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USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

JEFFERSON PROVING GROUND

SITE-SPECIFIC TECHNICAL PLAN

Prepared For:

U. S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY (USATHAMA)
ABERDEEN PROVING GROUND, MARYLAND

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GRAND JUNCTION, COLORADO

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SITE SPECIFIC TECH PLAN (JAN '92)
DU AND STREAMS
JPG

TABLE OF CONTENTS

TABLE OF CONTENTS, cont'd.

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This Site-Specific Technical Plan outlines the overall approach and defines the activities associated with the sampling and analysis of streams entering and exiting the U.S. Army Jefferson Proving Ground (JPG), Madison, Indiana, and sampling and analysis of 15 existing monitoring wells of the Gate 19 Landfill and it boundaries. This work is being performed in support of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) under Contract No. DAAA15-90-D-0007, Task Order 0002. The work tasks to be completed under this plan are tasks required to provide additional data needed to satisfy the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by SARA (1986), the National Contingency Plan (40 CFR Part 300), and the National Environmental Policy Act (NEPA). The work to be conducted is required to:

- Define extent and magnitude of possible environmental contamination originating on and exiting from JPG via the surface water pathway.
- Assess human health and environmental risk associated with this contamination.
- Determine the presence or absence of contaminants in groundwater related to the Gate 19 Landfill and DU (Depleted Uranium) areas.
- Confirm the results of previous investigations.

This Site-Specific Technical Plan is supported by the following documents:

- Site-Specific Sampling Design Plan
- RI/FS Quality Control Plan (Volume III)
- RI/FS Health and Safety Plan (Volume IV)

Although there have been previous environmental investigations performed at JPG, little to no site characterization work has been conducted and, therefore, data concerning the presence and extent of contamination is lacking. This work plan provides a description of the work tasks necessary to provide information required to support an assessment of risk to human health and the environment as a result of potential off-site migration of contaminants via the surface water and groundwater pathways and to ensure JPG compliance with applicable federal and state laws and regulations.

1.1 Plan Organization

This plan, designated Site-Specific Technical Plan, provides the overall plan for conducting site-specific sampling and analysis at JPG according the Scope of Work defined by Task Order 0002. Details of sampling and analysis, quality assurance, and health and safety procedures are presented in the accompanying documents as stated above. The work plan is organized as follows:

Section 1.0 Introduction
Section 2.0 Site Background and Environmental Setting
Section 3.0 Regulatory Setting
Section 4.0 Conceptual Site Models

Section 5.0 Data Needs, Data Quality Objectives and Technical Approach
Section 6.0 RI Work Tasks
Section 7.0 Project Schedule
Section 8.0 References

1.2 Scope of Work

As previously stated, the scope of the work under this plan is limited to the site-specific sampling and analysis specified under Task 0002, which includes sampling of streams entering and exiting JPG and groundwater sampling and analysis at the Gate 19 Landfill and the DU Impact areas.

The work described in this plan and the accompanying plans is based on an initial evaluation of the results of previous investigations, wherein data gaps were identified. Individual work tasks are described in this document with respect to specific rationale, objectives, and technical approach to be used to fill these data gaps. All work tasks will be designed to provide information which will satisfy any standard requirements, criteria, or limitations promulgated under federal or State of Indiana environmental laws that apply to JPG. These include, but are not limited to:

- The Safe Drinking Water Act [42 U.S.C. 30 et seq]
- The Toxic Substances Control Act [15 U.S.C. 2601 et seq]
- The Clean Water Act [33 U.S.C. 1251 et seq]
- The Solid Waste Disposal Act [42 U.S.C. 6901 et seq]
- Endangered Species Act [16 U.S.C 1531 et seq]
- State laws which are more stringent than the equivalent federal Standard

A more comprehensive list of potentially applicable or relevant and appropriate requirements (ARARs) is presented in Section 3.0 of this plan.

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

2.1 Location

Jefferson Proving Ground (JPG) occupies 55,265 acres of land along U.S. Highway 421 north of Madison, Indiana (see Figure 1). The facility is located in portions of three counties (Ripley, Jennings, and Jefferson). The installation is approximately 18 miles long (north-south) and 5 miles wide (east-west). The major portion of JPG is wooded. Industrial buildings and workshops, as well as administrative buildings and personnel housing, are located in the southern portion of the facility. A line of gun positions (268) run east-west across the southern portion of JPG. Weapons are fired at targets located to the north of these gun positions. It is the immediate area of the gun positions that is referred to as the Firing Line (see Figure 2) In addition to the gun positions, there are 50 impact areas, 13 permanent test complexes, and 7 ammunition assembly plants.

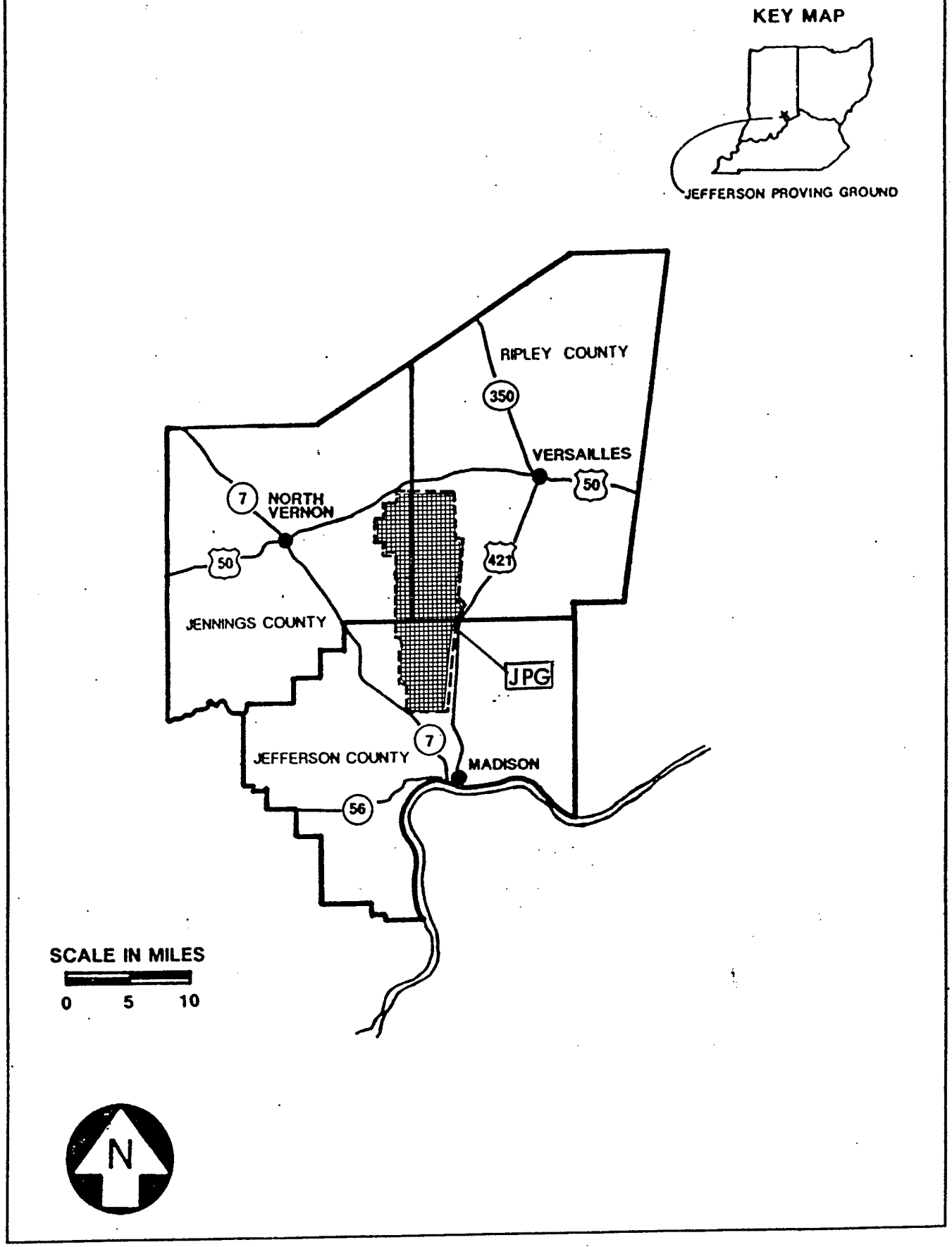

Figure 1. Map showing location of Jefferson Proving Ground.

