that closure activities were no longer necessary at Building 19 because of building renovations that satisfied NJDEP concerns. As mentioned above, soil analysis data was provided for Buildings 19 and 19A in a letter sent from Picatinny to USEPA and NJDEP on April 23, 1997. Soil samples were collected in 1992 as part of the soil management site clearance policy for a proposed addition to Building 19. A letter from NJDEP, dated December 8, 1992, stated that closure was completed at Building 19A and that no further action was required. This site was recommended for No Further Action in the Feasibility Study (2007).

2.5.2.4 PICA 095/Site 86 Environmental Investigations

One environmental investigation was conducted at Site 86, the 1998 Phase 1 RI. The Phase 1 RI included the collection and analysis of four surface soil samples for volatile organic compounds (VOCs), base neutrals/acid extractables (BNAs), metals plus cyanide, explosives, pesticides, PCBs and total nitrogen.

A variety of constituents were detected in the soil samples at Site 86, with most detected at very low concentrations below available comparison criteria. Only arsenic, which was detected at a concentration of 23.1 mg/kg (in one sample), exceeded its NJDEP non-residential use criterion of 20 mg/kg. In total, arsenic was detected in five samples at concentrations above the USEPA Region 9 residential PRG of 1.59; however, risk levels for Site 86 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks).

2.5.2.5 PICA 099/Site 182 Environmental Investigations

One environmental investigation was conducted at Site 182, a RCRA Closure Verification Investigation in 1991. Weston Environmental performed closure activities, including decontamination of the floor and collection of verification samples in the area surrounding photo processing activities at the southern end of Building 5. The activities were completed in accordance with the approved Closure Plans, and no further action was recommended. A NJDEP letter, dated December 8, 1992, indicated that closure activities were accepted for Building 5. Based on the similar use and history of Site 182 to other sites in this group that require a response action, contamination at this site is not anticipated to adversely impact human health under existing non-residential use conditions, and this site is included in the response action outlined in this ROD.

2.5.2.6 PICA 100/Site 183 Environmental Investigations

No environmental investigations have been conducted at Site 183. Due to renovation activities at Building 58, a closure plan for this site was not implemented. NJDEP stated in a letter dated December 8, 1992 that the renovation work adequately addressed the closure requirements and that closure had been accepted. Based on the similar use and history of Site 183 to other sites in this group that require a response action, contamination at this site is not anticipated to adversely impact human health under existing non-residential use conditions, and this site is included in the response action outlined in this ROD.

2.5.2.7 PICA 070/Site 28 Environmental Investigations

Three environmental investigations were conducted at Site 28: a USGS Geophysical Survey in 1986, a Site Investigation in 1985, and the 1998 Phase 1 RI. Of relevance to this ROD is the work conducted as part of the 1988 SI and the Phase 1 RI.

Chemicals in soil were identified at Site 28; however, most were present at low (i.e., below NJDEP non-residential use criteria) concentrations. Subsurface soil data indicate that BNAs are present at concentrations below all comparison criteria in the upper sample from each boring. Also, the higher concentrations of most metals were located in the upper subsurface sample indicating that it is unlikely to be more contaminated at depth. Risk levels for Site 28 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks).

2.5.2.8 PICA 083/Site 44 Environmental Investigations

Five environmental investigations were conducted at Site 44 and include a pesticide risk management study conducted by USAEHA in 1988, a soil assessment by Chemical Waste Management in 1990, a RCRA closure performed by Weston in 1991, the 1998 Phase I RI, and the *Phase I Additional RI Sites 22, 44, 61, 104, 122, 135, 141 and 145* (ARI) (IT, 1999).

Analytical results from the site indicate that no compounds are present at concentrations above all appropriate NJDEP non-residential use or residential use criteria and USEPA Region 9 residential PRGs. Based on these results, no contaminants of concern were identified in soil at Site 44, and no further action was recommended. This site was recommended for No Further Action in the Feasibility Study (2007).

2.5.2.9 PICA 036/Site 106 Environmental Investigations

One environmental investigation was conducted at Site 106, the 1998 Phase 1 RI. The only analytes detected above screening criteria and background concentrations were PCBs. Total PCBs are a concern at the location of test pit TP106-3, where a total PCB concentration of 6.49 mg/kg was detected in the surface soil, with a maximum of 10.8 mg/kg detected in subsurface soil. Both of these concentrations exceed the NJDEP non-residential use criterion for total PCBs (2.0 mg/kg). However, risk levels for Site 106 were calculated to be within acceptable risk levels (see Section 2.7, Summary of Site Risks) and TP106-3 is located beneath approximately eight feet of stockpiled rock and gravel.

2.5.2.10 PICA 105/Site 124 Environmental Investigations

One environmental investigation was conducted at Site 124, the 1998 Phase 1 RI. All detected constituent concentrations were below available comparison criteria except for arsenic and copper.

Arsenic and copper were each detected once from two soil samples at concentrations (20.9 mg/kg and 848 mg/kg, respectively) that exceed NJDEP non-residential use criteria (20 mg/kg and 600 mg/kg, respectively). The locations of the metal detections are on opposite sides of Building 166 and do not indicate any significant source of contamination. Human health risk levels for Site 124 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks).

2.5.2.11 PICA 110/Site 141 Environmental Investigations

Two environmental investigations were conducted at Site 141: the 1998 Phase 1 RI and the ARI 99. Analytical data from surface soil showed no constituents of concern at concentrations greater than comparison criteria. Risk levels for Site 141 were calculated to be within acceptable risk levels (see Section 2.7, Summary of Site Risks).

2.5.2.12 PICA 112/Site 143 Environmental Investigations

One environmental investigation was performed at Site 143: the 1998 Phase 1 RI. The Phase 1 RI included collecting four surface soil samples for VOCs, BNAs, metals plus cyanide, and explosives analyses. One sample was also analyzed for pesticides/PCBs. Constituents of concern have been identified at Site 143; however, most are present at low concentrations, below comparison criteria. Bis(2-ethylhexyl)phthalate was detected in one sample at a concentration of 500 mg/kg, which exceeds the current NJDEP non-residential use criterion of 210 mg/kg. Arsenic from another single sample with a concentration of 52 mg/kg exceeds the NJDEP non-residential use criterion of 20 mg/kg in surface soil. Human health risk levels for Site 143 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks).

2.5.2.13 PICA 118/Site 135 Environmental Investigations

Four environmental investigations were conducted at Site 135: (1) radiological surveys and removal actions at Buildings 315 and 316 completed by Allied Technology Group (ATG) in 1994, (2) a second radiological removal action conducted by ATG at Building 316 in 1996, (3) environmental sampling at Building 315 during the 1998 Phase 1 RI, and (4) sampling and surveys at Buildings 315 and 316 during the ARI 99.

