



*Remediation Waste Disposal Project
Defense Logistics Agency (DLA)
New Haven, Indiana*

RADIOLOGICAL WORK PLAN

Revision 1

June 2004

Prepared by

Pangea Group
743 Spirit 40 Park Drive
Suite 232
Chesterfield, Missouri 63005

For the

U.S. DEPARTMENT OF DEFENSE
DEFENSE NATIONAL STOCKPILE CENTER
New Haven Depot
15411 Dawkins Road, New Haven, Indiana 46774
Under Contract DLA 2003-006

Summary of Changes

This *Radiological Work Plan* (RWP) has been revised to incorporate changes that are required because of changed circumstances. The changed sections are identified in the text.

Addendum Number	Date	Comments
Revision 0	February 2004	New Document
Revision 1	June 2004	Incorporated changes required because of changed circumstances.

REMAINDER OF PAGE INTENTIONALLY BLANK

Abstract

The *Radiological Work Plan* (RWP) has been prepared for the United States Department of Defense (DOD), Defense Logistics Agency (DLA) *Remediation Waste Disposal Project* at the Defense National Stockpile Center facility located in New Haven, Indiana under U.S. Army Joint Munitions Command Task Order No. DLA 2003-006. This plan has been developed to comply with the requirements and provisions of the Contract. The RWP presents a description and the basis for implementing work practices at the site, and will serve as a general source of information and guidance for project personnel during the conduct of remedial activities at the site.

REMAINDER OF PAGE INTENTIONALLY BLANK

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Summary of Changes.....	i
Abstract.....	ii
1. SIGNATURE SHEET.....	1
2. BACKGROUND INFORMATION.....	1
2.1 Project Background and Introduction.....	2
2.2 Purpose.....	2
2.3 Project Objectives.....	3
2.4 Scope.....	7
2.5 Description of Work.....	7
2.6 Remediation Goals.....	8
2.7 Estimated Remediation Quantities.....	8
3. POLICY STATEMENT.....	9
4. RESPONSIBILITIES AND LINES OF AUTHORITIES.....	10
4.1 Project Organizational Structure.....	11
4.2 Authority and Responsibility.....	11
4.2.1 EH&S Manager.....	13
4.2.2 Corporate Quality Director (CQD).....	13
4.2.3 Project Manager (PM).....	13
4.2.4 Project Superintendent (PS).....	13
4.2.5 Site Safety and Health Officer/Radiation Safety Officer(SSHO/RSO).....	13
4.2.6 Project Quality Control System Manager (QCSM).....	14
4.3 Responsibilities of Subcontractors and Suppliers.....	14
5. MOBILIZATION.....	14
5.1 General.....	15
5.2 Office Trailer and Utilities.....	15
5.3 Decontamination Facilities.....	15
5.4 Radiation and Contamination Instrumentation.....	18
5.5 Topographical Survey.....	19
5.6 Clearing and Grubbing.....	19
5.7 Soil/Waste Excavation and Loading.....	19
5.8 Heavy Equipment.....	19
5.9 Personnel.....	20
5.10 Coordination with Local Agencies.....	20
6. SITE CONTROL MEASURES.....	20
7. WASTE MANAGEMENT.....	22
8. DEMOBILIZATION.....	23
9. PROJECT CLOSURE REPORT.....	24
10. DOCUMENTATION.....	25
11. REFERENCES AND RELATED DOCUMENTS.....	26
12. ACRONYMS.....	27
	28

TABLE OF CONTENTS

SECTION

PAGE

12.1 List of Acronyms.....28

APPENDIXES

A Project Schedule

REMAINDER OF PAGE INTENTIONALLY BLANK

LIST OF FIGURES

<u>NUMBER</u>	<u>PAGE</u>
Figure 2-1 Project Location and Vicinity Map	5
Figure 2-2 Work Site Map	6
Figure 4-1 Project Organizational Structure	12
Figure 5-1 Site Layout for the Removal Action.....	17

REMAINDER OF PAGE INTENTIONALLY BLANK

1. SIGNATURE SHEET



DLA 2003-006

*Remediation Waste Disposal Project
Defense Logistics Agency (DLA)
New Haven, Indiana*

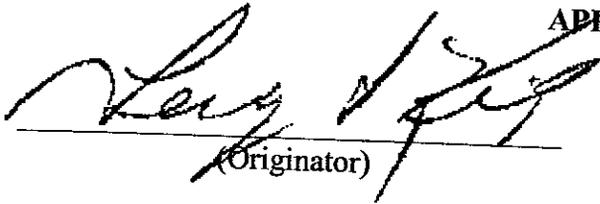
PLAN TITLE:

RADIOLOGICAL WORK PLAN

Revision 1

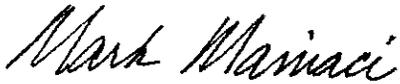
June 2004

APPROVALS



(Originator)

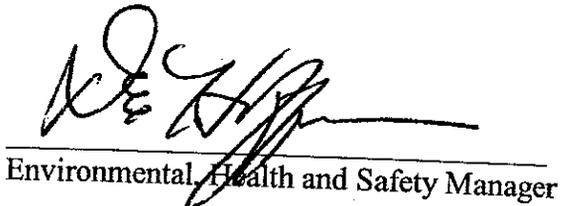
6/24/04
Date



Mark Maniaci

Project Manager (PM)

6/24/04
Date



Environmental Health and Safety Manager

6/24/04
Date

2. BACKGROUND INFORMATION

2.1 Project Background and Introduction

The US Army Joint Munitions Command (JMC) has contracted Pangea Group (Pangea) to provide services for the removal of unwanted radioactive materials from the DLA Defense National Stockpile Center Depot located in New Haven, Indiana, under Task Order No. 2003-006. The work will involve excavation, profiling and packaging of approximately 2,500 cubic yards of radioactively contaminated soils and miscellaneous debris. Other activities include transportation and disposal of the waste at U.S. Ecology-Grandview, Idaho.

The site (268 acres) is located three miles east of New Haven, IN at 15411 Dawkins Road. It is currently owned by the General Services Administration (GSA), and operated by the DOD Defense Logistics Agency (DLA), Defense National Stockpile Center. Figure 2-1 is a *Project Location and Vicinity Map* and Figure 2-2 is a *Work Site Map*.

The site has been used historically for the purpose of storing metallurgical ores and materials necessary for manufacturing defense materials or strategic materials used in national defense. The site is currently an active storage depot, engaged in the storage of various materials, including metallic ores, refined metals, minerals substances such as fluorspar and certain natural organic materials such as tannin extract.