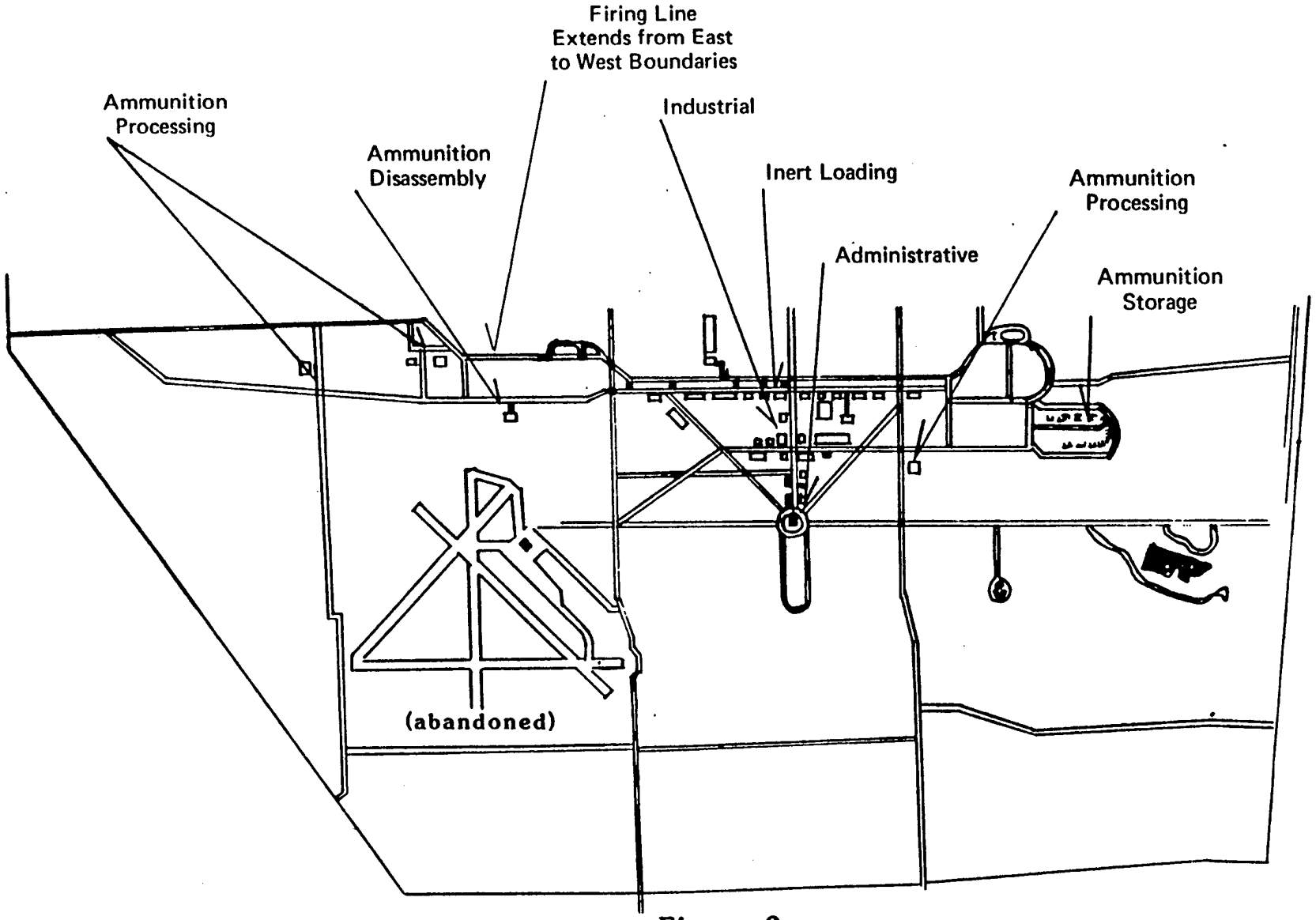

Figure 2
SUPPORT FACILITIES
SOUTH OF FIRING LINE
Jefferson Proving Ground
Madison Indiana

Source: History of JPG

2.2 Site History

JPG has been used as a testing proving ground since May 1941. A wide assortment of conventional munitions and weapons have been tested at the facility. These include propellants, projectiles, cartridges, mortars, grenades, fuses, primers, boosters, rockets, tank ammunition and weapon components. The mission of JPG has been to plan and conduct production acceptance tests, components. The mission of JPG has been to plan and conduct production acceptance tests, reconditioning tests, surveillance tests, and other studies of ammunition and weapons systems.

Past and present activities at JPG have resulted in the detonation, burning, and disposal of many types of waste propellants, explosives, and pyrotechnic substances at the site. These activities have resulted in several physically and chemically hazardous wastes throughout the facility. Physical hazards mainly involve unexploded ordnance (UXO). Chemically hazardous wastes include various explosive compounds, waste propellants, lead, chlorinated solvents, wood preservatives, sulfur, silver, photographic development wastes, sanitary wastes, and petroleum products. Some of these wastes are known to have been released into the soil. As a result, the groundwater and surface water pathways may have also been contaminated. Previous environmental investigations have been limited in scope and have not adequately characterized the nature and extent of contamination at JPG.

Impact areas at JPG include high impact targets, asphalt, and sediment bottom ponds for testing proximity fuses, a gunnery range, mine fields, and a depleted uranium impact area. Surrounding the impact areas are safety fans where wide, long, or short rounds may fall. These areas are all considered to be contaminated with explosive ordnance. The impact areas are kept clear of vegetation by herbicides application.

The Defense Secretary's Commission on Base Realignment and Closure recommended JPG among other bases for closure and/or realignment in December 1988. The Congress mandated JPG be closed and its mission be realigned with Yuma Proving Ground in April 1989. As a result, USATHAMA was given the responsibility for managing and conducting environmental investigations at JPG in association with the Base Closure Program. Under the base closure plan, testing activities are expected to stop in 1994 and land disposition accomplished by 1995 (Ebasco, 1990).

2.3 Previous Investigations

Section 8.0 of this plan provides a list of references to previous investigations conducted at JPG. Several reports regarding various environmental aspects of JPG have been written over the years. Many were site-specific, while others were facility-wide investigations. The facility-wide investigations included an Environmental Impact Assessment of JPG (O'Neill, 1978), Installation Assessment of JPG (USATHAMA, 1980), Update of the Initial Assessment (Environmental Science and Engineering, 1988), and a Report to the Governor (Indiana Department of Environmental Management, 1989). Another significant report dealing with environmental practices at JPG was a RCRA Part B Application for Open Burning/Open Detonation (U.S. Army Corps of Engineers, 1988).

In October 1989, Ebasco Environmental (Ebasco, 1990a) began an enhanced Preliminary Assessment (PA) through Argonne National Laboratory to support the Base Realignment and Closure Program. This PA was based on a review of the above described existing information which included JPG records, reports, and aerial photographs. The enhanced PA, through review and analysis of previous data, identified and characterized areas requiring further environmental evaluation (AREEs), defined potential pathways for contaminant migration, identified potential receptors of contamination, and provided recommendations for further study.

A follow-on report to the enhanced PA was prepared by Ebasco (1990b) in November 1990. This report, Master Environmental Plan (MEP), was designed to support the Base Closure process by providing additional information required to characterize areas of concern at JPG, supporting the Installation Restoration Program (IRP) activities, providing information to be used to prioritize site actions, and assisting in the development of cost-effective response actions. The MEP described, in detail, the existing conditions at 46 SWMUs and AREEs at JPG, additional data required, and proposed activities to provide the required data.

This Site-Specific Technical Plan and associated planning documents were prepared on the basis of the findings and recommendations of both the PA and MEP. Work tasks presented in the RI/FS Technical Plan are designed to meet the following objectives:

- Define extent and magnitude of environmental contamination entering and exiting JPG through the surface water pathway;
- Define the extent of groundwater contamination at the Gate 19 Landfill and DU Impact areas;
- Assess human health and environmental risk associated this contamination;
- Determine needs for further investigation and/or remedial actions;

2.4 Environmental Setting

2.4.1 *Physiography*

JPG is located in the Till Plains section of the Central Lowlands Physiographic Province which is characterized by young till plains with no pronounced morainic features. Topography of JPG is flat to rolling, with most relief due to stream incision. Seven streams and their tributaries drain the JPG area.

2.4.2 *Climate*

The climate at JPG is mid-continental, with frequent changes in temperature and humidity. During the summer, the temperature averages from the mid 70s and mid 80s (°F) and, on an average, exceeds 90°F for 39 days a year. Winter temperatures generally range from 22-35°F. The total annual precipitation is approximately 42-44 inches, with nearly 50 percent of the precipitation occurring during the growing season. On the average, 28 days of the year have precipitation greater than or equal to 0.5 inch. The region of JPG is subject to tornadoes and severe thunderstorms. Tornadoes in 1974 reportedly caused nine deaths and

many injuries in the communities of Madison and Hanover. No damage has been reported for JPG from these storms.

2.4.3 *Geology*

Jefferson Proving Ground lies on the western limb of a plunging anticline known as the Cincinnati Arch. The geology is characterized by glacial tills that overlie Ordovician and Silurian limestones and dolomites interbedded with shales.

Surficial deposits consist of glacially-derived soils over glacial till of Illinoisan and Wisconsinan Age and is characterized by silts and clays with only minor amounts of gravel and rock fragments. The two major soil associations present at JPG are the Cincinnati-Rossmoyne-Hickory and the Avonburg-Clermont. The Cincinnati-Rossymoyne-Hickory soils are generally deep, moderately well to well drained, whereas, the Clermont-Avonburg soils are somewhat poorly drained. The Cincinnati-Rossymoyne-Hickory soils are found mainly on ridgetops, breaks, and hillsides at JPG. The Clermont-Avonburg soils are gently sloping soils located on broad ridges. Both associations contain fragipan layers (low permeability, firm, and brittle) which restrict the downward movement of water. A combination of different soil types occur on or adjacent to stream beds. These soils include Ryker, Grayford, Holton, Eden, Elkinsville, and Wirt soil types. The soil types at JPG are summarized in Table 1. The underlying unconsolidated glacial tills are typically 25 to 30 ft.-thick but are generally absent in the stream valleys at JPG.

Bedrock at JPG consists of thick sequences of interbedded limestones, dolomites, and shales or Ordovician and Silurian ages. Outcrops of thinly bedded limestones and shales seen in stream drainages at JPG are from the Dillsboro Formation. The Dillsboro Formation is composed of gray calcareous shale with thin limestone interbeds (up to 50%). The sequence contains joints and fractures.

2.4.4 *Hydrology*

Water table depths within JPG are relatively shallow, generally less than 20 ft.. The water table varies according to the season. There are several flat areas where the water is at the surface and remains for extended periods. The apparent direction of groundwater flow is to the west-southwest, which coincides with the direction of surface drainage and regional dip of the bedrock.

Although little hydrologic information is available for JPG, outcrops of the limestone bedrock show vertical joints and fractures in addition to abundant bedding planes which most likely results in some downward migration of water from the unconfined surface aquifer.