In 1994 radiological surveys and removal actions were performed at Building 315 and 316. Picatinny completed a predisposal survey of two DU wastewater tanks located at Building 315. The survey documented beta and gamma activity on the surface of one of the tanks. Following the survey, the tanks were cut and packaged for disposal. In addition to this tank removal, Picatinny removed two other holding tanks from Building 315. After performance of the tank removal an "as left" survey was performed. No radiological contamination was observed above NRC license requirements. The floor drain which served as the discharge point for the wastewater tanks was also surveyed, and no radiological contamination was observed above the NRC requirement.

As part of the removal activities, ATG surveyed all laboratory equipment from Building 316. Equipment that met the free release criteria, as stated in the NRC license requirements, was moved to Building 318, while equipment not meeting the criteria was segregated and packaged for disposal. During the survey, several areas on the floor of Building 316 were found to have radiological contamination above the release criteria. Based on the survey results, smear samples were obtained from the interior and exterior of Building 316 and analyzed for alpha, beta, and gamma radiation. No radiological contamination was

observed above the NRC license requirements. However, radiological contamination was found in three floor drains within Building 316. In 1996, Picatinny removed the three radiologically contaminated floor drains and approximately 38 linear feet of associated piping from Building 316. Approximately 14 feet of contaminated piping was also removed outside of the building. Confirmatory samples collected from the pipe trench showed no detectable activity greater than background. In 1998, the NRC released Building 316 for unrestricted use. This release removed restrictions previously imposed by the NRC and the Picatinny Radiation Protection Office (RPO).

The NJDEP soil remediation standards for radioactive material were used to evaluate compliance at this site. The evaluation model was run using the confirmatory samples as the proposed residual soil concentration level. Background values for Picatinny Arsenal were included as site background levels. Under the most conservative assumptions (i.e., unrestricted use scenario with 6 ft of soils containing radiological concentrations present in the confirmatory samples and no clean fill on top of the contaminated soils), it was determined that levels of radiation currently present at Site 135 are within compliance.

In the Phase I RI, arsenic and cadmium were identified as possible contaminants of concern in surface soil at Site 135. However, it should be noted that cadmium was found in four samples at concentrations that do not exceed the current NJDEP non-residential use criterion of 100 mg/kg. These samples did exceed the previous NJNRDCSCC of 1 mg/kg (cadmium concentrations detected were: 2.3 mg/kg, 6.35 mg/kg, 1.23 mg/kg, and 1.7 mg/kg). Arsenic was detected in one sample and its duplicate at concentrations of 25.7 mg/kg and 29.6 mg/kg, respectively, which exceeds the NJDEP non-residential use criterion of 20 mg/kg. Human health risk levels for Site 135 were calculated to be within or below acceptable risk levels (see Section 2.7, Summary of Site Risks).

The ARI 99 concluded that no further radiological sampling was needed at Site 135.

2.6 CURRENT AND POTENTIAL FUTURE LAND USES

All sites addressed in this ROD are active U.S. Army Industrial Sites with the exception of Site 163, Baseball Fields, which is used recreationally. The current use of the buildings within each site is based on the Picatinny master planning IFS. The future land uses for the 13 sites is based on the Picatinny Master Plan/Future Land Use Map, which was updated in 2007. However, it should be noted that the nomenclature used in the Picatinny Master Plan/Future Land Use Map does not totally reflect the usage of the sites. The listed uses of the 13 sites are as follows:

- Site 19 – The master plan for future land use at the site is for research development and testing. This area is currently inactive.
- Site 28 – The master plan for future land use in the area of this site is for bulk storage/wetlands. Building 80 is currently used as a sewage lift station.
- Site 44 – The master plan for future land use in the area of this site is for outdoor recreation. Building 39 is currently used as an engineering maintenance facility.
- Site 49 – The master plan for future land use in the area of this site is for administrative/non-explosives laboratories. Building 19 is currently used as an electronic storage building.
- Site 86 – The master plan for future land use in the area of this site is for administrative/non-explosives laboratories. Building 12 is currently used as an information processing facility.

- Site 106 – The master plan for future land use in the area of this site is for non-explosive operations. Site 106 is currently used for rock storage.
- Site 124 – The master plan for future land use in the area of this site is for administrative support. Building 166 located at Site 124 is currently used as a laboratory test building.
- Site 135 – The master plan for future land use in the area of this site is for administrative support. Buildings 315 and 316 located at Site 135 are currently used as a metallurgical laboratory and Hazmart pharmacy respectively.
- Site 141 – The master plan for future land use in the area of this site is for explosive labs. Building 429 is currently used as a propulsion system building.
- Site 143 – The master plan for future land use in the area of this site is for explosive labs. Building 436 is currently used as a propulsion system building.
- Site 163 – The master plan for future land use in the area of this site is for wetlands. However, this area may be used to locate a high-tech research center or associated hotel as part of the planned public/private partnership. Site 163 is currently used as baseball fields.
- Site 182 – The master plan for future land use in the area of this site is for administrative/non-explosives laboratories. Building 5 is currently used as a plant utility building and energy maintenance control system.
- Site 183 – The master plan for future land use in the area of this site is for administrative/non-explosives laboratories. Building 58 is currently used as an organization classroom/administrative service.

Future development of these sites will be consistent with the response action and acceptable risk exposure discussed in this ROD. At this time, an Environmental Assessment is being developed to evaluate Site 163 for use in a public/private partnership. Land use at Site 163 under this partnership may be for a research facility, hotel, or office space. In the future, similar plans may be made for some or all of the sites in this ROD. Additionally, in the event that Picatinny should be declared excess property and ownership transferred, the responsibility for maintaining the LUCs will have to be transferred to the new owners. In this case, the Army would retain ultimate responsibility for remedy integrity. If land use of the site should change, the response actions for the impacted sites may have to be reevaluated.

2.7 SUMMARY OF SITE RISKS

All of the 13 sites were included in the Phase I RI performed in the early 1990s (Dames and Moore, 1998). As part of the RI, site data was evaluated to determine if a Human Health Risk Assessment (HHRA) or Environmental Risk Assessment (ERA) was necessary. The evaluations were done based on the technical characteristics of the site such as type and magnitude of contamination, size of the site, and site use characteristics. Human health risk assessments were completed for all of the 13 sites with the exception of Sites 44, 49, 182, and 183. After evaluating site data, it was determined that no HHRAs were necessary for these four sites because all potential environmental concerns were addressed as part of the RCRA program. Baseline ERAs were performed for sites having adequate habitat and the potential for a completed ecological receptor pathway. The following sections summarize the HHRA and ERA results.

In addition to evaluating site risk via the HHRA, the Army has also agreed to compare site soils data to the NJDEP non-residential use criteria when determining the need for a response action. This agreement is detailed in a letter from Brigadier General John P. Geis to Bruce Venner, Chief of NJDEP Division of Responsible Site Remediation, Bureau of Federal Case Management, dated August 5, 1999. When

compared to these criteria, soil data from the sites indicate a moderate number of exceedance conditions. The response action selected in this ROD is necessary to maintain current protection of public health or welfare from actual or threatened releases of hazardous substances into the environment. There were no unacceptable risks identified for the current and reasonably anticipated future uses at any of the PICA 020 sites.