The site includes a series of rail spurs extending from the Norfolk Southern rail line, which crosses the site along its east-west axis, converging at the sites southwestern and southeastern corners. The site is surrounded by a six foot high fence topped with barbed wire and is controlled by a site security officer.

Prior to October 2000, the facility stored two piles of baddeleyite ore containing natural uranium and thorium. Baddeleyite ore is comprised of natural zirconium oxide found in Brazil and Sri Lanka (Ceylon). A typical assay for this material is reported as 0.204 wt % U and 0.091 wt % Th. The two piles designated as 111 and 111A were located in open area "7A" in the northwest corner of the depot (see Fig 2-2). The ore was in the form of stones, (rocks and pebbles) and was not subject to dispersal, as would a powder or other fine-grained material. The original piles have been removed; however, residual material remains on the footprint of the storage piles. The area of concern is approximately 940 feet by 120 (112,800 sq. ft.). Initial characterization efforts conducted by DLA in 2001 indicate that radiological contamination has not migrated into the existing soil beyond 15 cm (6 inches) in depth. The soils, railroad tracks and other miscellaneous debris located in the above-described area will be removed and disposed at an US Ecology Waste Facility in Grandview, ID. The US Ecology facility is permitted, with Idaho Department of Ecology concurrence, to receive wastes that are exempted from the Nuclear Regulatory Commission (NRC) regulations by rule, order, license or letter of interpretation. US Ecology has reviewed analytical data on the described wastes and is prepared to accept the wastes based upon the above criteria.

The exemption is implied in the NRC approval letter dated April 7, 2004 to "F. Kevin Reilly, Director, Directorate of Environmental Management, Defense Logistics Agency" from James Schmidt, Nuclear Materials Safety Branch 2, Division of Nuclear Materials Safety, NRC. The letter states:

"This is in reference to your letter dated March 1, 2004 that included the Health and Safety Plan, the Radiological Work Plan, and the Radiation Safety program to be used for remediation activities at the Defense Stockpile Center located in New Haven, Indiana. These Documents are accepted without comment."

Based on the initial site characterization sampling conducted in June 2003, the primary radionuclides present are natural uranium and natural thorium. The analytical data appears to indicate that U-238, measured up to 335 pCi/g, is in secular equilibrium with its daughter products. In addition, Th-232, measured up to 35 pCi/g, also appears to be in secular equilibrium with its daughter products. The fact that the U-238 and Th-232 series radionuclides appear to be in secular equilibrium with their respective progeny is consistent with the history of the site, i.e., that only raw (unprocessed) ores were known to be stored in Area 7A of the site.

Radiological action levels are summarized in the following Table 2-1.

2.2 Purpose

This *Radiological Work Plan* (RWP) has been developed in conformance with the requirements and provisions of the Contract (T.O. Description of Work, DLA 220-006). The RWP provides a detailed description of the work to be performed by Pangea at the *DLA Remediation Waste Disposal* Project.

This RWP is to be used in conjunction with the applicable portions of the Health and Safety Plan (HASP) prepared for this Project, which addresses radiological and industrial/construction safety requirements that will apply to the work.

The RWP is intended to supplement the Client's contract documents, not supersede them. The RWP fulfills general criteria covered under the applicable (Federal, State, and local) regulations as well as Pangea corporate Plans and Standard Operating Procedures (SOPs). It also conforms to current industry practices and standards. Refer to Section 11, *References and Related Documents* for details.