Surface water at JPG consists of several major drainageways which generally flow in a northeast to southwest direction across JPG toward the Ohio River (Figure 3) and also consists of at least 10 ponds/lakes (most of which are stocked with fish and used for recreational purposes). The southern portion of JPG is drained by Harberts Creek which

Table 1. General soil characteristics of JPG.

Soil name (map symbol)	Depth (inches)	USDA Textures	Liquid Limit	Plasticity Index	Permeability (in/hr)	Shrink-swell potential	Erosion factors		High Water Table (ft)
							K	T	
Avonburg (Ava, AvB2)	0 - 10	Silt loam	20 - 30	2 - 10	0.6 - 2.0	Low	0.43	4	1.0-3.0
	10 - 30	Silty clay loam, silt loam	30 - 45	10 - 20	0.6 - 2.0	Moderate	0.43		
	30 - 80	Silty clay loam	30 - 45	10 - 20	<0.06	Moderate	0.43		
Cincinnati CnB2, CnC2, CnC3)	0 - 6	Silt loam	25 - 40	3 - 16	0.6 - 2.0	Low	0.37	4 - 3	>4
	6 - 33	Silty clay loam, loam	26 - 40	8 - 15	0.6 - 2.0	Low	0.37		
	33 - 56	Clay loam, loam	25 - 40	6 - 20	0.06 - 0.6	Moderate	0.37		
	56 - 80	Silty clay loam, clay loam	25 - 40	5 - 20	0.06 - 0.6	Moderate	0.37		
Cobbs fork (CO)	0 - 12	Silt loam	15 - 30	3 - 10	0.06 - 0.2	Low	0.37	4	0.5 - 1.0
	12 - 27	Silt loam	15 - 30	3 - 10	0.06 - 0.2	Low	0.37		
	27 - 50	Silt loam, silty clay loam	20 - 35	5 - 15	<0.06	Low	0.37		
	50 - 77	Silt loam, silty clay loam	20 - 35	5 - 15	0.06 - 0.2	Low	0.37		
	77 - 80	Clay loam	30 - 40	10 - 15	0.06 - 0.2	Moderate	0.37		
Eden (Ee, D2)	0 - 5	Silty clay loam	35 - 65	12 - 35	0.06 - 0.6	Moderate	0.43	7	>6.0
	5 - 21	Flaggy silty clay, flaggy clay, silty clay	45 - 75	20 - 45	0.06 - 0.2	Moderate	0.28		
	21	Weathered bedrock					0.17		
Elkinsville (EkA, EkB)	0 - 8	Silt loam	25 - 40	5 - 15	0.6 - 2.0	Low	0.37	5	<6.0
	8 - 36	Silty clay loam, silt loam	35 - 40	8 - 18	0.6 - 2.0	Moderate	0.37		
	36 - 60	Silty clay loam, sandy clay loam	30 - 40	8 - 18	0.6 - 2.0	Moderate	0.37		
Grayford (GrC2, GrC3, GrD2, GrD3)	0 - 12	Silt loam	18 - 30	4 - 10	0.6 - 2.0	Low	0.37	5 - 4	>6.0
	12 - 22	Silty clay loam, clay loam	25 - 35	8 - 13	0.6 - 0.2	Moderate	0.37		
	22 - 45	Clay loam, loam	25 - 40	8 - 15	0.6 - 2.0	Moderate	0.37		
	45 - 52	Clay, silty clay	45 - 55	20 - 30	0.6 - 2.0	High	0.37		
	52	Unweathered bedrock							

Table 1. (cont.) General soil characteristics of JPG (concluded).

Soil name (map symbol)	Depth (inches)	USDA Textures	Liquid Limit	Plasticity Index	Permeability (in/hr)	Shrink-swell potential	Erosion factors		High Water Table (ft)
							K	T	
Hickory (HkC2, HkC3, HkD2, HkD3, HkE)	0 - 9	Silt loam	20 - 35	8 - 15	0.6 - 2.0	Low	0.37	5	>6.0
	9 - 54	Clay loam, silty clay loam, silt loam	30 - 50	15 - 30	0.6 - 2.0	Moderate	0.37		
	54 - 60	Clay loam sandy loam, loam	20 - 40	5 - 20	0.6 - 2.0	Low	0.37		
Holton (Ho)	0 - 8	Loam	<25	2 - 10	0.6 - 2.0	Low	0.37	5	1.0 - 3.0
	8 - 32	Fine sandy loam loamy sand	<25	4 - 12	0.6 - 2.0	Low	0.24		
	32 - 60	Stratified loamy sand to sandy clay loam	<25	2 - 14	0.6 - 2.0	Low	0.24		
Ryker (RyA, RyB2, RyC2, RyC3)	0 - 6	Silt loam	20 - 30	5 - 15	0.6 - 2.0	Low	0.37	5	>6.0
	6 - 67	Silt loam, silty clay loam clay loam	25 - 40	10 - 15	0.6 - 2.0	Moderate	0.37		
	67 - 80	Silt loam, silty clay loam clay loam	25 - 45	10 - 20	0.6 - 2.0	Moderate	0.37		
Rossmoyne silt loam (RoA, RoB2)	0 - 8	Silt loam	30 - 40	4 - 10	0.6 - 2.0	Low	0.37	4	1.5 - 3.0
	8 - 25	Silty clay loam, silt loam, clay loam	30 - 48	8 - 20	0.6 - 2.0	Moderate	0.37		
	25 - 80	Clay loam, silt loam, silty clay loam	25 - 40	9 - 19	0.06 - 0.6	Moderate	0.37		
Wirt silt loam (Wt)	0 - 15	Silt loam	<25	3 - 7	0.6 - 2.0	Low	0.37	5	>6.0
	15 - 50	Silt loam, loam	<25	3 - 7	0.6 - 2.0	Low	0.24		
	50 - 60	Stratified loam to loamy fine sand	<25	7	2.0 - 6.0	Low	0.24		

Source: USDA 1976, 1985

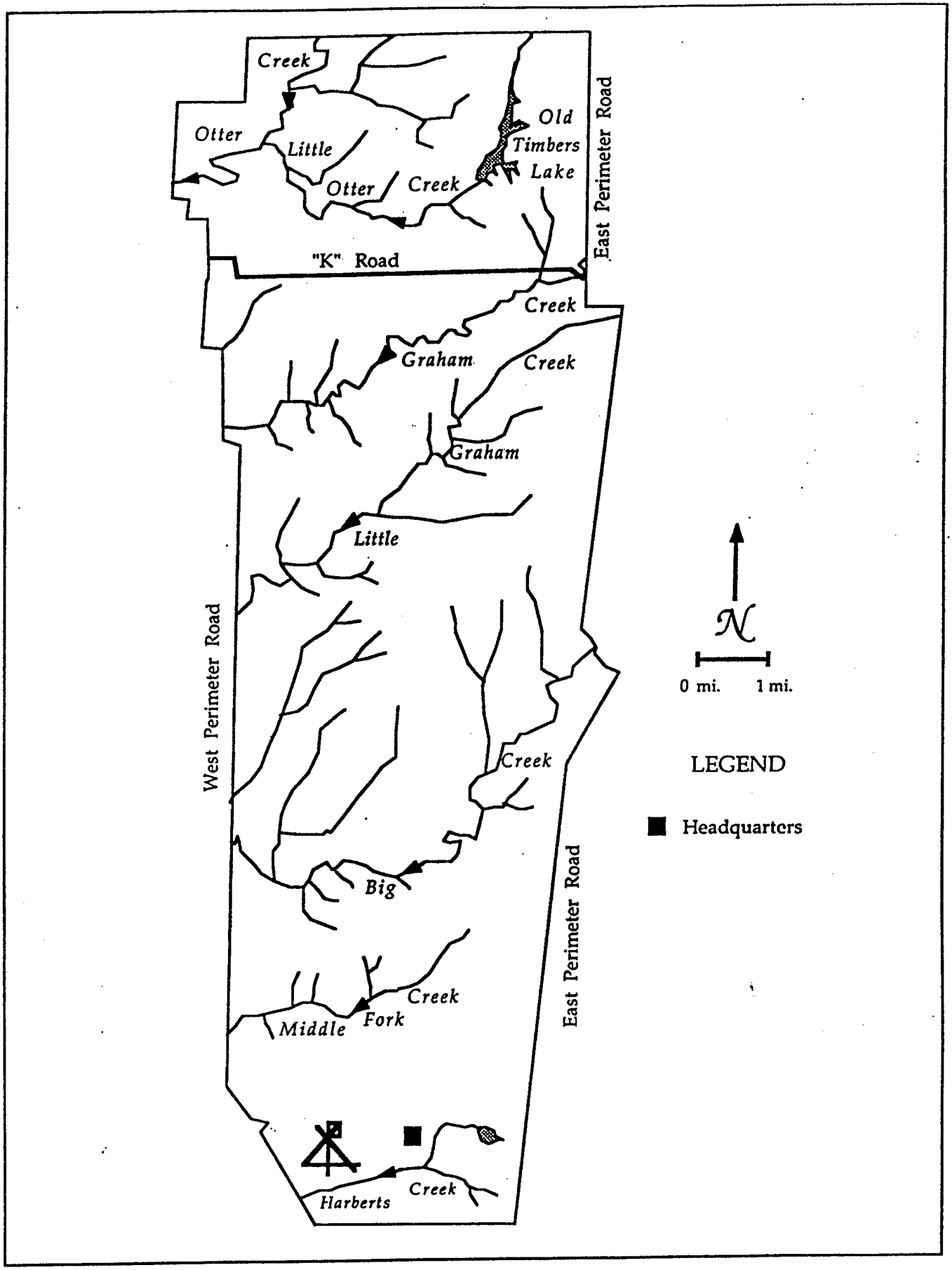

Figure 3. Stream corridors within the JPG

leaves the installation at the southwest corner. Middle Fork Creek and its tributaries drain the south central portion of JPG. Big Creek traverses JPG north of Middle Fork Creek and has tributaries originating both on and off the installation. To the north and west of Big Creek is Marble Creek, which originates on JPG.

