

WORK PLAN

**Interim Corrective Measures for
SWMU #66, Radar Facility Disposal Area and
SWMU #67, Horse Pasture Disposal Area**

**NAVAL AIR STATION MEMPHIS
MILLINGTON, TENNESSEE**

**Revision 0
April 18, 1995**

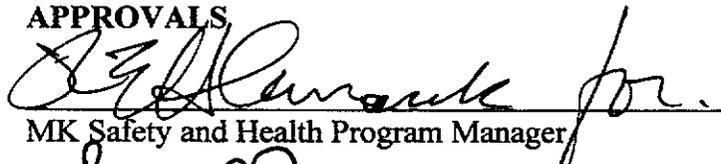
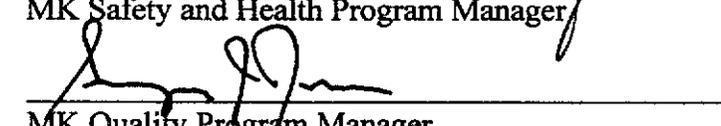
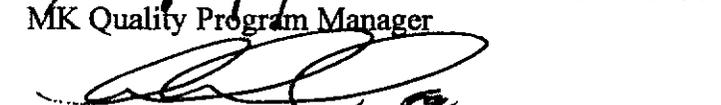
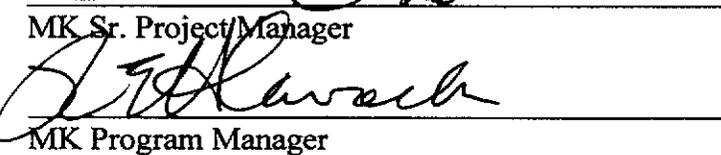
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**CONTRACT N62467-93-D-1106
DELIVERY ORDER 0011
STATEMENT OF WORK 013
TASK 1**

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ACCEPTANCE

<hr/> U.S. Navy Responsible Authority	<hr/> Date
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DELIVERY ORDER 0011
STATEMENT OF WORK 013
TASK 1
NAVAL AIR STATION MEMPHIS
MILLINGTON, TENNESSEE

WORK PLAN

Revision 0, Dated April 24, 1995

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WORK PLAN - NAS MEMPHIS - MILLINGTON, TENNESSEE
CONTRACT N62467-93-D-1106
DELIVERY ORDER 0011, STATEMENT OF WORK 013, TASK 1

REVISIONS

SECTION	TITLE	INSTRUCTIONS	REVISION	DATE
	WORK PLAN			
	Cover Page	Replace existing Cover Page	0	4/24/95
	Table of Contents	Replace page ii	0	4/24/95
Appendix G	Sampling and Analysis Plan	Replace Appendix G in its entirety	0	4/24/95
Appendix I	Responses to Comments	Place Appendix I after Appendix H	0	4/24/95

WORK PLAN

Interim Corrective Measures for SWMU #66, Radar Facility Disposal Area and SWMU #67, Horse Pasture Disposal Area

**NAVAL AIR STATION MEMPHIS
MILLINGTON, TENNESSEE**

**CONTRACT #N62467-93-D-1106
DELIVERY ORDER #0011
STATEMENT OF WORK #013
TASK 1**

**REVISION 0
APRIL 24, 1995**

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1.0 INTRODUCTION

This work plan describes the methods to be used to perform the Corrective Action Interim Measure (interim measure) at the Naval Air Station (NAS) Memphis for two Solid Waste Management Units (SWMU). The SWMUs are known as #66, Radar Facility Disposal Area, and #67, Horse Pasture Disposal Area. NAS Memphis is located in Shelby County, Millington, Tennessee as shown in Figure 1-1. The SWMU's are located in the northeastern portion of the NAS facility and are shown in Figure 1-2.

Morrison Knudsen (MK) prepared this work plan for the Naval Facilities Engineering Command (NAVFACENGCOM), Southern Division pursuant to the scope of work defined in Delivery Order #0011, Statement of Work 013, under Contract #N62467- 93-D-1106. The procedures included in this plan are based on the recommended interim corrective measures described in the United States Environmental Protection Agency (USEPA) guidance document, RCRA Facility Investigation Guidance, 1989, Section 3.8 "Interim Corrective Measures."

1.1 PROJECT DESCRIPTION

The primary work objectives of this interim measure are as follows:

- reduce the threat to human health and the environment by eliminating or reducing the possible pathways of exposure from potentially hazardous substances at NAS Memphis, SWMUs 66 and 67;
- provide a partial cleanup of SWMU 66 and SWMU 67 and provide information on how to achieve the remediation goals at NAS Memphis;
- perform all work so that worker safety is maximized and environmental impacts are minimized; and
- cost-effectively and efficiently execute the work according to the Delivery Order requirements while meeting or exceeding all site-specific, local, state, and federal requirements.

1.2 SITE DESCRIPTION

SWMU 66 is located in a ravine, approximately 8-12 feet deep, southwest of the radar facility, Building #1696. NAS Memphis discovered SWMU 66 during tree clearing activities around the base radar facility. The disposal area is an inactive open dump site used for the disposal of drums, scrap metal, wood, rail road ties, appliances, fencing material, corrugated roofing material, floor tiles, furniture, hand sprayers and other miscellaneous items. Approximately 55 drums are visible. Most of the drums are empty. Markings show some may have come from the Moral, Welfare, and Recreation (MWR) Department. Some are similar to those used by the MWR for "barrel racing." Some may have been used as trash barrels. It has not been determined if all of the drums are empty. At least one label says that it contained solvents. Historical records of the original contents of the drums are not available. The disposal area is approximately 50 feet wide and 350 feet long. The majority of the debris is in an area approximately 165 ft. long by 24 ft. wide. The gravel road beside the radar facility will

be used to reach the site. Temporary gravel improvements to extend the road may be required. The area is wooded including undergrowth and mature trees up to approximately two feet in diameter. Some clearing will be required to enter the area for debris removal. Access into the ravine for debris removal after clearing should not be a problem. Photographs of the site are included in the Environmental Conditions Report, Appendix C.

SWMU 67 is located north of building 1460, the Riding Academy, in the horse pasture. The site consists a pile of debris probably accumulated from either construction or demolition work near or in the horse pasture area. The debris includes: fencing material, corrugated roofing material, aluminum boats, discarded farm wagons, scrap wood and metal, engine storage tanks, tires, plastic seats, concrete, wooden pallets, and other discarded material. There was no visible evidence suggesting the presence of hazardous contamination. The area consists of two adjacent piles. One pile is approximately 100 feet long, 100 feet wide, and up to 10 feet high. The second pile is approximately 10 feet wide, 20 feet long, and 6 feet high. Access to the site may require placement of gravel to provide a temporary road. Photographs of the site are included in Appendix C.

1.3 SUBSURFACE CONDITIONS

No site investigations have been done in SWMUs 66 and 67. There are no known utilities in the work area.

2.0 WORK APPROACH

2.1 COMPLIANCE REQUIREMENTS

Promulgation of the United States Environmental Protection Agency's (USEPA) Resource Conservation and Recovery Act (RCRA) Hazardous Waste Regulatory Program provided the impetus to identify and control environmental contamination from past practices at NAS Memphis. The activities conducted under this Work Plan are according to the RCRA Corrective Action provisions of 40 CFR Part 254.101, incorporated by reference at Rule 1200-1-11:06(c)(2). The relevant compliance requirements for this Delivery Order are listed as follows:

- State of Tennessee Regulations Chapter 1200-1-7 "Solid Waste Processing and Disposal";
- State of Tennessee Regulations Chapter 1200-1-11 "Hazardous Waste Management";
- 40 CFR Part 257 "Criteria for Classification of Solid Waste Disposal Facilities and Practices";
- 40 CFR Part 261 "Hazardous Waste Identification and Listing";
- 40 CFR Part 262 "Standards Applicable to Generators of Hazardous Waste";
- 40 CFR Part 263 "Standards Applicable to Transporters of Hazardous Waste";
- 40 CFR Part 268 "Land Disposal Restrictions";
- 40 CFR Part 311 "Worker Protection";
- 49 CFR Part 172 "Hazardous Materials Tables, Hazardous Materials Communications Requirements and Emergency Response Information Requirements";
- 49 CFR Part 173 "Shippers - General Requirements for Shipments and Packaging";
- 49 CFR Part 177 "Carriage By Public Highway";
- 49 CFR Part 178 "Specifications For Packaging";
- EM-385-1-1 U.S. Army Corps of Engineers Safety and Health Manual, "Conduct of Field Operations";
- 29 CFR 1926 "Conduct of Field Operations and Hazardous Waste Operations"; and
- 29 CFR 1910.120 "Training Requirements for Hazardous Waste Removal."

2.2 NOTIFICATIONS

According to Tennessee Regulation Chapter 1200-1-13-.09(2)(c), public notice may be required on an interim action as directed by the Tennessee Department of Environment and Conservation. This work plan shall serve as the notification required by the department before commencement of an interim action. NAS Memphis shall submit information necessary to fulfill the requirements of the Base Realignment and Closure and Installation Restoration Programs Community Relations Plan (CRP), August 1994.

Notification requirements identified in the "Final Revised Model HSWA Permit", permit number HSWA - TN 002 identification number TN2 170 022 600 shall also be provided.

MK shall provide information to NAS Memphis as required to fulfill the notification requirements. No additional State or Federal permits are required. NAS Memphis shall issue excavation permits. The contractor shall notify NAS Memphis before removal of trees, or changes to any physical features of the property such as construction of permanent roadbeds. Approval from the NAS Memphis Resident Officer in Charge of Construction (ROICC) is required before proceeding.

Contractor and all subcontractors shall provide daily written notification to the ROICC of activities which pertain to this interim corrective action. These notifications shall include but are not limited to the following activities:

- clearing;
- debris excavation and removal;
- backfilling and compaction;
- interim storage and handling of hazardous waste;
- inspection, manifesting, and shipping of hazardous waste;
- construction activities; and
- any other change to physical features of the property including but not limited to construction of permanent roadbeds.

Any emergency notification in case of fire, explosion or spills which may occur during activities described in this work plan, shall be performed according to the Emergency Response Plan as described in Section 12 of the Site Safety and Health Plan (SSHP) and the CRP.

Besides the notifications required by the Community Relations Plan, RCRA Permit, Tennessee Department of Environment and Conservation; the USEPA, the Memphis and Shelby County Health Department, or the ROICC may request additional information or notification as the interim corrective measure is performed.

2.3 TRAINING/MEDICAL SURVEILLANCE

Training and medical surveillance requirements are identified in Sections 4 and 5 of the SSHP, attached as Appendix A. All personnel entering the remediation site will be required to show that they have the required training. For MK and subcontractor staff, records of this training will be submitted to the SSHO before the start of activities.

2.4 CORRECTIVE ACTION INTERIM MEASURES

2.4.1 Work scope SWMU #66, Radar Facility Disposal Area

The scope of work includes the following:

- visual investigation and inventory of the disposal area;
- construction of temporary roads, storm-water run-on/run-off control, and access control devices;
- clearing of the area as necessary to carry out the interim measure;
- field screening of the drums, debris, and soil with a photoionization detector or similar device;
- screening for safety and health requirements as described in the SSHP sections 7.2, and 7.3;
- removal, identification, segregation, decontamination, transportation, and disposal of debris;
- excavation, staging, sampling, and disposal of visually stained or potential contamination source soils;
- confirmatory screening of disposal area for remaining debris using a metal detector;
- confirmatory sampling;
- backfilling of the excavated area if required; and
- restoration of the area to control runoff.

2.4.2 Work scope SWMU #67, Horse Pasture Disposal Area

The scope of work includes the following:

- visual investigation and inventory of the disposal area;
- construction of temporary roads, storm water run-on/runoff control, and access control devices;
- clearing of the area as necessary to carry out the interim measure;
- field screening of the drums, debris and soil with a photoionization detector or similar device;
- screening for health and safety requirements as described in the SSHP sections 7.2, and 7.3;
- removal, identification, segregation, decontamination (if necessary), transportation, and disposal of debris;
- excavation, staging, sampling, and disposal of visually stained or potential contamination source soils;
- confirmatory screening of disposal area for remaining debris using a metal detector;
- confirmatory sampling; and
- backfilling of the excavated area if required; and
- restoration of the area to control runoff.

2.4.3 Utility Clearance

Before excavating, MK will obtain a digging permit through the NAS Memphis Facilities Officer. As part of this permit activity, MK will determine if local utilities are required to be notified for screening of the work area.

2.4.4 Preparatory/Mobilization Activities

Preparation for site activities will begin with an initiation meeting. The MK Project Manager, the SSHO, and other project staff as necessary will conduct this meeting. All personnel who will routinely be in the work zone are required to attend. Procedures, requirements, and roles and responsibilities will be clearly outlined. Specific questions will be addressed at this time. Key elements of the SSHP, Quality Control Plan (QCP), Waste Management Plan, and Environmental Protection Plan will be reviewed.

The initial steps in mobilization will be to define the layout of the work area including: staging areas, the boundaries of the Exclusion Zone (EZ), the Contamination Reduction Zone (CRZ) with appropriate decontamination stations, the Support Zone (SZ), access routes and storm water and erosion control measures as necessary. The work zones and access routes will be approved by the SSHO and the Project Manager. These areas may be modified or eliminated as required during the execution of the interim measures. Appropriate barricades, warning tapes, and signs around the site shall be placed as directed by the SSHO and the Project Manager. Access barriers and other control measures shall be inspected and maintained daily to ensure that they do their intended function.

Tools, equipment, and supplies will be delivered to site and personnel will be mobilized. The project manager will visually inspect all equipment mobilized to site for potential contamination and mechanical condition before acceptance onto the site.

Erosion and sedimentation controls will be established. Erosion and sedimentation will be primarily controlled by using hay bales and siltation fencing or other appropriate devices as determined by on site personnel. These controls will be inspected daily. Inspections and corrective actions will be documented in daily logs.

2.4.5 Surveying

The site will be surveyed before debris removal starts to locate the debris and to provide contours for restoration after excavation. The site will be surveyed again after the debris and contaminated soil have been removed. The purpose of this survey is to locate where soil has been removed, and to locate the sample locations for future work.

2.4.6 Removal of Debris

Debris includes natural and man made materials, most of which is greater than 60 mm. Debris may contain stones, concrete, steel, waste, plastic or glass.

Preliminary screening of debris will be performed prior debris removal. Preliminary screening shall at a minimum consist of the following:

- visual inspection of the entire area;
- inventory of drums, containers, and other debris;
- screening using a photoionization detector;
- sampling if necessary as determined by the project manager and SSHO

The debris shall be segregated into four categories: recyclable/salvageable materials, nonhazardous solid waste/construction debris, landscaping/land clearing wastes, and hazardous/potentially hazardous waste.

2.4.6.1 Recyclable/salvageable materials

Recyclable/salvage materials shall include scrap metal that can be readily and safely segregated as decided by the Project Manager. Salvageable material may include but is not limited to the following items:

- appliances
- metal fencing not unreasonably bound to posts or other materials,
- corrugated roofing material
- farm equipment
- boats
- empty tanks
- empty drums

Appliances used for cooling purposes including but not limited to refrigerators, freezers, air conditioners, and dehumidifiers shall be assumed to contain Freon or other listed material. These items shall be taken to a facility licensed to dispose of the refrigerant.

40 CFR 261.7(b) defines an empty drum as a drum which contains less than one inch of material or 3 percent by weight of its capacity. Empty drums and tanks shall be screened using a photoionization detector (PID) and visually inspected. If PID levels above background are detected, the empty drums and tanks shall be moved to a temporary staging area where they will be rinsed with a solution of detergent and water. Drums shall be triple rinsed if acute hazardous wastes listed in 40 CFR Part 261.31, 263.32 or 261.33(e), are suspected (i.e., labeling). Where no hazardous wastes are detected or suspected, the drums shall be crushed and staged for salvage. All rinseate shall be collected. After rinsing, the empty containers shall be screened and rinsed again, if necessary. When "clean," the drums shall be crushed for salvage.

All salvageable material shall be turned over to the Defense Reutilization and Marketing Office (DRMO).

2.4.6.2 Nonhazardous Solid Waste/Construction Debris

All nonhazardous solid waste/construction debris shall be segregated and disposed of in a permitted Class I, Class II, or Class IV disposal facility as defined by Tennessee regulation 1200-1-7-.01.

Nonhazardous solid waste/construction debris may include but is not limited to the following items:

- concrete;
- metal fencing attached to posts or other materials;
- scrap wood;
- tires;

- floor tiles; and
- roofing material which is not salvageable.

2.4.6.3 Asbestos Containing Material

Any suspected asbestos containing material (ACM) including but not limited to floor tiles, siding, pipe insulation, shall be sampled for asbestos before removal by a licensed asbestos subcontractor. The ACM will be managed and disposed according to federal and state requirements. Only ACM licensed waste facilities will be used to dispose of the material.

2.4.6.4 Landscaping/Land Clearing Wastes

Landscaping/land clearing wastes shall be defined as organic material including: trees, shrubs, bushes, vines, grass, roots and other vegetation. It shall not include soil, sediment, or rocks. Vegetation removal shall be limited to that which is deemed necessary for site clean-up. The removed vegetation shall be cut and shredded for use as mulch on site. An area shall be designated for placement of the mulch. Large branches or trunks which cannot be chipped shall be set aside for use by NAS Memphis. Removal of trees shall be limited to those necessary to gain access to the sites. Approval from NAS Memphis shall be obtained prior to the removal of any trees.

If a tree is growing through soil which is visually stained or suspected of being contaminated, the tree will be cut flush to grade. The tree will be disposed as described above. The remaining stump will be declared to be the same as the suspect soil.

2.4.6.5 Hazardous Waste/Potentially Hazardous Waste

Hazardous waste or potentially hazardous waste shall include those wastes which are hazardous by listing or by characteristics in accordance with 40 CFR 261. All drums containing unknown liquids or solids shall be considered to contain hazardous waste until confirmatory samples are taken. Drums which contain less than three percent by weight or less than one inch of material are empty by definition.

Hazardous waste shall not be stored or accumulated on site for a period greater than 90 days. The waste may be stored for a period up to 90 days provided that it is in compliance with Tennessee Rule 1200-1-11 Hazardous Waste Management and 40 CFR 262.34. All hazardous waste shall be handled as described in Appendix E Waste Management Plan.

A hazardous waste (HW) storage area shall be constructed at each SWMU to stage containerized hazardous wastes for off-site disposal, if necessary.

The storage area shall meet the standards of 40 CFR 265 and be large enough to store all of the removed containers. The containers shall be stacked one high with sufficient aisle space between rows of containers. The storage area must have an impervious base with side containment walls. The volume contained within the walls shall be sufficient to contain 10% of the volume of the containers or the volume of the largest container,

whichever is greater. The walls must be joined to the base and sealed to prevent any

releases from migrating between the base and the walls.

Potentially hazardous wastes (i.e., drummed waste and debris) shall be removed and placed in the HW storage area.

Debris encountered during the soil removal process shall be placed on the decontamination pad and pressure washed to remove possible contaminants. All visually contaminated debris shall be pressure washed to remove soil and possible contamination. Decontamination water shall be collected for sampling and off-site disposal.

Once debris has been removed it will be sorted, classified and/or containerized for disposal. All debris which is found to be hazardous will be transported off-site for disposal. The inspection, labeling and preparation for shipment of hazardous waste to an off-site Treatment, Storage and Disposal Facility (TSDF) will be as described in the Waste Management Plan. All non-hazardous debris will be transported to a local landfill, disposal facility, or turned over to DRMO for salvage.

Subsurface removal of drums and debris shall require additional precautions and safety considerations as detailed in the SSHP. Soil removal shall proceed as detailed in Section 2.4.7.

Partially buried drums shall be hand excavated to prevent punctures. Movement of the excavated drums shall be with a drum grappler or similar device designed specifically for drum movement.

If a drum shows potential internal pressure, as evidenced by bulging, the work around that drum will proceed with extreme care. Movement of a pressurized drum will be by a grappler unit equipped for safe containment. The bulged drum will be moved only as far as necessary to allow seating on firm ground. After its position is stabilized the drum will be vented using a mechanical drum punch to relieve pressure. The SSHO and Project Manager shall supervise this operation. Drums will be staged in the bermed storage area.

Drums will be visually inspected daily to check for leakage, buckling or excess corrosion. Any leaking, significantly corroded, damaged, open, or bulging containers that may leak or burst shall be overpacked or redrummed. This action shall occur within 24 hours of detection. If no leakage has occurred or if the drum is empty, it can be placed in the storage area directly. If the drum is leaking it will be placed in an overpack container prior to being placed in the storage area.

Care will be exercised when opening drums. Leaking or damaged drums will be overpacked. Damaged drums, if required by the SSHO, will be overpacked or contained at the working face to minimize spillage. Any material spilled from a damaged drum will be immediately cleaned up in accordance with Section 3.0, Spill Prevention, in the Waste Management Plan. Notification of this spill will be in accordance with Section 2.2 Notifications and the CRP.

Field personnel will characterize each drum visually and with field screening techniques including but not limited to PID meters and pH measurements. Personnel involved in handling and transporting of drummed waste will work in teams containing no fewer than

two people. Visual contact will be maintained between members of the working team at all times. All team members will be able to communicate between themselves and with the on-site SSHO at all times on the work site. Removal of drum bung or ring tops will be performed with non-sparking tools. Sample access ports may also be made using a non-sparking punch attached to a backhoe or other similar mechanical equipment. Drummed waste will be characterized in accordance with Appendix G, the Sampling and Analysis Plan.

2.4.7 Removal of Contaminated Soil

After removal of surface debris, soil that creates a potential contamination source will be excavated. A potential contamination source shall be determined by the Project Manager. Observational methods shall be used including but not limited to: visual staining, field screening, strong odor, creates a sheen on water. Excavated soil will be placed in a lined roll-off container prior to characterization sampling. Samples of excavated material will be taken in accordance with the Sampling and Analysis Plan, Appendix G. Data management shall be in accordance with the Data Management Plan, Appendix H.

Roll-off containers shall be labeled and placed in temporary storage for no more than 90 days. The inspection, labeling and preparation for shipment of potentially contaminated soil to an off-site Treatment, Storage and Disposal Facility (TSDF) is described in the Waste Management Plan, Appendix E. The disposal facility's permit shall be submitted to MK for review. Manifests shall be prepared and presented to NAS Memphis for signature.

2.4.8 Sampling and Analysis

Drums and excavated soil shall be sampled for disposal purposes. Confirmatory soil samples shall be taken from the SWMUs after debris removal. Sampling and analysis shall be according to the Sampling and Analysis Plan, Appendix G.

2.4.9 Site Restoration

The excavation will then be backfilled to grade with clean material. Clean backfill material will be obtained from an approved on-site borrow area.

The backfill will be placed in 12 inch lifts and compacted with a vibrating tamping device or similar equipment to a density of 85 percent or as otherwise directed. All areas will be covered with three (3) inches of topsoil (defined as having a minimum of 5% organic matter), seeded with native grasses and fertilized. Erosion control measures shall be maintained until the growth of grasses is sufficient to prevent erosion.

2.4.10 Demobilization

As equipment is no longer required in the EZ it will be decontaminated and moved to the safe zone SZ. The SSHP found in Appendix A further defines the work zones. Once all contaminated materials are containerized, the remaining equipment will be decontaminated and moved to the SZ. The decontamination equipment will then be decontaminated according to the equipment decontamination procedures and the work

zone barriers removed. All decontamination fluids shall be collected, sampled and transported to the ground water treatment facility for treatment or to an off-site disposal facility. At the completion of work identified in this contract, all equipment and temporary facilities will be demobilized. All temporary utilities will be decommissioned. Demobilization includes decontamination of all equipment which potentially contacted contaminated material. See section for 2.5.2 decontamination procedures.

2.5 DECONTAMINATION

2.5.1 Decontamination Facility

A decontamination facility will be constructed at each site. The facilities shall be approximately 20 feet by 30 feet. They will be enlarged if the need arises.

Each shall consist of a high density polyethylene (HDPE) liner over sand bedding material, The sides will be constructed of the liner draped over sandbags. The decontamination facility shall be sloped to a sump or collection area. A single sheet of HDPE will cover the base of the decontamination facility. If the ground is too soft to support the decontamination pad, plywood will be used as a base for support.

The liner will be visually inspected daily before use, to detect possible failures of the liner material. This liner will be inspected:

- for evidence of tears and holes;
- for evidence of seepage;
- to ensure that the sheeting is adequately fastened to the side walls;
- to ensure that the liner is adequately covers the sand bags at the end sections; and
- to ensure that generated liquids can be contained until collected for disposal.

If damages are detected, they will be repaired or replaced before further use. Records will be maintained specifying decontamination facility construction materials and methods, disposition of liquids, and any repairs and/or breaches of liner integrity.

When the decontamination facility is dismantled, the underlying material will be visually inspected. Visibly contaminated material will be removed and managed as a contaminated waste.

2.5.2 Construction and Field Equipment Decontamination Procedures

Construction and field equipment that have come into contact with any excavated materials will be decontaminated. After on-site removal of potentially contaminated material, affected surfaces of the equipment will be wrapped in plastic and transported to the decontamination facility. A decontamination facility may be located at each site in which case wrapping in plastic is not necessary. At the decontamination facility, exposed surfaces of construction and field equipment will be decontaminated using a solution of high-pressure/low-volume water or steam with detergent. The equipment will be visually inspected for signs of contamination and screened for organic vapors with a PID. If elevated levels (greater than environmental background) are measured, the decontamination procedure will be repeated. Pumping equipment and associated hoses (including vacuum truck hoses) will be flushed with water and detergent followed by a

water rinse.

2.5.3 Sampling Equipment Decontamination Procedures

See Appendix G Section 3.2 for sampling equipment decontamination procedures.

2.6 REPORTS

According to the approved Community Relations Plan for NAS Memphis, progress reports shall not be required during the execution of this interim measure because of the its short duration. A final report will be submitted to the Regional Administrator by NAS Memphis which at a minimum shall contain:

- a description of the interim measures implemented;
- summaries of results;
- summaries of all problems encountered;
- summaries of accomplishments and /or effectiveness of interim measures; and
- copies of all laboratory/monitoring data.

3.0 PERMITS

No federal or state permits are expected. Local disposal permits may be required. Notification to the local POTW may be required prior to discharge of the decontamination water.

4.0 ENVIRONMENTAL PROTECTION

MK will employ measures during site work to ensure protection of the environment. All work will be performed in a manner which will minimize pollution of the air, water, and land at the site. Environmental protection activities executed at the site will follow The Environmental Protection Plan, Appendix D.

5.0 SAFETY AND HEALTH

The Site Safety and Health Plan (SSHP) describes safety and health requirements for remediation activities at NAS Memphis, specifically at SWMU 66 and 67. The SSHP is consistent with requirements of the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Site Regulations, 29 CFR 1910.120 and 29 CFR 1926.65 along with the U.S. Army Corps of Engineers' *Safety and Health Requirements Manual* EM 385-1-1 dated October 1992.

The SSHP is applicable to all personnel who enter into work areas described in this SSHP and which are under Morrison Knudsen Corporation (MK) or MK's subcontractors' control.

The SSHP is bound under separate cover and constitutes Appendix A of this work plan. The SSHP is intended to cover all aspects of this work plan. Each task has an Activity Hazards Analysis. If a new task is identified, an Activity Hazards Analysis will be performed.

6.0 QUALITY CONTROL

As the prime contractor, MK implements and retains full authority for the quality control program. All matters involving quality control performed in the execution of SOUTHDIV ERAC Delivery Orders are managed by MK. This approach provides the Navy with a quality management system that has clear lines of authority and responsibility with a consistent approach and application of quality requirements.

The Quality Control Plan (QCP), included as Appendix B and bound under a separate cover, identifies quality testing and inspection requirements for the scope of work to be performed. At the heart of the QCP is the Testing Plan and Log, which lists required tests and inspections for each definable feature of work. The on-site Quality Control Superintendent ensures that all tests and inspections are performed to the standards specified and at the required frequencies. Results of these tests and inspections are documented on the "Testing Plan and Log". The program quality control (QC) manager is the primary point of contact with the Navy Contracting Officer for quality matters, and is based in the MK Program Management Office in North Charleston, SC.

The QC manager is responsible for implementing the "Three Phases of Control" during construction activities to ensure that work complies with contract requirements. The "Three Phases of Control" are performed to fully and adequately encompass both on-site and off-site work. The "Three Phases of Control" are performed for each definable feature of work delineated in the QCP. The "Three Phases of Control" consist of the following: Preparatory Phase, Initial Phase, and Follow-up Phase. These are described briefly below and detailed in the QCP.

The Contracting Officer shall be notified at least two working days in advance of each preparatory phase. The preparatory phase is conducted with the superintendent and the foreman responsible for the definable feature of work. Results of the preparatory phase actions are documented in the daily Contractor quality control report. The following activities are performed prior to beginning on each definable work feature:

- Review each paragraph of the applicable specification sections;
- Review the testing plan and ensure that provisions have been made to provide the required QC testing;
- Examine the work area to ensure that the required preliminary work has been completed;
- Review the SSHP and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required material safety data sheets (MSDS) are submitted; and,
- Discuss construction methods.

The Contracting Officer shall be notified at least two working days in advance of each initial phase. When crews are ready to start work on a definable feature of work, the initial phase is conducted with the personnel responsible for that definable feature of work to ensure that the work complies with contract requirements. The results of the initial phase are documented in the daily contractor quality control report. The initial phase is repeated for each new crew to work on-site, or when acceptable levels of specified quality are not being met. The following is performed for each definable feature of work:

- Establish the quality of workmanship required;
- Resolve conflicts;
- Review the SSHP and the appropriate activity hazard analysis to ensure that applicable safety requirements are met; and,
- Ensure that testing is performed.

The following is performed daily as the follow-up phase for on-going work, or more frequently as necessary until the completion of each definable feature of work. The results of the follow-up phase are documented in the daily Contractor quality control report:

- Ensure the work is in compliance with contract requirements;
- Maintain the quality of workmanship required;
- Ensure that testing is performed; and,
- Ensure that rework items are being corrected.

QC consists of a system of checks on field sampling and laboratory analysis (through the use of field blanks, duplicates, documentation of all sample movement, chain of custody records, etc.) to provide supporting information on the methods employed to ensure quality analytical data.

7.0
SCHEDULE

EARLY START	FINISH	REM DUR	PCT	1995																															
				MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC			
				8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11
				SOW#013, Phase 30 MOBILIZATION																															
17MAY95		0	0	MOBILIZE TO SITE																															
17MAY95	17MAY95	1	0	OBTAIN SECURITY PASSES																															
18MAY95	23MAY95	4	0	SET UP TRAILER																															
24MAY95	24MAY95	1	0	PERFORM SITE SPECIFIC TRAINING																															
				SWMU 66-SOLID WASTE MGT. UNIT 66																															
25MAY95	25MAY95	1	0	PERFORM SITE SURVEY - SWMU 66																															
25MAY95	30MAY95	4	0	MOBILIZE SUBCONTRACTOR																															
31MAY95	31MAY95	1	0	STONE BASE COURSES																															
31MAY95	1JUN95	2	0	CLEAR TREES & BRUSH/CHIP & SHRED																															
2JUN95	6JUN95	3	0	COLLECT/STAGE/REPACK POTENTIAL HAZ WASTE/DRUMS																															
7JUN95	14JUN95	6	0	COLLECT AND PACKAGE NONHAZARDOUS SOLID WASTE																															
7JUN95	14JUN95	6	0	COLLECT RECYCLABLE MATERIAL																															
15JUN95	16JUN95	2	0	EXCAVATE CONTAMINATED/DISCOLORED SOILS																															
19JUN95	20JUN95	2	0	SAMPLE DRUMS/SOIL FOR DISPOSAL																															
19JUN95	20JUN95	2	0	SAMPLE EXCAVATION AREA																															
21JUN95	21JUN95	1	0	DECONTAMINATE EQUIPMENT																															
21JUN95	23JUN95	3	0	QC TESTING																															
21JUN95	4JUL95	10	0	LABORATORY ANALYSIS																															
22JUN95	23JUN95	2	0	BACKFILL EXCAVATION AREA																															
26JUN95	26JUN95	1	0	SEED EXCAVATION AREA																															
27JUN95	25SEP95	65	0	HAZARDOUS WASTE STORAGE																															
5JUL95	21SEP95	57	0	LOADING/HAULING/UNLOADING OF SOLIDS																															

Plot Date 17APR95
 Data Date 14APR95
 Project Start 1MAR94
 Project Finish 31MAR99 *

Activity Bar/Early Dates
 Critical Activity
 Progress Bar
 Milestone/Flag Activity

4324
 MORRISON KNUDSEN CORPORATION
 SOUTH DIV ERAC PROGRAM - WO# 4324
 DO#0011 - MEMPHIS MASTER SCHEDULE

Sheet 1 of 3

Date	Revision	Checked	Approved

8.0 PROJECT ORGANIZATION

8.1 PROJECT MANAGER

The Project Manager (PM) shall maintain overall responsibility for the implementation of this Work Plan, as well as all other project operations. The PM will report to the designated SouthDiv representative for all project related activities and the MK Program Management Office (PMO) for project oversight, management direction, and resolution of any company-related matters. The PM will control all on-site professional, technical, and labor forces to ensure the adequate and timely completion of planned project tasks. Assisted by both on and off-site resources, the PM shall assure the following:

- Maintenance of a single point of contact for SouthDiv liaison on all project-related schedule, cost, safety, and technical matters, including any communications, meetings, or updates.
- Coordination of the project resources to assure that adequate safety and industrial hygiene controls are enforced to ensure safe and efficient conduct of project operations in compliance with the appropriate plans, procedures, and regulatory requirements.
- Provision of sufficient resources to support successful completion of the Work Plan and other project tasks.
- Maintenance of all appropriate project data, documents, and records, as well as the compilation of a final report.

8.2 SITE SAFETY AND HEALTH OFFICER

The Site Safety and Health Officer (SSHO) will report directly to the on-site PM and the MK SouthDiv Corporate Health and Safety Manager to ensure that the technical aspects of the project are in compliance with all plans, procedures, and regulatory requirements. Specific responsibilities include:

- Make recommendations, if necessary, to the PM for the control and elimination of existing and potential industrial hazards.
- Oversee the bioassay and sampling program to ensure proper monitoring of internal and external exposures.
- Perform a technical review of the data and final report.
- Develop and implement a Site Safety and Health Plan, and ensure that all project employees, subcontractors, and visitors understand the and carry out the plan.
- Conduct appropriate surveys and inspections to ensure that all industrial safety and hygiene hazards are appropriately identified, and assure that necessary precautions are in place prior to the initiation of work activities.

- Specify appropriate industrial hygiene and safety controls for work permits.
- Select instrumentation, personal protective equipment, and work techniques appropriate for the protection of project personnel, the public, and the environment.
- Review and maintain all appropriate project personnel records, including survey data; training, certification, and qualification records; industrial hygiene, and safety surveys; and permits, licenses, and instrument records.
- Maintain industrial hygiene, safety supplies and instrument inventories.
- Inspect and assist in the preparation of waste materials for shipment.
- Stop work when necessary to maintain a safe industrial work area.
- Implement, enforce, and adhere to any work permit requirements in areas under their control.
- Act under the direction of the PM to conduct all required monitoring surveys and other project tasks.

8.3 SITE SUPERINTENDENT

The site superintendent reports to the PM and has primary responsibility for the coordination and control of all field activities to insure that all tasks included in this work plan are completed.

- Coordinates the activities of all subcontractors. In conjunction with the PE/quality control (QC) supervisor, direct all subcontractors.
- Provides daily reports to the PM and PE/QC supervisor on the status of field activities.