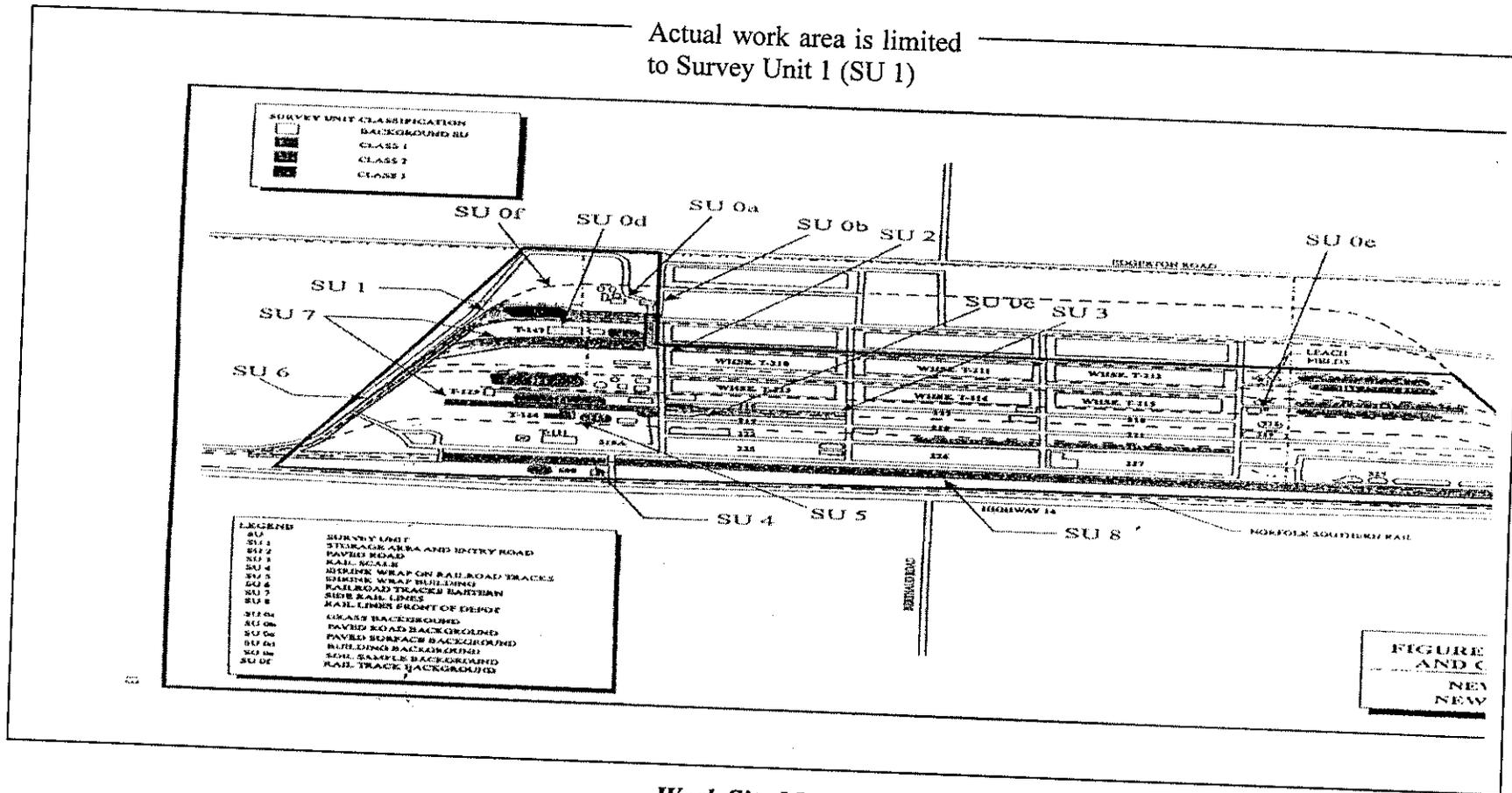
REMAINDER OF PAGE INTENTIONALLY BLANK

Table 2-1 Radiological Action Levels for the DLA New Haven Site Remediation Project

Instrument Reading	Location	Duration	Action	Personal Protective Equipment
External Gamma Radiation – Micro R Meter				
> 2 mrem/hr above site background	Point of entry or operations	Any duration	Suspend work in the affected area; reevaluate instrument response to check source; notify Corporate EH&S Mgr; investigate potential sources of elevated radioactivity	N/A
Radiological Surface Contamination (Direct) – G-M Survey Meter and Alpha Scintillation Counter				
> 1000 dpm/100cm ² (20% of Reg. Guide 1.86 Criteria for natural uranium)	Support areas adjacent to the work zones	≥1 minute	Assess extent of removable activity; reevaluate contamination control measures as appropriate; Identify source and remediate as appropriate.	NA
Radiological Surface Contamination (Removable) – Wipe Samples Analyzed via Zinc Sulfide Scintillation Counter				
> 100 dpm/100cm ² (10% of Reg. Guide 1.86 Criteria for natural uranium)	Support areas adjacent to the work zones	Obtain MDA <50% of Action Level	Determine extent of removable activity; restrict access; reevaluate contamination control measures as appropriate; demarcate area of contamination; initiate cleanup of affected area.	Protective shoe covers and gloves are the minimum requirements for personnel entering the affected area.
Work Zone Airborne Radioactivity – Based on alpha activity from air samples collected in the work zone				
≥10 % of DAC for Natural U	Inside Work Zone	8-hour sample	Reevaluate dust control measures	Implement respiratory protection as required
≥10% of DAC for Natural Th	Inside Work Zone	8-hour sample	Reevaluate dust control measures	Implement respiratory protection as required
Work Zone Perimeter Airborne Radioactivity – Based on alpha activity from air samples collected at the work zone perimeter				
2% of DAC for Natural U and Th	Work Zone Perimeter	8-hour sample minimum	Reevaluate dust control measures	NA

REMAINDER OF PAGE INTENTIONALLY BLANK

Figure 2-2 Work Site Map



*Work Site Map
 Remediation Waste Disposal Project
 Defense Logistics Agency (DLA)
 New Haven, Indiana*

2.3 Project Objectives

Five primary objectives have been identified for the Defense Logistics Agency (DLA) *Remediation Waste Disposal* Project. They are:

- Profile, excavate, and package approximately 2500 cubic yards of radioactively contaminated soils and miscellaneous debris.
- Conveyance of radioactive waste from New Haven, Indiana to the U.S. Ecology Radioactive Waste Disposal Site in Grandview, Idaho.
- Removing the unwanted radioactive materials from the New Haven site to allow the area of concern to meet the NRC unrestricted release criteria.
- Meet or exceed stakeholder expectations.
- Carry out the project while ensuring the safety and health of the workers, DLA site personnel, the environment, and the surrounding community and with zero accident/incident performance.
- Complete all work using ALARA principles while protecting wetlands and surface waters by control of contaminated runoff.
- It is the policy of Pangea to conduct its radiological operations in a manner that ensures the health and safety of all its employees and the general public. In achieving this objective, Pangea shall ensure that radiation exposures to its workers and the public and releases of radioactivity to the environment are maintained below regulatory limits and deliberate efforts are taken to further reduce exposures and releases as low as reasonably achievable. Pangea is fully committed to implementing a radiological control program of the highest quality that consistently reflects this policy.

2.4 Scope

The requirements of this RWP apply to all services provided by Pangea under the above referenced contract.

This RWP includes a description of the work, including site background/history; mobilization; excavation and removal methods; topological surveys; waste characteristics; waste packaging, transportation and disposal; radiological survey methods; personnel and equipment decontamination; emergency response; and schedule of project activities.

This RWP may be augmented and supported through the use of site-specific or activity-specific procedures and/or plans where necessary. The RWP and supporting documentation, such as the

site-specific Health and Safety Plan (HASP) are intended to be used as management tools to ensure that work activities are executed in a manner that provides the Client with an end product that meets environmental protection, safety and quality expectations.

2.5 Description of Work

The project site work will include the following tasks and general sequence:

- Mobilization
- Pre-excavation topographical survey
- Waste profiling for disposal
- Clearing and grubbing
- Soil/waste excavation
- Waste packaging and loading
- Waste Transportation and disposal at U.S. Ecology – Grandview, ID
- Radiological Clearance Survey
- Post-excavation topographical survey
- Demobilization

Minor variations in the above described scope of work and/or sequencing of activities may occur during the course of the project. However, if hazards change as a result of a change in work scope or methods, an addendum will be developed and submitted to the Client for approval.

In all cases of changing hazards or undefined hazards it is the responsibility of project personnel to suspend work activities and notify client and site personnel.

A detailed *Project Schedule* is provided in Appendix A. Dave needs to supply the schedule

2.6 Remediation Goals

The type and extent of the potential chemical hazards expected on this project site are summarized in the HASP (Ref. 5) prepared for this project.

Pangea will remove and dispose of the baddeleyite contaminated soils and debris identified in the Task Order Scope of Work. Upon completion of the initial excavation and debris removal the area will be surveyed using a 2" x 2" sodium iodide scintillation detector. Areas that exceed a gamma count rate that is at or above two times normal background gamma count rate for the area or other approved investigation level will be marked with spray paint or other method. Remediation of those areas, if present, is beyond the original scope of this project and will be considered as a changed condition. Client approval will be required prior to any excavation below the initial 6-inch depth.