Little Graham Creek originates off the installation and traverses the north central portion of the installation along with its major tributaries, Horse and Poplar Branch. Big Graham Creek also originates off the installation, traversing JPG nearly parallel to and north of Little Graham Creek. The two major tributaries of Big Graham Creek are Grapevine Branch and Rush Branch which originate on the installation.

Little Otter Creek, Otter Creek and its tributaries, Falling Timber Branch, and Vernon Fork, join in the northwestern corner of JPG before exiting the installation at the western boundary.

2.5 Land Use/Demography

JPG is surrounded by several small, rural towns including New Marian, Holton, Nebraska, Rexville, Grantsburg, Belleview, Middlefork, San Jacinto, and Wirt. The area immediately adjacent to the installation is farm land consisting primarily of crops of sorghum, tobacco, corn, and wheat.
Most of JPG is wooded with the exception of impact areas and clear areas surrounding building complexes. As a result, the installation has an active forest and wildlife management program. Limited hunting and limited timber sales are a part of this management program.

Employment at JPG ranged from 1,774 in 1953 to the present employment which, in 1990, was reported at 386.

3.0 REGULATORY SETTING

Guidelines for the remediation of hazardous constituents released from federal facilities is provided in Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Essentially, all guidelines, rules, regulations, and criteria carried out under CERCLA apply to federal facilities. In that context, environmental studies and future remediation activities conducted at JPG are governed by CERCLA under the review and approval of the U.S. Environmental Protection Agency (EPA), Region V, and the State of Indiana. The U.S. Army (USATHAMA) is responsible for the study and cleanup of waste sites at JPG.

A preliminary list of ARARs for site-specific sampling and analysis activities at JPG outlined in this Work Plan is presented in Table 2. Generally, these ARARs represent federal requirements except those areas where state requirements are more stringent than the federal requirements. In addition to CERCLA or state requirements, there are also USATHAMA and Department of Defense requirements which must be met (i.e., regulations governing unexploded ordnance).

Table 2. PRELIMINARY ARARS FOR JPG

STANDARD REQUIREMENTS, CRITERIA, OR LIMITATION	CITATION	DESCRIPTION
SAFE DRINKING WATER ACT	40 U.S.C 300	
National Primary Drinking Water Regulations	40 C.F.R Part 141	Establishes health-based regulations for public water systems (maximum contaminant levels (MCL)).
National Secondary Drinking Water Regulations	40 C.F.R Part 143	Establishes aesthetic-based standards for public water systems.
CLEAN AIR ACT (CAA)	42 U.S.C. 7401	
National Ambient Air Quality Standards (NAAQS)	40 C.F.R. Part 50	Establishes primary and secondary standards for six pollutants to protect public health and welfare.
FISH AND WILDLIFE COORDINATION ACT	16 U.S.C 661-	Requires consultation when federal department or agency proposes or authorizes any modification of any stream or other water body and adequate provision for protection of fish and wildlife resources.
ENDANGERED SPECIES ACT	16 U.S.C. 1531 50 C.F.R. Parts 200 and 402	Requires action to conserve endangered species within critical habitats upon which endangered species depend (includes consultation with Department of Interior).
CLEAN WATER ACT Dredge or Fill Requirements	33 U.S.C. 1251- 40 C.F.R. Parts 230-231	Requires discharges to address impact of discharge of dredge or fill material on the aquatic ecosystem.
National Pollutant Discharge Elimination System (NPDES)	40 C.F.R. Parts 122 and 125	Requires permits for discharge of pollutants for any point source into waters of the United States.
Effluent Guidelines Standards for the Point	40 C.F.R. Part 414	Requires specific effluent characteristics for discharge Source Category under NPDES permits.

Table 2. PRELIMINARY ARARS FOR JPG

STANDARD,REQUIREMENTS CRITERIA, OR LIMITATION	CITATION	DESCRIPTION
National Pretreatment Standards	40 C.F.R. Part 403	Sets standards to control pollutants which pass through or interfere with treatment processes in public treatment works or which may contaminate sewage sludge.
Water Quality Criteria	40 C.F.R. Part 131	Sets criteria for water quality based quality based on toxicity to human health.
Ambient Water Quality	40 C.F.R. Part 131	Sets criteria for ambient water water quality Criteria based on toxicity to aquatic organisms.
SOLID WASTE DISPOSAL ACT		
Criteria for Classification Solid Waste Disposal Facilities and Practices	40 C.F.R. Part 257	Establishes criteria for use in which solid waste disposal facilities practices pose a reasonable probability of adverse effects on public health or the environment and thereby constitutes prohibited open dumps.
Groundwater Protection	40 C.F.R. 264.90 - 264.101	
Standards Applicable to Generators of Hazardous Waste	40 C.F.R Part 262	Establishes standards for generators hazardous waste.
Standards for Owners and Operators of Hazardous Waste Treatment, Storage Disposal (TSD) Facilities	40 C.F.R. Part 264	Establishes minimum national standards which define the acceptable management of hazardous waste for operators of facilities which treat, store or dispose of hazardous wastes.

Table 2. PRELIMINARY ARARS FOR JPG

STANDARD,REQUIREMENTS CRITERIA, OR LIMITATION	CITATION	DESCRIPTION
General Facility Standards	Subpart B	Provides standards for general waste analysis, security, inspection requirements, personnel training, location standards and requirements for the handling of ignitable, reactive or incompatible wastes.
Preparedness and Prevention	Subpart C	Provides standards for facility design, required equipment testing and maintenance, and arrangements with local authorities for owners and operators of all hazardous waste facilities.
Contingency Plan	Subpart D	Provides contingency plan requirements and emergency procedures for hazardous waste management facilities.
Releases from Solid Waste Management Units	Subpart F	Imposes general groundwater monitoring and protecting requirements to detect and respond to releases in the upper aquifer from "regulated" hazardous waste management units.
Closure and Post-Closure	Subpart G	Provides general closure performance standards and requires removal or decontamination of all hazardous wastes from hazardous waste management facilities.
Surface Impoundments	Subpart K	Provides design, general operating and inspection requirements for the use of surface impoundments to treat, store, or dispose of hazardous waste.
Waste Piles	Subpart L	Provides containment, design closure, and post-closure care requirements for facilities that treat or store hazardous wastes in piles.

Table 2. PRELIMINARY ARARS FOR JPG

STANDARD,REQUIREMENTS CRITERIA, OR LIMITATION	CITATION	DESCRIPTION
Land Treatment	Subpart M	Prohibits placement of hazardous waste in or on a land treatment facility unless the waste can be made less hazardous or nonhazardous by degradation, transportation, or immobilization processes occurring in or on the soil. Establishes requirements for unsaturated zone monitoring, closure and post-closure waste analysis, and special requirements for ignitable or reactive waste.
Landfills	Subpart N	Establishes requirements for design, operation, and closure/post-closure care for landfills that handle hazardous wastes. Also provides requirements for the handling of bulk and containerized liquors and incompatible wastes.
Land Disposal	40 C.F.R. Part 268	Identifies hazardous wastes that are restricted from land disposal and describes those circumstances under which an otherwise prohibited waste may be land disposed.
Hazardous Materials Transportation Regulations	49 C.F.R. Parts 107,171-177	Regulates transportation of hazardous materials.
GENERAL		
	29 C.F.R 1910.120	OSHA Worker Safety
	10 C.F.R. Part 20	Establishes permissible levels of radiation in unrestricted areas and waste disposal requirements.
	40 C.F.R 440	Regulates discharges of radionuclides to surface waters.

Where the potential for unexploded ordnance (UXO) exists, site work must comply with the following regulations:

- Department of Defense (DOD) 6055.9-STD Ammunition and Explosive Safety Standards
- AR 385-64 Ammunition and Explosive Safety Standards
- AR 50-6 Chemical Surety Program
- AR 75-15 Responsibilities and Procedures for Explosive Ordnance Disposal (EOD)

State of Indiana regulations will be reviewed to determine which of these requirements are more stringent than those listed in Table 2.

Current JPG activities require the following major permits:

- RCRA Permit
- NPDES Permit
- Fire Training Permit
- Open Burning Permit
- Air Permit

JPG requires a RCRA Interim Permit because pyrotechnics, explosives, and propellants are stored and thermally treated at the facility. These items are also detonated on open ground. A RCRA Interim Permit application has been submitted, but is still under review by EPA Region V.

A NPDES permit is required at JPG to discharge the effluent from the sewage treatment plant. The permit was just recently renewed by the State of Indiana.

A local Fire Training Permit is required for JPG to conduct fire fighting training to JPG personnel. This training is conducted under the supervision of State and local fire fighting agencies.

JPG requires an Open Burning Permit from the Indiana Department of Environmental Management to burn excess propellants, explosives, vegetation, and scrap wood. The permit is renewed annually.

An air permit would normally be required to operate an incinerator. In the case of JPG, local regulations require an air permit only if at least 10 tons/day of solid wastes are incinerated. JPG's new incinerator capacity is only 4 tons/day. Consequently, no air permit is required to operate the incinerator. JPG does, however, have a permit from the Indiana Department of Environmental Management for the open burning of excess propellants and explosives.

4.0 CONCEPTUAL SITE MODELS

On the basis of all presently available data, the following conceptual site models have been developed to provide a preliminary understanding of the sources of contamination in the south area of JPG, the migration pathways of contaminants, and potential receptors of contaminants at or near JPG. These models are used to assess the adequacy of present information and the need for further investigations to provide data necessary for proper remedial action decisions. Where data gaps exist, the types, quality, and quantity of data to be collected are determined, and the uses for the data are described. These additional data needs are described in Section 5.0, Data Needs, Data Quality Objectives, and Technical Approach, of this plan. The following contains a preliminary assessment of the contaminant pathways at each site.