2.7.1 PICA 020/Site 19 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site-specific decisions can be made regarding the need for remedial action.

- Site 19 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 9×10^{-07} . The noncarcinogenic hazard index equals 6×10^{-03} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 9×10^{-06} . The noncarcinogenic hazard index equals 8×10^{-02} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 4×10^{-06} . The noncarcinogenic hazard index equals 5×10^{-01} .

The results of HHRA calculations for carcinogenic risk at Site 19 are summarized in Table 2.7-1.

Ecological Risk: A site-specific ERA was not conducted at Site 19 for the following reasons: a preliminary reconnaissance of Area C indicated that Site 19 provided poor habitat, and that other parts of Area C (Sites 25, 26, and 180) would provide better evaluation of ecological conditions and risks. Site 19 consists of cleared, hard-packed gravel, with little or no vegetation or cover. This area offers few attractions for terrestrial wildlife as food and cover are extremely limited. Further considerations are the lack of contaminants at elevated levels, preventing this area from acting as a source to degrade surrounding habitat.

2.7.2 PICA 092/Site 163 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell below the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Below this range remedial action is generally not necessary. However, site environmental data exceeded the Region 9 PRGs for residential use and the site is included in this remedial action group.

- Site 163 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 1×10^{-07} .
- Human health RA calculations using a land-use scenario for current Child Baseball Players yield a carcinogenic risk number of 3×10^{-08} .

- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 7×10^{-07} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 6×10^{-08} .
- No noncarcinogenic constituents of concern were identified for this site.

The results of HHRA calculations for carcinogenic risk at Site 163 are summarized in Table 2.7-2.

Ecological: A site-specific ERA was not conducted at Site 163 for the following reasons: a preliminary reconnaissance of Area C indicated that Site 163 provided poor habitat, and that other parts of Area C (Sites 25, 26, and 180) would provide better evaluation of ecological conditions and risks. Site 163 consists of cleared and maintained dirt and grass playing fields. Because the ball fields are used regularly, there is constant anthropogenic activity and disturbance at this site. Cover for terrestrial wildlife is very limited. Much better habitat is located west of the site, tending to make any populations transitory at Site 163. Further considerations are the lack of contaminants at elevated levels, preventing this area from acting as a source to degrade surrounding habitat.

2.7.3 PICA 088/Site 49 Summary of Site Risks

A RCRA Closure Verification Investigation was conducted in 1991 for Building 19A. Prior to the RCRA closure activities, NJDEP stated in a letter dated December 13, 1990, that closure activities were no longer necessary at Building 19 due to building renovations. In addition, a construction site clearance was conducted during the planning of an addition to Building 19. Soil data from the site clearance was forwarded to NJDEP and USEPA on April 23, 1997. There were no exceedances of NJDEP residential use criteria or Region 9 PRGs in the two soil samples collected, and the site clearance data supports the proposed remedy for this site. In addition, Site 49 data was summarized from information contained in the RCRA Closure Verification Investigation, Building 19A, 1991. Based on the NJDEP-approved RCRA closure and site environmental data, no further action was recommended for Site 49 in the Feasibility Study (ARCADIS, 2007).

2.7.4 PICA 095/Site 86 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within or below the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action. Below this range remedial action is generally not necessary.

- Site 86 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 6×10^{-07} . The noncarcinogenic hazard index equals 3×10^{-03} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 7×10^{-06} . The noncarcinogenic hazard index equals 4×10^{-02} .

- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 6×10^{-06} . The noncarcinogenic hazard index equals 3×10^{-01} .

The results of HHRA calculations for carcinogenic risk at Site 86 are summarized in Table 2.7-3.

Ecological: A site-specific ERA was not conducted at this site because the site consists of a building (12) in the research and testing section of Picatinny. Streets, paved parking lots, maintained lawns and other buildings surround Building 12. Therefore, there is not sufficient food or cover to provide sufficient habitat for terrestrial wildlife. Much better habitat is located to the west. All populations at this site are anticipated to be transitory. The lack of contaminants at elevated levels would prevent this site from acting as a source to degrade surrounding habitat.

2.7.5 PICA 099/Site 182 Summary of Site Risks

This site underwent a RCRA closure, which received NJDEP approval. No HHRA or ERA was conducted. Investigations conducted to date indicate minimal impact to the environment at this site. However, this site has similar use and history of other sites within the group and, therefore, land use restrictions are recommended to prevent future residential usage. Based on RCRA closure, contamination at this site is not anticipated to adversely impact human health under industrial conditions.

2.7.6 PICA 100/Site 183 Summary of Site Risks

This site underwent a RCRA closure, which received NJDEP approval. No HHRA or ERA was conducted. Investigations conducted to date indicate minimal impact to the environment at this site. However, this site has similar use and history of other sites within the group and, therefore, land use restrictions are recommended to prevent future residential usage. Based on RCRA closure, contamination at this site is not anticipated to adversely impact human health under industrial conditions.

2.7.7 PICA 070/Site 28 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within or below the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action. Below this range remedial action is generally not necessary.

- Site 28 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 3×10^{-07} . The noncarcinogenic hazard index equals 2×10^{-04} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 2×10^{-06} . The noncarcinogenic hazard index equals 3×10^{-03} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 2×10^{-07} . The noncarcinogenic hazard index equals 1×10^{-01} .

The results of HHRA calculations for carcinogenic risk at Site 28 are summarized in Table 2.7-4.

Ecological: Based on the Ecological Risk Assessment, four metals (arsenic, chromium, lead and zinc) have maximum Hazard Quotients (HQs) above 1. None of the metals' HQs are above 10 and p,p'-DDT appears to be of greatest potential concern with a maximum HQ of 19.6. The findings that the Woodcock is at risk primarily due to arsenic, chromium, lead, selenium, and zinc are conservative since the risk is based on localized samples collected near the treatment cells. This would not represent a risk for the Woodcock living in surrounding, relatively unimpacted forests. Risks to the Barred Owl are primarily associated with p,p'-DDT, but actual risks are likely to be much lower due to extensive home range of this receptor. It should be noted that Area Use Factors (AUFs) were used in calculating HQs in the Phase I RI for some species at selected sites. For this reason, criteria such as residence time and extensive home ranges are a factor in the HQs generated for the ERA at this site.

2.7.8 PICA 083/Site 44 Summary of Site Risks

Site 44 was closed under RCRA prior to the 1998 Phase 1 RI and, as a result, no risk assessment was conducted. Based on the NJDEP-approved RCRA closure and site environmental data, no further action was recommended for Site 44 in the Feasibility Study (2007).

2.7.9 PICA 036/Site 106 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action.

- Site 106 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 1×10^{-05} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 7×10^{-05} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 7×10^{-06} .
- No noncarcinogenic constituents of concern were identified for this site.