2.7 Estimated Remediation Quantities

Based upon the anticipated scope of the work, the volume of radioactive material (soils and miscellaneous debris) that will require disposal is estimated to be approximately 2500 cubic yards. The radiological wastes will be shipped via gondola rail car to U.S. Ecology disposal facility located in Grandview, Idaho.

REMAINDER OF PAGE INTENTIONALLY BLANK

3. POLICY STATEMENT

This *Radiological Work Plan* (RWP) is developed to provide Pangea with a sound project management baseline from which to execute the project work. The Pangea goal is to deliver to the Client a quality environmental remediation project. Pangea is committed to a Continuous Improvement Program to improve both our services and the processes we use to provide these services. Achievement of this goal requires excellence in planning, executing, assessing performance, and improving the performance of our work. We will draw from, and implement appropriately, lessons learned from other projects, other team members, as well as from technological advancements.

It is the policy of Pangea that all operations performed by the company or under its control be conducted in a sound manner that will ensure compliance with applicable Federal, State, and local laws and regulations; executive orders; and the Client's directives.

The Pangea Environmental, Health and Safety (EH&S) Manager or Quality Control Director (CQD) or designee has the organizational freedom, authority and responsibility to ensure implementation of this plan, to identify potential quality, safety and health deficiencies to initiate actions that result in solutions, and to verify implementation of solutions.

The RWP is written to conform to Pangea's Corporate Plans (Ref. 2, 3, and 6) and applicable SOPs and to work in conjunction with the quality, environmental, health and safety needs and requirements of the project and the Client. The RWP will be modified as necessary to fully satisfy these objectives. If a conflict or overlap is identified between this document and those referenced herein, the more protective requirement shall govern the work. Pangea is responsible for all activities necessary to manage, control, and document work so as to ensure compliance with contract plans and specifications.

Corporate procedures and other applicable federal guidance documents and directives will be used to direct the projects. For full listing of documents, refer to Pangea *Health and Safety Program Manual* (Ref. 2), the QAPP (Ref. 4), and *Radiation Safety Program* (Ref. 6)

Pangea has developed corporate procedures to implement the processes described in the *H&S Program Manual* (Ref. 2), *QAPP* (Ref. 4), and *RSP* (Ref. 6) as well as project specific Plans. Forms to be used during the execution of work and control activities are included in corporate or project implementing procedures corresponding to the work or control activities.

Unless otherwise specified in the contract documents, for detailed specifics for implementation and appropriate forms to be used, refer to Pangea H&S System SOPs in the series 7-IH-XX and 7-SA-XX and Quality SOPs in the series 5-QA-XX.

4. RESPONSIBILITIES AND LINES OF AUTHORITIES

This section describes the requirements and responsibilities of personnel associated with the execution of all contract work activities.

The project organizational structure, staffing, training requirements, and functional responsibilities are well described in Pangea HASP (Ref. 5) prepared for this project. As such, they are not duplicated here. However, a brief summary of the same is presented below.

4.1 Project Organizational Structure

The organization established for the implementation of Pangea Safety, Quality and Project Management programs is illustrated/provided in Figure 4-1, *Project Organizational Structure*.

The primary function of the organization is to ensure that all work is completed to the satisfaction of the Client and within the contractual and regulatory requirements. The organization shall also ensure that only qualified personnel are assigned to the project and that sufficient procedures are in place to carry out the project.

The following Pangea key individuals are responsible for process implementation and/or execution of work at the site:

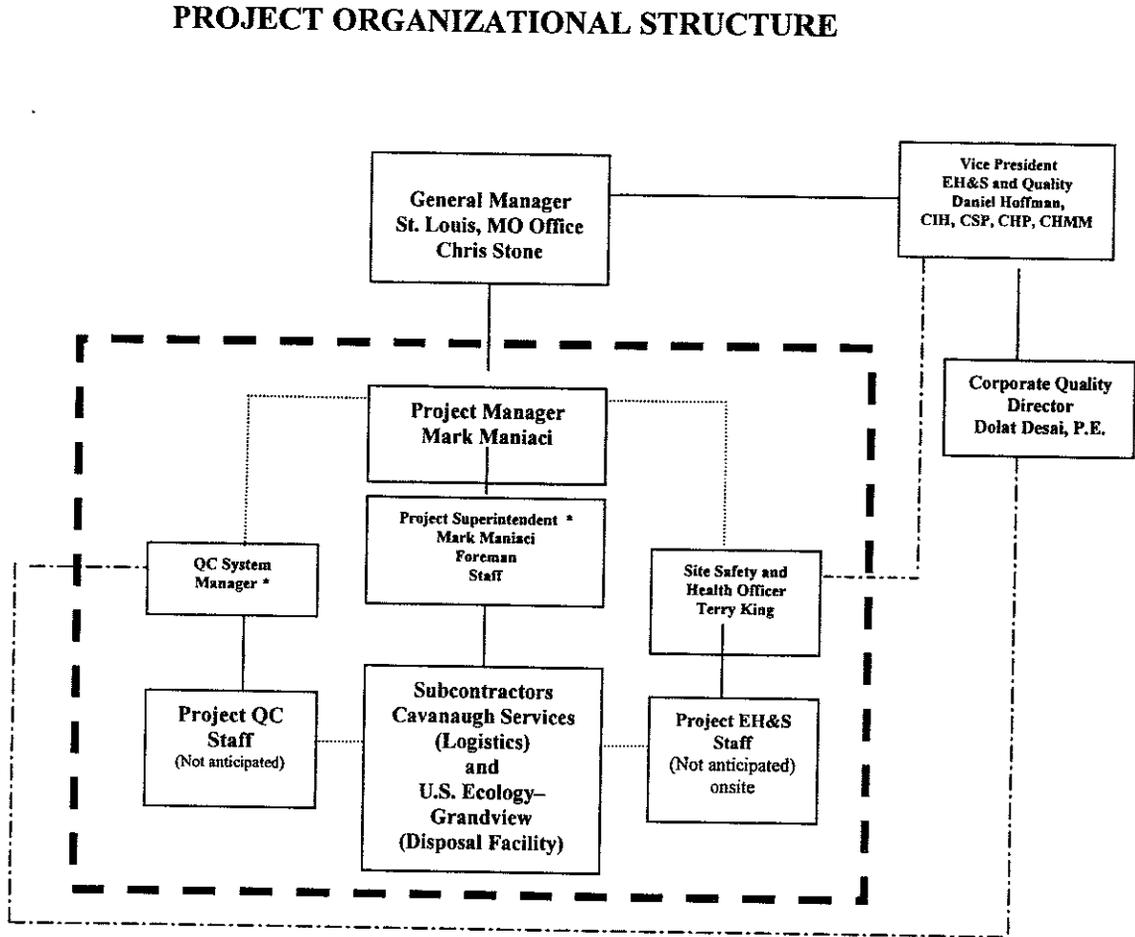
- Environmental, Health and Safety (EH&S) Manager – Dan Hoffman
- Corporate Quality Director (CQD) – Dolat Desai
- Project Manager (PM) – Mark Maniaci
- Site Safety and Health Officer (SSHO/RSO) – Terry King
- Project Superintendent – Mark Maniaci
- Occupational Physician – Dr. Shelby Kopp