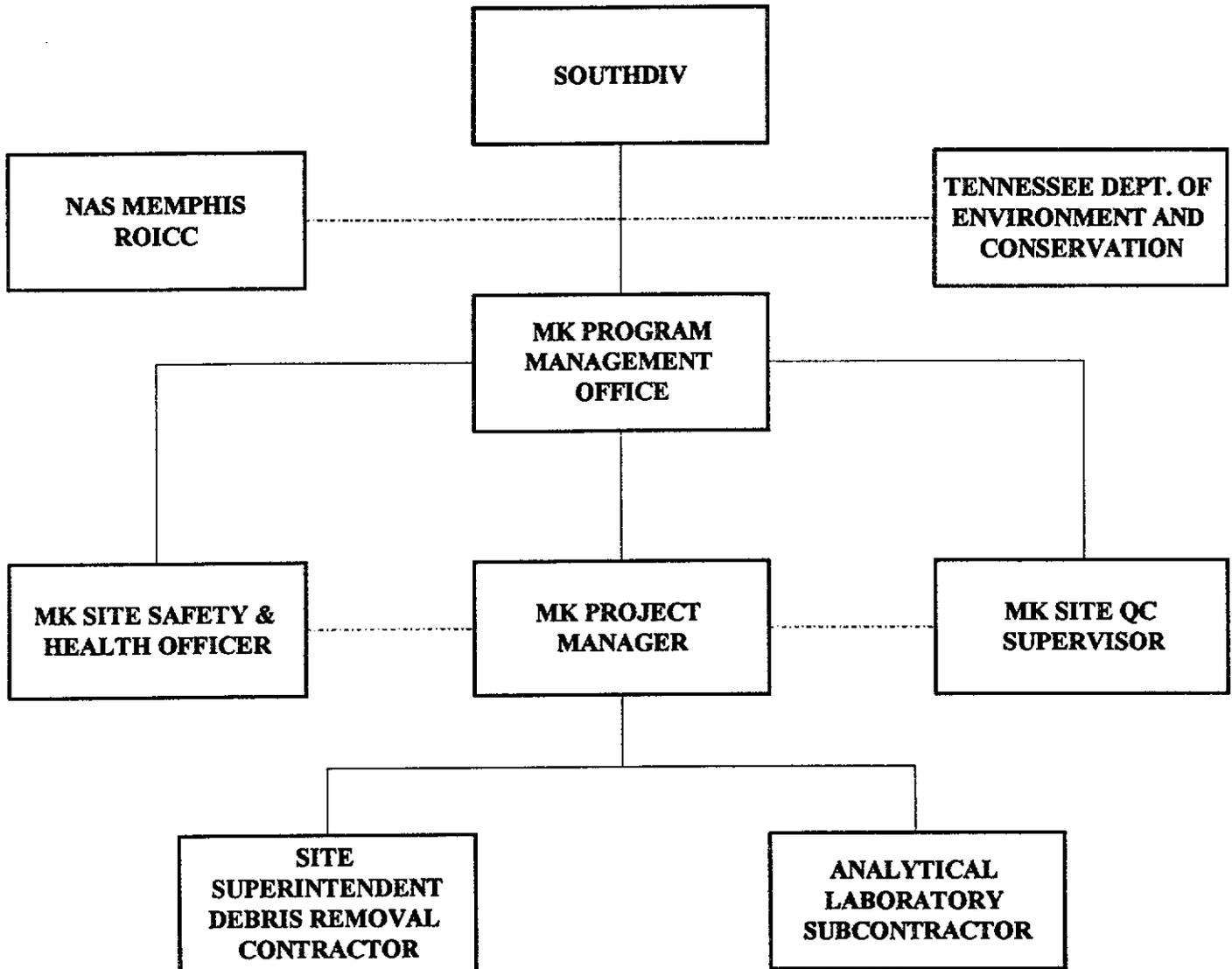
8.4 SITE QUALITY CONTROL SUPERVISOR

The Quality Control Supervisor reports to the PMO and has primary responsibility for the maintenance of a consistent high level of quality for the project.

- Reviews and checks all documents, reports and testing results.
- Coordinates with procurement, engineering, cost, and scheduling departments.
- Observes all field activities to insure compliance with this work plan.
- Keeps minutes of the periodic quality meetings.

Note: See Site Safety and Health Plan, Section 3, for names and contact numbers.

NAS MEMPHIS PROJECT ORGANIZATIONAL CHART



9.0 REFERENCES

- USEPA Guidance for RCRA Corrective Action Measures PB91-139881
- State of Tennessee Regulations Chapter 1200-1-7 Solid Waste Processing and Disposal.
- State of Tennessee Regulations Chapter 1200-1-11 Hazardous Waste Management.
- State of Tennessee Regulations Chapter 1200-1-13.09 Remedial Investigation and Feasibility Study.
- 49 USC 1801-1813 The Hazardous Materials Transportation Act, (as it applies to the transportation of potentially hazardous materials including samples and wastes.)
- 49 CFR 173, Subpart M Other Regulated Material; ORM-C (.1090 Asbestos)
- 49 CFR 172, 173, 178 Storage and shipping containers for the storage and transport of materials.
- 40 CFR Part 265, Subpart I The use and management of containers.
- EM-385-1-1 U.S. Army Corps of Engineers Safety and Health Manual Conduct of field operations.
- 29 CFR 1926 Conduct of field operations and hazardous waste operations.
- 29 CFR 1910.120 Training requirements for hazardous waste removal.
- 40 CFR Part 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices
- 40 CFR Part 262, Subparts B & C Shipping of contaminated materials.
- 40 CFR Part 261 Identification and listing of hazardous waste.
- 40 CFR Part 268 Land Disposal Restrictions.

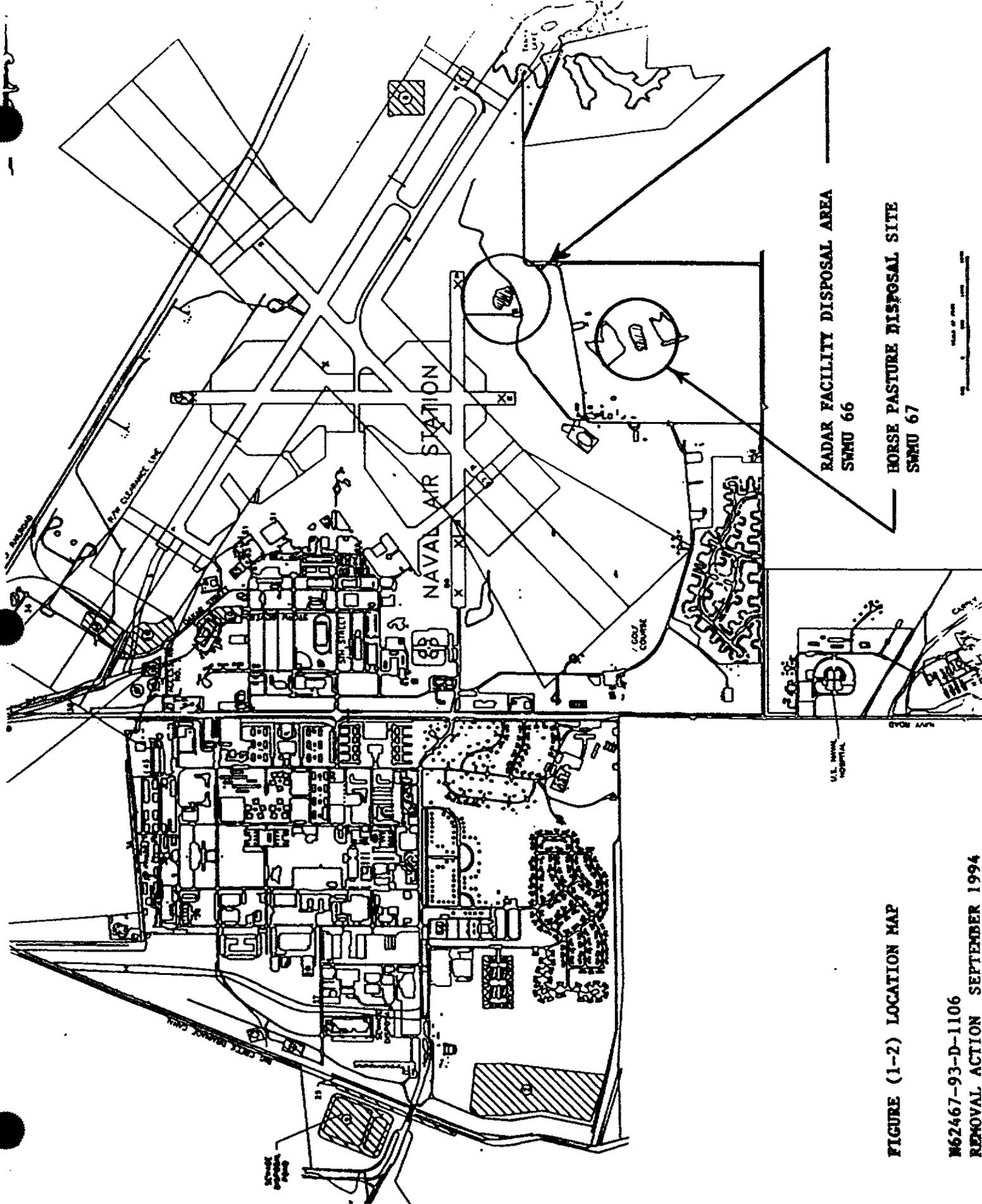
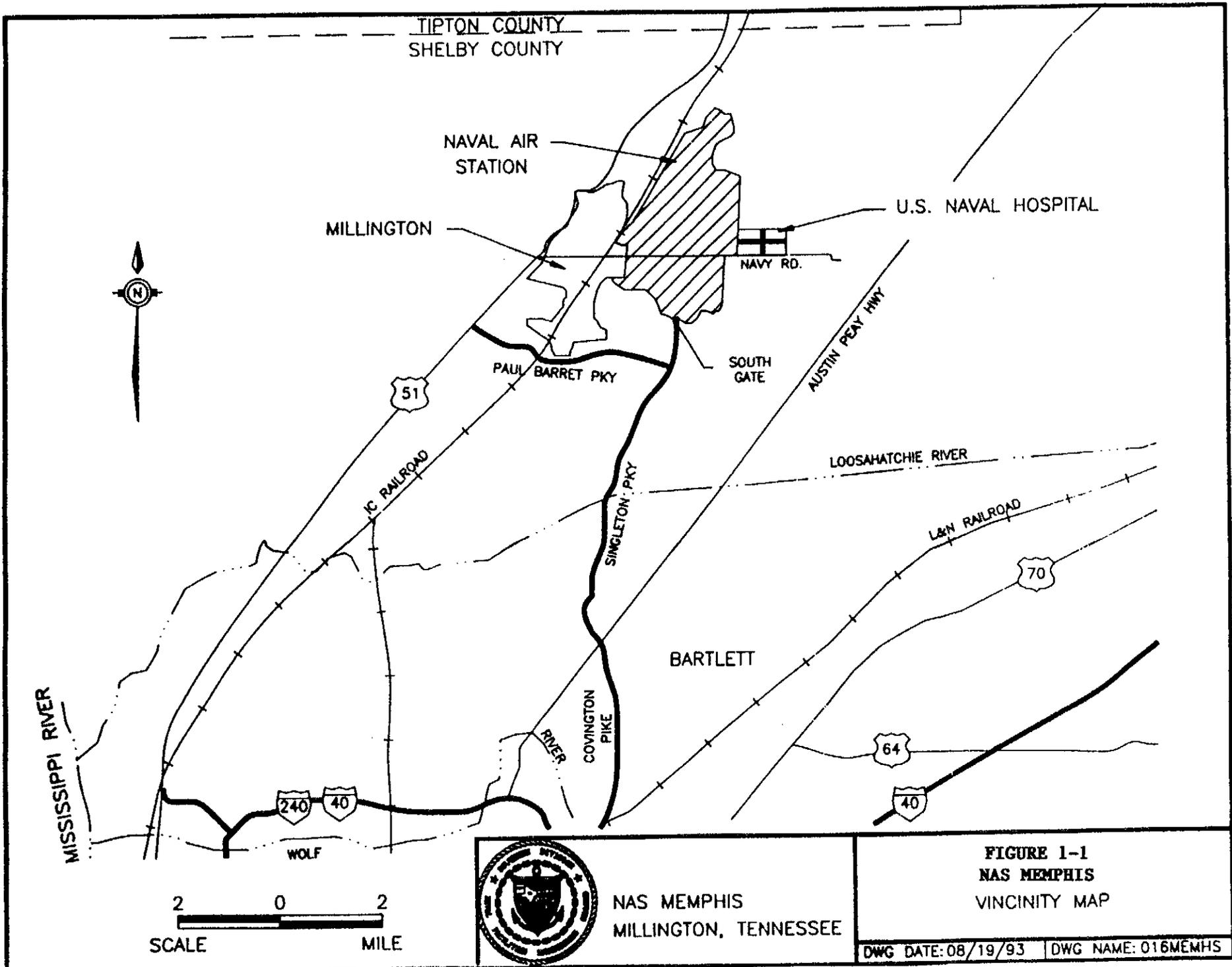


FIGURE (1-2) LOCATION MAP

M62467-93-D-1106
REMOVAL ACTION SEPTEMBER 1994



NAS MEMPHIS
MILLINGTON, TENNESSEE

FIGURE 1-1
NAS MEMPHIS
VINCINITY MAP

DWG DATE: 08/19/93 | DWG NAME: 016MEMHS

**APPENDIX A
SITE SAFETY AND HEALTH PLAN**

SITE SAFETY AND HEALTH PLAN (SSHP)

**NAS MEMPHIS
MILLINGTON, TENNESSEE**

**REVISION 0
APRIL 18, 1995**

**CONTRACT #N62467-93-D-1106
DELIVERY ORDER #0011
STATEMENT OF WORK # 013**

Prepared For:

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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SITE SAFETY AND HEALTH PLAN FOR REMEDIATION ACTIVITIES AT NAS MEMPHIS SWMU 66 AND 67

1.0 SITE DESCRIPTION, CONTAMINANT CHARACTERIZATION AND REFERENCES

1.1 INTRODUCTION

This Task Specific Site Safety and Health Plan (SSHP) describes safety and health requirements for remediation activities at NAS Memphis, specifically at SWMU 66 and 67. This SSHP is consistent with requirements of the Occupational Safety and Health Administration's (OSHA) Hazardous Waste Site Regulations, 29 CFR 1910.120 and 29 CFR 1926.65 along with the U.S. Army Corps of Engineers' *Safety and Health Requirements Manual* EM 385-1-1 dated October 1992.

This SSHP is applicable to all personnel who enter into work areas described in this SSHP and which are under Morrison Knudsen Corporation (MK) or MK's subcontractors' control.

1.2 SITE DESCRIPTION

Refer to Work Plan Section 1.0 and 2.0. A brief summary of the work tasks is described as follows. Table 1 is included to summarize identification of work areas; identify location of work areas; describe scope of work; and list potential contaminants.

SWMU 66, Radar Facility - The scope of work includes: clearing and grubbing; removal, identification, decontamination, transportation, and disposal of debris; excavation, stockpiling, sampling, and disposal of contaminated soils; and backfilling and restoration of the excavated area. Figure 1-2 in the Work Plan shows the general location of the work site. Debris will be segregated into four categories (Work Plan Section 2.4). The excavation and stockpiled soils will be sampled per the Sampling and Analysis Plan. All containers and drums will be sampled if determined to be necessary.

SWMU 67, Horse Pasture Site - The scope of work includes: clearing and grubbing; the removal, identification, decontamination, transportation, and disposal of debris; and restoration of the excavated area. Figure 1-2 in the Work Plan shows the general

location of the work site. Debris will be segregated into three categories (Work Plan Section 2.4). The excavation and stockpiled soils will be sampled per the Sampling and Analysis Plan. This site is not expected to contain any hazardous waste.

1.3 CONTAMINANT CHARACTERISTICS

The potential contaminants and debris are summarized below based on the best available information. The majority of the information on contaminants will be obtained during screening operations as debris are unearthed and segregated.

Information concerning some of the potential contaminants can be found in Table 2. MSDS's or NIOSH Pocket Guides for each of the identified contaminants will be organized into a separate MSDS Binder located at the site as the information becomes available.

SWMU 66, Radar Facility - scrap metal, appliances, fencing material, corrugated roofing material, scrap wood and metal, and other discarded items. Drums are visible. It is unknown whether they are empty or if they were emptied in place at disposal. This area is in a ravine approximately 8 - 12 feet deep, 50 feet wide by 350 feet long. Assume drum contents was (is) solvent based material of aromatic and/or chlorinated hydrocarbon derivatives. Assume potential for heavy metal exposure, most likely inorganic lead compounds are present. Assume spent paint, thinners, lubrication and hydraulic fluids are present. No utilities are believed to be in the area of excavation and removals.

SWMU 67, Horse Pasture Site - debris consisting of fencing material, corrugated roofing material, aluminum boats, discarded farm wagons, scrap wood and metal, engine storage tanks, tires, plastic seats, concrete, wooden pallets, and other discarded items. There is no visible evidence or reason to believe that there has been hazardous contamination. It is possible that inorganic lead surface coatings may be encountered. The debris pile is approximately 140 feet long by 100 feet wide and up to 10 feet high. No utilities are believed to be in the area of excavation and removals.

1.4 REFERENCES

1. *Interim Measures Work Plan RCRA Facility Investigation, NAS Memphis; SWMU 45, Ensafe/Allen and Hoshall, October 28, 1994.*
2. *Comprehensive RFI Work Plan, NAS Memphis, Revision 0, Ensafe/Allen and Hoshall, October 6, 1994.*
3. *Safety and Health Requirements Manual, US Army Corps of Engineers, EM 385-1-1, October 1992.*
4. *Pocket Guide to Chemical Hazards, National Institute for Occupational Safety and Health (NIOSH), 1990.*
5. *Limits for Air Contaminants, Title 29 CFR Part 1910 Section 1000, Table Z-1, July 1, 1993 revision.*
6. *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Indices, American Conference of Governmental Industrial Hygienists (ACGIH), Second Printing, 1993 - 1994.*
7. *Accident Prevention Plan For Naval Facilities Engineering Command Southern Division, Prepared by Morrison Knudsen under contract N62467-93-D- 1 106, May 20, 1994, Revision 0.*
8. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/EPA, DHHS (NIOSH) Publication No. 85-115, October 1985.*
9. *Industrial Hygiene Procedures Manual, Morrison Knudsen Corporation EC&E Group, Rev.No 0, April 1994.*
10. *Safety and Health Program Description for Hazardous Waste Operations, Morrison Knudsen Corporation, Rev. 1, September 1994.*
11. *Safety Manual, Morrison Knudsen Corporation, MK-Ferguson Group, 1/27/89.*

12. The following MK NAVFAC SouthDiv Project Procedures:

PHSP 001.1, Hazardous Energy Control (Lockout/Tagout), 11/4/94.

PHSP 002.1, Emergency Response, 11/4/94.

PHSP 003.1, Spill Response, 11/4/94.

PHSP 005.1, Excavations, 11/4/94.

PHSP 004.1, Incident Reporting, 3/2/95.

13. Maslansky , Carol J. and Steven P., *Air Monitoring Instrumentation, A Manual for Emergency, Investigatory, and Remedial Responders*, Van Nostrand Reinhold, 1993.

2.0 SAFETY AND HEALTH HAZARDS SUMMARY

2.1 OVERVIEW

Any investigative and remediation tasks completed at an uncharacterized landfill presents a moderate to high risk of acute exposure to chemical, physical and biological agents. The potential risk of acute exposure to chemical contaminants will be significantly reduced if the engineering controls, administrative controls which includes air monitoring and Personal Protective Equipment (PPE) requirements are strictly adhered to. The workers must be on the alert for unexpected objects being encountered during excavations and debris removal. Handling drums suspected of containing toxic, reactive and/or flammable materials presents the greatest risk. Steps to insure identification and confirmation of the object uncovered must be completed and the object must be staged properly.

Other hazards at this project site are construction safety hazards associated with heavy equipment; soil excavation and penetrations and potential contact with buried drums and/or containers; contact with underground utilities; walking and working surfaces; traffic control to include haul road layout; slinging and rigging for moving objects out of the excavation to staging; physical hazards during clearing and grubbing, site restoration to include backfilling and compaction; and eye/head/feet physical hazards. heat stress and cold Stress may be a concern depending on the date of start-up for this project.

2.2 ACTIVITY HAZARD ANALYSES

Activity hazard analyses have been prepared for each anticipated task in accordance with EM 385-1-1, October 1992³. These hazard analyses are contained in Appendix A of this SSHP. Each site activity will be reviewed by supervision prior to start to determine if the prepared hazard analysis adequately addresses the planned activity. If it is found the hazard analysis is not adequate, additional hazard analysis will be prepared as needed. Pre-entry briefing will be conducted with all affected workers.

2.3 CHEMICAL HAZARDS

The potential chemical contaminants considered most significant on this project with their routes of exposure, exposure limits and signs/symptoms of overexposure are presented in Table 2. This list is preliminary and will be updated as the debris is identified and characterized on site.

2.4 CONSTRUCTION SAFETY HAZARDS

2.4.1 Physical Hazards

The physical hazards associated with the project include the use of heavy equipment such as, dump trucks, backhoes, excavators, cutting saws for clearing and grubbing, high voltage electrical lines, heat stress and cold stress (depending on season) and other adverse weather conditions, and noise. These hazards could cause slips, trips, and falls, cuts, contusions, and lacerations, traffic accidents, electrical shock, fires and explosions, crunching, pinching, injury from falling objects and heat related disorders. Hazards also arise from vehicular traffic in and around the support zone.

2.4.2 Noise

Certain operations may create noise levels that exceed the applicable limits. Hearing protection will be provided for all field personnel and its use is required when noise levels exceed 85 dBA steady state or 140 dBA impulse, regardless of the duration of exposure. A comprehensive Hearing Conservation Program will be implemented when noise levels equal or exceed 85 dBA as an 8 hour time weighted average.

2.4.3 Heat Stress and Cold Stress

All employees are to be alert to the signs and symptoms of heat stress. Should any of the following symptoms occur—extreme fatigue, cramps, dizziness, headache, nausea, profuse sweating, pale clammy skin—the employee is to immediately leave the work area, rest, cool off, and drink plenty of cool water. If the symptoms do not subside after a reasonable rest period, the employee shall notify their supervisor and SSHO and seek medical assistance. The SSHO will be alert to signs of heat stress in site personnel and

increase the frequency of breaks and fluid consumption as necessary. Refer to Section 7.2.6 for more specific guidance on Heat and Cold Stress management.

2.4.4 Excavations

Open excavations are a hazard from falling into the excavation and/or side wall collapse while personnel are near or inside the excavation. Refer to MK project procedure PHSP 005.1 for specific excavation requirements. Excavations near or around building and structural supports are a hazard from collapse or structural damage. To minimize these hazards the excavation will be barricaded. Existing structures will be braced or underpinned as determined to be necessary. The excavation walls will be properly sloped or shored according to OSHA and Corps of Engineers requirements (EM 385-1-1, Section 25) prior to any personnel entry into the excavation. For excavations less than 20 feet in height, the maximum slope shall be 34° measured from the horizontal (1-1/2 horizontal to 1 vertical) unless the sloping or benching system is designed by a registered professional engineer. Excavations greater than 20 feet must be designed by a registered professional engineer. Support systems may be used, but they must be in accordance with manufacturers specifications, limitations, and recommendations or they must be selected from tabulated data designed by a registered professional engineer. Personnel not directly involved in excavation activities will remain at least ten feet away from the edge of the excavation. Such work shall be carefully planned with input from the SSSHO as to protective measures and equipment use. Positive identification of underground utilities and services is required. An Excavation and Trenching Permit system shall be used whenever excavation, trenching or penetrations are planned. Figure 1 is the MK Excavation and Trenching Permit. MK and the Public Works Department (PWD) on site will provide and coordinate underground utility locator service. Individuals shall be properly trained prior to initiating work activities. A competent person shall evaluate excavations prior to personnel entry.

2.4.5 Overhead Power Lines

Overhead power lines represent an electrocution hazard. Work conducted in proximity of overhead power lines shall be performed in accordance with the requirements contained in the EM 385-1-1, Section 11.E.

2.4.6 Underground Utilities

Underground utilities represent a fire/explosion hazard, electrocution hazard, and excavation collapsing/filling with water hazard. Underground utilities will be located to the extent possible via historical information, as-built drawings, and through the use of metal detectors and/or other devices such as ground penetrating radar prior to initiating excavation. Positive identification of underground utilities and services is required. An Excavation and Trenching Permit system shall be used whenever excavation, trenching or penetrations are planned. If energy control is anticipated for underground utilities, the requirements established in MK project procedure PHSP 001.1 shall be followed. MK and the Public Works Department (PWD) onsite will provide and coordinate underground utility locator service. An underground utility locator service that uses ground penetrating radar may be used whenever the validity of As-Built drawings is questionable or the accuracy of utility equipment and its application to a particular job site may be less than adequate.

2.4.7 Fire and Explosion

No hot work or open flames will be allowed in the work area without a "Hot Work Permit". The MK Hot Work Permit form is attached as Figure 2. Hot Work Permitting must be coordinated through the base Fire Department. If fire or explosion hazards exist, all tools will be of the non-sparking variety and pumps/blowers will be bonded or grounded to minimize hazards associated with static discharge.

At least one 40 lb or equivalent "ABC" multi purpose fire extinguisher shall be maintained at the entrance to the Contamination Reduction Zone for fire response. All mobile heavy equipment must be fitted with a minimum 10 lb "ABC" fire extinguisher. Any temporary trailers or structures must have fire extinguishers installed in accordance with NFPA 10. Use of any tool that can be considered an ignition hazard where fire and explosion hazards may exist is strictly prohibited. Portable power tools shall be explosion proof in accordance with NFPA 70B and 70E, Class 1, Division 1, Group D or otherwise approved for use in potentially explosive atmospheres.

2.4.8 Electrical Hazards, Control of Hazardous Energy (Lockout/Tagout)

If energy control is anticipated for any utility, mechanical or process equipments, the requirements established in MK project procedure PHSP 001.1 shall be followed. There are many ways an employee can come into contact with energized circuits. The most common are with hand held electric power tools, overhead or buried power lines. All overhead and buried power lines will be identified prior to site activities. Ground Fault Circuit Interrupters (GFCIs) will be installed on all portable electrical equipment and installations in accordance with EM 385-1-1 Section 11.C.05.

Any system where the potential exists for unexpected energizing, start-up, or release of kinetic or stored energy during servicing and maintenance resulting in injury or damage shall be isolated in accordance with the requirements of PHSP 001.1 which is directly traceable to EM 385-1-1 Section 12. The site superintendent has the responsibility for energy control. The Public Works Department (PWD) on site will provide energy control services which will be coordinated by MK.

2.4.9 General Safety Hazards

Other possible safety hazards include the potential for slipping, falling, head trauma, lifting heavy objects, insect and snake bites, etc. All personnel working on the project will wear appropriate PPE, including eye protection, head protection (hard hat) and steel-toed boots as required by the SSHO. At a minimum, Level D protection is required outside of the exclusion zone. First aid will be available on site to take care of any minor injuries. Local emergency response organizations shall be contacted to deal with emergency situations more serious than cuts or scrapes.

2.4.10 Traffic and Work Site Control Hazards

Potential hazards from vehicular traffic around the work areas will be controlled placing approved barricades and signs around the work area. Suggested types of barricades along with placement and signs will follow the requirements of EM 385-1-1, Section 8 and 29 CFR 1926.201 and 202.

2.4.11 Clearing and Grubbing

Clearing and grubbing of any work site shall be completed in accordance with the requirements of EM 385-1-1 Section 31.

2.4.12 Access and Haul Roads

If special access and haul roads are constructed for this project, they shall be constructed in accordance with EM 385-1-1 Section 21.I.

2.4.13 Handling Drums and Other Containers

Practices and procedures for safe handling of drums and other hazardous waste containers shall be established at mobilization during the project kick-off safety meeting and be based upon the guidance of Reference 8 Section 11 and Section 16 in this SSHP. Drums and containers suspected of containing hazardous material shall be visual inspected and categorized by the following: radioactive; leaking/deteriorated; bulging; explosive/shock sensitive; and small volume individual container of laboratory wastes or other dangerous materials.

Assume all unlabeled drums contain hazardous material until their contents is characterized. If buried drums are suspected, an underground location device shall be used at the MK PM and SSHO discretion to estimate the location and depth of drums.

A preliminary drum/container handling plan must be established by the MK PM based on the category of the drums/container identified. The drums can either be sampled in place and characterized or moved to a staging area for sampling and characterization. At all times minimize the amount of handling and use remote moving/handling equipment.

Overpacks shall be available and ready before any attempt is made to move drums along with portable spill containment and clean up supplies.

Drums shall be opened in Level B PPE from behind explosive resistant shields using non-sparking tools or with remote opening equipment designed for blast containment. Air monitoring shall be completed continuously and as close to the source as possible. The drum or container shall be surveyed for ionizing radiation.

Staging of the drums shall follow the guidance in Reference 8. All staging areas shall be equipped with at least a one foot high containment wall.

3.0 RESPONSIBILITIES AND AUTHORITIES SUMMARY

3.1 RESPONSIBILITIES/AUTHORITIES

This section describes the roles and responsibilities of project personnel with regard to safety and health. Ultimately, responsibility for the safety and health lies with the individual. All personnel must be cognizant of the hazards and the methods of reducing the risk of injury and illness. All personnel will comply with the rules and procedures set forth in this plan and will make project management aware of any conditions which may jeopardize the welfare of project workers and/or the general public. The specific personnel names and telephone numbers of responsible persons are presented in Table 3.

3.2 PROJECT MANAGER

The Project Manager is responsible for the management of all aspects of the project, including safety and health. The Project Manager is responsible for ensuring that all project tasks receive appropriate safety and health review before commencement of field activities and that the necessary equipment and facilities are available to implement the SSHP.

3.3 SITE SUPERINTENDENT

The Site Superintendent are responsible for ensuring that the safety and health aspects for their particular task are addressed. They are responsible for the implementation of the SSHP in the field and for ensuring that all project personnel comply with provisions of the plan. The Site Superintendent are also responsible for notifying the Site Safety and Health Officer (SSHO) of any changes in work conditions which may affect the safety and health aspects of the task. The Site Superintendent or designated foreman are responsible to conduct Plan of the Day (POD) meetings, pre-entry briefings, post job briefs and conduct or insure that other training is completed.

The Site Superintendent must notify the SSHO of all accidents as soon as practical. The Job Supervisor shall conduct an accident investigation and record the results of the investigation on a Supervisor Accident Investigation Report form or equivalent form.

Lessons learned from each accident shall be developed by the Job Supervisor and communicated to employees during pre-entry site briefings.

3.4 CERTIFIED INDUSTRIAL HYGIENIST (CIH)

The CIH is responsible for preparation of the Site Safety and Health Plan. The CIH is also responsible for making modifications to the plans and recommending changes to the work tasks if they affect safety and health. The CIH is responsible for ensuring that all required sampling/monitoring is performed and that all required safety and health documentation is maintained. The CIH may assign some tasks to a site Safety and Health Officer for implementation.

3.5 SITE SAFETY AND HEALTH OFFICER (SSHO)

The Site Safety and Health Officer (SSHO) is responsible for the day-to-day implementation of the Site Safety and Health Plan, and verification of compliance with the SSHP and all applicable occupational safety and health rules and regulations. The SSHO has the authority to suspend work at any time if there is an imminent threat to the health and safety of project workers or the general public. The SSHO shall assure the Navy's designated authority at the site is notified immediately of any accident including spills. The SSHO shall assist in the accident investigation effort and shall have final approval authority for accident reports. Section 8.3 of the Work Plan describes in detail the role and responsibilities of the SSHO on this project.

3.6 SUBCONTRACTORS

All subcontractors are required to abide by the requirements of this Site Specific Safety and Health Plan. They are also required to comply with all applicable and appropriate federal, state, and local laws, standards, and regulations. They must notify the SSHO of all accidents as soon as practical. Subcontractors must maintain records of all first aid recordable, and lost time injuries. Notify the Site Safety and Health Officer of any changes in work conditions which may affect the safety and health aspects of the task. The Site Superintendent or designated foreman are responsible to conduct pre-job briefings and to conduct or insure that other training is completed.

3.7 NEAREST EMERGENCY MEDICAL FACILITY

Directions to Methodist North Hospital

Methodist North Hospital
3960 Covington Pike
Memphis, Tennessee
901-372-5211

From NAS Memphis Main Gate:

Exit Base through South Gate (Singleton Parkway)

Continue on Singleton Parkway through the stop signs

Singleton Parkway and Covington Pike will intersect at a red light (about 5 miles)

You will see the entrance to the emergency room 700 feet past this light on the left.

Note: refer also to Table 3 and Figure 3

4.0 TRAINING REQUIREMENTS SUMMARY

4.1 HAZARDOUS WASTE OPERATIONS INITIAL TRAINING

All personnel entering a contamination reduction zone or exclusion zone shall have completed the initial 40-Hour Hazardous Waste Operations Safety and Health Training and three days of supervised experience pursuant to 29 CFR 1910.120(e)(3).

4.2 HAZARDOUS WASTE OPERATIONS ANNUAL REFRESHER TRAINING

All personnel shall receive eight hours of refresher training annually, pursuant to 29 CFR 1910.120(e)(8), as necessary.

4.3 HAZARDOUS WASTE OPERATIONS SUPERVISOR/MANAGER TRAINING

All on-site supervisors and managers as well as subcontractor superintendents and foremen shall receive an additional eight hours of specialized training pursuant to 29 CFR 1910.120(e)(4).

4.4 SITE-SPECIFIC TRAINING

All personnel shall receive site-specific training prior to entering the site or commencement of work. All site employees and subcontractors, including those working in the support zone, shall receive this training. The SSHO is responsible for this training. Site visitors shall receive site-specific training prior to entering an exclusion zone. This training will cover the SSHP, but not necessarily be limited to, the following topics.

- Names of site safety and health personnel.
- Safety, health and other hazards present on the site.
- PPE requirements.
- Safe work practices.
- Engineering controls.
- Medical surveillance requirements, including recognition or symptoms and signs which might indicate overexposure to hazards.

- Decontamination procedures.
- Emergency procedures.
- Spill containment plan.
- Confined Space Entry
- Energy Control.
- Requirements of this SSHP.

4.5 SAFETY MEETING

A safety meeting for all employees and subcontractors shall be conducted by the project supervisor(s) at project kickoff and prior to each change in operation. A safety meeting for all MK Project Supervisors and Subcontractor Superintendents and Foremen shall be conducted at least once per month. The monthly meeting is chaired by the Project Manager or construction superintendent with assistance from the SSHO. This training shall be documented to include date, time, personnel in attendance, topics, and instructor. The Safety Meeting shall be documented via project field log book or separately on a training record form (See Figure 4). This meeting is discussed in Section 8.2.1 also.

4.6 CONFINED SPACE ENTRY TRAINING

Not anticipated on this project. However, if excavations greater than 5 foot are to be entered, the excavation shall be treated as a permit confined space until authorized to be downgraded to non permit confined space based on initial and periodic air monitoring and engineering controls in place to safeguard the excavation from collapse.

4.7 RESPIRATORY PROTECTION

All personnel required to use respiratory protection must be trained in respirator use, care and maintenance pursuant to 29 CFR 1926.103 and 29 CFR 1910.134.

4.8 HAZARD COMMUNICATION

All personnel will complete hazard communication training pursuant to 29 CFR 1910.1200 and 29 CFR 1926.59 regarding all potentially hazardous chemicals to which they might be exposed. Discussed in Section 8.4 also.