The results of HHRA calculations for carcinogenic risk at Site 106 are summarized in Table 2.7-5.

Ecological: A site-specific ERA was not conducted at this site because the area consists of cleared, hard-packed gravel and was employed as a staging area for construction and remediation contractors. The area provides poor habitat with constant human activity, and the area offers few attractions for terrestrial wildlife as food and cover are extremely limited. Because of the poor habitat, any populations would tend to be transitory.

2.7.10 PICA 105/Site 124 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within or below the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action. Below this range remedial action is generally not necessary.

- Site 124 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 5×10^{-07} . The noncarcinogenic hazard index equals 6×10^{-02} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 6×10^{-06} . The noncarcinogenic hazard index equals 2×10^{-01} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 6×10^{-06} . The noncarcinogenic hazard index equals 1 due primarily to detections of phenanthrene and benzo(a)anthracene.

The results of HHRA calculations for carcinogenic risk at Site 124 are summarized in Table 2.7-6.

Ecological: A site-specific ERA was not conducted at this site because the site consists of a building (166) in the research and testing section of Picatinny. Streets, paved parking lots, maintained lawns and other buildings surround the building. Therefore, there is not sufficient food or cover to provide sufficient habitat for terrestrial wildlife. Much better habitat is located to the west. All populations at this site are anticipated to be transitory. The lack of contaminants at elevated levels would prevent this site from acting as a source to degrade surrounding habitat.

2.7.11 PICA 110/Site 141 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action.

- Site 141 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 1×10^{-06} . The noncarcinogenic hazard index equals 8×10^{-03} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 2×10^{-05} . The noncarcinogenic hazard index equals 9×10^{-02} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 1×10^{-05} . The noncarcinogenic hazard index equals 8×10^{-01} .

The human health RA reported that carcinogenic risk from soil exposure is mainly driven by arsenic, beryllium, and 2,4-dinitrotoluene in the sediment samples, not in the soil samples. The noncarcinogenic hazard does not exceed the hazard index criterion of 1. Because the 1998 Phase 1 RI did not separate sediment from soil in conducting the RA, the risk value reported for soil is biased high. Although the Phase 1 RI concluded that reported exceedances in sediment were found in the GPB tributary that flows near Site 141, surface soil did not contain any of the elevated concentrations of chemicals found in sediment.

The results of HHRA calculations for carcinogenic risk at Site 141 are summarized in Table 2.7-7.

Ecological: No ERA was conducted at this site because of the small size of the site, consisting of a small building and surrounding property (approximately 1/10 acre).

2.7.12 PICA 112/Site 143 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell within the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Within this range, site specific decisions can be made regarding the need for remedial action.

- Site 143 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 1×10^{-06} . The noncarcinogenic hazard index equals 1×10^{-02} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 1×10^{-05} . The noncarcinogenic hazard index equals 1×10^{-01} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 1×10^{-05} . The noncarcinogenic hazard index equals 1.

The results of HHRA calculations for carcinogenic risk at Site 143 are summarized in Table 2.7-8.

Ecological: No ERA was conducted at this site because of the small size of the site, consisting of a small building and surrounding property.

2.7.13 PICA 118/Site 135 Summary of Site Risks

Human Health: Estimates of excess carcinogenic risk fell below the range of 1×10^{-06} to 1×10^{-04} established by the USEPA. Below this range remedial action is generally not necessary.

- Site 135 human health RA calculations using a land-use scenario for current Outdoor Maintenance Worker yield a carcinogenic risk number of 5×10^{-08} . The noncarcinogenic hazard index equals 2×10^{-06} .
- Human health RA calculations using a land-use scenario for future Industry/Research Worker yield a carcinogenic risk number of 7×10^{-07} . The noncarcinogenic hazard index equals 2×10^{-05} .
- Human health RA calculations using a land-use scenario for future Construction/Excavation Worker yield a carcinogenic risk number of 2×10^{-07} . The noncarcinogenic hazard index equals 1×10^{-04} .

The actions at this site are based on management of risk. Based on existing concentrations of contaminants of concern in excess of EPA Region 9 residential PRGs, implementation of land use controls are required to maintain the current use of the site.

The results of HHRA calculations for carcinogenic risk at Site 135 are summarized in Table 2.7-9.

Ecological: A site-specific ERA was not conducted at this site because the site consists of a building (135) in the industrial section of Picatinny. Streets, paved parking lots, maintained lawns and other buildings surround the building. Therefore, there is not sufficient food or cover to provide sufficient habitat for terrestrial wildlife. Much better habitat is located to the west. All populations at this site are anticipated to be transitory. The lack of contaminants at elevated levels would prevent this site from acting as a source to degrade surrounding habitat.

**Table 2.7-1
Site 19 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	5 E-07	7 E-08	-	5.7 E-07
		Soil On-site-Direct Contact	Beryllium	9 E-08	3 E-09	-	9.3 E-08
		Soil On-site-Direct Contact	Total PCBs	1 E-08	-	2 E-07	2.1 E-07
Total Risk =							9x10 ⁻⁷
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	6 E-06	9 E-07	-	6.9 E-06
		Soil On-site-Direct Contact	Beryllium	1 E-06	3 E-08	-	1.0 E-06
		Soil On-site-Direct Contact	Total PCBs	2 E-07	-	1 E-06	1.2 E-06
Total Risk =							9x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Arsenic	1 E-06	3 E-06	-	4.0 E-06
		Soil On-site-Direct Contact	Beryllium	3 E-07	1 E-07	-	4.0 E-07
		Soil On-site-Direct Contact	Total PCBs	3 E-08	-	2 E-08	5.0 E-08
Total Risk =							4x10 ⁻⁶

**Table 2.7-2
Site 163 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	1234678-HPCDD	6 E-10	7 E-12	7 E-09	7.6 E-09
		Soil On-site-Direct Contact	OCDD	7 E-09	8 E-11	8 E-08	8.7 E-08
Total Risk =							1x10 ⁻⁷
Scenario Timeframe: Current							
Receptor Population: Baseball Players							
Receptor Age: Child							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	1234678-HPCDD	2 E-09	1 E-10	8 E-10	2.9 E-09
		Soil On-site-Direct Contact	OCDD	2 E-08	2 E-09	9 E-09	3.1 E-08
Total Risk =							3x10 ⁻⁸
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	1234678-HPCDD	8 E-09	9 E-11	5 E-08	5.8 E-08
		Soil On-site-Direct Contact	OCDD	9 E-08	1 E-09	5 E-07	5.9 E-07
Total Risk =							7x10 ⁻⁷

Table 2.7-2 (Continued)
Site 163 Risk Characterization Summary

Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	1234678-HPCDD	8 E-09	4 E-10	1 E-09	9.4 E-09
		Soil On-site-Direct Contact	OCDD	3 E-08	5 E-09	2 E-08	5.5 E-08
Total Risk =							6x10⁻⁸