The Project Superintendent will also perform the role of a Contractor Quality Control System Manager (CQCSM) on this project.

Resumes for Mr. Hoffman, Mr. Desai, Mr. Maniaci, and Mr. King are included in Pangea HASP (Ref. 5) prepared for this project.

REMAINDER OF PAGE INTENTIONALLY BLANK

Figure 4-1 Project Organizational Structure



* Same Individual

4.2 Authority and Responsibility

4.2.1 EH&S Manager

The EH&S Manager's responsibilities include the following:

- Approval, oversight, and enforcement of the HASP
- Assist in providing training and other EH&S resources, as required
- Visit the project site, as required, to audit the effectiveness of the HASP
- Provide consultation as needed to ensure that the HASP is implemented
- Coordinate modifications to the HASP with the PM, PS, SSHO/RSO, and the Client

4.2.2 Corporate Quality Director (CQD)

The Pangea Corporate Quality Director (CQD) or designee has the organizational freedom, authority and responsibility to ensure implementation of quality control (QC) program, to identify potential QC deficiencies to initiate actions that result in solutions, and to verify implementation of solutions. Refer to Pangea *Quality Assurance Program Plan* (QAPP) (Ref. 4) for detailed information.

4.2.3 Project Manager (PM)

The Project Manager is responsible for the performance of staff members, with emphasis upon safety, quality and responsiveness to the Client (contracting officer and designated representatives). The PM has overall responsibility for the coordination, direction, and implementation of the field activities. The PM will be accountable to the Client and the Pangea senior management for control of all project processes.

4.2.4 Project Superintendent (PS)

The Project Superintendent shall be responsible for directing the project work force on a daily basis and for ensuring conformance to environmental, safety and quality requirements applicable to the project. The PS shall be the designated alternate project safety representative when the SSHO/RSO is not on site.

4.2.5 Site Safety and Health Officer/Radiation Safety Officer (SSHO/RSO)

The SSHO/RSO is assigned responsibility for implementation of the SHSP, Radiation Safety Plan and project-specific safety requirements. The SSHO/RSO has sufficient authority to stop work if necessary when such work is unsafe or not in compliance with the contract. Responsibilities include the following:

- Assuring that this HASP is implemented for the full scope of work; and

Conducting regular reviews and reporting to the EH&S Manager and the PM regarding the status and adequacy of the health and safety program.

- Performing or directing radiological.

4.2.6 Project Quality Control System Manager (QCSM)

The QCSM is assigned responsibility for implementation of project-specific QC requirements. Responsibilities include the following:

- Assuring that the project *Quality Control (QC)* program is implemented for the full scope of work; and
- Conducting regular reviews and reporting to the CQD and the PM regarding the status and adequacy of the QC Program.

For this project, the Project Superintendent will also serve as the Project QCSM.

4.3 Responsibilities of Subcontractors and Suppliers

Pangea subcontractor personnel will be required to review the project plans and specifications and/or attend project meetings as required, prior to participating in any work activities at the site. Failure to comply with the requirements outlined herein may result in removal from the project site.

REMAINDER OF PAGE INTENTIONALLY BLANK

5. MOBILIZATION

5.1 General

Mobilization of personnel, equipment, and materials, etc. to the DLA *Remediation Waste Disposal* Project will occur in accordance with the project schedule (see Appendix A, *Project Schedule*).

Pangea personnel assigned to this project will be mobilized from Pangea's offices in Chesterfield, MO, O'Fallon, IL, and Cincinnati, OH. The majority of equipment utilized for the project will be obtained through local equipment rental dealerships with specialty equipment such as radiation instrumentation being mobilized from Pangea's corporate offices.

During the mobilization, Pangea will establish a work control area; install silt fencing to protect adjacent areas from contamination runoff; perform preliminary topographical survey; and establish a job trailer/break trailer close to Area 7A. Since the transportation of the excavated materials from the project site to the disposal facility will be via rail, Pangea will also establish a controlled work zone adjacent to one of the DLA New Haven on-site rail spurs for loading and load-out of railcars. Other activities will also include the setting of the office/break trailer, connecting electrical utility and telephone services (temporary set-up will be adequate due to short duration of field work), delivery of miscellaneous equipment and materials, establishing and coordinating project access, and site-specific training of project personnel.

As site personnel are first assembled, the Pangea SSHO/RSO will provide them a brief site-specific orientation to include review of the various site plans and applicable standard operating procedures (SOPs). The briefing will inform the personnel concerning the hazards of the work areas, the expected dose to be received, and the possible biological effects from receiving such exposure. Additional information on training requirements can be found in section 6, Personnel Training and Qualification of the Health and Safety Plan (HASP)(Ref.6).

The exclusion zone, contamination reduction zone, and support zones for the removal activities will be established as described in the HASP. A *Site Layout for the Removal Action* is represented in Figure 5-1, which identifies the current plan for the Pangea mobilization and site setup. Actual site conditions may dictate changes in this layout prior to the start of fieldwork.

5.2 Office Trailer and Utilities

Pangea will mobilize one office/break trailer to the DLA New Haven Remediation Waste Disposal project site. Pangea project management personnel will utilize the office trailer as office, meeting and storage space while the Pangea site workers will utilize a section as a clear break area. The office/break trailer will be installed in compliance with the existing building codes and the project requirements.