4.9 CPR/FIRST AID

The SSHO and at least one other site worker at each work site shall be certified in basic first aid and CPR by the American Red Cross or equivalent organization.

4.10 ASBESTOS TRAINING

Not anticipated as required.

4.11 INORGANIC LEAD TRAINING

Not anticipated as required. This may change as debris characterization is completed. If inorganic lead compounds are detected, all personnel working on any of the SWMUs where inorganic lead contamination is detected shall receive training on the OSHA Lead Standard, 29 CFR 1926.62.

4.12 CADMIUM TRAINING

Not anticipated on this project.

4.13 INORGANIC ARSENIC TRAINING

Not anticipated on this project.

4.14 SUBSTANCE-SPECIFIC TRAINING

In the event that the OSHA regulations regarding other contaminants or hazards become applicable, substance-specific training pursuant to the subject regulation will be performed for the affected project personnel.

4.15 DEPARTMENT OF TRANSPORTATION (DOT) HAZARDOUS MATERIALS TRAINING

All personnel required to classify, mark, select packaging, inspect, load and transport hazardous materials must be trained to 49 CFR Part 172 Subpart H.

4.16 PLAN OF THE DAY (POD) MEETINGS

POD Meetings shall be held at the beginning of each shift to go over the planned work as well as any safety and quality concerns. The date, time, personnel attending and meeting minutes shall be documented via project field log books or separately on a training record form (see Figure 4). The Plan of the Day meeting is discussed in Section 8.2.1 also.

4.17 PRE AND POST-ENTRY BRIEFINGS

Pre-entry briefings shall be held for employees prior to their initiating any new or differing site activity and at such other times as necessary to ensure employees are knowledgeable of the plan and activity, hazard analysis, and that the plan and analysis are being followed.

Post-entry briefings shall be held as needed to assure changes in conditions or work methods are promptly reported and addressed. In addition, all incidents will be promptly evaluated and the evaluation results will be communicated to personnel in post-entry briefings and other meetings. Lessons-learned from these evaluations shall be communicated to all affected personnel. Pre and Post Entry Briefings are discussed in Section 8.6 also.

4.18 RECORDKEEPING

Written records of all required training and briefings shall be maintained on site by the SSHO. These records shall be made available to U.S. Navy personnel upon request and will be included as part of the Closure Report for the project. Subcontractors to MK shall provide copies of training certification or a letter summarizing each employee training record to the MK Project Manager or SSHO prior to mobilization activities onsite.

4.19 TRAINING REQUIREMENTS MATRIX

A training requirements matrix is shown in Table 4.

5.0 MEDICAL PROGRAM SURVEILLANCE PROGRAM REQUIREMENTS

5.1 SUMMARY

All project personnel who work within the exclusion zone for more than three days per month, or are required to use respiratory protection regardless of the time within the exclusion zone, will participate in a medical surveillance program as described in this section. Clean new construction activities will not require participation in the Medical Surveillance Program unless special tasks dictate as determined by the SSHO.

The medical surveillance program consists of a baseline or initial examination, an annual medical examination, a termination examination, and episodic medical examinations as necessary. **Termination or Exit physicals shall be required on this project.**

At a minimum, the content of the initial, annual and termination examinations shall consist of the following medical tests and procedures (or as determined by the examining physician):

- Medical and occupation history.
- Complete physical examination.
- Pulmonary function test (FVC and FEV 1.0).
- Complete blood count.
- Audiometry.
- Complete urinalysis.
- SMAC-22 biochemical profile.
- Resting electrocardiogram.
- Creatinine clearance.
- SGPT.
- Vision screen.
- Chest X-ray (PA) (at the direction of the examining physician).

Special Requirement #1 - pre-employment or pre-task baselines shall be obtained for heavy metals via 24 hour urine collection and analysis for each MK employee and subcontractor working in any of the SWMU exclusions zones on a routine basis during the work campaign. Metals analyzed for include antimony, arsenic, cadmium and chromium.

Special Requirement #2 - pre-employment or pre-task baselines shall be obtained for heavy metals, specifically cadmium and lead via whole blood collection and analysis for each MK employee and subcontractor working in any of the SWMU exclusions zones on a routine basis during the work campaign.

An episodic examination will be required if any worker develops signs or symptoms related to the possible overexposure to hazardous substances or other health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation. The scope of any episodic examination will be left to the discretion of the examining physician.

A copy of the examining physician's written opinion about the employee's ability to perform work on this hazardous waste site and use respiratory protection, and a statement that the physician has informed the employee of the results of the examination shall be kept on site. Subcontractors must provide this information to the MK Project Supervisor or the SSHO prior to mobilization activities on site.

The examining physician must be provided with the following information:

- Information on the employee's anticipated or measured exposure levels.
- PPE used or to be used.
- A description of the employee's duties as they relate to the employee's exposures.
- A copy of 29 CFR 1910.120 (optional).

5.2 DRUG ABUSE PREVENTION PROGRAM

Morrison Knudsen Corporation is committed to the establishment and maintenance of a safe and efficient work environment for all employees free from the effects of alcohol, illegal drugs, other controlled substances, and prohibited items. Refer to Reference 7 for more details on the substance abuse program.

5.3 RECORDKEEPING

Arrangements shall be made with the examining physician(s) or others to assure long-term storage of medical records in accordance with 29 CFR 1910.120. Statements by the examining physician(s) attesting to the medical qualification of individual workers shall be maintained at the project site. These statements must not contain the specific results of medical examinations or tests. These statements shall be made available to the SSHO or U.S. Navy personnel upon request.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

6.1 GENERAL REQUIREMENTS

In addition to engineering controls and work practices, personal protective equipment (PPE) shall be used to protect personnel from exposure to contaminants which may be encountered during activities on site as warranted. The following guidelines will be followed:

- Respirators and other PPE necessary to protect the health of employees will be provided by their employer.
- Only NIOSH/MSHA-approved respirators will be used.
- The respirator user's medical status will be reviewed before work is performed requiring respirator use.
- Written standard operating procedures governing the use of respirators and other PPE as warranted at the site will be provided.
- Respirators will be assigned to individual employees for their exclusive use and marked to indicate to whom it was assigned, for the duration of this scope of work.

Table 5 presents the basic levels (Level B, C, Modified D, and D) of PPE.

Table 6 lists the minimum PPE level required for each task or operation. If air sampling/monitoring indicates that modification to the levels of protection are warranted, the SSHO is empowered with the authority to authorize the modification based on the guidance provided in Table 7, Airborne Contaminant Response Criteria.

The PPE has been selected based on the site specific hazards. If conditions change, PPE selection and use shall be reviewed by the SSHO. Personnel will be trained if necessary on the use and limitations of specific pieces of PPE prior to initiation of work by the Project Supervisor with assistance from the SSHO.

PPE will be maintained and stored in accordance with the manufacturer's recommendation and good industrial hygiene practices. Personnel will inspect PPE prior to each use to assure the PPE is clean and good working order. Training will be provided to personnel concerning PPE inspection criteria.

Where needed, PPE donning and doffing procedures will be developed or reviewed and personnel will be trained on these procedures by the Project Supervisor with assistance from the SSHO.

The SSHO shall conduct evaluations of effectiveness of PPE. Revisions in PPE selection and use will be made as warranted. Supervision in coordination with the SSHO shall address medical considerations, including work limitations due to temperature extremes, when assigning PPE requirements to personnel.

7.0 AIR MONITORING AND SAMPLING

Air monitoring refers to direct real time reading of airborne concentrations and air sampling refers to time integrated air sampling either personal or area samples.

7.1 GENERAL

This section describes the air sampling and air monitoring program performed to evaluate project worker exposure to potentially hazardous airborne materials and to evaluate off-site impacts. The air sampling/monitoring results will be used to:

- Assess worker exposure to potentially hazardous materials with respect to the Permissible Exposure Limit (PEL) for Air Contaminants (Title 29 Code of Federal Regulations, Part 1910.1000) or other published exposure levels.
- Assess the adequacy of engineering controls and respiratory protection.
- Delineate areas where controls or respiratory protection is needed.
- Establish work control zones.

7.2 AIR MONITORING

7.2.1 Volatile Organic Compounds

A direct-reading, real-time photo-ionization (PID) and flame-ionization (FID) detection instrument capable of detecting volatile organic compounds (VOCs) will be used whenever excavation and penetration in potentially contaminated areas occurs and during characterization of debris. Readings will be taken at locations that reflect approximate concentrations of organic vapors and gases in the breathing zone of excavation personnel. Results of the organic vapor and gas monitoring will be documented. If necessary, the level of personal protective equipment used by excavation/penetration personnel will be modified. Section 6 describes the level of PPE to be used based on the concentration of organic vapors and gases in the breathing zone of project personnel. The direct-reading real-time organic vapor and gas monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, background readings

will be recorded in the Contamination Reduction Zone (CRZ), and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site. A charcoal filter should be used on the FID if the presence of methane gas is suspected.

Colorimetric indicator tubes (e.g., Dräger tubes) will be used at the SSHO's discretion whenever the direct-reading real-time instrument measures breathing zone concentrations of organic gases or vapors exceeding 2 part per million (ppm) greater than background concentrations. The following compounds may be measured by colorimetric indicator tubes: benzene, toluene, xylene, ethylbenzene, petroleum hydrocarbons (n-Octane), and trichloroethene (TCE). If benzene or other volatiles are detected, the level of PPE will be upgraded as specified in Section 6, or as determined by the SSHO. Additional colorimetric indicator tubes may be required as characterization continues.

7.2.2 Airborne Dust

A direct-reading real-time instrument capable of detecting airborne dust (e.g., MIE Miniram) may be used whenever warranted based on visible observations of excessive dusts. Readings will be taken at locations that reflect approximate concentrations of airborne dust in the breathing zone of personnel. Results of the airborne dust monitoring will be documented. If necessary, the level of PPE used by personnel will be modified or engineering controls enhanced. The direct-reading real-time monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site. When such monitoring is conducted and results are greater than 10 mg/m³ total dust concentration, immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel.

7.2.3 Confined Space Monitoring

Not anticipated for this project. However, if excavations greater than 5 foot are to be entered, the excavation shall be treated as a permit confined space until authorized to be downgraded to non permit confined space based on initial and periodic air monitoring and engineering controls in place to safeguard the excavation from collapse. Real time

air monitoring shall be conducted for % LEL, O₂, and H₂S. See Section 7.2.7 for % LEL, O₂, and H₂S survey instrumentation for use during SWMU characterization and debris removal activities.

7.2.4 Perimeter Monitoring

Perimeter monitoring to evaluate emissions of VOCs will be performed periodically during soil excavation. At a minimum, perimeter monitoring shall be performed at two-hour intervals initially using a direct-reading real-time organic vapor instrument. When such monitoring is conducted and results are 5 ppm higher than background levels of organic vapors, immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel.

Perimeter monitoring to evaluate emissions of airborne dust may be performed periodically during soil excavation as warranted. When such monitoring is conducted and results are greater than 1.0 mg/m³ (10 times less than the TLV-TWA listed in Section 7.2.2), immediate steps will be taken to determine the cause; make changes to site operations; evacuate unprotected personnel and the public, if necessary; and notify agency contact personnel.

7.2.5 Noise Monitoring

Noise monitoring will be performed as warranted at the initiation of each task or operation to determine the sound levels associated with the particular task or operation. Sound levels will be determined at locations that best approximate the sound levels at the ear of potentially affected personnel. Noise monitoring equipment will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site.

7.2.6 Heat Stress and Cold Stress Monitoring

When temperatures at the site are above 65°F, the wet bulb globe temperature (WBGT) may be monitored to assess the potential for heat stress. Work/rest period will be adjusted according to the guidelines stated in the current edition of *ACGIH Threshold Limit Values for Chemical Substances and Physical Agents*⁵. When the clothing worn differs from the ACGIH standard ensemble such as in the case of workers wearing semipermeable or impermeable, guidelines established in the NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities⁹, Section 8 should be consulted. The following is a summary from that document.

When employees are required to wear impermeable chemical protective clothing in temperatures exceeding 70°F, employees shall use the "buddy system" to monitor each other's pulse rate at the start of each rest period. If the pulse rate exceeds 110 beats per minute, the next work period shall be shortened by one-third without shortening the rest period. The pulse rate shall be monitored again at the beginning of the next rest period and if the pulse rate exceeds 110 beats per minute, the work period shall again be shortened by one-third. No employee shall be permitted to continue working in PPE if his or her pulse rate exceeds 110 beats per minute continuously. Table 8, reprinted from reference 9 can be used to establish work/rest periods and the frequency of monitoring pulse rates.

Cold Stress Guidelines

Guidelines for the prevention of cold stress and cold stress TLVs shall follow the guidelines stated in EM-381-1-1 Section 06.J and the current edition of *ACGIH Threshold Limit Values for Chemical Substances and Physical Agents*⁵. At air temperatures below 45°F, the air temperature shall be monitored. Below 30°F, the temperature and wind speed shall be monitored and the equivalent chill temperature calculated. Clothing requirements are listed in paragraph 06.J.09, Section 06.J of EM 385-1-1.

7.2.7 % LEL, O₂, and H₂S Monitoring

A direct reading real time combination instrument capable of measuring % Lower Explosive Level (LEL), percent of oxygen O₂, and Hydrogen Sulfide H₂S concentration in parts per million (ppm) will be used whenever excavation and penetration in potentially contaminated areas occurs and during characterization of debris. Readings will be taken at locations that reflect approximate general work area conditions. Results of the measurements will be documented. If necessary, the level of personal protective equipment used by excavation/penetration personnel will be modified. Section 6 describes the level of PPE to be used based on the concentration of organic vapors and gases in the breathing zone of project personnel. The combination gas meter will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site.

7.2.8 Ionizing Radiation Monitoring

A portable direct reading ionizing radiation survey meter with geiger-mueller (GM) probe suitable for detection of beta, gamma and x-ray radiation will be used during characterization of debris. The meter must display readings in milli-rem per hour mR/hr. The GM meter will be "response checked" according to the manufacturer's instructions prior to use each day, and calibrated by the manufacturer or other qualified personnel yearly. Records of the response check, maintenance and annual calibration will be maintained on site. An action level of 1 mR/hr above background is established. If readings greater than 1 mR/hr above background are detected, the immediate area will be secured. The dose rate on the boundary of the secured area must be below 1 mR/hr. Health Physics personnel from NAS Memphis will be notified to investigate the readings.

7.3 AIR SAMPLING

7.3.1 Organic Compounds

Time-integrated air sampling for aromatic hydrocarbons using personal air sampling pumps will be performed whenever the real-time monitoring measures concentrations in

the personal breathing zone exceeding 5 ppm organic gases or vapors for more than five consecutive minutes. Time-integrated air samples will be collected and analyzed at the SSHO's discretion for aromatic hydrocarbons. The air samples will be collected and analyzed in accordance with NIOSH Method 1501 or equivalent method. The air sampling pump will be calibrated before and after sample collection. Passive dosimeters may be used in place of air sampling pumps. Analysis of all air samples will be performed by an American Industrial Hygiene Association (AIHA) accredited laboratory.

7.3.2 Inorganic Lead

No samples are anticipated as necessary for inorganic lead compounds.

7.3.3 Welding/Cutting Fumes

No samples are anticipated as necessary for welding/cutting fumes.

7.3.4 Asbestos

No samples are anticipated as necessary for asbestos fibers unless debris analysis indicates friable asbestos remediation required.

7.3.5 Cadmium

No samples are anticipated as necessary for cadmium compounds.

7.3.6 Inorganic Arsenic

No samples are anticipated as necessary for inorganic arsenic compounds.

7.3.7 Explosives Residues

No samples are anticipated as necessary for explosive compounds.

7.3.8 Biological Hazards

No samples are anticipated as necessary for biological agents.

7.3.9 PCB Hazards

No samples are anticipated as necessary for PCB's.

7.4 AIR MONITORING AND SAMPLING REQUIREMENTS

Air monitoring and sampling requirements are shown in Table 9.

7.5 RECORDKEEPING AND CHAIN OF CUSTODY

Written records of all monitoring will be maintained on site and affected employees will be notified of monitoring results representative of their exposure. For industrial hygiene sampling requiring collection and shipment of a sample to an approved analytical laboratory, Chain-of-custody forms will be properly completed and accompany all collected samples in accordance with MK Industrial Hygiene Procedures Manual⁹, Procedure 7.0, titled Analytical Laboratory Procedures. The selected AIHA accredited industrial hygiene lab is American Analytical Laboratories, Inc., Akron, Ohio (216-535-1300) or a local laboratory if one is located. Turn-around time is estimated at 5-10 working days.

Workers will be notified of time integrated sampling results via memo to the designated supervisor. The Navy will receive all sampling records and results as part of the Closure Report.

8.0 SAFETY AND HEALTH WORK PRECAUTIONS AND PROCEDURES

8.1 GENERAL

Operations shall be conducted in a safe manner consistent with the policies and procedures outlined in this SSHP. The number of personnel shall be restricted to the minimum necessary to complete the required work as an administrative control to limit personnel exposures to site chemical hazards.

All project and subcontractor personnel assigned to this project are responsible for following this SSHP, for using safe practices, and for wearing the PPE specified by the SSHP. Project personnel shall report hazards and unsafe conditions and practices to the SSHP. All federal, state and local occupational health and safety regulations must be complied with by project personnel. Violations of project procedures may include disciplinary measures up to and including termination.

8.2 OPERATIONS SAFETY

Policies, procedures, requirements, and specific rules shall be established to ensure the safety of workers during onsite operations as needed.

8.2.1 Safety Meetings

A safety meeting shall be held at project kickoff and prior to each change in operation. Plan of the Day meetings are required along with Pre and Post Entry Briefings. Refer to Sections 4.4, 4.5, 4.16, 4.17 and 8.6.

8.2.2 General Safety Rules/Procedures

- Have 40 lb rated multipurpose dry chemical fire extinguisher, first aid kit, eyewash, and spill response equipment available at every controlled work location. Also have the Work Zone Map posted with pertinent information included and all signs posted.

- Avoid driving over dry grass that is higher than the ground clearance of the vehicle. Catalytic converters on the undercarriage of vehicles are sufficiently hot to ignite dry prairie grass. Never allow a vehicle with a warm undercarriage to sit in a stationary location over dry grass or other combustible materials.
- Do not eat, drink, smoke, take medications, chew gum or tobacco, or put objects in your mouth while in the exclusion zone or handling samples.
- When on site or handling samples, thoroughly wash hands and, if necessary, face, before eating or putting anything in your mouth (i.e., avoid hand-to-mouth contamination).
- At a minimum, wear hard hats, safety glasses and steel-toed and steel-shanked boots when inside the work boundaries.
- Remain a safe distance from the excavation equipment when not involved in operation or monitoring activities.
- Do not under any circumstances enter or ride in or on any backhoe bucket, materials hoist or any other similar device not specifically designed for carrying human passengers.
- Remain aware of your own and other's positions with regard to rotating equipment and be extremely careful when assembling, lifting and carrying items that may cause pinch point injuries and collisions.
- Be alert to the symptoms of fatigue, heat stress and cold stress and their effect on the normal caution and judgment of personnel.
- Use explosion proof sampling equipment and tools when required.
- Use ground fault circuit interrupters (GFCI) with all electrical tools and equipment.
- Stand clear of trenches during excavation. Always approach the excavation from upwind.

- Stand upwind, whenever possible, of excavations and other sites where the soil has been disturbed.
- Be alert to potentially changing exposure conditions as evidenced by perceptible odors, unusual appearance of excavated soils, oily sheen on water, or other evidence of possible contamination.
- Do not enter any excavation or trench greater than five feet in depth unless authorized by a competent person.
- Keep tools and equipment off the ground whenever possible to avoid tripping hazards and the spread of contamination.
- Use the buddy system at all times while operating in the site.
- Use the buddy system for all manual lifting.
- Minimize truck tire disturbance of all stabilized sites.
- Cease all work operations on the site at sunset unless the control zone is adequately illuminated with artificial lighting.
- Attend the plan of the day meeting prior to the start of the work along with the pre and post entry briefs. All team personnel are required to attend.
- Avoid direct contact with contaminated materials unless necessary for sample collection or required observation. PPE shall be worn at all times, as required.
- Do not handle contaminated soil, waste samples or any other potentially contaminated items unless wearing chemical resistant gloves.
- Remove disposable clothing and follow decontamination procedures.
- Always use an appropriate level of personal protection as assigned in the site-specific procedures. Lesser levels of protection can result in otherwise preventable exposure.

Excessive levels of safety equipment can impair efficiency and increase the potential for accidents.

- Maintain a high level of awareness of the limitations in mobility, dexterity and visual impairment inherent in the use of Level B and Level C PPE.
- Establish prearranged hand signals or other means of emergency communication when wearing respiratory equipment, since this equipment seriously impairs speech communication.
- Wear hearing protection if you have to shout to communicate at a distance of three feet in steady-state (continuous) noise or when you expect loud impact noise from certain activities.

8.3 WORK SITE PRACTICES

No worker may engage in any activity for which the health and safety consequences of his/her actions are unclear (e.g., previously unplanned work) without the approval of the SSHO. If such activities become necessary to complete any phase of the work, a project instruction or procedure shall be developed and followed.

8.4 HAZARD COMMUNICATION

Each subcontractor shall have a written Hazard Communication Program in accordance with OSHA's Hazard Communication Standard, 29 CFR 1910.1200 and applicable State Department of Health Regulations. Employers shall ensure that other employer(s) are notified of workplace hazards where the latter employers may come in contact with these hazards. Material Safety Data Sheets (MSDS) for all hazardous materials in the work area shall be readily available for employees to review. MSDSs and/or NIOSH Pocket Guides for the contaminants confirmed to be present in the various work sites will be added to the site MSDS Binder. Refer to Section 4.8 for training requirement.

8.5 EXCAVATIONS

Excavations shall be conducted in accordance with OSHA's Excavation Standard, 1926 Subpart P, and EM 385-1-1, October 1992, Section 25. A competent person must

inspect and approve an excavation for personnel entry prior to each work shift or more often as conditions change. Refer to Section 2.4.4 for more details.

8.6 PRE-ENTRY BRIEFINGS

Prior to initial entry into a contamination reduction zone or exclusion zone, personnel must attend a pre-entry briefing which reviews the requirements of this SSHP and site-specific requirements. A record of attendance at this briefing shall be maintained on the form shown as Figure 4. Additional pre-entry job briefings and safety meetings will be conducted if conditions change. The Pre-Entry Briefings are conducted by Project Supervisors. See Section 4.17 for the training requirement.

Note: Attendance at Post-Entry Briefs are not required to be separately documented. A log entry is satisfactory. Safety Meetings, Pre-Entry Briefs and Tool Box Safety Meetings are required to be formally documented using Figure 4 and or Figure 4a.

8.7 WORK SITE CONTROL

During work activities, and during non-work periods as warranted, personnel responsible for the work shall maintain control of the work area. No unauthorized personnel shall be permitted to enter the work areas unless they meet the requirements of this SSHP and obtain the approval of the SSHO. Violations of the work control must be reported immediately to the SSHO.

9.0 SITE CONTROL MEASURES

9.1 SITE WORK ZONES

Where a potential for worker exposure to potentially hazardous substances, safety or health hazards exists, work zones will be established and the flow of personnel and equipment will be controlled. The establishment of work zones will ensure that personnel are properly protected against hazards present in the work area, work activities and contamination are confined to the appropriate areas, and personnel can be located and evacuated in an emergency.

Prior to the commencement of field activities, work zones will be established by the job supervisor with the approval of SSHO as necessary to meet operational and safety objectives. These work zones will be depicted on maps that are field prepared by the subcontractor and posted by the job supervisor near the entrance to the work area. In addition to the zones, these maps should show assembly points, evacuation routes, location of first aid equipment and fire extinguisher, and emergency communications equipment. One copy of the work zone maps and all revisions will be retained by the SSHO to include in Appendix C of this SSHP.

9.1.1 Exclusion Zone

The exclusion zone (EZ) is the area where hazardous substances are present or are expected to occur, or health and safety hazards are present. Entry into this area is limited to personnel required to perform the work and who are wearing the specified PPE and have attended a Pre-Entry Briefing. Everyone entering the EZ shall have completed the required health and safety training, and participate in the medical surveillance program as necessary. The boundary of the EZ will be determined for each activity and may change depending on activities and conditions.

An exclusion zone (EZ) will be established to encompass the contaminated area. For this job, the EZ for each soil excavation area will consist of the immediate in process excavation extending outward for approximately 20 feet, and any excavated soil classified as potentially contaminated that may be stockpiled.

The EZ will be clearly delineated through the use of signs, barricade tape, fences, or other suitable means. Access control points will be established to regulate the flow of personnel and equipment in an out of the zone and to help verify that proper procedures for entry and exit are followed. PPE levels in the EZ are initially scoped as Level B and C depending on the task (see Table 6). Decontamination will follow guidelines established in Section 10 noting gross contamination will be removed in the EZ followed by additional decontamination in the Contamination Reduction Zone (CRZ) (refer also to the Work Plan, Section 8.0 and subsequent subsections). The SSHO will monitor activities in the EZ from his position in the CRZ. The boundary line from the EZ to the CRZ will be based on the following criteria:

- a) Approximately 20 feet outward from contaminated work area or as much as necessary to include the heavy equipment operating in the zone and the temporary staging of any potentially contaminated soil.
- b) Perimeter air monitoring for VOCs reads no increase in ppm-equivalents above background and the portable dust/aerosol monitor shows no increase in concentration above background. Background is considered the Support Zone area.

9.1.2 Contamination Reduction Zone

The contamination reduction zone (CRZ) is the transition area between the contaminated area (the EZ) and the clean area (the Support Zone). While designed primarily to reduce the possibility of the support zone becoming contaminated or affected by EZ activities, the CRZ is also used for decontamination of personnel and equipment. No personnel or equipment will be allowed to exit the contamination reduction and exclusion zones without being properly decontaminated except in emergency situations. The immediate area around the EZ extending outward approximately 20 feet or as much as necessary to accommodate the complete length of the longest piece of heavy equipment will be designated the CRZ. Also, the immediate area extending outward for approximately 10 feet from the decontamination facility will be designated as the CRZ (refer to Work Plan, Section 2.5).

Used PPE will be removed and stored in properly marked 55 gallon drums or other containers for later disposal. Work clothing will also be removed and stored in lockers. Personnel washing and shower facilities will be provided. Construction and field equipment is decontaminated per Work Plan Section 2.5, soil sampling equipment per the Sampling and Analysis Plan.

9.1.3 Support Zone

The support zone (SZ) consists of all areas outside the exclusion and contamination reduction zones, but within the project site. These areas are used for all site activities which are not limited to the EZ or CRZ equipment and material storage, offices, parking, etc. Logs will be maintained of the pre-entry briefing in the SZ recording the names, companies and reason for entry into the CRZ or EZ. The SZ will also serve as the staging area for all activities to be conducted.

9.1.4 Work Zone Controls

Before site operations begin, the SZ site office/decontamination facility will be identified with signs indicated that all visitors are required to stop and inform site personnel of their presence on work site.

Entrances to the CRZ and EZ will be conspicuously posted with signs stating the following:

HAZARDOUS AREA KEEP OUT
DANGER
AUTHORIZED PERSONNEL ONLY
PERSONAL PROTECTIVE EQUIPMENT IS REQUIRED IN THIS AREA

Post signs at the entrance to the CRZ before operations being, stating:

NO SMOKING, DRINKING OR EATING BEYOND THIS POINT

The following requirements will apply to all personnel entering the CRZ or EZ:

- The use of the "buddy system" is mandatory. No one will be allowed to work alone in the CRZ or EZ without permission from the SSHO or project supervisors.
- No smoking, eating, drinking, chewing tobacco or gum, or application of cosmetics within the CRZ or EZ.

The following traffic rules will apply to all motorized vehicles and equipment while on site:

- Equipment carrying waste shall always have the right-of-way.
- The speed limit is 10 mph, or as posted. Exceeding the speed limit is cause for disciplinary action, including removal from the site.
- Personnel will not ride equipment that has not been specifically designed for the transport of personnel.

10.0 PERSONNEL AND EQUIPMENT DECONTAMINATION AND HYGIENE PROCEDURES

10.1 GENERAL

All personnel, clothing and equipment leaving an exclusion zone (contaminated or potentially contaminated area) shall be inspected and, if necessary, decontaminated to remove any potentially harmful substances that may have adhered to them. Some equipment/clothing may be disposed of rather than decontaminated. In this case, the used PPE and/or equipment (ie., disposable sampling equipment) will be stored in properly marked, plastic lined 55 gallon drums in the CRZ followed by approved disposal. A Decontamination Facility will be constructed for personnel decontamination and for equipment decontamination. Refer to Section 8.2 in the Work Plan. Refer also to Workplan Section 8.3 for personnel decontamination, 8.4 for equipment and 8.5 for sampling equipment decontamination. This section gives guidelines regarding the decontamination procedures to be implemented. Final details will be described during the site-specific safety and health briefing prior to commencing field operations when all equipment is procured, tested and in place.

10.2 PERSONNEL DECONTAMINATION

Decontamination (decon) stations will be established in the contamination reduction zone. The decon stations will consist of the following, as appropriate:

- Equipment drop.
- Portable HEPA Vacuum for vacuuming PPE prior to removal.
- Boot wash station (a boot pick for mud removal, a tub of water and detergent with brushes for cleaning and another tub of water for rinsing).
- Glove wash station (similar to boot wash station).
- Sampling equipment wash station (similar to boot wash station).

- Disposable clothing drop and work clothing drop. All contaminated or potentially contaminated disposable clothing shall be placed into labeled 6-mil plastic bags for disposal. Work clothing will be required to be placed into labeled 6-mil plastic bags for laundry servicing if potentially contaminated as a result of ripped or torn disposable clothing or other off normal contamination events.
- Personal showers and Washing facilities consisting of water, towels, and soap. Street clothing shall be stored in lockers provided in the personnel decontamination facility "clean side".

10.3 EQUIPMENT DECONTAMINATION

All equipment/tools used in the exclusion zone will be inspected for contamination prior to removal from the site. Any equipment/tools with visible contamination will be cleaned prior to removal from the site. A water and detergent solution will be used for highly contaminated equipment, followed by a high-pressure hot water rinse if necessary. All water used during decontamination will be contained for treatment and/or disposal. Some construction and field equipment will be decontaminated at the temporary decontamination facility. Gross contamination is removed, affected surfaces of the equipment will be wrapped in plastic and transported.

10.4 WASHING FACILITIES

A washing facility may or may not be available in the support zone consisting of water, towels and soap for personnel, as necessary. If one is not available, support zone personnel will be permitted to use the washing facilities in the CRZ.

10.5 DECONTAMINATION WASH WATER

Equipment and personnel decontamination areas and washing facilities will be designed to allow for collection of all wash/rinse waters into 55-gallon drums or a larger temporary storage container. The tank if used will be of sufficient volume to allow for collection and temporary storage of decontamination water/rinse from the CRZ and vehicle decontamination. Decontamination water will be disposed via the onsite POTW or shipped off-site for disposal.

10.6 PERSONAL HYGIENE

Eating, drinking, or using tobacco or cosmetic products are prohibited in the contamination reduction zone or exclusion zone. Personnel exiting the controlled areas are required to thoroughly wash their hands and face prior to eating, drinking, smoking, or using toilet facilities.

11.0 ON-SITE FIRST AID AND EQUIPMENT

11.1 FIRST AID AND CPR TRAINING

At least two employees on each shift shall be qualified to administer first aid and CPR. Individuals required to work alone in remote areas shall be trained in first aid. At the minimum, the MK SSHO will be first aid/CPR qualified. Each subcontractor must have at least one first aid/CPR qualified individual on site when the subcontractor is at work.

11.2 FIRST AID AND MEDICAL FACILITY REQUIREMENTS

A 16-unit first aid kit, at a minimum, shall be maintained at the work site. The location of the first aid kit shall be communicated to project personnel as part of the pre-entry briefing and site-specific training. Included with the first aid kit shall be a CPR kit for control of biohazards and clean up and packaging of medical supplies contaminated with body fluids. A separate eyewash kit shall be available also at each work station. The phone numbers and locations of emergency contacts and medical facilities shall be posted in the office trailers and at entry to the control zones. At each controlled work area, the Work Zone Map must also be posted. The locations and phone numbers of emergency contacts for each facility are listed on Table 3.

11.3 REPORT OF FIRST AID CASES

All first aid cases, accidents and incidents shall be promptly reported to the SSHO. The SSHO shall immediately notify the Navy Technical Representative (NTR) of all injuries even if preliminary information is available.

The MK Charleston Project Management Office (PMO) should be notified shortly after notification to the Navy's designated authority. If the NTR cannot be reached, the MK Charleston PMO still should be promptly notified.

A written report of the injury must be provided to the NTR and MK Charleston PMO within 24 hours of the incident. This report is to include:

- a. Employer's First Report of Injury (Workman's Comp Insurance Form)
- b. Supervisor's Accident Investigation Report (MK Form CAS 24/77)
- c. Accident Data Report (MK Form 6783/91)
- d. Any records provided by the Medical Service Provider such as 1) Hospital Emergency room Report, 2) Examining Physician's designation of work restriction, and 3) Examining Physician's Work Release.

12.0 EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES

12.1 GENERAL

This section describes a contingency plan to be implemented in the event of injuries, illnesses, accidents, and fires. The contingency plan provides guidelines for the proper response to emergency situations, but the actual response will depend on the situation.

In the event of an emergency, the SSHO will direct all personnel to take appropriate action which could include any or all of the following:

- Evacuate the work zone to a safe place of refuge.
- Notify emergency services as identified in Table 3.
- Initiate emergency response action and notify emergency services.

12.2 PRE-EMERGENCY PLANNING

During mobilization activities for this project, the MK Project Manager, Project Superintendents and the SSHO shall review the NAVFAC SouthDiv Project Procedure PHSP 002.1 and execute the steps necessary to assure effective emergency response requirements and resources are established for this project.

In addition to the guidance provided in this document, the project kickoff meeting, any task-specific safety meetings, and pre-entry briefs will include emergency response preplanning specific to each task and work site. This training will include:

- **Assembly Points.** If the work activity may result in a release of hazardous substances, more than one assembly point will be specified to ensure that at least one upwind assembly point is accessible. This also pertains to fires and sites subjected to adverse weather conditions. Information must be included on the Work Zone Maps to be completed by the MK Subcontractors.
- **Emergency Response Coordinator.** The SSHO, as the onsite emergency response coordinator, will contact the emergency response providers, account for individuals at the assembly point, and plan the appropriate response.

- Evacuation Routes. Routes will be specified as needed. Information must be included on the Work Zone Maps.
- Means of Evacuation. The number of personnel that may be evacuated from the work site by various routes will be evaluated by the SSHO.
- Means of Communication. This will include the means of alerting personnel to an emergency at all points in the work site and should consider the sound screening potential of hearing protection, distance and noisy equipment when specifying the use of alarms, horns and sirens. The means of communication with emergency response providers will be considered. Information must be included on the Work Zone Maps.
- Designation of a location for first aid services, fire extinguisher(s) and spill control equipment. Information must be included on the Work Zone Maps.
- Procedures to be followed by employees who remain to operate critical operations to insure safe shutdown.

Emergency response providers (ambulance, fire, police) will be apprised of their responsibilities under this SSHP by the SSHO, and provided with such advance information as necessary to enable them to respond to an emergency expeditiously, while minimizing risk to themselves.

12.3 RESPONSIBILITIES

The following is a description of personnel roles, lines of authority, and the emergency response communication/notification responsibilities for site personnel.

12.3.1 Site Personnel

It is the responsibility of all site personnel to recognize conditions that have the potential for resulting in a personal injury or damage to property, and to report the condition immediately to their supervisor or the MK SSHO.