**Table 2.7-3
Site 86 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	5 E-07	7 E-08	-	5.7 E-07
Total Risk =							6x10 ⁻⁷
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	6 E-06	9 E-07	-	6.9 E-06
Total Risk =							7x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Arsenic	2 E-06	4 E-06	-	6.0 E-06
Total Risk =							6x10 ⁻⁶

**Table 2.7-4
Site 28 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Total PCBs	2 E-08	-	3 E-07	3.2 E-07
Total Risk =							3x10 ⁻⁷
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Total PCBs	3 E-07	-	2 E-06	2.3 E-06
Total Risk =							2x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Total PCBs	1 E-07	-	7 E-08	1.7 E-07
Total Risk =							2x10 ⁻⁷

**Table 2.7-5
Site 106 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	2 E-08	-	-	2.0 E-08
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	2 E-08	-	-	2.0 E-08
		Soil On-site-Direct Contact	Total PCBs	7 E-07	-	9 E-06	9.7 E-06
Total Risk =							1x10 ⁻⁵
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	2 E-07	-	-	2.0 E-07
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	2 E-07	-	-	2.0 E-07
		Soil On-site-Direct Contact	Total PCBs	9 E-06	-	6 E-05	6.9 E-05
Total Risk =							7x10 ⁻⁵

Table 2.7-5 (Continued)
Site 106 Risk Characterization Summary

Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			Exposure Routes Total
				Ingestion	Inhalation	Dermal	
Soil	Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	1 E-07	-	-	1.0 E-07
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	1 E-07	-	-	1.0 E-07
		Soil On-site-Direct Contact	Total PCBs	4 E-06	-	3 E-06	7.0 E-06
Total Risk =						7x10 ⁻⁶	

**Table 2.7-6
Site 124 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a) anthracene	1 E-08	-	-	1.0 E-08
		Soil On-site-Direct Contact	Benzo(b) fluoranthene	9 E-09	-	-	9.0 E-09
		Soil On-site-Direct Contact	Arsenic	4 E-07	6 E-08	-	4.6 E-07
		Soil On-site-Direct Contact	Cadmium	-	2 E-08	-	2.0 E-08
Total Risk =							5x10 ⁻⁷
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a) anthracene	2 E-07	-	-	2.0 E-07
		Soil On-site-Direct Contact	Benzo(b) fluoranthene	1 E-07	-	-	1.0 E-07
		Soil On-site-Direct Contact	Arsenic	5 E-06	8 E-07	-	5.8 E-06
		Soil On-site-Direct Contact	Cadmium	-	2 E-07	-	2.0 E-07
Total Risk =							6x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Benzo(a) anthracene	5 E-08	-	-	5.0 E-08
		Soil On-site-Direct Contact	Benzo(b) fluoranthene	3 E-08	-	-	3.0 E-08
		Soil On-site-Direct Contact	Arsenic	2 E-06	3 E-06	-	5.0 E-06
		Soil On-site-Direct Contact	Cadmium	-	1 E-06	-	1.0 E-06
Total Risk =							6x10 ⁻⁶

**Table 2.7-7
Site 141 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	8 E-07	1 E-07	-	9.0 E-07
		Soil On-site-Direct Contact	Beryllium	2 E-07	4 E-09	-	2.0 E-07
		Soil On-site-Direct Contact	2,4-DNT	2 E-07	-	-	2.0 E-07
Total Risk =							1x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Arsenic	1 E-05	1 E-06	-	1.1 E-05
		Soil On-site-Direct Contact	Beryllium	2 E-06	5 E-08	-	2.1 E-06
		Soil On-site-Direct Contact	2,4-DNT	3 E-06	-	-	3.0 E-06
Total Risk =							2x10 ⁻⁵

Table 2.7-7 (Continued)
Site 141 Risk Characterization Summary

Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Arsenic	3 E-06	6 E-06	-	9.0 E-06
		Soil On-site-Direct Contact	Beryllium	6 E-07	2 E-07	-	8.0 E-07
		Soil On-site-Direct Contact	2,4-DNT	8 E-07	-	-	8.0 E-07
Total Risk =							1x10⁻⁵

**Table 2.7-8
Site 143 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Bis(2-Ethylhexyl) Phthalate	1 E-07	-	-	1.0 E-07
		Soil On-site-Direct Contact	Arsenic	1 E-06	2 E-07	-	1.2 E-06
Total Risk =							1x10 ⁻⁶
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Bis(2-Ethylhexyl) Phthalate	1 E-06	-	-	1.0 E-06
		Soil On-site-Direct Contact	Arsenic	1 E-05	2 E-06	-	1.2 E-05
Total Risk =							1x10 ⁻⁵
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Bis(2-Ethylhexyl) Phthalate	4 E-07	-	-	4.0 E-07
		Soil On-site-Direct Contact	Arsenic	4 E-06	8 E-06	-	1.2 E-05
Total Risk =							1x10 ⁻⁵

**Table 2.7-9
Site 135 Risk Characterization Summary**

Scenario Timeframe: Current							
Receptor Population: Outdoor Maintenance Worker							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	2 E-08	-	-	2.0 E-08
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	3 E-08	-	-	3.0 E-08
Total Risk =							5x10 ⁻⁸
Scenario Timeframe: Future							
Receptor Population: Industrial/Research Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Shallow Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	3 E-07	-	-	3.0 E-07
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	4 E-07	-	-	4.0 E-07
Total Risk =							7x10 ⁻⁷
Scenario Timeframe: Future							
Receptor Population: Construction Workers							
Receptor Age: Adult							
Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil On-site-Direct Contact	Benzo(a)anthracene	8 E-08	-	-	8.0 E-08
		Soil On-site-Direct Contact	Benzo(b)fluoranthene	1 E-07	-	-	1.0 E-07
Total Risk =							2x10 ⁻⁷

2.8 REMEDIAL ACTION OBJECTIVES

The Remedial Action Objective (RAO) for soils at these 11 sites has been developed in such a way that attainment of this goal will result in the continued protection of human health. No unacceptable risk to the environment was identified in the RI. The remedial action objective for the 11 sites was developed to assure the protection of human health from potential risks posed by residual soil contamination at the sites. The remedial action objective is specific to soil contamination associated with the 11 sites and were developed such that attainment of these goals will result in maintaining the risk assumptions for the sites which are protective of human health. Currently, all of the 11 sites are used for industrial purposes except the baseball fields, which are recreational and were evaluated accordingly in the risk assessment. Action is required at these sites to maintain the current land use to the existing and reasonably anticipated military/industrial usage since there were no unacceptable risks to human health resulting from this use.

No chemical specific Applicable or Relevant and Appropriate Requirements (ARARs) exist for soils at Picatinny. However, the Army has determined that concentrations of metals, PCBs, and SVOCs exceed comparison criteria at some of the 11 sites. The Army has developed the following RAO for these 11 sites:

- Maintain current land use (industrial) and current institutional controls.