The following utilities will be required for this project site:

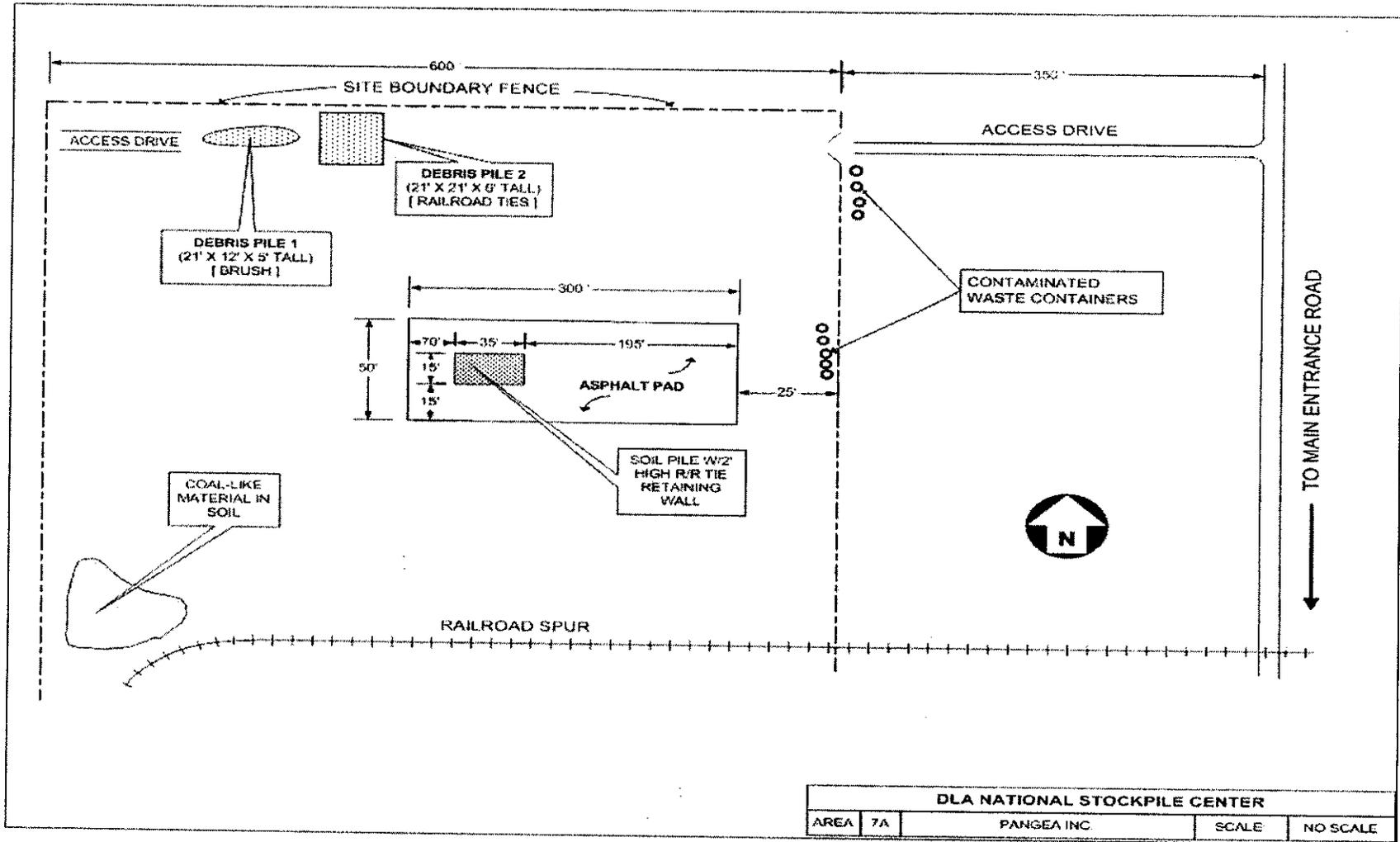
- Electrical Service - Pangea Site Superintendent will coordinate an electrical tie-in point with DLA personnel to ensure adequate power is available for the office/break trailer. Additional electric power for field activities will be provided via generator at the location of need. Electrical wiring to extend services to the point of usage shall be made by qualified electricians in accordance with applicable state and local codes.
- Water - Potable (drinking) water will be supplied by Pangea in the office/break trailer through a contract delivery service. Bottle water coolers will be placed in appropriate locations, as dictated by the work in progress. Water will be required for dust control and to supply the decontamination (decon) facilities. Should water not be available through the local utility, it will be delivered in trucks to temporary, onsite storage tanks.
- Telephone - Access will be provided at the New Haven project site for facsimile and telephone services. Tie in to site services will be coordinated with U.S. Army Joint Municipalities.
- Sanitary Systems (Temporary) - Pangea will provide additional facilities to be provided near the decon through the use of portable facilities. Additional portable restroom facilities will be provided by Pangea and placed at convenient and accessible locations adjacent to work locations. The supply and service for off-site disposal of sanitary wastes will be subcontracted to a qualified local firm.
- Government Furnished Equipment - The project installation will provide a copy machine for Pangea's use throughout the contract duration.

NOTE: *Pangea is responsible for all utility installations.*

REMAINDER OF PAGE INTENTIONALLY BLANK

Figure 5-1 Site Layout for the Removal Action

SITE LAYOUT FOR THE REMOVAL ACTION



5.3 Decontamination Facilities

A personnel decon station will be established at the project site in the interface of the contamination reduction zone (CRZ) and the support zone. This decon station will provide site personnel with a place to remove and decon PPE upon exit from the exclusion zone.

For heavy equipment, it is anticipated that decontamination will primarily be accomplished with the use of mechanical scraping in lieu of pressure washing. Heavy equipment will be kept within the exclusion zone as much as practicable during the excavation operations to preclude the need for surveying and decontamination of equipment upon exit.

The railcars will be inspected prior to loading to ensure that no damage has occurred during transport and that any holes are sealed to prevent leakage. If drain holes are open or damaged areas are discovered, installing the appropriate fittings or the installation of metal patchwork sealed with silicone sealer will be used to seal the areas. The patch will be fastened in place by drilling and installed metal screws or welding. Upon satisfactory completion of the inspection, the railcars will be prepared for filling by placement of a polyethylene liner (burrito wrapper) on the inside of the railcar. The liner by design drapes over the sides of the railcar minimizing the possibility of cross contamination.

Once railcar filling operations are completed, the polyethylene liner will be sealed, a tarp cover will be placed over the railcar and then secured for transport. The exterior of the railcar will be inspected for visible spillage of material on the railcar. All visible material will be removed and placed in the waste stream for disposal. Railcars will then be surveyed in accordance with DOT regulations for radiation and contamination. Surveys will be documented and maintained in accordance with Pangea SOP's.