12.3.2 Project Manager

The Project Manager is responsible for assuring adherence to the administrative elements and implementation of the Emergency Response Plan, as referenced in this document. He will evaluate the site's preparedness for emergency responses and identify special conditions which may require additional preparations. He will ensure that necessary equipment and facilities are provided to support this plan.

12.3.3 Certified Industrial Hygienist

The Certified Industrial Hygienist (CIH) is responsible for preparing the Emergency Response Plan (this section of the SSHP typically). The CIH will develop and review the Emergency Response Plan, evacuation plans, and oversee implementation at the site. The CIH will ensure that supervisors and employees meet the training requirements of the plan and approve the equipment used in the plan. The CIH may designate duties on site to the SSHO.

12.3.4 Site Safety and Health Officer

The SSHO is responsible for directing response actions to emergency situations. He will coordinate with project management to ensure the availability of response equipment and supplies, and initiate drills. Emergency response plans will be evaluated over the course of the project by the SSHO to keep them up-to-date and to ensure that they are applicable and relevant to emergency response organizations.

12.3.5 Subcontractors

All subcontractor personnel will comply with the provisions of this plan and participate in training as required to implement response procedures. All personnel will be cognizant of their work areas and notify their supervisors of hazards at the site.

12.4 EMERGENCY RECOGNITION AND PREVENTION

Site personnel shall be apprised of hazards and life-threatening emergency situations during site-specific training to include the project kickoff meeting, safety meetings and briefs. Means to control hazards and mitigate emergency situations will be addressed at that time.

12.5 SAFETY ZONES

Suitable assembly points will be established at the start of the project by the SSHO to provide a safe point of refuge for site personnel. Additional information will be provided in the site briefing concerning other hazards that may arise at the site. Safety Zones or assembly points must be included on the Work Zone Map.

12.6 SITE SECURITY AND CONTROL

At all times, base personnel shall be apprised of any emergency and only authorized personnel shall be allowed into the area. As necessary, areas may be cordoned off and access restricted.

12.7 EVACUATION ROUTES

Evacuation routes will be established based on scope of work, location of work and atmospheric conditions. Evacuation routes shall be posted in various locations on the site if necessary and included on the Work Zone Map. All site personnel will be made aware of evacuation procedures during site-specific training especially pre entry briefings.

12.8 EMERGENCY DECONTAMINATION

In the event an employee is injured or becomes ill and requires hospital treatment, the extent of decontamination to be performed will be assessed based on severity of the injury or illness and time delay that decontamination may cause. If the employee has any signs of contamination, the ambulance and hospital staff will be notified of this and the nature of the contamination. The NAS Memphis Base Fire Department can provide gross decontamination prior to treatment and transport by the Ambulance Service. Reasonable effort will be expended to decontaminate the victim prior to removal from

the site. The medical facilities will be notified of the intended scope of work and the potential for contaminated personnel. The medical facilities will receive copies of all the Material Safety Data Sheets (MSDSs) and/or NIOSH Pocket Guides applicable to this project. The SSHO will visit the nearest medical facility and drop off the necessary information.

12.9 EMERGENCY MEDICAL TREATMENT AND FIRST AID

See Section 11.

12.10 COMMUNICATIONS

The SSHO and the Construction Superintendent(s) shall be equipped with two-way radios for communications on site as warranted. Additional communications with outside emergency services will be accomplished through the use of cellular telephones if necessary. The job supervisor(s) with concurrence from the SSHO, must establish the requirements for radios and/or cellular telephones.

12.11 CRITIQUE OF RESPONSE AND FOLLOW-UP

All drills, exercises and actual emergencies shall be critiqued and follow-up corrective actions shall be implemented as needed.

12.12 PPE AND EMERGENCY EQUIPMENT

Any actions by site personnel pursuant to either a rescue or spill response must be conducted with an understanding of the potential hazards involved and performed while wearing the appropriate personal protective equipment.

Portable fire extinguishers will be used for fire protection in all work and storage areas. Portable fire extinguishers using dry chemical materials must be used in areas where flammable/combustible liquids or gases are stored or used. Portable emergency eyewash kits shall be available at each work site. Where necessary, emergency spill containment equipment shall be available at each work site.

12.13 SITE TOPOGRAPHY, LAYOUT AND PREVAILING WIND CONDITIONS

Topography, layout and prevailing wind conditions shall be considered in establishing evacuations routes and assembly points.

12.14 INITIAL REPORTING AND MANAGEMENT OF INCIDENTS

All emergencies will be promptly reported to the Emergency Response Number X 9-911 on site and to the MK SSHO. The SSHO will assure that the Navy designated authority is notified promptly and directing initial emergency response actions until the arrival of the NAS Memphis designated authority. The NAS Memphis designated authority can include the officer in charge of security, fire department and/or ambulance services.

The following contains the initial response actions to be taken by MK personnel and subcontractors at the work site for the type of incident incurred.

A. Incident Type: Fires in Vehicles and mobile equipment, process equipment and support structures.

Response Actions:

1. Notify the NAS Memphis Security Desk at extension 9-911, include the following information:
 1. Name and phone number of person calling;
 2. Location of incident;
 3. Type of incident;
 4. Is anybody injured or trapped and if material release potential.
2. SSHO or Project Supervisor designates one person to meet the emergency response units at the nearest road where the units will be approaching.
3. SSHO or Project Supervisor assumes initial command of the situation and directs personnel to do one of the following:

1. Emergency shutdown of process equipment or mobile equipment, evacuate the work zone or immediate area to a safe place of refuge and meet the incoming response units and provide all available information.
2. Initiate initial fire attack and knockdown using available fire extinguishing equipment followed by evacuating the work zone or immediate area.

B. Incident Type: Preparation for adverse weather condition to include high winds, tornado, heavy rains, snow and ice conditions.

Response Actions:

1. SSHO or Project Supervisors notify the NAS Memphis Security Desk at extension 9-911, include the following information:
 1. Name and phone number of person calling;
 2. Location of work site(s);
 3. Preparation for adverse weather condition has begun;
 4. Permanent structure location where personnel will be relocating to on Base.
2. SSHO and/or Project Supervisor direct personnel to shutdown operations, secure loose materials, park and secure mobile equipment. Personnel shall be directed on the permanent building to report to after completing decontamination procedures.
3. SSHO and/or Project Supervisor complete accountability and await clearance from Base Security to resume operations or other action.

C. Incident Type: Medical and Rescue Emergencies.

Response Actions:

1. Notify the NAS Memphis Security Desk at extension 9-911, include the following information:
 1. Name and phone number of person calling;
 2. Location of incident;
 3. Type of incident;
 4. Person(s) injured or trapped and if exposure to hazardous material.
2. SSHO or Project Supervisor designates one person to meet the emergency response units at the nearest road where the units will be approaching.
3. SSHO or Project Supervisor assumes initial command of the situation and completes or directs personnel to do one or both of the following:
 1. Emergency shutdown of process equipment or mobile equipment and any other necessary action to mitigate or control the incident.
 2. Initiate emergency first aid actions until arrival of emergency units.

D. Incident Type: Spills or releases of hazardous material

Response Actions:

1. Notify the NAS Memphis Security Desk at extension 9-911, include the following information:
 1. Name and phone number of person calling;
 2. Location of incident;

3. Type of incident;
 4. Is anybody injured or trapped and estimated material released.
2. SSHO or Project Supervisor designates one person to meet the emergency response units at the nearest road where the units will be approaching.
 3. SSHO or Project Supervisor assumes initial command of the situation and directs personnel to do one of the following:
 1. Emergency shutdown of process equipment or mobile equipment, evacuate the work zone or immediate area to a safe place of refuge and meet the incoming response units and provide all available information.
 2. Initiate initial spill response using available spill response equipment only for small operational spills where personnel are trained to mitigate. Evacuate the work zone or immediate area if there are any health threats or risks to personnel.

13.0 LOGS, REPORTS, AND RECORDKEEPING

13.1 SAFETY AND HEALTH LOGBOOK

The SSHO shall maintain a Project Safety and Health Logbook for the duration of work activities at the site. The logbook will contain the following information recorded on a daily basis utilizing the Form shown in Figure 5:

- General weather conditions (approximate wind speed and direction, temperature, precipitation, and amount of sun).
- Monitoring/sampling conducted for the day, with results, as appropriate.
- Instrumentation used.
- Level of protection and any special considerations.
- Any problems or unusual situations during the day.
- Activities conducted throughout the day.
- Documentation of any correspondence.
- Number of employees in each area.
- SSHO's signature and date.

Additional records to be kept include calibration data, instrument serial numbers, modifications to established safety and health procedures, and daily safety inspections. Visitors will be registered prior to entering the site. Records of training and site orientations and briefings including pre entry briefs will be kept.

13.2 REPORTS

A weekly site safety and health inspection report shall be prepared by the SSHO. This report shall identify work activities, safety and health-related deficiencies, and corrective

measures. As a minimum the checklist shown in Figure 6 shall be completed by the SSHO. Additional industrial hygiene and safety forms will be used as necessary such as in the case of recording instrument calibrations, monitoring results and air sampling data. All incidents that result in property damage, personnel injuries or illness will be investigated and notification/reporting requirements met per standard MK policy and procedure.

The SSHO will be expected to complete the section marked "Safety" on the Contractor Production Report form which is managed and controlled by the Quality Control (QC) Supervisor. The MK SSHO will complete a section of the Project Managers (PM) Daily Report titled Summary of Health and Safety Concerns.

13.3 RECORDKEEPING

The SSHO shall maintain records of all injuries and illnesses for MK employees only incidental to the work in accordance with 29 CFR 1904, including copies of the Worker's Compensation First Report of Injury.

The SSHO shall review records of all injuries and illnesses of subcontractors incidental to the work, including copies of the Worker's Compensation First Report of Injury. These records will be maintained on the subcontractors OSHA 200 log or equivalent and will include the number of exposure workhours.

A record of all first aid treatments not otherwise recordable shall be maintained and furnished to the Navy's designated authority upon request. The SSHO shall maintain records of employee exposure to potentially harmful toxic materials, harmful physical agents and medical records, in accordance with 29 CFR 1910.120. Workers will be notified of time integrated sampling results via memo to the designated supervisor. The Navy will receive all sampling records and results as part of the Closure Report or Construction Completion Report.

14.0 ON-SITE WORK PLANS

A Site-Specific Work Plan of which this document is designated Appendix A was developed to define the work tasks and identify the work objectives. The means and personnel required to complete the task is identified along with consideration for methods, logistics, quality control/assurance and resources.

15.0 COMMUNICATION PROCEDURES

15.1 RADIO COMMUNICATION

The SSHO and construction supervisors shall be equipped with two-way radios for on-site communications as warranted by the number and proximity of work sites. Two-way radios will not be available from the base. MK will lease radios per requirements specified by the Security Chief. The SSHO will obtain information on radio unit designation and communication protocols and brief the construction supervisors.

15.2 TELEPHONE

A cellular telephone shall be available for emergency communications if no other telephone is readily available. At each job location, the Supervisor is responsible for verifying the location of the nearest telephone informing the workers at the pre-briefing.

15.3 EMERGENCY ALARM

An emergency alarm, such as an air horn, shall be available if necessary at each major work site to warn personnel of an emergency. Personnel shall be trained on what actions they are to take if the alarm is sounded to include evacuation routes and assembly points. During this job, use of audible alarm may not be necessary and voice contact should be all that is necessary for emergency annunciation. The SSHO will make this decision. The buddy system shall be used at all times while operating at this site. The job supervisor along with the SSHO shall establish prearranged handsignals as a backup to voice communications such as in the case of wearing respirator equipment and confined space entry.

15.4 DRILLS AND EXERCISES

Drills and exercises shall be conducted to ensure that communication methods are adequate. The SSHO will test the two way communication for confirmation of emergency communication using NAS Memphis recommended protocols. No field exercises are planned at this time.

16.0 SPILL CONTAINMENT PLAN

16.1 GENERAL

Spill and release accident scenarios during remediation could occur and involve residue waste material and rinsates from decontamination activities. The following information will be used by project personnel to respond to and mitigate any releases on the project site.

In the event of a spill or release off normal situation, the SSHO will order all personnel to take appropriate action which could include any or all of the following:

- Evacuate the work zone to a safe place of refuge.
- Notify emergency services as identified in Table 3.
- Initiate spill response action and notify emergency services.

16.2 PREPLANNING FOR SPILL CONTROL

Remediation activities will be reviewed for release potential and the capability of on-site personnel to adequately respond. Base personnel will be contacted to determine their capability to respond to various releases. All aspects of the Emergency Response Plan as described in Section 12, will be reviewed by site personnel to ensure adequacy and that resources are available.

During mobilization activities for this project, the MK Project Manager, Project Superintendents and the SSHO shall review the NAVFAC SouthDiv Project Procedure PHSP 003.1 and execute the steps necessary to assure effective spill response planning requirements and resources are established for this project.

MK will cooperate with the base and if necessary; other site contractors; and federal, state and local directors of emergency preparedness and response to ensure a coordinated effort in preparing for a spill emergency, with response plans that are compatible and integrated. Prior to the start of work, MK will review the Base's Spill Control or Contingency Plan; meet with site representatives on spill control and assure the SSHP is consistent with site requirements for spill control. Specific roles and responsibilities

will be developed for MK and Navy personnel. It is anticipated that the Base Fire Department will be notified of any spills. They will assist in spill containment.

In addition to the guidance provided in this document, the project kickoff meeting, any task-specific safety meetings, and pre entry briefs will include spill response and emergency response preplanning specific to each task and work site. This training will include:

- **Assembly Points.** If the work activity may result in a release of hazardous substances, more than one assembly point will be specified to ensure that at least one upwind assembly point is accessible. This also pertains to fires and sites subjected to adverse weather conditions. Information must be included on the Work Zone Maps.
- **Emergency Response Coordinator.** The SSHO, as the onsite emergency response coordinator, will contact the emergency response providers, account for individuals at the assembly point, and plan the appropriate response.
- **Evacuation Routes.** Routes will be specified as needed. Information must be included on the Work Zone Maps.
- **Means of Evacuation.** The number of personnel that may be evacuated from the work site by various routes will be evaluated by the SSHO.
- **Means of Communication.** This will include the means of alerting personnel to an emergency at all points in the work site and should consider the sound screening potential of hearing protection, distance and noisy equipment when specifying the use of alarms, horns and sirens. The means of communication with emergency response providers will be considered. Information must be included on the Work Zone Maps.
- **Designation of a location for first aid services, fire extinguisher(s) and spill control equipment.** Information must be included on the Work Zone Maps completed by MK subcontractors.
- **Procedures to be followed by employees who remain to operate critical operations to insure safe shutdown.**

Emergency response providers (ambulance, fire, police) will be apprised of their responsibilities under this SSHP by the SSHO, and provided with such advance information as necessary to enable them to respond to an emergency expeditiously, while minimizing risk to themselves.

16.3 SPILL AND FIRE CONTROL MATERIALS AND EQUIPMENT

Prior to the moving or handling of drums (or other containers) containing hazardous materials, salvage drums or containers (approved by the U.S. Department of Transportation) and suitable quantities of proper absorbent materials, neutralizing agents, and fire suppression equipment will be kept available in areas where spills, leaks or ruptures may occur.

Drums and containers used during a clean-up will be appropriate to the hazardous substances they are meant to contain, and will meet the regulations promulgated by DOT, 49 CFR Parts 171-179, OSHA, 29 CFR 1910.120, and EPA 40 CFR 262. Drums and containers will be inspected for defects and their integrity assured prior to being filled with any non-solid hazardous substance.

A spill of material can be contained with porous or absorbent barriers. Absorbent materials can take several configurations (pillows, sheets, brooms, loose chips, particle beads, and fibers) that may be set in place, or scattered by hand or blower. Preferred sorbents are inert nonreactive clay minerals (neutralizing agents may be added), or specific formulations which provide automatic neutralization or vapor control.

16.4 SPILL CONTROL MEASURES

Stopping the leak or spill at its source may involve turning off pumps or closing valves. Returning a container to an upright position, transferring wastes to other containers, or moving containers to less dangerous locations may, in some circumstances, be possible, but should not be attempted if there is the potential for a skin contact exposure to an unknown or caustic/skin absorbent chemical. Similarly, the patching of an active leak is not advised until a careful evaluation of the operation can be made, and the necessary personal protection and rescue equipment readied.

16.5 DRUM, CONTAINER, AND TANK HANDLING AND MOVING PROCEDURES

Drums, containers, and/or tanks of hazardous or flammable substances will not be moved until the requirements for preparations described in a task work plan and SSHP have been completed (i.e., all required equipment and materials are at the work site ready for use, and the employees have been familiarized with their responsibilities, the emergency response procedures, and the potential hazards associated with the contents of the drums and containers).

Work site operations will be organized to minimize the amount of drum or container movement. Each drum or container will be inspected before it is moved to ensure that it can be picked up without suffering a rupture or puncture, and relocated without having the contents spill or leak.

Unlabeled drums and containers will be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Drums and containers under pressure, as evidenced by bulging or swelling, will not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosion.

Equipment used to handle the drums and containers will be selected, positioned, operated, and maintained to minimize any contact that could rupture, puncture, dent, or drop drums and containers holding hazardous substances.

Equipment used to handle the drums and containers will be selected, positioned and operated to minimize the potential for equipment ignition sources to ignite vapors released from ruptured drums or containers.

Drums and containers that cannot be moved without rupture, leakage or spillage will be emptied into a sound container using a device specified for the material being transferred and bonding and grounding requirements have been satisfied.

16.6 INITIAL REPORTING AND MANAGEMENT OF INCIDENTS

All emergencies will be promptly reported to the Emergency Response Number X 9-911 on site and to the MK SSHO. The SSHO will assure that the Navy's Technical Representative (NTR) is notified promptly and directing initial emergency response actions until the arrival of the NAS Memphis designated authority. The NAS Memphis designated authority can include the officer in charge of security, fire department and/or ambulance services.

The following contains the initial response actions to be taken by MK personnel and subcontractors at the work site for spill and release emergencies.

A. Incident Type: Spills or releases of hazardous material

Response Actions:

1. Notify the NAS Security Desk at extension 9-911, include the following information:
 1. Name and phone number of person calling;
 2. Location of incident;
 3. Type of incident;
 4. Is anybody injured or trapped and estimated material released.
2. SSHO or Project Supervisor designates one person to meet the emergency response units at the nearest road where the units will be approaching.
3. SSHO or Project Supervisor assumes initial command of the situation and directs personnel to do one of the following:
 1. Emergency shutdown of process equipment or mobile equipment, evacuate the work zone or immediate area to a safe place of refuge and meet the incoming response units and provide all available information.
 2. Initiate initial spill response using available spill response equipment only for small operational spills where personnel are

trained to mitigate. Evacuate the work zone or immediate area if there are any health threats or risks to personnel.

17.0 CONFINED SPACES

Permit required confined space entry is not anticipated on this project. If entry is required in a completed excavation and it is greater than 5 feet in depth, the excavation must be treated initially as a permit required space until atmospheric monitoring is completed and the space can be downgraded to non-permit required confined space. Engineering controls must be in place to safeguard the excavation from collapse. Any confined space entry must follow the MK Procedure 9.0 found in the Industrial Hygiene Procedures Manual, Reference 9.

TABLES

**TABLE 1
SITE DESCRIPTION AND CONTAMINANTS**

Identifier	Location/Description	Scope of Work	Contaminants
SWMU 66, Radar Facility	Adjacent to Building 1696. See Figure 1-2 in Work Plan.	clearing and grubbing; removal, identification, decontamination, transportation, and disposal of debris; excavation, stockpiling, sampling, and disposal of contaminated soils; and backfilling and restoration of the excavated area	scrap metal, appliances, fencing material, corrugated roofing material, scrap wood and metal, and other discarded items. Unknown drums and/or containers, assume aromatic and chlorinated hydrocarbons and assume potential for heavy metals, mainly lead.
SWMU 67, Horse Pasture Site	North of Building 1460, see Figure 1-2 in Work Plan.	clearing and grubbing; removal, identification, decontamination, transportation, and disposal of debris; and restoration of the excavated area	fencing material, corrugated roofing material, aluminum boats, discarded farm wagons, scrap wood and metal, engine storage tanks, tires, plastic seats, concrete, wooden pallets, and other discarded items.

Table 2. Potential Contaminants

Potential Contaminant	Description	Exposure Limits	Signs and Symptoms	First Aid
BTEX (Benzene, Toulene, Ethylbenzene, Xylene) hydrocarbon contamination in soils or residuals in containers, not in pure form	Colorless or light colored liquids with petroleum aromatic odor.	Benzene, OSHA PEL of 1 ppm. ACGIH TLV-TWA 10 ppm. Toulene, OSHA PEL of 200 ppm. ACGIH TLV-TWA of 50 ppm. Ethylbenzene, OSHA PEL of 100 ppm. ACGIH is the same. Xylene, OSHA PEL of 100 ppm. ACGIH is the same.	Irritant to eyes, nose and throat. Causes headache, dermatitis and narcosis. May cause dizziness, excitement, drowsiness and incoherence. May cause nausea, vomiting and abdominal pain if ingested.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
Waste Oil	Yellow to brown liquid which is combustible at high temperatures.	OSHA PEL 100 ppm as 8 hr TWA for naphtha.	Skin and eye irritant. Igestion causes gastrointestinal tract irritation.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.
Inorganic Lead	A heavy, ductile, soft grey solid. Noncombustible solid. (May be in soil as a biodegraded product of leaded gasoline.	OSHA PEL 50 ug/m ³ as 8 Hr. TWA	Weakness, lassitude, and insomnia. Facial pallor, anorexia, low weight, and malnutrition. Constipation, abdominal pain and colitis. Anemia, gingival lead line, tremor, Encephalopathy, Nephropathy. Irritant to eyes. Hypertension.	Irrigate eyes immediately with water. Soap wash skin promptly. Provide respiratory support. Seek medical attention immediately.

Note: Data is Table derived from References 4, 5 and 6 listed in Section 1.

Table 3. Personnel Names and Telephone Numbers

<u>Contact</u>	<u>Person or Agency</u>	<u>Telephone</u>
Robert Hlavacek	MK Program Manager	(803) 554-9367
Scott Newman	MK Project Manager	(803) 554-9369
XXX XXXXX	MK Project Manager on site at NAS Memphis	Office: (xxx) xxx- xxxx Hotel: (xxx) xxx- xxxx
XXXXXX XXXX	MK Site Safety and Health Officer	Office:(xxx) xxx- xxxx Hotel: (xxx) xxx- xxxx Cellular: (xxx) xxx-xxxx 2 way radio designation: Unit xxxx
Steve Travis xxxxxx xxxxx xxxxxx xxxx xxxxxx xxxx	MK Project Engineer onsite MK Project Controls onsite MK Quality Control onsite MK xxxxxxxx xxxxxx onsite	Office:(216) 523- 5210
Michael Findley	MK Health and Safety Program Manager	(803) 554-9407
CDR. Ken Fulmar	NAS NTR (ROICC), located in Building S137	(901) 873-5475, fax 5788
Rob Williamson	NAS Memphis Environmental Field Coordinator, Public Works Dept., 7800 3rd Avenue	(901) 873-5461, fax 5300
Mark Taylor	SOUTHNAVFACENGCOM, Remedial Project Manager	803-743-0573, fax 0983
Chris Bartku	SOUTHNAVFACENGCOM, Remedial Project Engineer	803-743-0611, fax 0465
David Porter	SOUTHNAVFACENGCOM, Environmental Coordinator	803-743-0610, fax 0563

<u>Contact</u>	<u>Person or Agency</u>	<u>Telephone</u>
Law Enforcement	NAS Security	9-911 emergency
Fire Department	NAS Fire Department (Base)	9-911 emergency (xxx) xxx-xxxx
Ambulance Service	NAS Ambulance (Base)	9-911 emergency (xxx) xxx-xxxx
Poison Control Center	Poison Control Center	(901) 528-6048
National Response Center	National Response Center	(800) 424-8802
Regional USEPA Emergency	USEPA (Region III Atlanta)	(xxx) xxx-xxxx
Hospital	Methodist North Head Nurse (XXX xxxxx)	(901) 873- 5801/5802
Utility Locator Service	XXXX	(901) xxx-xxxx

Table 3. Personnel Names and Telephone Numbers (continued)

Addition to Table 3

Directions to Methodist North Hospital

Methodist North Hospital
3960 Covington Pike
Memphis, Tennessee
901-372-5211

From NAS Memphis Main Gate:

Exit Base through South Gate (Singleton Parkway)

Continue on Singleton Parkway through the stop signs

Singleton Parkway and Covington Pike will intersect at a red light (about 5 miles)

You will see the entrance to the emergency room 700 feet past this light on the left.

Note: SSHO to make sure Table 3 and Figure 3 is included with the Work Zone Map posted at the job site. In addition, Table 3 and Figure 3 must be posted at each office location. Table 3 must be updated to include all subcontractor points of contact also.

Notify the Site Safety and Health Officer (SSHO) of any changes in work conditions which may affect the health and safety aspects of the task. The Site Superintendent or designated foreman are responsible to conduct plan of the day meetings, pre-job and post job briefings and weekly safety meetings and conduct or insure that other training is completed.

Table 4. Training Requirements

Identifier	Location	40 Hr. Haz. Waste	Haz. Waste Annual Ref.	Haz. Waste Supervisor	Weekly Safety Mtg.	Haz. Com.	Metals	CPR First Aid	Respiratory Protection	Confined Space	Site Specific	POD, Pre & Post Entry Brief	Other
SWMU 66	Radar Facility	Y	Y	Y	Y	Y ⁶	Y ⁵	Y	Y	O ¹	Y	Y	O ^{2,3}
SWMU 67	Horse Pasture	Y	Y	Y	Y	Y ⁶	Y ⁵	Y	Y	O ¹	Y	Y	O ^{2,3}
Soil, debris and drum /container sampling	All Areas	Y	Y	Y	Y	Y ⁶	Y ⁵	Y	Y	O ¹	Y	Y	Y ^{2,3}

Y = Yes, N = No, O = Optional

- Notes:
- 1- Excavations greater than 5 feet in depth should be treated as permit required confined spaces until atmospheric monitoring proves it can be downgraded to non permit required confined space and engineering controls on excavation design are in place.
 - 2- Competent person per 29 CFR 1926, subpart P, Excavations.
 - 3- 49 CFR Part 172 Subpart H for personnel required to classify, mark, select packaging, inspect, load and transport hazardous materials.
 - 4- reserved
 - 5- Competent person per 29 CFR 1926.62 Lead Standard and Hazard Communication.
 - 6- Special training topic, emphasis on reviewing practices and procedures for safe handling of drums and other hazardous waste containers to include the preliminary drum/container handling and staging plan.

Table 5. Selection of Personal Protective Equipment

PPE	Level D	Modified Level D	Level C	Level B
Coveralls or other approved working apparel	Yes	Optional*	Optional	Optional
Chemical-resistant clothing (coveralls; hooded, one- or two-piece chemical-resistant coveralls)		Yes		
Chemical-resistant clothing (coveralls; hooded one- or two-piece chemical splash suit; chemical-resistant hood and apron; disposal chemical-resistant coveralls)			Yes	
Chemical-resistant clothing (coveralls and long-sleeved jacket; one- or two-piece chemical splash suit; disposal chemical-resistant one-piece suit)				Yes
Boots, leather or chemical resistant, protective toe and steel shank meeting ANSI Z41.1 (29 CFR 1926.28(a)).	Yes			
Boots (inner), chemical resistant, protective toe and shank meeting ANSI Z41.1 (29 CFR 1926.28(a)).		Yes	Yes	Yes
Boot covers (outer), chemical resistant (disposable)		Optional	Optional	Optional
Safety glasses or chemical splash goggles, meeting ANSI Z87.1-1979 for "Industrial Safety Glasses"	Yes	Yes	Yes	
Face shield	Optional	Optional	Optional	Optional
Gloves (cotton/leather)	Optional			
Gloves (inner), chemical resistant or liners		Optional	Yes	Yes
Gloves (outer), chemical resistant		Yes	Yes	Yes
Long underwear		Optional	Optional	Optional
Hardhat	Yes	Yes	Yes	Yes
Positive pressure, full-facepiece with nose cup, self-contained breathing apparatus (SCBA) or positive pressure, supplied-air respirator with escape SCBA (MSHA or NIOSH approved) (Note: escape SCBA may not be required)				Yes
Air-purifying respirator, half-face or full face with suitable cartridge (MSHA or NIOSH approved)			Yes	

* Optional requirements to be determined by SSHO based on activity hazard analysis.

Table 6. Minimum Personal Protective Equipment Requirements by Task

Site	Activity	PPE
SWMU 66	<ol style="list-style-type: none"> 1. Configure and set up work area. 2. Preliminary screening of debris. 3. Hand excavation. 4. Mechanical excavation. 5. Drum or container handling 6. Soil packaging. 7. Decontamination. 8. Site restoration. 	<ol style="list-style-type: none"> 1. Level D, modify where necessary. 2. Level B, modify where necessary. 3. Level B, modify where necessary. 4. Level B, modify where necessary. 5. Level B, modify where necessary. 6. Level C, modify where necessary. 7. Level C, modify where necessary. 8. Level D.
SWMU 67	<ol style="list-style-type: none"> 1. Configure and set up work area. 2. Preliminary screening of debris. 3. Hand excavation. 4. Mechanical excavation. 5. Drum or container handling 6. Soil packaging. 7. Decontamination. 8. Site restoration. 	<ol style="list-style-type: none"> 1. Level D, modify where necessary. 2. Level B, modify where necessary. 3. Level B, modify where necessary. 4. Level B, modify where necessary. 5. Level B, modify where necessary. 6. Level C, modify where necessary. 7. Level C, modify where necessary. 8. Level D.
Sampling at all locations including drums and/or containers.	<ol style="list-style-type: none"> 1. Obtain soil and/or groundwater and/or drum/container samples per sampling and analysis plan. 	<ol style="list-style-type: none"> 1. Level B for unknown drums and containers, modify where necessary. Soil and groundwater may only require level C or modified Level D.

Table 7. Airborne Contaminant Response Criteria

Contaminant	Level	PPE	Monitoring Frequency	Actions Taken
Volatile organic compounds	No more than 5 ppm above background, no benzene detected.	Level D or modified Level D	Prior to each shift and reentry following 30 minute vacancy or as warranted. Continuous during opening and sampling of drums/containers of unknown contents.	Continue periodic monitoring
	Greater than 5 ppm above background but less than 10 ppm above background. No benzene detected, no Action Level for any organic exceeded.	Level D or Modified Level D	At least once every hour, when change in operation occurs, or when requested by workers	Monitor for benzene or other organics. Continue periodic monitoring
	Greater than 10 ppm above background or benzene detected or Action Level exceeded for any organic.	To be determined by SSHO	To be determined by SSHO	Stop work and notify SSHO

Table 7. Airborne Contaminant Response Criteria (continued)

Contaminant and O ₂	Level	PPE	Monitoring Frequency	Actions Taken
Hydrogen Sulfide	Greater than 10 ppm.	To be determined by SSHO	Prior to each shift and reentry following 30 minute vacancy or as warranted. Continuous in excavations	Stop work and notify SSHO
Oxygen	Less than 19.5%	To be determined by SSHO	To be determined by SSHO. Continuous during opening and sampling of drums/containers of unknown contents.	Stop work, exit area and immediately notify SSHO
Inorganic Lead	Less than action level for lead (30 µg/m ³) and/or no visible observation of excessive dusts	Level C	Periodic per plan	Continue monitoring and/or sampling and observations
	Greater than action level or visible observation of excessive dusts.	Level C or as determined by SSHO	Representative personnel sampling and monitoring to be conducted or continued	Stop work and notify SSHO
	Greater than OSHA PEL or greater than 10 mg/m ³ total dust.	As determined by SSHO	Representative personnel sampling and monitoring to be conducted or continued	Stop work and notify SSHO

Table 7. Airborne Contaminant Response Criteria (continued)

Contaminant and O ₂	Level	PPE	Monitoring Frequency	Actions Taken
% LEL	Equal to or greater than 10%.	To be determined by SSHO	To be determined by SSHO. Continuous during opening and sampling of drums/containers of unknown contents.	Stop work, shut off equipment, remove ignition sources if safe to do so; notify SSHO

Table 8. Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers^a

ADJUSTED TEMPERATURE ^b	IMPERMEABLE ENSEMBLE
90°F (32.2°C) or above	After each 15 minutes of work
87.5°-90°F (30.8°-32.2°C)	After each 30 minutes of work
82.5°-87.5°F (28.1°-30.8°C)	After each 60 minutes of work
77.5°-82.5°F (25.3°-28.1°C)	After each 90 minutes of work
72.5°-77.5°F (22.5°-25.3°C)	After each 120 minutes of work

^aFor work levels of 250 kilocalories/hour.

^bCalculate the adjusted air temperature (ta adj) by using this equation:

$$ta \text{ adj } ^\circ F = ta^\circ F + (13 \times \% \text{ sunshine}).$$

Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow.

(100 percent sunshine = no cloud cover and a sharp, distinct shadow: 0 percent sunshine = no shadows.)

Note: reprinted from Reference 9

Table 9. Air Monitoring and Sampling Requirements

Site	Activity	Monitor						Sample		
		VOC	Dust	Oxygen, H ₂ S and % LEL	Perimeter (VOCs /Dust)	Noise	Heat Stress	VOC	Metals	Asbes tos
SWMU 66	1. Configure and set up work area.	1.O	1.N	1.N	1.N	1.N	1.O	1.O	1.N	1.N
	2. Preliminary screening of debris.	2.Y	2.O	2.O	2.O	2.N	2.O	2.O	2.N	2.N
	3. Hand excavation.	3.Y	3.Y	3.Y	3.Y	3.N	3.O	3.O	3.O	3.N
	4. Mechanical excavation.	4.Y	4.Y	4.Y	4.Y	4.O	4.O	4.O	4.O	4.N
	5. Drum or container handling	5.Y	5.O	5.Y	5.O	5.O	5.O	5.O	5.N	5.N
	6. Soil packaging.	6.Y	6.Y	6.O	6.O	6.O	6.O	6.O	6.O	6.N
	7. Decontamination.	7.O	7.O	7.O	7.N	7.O	7.O	7.O	7.O	7.N
	8. Site restoration.	8.N	8.O	8.N	8.N	8.O	8.O	8.N	8.N	8.N

Table 9. Air Monitoring and Sampling Requirements (continued)

Table 9. Air Monitoring and Sampling Requirements

Site	Activity	Monitor						Sample		
		VOC	Dust	Oxygen, H ₂ S and % LEL	Perimeter (VOCs /Dust)	Noise	Heat Stress	VOC	Metals	Asbes tos
SWMU 67	1. Configure and set up work area.	1.O	1.N	1.N	1.N	1.N	1.O	1.O	1.N	1.N
	2. Preliminary screening of debris.	2.Y	2.O	2.O	2.O	2.N	2.O	2.O	2.N	2.N
	3. Hand excavation.	3.Y	3.Y	3.Y	3.Y	3.N	3.O	3.O	3.O	3.N
	4. Mechanical excavation.	4.Y	4.Y	4.Y	4.Y	4.O	4.O	4.O	4.O	4.N
	5. Drum or container handling	5.Y	5.O	5.Y	5.O	5.O	5.O	5.O	5.N	5.N
	6. Soil packaging.	6.Y	6.Y	6.O	6.O	6.O	6.O	6.O	6.O	6.N
	7. Decontamination.	7.O	7.O	7.O	7.N	7.O	7.O	7.O	7.O	7.N
	8. Site restoration.	8.N	8.O	8.N	8.N	8.O	8.O	8.N	8.N	8.N

Table 9. Air Monitoring and Sampling Requirements (continued)

Table 9. Air Monitoring and Sampling Requirements

Site	Activity	Monitor						Sample		
		VOC	Dust	Oxygen, H ₂ S and % LEL	Perimeter (VOCs /Dust)	Noise	Heat Stress	VOC	Metals	Asbestos
Sampling	1.obtain soil and/or groundwater and/or debris/drum/container samples	1.Y ¹	1.O	1.Y ¹	1.N	1.N	1.O	1.N	1.N	1.N

Y = Yes, O = Optional at discretion of SSHO, N = Not required

¹ = When obtaining soil samples in excavations deeper than 5 feet, treat the excavation as permit required confined space until it has been assessed by atmospheric monitoring that the atmosphere is safe and it can be downgraded to non permit required confined space. Engineering controls must be in place to safeguard excavation from collapse.