4.1 Sampling and Analysis of Major Streams

4.1.1 *Potential Contaminant Sources*

Off-site sources of contaminants may exist that contribute to surface water pathway contamination prior to major streams entering JPG. The primary source of contaminants would be from agricultural sources. Anticipated contaminants would be herbicides and pesticides used in weed and pest control at surrounding farms. Elevated nitrates and nitrites are also common contaminants found in agricultural areas due to livestock and commercial fertilizers.

Suspected on-site sources of contaminants to the surface water environment include leaking UXO, the DU Impact Area, red lead disposal area, burn areas, and the sulfur disposal area. Runoff from soils treated on-site with herbicides and pesticides is also a potential source of contamination to the surface water pathway leaving the JPG installation.

4.1.2 *Evaluation of the Surface Water Pathway*

Suspected releases of contaminants to the surface waters would be primarily from the runoff from contaminated surface soils during precipitation events. Other releases could occur from the discharge of contaminants through storm sewers and building floor drains. In addition to the potential for contaminating streams exiting JPG, several surface water bodies of water such as ponds and lakes are present at JPG. These ponds and lakes are primarily fed by surface water drainages, which if contaminated, could result in contamination of the larger surface water bodies. Many of these ponds and lakes are stocked with fish and are used by JPG personnel for sport fishing. Ingestion of contaminated fish could result in risk to human health.

4.1.3 *Evaluation for Existing Data*

With the exception of monitoring data for the Wastewater Sewage Treatment Plant discharge to Harberts Creek, no other surface water quality or stream sediment data exist for streams entering and exiting JPG. Data are needed from locations where the streams enter JPG and at the point

where they exit JPG to determine the potential for off-site migration of contaminants and the potential risks to human health and the environment.

4.2 Gate 19 Landfill Groundwater Monitoring Wells

4.2.1 *Potential Contaminant Sources*

The Gate 19 Landfill (Figure 4) is an active 12 acre landfill which includes an asbestos disposal area and waste pile of construction debris. Disposal of asbestos is in a separate portion of the landfill than the construction debris. Construction debris reportedly consists mainly of concrete block, metal, wire, and a minor amount of wood debris which was deposited on the ground surface over as much as 10 of the 12 acre area. The area also receives ash from the new incinerator and other non-combustible trash. Previously, however, the landfill reportedly received red lead paint and methylene chloride/polyurethane residues. Between 1960 and 1980, the site also reportedly received 1000 to 10,000 gallons of TCE and paint. Contaminants of concern are primarily solvents and metals. Asbestos is doubled bagged and buried, which significantly reduces risk to exposure of asbestos.

The Burning Ground (Site JPG-014), a 1/2 acre thermal treatment area used for the open burning of construction debris and waste propellants, is located immediately south of the Gate 19 landfill (Figure 4). The burning area, which was used between the 1950s and 1970s, reportedly also received trichloroethylene (TCE) and paint waste. Aerial photographs of the site show liquid-filled trenches and mounded material present. The area is currently overgrown with vegetation and the burning area is not readily discernable. Contaminants of concern are tetrachloroethylene and metals.

4.2.2 *Evaluation of the Groundwater Pathway*

Soil contamination as a result of improper disposal of solvents and paint residue is likely to be present. Groundwater contamination due to past disposal practices at the landfill are likely, particularly with the disposal of highly mobile spent solvents. Although they have a lower mobility, metals may also have migrated to the groundwater pathway. Groundwater flow is to the west-northwest which could result in off-site migration of contaminants to off-site drinking water supplies.

Surface and subsurface soil contamination related to solvents, paint residue, and ash from open burning is likely to be present at the site. Adjacent to the site is a pond which appears to be a discharge point for shallow groundwater. Contact of groundwater with the materials present in the former trenches would result in the contamination groundwater pathway. The spent solvents and metals are likely to be highly mobile in the groundwater environment.

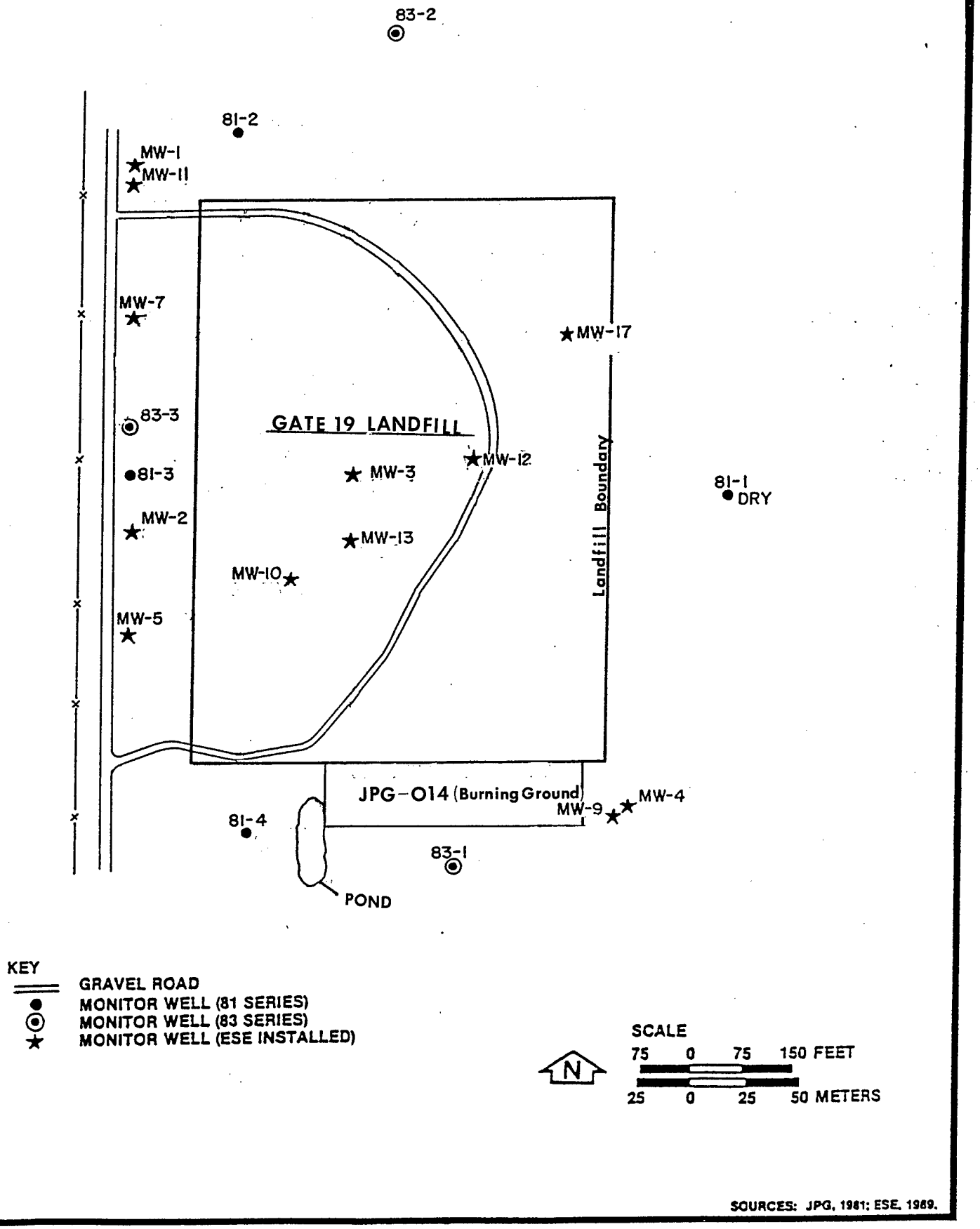

Figure 4. Gate 19 Landfill Site Monitoring Wells

4.2.3 *Evaluation of Existing Data*

An RI/FS was previously conducted at the Gate 19 Landfill site by Environmental Science and Engineering, 1989. During this investigation, 12 groundwater monitoring wells were installed to monitor any potential migration of contaminants from the landfill. The monitoring wells ranged from 30-56 ft. in depth, with the screened interval ranging from 20-54 ft. All screens were placed in limestone bedrock. ESE sampled the 12 wells in July 1988 and October 1988. In addition, wells 83-1 through 83-3 were sampled during the October sampling round. Chemical analysis consisted of base/neutral/acid extractable (BNA) compounds including pesticides and PCB, and lead. Analytical results from the sampling rounds indicated that groundwater contamination was insignificant or nonexistent. Additional groundwater analytical data are needed to detect any potential migration of contaminants from the landfill site since the previous sampling rounds.

Groundwater monitoring wells are also present at the Gate 19 Landfill immediately adjacent to the burning area. Monitoring wells located along the West Perimeter Road were intended to detect any contamination plume originating from the burning ground. To date, data from these wells indicate that no such contaminant plume exists. Additional groundwater analytical data are needed to determine if contamination exists in the area of the burning ground. A potential exists for off-site migration of contaminated groundwater to private drinking water supplies. Monitoring data collected to date do not indicate that contamination of the groundwater has occurred. Sampling proposed in this plan will be used to confirm the results of previous sampling.

4.3. DU Impact Area Groundwater Monitoring Wells

4.3.1 *Potential Contaminant Sources*

The DU Impact Area (Figure 5) covers about 2 square miles in the south central part of JPG north of the firing line between Wonju Road (east side) and Morgan Road (west side). Until 1984, tungsten alloy armor piercing ammunition was fired in the area. Since 1984, a depleted uranium alloy has been used in place of the tungsten, with approximately 50,000 kg of DU rounds being shot in the area. The depleted uranium ammunition may be a source of uranium contamination (U-238/U-235).