5.4 Radiation and Contamination Instrumentation

Pangea will utilize a Ludlum Model 19 Micro R meter or equivalent to conduct dose rate measurements. Removable activity measurements will be performed using standard wipe samples, which are counted using alpha scintillation instrumentation, such as Ludlum Model 43-10, or equivalent.

5.5 Topographical Survey

Upon the completion of mobilization activities, a pre-excavation topographical survey will be performed to document existed grade elevations and contours. Information obtained will be used to prepare a topographical map of the area and to ensure that excavation activities result in the removal of soil to a depth of 15 cm (5.9 inches). This information will also be utilized to document areas requiring over excavation to meet the required NRC unrestricted release criteria.

5.6 Clearing and Grubbing

Upon completion of the topographical survey and the installation of construction fencing and erosion control system, the excavation site will be cleared of any vegetation, brush, trees and debris that would impact the removal activities. The activities will complete utilizing the dozer or backhoe equipped with guards to protect the operator from potential hazards of debris striking the cab. Activities will include the clearing of wooden debris, existing soil piles, and the breaking up and removal of the existing asphalt pad. The items will be sized reduced and staged for load out into the gondola cars.

5.7 Soil/Waste Excavation and Loading

Once clearing and grubbing activities have been completed, the below grade soils will be removed to a depth of approximately 15 cm (5.9 inches). The removal will be performed utilizing the dozer and backhoe as required to excavate and stockpile the 2500 cubic yards of soil removed. Removal activities will commence in the west and continue toward the east until all soils are stockpiled for load out and relocation as required for disposition into gondola railcars.

After the entire area has been scraped and excavated, Pangea's radiological control technician (RCT) will conduct a thorough walk over survey using a 2" by 2" NaI detector. Hot spots identified by this walk over will be documented and JMC/DLA technical coordinators will be presented with recommendations for the removal of these materials.

Pangea anticipates loading out the contaminated materials in close proximity to the excavation area as possible. The adjacent rail spur will be used to allow the staging of gondola cars for completion of loading operations. In the event that the rail spur adjacent to the excavation area is not serviceable, the materials will be loaded in to a dump truck utilizing the backhoe and relocated as necessary to allow the load out activities to be completed.

5.8 Heavy Equipment

The following heavy equipment will be utilized at the DLA New Haven project site:

- Caterpillar 420/420 D IT Backhoe Loader (or equivalent)
- Caterpillar 953-C Track Loader (or equivalent)
- Caterpillar D5N LPG Dozer (or equivalent)

Heavy equipment will be inspected upon delivery to the site in order to verify the equipment is in a safe operable condition and functioning properly. Additional small equipment, such as pumps, generators, spray washers, and assorted hand tools will be utilized throughout the project.

5.9 Personnel

The project organizational structure, staffing, training requirements, and functional responsibilities are described in Section 4, *Responsibilities and Lines of Authority*. It also identifies the key individuals responsible for overall management and coordination of operations and implementation of the associated site plans.

5.10 Coordination with Local Agencies

Pangea project staff will contact the local agencies listed below to establish a line of communications, notify them of the pending project start, and confirm their participation, if required. Site communications with local agencies are developed in accordance with requirements set forth in the Health and Safety Plan (Ref. 5). Arrangements with each agency will be finalized and documented prior to mobilization. Those organizations that may be called upon to assist and/or respond to incidents or emergencies at the project site are identified below:

Hospitals – Parkview Memorial Hospital (Ft. Wayne); St. Joseph Medical Center (Ft. Wayne)

Ambulance Services – New Haven Adams Township EMS Department

Fire Departments – New Haven Adams Township Fire Department

Police – New Haven Police Department

Emergency procedures and contact information provided in the HASP (Ref. 5) prepared for this project will be posted in the office trailer throughout the project.

REMAINDER OF PAGE INTENTIONALLY BLANK

6. SITE CONTROL MEASURES

Work zones where radiological contamination is present, the exclusion zone, contamination reduction zone (CRZ), and support zone will be demarcated and appropriate postings will be placed as a precaution against unauthorized entry. Each area will have independent delineation, such as caution tape or construction fencing and appropriate signage.

Radiological controls are governed by the Pangea Radiation Safety Plan and are implemented using the specific Radiation Safety Procedure (RSP's). Specific reference to RSP's is given in the appropriate section of the HASP. These include air monitoring, equipment and personnel surveys, site access, and dose monitoring.

Only authorized project personnel and oversight personnel will be authorized access to the radiologically contaminated portions of the site.

The site will be secured and personnel access to the site will be controlled. Site visitors shall be required to obtain authorization from the Site Superintendent or SSHO/RSO and they shall be escorted at all times when on site. Visitors will not be authorized to enter the exclusion zone unless the appropriate training/medical documentation is provided.

It is the policy of Pangea that site control measures will be implemented in a manner that will ensure compliance with applicable Federal, State, and local laws and regulations; Pangea corporate Plans and Standard Operating Procedures (SOPs); executive orders; and the Client's directives. Refer to Section 11, *References and Related Documents* for details.

REMAINDER OF PAGE INTENTIONALLY BLANK

7. WASTE MANAGEMENT

Waste management activities will be conducted in compliance with applicable laws, requirements, regulations, and good practices governing the management of radiological wastes.

Pangea will provide a JMC approved waste broker to develop waste profiles, waste manifests, and oversee waste management activities at the site. The broker will also coordinate all shipping activities with the transportation subcontractor and the disposal facility.

Good housekeeping practices will be employed to prevent trash and debris from being scattered about the site. Only essential equipment/materials will be used on the contaminated portions of the site in order to minimize waste generation and the need to decontaminate materials and equipment. In addition, unnecessary packaging will be removed prior to allowing equipment/materials to be brought into the exclusion zone.

All soils removed from the footprint of the storage pile area will be handled so as to prevent contamination of adjacent unimpacted areas. As materials are excavated and site systems allow they will be direct loaded into lined gondola rail cars. Material that cannot be direct loaded will be placed in an adjacent area, from which the materials will be loaded into lined gondola rail cars. After each gondola car is filled, or at the conclusion of each day's activities, the top portions of the "burrito bag" liners will be placed over the top of the accumulated wastes and secured to prevent the accumulation of water.

Silt fencing will be installed at the perimeter of the excavation and temporary stockpile areas to prevent the release of contaminated sediment to adjacent unimpacted areas.