FIGURES

DATE:	TIME:	DATE EXPIRES:															
JOB DESCRIPTION AND LOCATION (Be Specific):																	
BEFORE TRENCHING AND EXCAVATION																	
<input type="checkbox"/> Soil Classification <input type="checkbox"/> Stable Rock <input type="checkbox"/> Type A <input type="checkbox"/> Type B <input type="checkbox"/> Type C	<input type="checkbox"/> Check For Previously Disturbed Ground <input type="checkbox"/> Adequacy and Availability of All Equipment, Including Personal Protective Gear, Shoring Material, Signs, Barricades and Machinery.	<input type="checkbox"/> Check For Proximity To Utilities, Buildings, Footing or Pilings and Sources of Vibrations. <input type="checkbox"/> Owners of Utilities, Services or Transmission Piping, Etc. (Electrical, Telephone, Water, Sewer)															
<input type="checkbox"/> Other Known Obstructions (e.g. Footing Concrete Encasement) <input type="checkbox"/> Allowable Slope.																	
COMMENTS:																	
DURING TRENCHING AND EXCAVATION																	
<input type="checkbox"/> Size of Excavation Depth _____ Width _____ Length _____	<input type="checkbox"/> Protective Systems Depth of A Trench Or Excavation Of 5 Feet or More.	Check The Applicable OSHA Appendix Below: <input type="checkbox"/> B - Sloping and Benching															
<input type="checkbox"/> Changing Ground Conditions, Particularly After Rain Fall <input type="checkbox"/> Monitor For Possible Oxygen Deficiency Or Gaseous Conditions. (Record per IH Manual Procedure 5.0 or equivalent).	<table style="margin-left: 20px; border-collapse: collapse;"> <tr> <th colspan="3" style="text-align: left; padding: 2px;">Maximum Allowable Slopes</th> </tr> <tr> <td style="padding: 2px;">Stable Rock</td> <td style="padding: 2px;">Vertical</td> <td style="padding: 2px;">(90°)</td> </tr> <tr> <td style="padding: 2px;">Type A</td> <td style="padding: 2px;">3/4:1</td> <td style="padding: 2px;">(53°)</td> </tr> <tr> <td style="padding: 2px;">Type B</td> <td style="padding: 2px;">1:1</td> <td style="padding: 2px;">(45°)</td> </tr> <tr> <td style="padding: 2px;">Type C</td> <td style="padding: 2px;">1 1/2:1</td> <td style="padding: 2px;">(34°)</td> </tr> </table>	Maximum Allowable Slopes			Stable Rock	Vertical	(90°)	Type A	3/4:1	(53°)	Type B	1:1	(45°)	Type C	1 1/2:1	(34°)	NOTE: Sloping or Benching For Excavations Greater Than 20 Feet Deep Shall Be Designed By A State Registered Professional Engineer (RPE).
Maximum Allowable Slopes																	
Stable Rock	Vertical	(90°)															
Type A	3/4:1	(53°)															
Type B	1:1	(45°)															
Type C	1 1/2:1	(34°)															
<input type="checkbox"/> Adequacy Of Shoring And/Or Sloping As Work Progresses. <input type="checkbox"/> Entrances and Exit Facilities <input type="checkbox"/> Stairway <input type="checkbox"/> Ladders <input type="checkbox"/> Ramp <input type="checkbox"/> Change In Vehicular and Machinery Operation <input type="checkbox"/> Water Removal Equipment and Operation <input type="checkbox"/> Adequacy of Portable Trench Boxes or Trench Shields	<input type="checkbox"/> C - Timber Shoring For Trenches <input type="checkbox"/> D - Aluminum Hydraulic Shoring For Trenching <input type="checkbox"/> RPE - Designed Protection Systems (data must be filed on job-site)	COMMENTS:															
SIGNATURES AND DATES																	
COMPETENT PERSON:	SSHO:	PROJECT MANAGER:															
CLIENT REPRESENTATIVE:	CIVIL ENGINEER:	CIVIL SUPERINTENDENT:															
EQUIPMENT OPERATOR:	SUBCONTRACTOR REP:	OTHER APPROVAL:															

Figure 1. Excavation and Trenching Permit



MORRISON KNUDSEN CORPORATION

ENGINEERING, CONSTRUCTION, AND ENVIRONMENTAL GROUP

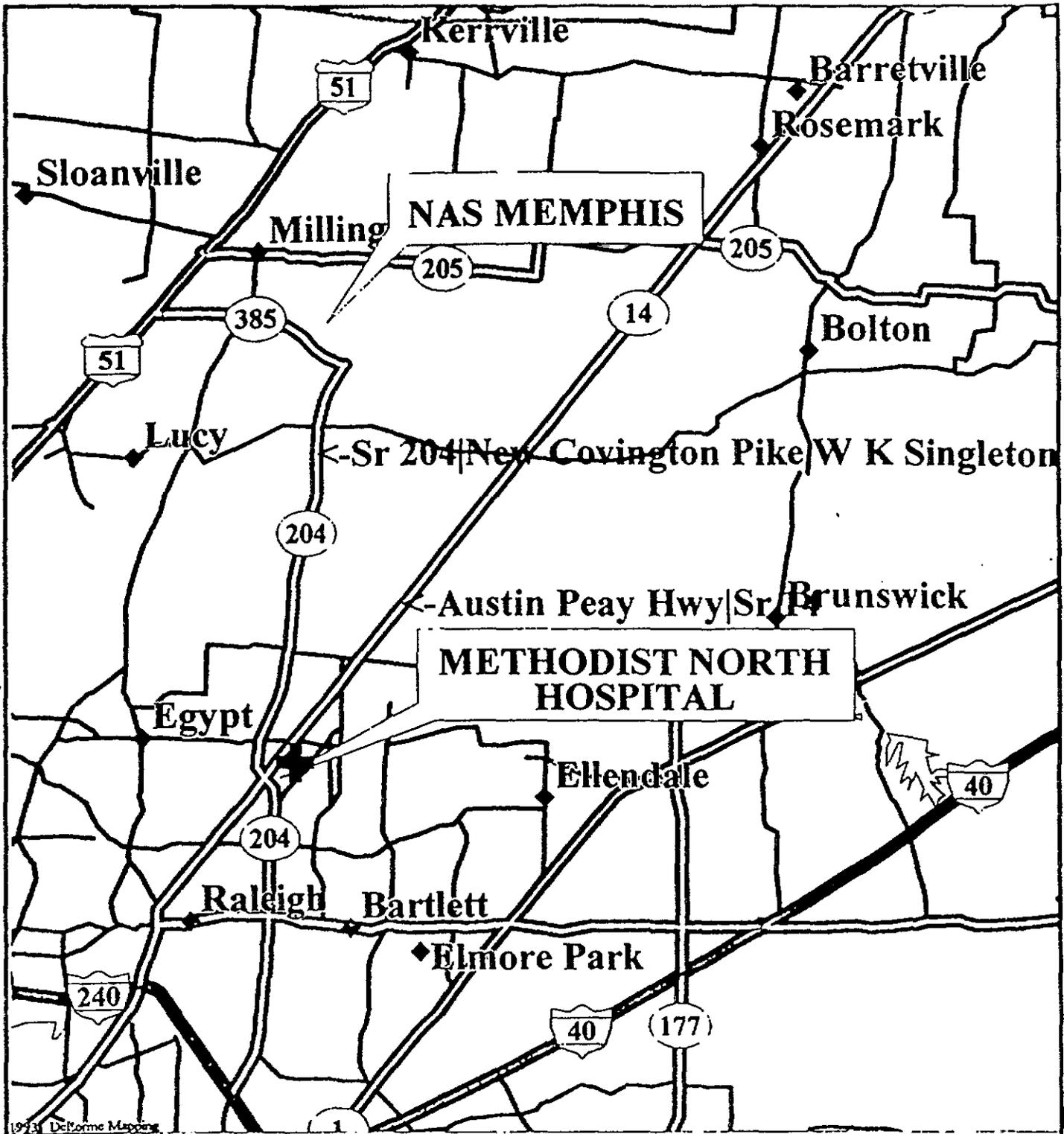
HOT WORK PERMIT

Issued to:		Responsible Person:		Date:		
Building:		Area Equipment		Control No.		
Special Work To Be Done:				Time From/To:		
Please check appropriate responses				YES	NO	N/A
1. Has affected personnel been briefed on job safety & requirements?						
2. Has equipment been properly prepared for this work?						
3. Does other work or processes affect this work?						
4. Has fire detection and/or gas systems been isolated?						
5. Is the work area clean and ready for work to begin?						
6. Has isolation lockout been completed? If so, record lock and tag numbers below.						
7. Has fire watch been assigned with appropriate equipment? Name(s)						
8. Is GAS TEST required? <input type="checkbox"/> Yes <input type="checkbox"/> No				Test Results	Percent LEL	O ₂
						H ₂ S, CO, other toxic
						Time Tester
Continuous? <input type="checkbox"/> Yes <input type="checkbox"/> No				Total Hydrocarbons	Others As Req.	
Remarks:						
Special Instructions: <input type="checkbox"/> Yes <input type="checkbox"/> No				Lock Numbers		Tag Numbers
Job Completed? <input type="checkbox"/> Yes <input type="checkbox"/> No		Time/Initial:		Permit Cancelled: (Time)		

Endorsements as Required

Area Operations Technician:	Signature/Name:	Time:
Person Doing The Work:		
Job Supervisor/Foreman:		
Project Supervisor:		
J (Safety)		

Figure 3. Directions to Nearest Emergency Medical Facilities



Date _____ Report Number _____

Location(s) Work Activity and # Employees: _____

Weather: Wind speed _____ Wind direction _____
Temp & Pressure _____ Precipitation _____
Amount sun _____

Monitoring conducted:

<u>Location</u>	<u>Sampled for</u>	<u>Instrument used</u>	<u>Results</u>	<u>Sampled By/Time</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Levels of Protection: _____

Problems or Unusual Situations: _____

Correspondence: _____

Other Comments: _____

SSHO Printed Name: _____ Signature _____ Date _____

Figure 6. SSHP WEEKLY INSPECTION CHECKLIST

Surveillance No. _____

SURVEILLANCE NO:		ACTIVITY:		PROJECT NO:	
DATE:		LOCATION:		SURVEYED ORGANIZATION:	
		SITE/AREA CONTACT:		RESPONSIBLE MANAGER:	
				PRIME:	
				SUBTIER:	

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
	Section 1						
1	Scope of work and site contaminants accurately described?						
	Section 2						
2	Activity hazard analysis prepared for each major work phase? (EM 385-1-1, Section 01.A.09)						
3	All hazards including chemical and physical adequately described?						
	Section 3						
4	Roles and responsibilities described and personnel roster up-to-date?						
	Section 4						
5	All site personnel completed required training?						
6	Training documented and records on site?						
	Section 5						
7	All site personnel completed initial medial qualification?						

FIGURE 6. SSHP WEEKLY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
Section 6							
8	PPE available and in good condition?						
9	PPE work per SSHP and/or SSHO direction?						
10	Personnel trained in proper use, limitations, and inspection of PPE?						
11	PPE inspected per SSHP?						
12	PPE donning/doffing procedures in place?						
13	Written SOP available describing respirator selection and use?						
Section 7							
14	Air monitoring conducted per SSHP?						
15	Monitoring equipment properly maintained and calibrated?						
16	Employees notified of monitoring results?						
17	Chain of custody prepared and maintained for all samples?						
Section 8							
18	Weekly safety meeting held?						
19	Pre entry briefs held? and signature sheet completed?						
20	Haz Com programs in place?						
21	Competent person evaluates excavation?						
22	Personnel responsible for work maintain control of area?						
Section 9							
23	Work zone maps prepared and updated?						

FIGURE 6. SSHP WEEKLY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
24	Maps posted near work area and stored in SSHP?						
25	Traffic patterns established and rules observed?						
Section 10							
26	Inspections performed of all personnel, clothing and equipment leaving exclusion zone?						
27	All materials decontaminated prior to existing contamination reduction zone?						
28	Decon stations properly established?						
29	Proper personal hygiene practices observed?						
30	Decon solutions collected and properly disposed of?						
Section 11							
31	At least two employees on each shift trained in CPR and first aid?						
32	First aid kit at each work site?						
33	All first aid and medical cases promptly reported to SSHO?						
Section 12							
34	All personnel trained on Emergency Response Plan and Contingency Procedures?						
35	Emergency pre-planning addressed in safety meeting?						
36	List of emergency services/contact is up to date and posted?						
37	Assembly points identified and communicated to employees?						

FIGURE 6. SSHP WEEKLY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
38	Evacuation routes established and communicated to employees?						
39	Communication methods are adequate						
40	All drills, exercises, and emergencies critiqued?						
41	All emergencies promptly reported to SSHO?						
Section 13							
42	SSHO maintains project log book?						
43	Daily reports completed by SSHO?						
44	Daily inspections completed by SSHO?						
45	Weekly reports prepared by SSHO?						
46	Records of all injuries and illnesses maintained by SSHO?						
Section 14							
47	Work plans available and up to date?						
48	SOPs developed as needed?						
Section 15							
49	Two-way radios available per SSHP?						
50	Cellular telephone available as needed?						
51	Emergency alarms available and personnel trained on what actions to take?						
52	Drills and exercises conducted to test communication methods?						
Section 16							
53	Spill response measures reviewed with personnel?						

FIGURE 6. SSHP WEEKLY INSPECTION CHECKLIST (continued)

Surveillance No. _____

ITEM NO.	DESCRIPTION OF SURVEYED ITEMS	N/A SAT UNSAT	DESCRIPTION OF DISCREPANCY/ NON-COMPLIANCE	ACT OR COND	CAT	REQUIRED ABATEMENT DATE	CORRECTIVE ACTION TAKEN AND DATE ABATEMENT COMPLETED
54	Suitable quantities of spill supplies available?						
55	Spills promptly reported to SSHO?						
56	Operations arranged to minimize spills?						
Section 17							
57	Confined space requirements of 385-1-1, Section 06.0.01 followed? Personnel trained?						

Inspection Performed By: _____ Date: _____

Abatement Accepted By: _____ Date: _____

APPENDIX A
ACTIVITY HAZARD ANALYSIS (AHA)

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Configure and set up work areas.

Analyzed By/Date:

Reviewed By/Date:

FARUK CSOKUCI 4/14/95

1.0 Principal Steps	Potential Hazards	Recommended Controls
<p>1.1 Walk area down, establish work zone and laydown areas.</p> <p>1.2 Clearing and grubbing.</p>	<p>1.1a. Struck by and struck against physical objects during loading and unloading operations and setup.</p> <p>1.1b. Biological; weeds, snakes, spider's; other plant life.</p> <p>1.1c. Contact by inhalation, direct contact or ingestion of chemical contaminants.</p> <p>1.2a. Struck by and struck against physical objects during clearing and grubbing.</p> <p>1.2b. Contact with debris resulting in inhalation, direct contact or ingestion of chemical contaminants .</p>	<p>1.1a. Preplan work layout (Work Zone Map completed and posted by Subcontractor). Backup alarms on all motorized heavy equipment. Use correct hand and power tools for job and good housekeeping practices.</p> <p>1.1b. MK SSHO to discuss specific biological hazards awareness and communicate findings at POD and/or Pre Entry Briefs.</p> <p>1.1c. Level D PPE expected. MK SSHO to visual inspect area for evidence of contaminants and will also conduct general area scans for VOCs using PID and FID.</p> <p>1.2a. Preplan work layout (Work Zone Map completed and posted by Subcontractor). Backup alarms on all motorized heavy equipment. Use correct handtools and power equipment for the job. Review EM 385-1-1 Section 31 on safeguards and recommended practices.</p> <p>1.2b. Level C PPE for clearing and grubbing. Level B PPE for clearing and grubbing in areas posing immediate contact with unknown drums and also for preliminary screening of debris. Modify PPE levels as conditions warrant.</p>
1.3 Equipment to be Used	Inspection Requirements	Training Requirements
<p>1.4 Heavy equipment for loading and hauling. Hand and power tools.</p>	<p>Daily, prior to use per manufacturer's recommendation.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator.</p>

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Preliminary Screening of Debris including Hand and Mechanical excavating.		Analyzed By/Date: <i>F.A.P. & CSP/KHM 4/14/95</i>	Reviewed By/Date:
2.0 Principal Steps	Potential Hazards	Recommended Controls	
2.1 Initial excavations completed by hand (potholing) to locate underground debris/drums and containers	Contact with underground utilities, and other objects not expected in the burial area.	MK Excavation and Trenching permit required. Confirm if any utilities in area. Underground location equipment available to estimate size and depth of buried containers and drums if determined to be necessary.	
2.2 Mechanical excavation.	Inhalation, direct contact or ingestion of chemical, biological and physical agents. (Physical includes ionizing radiation) Struck by and struck against physical objects during excavations.	Level B PPE during excavating, upgrade or downgrade per SSHO direction. SSHO to conduct periodic air monitoring for VOCs, LEL, O ₂ and H ₂ S. General object surveys for ionizing radiation required as a general precaution. Maintain clear area around heavy equipment. Competent person shall inspect excavation on a periodic basis.	
2.3 Equipment to be Used	Inspection Requirements	Training Requirements	
2.4 Heavy equipment and handtools.	Daily, prior to use per manufacturer's recommendation.	OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator and Operator Training.	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Handling and Staging of Debris		Analyzed By/Date: <i>FJ Petal CSPK/MH/M 4/14/95</i>	Reviewed By/Date:
3.0 Principal Steps	Potential Hazards	Recommended Controls	
3.1 Complete final clean-off of debris. 3.2 Load debris onto staging area.	Physical hazards related to the lifting, moving and loading of debris. Direct contact with any contaminated material not readily removable from surface.	Preplan the staging area layout and flow of material. Preplan all lifts and verify safe loading factors and correct rigging for equipment. Level B PPE, downgrade per SSHO direction.	
3.3 Equipment to be Used	Inspection Requirements	Training Requirements	
3.4 Heavy equipment, slinging and rigging, overpack containers, handtools.	Daily, prior to use per manufacturer's recommendation.	OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication and Respirator.	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Decontamination Facility Operations, Personnel and Equipment.		Analyzed By/Date: <i>F. B. L. CSPK/11/17 4/14/95</i>	Reviewed By/Date: _____
4.0 Principal Steps	Potential Hazards	Recommended Controls	
<p>4.1 Receive and place material at facility.</p> <p>4.2 Decontaminate Equipment using high pressure wash or hand scrubbing and/or automatic wash on vehicle tires and undercarriage.</p>	<p>4.1a. Struck by and struck against. Material handling concerns.</p> <p>4.2a. Contact with contaminated material and cross contamination; inhalation of airborne aerosols; contact with high pressure wash stream; unexpected movement of material to be decontaminated.</p>	<p>4.1a. Site Decontamination Facility to provide isolation and controlled access. MK SSHO and Project Supervisor(s) to review material handling procedures to insure good practices and approved equipment is used which conforms to OSHA and EM-381 Section 28.I requirements.</p> <p>4.2a. Level C PPE with faceshield, modify per SSHO review. Secure items to be decontaminated. Visual inspect integrity of Facility's containment liners and containers used for waste waters. Clean side area established for worker's street clothes and approved respirator storage after cleaning and sanitizing.</p>	
4.3 Equipment to be Used	Inspection Requirements	Training Requirements	
<p>4.4 High pressure wash with soap solution; other decontamination solutions; scrub brushes; material handling equipment and securing equipment.</p>	<p>Before use per manufacturers recommendation.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, and Respirator.</p>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Backfilling and Site Restoration.		Analyzed By/Date: <i>FJ Petal CSK/M/M 4/14/95</i>	Reviewed By/Date:
5.0 Principal Steps	Potential Hazards	Recommended Controls	
5.1 Offload, spread, compact and reseed area.	<p>5.1a. Contact with airborne material, may present a biological hazard.</p> <p>5.1b. Struck by and struck against physical objects during offloading and spreading material.</p> <p>5.1c. Vibration from compactor, electric or air source.</p>	<p>5.1a. Dust Controls required to include wetting fill material. Level D PPE expected, upgrade if necessary. Dust controls and respirator (dust mask) may be necessary during spreading and covering with cover material (spray on straw or other material)</p> <p>5.1b. Preplan work layout. Backup alarms on all motorized equipment. Keep clear area around heavy equipment.</p> <p>5.1c. Equipment operated per manufacturers recommendation. May require heavy work glove for vibration dampening and hearing protection for noise mitigation.</p>	
5.2 Equipment to be Used	Inspection Requirements	Training Requirements	
5.3 Heavy equipment, handtools, sodding equipment, straw spreader, Compactor.	Daily, prior to use per manufacturer's recommendation.	OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator.	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Field Sampling Activities for Soil.		Analyzed By/Date: <i>FJ Petal / CSPK/WHM 4/14/95</i>	Reviewed By/Date:
6.0. Principal Steps	Potential Hazards	Recommended Controls	
<p>6.1. Hand augering (in excavations)</p> <p>6.2. Hand augering (non excavated areas)</p> <p>6.3. Containerized Liquids Sampling (known contents)</p> <p>6.4. Sampling Equipment Decontamination</p>	<p>6.1a. Collapse of excavation, entrance and egress, contaminated soil contact, contact with underground utility or piping/ mechanical system.</p> <p>6.2a. Contaminated soil contact, contact with utility or piping/ mechanical system.</p> <p>6.3a. Contaminated liquid contact.</p> <p>6.4a. Contact with contaminated material, also direct contact with decontamination solutions (weak nitric acid and acetone)</p>	<p>6.1a. Sampler requires approval from competent person to enter excavation if deeper than 5 foot. Atmospheric conditions in excavation checked prior to and during sampling. Modified Level D PPE expected, upgrade per SSHO review. Analyze for potential contact with any underground utility or mechanical service. Note: Excavation Permit must be valid. Review Field Sampling Kit MSDSs.</p> <p>6.2a. Excavation/Trenching Permit required for sampling, analyze for potential contact with any underground utility or mechanical service. Level D PPE expected, upgrade per SSHO review. Review Field Sampling Kit MSDSs, add MSDS to project files.</p> <p>6.3a. Level D+ PPE.</p> <p>6.4a. Level D+ PPE with splash goggles and chemical gloves.</p>	
6.5 Equipment to be Used	Inspection Requirements	Training Requirements	
<p>6.6. Soil auger, stainless steel spoons, buckets, field sampling kits and decontamination solutions.</p>	<p>Per manufacturers recommendation. Core drilling equipment if used must be inspected daily. Preplan waste handling.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator. DOT 181 certification for person supervising the preparation of contaminated materials for offsite shipment.</p>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Drum and container sampling and disposal of "identifiable" drums and containers.		Analyzed By/Date: <i>FJ Petal CSR/KHM 4/14/95</i>	Reviewed By/Date:
7.0 Principal Steps	Potential Hazards	Recommended Controls	
<p>7.1 Conduct visual inspection of drum.</p> <p>7.2 Prepare for sampling.</p> <p>7.3 Open drum.</p> <p>7.4 Obtain sample.</p> <p>7.5 Secure drum and stage.</p> <p>7.6 Load for final disposition.</p>	<p>7.1 Inhalation or direct contact with contaminants if drum breached. Unintentional drum movement.</p> <p>7.2 None identified.</p> <p>7.3 Inhalation or direct contact with drum contents, sparks and static electricity.</p> <p>7.4 Same as 7.3.</p> <p>7.5 Same as 7.3 plus loss of drum containment during transport onsite. Physical hazards during manual movement of drums.</p> <p>7.6 Physical hazards during movement of drums.</p>	<p>7.1 Establish protocol for conducting visual inspection of drum, scan immediate area around drum with PID and FID and CGI/O₂ direct reading instruments and GM Survey instrument. No drum movement permitted. Level B PPE.</p> <p>7.2 Preplan staging area and handling methods. Stage spill prevention equipment (absorbent, temporary containment, overpack) and fire extinguisher and eyewash.</p> <p>7.3 Reverify drum is not candidate for remote opening. Use non sparking tools. Assume Level B PPE, downgrade per known characterization data and SSHO concurrence. Monitor near drum opening using PID and FID and CGI/O₂ direct reading instruments.</p> <p>7.4 Same as 7.3. Lowest downgrade on PPE is D+, chemical resistant gloves required during sampling. Sample technique and equipment in accordance with Sampling and Analysis Plan. Grounding and bonding required or per manufacturers recommendation.</p> <p>7.5 Same as 7.3 during securing (closing up) of drum. Drum movement, use remote drum handling equipment when possible. Drum transport, use approved carrying platforms and secure all loads. Use approved manual moving equipment.</p> <p>7.6 Dispose of drum per Sampling and Analysis Plan. Review material handling practices and insure all loads are secure.</p>	
7.7 Equipment to be Used	Inspection Requirements	Training Requirements	
<p>7.8 Hand tools (non sparking type), drum handling equipment, motorized and non-motorized. Monitoring and sampling equipment.</p>	<p>Daily, prior to use per manufacturers recommendation.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator. DOT 181 certification for person supervising the preparation of contaminated materials for offsite shipment.</p>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Drum and container sampling and disposal of "unidentifiable" drums and containers.		Analyzed By/Date: <i>FJPetrol CSP/KHM 4/14/95</i>	Reviewed By/Date:
8.0 Principal Steps	Potential Hazards	Recommended Controls	
<p>8.1 Conduct visual inspection of drum.</p> <p>8.2 Move drum to Staging Area, prepare for sampling.</p> <p>8.3 Open drum.</p> <p>8.4 Obtain sample.</p> <p>8.5 Secure drum and stage.</p> <p>8.6 Load for final disposition.</p>	<p>8.1 Inhalation or direct contact with contaminants if drum breached. Unintentional drum movement.</p> <p>8.2 Loss of drum containment initiated during movement and transport onsite to Staging area. Physical hazards during manual movement of drums.</p> <p>Inhalation or direct contact with contaminants if containment breached.</p> <p>8.3 Inhalation or direct contact with drum contents, sparks and static electricity.</p> <p>8.4 Same as 8.3.</p> <p>8.5 Same as 8.3 plus loss of drum containment and movement during transport onsite. Physical hazards during manual movement of drums.</p> <p>8.6 Physical hazards during movement of drums.</p>	<p>8.1 Establish protocol for conducting visual inspection of drum, scan immediate area around drum with PID and FID and CGI/O₂ direct reading instruments. Complete general area survey using GM-Survey Meter. No drum movement permitted. Level B PPE (Faceshield and chemical resistant protective clothing)</p> <p>8.2 Preplan staging area and handling methods. Stage spill prevention equipment (absorbent, temporary containment, overpack) and fire extinguisher and eyewash. For drum movement, use remote drum handling equipment when possible. For drum transport, use approved carrying platforms and secure all loads. Use approved manual moving equipment. Level B PPE (Faceshield and chemical resistant protective clothing).</p> <p>8.3 Reverify drum is/is not candidate for remote opening. Use non sparking tools and explosive-resistant shield. Assume Level B PPE, downgrade per known characterization data and SSHO concurrence. Monitor near drum opening using PID and FID and CGI/O₂ direct reading instruments.</p> <p>8.4 Same as 8.3. Lowest downgrade on PPE is D+, chemical resistant gloves required during sampling. Sample technique and equipment in accordance with Sampling and Analysis Plan. Grounding and bonding required or per manufacturers recommendation.</p> <p>8.5 Same as 8.3 during securing (closing up) of drum. Drum movement, use remote drum handling equipment when possible. Drum transport, use approved carrying platforms and secure all loads. Use approved manual moving equipment.</p> <p>8.6 Dispose of drum per Sampling and Analysis Plan. Review material handling practices and insure all loads are secure.</p>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Drum and container sampling and disposal of "unidentifiable" drums and containers.		Analyzed By/Date: <i>F. J. P. CSPE/4/14/95</i>	Reviewed By/Date:
8.7 Equipment to be Used	Inspection Requirements	Training Requirements	
8.8 Hand tools (non sparking type), drum handling equipment, motorized and non-motorized. Monitoring and sampling equipment.	Daily, prior to use per manufacturers recommendation.	OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator. DOT 181 certification for person supervising the preparation of contaminated materials for offsite shipment.	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity: Clean and dispose of engine storage tanks at SWMU 67.

Analyzed By/Date:

F. J. Petrucci / CSF/KHM 4/14/95

Reviewed By/Date:

9.0 Principal Steps	Potential Hazards	Recommended Controls
<p>9.1 Wrap tank in 6 mil polyethylene plastic. 9.2 Transport tank to Decontamination Facility. 9.3 Test tank internal atmosphere using CGI/O₂ and PID instrument. 9.4 Clean interior tank surfaces using high pressure water washer from the outside. Containerize waste waters. 9.5 Visual inspection of interior tank and test atmosphere. 9.6 Demolition of tank and load for offsite disposal. 9.7 Sample wastewaters and prepare for disposal.</p>	<p>9.1 Struck by or struck against tank, contact with contaminated waste oil, flammable/combustible offgas vapors. 9.2 Struck by or struck against tank, loss of load. 9.3 Flammable/combustible offgas vapors. Falls and unexpected tank movement. 9.4 Offgas vapors, contaminated aerosols, direct contact with high pressure stream. 9.5 Same as 9.3. 9.6 a. flying debris b. fire potential from hidden residues c. caught under, caught between, pinch points on equipment d. noise e. chemical exposure by direct contact or inhalation. 9.7 Physical hazards, drum handling and contact with contaminated wastewaters.</p>	<p>9.1 Visually inspect tank for stability and free product (inside and out). Check tank internal atmosphere to insure < 10 % LEL, purge if necessary. Insure tank is isolated. Level D PPE, upgrade to Level D+ per SSHO direction (if free product contact is possible). 9.2 Preplan lift, qualified person to inspect rigging. Follow EM 385-1-1 Section 15 requirements on rigging. Secure load. Maintain right of way during transport. 9.3 Test internal tank atmosphere from outside tank. Use fall protection equipment if height > 6 feet. Insure tank is secure. 9.4 Check tank internal atmosphere to insure < 10 % LEL, purge if necessary. Level D+ PPE, respirator with organic vapor/HEPA cartridge if inhalation potential of aerosols. Inspect and operate high pressure wash equipment in accordance with manufacturers recommendations. 9.5 Same as 9.3. 9.6 a. Maintain clear area around demolition area at least 25 feet; hardhats, faceshield and safety glasses required. b. fire watch initiated. c. Review material handling practices, operate handheld equipment per manufacturers recommendation. d. SSHO to conduct noise surveys if necessary and specify hearing protection. e. SSHO to access exposure potential based on residual product remaining, if any and the cutting method used. Upgrade in PPE may be required. 9.7 Level D+ PPE. Use approved drum handling techniques.</p>
9.8 Equipment to be Used	Inspection Requirements	Training Requirements
<p>9.9 Hand tools, cutting tools, material handling equipment and rigging. Monitoring equipment. High Pressure wash. Collection drums, pumps, & liquid sampling equipment.</p>	<p>Daily, prior to use per manufacturers recommendation.</p>	<p>OSHA 1910.120 40-Hour Training, 3 day OJT, 8 hours Supervisory. 8 hour Refresher, Site Safety and Health Plan (Project Kickoff), POD, Pre and Post Entry Briefs, OSHA Hazard Communication, Respirator. DOT 181 certification for person supervising the preparation of contaminated materials for offsite shipment.</p>

APPENDIX B MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheets (MSDSs) or NIOSH Pocket Guide Summaries are provided for the known or expected contaminants and the list will be updated as the project progresses. MSDS and/or NIOSH Pocket Guides will be added to a Site MSDS (Right-To-Know) Binder instead of this Appendix.

**APPENDIX C
WORK ZONE MAPS**

(Maps to be developed as necessary)

**APPENDIX B
QUALITY CONTROL PLAN**

QUALITY CONTROL PLAN

**NAS MEMPHIS
MEMPHIS, TENNESSEE**

**CONTRACT #N62467-93-D-1106
DELIVERY ORDER #0011
STATEMENT OF WORK #013**

**REVISION 0
APRIL 18, 1995**

Prepared for:

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
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1.0 INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

The Quality Control Plan (QCP) presented herein is structured to implement the procedures necessary to achieve and maintain a consistently high level of quality in environmental remediation activities performed for the U.S. Naval Facilities Engineering Command, Southern Division. A separate Quality Assurance Project Plan (QAPjP) addresses procedures for achieving a high degree of quality on sampling and laboratory analysis. This consistency will be accomplished through standardization and documentation of field techniques and activities. This QCP is intended to be a working document that provides the structure for achieving a high level of confidence in the quality of Delivery Order work.

This QCP is generated to address the NAS Memphis remediation activities specified under Delivery Order No. 0011, *Statement of Work #013*.

1.2 THREE PHASES OF CONTROL

This QCP integrates the Navy's Quality Control system of the Three Phases of Control. These phases, Preparatory, Initial, and Follow-up, represent a logical and systematic approach to assuring the control and the quality of the remediation work processes. Integration of the Three Phases of Control is accomplished by the performance of Preparatory, Initial, and Follow-up inspections at representative points in the remediation work process. Details of these inspections are contained in Section 4 of this QCP, "Inspection System".

At each phase, Quality Control verification activities may be supplemented by the performance of detailed inspections of a particular activity. In these cases, Field Inspection Checklists have been generated to assure a thorough verification of the work process. The use of Field Inspection Checklists is detailed in the Testing Plan and Log, Section 5 with work plans for each SWMU. Copies of the specified Field Inspection Checklists are provided with the Work Plan for each SWMU. When utilized, the completed Field Inspection Checklist is attached to the combined Contractor Production Report/Contractor Quality Control Report (Form 01400-1/2).

1.3 PRECONSTRUCTION/QUALITY CONTROL MEETINGS

To ensure that all parties performing work at NAS Memphis fully understand the Quality requirements established for this Delivery Order, a Pre-Construction Meeting will be held prior to the start of construction/remediation activities. Attendees at the meeting include the Contracting Officer, or designee, and the Morrison Knudsen Project Manager, the MK Project Superintendent, the MK Site QC Supervisor, MK Site Safety and Health Officer and the ROICC. Minutes of the meeting shall be prepared by the MK Site QC

Supervisor and signed by all meeting attendees. A copy of the minutes of the meeting are then provided to the Navy and the MK Charleston Project Management Office.

After construction/remediation activities commence, the MK Site QC Supervisor will conduct QC Meetings at least once every two weeks or more frequently if appropriate. QC Meetings will be held with the MK Project Manager and superintendents, foreman, or managers responsible for upcoming work. The purpose of the QC Meeting is to review the minutes of the previous meeting, review the schedule, review the status of submittals, review the work to be accomplished in the next two weeks and any testing and documentation required, resolve any QC and production problems, and address any items that may require revising the QC Plan. QC Meetings will be documented, and a copy of the minutes of the meeting will be provided to the Contracting Officer within two working days after the meeting.

2.0 DEFINABLE FEATURES OF WORK

The definable features of work are described below.