2.9 PRINCIPAL THREAT WASTE

The NCP establishes an expectation that USEPA will use treatment to address the principal threats posed by a site wherever practicable [NCP 300.430(a)(1)(iii)(A)]. Identifying principal threat waste combines concepts of both hazard and risk. In general, principal threat waste are those source materials considered to be highly toxic or highly mobile and generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat waste are those source materials that generally can be reliably contained and would present only a low risk in the event of exposure. In addition, principal threat waste is identified based upon the results of the quantitative risk assessment, with those compounds that have a value of 1×10^{-3} or higher being considered as principal threat waste. None of the risk assessments for the subject sites identified risk at that level.

None of the 11 sites contain principal threat waste. The sites do contain non-principal threat waste, low levels of residual contamination resulting from site operations. Therefore, the response action does not need to address principal threat waste.

2.10 DESCRIPTION OF ALTERNATIVES

A feasibility study was completed for the 13 sites in the PICA 020 group in 2007. This study was completed after the proposed plan was public noticed to fulfill CERCLA requirements, as it had been determined, based on the results of the RAs, RCRA closures, and SIs and agreed to by the Army, Picatinny, USEPA, and NJDEP, that the implementation of LUCs was appropriate for all the sites. The feasibility study determined that no further action was required at Sites 49 and 44, as they have received NJDEP-approved RCRA closure, and site data do not exceed the NJDEP residential use criteria or the EPA Region 9 residential use PRGs.

Two alternatives were evaluated in the feasibility study for the 11 remaining sites and are described below.

2.10.1 Alternative 1: No Action

According to the NCP, the level of protectiveness achieved must be compared to the required expenditure of time and materials as an integral portion of the response action selection process. The No Action alternative is intended to serve as a baseline by which to compare the risk reduction effectiveness of other potential alternatives. In this alternative, no remedial actions would be performed. No efforts would be undertaken to contain, remove, or monitor any contaminated areas at the sites. The sites would remain without any additional actions.

2.10.2 Alternative 2: Implementation of Land Use Controls

Implementation of Land Use Controls maintains the current and reasonably anticipated future land use and will include land use restrictions. The DOD is responsible for implementing, maintaining, monitoring, reporting on and enforcing the LUCs that will be included in the remedial design. Land use controls will be implemented for the PICA 020 Group of Sites to maintain the current land use to ensure that no unacceptable risk to human receptors occurs in the future. The LUC objectives are the following:

- Prevent the development and use of the property for residential housing, elementary and secondary schools, child-care facilities, and playgrounds that leads to unacceptable risks.
- Prior to excavation of soils, require implementation of special handling procedures and permitting in order to protect the health and safety of the workers.
- Maintain a minimum of 12 inches of rock and gravel cover at TP106-3 at Site 106 as an engineering control to serve as a barrier to human contact.

It is anticipated that current land use will be continued unchanged after implementation of the response action. It is expected that implementation of LUCs will ensure that risks to humans remain within acceptable levels. However, as contaminants may remain in the soil at levels exceeding the remediation goals (RGs), uncontrolled use of the site is not provided by completing this action.

Picatinny has many existing LUCs in place. Elements of LUCs in place at Picatinny include: Site Clearance and Soil Management Procedures; UXO Clearance Procedures; Master Plan Regulations; Picatinny Base Access Restrictions; Picatinny Safety Program; Army Military Construction Program; and a facility wide Classification Exception Area. In addition to these LUCs, the Army uses a Geographic Information System (GIS) as a tool to document areas of contamination and restricted land use. The existing LUCs at Picatinny meet EPA's preference for LUCs being used in layers and/or series. All controls and restrictions would remain in place, even if the ownership or site use changes. Additionally, since the Army is the entity that would be instituting land use restrictions at Picatinny, the Army would ensure that the land use restrictions are incorporated into the transfer documents so they remain effective and in place after property transfer. A change in land use would include notifying the regulators and re-evaluating the cleanup requirements. The regulating and enforcing authority for LUCs on Picatinny is the Commanding Officer.

Elements of institutional controls at Picatinny, including specific LUC implementation descriptions, will be included as part of the remedial design. LUCs will include engineering controls at Site 106. A minimum

of 12 inches of rock and gravel cover will be maintained at TP106-3 as part of this alternative to serve as a barrier to human contact.

2.11 COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. These criteria are as follows:

Threshold Criteria – Requirement for Each Alternative

1. Overall Protectiveness of Human Health and the Environment – Determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through LUCs (ICs and/or ECs) or treatment.
2. Compliance with Applicable or Relevant and Appropriate Requirements – Evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Primary Balancing Criteria – Used to Weigh Major Trade-offs Among Alternatives

1. Long-term Effectiveness and Permanence – Considers the ability of an alternative to maintain protection of human health and the environment over time.
2. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment – Evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
3. Short-term Effectiveness – Considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
4. Implementability – Considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
5. Cost – Includes estimated capital and annual O&M costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of -30 to +50 percent.

Modifying Criteria – Considered after public comment on the Proposed Plan

1. State/Support Agency Acceptance – Considers whether the State agrees with the Army's analysis and recommendations, as described in the RI/FS and Proposed Plan.
2. Community Acceptance – Considers whether the local community agrees with the Army's analysis and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

2.11.1 Protection of Human Health and the Environment

Alternative 1 does not include any additional remedial activity that reduces potential site risks. However, risks to human health calculated at the PICA 020 Group of Sites are not unacceptable for the current and anticipated future use.

Alternative 2 provides adequate protection to human health assuming land use is utilized for industrial purposes as mandated by the action.

2.11.2 Compliance with Applicable or Relevant and Appropriate Requirements

COCs were identified for soils at the PICA 020 Group of Sites. No chemical-specific ARARs exist for soils; however, the NJNRDCSCC were selected as to-be-considered (TBC) criteria for soils in the FS. Alternatives 1 and 2 would not satisfy the chemical-specific cleanup levels because no treatment or removal is occurring. However, Alternative 2 will address exposure to COCs through land use controls, which will prevent the current land use (industrial) from changing and therefore maintain protection of human health.

2.11.3 Long-term Effectiveness and Permanence

Alternative 1 provides no long-term effectiveness or permanence. Alternative 2 reduces the long-term risks by limiting direct contact human exposure pathways. These land-use controls will be recorded in the Installation master plan and will remain in place in perpetuity, or until the USEPA, NJDEP, and U.S. Army agree that they are no longer required. These land-use controls would also remain in place after a property transfer, should one occur in the future.

2.11.4 Reduction in Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 would not actively reduce the toxicity, mobility, or volume of the contaminated soil as no treatment or removal is taking place. However, Alternative 2 does provide protection to industrial site users by limiting direct contact human exposure pathways.

2.11.5 Short-term Effectiveness

Neither Alternative 1 nor Alternative 2 have adverse short-term impact on workers, the surrounding community, or the environment because no construction activities are proposed.