As necessary, accumulated water will be pumped from the excavation area and stored in an open top contaminated water tank. All accumulated liquids will be dispositioned in accordance with site and NRC regulations. Liquids that are to be disposed will be treated /absorbed in accordance with the disposal facility requirements. At no time will free liquids be allowed to accumulate in the gondola cars. If necessary, an absorbent, such as "Waterworks" or other approved additive will be applied to absorb any excess water.

Used protective clothing and other contaminated items generated from the remediation project will be containerized and placed in the gondola cars with the contaminated soils and debris for offsite transportation and disposal.

Prior to each shipment, the SSHO/RSO or designee will collect wipe samples on the exterior portions of the gondola cars to determine removable alpha/beta activity and dose rate measurements will be taken as required to demonstrate conformance to DOT requirements for radioactive material shipments.

8. DEMOBILIZATION

At the conclusion of the project, a radiological release survey will be conducted for all items/equipment being removed from the exclusion zone. In addition, a final gamma walkover survey of the affected areas will be completed with results documented for the final report.

If pressure washing becomes necessary to meet unrestricted release criteria, a temporary decontamination pad will be used. The decon pad would be constructed of HDPE liner material to prevent dispersal of contaminated water and sediment to the surrounding soil areas. Liquids generated will be dispositioned in accordance with site and NRC regulations. Liquids that are to be disposed will be treated /absorbed in accordance with the disposal facility requirements.

Following the completion of all site tasks, Pangea personnel will remove all temporary fencing and signage associated with the project. The Pangea office trailer and any support equipment or temporary utilities will be demobilized and/or deactivated. A final site survey will be performed to reflect all site conditions and final site photographs will be taken.

Copies of shipping papers, waste disposal manifests, and other documentation regarding the disposal of the waste will be included in the Final Report.

REMAINDER OF PAGE INTENTIONALLY BLANK

9. PROJECT CLOSURE REPORT

At the completion of the project, Pangea will complete a draft *Project Closure Report* in accordance with Section 12 of the Task Order Scope of Work. The report will include the following information:

- Overall Project Summary, including a site plan with identifying excavation limits
- Results of pre- and post-excavation topological surveys
- Contaminated soil and debris disposal documentation, including waste manifests and disposal certificates
- Soil walkover survey documentation
- Cumulative quantities of excavated soil and debris
- Other relevant information, as required

A draft electronic copy of the report will be issued within 3 weeks of receipt of final disposal documentation from the disposal facility. A final report will be issued within 2 weeks of receipt of JMC and DLA comments on the draft report.

REMAINDER OF PAGE INTENTIONALLY BLANK

10. DOCUMENTATION

The requirements for maintenance of records shall be as described in *Pangea Health and Safety Program Manual* (Ref. 2), QAPP (Ref. 4), RSP (Ref. 6) and applicable SOPs, unless otherwise stated in the contract documents.

Records of training are maintained for internal company use and to meet regulatory and project-specific requirements. The Human Resources Manager maintains training and qualification records for all company personnel.

In general, the PM should follow the Pangea "Document Filing System." The PM shall maintain such files and records so as to properly document all actions, decisions, changes and communications on the project. Records must be legible, identifiable and retrievable. The files shall be kept current and complete at all times and stored in such a manner as to prevent damage and deterioration.

REMAINDER OF PAGE INTENTIONALLY BLANK

11. REFERENCES AND RELATED DOCUMENTS

1. Federal Regulations
 - a. 29 CFR 1910, *Occupational Safety and Health Standards (General Industry)*
 - b. 29 CFR 1926, *Safety and Health Standards for Construction.*
 - c. 29 CFR 1904, *Recording and Reporting Occupational Injuries and Illnesses.*
 - d. 10 CFR 20, *Standards for Protection Against Radiation.*
 - e. 49 CFR 171-172 (DOT Hazardous Materials Transportation Regulations)
2. Indiana administrative code, Title 326, Air Pollution Control Board; Title 329, Solid Waste Management Board; Title 327 Water Pollution Control Board.
3. *Pangea Health and Safety Program Manual*, Rev. 3. Prepared by Pangea Group, Chesterfield, MO. February 2003.
4. *Pangea Hazard Communication Program Plan*, Rev. 2. Prepared by Pangea Group, Chesterfield, MO. June 2001.
5. *Pangea Quality Assurance Program Plan*, Rev. 3. Prepared by Pangea Group, Chesterfield, MO. April 2001.
6. *Project Health and Safety Plan (HASP)*, Rev. 1. Prepared by Pangea Group, Chesterfield, MO. June 2004 (for the Joint Munitions Command for the New Haven, Indiana *Remediation Waste Disposal*).
7. Pangea, Inc. *Radiation Safety Program*, Rev. 1. Prepared by Pangea, Inc., Chesterfield, MO. March 2001.
8. Pangea Corporate Procedures
 - a. Pangea EH&S SOPs in the series 7-IH-XX and 7-SA-XX and References stated therein. *
 - b. Pangea RSP SOPs in the series RSP 100-XX, 200-XX, 300-XX and 400-XX and References stated therein. *
 - c. Pangea Quality SOPs in the series 5-QA-XX. *
9. Pangea (Human Resources) - *General Policy and Procedures.*

* Listings of Pangea EH&S, RSP and QA Standard Operating Procedures (SOPs) are provided in Applicable Plans/Manuals.

12. ACRONYMS

12.1 List of Acronyms

AHA	Activity Hazard Analysis
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CIP	Continuous Improvement Program
CQD	Corporate Quality Director
CQCSM	Contractor Quality Control System Manager
CQD	Corporate Quality Director
CRZ	Contamination Reduction Zone
DLA	Defense Logistics Agency
DNR	Department of Natural Resources
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EH&S	Environmental, Health and Safety
EPA	U.S. Environmental Protection Agency
GSA	General Services Administration
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
JMC	U.S. Army Joint Munitions Command
LEPC	Local Emergency Planning Committee
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
PM	Project Manager
PPE	Personal Protective Equipment
QAPP	Quality Assurance Program Plan
QCSM	Quality Control System Manager
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
RSP	Radiation Safety Program
RWP	Radiological Work Plan
SOP	Standard Operating Procedure
SOW	Statement (Scope) of Work
SSHO/RSO	Site Safety and Health Officer/Radiation Safety Officer
TSCA	Toxic Substance Control Act

NOTE: *Not all acronyms are used in this Plan.*

Appendix A Project Schedule