2.1 SOLID WASTE MANAGEMENT UNITS (SWMUs)

2.1.1 SWMU #66 - Radar Facility Disposal Area

2.1.1.1 Mobilization

- a. Site Orientation
- b. Security Requirements
- c. Field Office Setup
- d. Site Survey and Layout of Areas of Concern (AOC)
- e. Arrange for Utilities
- f. General Equipment Mobilization

2.1.1.2 Temporary Road Construction

- a. Health and Safety
 1. SSHO Survey
 2. Work Zones
- b. Equipment and Personnel
- c. Construction Plan
 1. Utilities Located and Marked
 2. Barricade Plan
 3. Stockpiling Procedures (if necessary)

2.1.1.3 Drum and Debris Removal

- a. Health and Safety
 1. SSHO Survey
 2. Work Zones
 3. Monitoring Equipment
- b. Equipment and Personnel
- c. Field Screening Procedures
- d. Identification and Segregation Procedures
- e. Stockpiling Plan
- f. Decontamination Procedures

2.1.1.4 Excavation

- a. Health and Safety
 - 1. SSHO Survey
 - 2. Work Zones
 - 3. Monitoring Equipment
- b. Equipment and Personnel
- c. Field Screening Procedures
- d. Rigging Procedures
- e. Stockpiling Plan
- f. Decontamination Procedures
- g. As-built Drawings
- h. Dewatering Plans
 - 1. Run-on
 - 2. Run-off
 - 3. Disposal/Treatment
 - On-site
 - Off-site
- i. Waste Disposal
 - 1. Manifest Procedures
 - 2. Transportation Plan

2.1.1.5 Confined Space Entry

- a. Health and Safety
 - 1. CSE Permit
 - Excavations

2.1.1.6 Sampling

- a. Health and Safety
- b. Confirmatory Sampling Plan/Procedures

2.1.1.7 Site Restoration

- a. Health and Safety
- b. Backfill
- c. Vegetation and Seeding Plan

2.1.1.8 Demobilization

- a. General Equipment Demobilization

2.1.2 SWMU #67 - Horse Pasture Disposal Area

2.1.1.1 Mobilization

- a. Site Orientation
- b. Security Requirements
- c. Field Office Setup
- d. Site Survey and Layout of Areas of Concern (AOC)
- e. Arrange for Utilities
- f. General Equipment Mobilization

2.1.1.2 Temporary Road Construction

- a. Health and Safety
 1. SSHO Survey
 2. Work Zones
- b. Equipment and Personnel
- c. Construction Plan
 1. Utilities Located and Marked
 2. Barricade Plan
 3. Stockpiling Procedures (if necessary)

2.1.1.3 Debris Removal

- a. Health and Safety
 1. SSHO Survey
 2. Work Zones
 3. Monitoring Equipment
- b. Equipment and Personnel
- c. Field Screening Procedures
- d. Identification and Segregation Procedures
- e. Stockpiling Plan
- f. Decontamination Procedures

2.1.1.4 Excavation

- a. Health and Safety
 1. SSHO Survey
 2. Work Zones
 3. Monitoring Equipment
- b. Equipment and Personnel
- c. Field Screening Procedures
- d. Rigging Procedures
- e. Stockpiling Plan
- f. Decontamination Procedures
- g. As-built Drawings

- h. Dewatering Plans
 - 1. Run-on
 - 2. Run-off
 - 3. Disposal/Treatment
 - On-site
 - Off-site
- i. Waste Disposal
 - 1. Manifest Procedures
 - 2. Transportation Plan

2.1.1.5 Confined Space Entry

- a. Health and Safety
 - 1. CSE Permit
 - Excavations

2.1.1.6 Sampling

- a. Health and Safety
- b. Confirmatory Sampling Plan/Procedures

2.1.1.7 Site Restoration

- a. Health and Safety
- b. Backfill
- c. Vegetation and Seeding Plan

2.1.1.8 Demobilization

- a. General Equipment Demobilization

2.2 SAMPLING AND LABORATORY PROCEDURES

Chemical quality control is included in the Chemical Data Acquisition Plan, Appendix G of the Work Plan.

2.2.1 Analytical Sampling

The objective of field sampling and laboratory analytical procedures is to obtain defensible data using the data quality objective (DQO) process for data collection. Data quality requirements for precision, accuracy, representativeness, comparability, and completeness are defined for a site and must be achieved in order to satisfy DQOs.

A major required component of all field investigation sampling plans is maintaining sample integrity from collection to data reporting. To maintain and document sample possession, chain-of-custody procedures must be implemented. Elements of the chain include at a minimum:

- Sample seals
- Labels with identification numbers to allow for sample tracking
- Field log books
- Field data record forms
- Chain-of-custody records
- Sample analysis request sheets
- Bills of lading and air bills
- Field and laboratory tracking forms

Field and laboratory sample custodians or their designated representatives are responsible for maintaining custody of samples. A sample is considered to be under a person's custody if one or more of the following conditions are met:

- It is in the person's physical possession.
- It is in view of the person.
- It is secured by the person so that no one can tamper with the sample without being detected.
- It is secured by the person in an area that is restricted to authorized personnel.

Chain of custody will be maintained in the field through use of field log books, chain-of-custody records, sample labels, custody seals and airbills/bills of lading. Once the samples have arrived in the laboratory the chain of custody is continued through use of an internal sample tracking system and locked or limited access sample storage areas. All records which are generated through the field and laboratory efforts are part of the Quality Assurance records kept in the project file.

2.2.2. Field Sample Custody

The sample custody program includes procedures for the preservation of samples, sample identification, recording sample collection locations, and specific considerations associated with sample acquisition. The chain of custody (see Figure 2-1) requires at a minimum, the following:

- Appropriate project identification information
- Sample identification
- Sample location
- Sample date and time
- Sample matrix
- Number of containers per sample
- Analysis required
- Sampler's name
- Release and acceptance information; i.e., date, location, and technician's signature

In-situ or field measurements (e.g., pH measurements, temperature, conductivity, flow measurements, field screening, and air monitoring data) are recorded in field log books or on field data record forms. Sample containers are labeled or tagged appropriately

according to applicable implementing procedures and plans. Labels (see Figure 2-2) or tags contain the following information:

- Organization and site name
- Location of sample collection
- Date and time of sample collection
- Preservation
- Sample identification number
- Name(s) of sampler(s)

Samples will be identified as discussed in the Sampling and Analysis Plan (Appendix G). Custody seals (see Figure 2-2) will be affixed to all shipping containers. Samples are accompanied by chain-of-custody records. Completed chain-of-custody documents are retained as quality assurance records and maintained in accordance with the Quality Assurance Program.

2.2.3 Laboratory Sample Custody

Samples are packaged and shipped to the laboratory in accordance with U.S. Department of Transportation requirements with a separate custody record accompanying each shipment. Authorized sample custodians at the laboratories sign for incoming field samples, obtain documents of shipment, and verify data entered onto the sample custody records. The laboratories are required to inform MK of receipt of samples within four working days. If any damage or shipping discrepancy is noted upon receipt of samples, the laboratories are required to inform MK immediately. Contract laboratories are required to maintain custody of samples to assure sample integrity.

2.2.4 Quality Assurance Records

Records generated as a result of analytical sampling activities are Quality Assurance Records and will be processed in accordance with the requirements of this QC Plan. Documents such as Chain of Custody Records, analytical testing results, and other required laboratory deliverables are essential documents necessary to ensure the integrity and defensibility of data used to make decisions in the remediation process. Further, Quality Assurance Records provide the record of events that have occurred for all features of the remedial work and their adequate generation, review, protection, and submittal is essential to the success of the project.

2.2.5 Laboratory Qualification Package

As of the time of generation of this Quality Control Plan, the analytical and earth sciences laboratories have not been selected for the testing to be performed at NAS Memphis. Laboratory services will be procured on a competitive basis, and work awarded only to those labs that meet the qualification requirements.

For analytical sample testing, the selected laboratory must meet, as a minimum, NEESA 20.2-047B requirements and shall have obtained NEESA approval as detailed in the subject document. The selected laboratory will be required to submit for approval their laboratory QAPjP to MK. Additionally, the selected analytical laboratory will be required to submit deliverables to support the data validation process.

Soil testing laboratories will be required to submit evidence of qualification to MK, and the award of these services will also be based upon qualifications and competitive pricing.

Sample ID:	 MORRISON KNUDSEN CORPORATION
Sample Description:	
Sample Date/Time:	
Requested Analyses:	
	Project Number:
	Task Number:
Preservative:	Phone Number:
Submission Date to Lab:	
Sampler's Signature:	



**MORRISON
 KNUDSEN
 CORPORATION**

CUSTODY SEAL

DATE _____

SIGNATURE _____



**MORRISON
 KNUDSEN
 CORPORATION**

CUSTODY SEAL

DATE _____

SIGNATURE _____

Sample ID:	 MORRISON KNUDSEN CORPORATION
Sample Description:	
Location:	
Sample Date/Time:	
Sampler's Signature:	
	Project No.

**FIGURE 2-2
 CUSTODY SEAL AND SAMPLE CONTAINER LABEL**

3.0 QUALITY CONTROL ORGANIZATION

3.1 DUTIES, RESPONSIBILITIES, AND AUTHORITIES (DRA)

Personnel with Quality Control responsibilities are distinct from personnel with project management responsibilities in that the oversight performed for quality control will be independent of the oversight performed for physical remediation/construction activities. Corrective measures necessitated by the results of inspection and testing will be implemented through the site project management personnel. A QC Organization Chart is provided in Figure 3-1 of this QC Plan. The organization chart identifies the structure and areas of responsibility of the project team and line of reporting authority within the project management organization. The Quality Control organization to be deployed in support of the Delivery Order work at NAS Memphis will consist of the following positions:

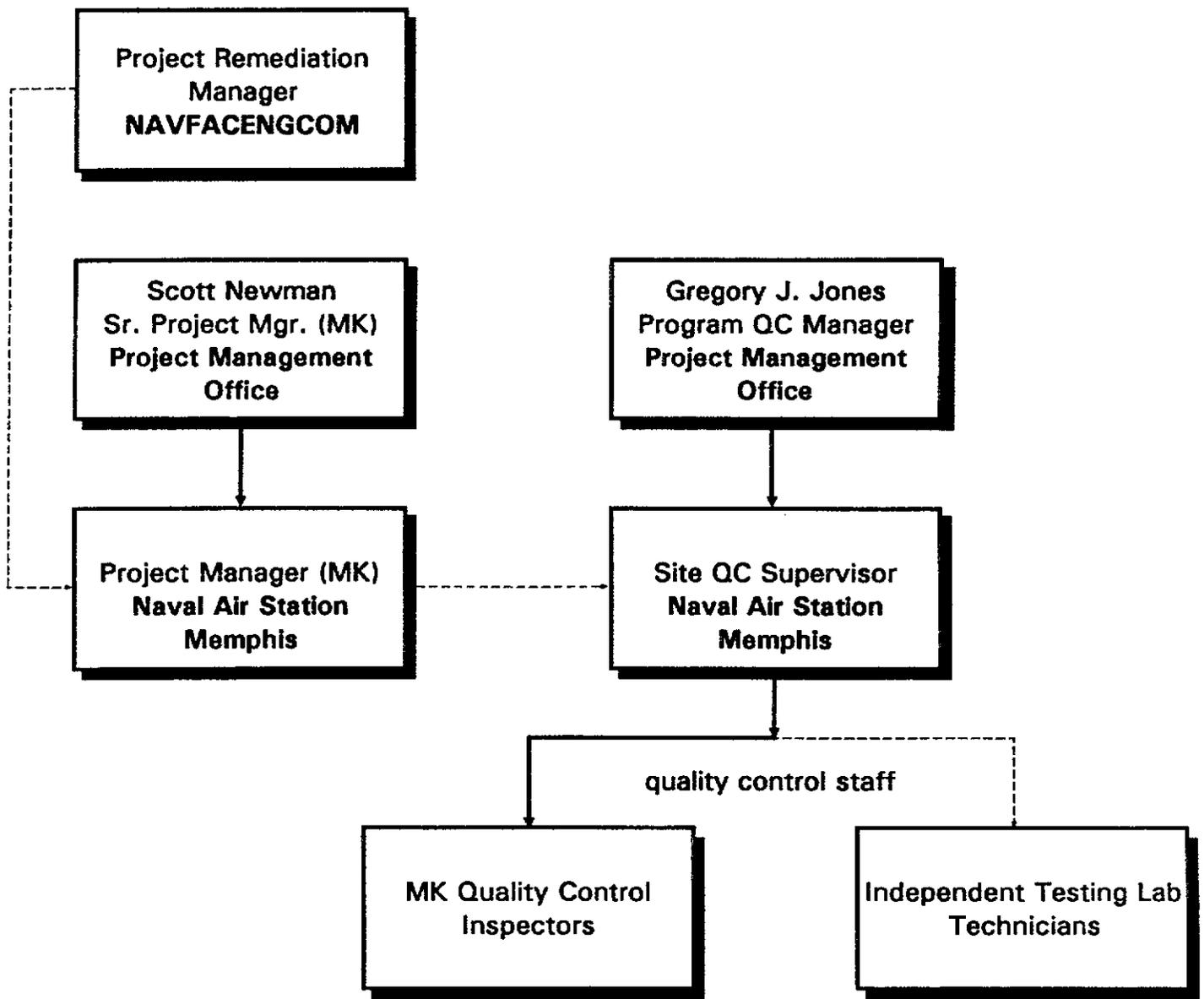
3.1.1 Site Quality Control Supervisor (SQCS)

The SQCS is responsible for overall implementation of this QC Plan at the project site, and has the authority to act independently in all Quality Control matters. The SQCS reports directly to the MK Program Quality Manager, and interfaces on a day-to-day basis with the site Project Manager. The SQCS has the authority to halt work if it is found to be nonconforming and further processing may result in an inability to resolve the identified condition. Key responsibilities of the SQCS include:

- Manage the performance of all on-site and off-site inspections and testing;
- Evaluate the results of the inspections and testing;
- Maintain the Testing Plan and Log status provided in Section 5.0 of this QC Plan;
- Perform Preparatory, Initial, and Follow-Up Inspections per the schedule provided in Section 4 of this plan;
- Document results of inspection and testing activities on the Contractor Quality Control Report provided in Section 7.0 of this QC Plan;
- Maintenance of the status of the Rework Items List per Section 6.0 of this QC Plan;
- Performing physical sampling as detailed in the Work Plan and in accordance with the Testing Plan and Log provided in Section 7.0 of this QC Plan;
- Ensure that sample custody requirements are maintained.

3.1.2 Laboratory Quality Control Personnel

Laboratory Quality Control personnel will perform the laboratory tests as specified to generate the QC analytical data. Laboratory QC personnel will be qualified by training and experience in accordance with the selected laboratory's Quality Assurance/Quality Control Manuals.



**FIGURE 3-1
ORGANIZATION CHART**

3.2 SUPPORT ORGANIZATIONS

The following chart lists the major portions of work for the remediation activities associated with the NAS Memphis site and who will perform them.

Scope of Work	Organization
Haul Road Construction	Subcontracted
Site Clearing	Subcontracted
Topsoil Removal and Stockpiling	Subcontracted
Drum and Debris Removal	Subcontracted
Contaminated Soil Excavation	Subcontracted
Backfilling and Compaction	Subcontracted
Packaging and Off-site Disposal of Materials	Subcontracted
Laboratory Analysis	Subcontracted

4.0 INSPECTION SYSTEM

4.1 QC PERSONNEL

QC Personnel are responsible for conducting assigned inspections in accordance with the technical requirements provided in the applicable specifications and drawings and for documenting the results of these inspections, tests, and observations in accordance with this QCP.

4.2 INSPECTION/TEST POINT

An Inspection or Test Point is that point in a work process where an inspection or test is to be performed. Inspection and Test Points are designated in the Testing Plan and Log contained in Section 5.0.

4.3 CONDUCT OF INSPECTIONS

Specific types and frequencies of tests will be detailed in the Testing Plan and Log contained in Section 5.0. Inspections will be performed utilizing inspection checklists as specified in the Testing Plan and Log.

4.4 PREPARATORY INSPECTION

Notify the Contracting Officer or designee at least two working days in advance of each preparatory phase. Conduct the preparatory phase inspection with the superintendent and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily Contractor quality control report. Perform the following prior of beginning work on each definable feature of work:

- Review each paragraph of the applicable specification sections;
- Review the contract drawings;
- Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;
- Review the testing plan and ensure that provisions have been made to provide the required QC testing;
- Examine the work area to ensure that the required preliminary work has been completed;
- Examine the required materials and equipment, and sample work to ensure that materials and equipment are on hand and conform to the approved shop drawings and submittal data;
- Review the Safety Plan; and,
- Discuss construction procedures.

4.5 INITIAL INSPECTION

At initiation of a representative sample of the given features of the work, the Site QC Supervisor will verify that the work meets the applicable quality requirements. The following items will be verified during Initial Inspection:

- the workmanship meets the established quality requirements;
- configuration and construction methods, equipment, and tools appear to be effective;
- calibration of measurement and test equipment;
- materials and articles used are as specified;
- adequacy of inspection/testing methods;
- adequacy of applicable drawings; and,
- adequacy of safety and environmental precautions.

4.6 FOLLOW-UP INSPECTION AND SURVEILLANCE

The following functions will be performed for on-going work on a daily basis, or more frequently as necessary for each definable feature of work and documented in the daily Contractor Quality Control report:

- Ensure the work is in compliance with contract requirements;
- Maintain the quality of workmanship required;
- Ensure that testing is performed; and,
- Ensure that rework items are being corrected.

4.7 QC PLAN INSPECTIONS

The Site Quality Control Supervisor will perform follow-up inspections based on the Inspection Plan and Log in Section 5.0 of this QC Plan. The Site QC Supervisor will document the results of each day's inspection on the Contractor Quality Control Report. Completed Contractor Quality Control Reports shall be submitted to the Program Quality Manager as a record.

4.8 DOCUMENTATION

Contractor Quality Control Reports are required for each day that work is performed and for every seven consecutive calendar days of no-work, on the last day of that no-work period. Account for each calendar day throughout the life of the project. The reporting of work shall be identified by terminology consistent with the construction schedule. Contractor quality control reports are to be prepared, signed, and dated by the MK Site QC Supervisor and shall contain the following information:

- a) Identify the control phase and the definable feature of work.
- b) Results of the preparatory phase meetings held, including the location of the definable feature of work and a list of personnel present at the meeting. Verify in the report

that for this definable feature of work, the drawings and specifications have been reviewed, and work methods and schedule have been discussed.

- c) Results of the initial phase meetings held, including the location of the definable feature of work and a list of personnel present at the meeting. Verify in the report that for this definable feature of work the preliminary work was done correctly, samples have been prepared and approved, the workmanship is satisfactory, test results are acceptable, work is in compliance with the contract, and the required testing has been performed, and include a list of who performed the tests.
- d) Results of the follow-up phase inspections held, including the location of the definable feature of work. Verify in the report for this definable feature of work that the work complies with the contract as approved in the initial phase, and that required testing has been performed, and include a list of who performed the tests.
- e) Results of the three phases of control for off-site work, if applicable, including actions taken.
- f) List rework items identified, but not corrected by close of business.
- g) As rework items are corrected, provide a revised rework items list along with the corrective action taken.
- h) Include a "Remarks" section in this report which will contain pertinent information including directions received, QC problem areas, deviations from the QC plan, construction deficiencies encountered, QC meetings held, acknowledgment that as-built drawings have been updated, corrective direction given by the QC manager, and corrective action taken by the Contractor.
- i) Contractor quality control report certification.
- j) Insure all transportation waste manifests are sent to NAS Memphis for signature and insure a file of all manifests is kept.

4.9 TESTING PLAN AND LOG

As tests are performed, the SQCS shall record on the testing plan and log the date the test was conducted, the date the test results were forwarded to the Contracting Officer, and any remarks and acknowledgment that an accredited or Contracting Officer approved testing laboratory was used. Attach a copy of the updated testing plan and log to the last daily Contractor Quality Control Report of each week.

4.10 REWORK ITEMS LIST

The MK SQCS shall maintain a list of work that does not comply with the contract, identifying what items need to be reworked, the date the item was originally discovered, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the MK rework items list to the last daily Contractor Quality Control Report of each week. The Site QC Supervisor shall be responsible for including on this list items needing rework including those identified by the Contracting Officer.

4.11 AS-BUILT RECORDS

The MK SQCS manager is required to review the as-built records required by contract to ensure that as-built records are kept current on a daily basis and marked to show deviations which have been made from the contract drawings. The MK SQCS shall initial each deviation or revision. Upon completion of work, the MK SQCS shall submit a certificate attesting to the accuracy of the as-built records prior to submission to the Contracting Officer.

4.12 SWMU INSPECTION CHECK LISTS

Check lists will be included in each work plan to assist managers in ensuring that all major tasks have been accomplished in accordance with project requirements.

4.13 REPORT FORMS

Inspection and test results will be summarized daily on the "Contractor Quality Control Report", and supported by completed inspection/test checklists for the activity. **Completed checklists are to be attached to the Contractor Quality Control Report.**

Reports shall be submitted daily to the Contracting Officer, with a copy sent to the Program Quality Control Manager in the Project Management Office.

Summaries of the required inspections for each SWMU are provided in Table 4-1. charts:

TABLE 4-1

SUMMARY OF INSPECTION APPROACH: NAS MEMPHIS/DELIVERY ORDER 0011 (SOW #013)					
Project Component	Required Inspection/Test	Applicable Procedure (Section VII of QCP)	Preparatory Inspection	Initial Inspection	Follow-up Inspection
<ul style="list-style-type: none"> • SWMU #66 Radar Facility Disposal Area 	<ul style="list-style-type: none"> -Clearing and grubbing of site. -Removal and stockpiling of topsoil 	<ul style="list-style-type: none"> -QEP 8.1 -QEP 8.1 -QEP 8.1 	Document on CQCR Form 1400-1	Document on CQCR Form 1400-1	Document on CQCR Form 1400-1; and Field Inspection Checklist.
<ul style="list-style-type: none"> • SWMU #67 Horse Pasture Disposal Site 	<ul style="list-style-type: none"> -Clearing and grubbing of site -Excavation of contaminated soils (based on field screening) -Confirmatory Sampling: Appendix IX and explosives -Characterize debris for disposal -Backfill, compaction, and soils testing of excavated area. 	<ul style="list-style-type: none"> -QEP 8.1 -QEP 8.1 -QEP 6.1 -QEP 8.1 	Document on CQCR Form 1400-1	Document on CQCR Form 1400-1	Document on CQCR Form 1400-1; and Field Inspection Checklist S0-01 for Soils.

5.0 TESTING PLAN AND LOG

A Testing Plan and Log has been prepared and included in this section of the Quality Control Plan to delineate the required tests and inspections applicable to a definable feature of work. The Testing Plan and Log identifies the project component, the specific inspection or test to be performed, the frequency of such testing or inspection, and lists the governing standard which governs the methodology to be employed. Qualitative and quantitative acceptance criteria is provided, either through an actual listing of the criteria or by reference to a supporting checklist, work plan element, or a governing regulation or standard.

The Testing Plan and Log is intended to serve as a living document, utilized in the field to record the status of sampling and inspection performed in support of the Delivery Order work. The Log contains sections for the entry of specific sample or test numbers, the results of sampling or testing activity, and relevant comments.

It is the responsibility of the Site Quality Control Supervisor to ensure that these required entries are made and that the Testing Plan and Log is maintained current.

TESTING PLAN AND LOG

CONTRACT NO./TITLE: MK SOUTH DIV ERAC

DELIVERY ORDER NO: 0011 (SOW #013) NAS Memphis

Activity	Freq.	Governing Standard	Performed or Sampled By	Sample or Test Number	Acceptance Criteria	Results	Comments
General Requirements							
• Site Preparation	Throughout task	• EM 385-1-1, Section 21.1 & 25 (Safety and Health Requirements Manual, USACE 10/92)	SUB*****		N/A		Refer to Work Plan and Contract
• Backfill/compaction of excavated areas	Every 500 square feet of material placed	• ASTM D2922 (density)	SUB		<u>Density</u> : 85% maximum lab density per site specific requirements or design specs and drawings		Document on FIC SO-01 Refer to Work Plan, for other requirements
• Characterization for off-site disposal	Per SWMU-specific Work Plan sections	40 CFR, Part 261, TCLP (volatiles, semi-volatiles, and metals) and 40 CFR Part 264.314 (paint filter test) (Additional tests may be required, refer to individual SWMUs below.)	SUB retrieves samples SUB packages and ships to lab LAB performs analytical work		Less than TCLP criterion. Paint filter test results as specified in 40 CFR Part 264.314.		Refer to SWMU-specific sections of Work Plan
• Construct Decontamination Pad	Once Per SWMU		Sub				Refer to Work Plan
• Photographs	Daily		MK				

TESTING PLAN AND LOG

CONTRACT NO./TITLE: MK SOUTH DIV ERAC

DELIVERY ORDER NO: 0011 (SOW #013) NAS Memphis

Activity	Freq.	Governing Standard	Performed or Sampled By	Sample or Test Number	Acceptance Criteria	Results	Comments
• Environmental Report	Once Per SWMU		MK				
• Site Restoration	Throughout activity	Work Plan	SUB		Ensure that topsoil and vegetative cover are placed per Work Plan specifications		Refer to Work Plan
SWMU #66 - Radar Facility Disposal Area							
• Characterization of soil for off-site disposal	Prior to off-site shipment	• 40 CFR Part 268, Appendix III	LAB		Per specific disposal requirements		
• Backfill/Compaction	Every 500 square feet of material placed	As per design drawings and specifications	SUB		As per site specific requirements		Document on FIC S0-04
SWMU #67 - Horse Pasture Disposal Site							
• Characterization of soil for off-site disposal	Prior to off-site shipment	• 40 CFR Part 2684, Appendix III	LAB		Per specific disposal requirements		
• Backfill/Compaction	Every 500 square feet of material placed	As per design drawings and specifications	SUB		As per site specific requirements		Document on FIC S0-04

6.0 REWORK PROCEDURES

The Site Quality Control Supervisor is responsible for ensuring that deviating items are reported, tracked, and resolved. MK Quality Execution Procedure (QEP) 13.1 establishes the requirements and responsibilities associated with the identification, reporting, and correction of deviating items. A deviating item is a departure from established requirements, and may be corrected through rework of the item or may result in a more formally documented solution requiring engineering evaluation. Deviations are usually identified by inspectors during the conduct of routine inspections or tests; however, deviations may be identified at any time by anyone involved with the work and reported to the assigned inspector or Quality Control Supervisor.

Identified deviations shall be identified on the Rework Items List. The Rework Items List is provided in Appendix A of this QCP, and shall be maintained current throughout the work process.

7.0 DOCUMENTATION

This section of the Quality Control Plan delineates the required Quality Control documentation that is to be completed to support the NAS Memphis Delivery Order work. Appendix A provides a listing of the required checklists to be completed when performing inspections, and specific forms to be used for activities such as sample chain of custody. Samples of these forms are included as attachments to this section.

8.0 SCHEDULE

The inspections outlined in the Testing Plan and Log follow the definable features of work outlined in Section 2.1, Introduction, to this QC Plan. Each definable feature of work is subject to preparatory, initial, and follow-up inspections of the work activity. Therefore, the schedule of inspections to be performed will mirror the construction/remediation schedule for Statement of Work #013.

APPENDIX A
MORRISON KNUDSEN STANDARD QC FORMS

REWORK ITEMS LIST/DEFICIENCY TRACKING SYSTEM

CONTRACT NO./TITLE: MK SOUTHDIV ERAC

DELIVERY ORDER NO: NAS Memphis - Delivery Order 0011 - Memphis, Tennessee

Number	Date Identified	Description	Contract Requirement (Spec. Section and Para.No.; Drwg. No., etc.)	Action Taken by QC Manager	Resolution	Date Completed	Remarks

Number	Date Identified	Description	Contract Requirement (Spec. Section and Para.No.; Drwg. No., etc.)	Action Taken by QC Manager	Resolution	Date Completed	Remarks

		Procedure Type QUALITY EXECUTION PROCEDURE	
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1.0 SCOPE

This procedure describes the requirements for preparation and control of submittals developed for approval by the Navy Contracting Officer. This procedure describes the MK SOUTHDIV ERAC submittal origination, review, control and distribution process to be utilized in the execution of the work.

2.0 RESPONSIBILITIES

2.1 MK Program Manager (PM)

The PM is responsible for ensuring that adequate resources are provided to enable implementation of this procedure, and for ensuring that the program is effectively implemented.

2.2 MK Program Quality Manager (PQM)

The PQM is responsible for effectively implementing this procedure, for management of the submittal/document control process, for certification of submittals as required, and for approval of submittals as required.

2.3 Project Managers (PiM)

Responsible for identifying the types of submittals to be generated for execution of Delivery Order work, and for assignment of personnel to carry out the generation of submittals.

2.4 Submittal Originators

Responsible for the origination of submittals necessary to support Delivery Order execution, such as Work Plans, Sampling and Analysis Plans, and QC Plans. Originators shall prepare submittals suitable for the performance of work in the format specified in Section 4.4 "Submittal Format."

2.5 Document Control Supervisor (DCS)

Responsible for maintenance of the Submittal Register through regular database input and statusing, and for the distribution of controlled documents in accordance with this procedure.

3.0 DEFINITIONS

3.1 Submittal

Submittals are shop drawings, product data, samples, and administrative documents that require review, approval, and distribution. A detailed categorization and description of submittal types is provided in ATTACHMENT A & B. Submittal types include:

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- a. **Shop Drawings.** As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this contract, by the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor, or other lower tier Contractor, to illustrate a portion of the work.
- b. **Product Data.** Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate a portion of the work, but not prepared exclusively for this contract.
- c. **Samples.** Physical examples of products, materials, equipment, assemblies, or workmanship, physically identical to a portion of the work, illustrating a portion of the work or establishing standards for evaluating the appearance of the finished work or both.
- d. **Administrative Submittals.** Submittals of data for which reviews and approval will be required to ensure that the administrative requirements of the project are adequately met but not to ensure directly that the work is in accordance with the design concept and in compliance with the contract documents.

3.2 Document

As used in this procedure, the term "document" is the general term applied to submittals.

3.3 Controlled Document

A Controlled Document is a document that is used to control/perform activities associated with design or construction where it is essential that these activities be carried out in accordance with the latest approved document. Controlled designation may be applied to other documents at the discretion of the PjM. Determination as to whether or not a document is to be released as "Controlled" is made when the document status as defined in Section 3.6 is designated as "Approved."

3.4 Document Control/Document Control Center

For the purposes of this procedure, the terms Document Control/Document Control Center apply to the Contractor's Document Control operations located on site. This is the prime point of entry for all information entering the project.

3.5 Contract Documents

Contract Documents are the contract and contract specified design/construction affecting documents.

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3.6 Document Status

The Document Status is assigned by the DCS to a submittal or a controlled document to indicate the state or condition of that item. Status options are as follows:

- a. **"Approved" or "Approved as Submitted"** - Use of this document is unrestricted;
- b. **"Approved as Noted"** - Use of document is unrestricted provided exception is not taken to noted comments.
- c. **"Disapproved" or "Revise and Resubmit"**- A status of submittals that indicates the submittal is incomplete or does not comply with the design concept or contract documents and requires resubmittal after appropriate changes.
- d. **"Not Reviewed"**- A status of submittals that indicates that the submittal has been previously reviewed and approved, is not required as a submittal, lacks review and approval by Mk, or is not complete. Submittals returned by the Navy marked "Not Reviewed" because of lack of review by MK or because of incompleteness shall be resubmitted to the Navy with appropriate action, change, or coordination.
- e. **"Preliminary Release for Information"**- A document status that indicates the document is in the process of being finalized but is being released for use in preliminary planning efforts. This status may also be used for documents that are routed internally for review, comment, or approval.
- f. **"Information Only"**-A document status that indicates the document may only be used for informational purposes and are not of controlled status. Information Only documents are not to be used as a source of design basis information or used as a reference in the completion or inspection of work.

3.7 Set Identification Number (Set I.D. No.)

The Set Identification Number is used in conjunction with the Controlled Document Standard Distribution List (SDL) system. Each individual or location that will receive Controlled Documents is assigned a Set Identification Number. This number is listed in red on the Controlled Document to indicate that the document is controlled and to whom or where it has been issued.

3.8 Standard Distribution List

- 3.8.1 A "Standard Distribution List" (Form QEP 8.1-3) of documents and Controlled Documents shall be maintained for the project by the DCS. It shall be updated as necessary and revision controlled by date. This list shall identify the individual(s) or organization(s) which shall receive the listed documents, the number of copies they receive, and any "Set I.D. Number" assigned to the copy.

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3.8.2	The Standard Distribution List may be generated manually or by sorting a computer database.		
3.9	<u>Navy</u>		
	The use of the term "Navy" in this procedure refers to the U.S. Navy Southern Division Naval Facilities Engineering Command located in Charleston, South Carolina.		
4.0	SUBMITTALS		
4.1	<u>Planning</u>		
4.1.1	Project Management performs the following steps upon receipt of a new Delivery Order.		
	a. Defines a scope of work.		
	b. Identifies a list of submittals required and the planned submittal date based on the scope of work.		
	c. Prepares a cost summary sheet by cost code for each submittal.		
	d. Transmits the submittal list with a Submittal Register (Part A) to the Navy for completion of Items (a) through (e).		
	e. Upon receipt of the completed Submittal Register from the Navy, Project Management will assign an Originator to each of the submittals.		
	f. The Submittal Register is forwarded to the DCS and is logged into the Document Control database.		
	g. Management identifies and forwards to the DCS, a list of individuals who are to be on standard distribution for each submittal or group of submittals associated with the Delivery Order. This includes internal routing for review and comment prior to submittal to PQM for approval (e.g., Originator's department manager, Environmental Manager, Site Project Manager, Project Engineer, Project Controls Manager, Safety Supervisor, etc.).		
4.2	<u>Scheduling</u>		
4.2.1	Submittal originators shall coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.		
4.2.2	Except as specified otherwise, allow a review period, beginning with receipt by the approving authority, that includes at least 15 working days for submittals for QC manager		

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approval and 20 working days for submittals for Contracting Officer approval. The period of review for submittals with Contracting Officer approval begins when the Government receives the submittal from the Contractor. The period of review for each resubmittal is the same as for the initial submittal.

4.3 Submittal Register

4.3.1 A Submittal Register will be used to track progress of submittals as they are processed. Users may arrange Parts A and B side-by-side in a notebook; however, submittal status will be maintained on a computer database by the DCC. (See Attachment C)

4.3.2 The Government will complete Sections (a) through (e) of the Submittal Register. These sections are described as follows:

- a. Column (a): Lists each specification section in which a submittal is required.
- b. Column (b): Lists each submittal description (SD number and type -- e.g., SD-04, Drawings) required in each specification section. Follow each submittal description with a list of material or products associated with that submittal.
- c. Column (c): Lists one principal paragraph in the specification section where a material or product is specified. This listing is only to facilitate submittal reviews. Do not consider entries in column (c) as limiting project requirements; do not consider that a blank must be filled in by Contractor or the Government.
- d. Column (d): Indicates approving authority for each submittal. A "G" indicates approval by Contracting Officer; a blank indicates approval by PQM.
- e. Column (e): Indicates, for submittals to be approved by Contracting Officer, specific reviewers other than QC organization. This column may or may not be filled out on the copy supplied by the Government.

4.3.3 Columns (f) through (i) will be used by the Contractor, QC organization, and Government on their own copies to record data established by the Contractor.