4.3.2 *Evaluation of the Groundwater Pathway*

Uranium contamination in soils may migrate to the groundwater pathway through leaching during precipitation/infiltration events.

4.3.3 *Evaluation of Existing Data*

Groundwater from 11 existing monitoring wells in the DU Impact Area has been collected and analyzed for uranium semi-annually since 1988. No significant concentrations of uranium have been detected.

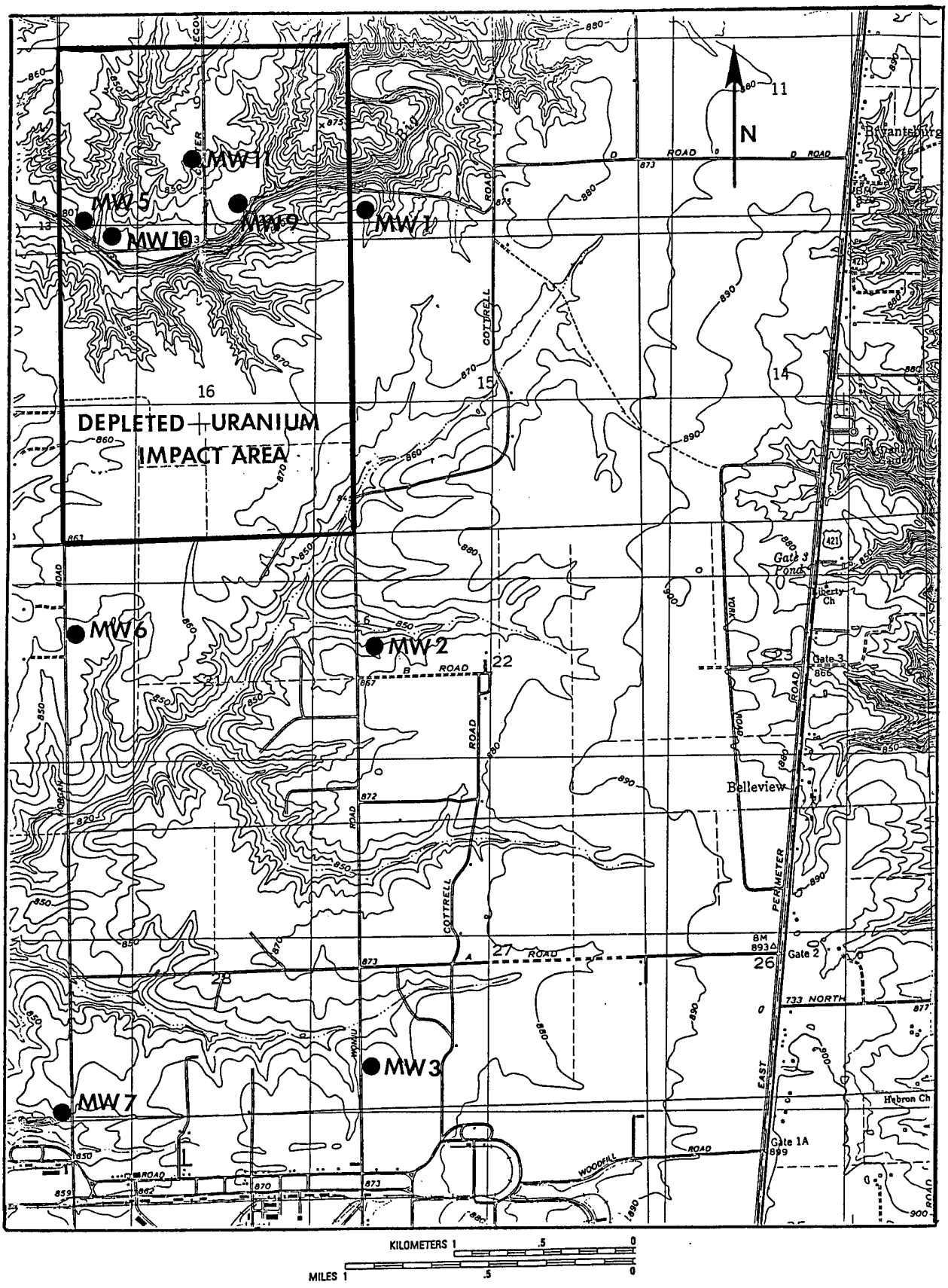

Figure 5. Depleted Uranium Impact Area and Groundwater Monitoring Well Locations

In addition to potential uranium contamination, explosives contamination may also be present in the DU Impact Area. The 11 existing groundwater monitoring wells have not been sampled and analyzed for explosives. Additional data are needed to evaluate the potential for explosives contamination in groundwater resulting from continuous firing of ammunition rounds into the area.

5.0 DATA NEEDS, QUALITY OBJECTIVES AND TECHNICAL APPROACH

Section 4.0 provided an assessment of the stream drainages and Gate 19 Landfill groundwater in terms of potential releases of contaminants to the surface water and groundwater environmental pathways, respectively, and the corresponding risks to human health and the environment. A review of previous investigations was also conducted to determine the need for the collection of additional data. Section 5.0 provides a summary of the identified data needs, data quality objectives, and the technical approach to data collection for those sites identified in Task Order 0002. Although the general technical approach to data collection is presented in this section, details of the field and laboratory procedures to be used are provided in the Site-Specific Sampling Design Plan.

Data Quality in this section is expressed in terms of levels established by the EPA to describe analytical levels that are appropriate for the different data uses under the RI/FS process. A Level I refers primarily to field measurements and field test kits that can provide an indication of contamination, but generally do not provide accurate concentration values. Level II uses instruments and techniques with the ability to identify specific analytes and assign a concentration. Level III generally corresponds to laboratory analysis using EPA CLP procedures with similar detection limits, but less rigid QA/QC requirements than CLP. Level IV refers to laboratory analysis using CLP procedures and protocols, with rigorous QA/QC. Data uses for this RI/FS site is limited primarily to site characterization and risk assessment activities. Evaluation of remedial action alternatives may require more data than proposed in this plan (i.e., accurate volume estimates of contaminants exceeding remedial action standards).

5.1 Major Stream Sampling and Analysis

5.1.1 *Data Needs*

To assess whether contaminants are entering the surface water pathway and exiting off-site due to past and present operations at JPG, surface water and stream sediments are needed at locations where major stream drainages exit JPG. To assess whether contaminants are present in stream drainages entering JPG from off-site sources of contamination, surface water and stream sediments are needed from locations where streams enter JPG. These samples should be analyzed for specific contaminants suspected on the basis of past and present land use and disposal practices. The sampling of surface water bodies (i.e., ponds and lakes) within JPG were not included in the present scope of work since the objective can be met utilizing entrance and exit points at JPG.

5.1.2 *Data Quality Objectives*

Since evaluations are being made to determine off-site versus on-site sources of contamination, a Level III data quality will be obtained for all surface water and sediment sample analyses. The

objective is not to characterize the extent of contamination, but is simply to determine if contamination exists and, if it exists, the probable source of the contamination. On the basis of the findings from the sampling effort, an assessment of the potential risks to human health and the environment will be made.

5.1.3 *Technical Approach*

One sediment sample and one surface water sample will be collected for each major stream drainage where it enters and exits the JPG Installation. These streams will include Otter Creek, Graham Creek, Little Graham Creek, Marble Creek, Big Creek, Middle Fork Creek, and Harberts Creek (Figure 6).

The samples to be collected at each location will analyzed for the following analytical parameters as specified in the Scope of Work, Task Order 0002:

ENTRANCE SAMPLES	ANALYTES
Herbicides:	2,4-Dichlorophenoxyacetic acid (2,4-D) 2,4,5-Triclorophenoxyacetic acid (2,4,5-T) 2-Chloro-4-ethylamino-6-isoproplyamino-5-triazine Pentachlorophenol Lithium salt of Bromacil, in ethylene glycol, ethanol and methanol (Hyvar X-L) 5-Bromo-3-sec-butyl-6-methyluracil (Bromacil)
Uranium:	Total Uranium
EXIT SAMPLES	
Herbicides:	As listed above
Explosives:	HMX RDX 2,4,6 Trinitrotoluene (TNT) Tetryl (2,4,6-Trinitrophenyl methylnitramine) Lead Azide Lead Monomitroresorcinate Mercury Fulminate Tetracene 2,4 Dinitrotoluene 2,6 Dinitrotoluene 2-Amino-4,6-Dinitrotoluene 1,3-Dinotrobenzene 1,3,5-Trinitrobenzene Diethylene Glycoldinitrate Trinitrate Nitrates Antimony Sulfide Nitroglycerin Nitroguanidine
Metals:	Target Compound List Metals
Uranium:	Total Uranium