2.11.6 Implementability

Both Alternatives 1 and 2 are readily implementable.

2.11.7 Cost

Alternative 1 has no costs associated with it as there is no action proposed by the remedy. Alternative 2 is cost effective as it eliminates direct contact human exposure pathways through land-use controls and maintenance of existing cover.

2.11.8 State Acceptance

NJDEP has provided input and comment on the selected remedy and accepts Alternative 2 for this group of sites. However, NJDEP did not concur on this ROD because it did not agree with language describing their soil clean-up standards.

2.11.9 Public Acceptance

The public comment period was held in June of 2001 and additional briefings have been provided to the public and the Restoration Advisory Board since that time, including a detailed briefing on September 20, 2007. Community acceptance is addressed in the Responsiveness Summary (Section 3) of this ROD.

2.12 SELECTED RESPONSE ACTION

This ROD represents the selected response action for Sites 19, 163, 86, 182, 183, 28, 106, 124, 141, 143, and 135 at Picatinny, in Rockaway Township, New Jersey, developed in accordance with CERCLA as amended and consistent with the NCP. This decision is based on the Administrative Record for the site. The selected response action for this site is Implementation of LUCs. Sites 49 and 44 do not require a response action and have been approved for No Further Action. Therefore, Sites 49 and 44 are not discussed further in this document.

The Implementation of LUCs alternative is the selected response action for the 11 sites because it provides overall protection of human health and would be cost effective. A detailed description of the selected response action is provided in this section.

2.12.1 Summary of the Rationale for the Selected Response Action

As agreed by the Army, USEPA, and NJDEP, implementation of LUCs represents an appropriate response action for these 11 sites. Because current land use results in acceptable risk, no engineered response action was needed. No active response action was needed at the sites with the exception of ensuring that site land use meets the requirement to be protective of human health and the environment. Human health risks have not been calculated for the unrestricted land use exposure scenario, and a response action is evaluated and selected for these sites in order to maintain the current land use.

The protectiveness of the selected response action is based on a combination of new actions that will take place and previous remedial actions that have already occurred. New actions that will occur as part of the implementation of LUCs include periodic site inspections and establishment and implementation of new LUCs as specified in the remedial design that will be submitted upon signature of this ROD. The protectiveness of the response action will be reviewed as part of annual inspections and the performance of five-year reviews. A significant portion of the protectiveness of LUCs is derived from older actions that the Army has already completed (i.e. RCRA closures).

Implementation of LUCs can be readily achieved and does not present any short-term risks to the surrounding community, environment, or site workers. Therefore, implementation of LUCs is recommended as the preferred alternative for the 11 sites.

Land use and access restrictions, which are the fundamental part of this preferred alternative, will be administered and implemented according to the specific LUCs included as part of the remedial design. The remedial design will be submitted after the ROD has been signed. The purpose of the LUCs specified in the remedial design will be to assure that institutional controls will be maintained and implemented at the 11 sites in a manner that ensures the protectiveness of the response action.

Based on information currently available, the lead agency believes the selected response action meets the threshold criteria and provides the best balance of tradeoffs among other alternatives with respect to the balancing and modifying criteria. The Army expects the selected response action to satisfy the following statutory requirements of CERCLA § 121(b): 1) be protective of human health and the environment; and 2) comply with ARARs.

2.12.2 Detailed Description of the Implementation of Land Use Controls

The selected response action for the 11 sites is "implementation of LUCs." Results of the environmental investigations have shown that the detected contaminant concentrations in soil at the sites are low and in most cases below regulatory, risk-based cleanup criteria or less than Picatinny background concentrations. Based on this evaluation, it has been determined that the existing Picatinny ICs and forthcoming LUCs to be included in the remedial design are protective of human health and the environment at the PICA 020 Group of Sites. No further remedial activities are proposed for these 11 sites under the current scenario.

Land Use Controls will be maintained until the concentrations of hazardous substances in the soil are at such levels to allow for unrestricted use and exposure. The DOD is responsible for implementing, maintaining, monitoring, reporting on and enforcing the LUCs that will be included in the remedial design. Land use controls will continue to be implemented for the 11 sites to ensure no unacceptable risks to human receptors occur in the future. The geographic coverage of land use controls at each of the 11 sites is depicted on Figures 2-1 through 2-5. Within 90 days of ROD signature, the Army shall prepare and submit to EPA for review and approval a LUC remedial design that shall contain implementation and maintenance actions, including periodic inspections. Although the Army may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity. In the event that Picatinny would be closed and declared excess property, the land use restrictions would be legally recorded (e.g., in zoning ordinance, property deeds, etc.) and incorporated into the provisions for the new land use. A change in land use would include the re-evaluation of cleanup requirements and notification and concurrence of USEPA and NJDEP. The LUC objectives are the following:

- Prevent the development and use of the property for residential housing, elementary and secondary schools, child-care facilities, and playgrounds that would lead to unacceptable risk;
- Prior to excavation of soils, require implementation of special handling procedures and permitting in order to protect the health and safety of the workers; and
- Maintain a minimum of 12 inches of rock and gravel cover at TP106-3 at Site 106 as an engineering control to serve as a barrier to human contact.

2.12.3 Summary of the Estimated Costs for the Selected Response Action

The costs associated with the implementation of LUCs are summarized as outlined in the following list:

CAPITAL COSTS

∅	Institutional Actions	\$42,000
	• Access Restrictions	\$6,000
	• Land Use Permits and Report Writing	\$36,000
∅	Contingency (15%)	\$6,300
	TOTAL CAPITAL COSTS	\$48,300

O&M COSTS

∅	Annual Inspections/Documentation/GIS (7% Dis.)	\$285,000
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∅ 5-Year Reviews (7% Dis.)	\$32,000
TOTAL PRESENT WORTH O&M COSTS (7% Dis.)	\$317,000
O&M Contingency (15%)	\$48,000
TOTAL PRESENT WORTH	\$413,300

The costing information in this section is based on the best available information regarding the anticipated scope of the remedial alternative.

2.12.4 Expected Outcomes of the Selected Response Action

It is anticipated that current land use will continue unchanged after implementation of the response action. It is expected that maintenance of existing LUCs will ensure protection of human health. However, as contaminants may remain in the soil at levels exceeding the remediation goals (RGs), uncontrolled use of the site is not provided by completing this action.

2.13 STATUTORY DETERMINATIONS

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment and permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected response action meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

There were no unacceptable risks to human health and the environment, as defined by the CERCLA risk range of 1×10^{-4} to 1×10^{-6} , for the current and reasonably anticipated future use of the PICA 020 Group of Sites. The response action was selected to be in compliance with the agreement outlined in the Geis memorandum (U.S. Army, 1999) which evaluated and selected a response action protective to the 1×10^{-6} risk level.