- a. Column (f): As submittals are processed, list a consecutive number assigned by Contractor for each group of submittals. Place this same number in the appropriate block of "Submittal Transmittal Form". **Note:** For a resubmission, repeat the same transmittal control number as used for the original submittal with a suffix beginning with "A". Subsequent resubmittals utilize the same control number with the next sequential suffix. For example, submittal #10 becomes 10A, 10B, 10C, etc.
- b. Column (g): List dates scheduled for approving authority to receive submittals. These dates are the scheduled beginnings of the submittal review period. the Contractor

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proposes these dates and the Contracting Officer approves them to establish the approved submittal register.

- c. Columns (h) and (i): Use to record Contractor's review when forwarding submittals to the QC organization.

4.3.4 Columns (j) through Column (o) will be used by Contractor, QC Organization and Government on their own copies.

- a. Column (j): Enter date submittal is transmitted to QC organization for PQM approval.
- b. Columns (k) and (l): If approving authority is Contracting Officer, enter date DCC transmits certified submittal to Contracting Officer; otherwise, no entries are required.
- c. Columns (m) and (n): If approving authority is Contracting Officer, enter the Government action and date of action as shown on returned submittal. If approving authority is PQM, enter QC action and date of action.
- d. Column (o): Enter date Contractor receives acted-on submittal.

4.4 Submittal Format

4.4.1 Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal. Mark each copy of each submittal identically, with the following:

- a. Project title and location.
- b. Construction contract number and delivery order.
- c. The section and part number of the section by which the submittal is required.
- d. The submittal description (SD) number of each component of the submittal.
- e. If a resubmission to Contracting Officer, an alphabetic suffix on the submittal description, for example, SD-10A, to indicate the resubmission.
- f. The name, address, and telephone number of the subcontractor, supplier, manufacturer and any other second tier Contractor associated with the submittal.
- g. Product identification and location in project.

4.4.2 Format for Shop Drawings:

- a. Shop drawings shall be not less than 8-1/2 x 11" nor more than 30 x 42".

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- b. Present 8-1/2 x 11-inch shop drawings as a part of the bound volume for the submittals required by the section. Present larger drawings in the sets.
- c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to the information required in Paragraph 4.4.1.
- d. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Identify materials and products for work shown.

4.4.3 Format for Product Data:

- a. Present product data submittals for each section as a complete, bound volume. Include a table of contents listing page and catalog item numbers for product data.
- b. Indicate, by prominent notation, each product which is being submitted; indicate the specification section number and paragraph number to which it pertains.
- c. Supplement product data with material prepared for the project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for the project.

4.4.4 Format of Construction Material Samples:

- a. Furnish samples in the sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:
 - (1) Sample of equipment or device: Full size.
 - (2) Sample of materials less than 2" x 3": Built up to 8-1/2 x 11".
 - (3) Sample of materials exceeding 8-1/2 x 11": Cut down to 8-1/2 x 11" and adequate to indicate color, texture, and material variations.
 - (4) Sample of linear devices or materials, such as conduit and handrails: 10-inch length or length to be supplied, if less than 10".
 - (5) Sample of non-solid materials (e.g., sand, paint, etc.): One pint, unless specified otherwise in technical sections.
 - (6) Sample panel: 4' x 4'.
 - (7) Sample installation: 100 square feet.

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- b. Samples showing range of variation: Where unavoidable variations must be expected, submit sets of samples of not less than three units showing the extremes and middle of the range.
- c. Reusable samples: Incorporate returned samples into the work only if so specified or indicated. Incorporated samples shall be in undamaged condition at the time of use.
- d. Recording of sample installation: Note and preserve the notation of the area constituting the sample installation but remove the notation at the final cleanup of the project.
- e. When a color, texture, or pattern is specified in naming a particular manufacturer and style, include one sample of that manufacturer and style for comparison.

4.4.5 Format of Administrative Submittals:

Submittals shall be in report form and comply with Paragraph 4.4.1.

4.5 **Quantity of Submittals**

4.5.1 Quantity of Shop Drawings:

- a. For shop drawings presented on sheets larger than 8-1/2" x 14", submit one reproducible and three prints of each shop drawing prepared for this project.
 - (1) Transmit reproducible rolled in mailing tubes.
 - (2) After review, the approving authority will retain the prints and return only the reproducible with notations resulting from the review.
- b. For shop drawings presented on sheets 8-1/2" x 14" or less, conform to the quantity requirements for product data.

4.5.2 Quantity of Product Data:

- a. Submit six copies of submittals of product data requiring review and approval only by the QC organization and seven copies of product data requiring review and approval by the Contracting Officer.

4.5.3 Quantity of Samples:

- a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.

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<p>b. Submit one sample panel. Include components listed in the technical section or as directed.</p> <p>c. Submit one sample installation, where directed.</p> <p>d. Submit one sample of non-solid materials.</p> <p>4.5.4 Quantity of Administrative Submittals:</p> <p>a. Unless otherwise specified, submit administrative submittals which are 8-1/2" x 14" or smaller in the quantity required for product data.</p> <p>b. Unless otherwise specified, submit administrative submittals larger than 8-1/2" x 14" in the quantities required for shop drawings.</p> <p>4.6 <u>Submittal Origination</u></p> <p>4.6.1 Originators of submittals prepare, format, and provide in the necessary quantities the submittal types detailed in Section 4.4, 4.5 and Attachment B.</p> <p>4.6.2 Originators determine and verify field measurements, materials, and field construction criteria. Originator checks and coordinates each submittal with requirements of the work and contract documents.</p> <p>4.6.3 Originator reviews submittal for conformance with project design concepts and compliance with the contract documents.</p> <p>4.6.4 Originators ensure no work begins until submittals for that work have been returned as "approved," or "approved as noted" except to the extent that a portion of the work may be performed to generate the basis for the submittal.</p> <p>4.6.5 Originator transmits submittal to the DCC to begin the review process.</p> <p>4.7 <u>Submittal Review Process</u></p> <p>4.7.1 DCC updates the Submittal Register and transmits submittal for internal Review/Approval to standard distribution as indicated by project management. DCC uses MK Document Transmittal (Form QEP 8.1-1) and attaches Comment Submittal Form ((QEP 8.1-2). Reviewer checks an "Action Taken" box on the transmittal and returns it to the DCC by response-due date. DCC tracks transmittal responses.</p> <p>4.7.2 If internal review results in approval, DCC updates Submittal Register and transmits submittal to PQM for approval.</p>		

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- 4.7.3 If internal review or review by PQM results in an status other than "Approved" or "Approved as Noted", DCC transmits submittal with returned Comment Submittal Form to originator for correction.
- 4.7.4 Originator corrects and forwards submittal to DCC. DCC retransmits to standard distribution to continue review process.
- 4.7.5 When submittal is approved by PQM as final approving authority, DCC assigns a SDL Number and transmits approved submittal to the standard distribution as a controlled document.
- 4.7.6 When Contracting Officer is final approving authority, the PQM or QC organization member specified in writing by MK as having that authority, signs the following certification. The signatures shall be in original ink. Stamped signatures are not acceptable.
- 4.7.7 Stamp each sheet of each submittal with the Contractor's certification stamp, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into Contract Number _____, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is submitted for Government approval.

Certified by Submittal Reviewer _____, Date
(signature when applicable)

Certified by QC Manager _____, Date
(signature)

- 4.7.8 When the approving authority is the PQM, the PQM will use the following approval statement when annotating submittals as "Approved" or "Approved as Noted".

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"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated into Contract Number _____, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

Certified by Submittal Reviewer _____, Date _____
(signature when applicable)

Certified by QC Manager _____, Date _____
(signature)

- 4.7.9 Submittal is then forwarded to DCC for transmittal to Contracting Officer for approval.
- 4.7.10 If Contracting Officer returns submittal as other than approved, DCC returns submittal to Originator for disposition.
- 4.7.11 Originator revises the submittal and modifies the submittal number beginning with an "A" for each resubmittal to the Contracting Officer (e.g., 10A, 10B, 10C, etc.) Note that the number modification begins upon first resubmittal to Contracting Officer.
- 4.8 **Submittal Implementation**
- 4.8.1 The DCC maintains a current status of submittals by updating the Submittal Register as submittal actions occur until final acceptance of work by the Contracting Officer.
- 4.8.2 When submittal is approved by Contracting Officer, DCC assigns a SDL Number and distributes the submittal as a controlled document.
- 4.8.3 A copy of approved submittals is retained at the project site, including MK's copy of approved samples.
- 4.8.4 When the approving authority is the QC manager, forward two copies of each approved submittal, except "samples", where one set is required, to the Contracting Officer.
- 5.0 **REFERENCED FORMS**
- Standard Distribution List (QEP 8.1-3)
Document Transmittal (QEP 8.1-1)
Comment Submittal Form (QEP 8.1-2)

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6.0 ATTACHMENTS

- a. Attachment 1: Categories and Descriptions of Submittal Types
- b. Attachment 2: Submittal Matrix
- c. Submittal Register

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ATTACHMENT A: Categories and Description of Submittal Types

SD-01, Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

SD-02, Manufacturer's Catalog Data

Data composed of catalog cuts, brochures, circulars, specifications, and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. A type of product data.

SD-03, Manufacturer's Standard Color Charts

Preprinted illustrations displaying choices of color and finish for a material or product. A type of product data.

SD-04, Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work. A type of shop drawing.

SD-05, Design Data

Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work. A type of shop drawing.

SD-06, Instructions

Preprinted material describing installation of a product, system, or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions. A type of product data.

SD-07, Schedules

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A tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work. A type of shop drawing.

SD-08, Statements

A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality. A type of shop drawing.

SD-09, Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-10, Test Reports

A report signed by an authorized official of a testing laboratory that a material product, or system identical to the material, product, or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. Testing must have been within 3 years of the effective date of award of the delivery order. Analytical laboratory testing must have been completed within established sample holding times. A type of product data.

SD-11, Factory Test Reports

A written report which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, or on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

SD-13, Certificates

Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meets specified requirements. The statements must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address. A type of shop drawing.

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SD-14, Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work. A type of sample.

SD-15, Color Selection Samples

Samples of the available choice of colors, textures, and finishes of a product or material, presented over substrates identical in texture to that proposed for the work. A type of sample.

SD-16, Sample Panels

An assembly constructed at the product site in a location acceptable to the Contracting Officer and using materials and methods to be employed in the work; completely finished; maintained during construction; and removed at the conclusion of the work or when authorized by Contracting Officer. A type of sample.

SD-17, Sample Installations

A portion of an assembly or material constructed where directed and, if approved, retained as a part of the work. A type of sample.

SD-18, Records

Documentation to ensure compliance with an administrative requirement or to establish an administrative mechanism. A type of administrative and closeout submittal.

SD-19, Operation and Maintenance Manuals

Data intended to be incorporated in an operations and maintenance manual. A type of administrative and closeout submittal.

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1.0 SCOPE

This procedure describes standard operating procedures for sampling during the site remediation activities, including decontamination, packaging, transport, and sample custody. Sample documentation is described and examples of types of documentation forms are provided.

2.0 RESPONSIBILITIES

2.1 Site Quality Control Supervisor (SQCS)

The SQCS is responsible for performance of preparatory, initial, and follow-up inspections of analytical sampling activities to ensure compliance with the requirements of this procedure and the Quality Control Plan. Additionally, the SQCS is responsible for maintaining the status of sampling activities on the Testing Plan and Log provided in the Quality Control Plan, Section 10.0.

2.2 Sample Technician

The Sample Technician is responsible for the physical collection of samples in accordance with the requirements of this procedure, and for ensuring proper chain of custody of collected samples.

3.0 DEFINITIONS

3.1 Sampling event

A sampling event is considered to be from the time the sampling personnel arrive at the site until these personnel leave for more than a day. An example of two sampling events would occur if sampling personnel went to a site for three weeks, drilled borings, and put groundwater wells in place. During this visit, soil and water samples were collected. The sampling crew then left the site for two months, thus concluding the first sampling event. The crew later returned to collect another set of groundwater samples over a three-day period. The second visit would constitute the second sampling event.

3.2 Trip Blank

Trip Blanks are QC samples which originate from analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with the volatile organic (VOA) samples. One trip blank should accompany each cooler containing VOA's, should be stored at the laboratory with the samples, and analyzed by the laboratory. Trip blanks are only analyzed for VOA's.

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3.3 Equipment Rinsates

Equipment rinsates are a type of QC sample and are the final analyte-free water rinse collected after equipment decontamination and during a sampling event. Equipment rinsates will be taken once a week for each sample medium. If analytes pertinent to the project are found in the rinsate, the field decontamination procedure will be evaluated and improved. The rinsates are analyzed for the same parameters as the related samples.

3.4 Field Blanks

Field blanks are a type of QC sample that consist of the source water used in decontamination and steam cleaning. At a minimum, one field blank from each event and each source of water must be collected and analyzed for the same parameters as the related samples.

3.5 Field Duplicates/Splits

Field Duplicates (or splits) for soil samples will be collected in the field and prepared by homogenizing the soil sample and splitting into two samples. All samples except those designated for VOA analysis will be homogenized and split. For VOA analysis select segments of soil will be taken from the length of the core and placed into 40 ml glass vials. Cores may be sealed and shipped to the laboratory for subsampling if the project deems this appropriate. The field duplicates for water samples should be collected simultaneously. Field duplicates should be collected at a frequency of 10% per sample matrix for Levels C and D. For Level E, the duplicates should be analyzed at a frequency of 5%. All the duplicates should be sent to the primary laboratory responsible for analysis. The same samples used for field duplicates shall be split by the laboratory and be used as the laboratory duplicate or matrix spike and a matrix spike duplicate (MS/MSD). The rate for MSD's is 1 in 20. This means that for the duplicate sample, there will be analyses of the normal sample, the field duplicate, and the laboratory MS/MSD. A separate MS/MSD will not be collected in the field, but will be obtained from the field duplicate by splitting the sample in the laboratory.

4.0 SAMPLING REQUIREMENTS

4.1 Decontamination

4.1.1 Equipment that may come in contact with potentially contaminated soil, sediment, waste, or water will be decontaminated prior to and after use. Decontamination consists of steam cleaning (high pressure, hot water washing), phosphate-free detergent wash, and distilled, deionized (DI), or clean water rinse, as appropriate.

4.1.2 Sampling, drilling, and monitoring well installation equipment will be decontaminated utilizing EPA guidelines. Summary decontamination steps are as follows:

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4.1.2.1 Water Sampling Equipment

Prior to collecting a water sample, non-dedicated sampling equipment must be decontaminated according to the following procedure.

1. *Equipment.* Remove all visible contamination with clean tap water and an Alconox™ solution.. If this is not effective, use a clean soft cloth or sponge or use pressurized water to clean equipment. If required, a brush may be used to clean stainless steel or metal equipment but not plastic equipment, which may be scratched by the brush. After cleaning equipment with tap water, triple rinse equipment with distilled water.
2. *Hoses.* Clean outside of hoses with high pressure hot water. Pump 3 volumes of clean tap water through hoses. If possible, use pressurized tap water. After cleaning hoses with tap water, pump 3 volumes of distilled water through hoses.
3. *Probe tips and meters.* Triple rinse with distilled water.
4. Collect sample according to the specific procedure for the sample type.
5. Rinse all sample collection equipment with clean tap water followed by distilled water. Store equipment in clean containers.

4.1.2.2 Soil and Sediment Sampling Equipment

Equipment used to collect samples for chemical analysis requires thorough decontamination, as described below:

1. Wash equipment (augers, split spoons, etc.) with distilled water, an Alconox™ solution, and/or a high-pressure washer. **If visible contamination remains, steam clean the equipment.**
2. A solvent rinse (Isoproponol) may be required to remove organic contamination that is not removed by washing and/or steam-cleaning.
3. Rinse with clean tap water.
4. Triple rinse all equipment with distilled water and allow to air dry.
5. Collect sample according to the specific procedure for the sample type.
6. Rinse all sample collection equipment with clean tap water followed by distilled water. Store equipment in clean containers.

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4.1.2.3 Drilling Equipment

Steam-clean downhole equipment on drill rigs, such as augers, drill rods, and drill bits, prior to and/or after use at a designated wash pad. Remove visible soil and grease.

4.1.2.4 Monitoring Well Installations

- Clean casing, screen, couplings, and caps used in monitoring well installation with high-pressure hot water (less than 125 degrees Fahrenheit) prior to installation. Remove visible foreign matter.
- Steam-clean the exterior surfaces and accessible interior portions of submersible, centrifugal, and positive-displacement pumps prior to each use.
- Steam-clean bailers and wash in phosphate-free detergent solution and rinse twice in distilled or DI water prior to each use. Water used for rinsing will be tested for all target analytes except dioxins at the beginning of the field programs to show that target analytes are not present above the reporting detection limit. Discard rope or string (used with bailers or disposable sampling bottles) that has been in contact with the water in the well or boring in accordance with WMPs, and replace with new string after each sample is collected.
- Wash steel tapes, well sounders, transducers, and water quality probes in a phosphate-free detergent solution, and rinse in distilled or DI water or wipe clean after each use. Clean the portion of these devices inserted into wells with a mild soap solution.

4.2 Sample Numbering

4.2.1 Sample identification will include the following information:

- Site name
- Sample matrix
- QC sample type
- Well or boring location number
- Sample interval/depth (when applicable)

4.2.2 The project will utilize a specific prefix, XXX, to the sample identification number. The prefix will be separated from the sample identification number with a backslash; for example, XXX\12345678. The laboratory will not utilize the site-specific prefix.

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4.2.3 The eight digit format will require that site designation, sample matrix, sample location, QC sample type, and sampling method/depth are coded and defined in the following format:
 1 2 3 4 5 6 7 8

4.2.4 The first three digits, 1, 2, and 3, will indicate the sample origin. These digits are alphanumeric and will be created with some mnemonic device for the true name of the site. The first digit is an alphabetical character in order to facilitate data processing. Sample origin abbreviations will vary widely according to specific project requirements. Examples are given below:

- SMWU #9 - S09
- Plume #3 - P03
- Unit #10 - U10
- Background - B01

4.2.5 The type of installation will be represented by digits 4, 5, and 6. Designations for a well or boring installations will be made by using a "W" or a "B" respectively in the fourth digit, followed by the two-digit sample location identifier. The sample location identifier is a number assigned to the specific well or borehole.

4.2.6 The seventh and eighth digits are matrix-dependent and will represent sample intervals for soil samples or sample identifiers for groundwater samples. For groundwater samples, each sample will be given a number by sequential collection. Duplicate samples will have the same sample identification but will have the letter "D" in place of the eighth digit.
Examples:

- XXX\S11B0901 represents the first soil sample from SWMU 11 at boring #9.
- XXX\P12W0702 represents the second groundwater sample collected from well #7 at plume #12.
- XXX\P12W072D represents a duplicate of the second sample example above.

4.2.7 The sample number shall be entered on sample labels, chain of custody forms, and in the appropriate section of the Testing Plan and Log in Section 8.0 of QC Plans. All sample identification information will also be documented in the sampler's field logbook, especially information not incorporated in the sample number.

4.2.8 QA/QC samples used to assess the precision and accuracy of the sampling and analyses will replace the fourth-digit (well or boring designation) when used. Digit 4 will represent the type of QC sample, followed by the month and day it was collected as digits 5, 6, 7, and 8. Samples required to meet this data quality objective are given below with their appropriate code:

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QA Sample Codes:

- F --- field blank
- E --- equipment rinsate
- T --- trip blank

4.2.9 The sample code will be followed by a four-digit date where the first two digits indicate the month and the second two digits indicate the day, (ex: August 14 would be written as 0814). As an example, XXX-W06-F1025 is the sample identifier for the field blank collected at SWMU 6 on October 25.

4.3 **Sample Packaging and Transport**

4.3.1 Each sample will be packaged and transported appropriately as described in the following protocol:

- Collect samples in appropriate containers and add preservatives, as needed (Table 1).
- Print the following information clearly in waterproof ink on the label for each sample container: the preservative that has been added to each sample container, the sample number, the project number, the initials of the sample collector, and the date and time the sample was collected. For water samples, package sets together if appropriate. Each VOC set should be placed together in a labeled ziplock plastic bag.
- Fill out field sample log and chain of custody record.
- Separate and place samples in coolers according to laboratory destination and according to expected concentrations (e.g., lowest concentration samples together). Each cooler must weigh less than 70 pounds including ice. Package samples well to protect from shipping damage.
- Place samples on ice, as necessary (Table 1).
- Seal the top two copies of each chain of custody form inside a ziplock bag. Use strapping tape to attach the packet to the inside of the cooler lid. Samples will always be accompanied by a chain of custody record. When transferring samples, both the individuals relinquishing and receiving the samples will sign and date the chain of custody record. Samples will be packaged properly for shipment, including isolation of samples thought to have high chemical concentrations, and dispatched to the appropriate laboratory for analysis.
- Secure cooler with custody seal.

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<ul style="list-style-type: none"> · Label coolers correctly; placing "Fragile" and "This-End-Up" labels on coolers, as appropriate. · Transport the coolers to the designated analytical laboratories via MK Team personnel or designated couriers. The planned mode of sample transport is to use couriers employed by the laboratory. Alternatively, commercial couriers, MK Team couriers, or overnight shipment may be used. Specific transportation arrangements are dependent on the location of the Delivery Order Site and the analytical laboratories; specific procedures will be described in site-specific planning documents. 			
4.3.2	Soil samples intended for immunoassay-based field screening methods (e.g., EnSys methods for pentachlorophenol, total petroleum hydrocarbons) will be collected and stored in labeled containers that are appropriate for the type of analysis to be performed.		
4.4	<u>Sample Custody</u>		
4.4.1	Sample custody procedures will be followed through sample collection, transfer, analysis, and ultimate disposal. The purpose of these procedures is to assure that the integrity of samples is maintained during their collection, transportation, and storage prior to analysis, and sample material is properly disposed after analysis. Sample custody begins with the shipment of the empty sample containers. Sample containers are shipped from the laboratory in sealed coolers or cartons with appropriate seals and custody documentation. Sample quantities, types, and locations will be determined before the actual field work commences. The Sample Technician will be responsible for the care and custody of the samples until properly transferred. Custody transfer will be documented on the Chain of Custody Form.		
4.4.2	At the chemical laboratory, a designated sample custodian will accept custody of the shipped samples and verify that the information on the sample label matches that on the chain of custody form(s). Pertinent information as to sample condition, shipment, pickup, and courier will also be checked on the chain of custody form(s). In addition, a project receipt checklist (e.g., Cooler Receipt Form) will also be completed by the custodian. Information on the date and time of receipt, method of shipment, and sample condition will be recorded on this form. The custodian will then enter the appropriate data into the laboratory sample tracking system. The laboratory custodian will use the sample number on the sample label as well as assign a unique laboratory number to each sample. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) in the appropriate secure area.		
4.4.3	Laboratory personnel will be responsible for the care and custody of samples from the time they are received, and are responsible for sample disposal. Data sheets and		

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<p>laboratory records will be retained as part of the permanent documentation for a period of at least 3 years.</p>			
4.4.4	<p>Samples and extracts are retained by the analytical laboratory for up to 30 days after the data are reported by the laboratory. Unless notified otherwise by the site managers, excess or unused samples are disposed by the laboratory in a manner consistent with appropriate government regulations.</p>		
4.5	<p><u>Sample Documentation</u></p>		
4.5.1	<p>Each sample will be labeled and sealed properly immediately after collection. Sample identification documents will be carefully prepared so that identification and chain of custody records can be maintained and sample disposition can be controlled. Forms will be filled out with waterproof ink. The following identification documents will be used during the investigation.</p>		
	<ul style="list-style-type: none"> · Sample Labels · Field Logs · Chain of Custody Forms 		
4.6	<p><u>Sample Labels</u></p>		
4.6.1	<p>Sample labels are necessary to prevent misidentification of samples. Preprinted sample labels will be provided. Where necessary, the label will be protected from water and solvents with clear label-protection tape. Each label contains the following information:</p>		
	<ul style="list-style-type: none"> · Project name · Project number · Name of collector · Date and time of collection · Place of collection (job site) · Sample number · Well/boring number · Depth · Preservative, if any 		
4.7	<p><u>Field Logs</u></p>		
	<p>A Field Log will be used daily by the Sample Technician to record activities as they relate to the progress of the investigation. The field logs will be retained in the investigation files according to project number for that task. Entries in the field log will include at least the following information:</p>		

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- Project name
- Project number
- Name of author and date
- Chronology and location of activities
- Names and affiliations of personnel onsite
- Instrument calibration details and identification number
- Decontamination procedures
- Sample collection or measurement methods
- Number of samples collected
- Sample identification numbers
- Sample distribution (laboratory)
- Field observations and comments
- Any modifications to or deviation from the site specific work plan.

4.8 Chain of Custody Record

4.8.1 A chain of custody record will be filled out for and will accompany every sample to the analytical laboratory to establish the documentation necessary to track sample possession from the time of collection. A copy of the chain of custody form will be retained in the investigation files according to project number. The record will contain the following information:

- Sample number or identification
- Names of samplers
- Signature of collector, sampler, or recorder
- Location of project
- Project manager's name
- Date of collection
- Place of collection (site location)
- Sample type
- Analyses requested
- Inclusive dates of possession
- Signature of person relinquishing or receiving sample
- Laboratory sample number, where applicable
- Date and time of sample receipt.
- Method of shipment and courier name.

4.9 Corrections to Sample Documentation

4.9.1 Original data recorded in field investigation daily reports, chain of custody records, and other forms will be written in waterproof ink. None of these documents will be altered, destroyed, or discarded, even if they are illegible or contain inaccuracies that require a replacement document.

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4.9.2	If an error is made on a document compiled by one individual, that individual will make the necessary correction by crossing a single line through the error, entering the correct information, and initialing and dating the change. The erroneous information will not be obliterated. Any subsequent error(s) discovered on a document will be corrected by the person discovering the error. All corrections will be initialed and dated. Site-specific documentation will be reviewed by site managers on a daily basis.		
4.10	<u>Transfer of Field Documentation</u>		
4.10.1	During site-specific field operations, field investigation daily logs will be telefaxed to Site Managers on a daily basis. In the absence of a facsimile, field geologists and/or engineers will be in contact with Site Managers, or at a minimum the field operations manager via mobile telephones. During drilling associated with the installation of monitoring wells, site managers will review boring logs prior to constructing the well.		
4.10.2	At the end of each week of field operations, all field documentation will be copied, and hard copies sent to Site Managers for review. A copy of this documentation will also be kept at the onsite field office for future reference, if necessary. The original field documents will be submitted to the Resident Officer in Charge of Construction (ROICC). Copies of all documentation generated will be submitted to the MK Project Management Office in Charleston.		
4.11	<u>Project Files</u>		
4.11.1	It is anticipated that two sets of project files will be kept for each Delivery Order site. The original field documentation will be submitted to the ROICC on a daily basis, while copies of the same documentation submitted to the ROICC will be submitted to the MK Charleston Project Management Office on a daily basis.		
5.0	REFERENCED FORMS		
	a. Chain of Custody Record		
6.0	EXHIBITS/TABLES		
	a. EXHIBIT 1: Sample Labels and Chain of Custody Seal		
	b. TABLE 1: Sample Preservation and Storage Requirements		
	c. TABLE 2: Field Measurement Calibration Procedures and Precision Requirements		
	d. TABLE 3: Example Summary of External (Field) QC Samples		
	e. TABLE 4: Example Summary of Internal (Laboratory) QC Samples		

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- f. TABLE 5: Example Quality Assurance Goals-Precision
- g. TABLE 6: Example Quality Assurance Goals-Accuracy, Percent Recovery
- h. TABLE 7: Summary of Calibration Procedures

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EXHIBIT 1-SAMPLE TAGS

STANDARD

SOILS

WATER

CUSTODY SEAL



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1.0 SCOPE

This Quality Execution Procedure establishes a standard method for conducting and reporting the results of inspections and tests that are performed in support of the project requirements. This QEP applies to all in-process and final inspections and tests conducted by both MK and Subcontractor personnel. This QEP also addresses MK surveillance of Subcontractor quality activities. Specific inspection and test methods and acceptance criteria are obtained from the applicable drawings, specifications, and procedures.

2.0 RESPONSIBILITIES

2.1 Program Quality Manager (PQM)

The Program Quality Manager is responsible for assuring MK compliance with this procedure, for ensuring observation by MK inspection personnel of designated Inspection/test point, for coordinating Client Inspection/test points, and for verifying Subcontractor compliance with the requirements of this QEP.

2.2 Project Manager (PjM)

The Project Manager is responsible for ensuring that Project Superintendents and/or the Subcontractors are provided with complete information regarding the requirements for their applicable Scope of Work.

2.3 Project Superintendents

Project Superintendents are those MK individuals who are responsible for directing MK's remediation/construction work forces (General Superintendent / Area Superintendents). These individuals are responsible for ensuring that MK's workers are qualified to perform the work to which they are assigned, for providing adequate notice when Inspection/test point are approaching, and for ensuring that work does not proceed beyond a point such that a required verification can not be performed.

2.4 Subcontractors

Subcontractors are responsible for ensuring the quality of their work. This responsibility includes providing qualified personnel and adequate equipment for the conduct of the work as well as any inspections and tests that the Subcontractor may be required to perform, providing adequate notification to MK when established Inspection/test point are approaching, ensuring that work does not proceed beyond a point such that a required verification cannot be performed, and documenting the results of inspections and tests the Subcontractor has been required to perform in accordance with this QEP.



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2.5 QC Personnel

QC Personnel are responsible for conducting assigned inspections in accordance with the technical requirements provided in the applicable specifications and drawings and for documenting the results of these inspections, tests, and observations in accordance with this QEP.

3.0 DEFINITIONS

3.1 Inspection/Test Point

An Inspection or Test Point is that point in a work process where an inspection or test is to be performed. Inspection and Test Points are designated in the Testing Plan and Log contained in QC Plans.

4.0 CONDUCT OF INSPECTIONS

4.1 Extent of Inspection

4.1.1 The extent of inspection shall be detailed in individual QC Plans developed for a Delivery Order. Specific types and frequencies of tests will be detailed in the Testing Plan and Log contained within the QC Plan.

4.1.2 Inspections will be performed utilizing inspection checklists as specified in QC Plans.

4.1.3 Where appropriate, the Quality Control Inspector shall prepare detailed sketches that depict the location and extent of decontamination, sampling, or inspection of an item or unit of work. Sketches shall be drawn to scale and contain sufficient information to fully describe the activities performed. Sketches shall be attached to the Daily Contractor Quality Control Report.

4.2 Preparatory Inspection

4.2.1 Notify the Contracting Officer at least two working days in advance of each preparatory phase. Conduct the preparatory phase with the superintendent and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily Contractor quality control report. Perform the following prior to beginning work on each definable feature of work:

- a. Review each paragraph of the applicable specification sections;
- b. Review the contract drawings;
- c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;



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- d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;
- e. Examine the work area to ensure that the required preliminary work has been completed;
- f. Examine the required materials and equipment, and sample work to ensure that materials and equipment are on hand and conform to the approved shop drawings and submitted data;
- g. Review the Safety Plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met, and that required material safety data sheets (MSDS) are submitted; and,
- h. Discuss construction methods.

4.3 Initial Inspection

4.3.1 Upon completion of a representative sample of the given features of the work, the Site QC Supervisor will verify that the work meets the applicable quality requirements.

4.3.2 The following items will be verified during Initial Inspection:

- a. the workmanship meets the established quality requirements;
- b. configuration and construction methods, equipment, and tools appear to be effective;
- c. calibration of measurement and test equipment;
- d. materials and articles used are as specified;
- e. adequacy of inspection / testing methods;
- f. adequacy of applicable drawings; and,
- g. adequacy of safety and environmental precautions.

4.4 Follow-Up Inspection and Surveillance

4.4.1 Perform the following for on-going work daily, or more frequently as necessary until the completion of each definable feature of work and document in the daily Contractor quality control report:

- a. Ensure the work is in compliance with contract requirements;
- b. Maintain the quality of workmanship required;
- c. Ensure that testing is performed; and,



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d. Ensure that rework items are being corrected.

4.5 QC Plan Inspections

4.5.1 The Site Quality Control Supervisor will perform follow-up inspections based on the Inspection Plan and Log in Section 8.0 of this QC Plan. The Site QC Supervisor will document the results of each day's inspection on the Contractor Quality Control Report.

4.5.2 Completed Contractor Quality Control Reports shall be submitted to the Program Quality Manager as a record.

5.0 DOCUMENTATION OF DEFICIENT/REWORK ITEMS

5.1 Contractor Quality Control Report

5.1.1 Reports are required for each day that work is performed and for every 7 consecutive calendar days of no-work, on the last day of that no-work period. Account for each calendar day throughout the life of the project. The reporting of work shall be identified by terminology consistent with the construction schedule. Contractor quality control reports are to be prepared, signed, and dated by the MK QC Manager and shall contain the following information:

- a) Identify the control phase and the definable feature of work.
- b) Results of the preparatory phase meetings held, including the location of the definable feature of work and a list of personnel present at the meeting. Verify in the report that for this definable feature of work, the drawings and specifications have been reviewed, and work methods and schedule have been discussed.
- c) Results of the initial phase meetings held, including the location of the definable feature of work and a list of personnel present at the meeting. Verify in the report that for this definable feature of work the preliminary work was done correctly, samples have been prepared and approved, the workmanship is satisfactory, test results are acceptable, work is in compliance with the contract, and the required testing has been performed, and include a list of who performed the tests.
- d) Results of the follow-up phase inspections held, including the location of the definable feature of work. Verify in the report for this definable feature of work that the work complies with the contract as approved in the initial phase, and that required testing has been performed, and include a list of who performed the tests.
- e) Results of the three phases of control for off-site work, if applicable, including actions taken.
- f) List rework items identified, but not corrected by close of business.



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- g) As rework items are corrected, provide a revised rework items list along with the corrective action taken.
- h) Include a "Remarks" section in this report which will contain pertinent information including directions received, QC problem areas, deviations from the QC plan, construction deficiencies encountered, QC meetings held, acknowledgment that as-built drawings have been updated, corrective direction given by the QC manager, and corrective action taken by the Contractor.
- i) Contractor quality control report certification.

5.2 Testing Plan and Log

- 5.2.1 As tests are performed, the QC manager shall record on the testing plan and log the date the test was conducted, the date the test results were forwarded to the Contracting Officer, and any remarks and acknowledgment that an accredited or Contracting Officer approved testing laboratory was used. Attach a copy of the updated testing plan and log to the last daily Contractor quality control report of each month.

5.3 Rework Items List

- 5.3.1 The MK QC manager shall maintain a list of work that does not comply with the contract, identifying what items need to be reworked, the date the item was originally discovered, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the Contractor rework items list to the last daily Contractor quality control report of each month. The Contractor shall be responsible for including on this list items needing rework including those identified by the Contracting Officer.

5.4 As-Built Records

- 5.4.1 The QC manager is required to review the as-built records required by contract to ensure that as-built records are kept current on a daily basis and marked to show deviations which have been made from the contract drawings. The QC manager shall initial each deviation or revision. Upon completion of work, the QC manager shall submit a certificate attesting to the accuracy of the as-built records prior to submission to the Contracting Officer.

5.5 Report Forms

- 5.5.1 Inspection and test results will be summarized daily on the "Contractor Quality Control Report", and supported by completed inspection/test checklists for the activity. Completed checklists are to be attached to the Contractor Quality Control Report.
- 5.5.2 Reports shall be submitted daily to the Contracting Officer, with a copy sent to the Program Quality Control Manager in the Project Management Office.



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6.0 DOCUMENTATION

- a. Contractor Quality Control Report-(Form 01400-1)



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1.0 SCOPE

This Quality Execution Procedure establishes the requirements and responsibilities associated with identifying, reporting, controlling, dispositioning, and correcting deviations identified in the execution of work on the U.S. Navy Southern Division NAVFAC Environmental Response Action Contract.