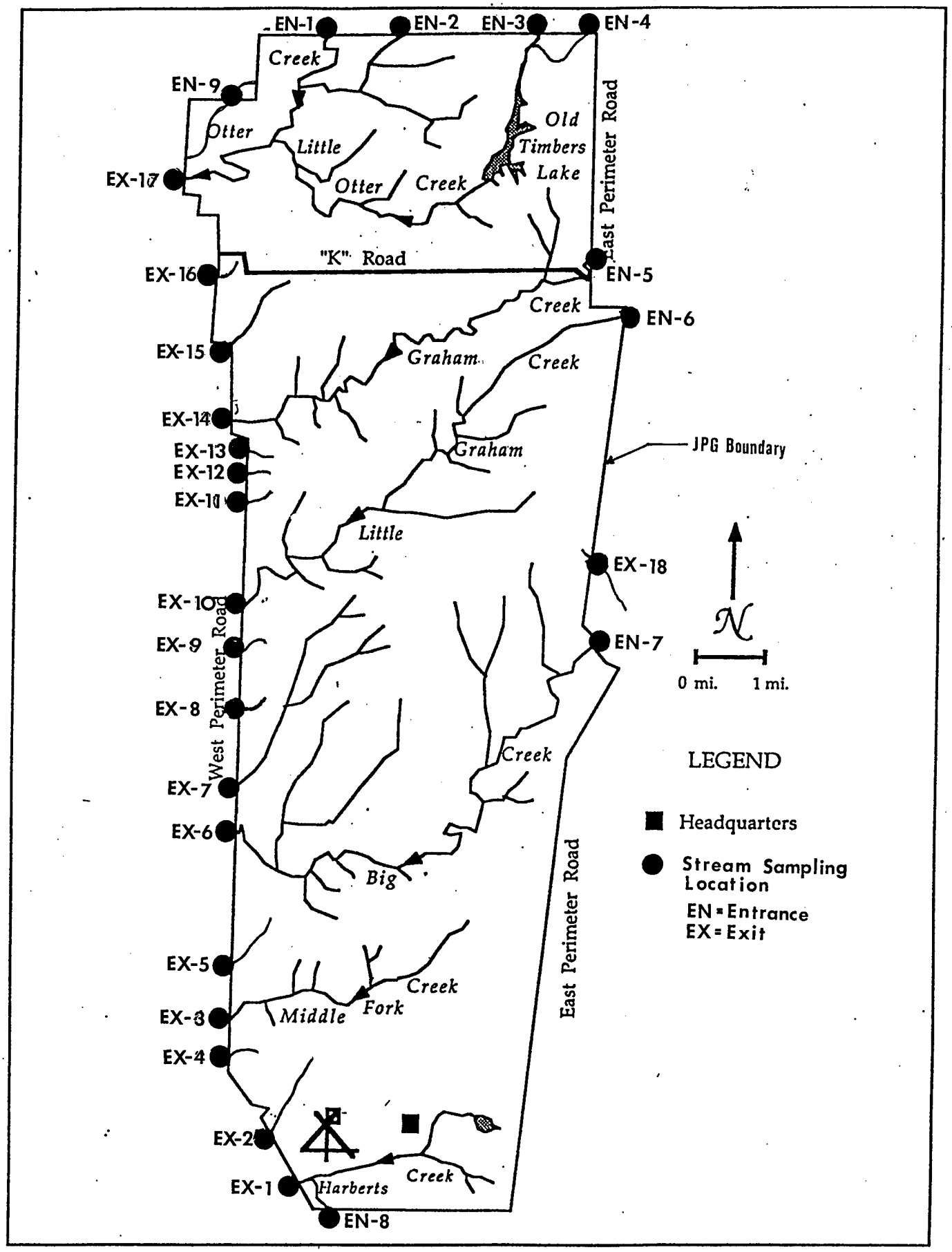

Figure 6. Stream Sampling Location Index Map

5.2 Gate 19 Landfill Groundwater Monitoring Well Sampling

5.2.1 *Data Needs*

Previous data from existing groundwater monitoring wells indicate that groundwater contamination related to the Gate 19 Landfill is insignificant to nonexistent. Migration of contaminants may have occurred since the last sampling round in October of 1988 (ESE, 1989). Additional sampling and analysis is needed to confirm the results of previous investigations.

No data currently exist that identify the location of reported disposal areas for solvents, pesticide containers, incinerator ash, polyurethane/methylene chloride waste, and red lead. Migration of contaminants from soils to the groundwater table may have occurred since 1988. Additional analytes will be analyzed for which were not included in previous rounds.

5.2.2 *Data Quality Objectives*

Sampling of existing monitoring wells will be conducted by CNES in January 1992. Results of this sampling effort will be evaluated along with results of previous sampling rounds to determine if additional groundwater monitoring is required. An evaluation of the existing wells will also be made in terms of proper construction and location to yield the necessary hydrologic data. Recommendations for the installation of additional wells or replacement of existing wells will be made on the basis of this evaluation.

5.2.3 *Technical Approach*

Sampling will be conducted at each monitoring well utilizing procedures described in Appendix A of the Site-Specific Sampling Design Plan. Samples will be analyzed for TCL Volatile Organic Compounds, TCL semi-Volatile Organic Compounds, and TCL metals.
An assessment of the adequacy of the current groundwater monitoring system at the Gate 19 Landfill will be made by a qualified hydrologist using all available information including borehole lithologic logs, monitoring well completion diagrams, water table surface contouring, and groundwater quality data. A letter report will be prepared with recommendations for further hydrologic investigations.

5.3 DU Impact Area Groundwater Monitoring Well Sampling

5.3.1 *Data Needs*

Existing monitoring wells in the DU Impact Area are routinely monitored for Uranium. Additional analyses are required, however, to determine if contaminants are present in groundwater as a result of explosives.

5.3.2 *Data Quality Objectives*

Sampling of the existing wells will be conducted by CNES in January 1992. Results of this sampling and analysis for explosives will be used to determine the need for future monitoring for explosives contamination.

5.3.3 *Technical Approach*

Sampling will be conducted according to procedures described in Appendix A of the Site-Specific Sampling Design Plan. Samples will be analyzed for explosives (see list of explosives for stream exit samples). Analytical results will be reviewed to determine the need for future monitoring for explosive contaminants.

6.0 RI WORK TASKS

The following section provides a summary description of the work tasks required to complete site-specific sampling and analysis at JPG, as described in the scope of work for Task Order 0002. These are presented as tasks and subtasks for each activity.

6.1 Task 1 - Project Planning

Work to be completed under the Project Planning Task includes the preparation of the work plans that will be the operating documents used in the completion of sampling and analysis activities. This task includes the process of USATHAMA review and contractor revision from draft to final versions.

6.1.1 *Subtask 1 - Site-Specific Technical Plan*

The Site-Specific Technical Plan provides an overall plan for conducting the sampling and analysis activities for the Streams and Gate 19 Landfill Area at JPG. The plan provides a brief description of location and environmental setting of the installation, provides a summary of site history and previous investigations, identifies the appropriate ARARs for the installation, provides conceptual site models, and summarizes the various work tasks required to complete the sampling tasks. Included is a summary of the proposed schedule (by duration) for completing these tasks.

6.1.2 *Subtask 2 - Site-Specific Sampling Design Plan*

On the basis of the work tasks identified in the above Technical Plan, the Sampling Design Plan provides the overall plan for conducting field investigations and laboratory analyses needed to satisfy the objectives of the proposed sampling and analysis tasks. The plan provides a detailed description of both field and laboratory methods and procedures to be used. It also provides maps showing the location of proposed field investigation activities (i.e., stream sampling

locations and monitoring well locations). Included are summaries of the number and types of samples and measurements required, sample identification numbers, analytical parameters, and QA/QC sample and measurement requirements. Appendices provide detailed procedures to be used.

6.1.3 *Subtask 3 - Quality Control Plan*

The Quality Control Plan to be used for this task is the RI/FS Quality Control Plan (Volume III) which describes the methods and procedures to be used to ensure that quality data is generated during the RI/FS with emphasis on precision, accuracy, and completeness. It also describes the project organization and responsibilities as they relate to Quality Assurance and Quality Control. The plan is formatted in such a way that it meets the requirements of the 14 elements specified in EPA guidance for conducting RI/FS under CERCLA (EPA, 1988) as well as meeting the requirements of the USATHAMA Quality Assurance Program (USATHAMA, 1990). It includes such items as the control of documents, calibration and maintenance of equipment, chain-of-custody requirements, analytical QA/QC requirements, corrective action procedures, procedures for the assessment of data quality, and requirements for audits and surveillance of RI/FS activities.

6.1.4 *Subtask 4 - Health and Safety Plan*

The Health and Safety Plan to be used is the RI/FS Health and Safety Plan (Volume IV) which describes the health and safety requirements for contractor and subcontractor personnel while conducting work at the entire JPG installation. The plan incorporates, as necessary, all federal (i.e., OSHA and USATHAMA), state, local, and installation-specific health and safety requirements. The plan meets the requirements of 29 CFR 1910.120. The health and safety plan identifies hazards and methods to control those hazards, assigns personnel responsibilities for health and safety, provides details of the medical program to be used, and the training requirements for the project. The plan also establishes procedures for personal protective equipment, access control, and decontamination procedures. Material Safety Data Sheets (MSDS) are provided for contaminants known to be present at identified sites at JPG.

6.2 Task 2 - Field Investigations

Detailed descriptions of field techniques to be used for field sampling are presented in Appendix A of the site-specific Sampling Design Plan.

6.3 Task 3 - Sample Analysis/Validation

Details of the methods of sample analysis and validation activities are provided in the site-specific Sampling Design Plan. All methods will be USATHAMA-certified methods and will also meet or exceed the equivalent EPA analytical procedures (i.e., SW-846 or CLP). To ensure the accuracy and validity of analytical data, the RI/FS Quality Control Plan (Volume III) will be used. This plan provides a description of quality assurance/quality control (QA/QC)

procedures that will be followed for all sampling and analysis activities at JPG. Requirements for the number and type of QA/QC samples to be taken in support of field activities at JPG are also presented in the Site-Specific Sampling Design Plan.