2.13.2 Compliance with ARARs

There are no promulgated standards for soils and sediments; therefore, there are no ARARs for evaluation. The agreement outlined in the Geis memorandum states that site soils data will be compared to NJDEP non-residential use criteria when determining the need for a response action, however, these standards are not ARARs. In addition, sites with radiological contamination were compared to the NJDEP remediation standards for radioactive material. Exposure to COCs will be addressed through land use controls, which will prevent the current land use (industrial) from changing and therefore maintain protection of human health.

2.13.3 Cost Effectiveness

This response action is cost-effective and represents a reasonable value. The costs are presented in Section 2.11.3.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

As determined by the project stakeholders, active remediation is not required to achieve the RAO developed for these 11 sites. Consequently, the selected response action does not employ treatment to eliminate contaminants present at the site. Chemical concentrations in soil will not be reduced over time. The selected response action satisfies the criteria for long-term effectiveness by preventing unacceptable exposures to site soils through maintenance of existing land use. In addition, permanent reduction of risks could be accomplished through proper enforcement of LUCs. Picatinny is an active military facility and there are currently no plans to change its status. However, should Picatinny ever be closed and the property transferred, the LUCs would need to be documented through an appropriate mechanism for privately owned property. The selected response action does not reduce toxicity, mobility or volume of contamination; however, the screening of chemical concentrations against the Impact to Groundwater Soil Cleanup Criteria (IGWSCC) indicates that chemical concentrations will not migrate significantly from the sites to either subsurface soil or groundwater. The selected response action does not present short-term risks to workers or the community. There are no special implementability issues associated with the selected response action.

2.13.5 Preference for Treatment as a Principal Element

The selected response action does not address principal threats posed by the site through the use of treatment technologies; however, there are no principal threats at these 11 sites. Because it was determined that an active response action was not needed at this site, treatment was not needed to achieve the RAO. The selected response action is protective of human health and the environment. In addition, chemical concentrations present in soil do not warrant treatment.

2.13.6 Five-year Review Requirements

Because this response action will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unrestricted exposure, statutory reviews will be conducted every five years after initiation of remedial action to ensure the response action is, or will be, protective of human health and the environment, until such time as it may be determined that the sites qualify for unrestricted use. Five-year reviews will be conducted in compliance with CERCLA §121(c) and the NCP §300.430(f)(5)(iii).

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

This ROD presents the selected remedial action as the preferred alternative. No significant changes have been made. The removal of two sites (Sites 49 and 44) as discussed above and in the Feasibility Study is a minor change to this document, and is supported by the RCRA-closure of these sites and comparison of site environmental data to USEPA Region 9 PRGs for residential use.

3.0 RESPONSIVENESS SUMMARY

The final component of the ROD is the Responsiveness Summary. The purpose of the Responsiveness Summary is to provide a summary of the stakeholders' comments, concerns, and questions about the selected response action for the 11 Sites and the Army's responses to these concerns.

In general, the community appears to be in support of the selected response action. All comments and concerns summarized below have been considered by the Army, USEPA, and NJDEP in selecting the final cleanup methods for the 11 Sites at Picatinny. The Proposed Plan was provided to the community for public comment in 2001 and included 13 sites as previously discussed. Two of these sites (Sites 49 and 44) have been removed for no further action in the subsequent feasibility study (2007) and are not included in the selected response action for this group of sites. However, the comments below refer to the 13 sites as previously public noticed.

While the Proposed Plan has been modified slightly since the original public notice period, an active public outreach program is continuous at Picatinny. Representatives of the public attend all working meetings between the USEPA and Army. The PICA 020 Group of Sites has been discussed at these meetings in detail. Picatinny Arsenal Environmental Restoration Advisory Board (PAERAB) meetings are held on a regular basis at a local hotel, open to the public, and advertised in local newspapers. At these meetings the status of all sites at Picatinny are discussed briefly with more focused presentations on subjects requested by the PERAB. The PICA 020 remedy has been briefed at these meetings periodically, including a meeting on September 20, 2007 where the minor changes were specifically discussed with the public.

3.1 PUBLIC ISSUES AND LEAD AGENCY RESPONSES

As of the date of this ROD, the Army endorses the preferred alternative for Sites 19, 163, 86, 182, 183, 28, 106, 124, 141, 143, and 135 of implementation of LUCs. USEPA and NJDEP support the Army's plan. Comments received during the public comment period on the Proposed Plan are summarized below. The comments are categorized by source and do not refer to the two sites that have been selected for no further action (Sites 49 and 44).

3.1.1 Summary of Comments Received During the Public Meeting on the Proposed Plan and Agency Responses

One comment specific to the selected response action for the 13 Sites was received during the public meeting held on June 21, 2001. Transcripts from the public meeting were completed and submitted into the Administrative Record (located at the Installation Restoration Library in Building 319 at Picatinny) for the site. The comment received on the selected response action for the 13 Sites is summarized as follows:

Comment 1: Mr. Michael Glaab, PAERAB Co-chair, wondered why the public notice was placed in the papers only three weeks prior to the meeting. He felt that more people would have come if more advanced notice had been given. He also felt that Thursday evening was a poor choice because it was a weekday and many people would not be able to attend a meeting held during the workweek. He asked who made that final decision and why. He also wanted assurances that the three-week notification period was in accordance with USEPA guidelines.

Reply: The notification was placed in the paper one week prior to the public meeting (corresponding Certificates of Publications of Public Notices are included in Attachment 1 of this ROD). The PAERAB was informed at the May 23, 2001 PAERAB meeting of this forthcoming public meeting. At that time, the PAERAB as a body stated they did not care when the public meeting was held. In addition, the date, time and place was incorporated with the minutes and mailed to each PERAB member. The final decision to have the RAB meeting June 21st was made by Ted Gabel, Project Manager for the Picatinny IRP, with input from his staff and USEPA. The USEPA Project Manager, Bill Roach, also added that the USEPA preferred to have the meeting in the middle of the comment period, because it gives the public the maximum amount of time to receive and read the material and an equal amount of time to prepare and submit comments.

3.1.2 Summary of Comments Received During the Public Comment Period and Agency Responses

One written comment was received on the 13 Sites during the comment period on the Proposed Plan. The comment is summarized as follows:

Written Comment 1: Y(y)our alternatives should include first of all a cessation of all pollution in Picatinny on all areas of Picatinny – every single inch, no more pollution.

Reply: The Army understands your concerns with regard to the cessation of all pollution at Picatinny. It should be clarified that this document specifically addresses contamination at the 13 Sites as a result of past Army practices. This contamination is addressed in accordance with the NCP of the CERCLA and the Defense Environmental Restoration Program (DERP). This document addresses only past contamination in the environmental media and does not address the ongoing sources or potential sources of contamination at Picatinny, which are addressed under other regulations including RCRA. However, it should be noted that Picatinny does make it a high priority to comply with state and federal regulations and Army-related policies in regard to sources.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues were raised on the selected response action.

4.0 REFERENCES

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