6.4 Task 4 - Data Evaluation

After data have been entered into the USATHAMA IRDMIS data management system and have been validated, data obtained from field investigation activities as well as previous investigations will be evaluated for later use in assessing risk to human health and the environment. Recommendations will also be developed for additional data collection needs where data gaps are found to occur. Examples of the types of data to be collected and evaluated include:

- Field Water Quality Data
- Field Toxic Gas or Vapor Monitoring
- Daily Field Observation Logs
- Water Level Data
- Laboratory Analyses of Ground and Surface Water Samples
- Laboratory Analyses of Sediment Samples

The data will be organized into discrete field data files and will be evaluated and processed to provide the following information:

- Aquifer-thickness Maps
- Groundwater-level Maps
- Groundwater Contaminant Flow Maps
- Contaminant Concentration Contour Maps
- Calculation of Groundwater Flow Parameters
- Sample Location Plots showing Contaminant Concentrations

6.5 Task 5 - Assessment of Risks

An assessment of risks will be conducted for the surface water environmental pathway at JPG and the groundwater pathway associated with the Gate 19 Landfill area associated with the release of contaminants in the absence of any remedial action. This assessment will be used as a basis for determining whether any further investigation is warranted or remedial action is required. The components of the assessment will be:

- Selection of indicator chemicals
- Assessment of contaminant concentrations and comparison of projected exposure point concentrations to applicable or relevant and appropriate requirements (ARARs).
- Estimation of human intakes
- Evaluation of toxicity of indicator chemicals
- Quantitative characterization of risk

The determination of indicator chemicals will be based on selecting those chemicals or contaminants that pose the greatest potential risk to public health from all contaminants identified as having been released to the surface water and groundwater environments at site-specific locations at JPG. Generally, these chemicals represent the most toxic, mobile, and persistent chemicals at the site, or those found in the largest amounts.

The contaminants and their concentrations at the point of potential exposure will be compared with the local, state, and federal ARARs to determine if they exceed the mandatory or recommended maximum concentrations.

Estimates of human uptake of the indicator chemicals will be based on the size of the population and proximity to the potential exposure point for each contaminant pathway, as well as predictions of the type of exposure (i.e., ingestion, inhalation, adsorption).

The physicochemical properties of the indicator chemicals will be reviewed as they relate to potential harm to human health. The chemicals are usually classified as toxic, hazardous, or carcinogenic, and have established exposure limits. These exposure limits will be compared with the concentrations and anticipated lengths of exposure for human receptors of contaminants present at JPG.

The quantitative characterization will utilize all of the above information which will be entered into a computer data base, and both on-site and off-site quantification of risk will be calculated using formulas contained in the EPA's Risk Assessment Guidance for Superfund: Environmental Evaluation Manual (EPA, 1989b). Calculations will be made on both the "worst case" and "most probable case" and compared to the EPA's "acceptable risk" threshold.

In addition to public health, a qualitative assessment, fashioned after U.S. Department of Interior, Type B evaluations (43 CFR 11, Subpart E, U.S. DOI, 1986), of the risks to the environment will be conducted. This will include an assessment of risk to terrestrial ecosystems and aquatic ecosystems at or near JPG. If sufficient evidence of a significant risk to the environment exists as a result of the assessment, biological sampling may be required as part of the future field activities.

7.0 PROJECT SCHEDULE

The proposed work schedule for conducting sampling and analysis activities at JPG. This schedule is as follows:

- Mobilization - January 13, 1992
- Stream Sampling - January 14-17, 1992
- Groundwater Sampling - January 14-22, 1992
- Sample Analysis - January 15 - February 28, 1992
- Data Packages (Level 2) - March 15, 1992
- Letter Report - March 30, 1992

8.0 REFERENCES

Ebasco Environmental, 1990a. Enhanced Preliminary Assessment Report: Jefferson Proving Ground, Madison, Indiana; prepared for U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland, March 1990.

Ebasco Environmental, 1990b. Master Environmental Plan: Jefferson Proving Ground, Madison, Indiana; prepared for U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland, November 1990.

Environmental Science and Engineering, Inc., 1989. Remedial Investigation at Jefferson Proving Ground, Draft Technical Report A011; prepared for U.S. Army Toxic and Hazardous Materials Agency, Aberdeen Proving Ground, Maryland, January 1989.

Hartke, E. J., 1989. Geology of Jefferson Proving Ground; Indiana Department of Natural Resources.

U.S. Army Corps of Engineers, 1988. RCRA Part B Permit Application for Open Burning/Open Detonation; Nashville, Tennessee.

_____, 1991. Closure of Jefferson Proving Ground, Indiana and Realignment to Yuma Proving Ground, Arizona: Environmental Impact Statement (Vol. 1 & 2); prepared by the Louisville District.

USAEHA, 1988. Interim Final Report, Ground Water Contamination Survey No. 38-26-0306-89, Evaluation of Solid Waste Management Units, Jefferson Proving Ground, Madison, Indiana.

U.S. Department of Agriculture and Soil Conservation Service, 1985a. Soil Survey of of Jennings County, Indiana.

_____, 1985b. Soil Survey of Ripley County and Part of Jennings County, Indiana.

_____, 1985c. Soil Survey of Jefferson County, Indiana.

U.S. Department of Interior, 1985. An Archeological Overview and Management Plan for Jefferson Proving Ground, Jefferson, Jennings, and Ripley Counties, Indiana; National Park Service, Contract No. CX-5000-3-0771.

U.S. Environmental Photographic Interpretation Center (EPIC), 1986. Installation Assessment Relook Program Working Document, Jefferson Proving Ground, Madison, Indiana; Warrenton, Virginia, TS-PIC-85X.

U.S. Environmental Protection Agency (EPA), 1986. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, November 1986.

_____, 1988. Draft Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA; OSWER Directive 9335.3-01.

_____, 1989a. Risk Assessment Guidance for Superfund, Vol. I: Human Health Evaluation Manual (Part A); EPA 540/1-89/001.

_____, 1989b. Risk Assessment Guidance for Superfund, Vol. II: Environmental Evaluation Manual; EPA 540/1-89/002.

_____, 1990. Environmental Audit: Jefferson Proving Ground, Madison, Indiana; prepared by the National Enforcement Investigations Center, Denver, Colorado, April 1990.

Corrections

USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

ADDENDUM

TO

JEFFERSON PROVING GROUND

SITE-SPECIFIC TECHNICAL PLAN

Prepared for

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY (USATHAMA)
ABERDEEN PROVING GROUND, MARYLAND

CONTRACT NO. DAAA-90-D-0007

Prepared by

SEC Donohue, Inc.
Grand Junction, Colorado

June 9, 1992

Addendum to the Plan

1. In Section 1.0, INTRODUCTION, page 1, the first bullet reads:

   "• Define the extent and magnitude of possible environmental contamination originating on and exiting from JPG via the surface water pathway."

   Change to:

   "• Identify possible environmental contamination originating on and exiting from JPG via the surface water pathway."

   Comment: It was not within the scope of work to determine extent and magnitude of contamination.

2. In Section 1.0, INTRODUCTION, page 1, the second bullet reads:

   "• Assess human health and environmental risk associated with this contamination."

   Change to:

   "• Compare contamination levels to criteria for protection of human health or the environment."

   Comment: The replacement bullet satisfies the meaning of the Objectives in the Delivery Order.

3. In Section 1.1., page 2, line 2 now reads:

   "Section 6.0 RI Work Tasks"

   Change to:

   "Section 6.0 Site-Specific Sampling Work Tasks"

   Comment: Typo

4. In Section 2.3, page 6, paragraph 3, line 3 now reads:

   "in the RI/FS Technical..."

   Change to:

   "in this Site-Specific Technical..."

   Comment: Typo

5. In this same paragraph, make the changes to the first and third bulleted items identified in comment numbers 1 and 2 above.

6. In Section 4.1.3, page 18, lines 1 and 2 now read:

   "...the potential risks to human health and the environment."

   Change to:

   "...to determine if contamination levels would be hazardous to human health or the environment."

7. In Section 5.0, page 22, second paragraph, line 8, delete the following sentence:

   "Data uses for this RI/FS...assessment activities."

   Comment: Not within the scope of this Task Order because it is applicable to the RI/FS activity.

8. In Section 6.0, page 26, heading now reads:

   "RI Work Tasks"

   Change to:

   "Site-Specific Work Tasks"

   Comment: Typo

9. In Section 6.4, page 28, first paragraph, second bullet, add the following:

   "(Only breathing zone for personnel protection)"

   Comment: This bullet is not intended to provide data for the air pathway of a Baseline Risk Assessment.

10. In Section 6.4, page 28, second paragraph, revise the bullets as follows:

    "• Groundwater Level Maps"
    "• Location Plots for Groundwater and Streams showing sample location and contamination levels at each sample point."

    Comment: The maps and calculations listed as bullets in this section are applicable to an RI activity. None of the bullets listed in this section, with the possible exception of the last item, can be provided from the data obtained in this Task Order.

11. Delete Section 6.5 in its entirety and replace with the following:

"**6.5 Task 5 - Identification of Hazardous Contaminants and the DU Impact Area**

An evaluation will be conducted for the surface water environmental pathway at JPG, the groundwater pathway associated with the Gate 19 Landfill area, and the DU Impact area associated with the release of contaminants in the absence of any remedial action. This evaluation will be used as a basis for identifying hazards and whether any further investigation is warranted. The components of the evaluation will be:

- Identification of contaminants of concern;
- Comparison of contaminant concentrations to appropriate MCLs, as listed in Table 2 of the Site-Specific Technical Plan.
- Identification of toxic levels for each contaminant of concern;
- Identification of potential hazards to human or environmental populations.

The determination of chemicals of concern will be based on those chemicals or contaminants identified in the scope of work and whose analysis values exceed established limits.

The contaminants and their concentrations at the sample location will be compared with the local, state, and federal MCLs to determine if they exceed the mandatory or recommended maximum concentrations.

The physicochemical properties of the indicator chemicals will be reviewed as they relate to potential harm to human health. The chemicals are usually classified as toxic, hazardous, or carcinogenic, and have established exposure limits. These exposure limits will be compared with the concentrations of contaminants present at JPG.

The identification of hazards to human and environmental populations will address the health effects for receptor intake from the EPA perspective to cover the worker and general population. It will also identify the intake mechanisms such as inhalation, ingestion, or absorption of those contaminants that might result in an exceedance of a regulatory level."