2.0 RESPONSIBILITIES

2.1 Program Quality Control Manager (PQCM)

The PQCM is responsible for ensuring that a system of identification and resolution of deficient items is established for execution of the work. The PQCM is also responsible for the reporting of adverse trends and programmatic problems to the Program Manager, Project Manager, and MK Corporate Quality Manager.

2.2 Project Manager (PiM)

The Project Manager is responsible for coordinating the development of dispositions to those deviations which require an engineering evaluation to determine the appropriate corrective action, and for resolving items appearing on the Rework Items List.

2.3 Site Remediation/Construction Supervision

Remediation/Construction Supervision is responsible for assuring that identified deviations are controlled and corrected. If a Nonconformance Report (NCR) is issued, the corrective action shall conform to the disposition.

2.4 Site Quality Control Supervisor (SQCS)

The MK Site Quality Control Supervisor is responsible for identifying, documenting, and reporting deviations and for re-inspecting corrected deviations in accordance with this QEP.

2.5 Subcontractors

For work performed by subcontractors, the subcontractors are responsible for assuring that deviations are identified, controlled, documented, reported, corrected, and re-inspected. If a Nonconformance Report (NCR) is issued, the corrective action shall conform to the disposition.



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3.0 DEFINITIONS

3.1 Deviation

A Deviation is any departure from established requirements. Deviations may result in defects that may be corrected through rework or that may result in nonconformances that require engineering evaluation in order to be resolved.

3.2 Nonconformance

A Nonconformance is a deviation of such a nature that its resolution involves the coordination of multiple organizations or requires a formal engineering review. Generally, any deviation that cannot be resolved by performance of rework is considered a nonconformance.

4.0 PROCEDURE

4.1 Identification of Deviations

4.1.1 Deviations are usually identified by inspectors during the conduct of routine inspections or tests. However, deviations may be identified at any time by anyone involved with the work and reported to the applicable inspector or to the PQCM.

4.1.2 When deviations are identified, they should be tagged or otherwise marked, if feasible, by the inspector to both prevent inadvertent additional work that might hinder correction and to assist in locating the item for rework.

4.1.3 Many deviations involve situations where the condition can be corrected by re-performing operations that have already been specified without obtaining additional information or approvals. Examples include: depth of excavation insufficient; failure to achieve specified level of compaction, etc.

4.2 Documentation of Deviations

4.2.1 Deviations or items requiring rework shall be identified on the Contractor Quality Control Report that is completed daily.

4.2.2 Items requiring rework shall be entered on the Rework Items List. Deficient items that can be resolved by reworking by the end of the shift need not be recorded on the Rework Items List.

4.2.3 A copy of the Rework Items List shall be provided to the Project Manager or designee who is responsible for correction of the deficient item.

4.2.4 A copy of the Rework Items List shall also be submitted to the PQCM, as the lists are generated.



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- 4.2.5 The SQCS shall maintain a current status of the resolution of items on the Rework Items List, and update the list as deficient items are reworked.
- 4.2.6 When all deviations on a Rework Items List are closed, the list shall be maintained for record purposes.
- 4.3 Review by Program Quality Manager
- 4.3.1 Rework Item Lists showing open deviations shall be reviewed by the PQCM to ensure the identified deviations are tracked and action is taken for resolution.
- 4.4 Issuance of Nonconformance Reports
- 4.4.1 A "Nonconformance Report" (NCR) (Form QEP 15.1-1) shall be issued by the SQCS to track the resolution of major deviations for the following conditions:
- In the event resolution of a deviation requires engineering input because design requirements cannot be met;
 - Resolution requires the coordination of multiple organizations; or,
 - The Navy stipulates the use of this more formal deviation reporting method.
- 4.4.2 NCR's are sequentially numbered, with the next number being assigned by the PQCM from the "Nonconformance Report Log" (Form QEP 15.1-2).
- 4.4.3 The SQCS shall fully describe the nonconforming condition on the NCR form and consult with the PQCM and the PjM regarding any proposed corrective action.
- 4.4.4 The NCR shall be forwarded to the PjM, who will assign the disposition of the NCR to the applicable MK Discipline Engineer(s), or other responsible engineering organization.
- 4.4.5 At the time of issue of an NCR, the SQCS will also place a HOLD tag on the item in question, if possible, to assure the condition is identified in the field.
- 4.4.6 If required, a copy of any NCR shall also be submitted to the Contracting Officer within one day of the issue date.
- 4.5 Implementation of NCR Dispositions
- 4.5.1 The NCR form with the proposed disposition shall be returned to the SQCS by the Project Manager.
- 4.5.2 The PQCM, the PjM, and the Project Superintendent shall review the proposed Engineering disposition to verify that it can be implemented as proposed and that it does not violate any contract requirements.



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- 4.5.3 The PQCM shall also verify that, where required, concurrence by the design organization or code or Navy representatives has been obtained for "Use-as-is" or "Repair" dispositions.
- 4.5.4 The applicable Project Superintendent or subcontractor is provided with the approved NCR disposition and performs the corrective action as specified.
- 4.5.5 The MK Site Quality Control Supervisor verifies that the disposition was performed as stipulated and documents the re-inspection on that day's Contractor Quality Control Report, noting the NCR number.
- 4.5.6 Upon acceptable re-inspection for the NCR, the SQCS shall also verify proper implementation of the corrective action and, if it was utilized, remove the HOLD tag.
- 4.5.7 The SQCS shall close out the Nonconformance Report and its entry on the Nonconformance Report Log.

5.0 REFERENCED FORMS

- a. Rework Items List
- b. QEP 15.1-1 - "Nonconformance Report"
- c. QEP 15.1-2 - "Nonconformance Report Log"



MORRISON KNUDSEN CORPORATION

Form Source

QUALITY EXECUTION PROCEDURE

Form Title

NONCONFORMANCE REPORT

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Form No.
QEP 15.1-1

Form Revision Date
20-May-94

Description of Affected Item or System

Nonconformance Report No.

Section Sheet of

Responsible Organization

Work Package No.

Hold Tag No.

Prob. Cause Code

Inspection Code

Const. Seq. Code

Source of Requirement Not Met

Event Type

Corrct. Action Code

Deviation Impact Lev.

Issue Date

Disposition Date

Close Date

CONDITION DESCRIPTION

Issued By:

Continued Sheets thru

PROPOSED FIELD DISPOSITION

Issued By:

Continued Sheets thru

APPROVAL OF PROPOSED FIELD DISPOSITION

Approved as Proposed

Revised - See Sheets thru

Engr. Organization:

Morrison Knudsen Concurrence

TITLE

SIGNATURE

DATE

TITLE

SIGNATURE

DATE

REINSPECTION RESULTS Accept Reject - Give Explanation

CLOSURE
MK QC
Inspection

Engineer
Review

Quality
Review

Client
Review

SIGNATURE

DATE

SIGNATURE

DATE

**APPENDIX B
SUBMITTAL REGISTER**

APPENDIX C ENVIRONMENTAL CONDITIONS REPORT

Representative photograph documentation of Naval Air Station (NAS) Memphis Solid Waste Management Units (SWMU) #66 Radar Facility Disposal Area are provided in Figures C-1 through C-3. Representative photograph documentation for SWMU #67, Horse Pasture Disposal Area, are provided in and Figures C-4 through C-6.



FIGURE C-1
SWMU #66 - Radar Facility Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995



FIGURE C-2
SWMU #66 - Radar Facility Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995

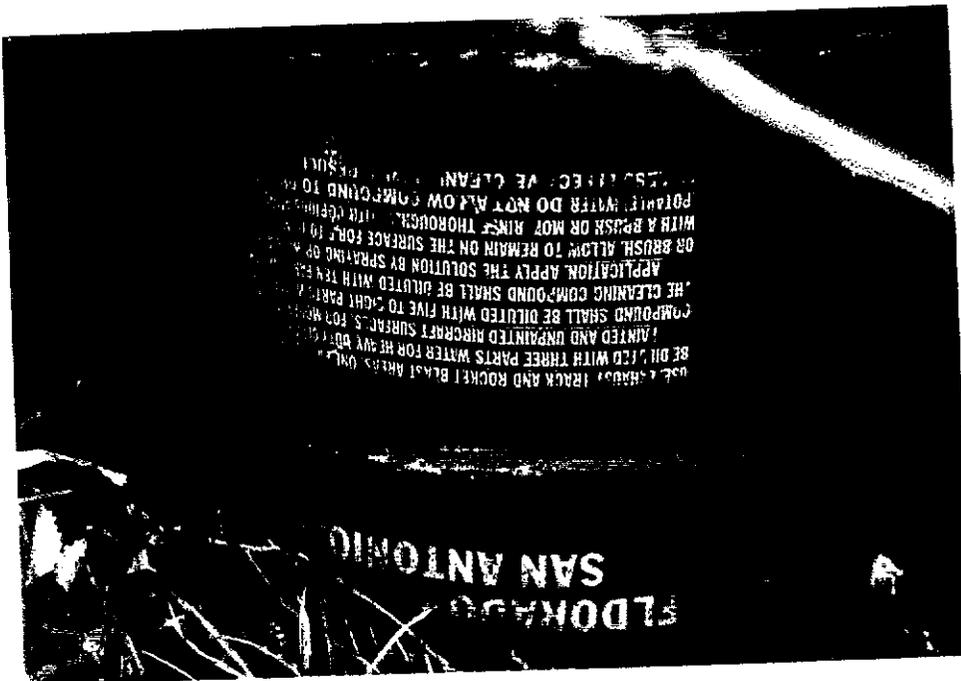


FIGURE C-3
SWMU #66 - Radar Facility Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995



FIGURE C-4
SWMU #67 - Horse Pasture Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995



FIGURE C-5
SWMU #67 - Horse Pasture Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995

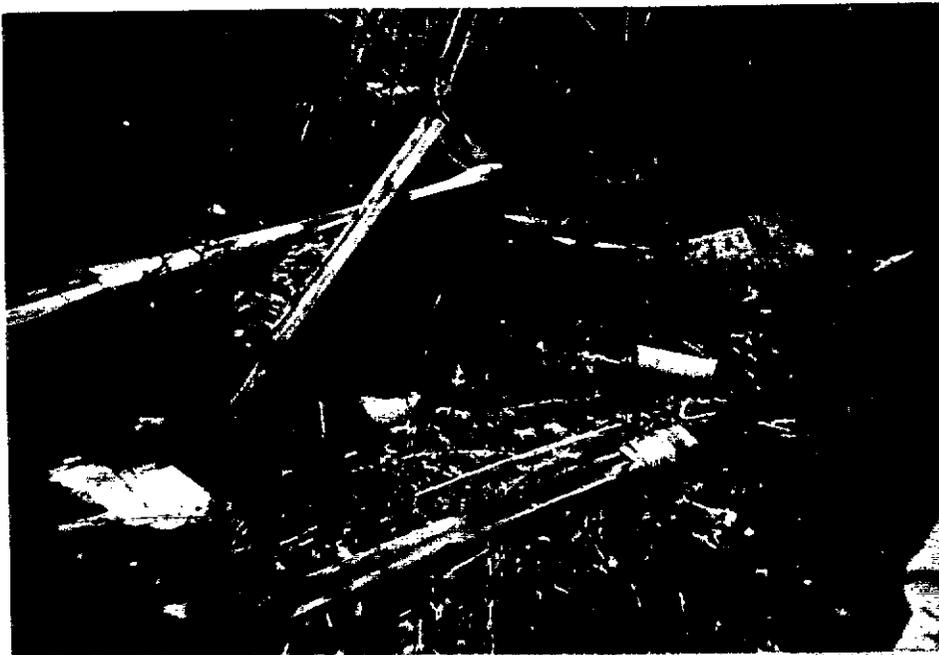


FIGURE C-6
SWMU #67 - Horse Pasture Disposal Area

Photo Taken By: Morrison Knudsen
Date: January 11, 1995

APPENDIX D ENVIRONMENTAL PROTECTION PLAN

1.0 INTRODUCTION

This describes the environmental protection measures MK proposes to use at NAS Memphis, Millington TN. The project involves removal of debris and visually contaminated soil. MK will perform all work in such a manner to minimize pollution of the air, water and land.

2.0 MEASURES FOR PROTECTING NATURAL RESOURCES

2.1 LAND PROTECTION

Except for any work or storage areas and access routes specifically assigned for MK's use under this contract, the land areas shall be preserved in their present condition. Trees and shrubs will not be removed, cut, defaced, injured or destroyed except as is necessary to complete the interim measure.

2.2 PROTECTION OF TREES

All trees which are to remain at the site that could be injured during operations will be protected by placing boards, planks or poles around them. No ropes, cables or guys will be attached or fastened to nearby trees for anchorage. Trees that are removed to gain access to SWMU 66 will not be replaced. SWMU 66 was discovered while clearing trees because of radar interference.

2.3 PROTECTION OF WATER RESOURCES

Run-on/run-off controls shall be used to prevent surface water contamination. These controls include but are not limited to silt fences, hay bales, soil berms and dikes.

3.0 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

All temporary roads and facilities shall be removed and vegetation restored unless otherwise instructed by NAS Memphis.

4.0 PROTECTION OF FISH AND WILDLIFE RESOURCES

This work will not disturb fish or wildlife, alter water flows, or otherwise significantly disturb the native habitat on or adjacent to the project sites.

5.0 WETLAND PROTECTION

No wetland areas will be disturbed while the interim measure is implemented.

6.0 HISTORICAL AND ARCHEOLOGICAL RESOURCES

Although no historical and archeological items or human skeletal remains are expected to be found, the NAS Memphis representative will be notified immediately in the event any archeological items are encountered. Any items discovered will be carefully preserved and work stopped in the area until direction is received from the Contracting Officer to resume work.

7.0 DUST CONTROL

MK will maintain all excavations, stockpiles, access roads and other work areas free from excess dust to avoid causing a hazard. Dust control at the site shall be accomplished by wetting the soil or structure with a wetting spray.

8.0 EROSION CONTROL

Temporary erosion control measures will be utilized in excavation areas until permanent surface drainage is re-established. The amount of bare soil exposed at any one time will be minimized and the excavation will be secured when work is not in progress, before leaving the site each night.

APPENDIX E WASTE MANAGEMENT PLAN

1.0 INTRODUCTION

Waste streams will be generated by removal of the debris during this interim measure. This plan details MK's approach to waste management and disposal for each of the waste streams generated during the site activities under the project scope of work. All waste will be collected and stored on-site in appropriate containers, analyzed for characterization purposes and disposed of according to appropriate federal, state and local regulations.

MK is responsible for the following activities:

- Managing waste streams in accordance with the procedures in this plan;
- Closing the work site in accordance with the work plan;
- Completing all required paperwork, including preparing manifests for all wastes generated during system installation activities within the designated notification time;
- Ensuring all waste containers are properly labeled;
- Maintaining waste records during the field effort; and
- Waste disposal.

2.0 WASTE STREAMS

Waste streams generated during the interim measure include excavated soil, decontamination water, disposable personnel protective equipment, nonhazardous solid waste/construction debris, salvageable material, landscaping waste, and possibly hazardous wastes. Generator knowledge, field screening and/or analytical results will be used to determine the proper disposal procedures and facilities.

2.1 EXCAVATED SOIL

Excavated soils will be staged in lined roll-off containers. The roll-off containers will be covered nightly with properly fitting tarp to prevent infiltration of rainwater during storm events. Representative samples of all staged soil will be taken according to the Sampling and Analysis Plan to characterize the soil for disposal.

2.2 DECONTAMINATION WATER

Decontamination water is generated during decontamination of equipment, debris, and sampling equipment. All water collected during decontamination procedures is collected in DOT 17-C closed-top 55-gallon drums or poly tanks before disposal. Decontamination water may be a hazardous waste. Decontamination water will be sampled and characterized prior to disposal.

The sanitary sewer, Navy Owned Treatment Works, will be used to dispose of the decontamination water if they can accept it. If they can not accept the decontamination water it will be taken to a commercial disposal facility. The decontamination water will be sampled and analyzed to determine the contaminant concentrations.

2.3 DISPOSABLE PERSONNEL PROTECTIVE EQUIPMENT

Waste personnel protective equipment (PPE) includes disposable Tyvek suits, gloves, boots, respirator cartridges and plastic sheeting. The quantity of PPE generated depends upon the schedule and number of times PPE is discarded daily. All disposable PPE shall be decontaminated prior to disposal. PPE will be placed in DOT 17-C open-top 55-gallon drums immediately after use. Drums will be transported to a landfill for ultimate disposal.

3.0 SPILL PREVENTION AND CONTROL

If a spill or release of hazardous materials occurs in the work area, the NAS Memphis Officer will be notified. MK will follow the Navy's instruction for mitigating spills and packaging and disposing of clean-up materials. Refer to Section 16 of the SSHP for a list of safety and spill control equipment available on-site in the event of an emergency.

**APPENDIX F
SUBCONTRACTING PLAN**

All bid packages will be competitively bid, with as much participation as possible from local, small and small disadvantaged firms.

1.0 EXCAVATION, DISPOSAL AND RESTORATION SUBCONTRACT

1.1 SCOPE OF WORK

The Work includes furnishing all supervision, labor, materials, tools, supplies, equipment, and services required for the excavation and disposal of debris and soil and restoration of SWMU #66 and SWMU #67 on the Naval Air Station (NAS) Memphis. The Work is further described below.

- Provide decontamination facilities.
- Install/improve temporary access roads.
- Vegetation Removal- Remove the brush and trees necessary to obtain access to the dump sites. The vegetation shall be cut and shredded for use as mulch on site. An area shall be designated for placement of the mulch. Large branches or trunks which cannot be chipped shall be set aside for use by NAS Memphis.
- Characterization - The debris shall be characterized for segregation into four categories including: recyclable/salvageable materials, nonhazardous solid waste/construction debris, landscaping/land clearing wastes, and hazardous/potentially hazardous waste. A portion of the debris consists of drums and containers. Special care shall be taken in inspecting and characterizing the contents of the drums and containers.
- Excavation of Debris- The dumps consist of natural and man-made debris. All debris shall be removed from the dump.
- Sorting and Disposal of Debris- Debris shall be segregated into four categories: recyclable/salvageable materials, nonhazardous solid waste/construction debris, landscaping/ land clearing wastes and hazardous/potentially hazardous waste.
- Excavation of Contaminated Soil- Visually contaminated soil from beneath the debris piles shall be containerized and shipped to a hazardous waste landfill in accordance with applicable federal and state regulations.
- Restoration of the Disturbed Area- After the removal of all debris and contaminated soil the areas affected shall be restored. Restoration shall consist of the placement of "clean" common fill plus 6" of topsoil over the affected sites and then revegetation of the areas. The Subcontractor is responsible for grading of the areas to promote drainage and ensure that is no ponding will occur in the restored areas. Revegetation shall include seed, fertilizer, mulch, seed bed preparation and limestone. The Subcontractor shall be responsible for the newly seeded areas for one month after placement. At the end of the one month period, bare areas shall be reseeded.
- Remove temporary road from SWMU #67.

- Submit work plans required by the Subcontract Documents and receive approvals from Contractor prior to construction activities.
- Provide dust control.
- Provide temporary erosion and surface water control at excavation areas.

1.2 TECHNICAL SPECIFICATIONS

The Technical Specifications are comprised of:

<u>Section</u>	<u>Description</u>
01010	Statement of Work
01025	Measurement and Payment
01500	Construction Facilities and Temporary Controls
01503	Temporary Facilities
02051	Excavation, Sorting and Disposal of Debris
02210	Earthwork
02936	Seeding

2.0 LABORATORY TESTING SUBCONTRACT

2.1 SCOPE OF WORK

The work includes furnishing all supervision, labor, equipment, supplies, and analytical testing services for samples collected to determine waste disposition and confirmation requirements. All samples will be collected, documented, and delivered (shipped) to the analytical laboratory by others. The subcontracting analytical laboratory will be approved by the NEESA prior to sample submittal and chemical analyses.

All work shall be performed in accordance with EPA-approved methods, state certification requirements, and NEESA 20.2-047B (the Navy Energy and Environmental Support Activity [NEESA] Sampling and Chemical Analysis Quality Assurance

A summary of work is as follows. The analytical laboratory shall:

- Provide certified, pre-cleaned, pre-preserved sample containers, labels, coolers, blue ice coolant, packaging material, deionized water, trip blanks and chain of custody forms for sample collection activities (Tables 1 and 2).
- Perform analyses according to NEESA 20.2-047B requirements for Level D data within specified holding times.
- Provide quick turnaround on sample analyses as requested.
- Provide deliverables for Level D data in accordance with Section 7.2 of the NEESA 20.2-047B.

2.2 TECHNICAL SPECIFICATIONS

The Technical Specifications are comprised of:

<u>Section</u>	<u>Description</u>
01010	Statement of Work

APPENDIX G
SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

This sampling and analysis plan has been developed as an element of the NAS Memphis Corrective Action Interim Measure Work Plan. This Field Sampling Plan sets forth the protocols to be utilized during the field activities associated with the interim measure at SWMUs 66 and 67.

Sample types that are intended to be collected are drum samples from drums with contents, soil samples collected after removal of debris to verify clean standards, decontamination liquid and solids disposal samples.

2.0 SAMPLING PLAN AND PROCEDURES

The sampling procedures are based upon guidelines set forth in USEPA SW-846, "Test Methods for Evaluating Solid Waste," Third Edition (November 1986) and NEESA 20.2-047b, "Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program," Second Revision (June 1988).

This removal action is not the final action to be performed at this facility. This removal action is an interim measure to allow remediation to occur before an RFI is performed. Sampling that will be performed after the debris has been removed from each area will be performed in such a manner as to conform with appropriate RCRA Closure guidelines so that if the sampling efforts do not identify contaminants, the area can be clean closed without additional efforts.

Final demobilization from the site will not occur until soil confirmation analytical results are obtained and managed in accordance with the Data Management Plan found in Appendix H. If required, additional soil removal or sampling and analysis will be conducted by MK at the direction of SouthDiv.

2.1 DRUM SAMPLING

Drums which contain greater than one inch of material (per definition of RCRA empty drums 40 CFR 261.7) need to be sampled. The samples will be submitted for analysis to determine contents for general site information and proper disposition. Because of the condition and state that the drums are in, full drums are not expected to be encountered. Health and safety aspects of drum handling and sampling are addressed in Section 2.4.13 in the SSHP.

Liquid samples will be collected with a dipper or drum thief, whichever is more practical to the situation. Sample parameters and analytical methods are included in Tables G-1 and G-2 of this plan.

Soil/solid samples will be collected with a trier or similar device that allows a core sample to be collected. A trier is a stainless steel rod with a hollow stem. The rod is inserted into the drum and the core sample is extracted. Several cores may need to be

collected to fulfill the sampling volume required for analysis. Sample parameters and analytical methods are included in Tables G-1 and G-2 of this plan. Drums will be opened either mechanically or manually as each situation dictates. Drums with openings (i.e., bung holes or rust holes) will be sampled through them as feasible.

2.1.1 Field Procedures

(All work will be in accordance with the SSHP)

- Number the drum.
- Open drum (mechanically or manually depending on drum).
- Screen drum with and O₂/LEL meter and either PID or FID meter. Record data in the field log.
- Estimate and record drum volume in the field log.
- Collect sample, place in appropriate sample container listed in Table G-2.
- Label sample container with drum number, date and time, analysis and preservative, as described in Section 5.0.
- Decontaminate equipment (Section 3.2 of this plan).
- Proceed to next drum.

2.2 CONFIRMATIONAL SOIL SAMPLING

The sampling is intended to confirm that the areas meet final closure standards so that they may proceed to final closure following the interim removal action. If the sampling determines that contaminants are still present in the soils remaining after the interim removal action, final closure will be performed during the site wide remediation.

2.2.1 SWMU 66, Radar Area

At SWMU 66, Radar Area, the debris pile is approximately 50 feet wide and 350 feet long (17,500 square feet). The debris is primarily strewn along the ravine/creek in an area approximately 165 feet by 24 feet. The debris will be removed before confirmational sampling. It is assumed that a minimum of four soil samples will be collected from areas identified as worst case scenarios (i.e., low spots, in the ravine, near the landing strip). Samples will be collected from 0-12 inches below the surface. One duplicate sample will be collected from the area. Samples will also be collected from areas after excavation of stained soil and from under suspected hazardous material including suspect drums or containers which may have provided a source of contamination. Sample parameters and analytical methods are included in Tables G-1 and G-2.

2.2.2 SWMU 67, Horse Pasture Area

SWMU 67, the Horse Pasture Area, contains one debris pile that is approximately 100 feet by 100 feet (10,000 square feet) and a second that is approximately 10 feet by 20 feet. It is assumed that a minimum of four soil samples will be

collected from the potential worst case scenarios (i.e., low spots). Samples will be collected from 0-12 inches. One duplicate sample will be collected from the area. Samples will also be collected from areas after excavation of stained soil. Sample parameters and analytical methods are included in Tables G-1 and G-2.

2.2.3 Field Procedures

Samples will be collected with either a hand auger or stainless steel trowel depending on soil hardness. A hand auger consists of a sample bucket attached to the bottom of a length of pipe that has a crossbar at the tip. A hole is drilled into the soil by turning the crossbar as the operator pushes the auger into the ground. The auger will be driven to a depth of 12 inches. When the auger is withdrawn from the sample area, a stainless steel spoon is used to remove sample material from the auger bucket.

Before samples are collected, the field team's procedures will include:

- Follow procedures as described in Section 6.1 of the SSHP.
- Select and mark sample locations using observational method combined with field screening using an organic vapor analyzer or photoionization detector.
- Remove vegetation and other non-soil material from sampling location.

After preparation, the field team will take the sample as follows:

- Collect sample with either a hand auger or stainless steel trowel.
- Fill soil VOA sample jar first then homogenize the remaining sample material in a stainless steel bowl and place in remaining jars. Completely fill sample containers so that there is no headspace and close lid tightly.
- Label the sample jars with location, analysis required, date and time of sample collection and samplers initials. Place sample containers in a cooler with ice. Cool the samples to 4°C.
- Record sample identification number, depth of sample, analysis required, general description of soil, and date and time of sampling on the field sample form or in the sample log book.
- Backfill the hole with the remaining cuttings and bentonite chips.
- Decontaminate all equipment as described in Section 3.2 of this plan.
- Record sample number on the wooden stake or surveyors ribbon and place at sample location for surveying.

2.3 DECONTAMINATION LIQUID SAMPLING

There are two types of containerized wastes that will be encountered during the interim remedial action; liquids remaining in recovered drums and decontamination liquids. In the event that a recovered drum contains free liquid, the liquid will be sampled as

described below and the sample analyzed for the disposal parameters listed in Table G-1. Decontamination liquids will be stored in either 55-gallon drums or poly tanks. The drum or tank contents will also be sampled determine proper disposal of the liquids (i.e., as hazardous or nonhazardous waste). A bailer (teflon or stainless steel) or dipper will be used to collect a representative sample of the liquid. The sample will be placed into the appropriate sample containers, labeled for analysis and placed into coolers with ice.

When a sample collection device is used to obtain the liquid sample, the samples will be placed in the sample bottle directly from the sampling device. If the volume required to fill the bottle exceeds the volume contained in the collection devise, an aliquot from each sample retrieved will be placed into each sample bottle until all the bottles are filled. The sampling devise will be lowered to the same depth each time. Analytical parameters that are anticipated for the liquid disposal samples are included in Table G-1. Additional parameters that might be requested by a disposal facility will be analyzed for as required.

2.4 SOLIDS DISPOSAL SAMPLING

Representative samples of the visibly contaminated soils excavated during the interim measure will be collected and analyzed for disposal parameters. These parameters are included in Table G-1. Several aliquots of the soil contained in the roll-off containers will be composited for one sample from each SWMU. The number of aliquots is dependent on the volume of soil that is excavated.

Drums containing more than one inch of solids (i.e., material potentially regulated by RCRA under 40 CFR Part 261.7) will be sampled for disposal characterization parameters listed in Table G-1. Prior to sample collection, visibly contaminated soils and product that has evidently spilled around the drum will be excavated and combined with the drum contents. The drum will be overpacked with the recovered product and/or soil, sampled for characterization and labelled "Hazardous Waste Pending Analysis." After receipt of the drum sample results, disposal arrangements can be made. Management and labelling of wastes is further described in the Waste Management Plan found in Appendix E. Compatible waste streams will be combined and sampled for additional disposal parameters if required by the disposal facility.

2.5 SAMPLE PREPARATION AND PRESERVATIONS

Immediately after collection, sample material will be transferred to properly labeled sample containers with all necessary preservatives then added. Table G-2 lists the proper container material, sample volume and preservative for all sampling required. Samples will be transferred to coolers with ice or ice packs immediately after collection.

2.6 QA/QC SAMPLES

Quality control samples to be collected during soil sampling include duplicate samples, trip blanks, equipment rinse blanks, and field blanks.

- Duplicate samples should be collected at a rate of one in 10 samples collected. One duplicate sample will be collected from each site of the soil confirmation samples. Samples should be analyzed for the same parameters as the regular sample.
- Trip Blanks should be received from the lab with the coolers and bottles. One Trip Blank per cooler will be submitted for volatiles analysis only.
- Equipment Rinse Blanks should be collected prior to soil sample collection and following initial equipment decontamination the rinse blanks will be submitted for the same analysis as the soil samples.
- Field Blanks are QC samples consisting of the source water used in decontamination and steam cleaning. At a minimum, one field blank from each event and each source of water must be collected and analyzed for the same parameters as the related samples.

3.0 DECONTAMINATION AND POST SAMPLING PROCEDURES

3.1 DECONTAMINATION OF TOOLS

Decontamination of the sampling equipment can occur with a portable decontamination station or at the decontamination station for the respective SWMU. A portable station can be carried from sample location to sample location or placed on the bed of a pickup truck.

3.2 SAMPLING EQUIPMENT DECONTAMINATION

All non-disposable equipment (i.e., hand auger and stainless steel spoons) will be decontaminated according to the procedure summarized below:

- Manual rinse with tap water;
- Manual scrub with Alconox™ and tap water wash;
- Tap water rinse;
- 10% nitric acid rinse;
- distilled/deionized water rinse;
- Isopropanol or methanol rinse; and
- Air dry.

4.0 DOCUMENTATION AND CHAIN-OF-CUSTODY PROCEDURES

4.1 SAMPLE IDENTIFICATION

Samples will be labeled, preserved and properly packaged for shipment to the analytical laboratory. Information on the sample label will include:

- Sample identification number;
- Name or initials of the individual collecting the sample;
- Date and time of sample collection;
- Location of sample;
- Analyses to be performed on the sample; and
- Sample preservative.

Sample identification numbers will be used to provide a tracking procedure allowing information on a particular sample location to be easily and accurately retrieved. This system also ensures that each sample is unique and not confused with any other sample. The Project Manager will maintain a complete list of sample numbers. The sample identification number consists of a three digit site identification and up to seven digits that represent the following information:

- Site name (i.e., site specific prefix);
- Sample origin (i.e., SWMU number);
- Sample matrix (i.e., soil, waste, ground water, decontamination water);
- QC sample type (when applicable); and
- Sample location number.

The project will utilize a site specific prefix, XXX, indicating a site name, separated from the sample identification number with a dash (e.g., XXX-12-34567). The laboratory will not use the site-specific prefix.

The first three digits indicate the site name. These digits are alphanumeric and are created with some mnemonic device for the true name of the site. The first digit is an alphabetical character in order to facilitate data processing. Sample origin abbreviations are developed according to specific project requirements.

The first two digits after the prefix indicate the sample origin, representing the number of the SWMU from which the samples are collected. The type of sample is represented by digit three. Designation for a boring is a "B" followed by the two digit sample location identifier (this is also on the surveyors stake) in positions four and five. The sample location identifier is a number assigned to the specific well or borehole. The location of a sample obtained by hand auger or trowel is considered a borehole location.

The sixth and seventh digits are matrix-dependant and represent sample intervals or sample identifiers, as required. Duplicate samples have the same sample identification, but contain the letter "D" in place of the seventh digit. The Project Manager is responsible for maintaining a map of the SWMUs showing the approximate location of each sample location number and keeping a list of which samples are submitted to the laboratory for QC purposes. Once the survey has been completed, exact sample locations can be noted.

QC samples are numbered by replacing digit three with the proper QC sample code, listed below, followed by the month and day it was collected as digits 4, 5, 6, and 7. For example, April 27 would appear in the last four digits of the sample identification number as 0427. QC sample codes used during the project are:

- F - field blank
- E - equipment rinsate
- T - trip blank

Examples of sample numbers for the Memphis project include:

- MEM-66-B09 represents the soil sample from SWMU 66, Boring 9.
- MEM-66-B09D represents the duplicate sample for the previous example
- MEM-67-E0429 represents the equipment rinsate blank from SWMU 67 on April 29, 1995.

The sample number is entered on sample labels, chain-of-custody forms, and in the appropriate section of the Testing Plan Log found in the Quality Control Plan (QCP). All sample identification information will also be documented in the sampler's field logbook, especially information not incorporated into the sample number.

Samples will be placed in shipping containers that are locked or sealed for shipment to the laboratory. Custody seals will be affixed to the sealed shipping container and/or individual sample containers. Information on the custody seal will include the date when the container was sealed and the signature of the sampler or relinquisher. Broken custody seals will be noted in the remarks section of the chain-of-custody record.

Sample locations will be marked and the point surveyed. The surveying will aid in the production of maps for reports and in case the sample locations need to be found again.

4.2 DOCUMENTATION AND CUSTODY PROCEDURES

All information pertinent to field surveys or samples will be recorded in the logbook as a permanent record. The minimum entries in the logbook will include:

- Client description (i.e., NAS Memphis) and address;
- Name and address of field contact;
- Location of sampling point (to include a sketch);
- Description of sample origination and known characteristics;
- Sample identification, depth and volume collected;
- Analytical parameters per sample;
- Date and time;
- Weather conditions;
- Results of health and safety monitoring, if applicable;
- Person collecting the sample; and
- Deviations for the sampling plan and rationale.

Procedures for calibration of field equipment and record keeping are included in the SSHP, Section 7.0.

All sample shipments will be accomplished by a chain-of-custody record. The chain-of-custody record includes the following information:

- Package contents;
- Sample identification numbers;
- Sample location;
- Date and time of sample collection;
- Signatures of samplers;
- Analytical tests for each sample; and
- Appropriate project identification information.

The chain-of-custody record will be completed with information and wording consistent with information and wording reported on sample labels and seals.

When transferring custody the sampler will record the time and date sign the chain-of-custody form in the "relinquished by" block. The receiver will sign "received by" block upon sample receipt. The original chain-of-custody record will accompany the shipment, and a copy will be retained by the Project Manager or designee. A signed chain-of-custody record will be obtained from the laboratory custodian after the samples have been received and their condition checked. Appendix B of the QCP contains an example of a chain-of-custody form.

**TABLE G-1
MEDIA SAMPLES FOR OFF-SITE ANALYSES**

Media	Number of Samples	Analytical Method	Parameter	Purpose
Drummed liquids/solids	TBD	SW-846 6010/7000 Series	TAL Metals	Characterization of drum contents
Drummed liquids/solids	TBD	SW-846 8240	Volatile Organic compounds (TC list)	Characterization of drum contents
Drummed liquids/solids	TBD	SW-846 8270	Semi-Volatile organic compounds (TC list)	Characterization of drum contents
Drummed liquids/solids	TBD	SW-846 8140, 8150	Organophosphorus Pesticides, chlorinated herbicides (TCL)	Characterization of drum contents
Drummed liquids/solids	TBD	EPA 8080	Organochlorine pesticides and PCBs (TCL)	Characterization of drum contents
Soil	10 (minimum)	SW-846 6010/7000 Series	TAL Metals	Confirmation
Soil	10 (minimum)	SW-846 8240	Volatile Organic compounds TCL list	Confirmation
Soil	10 (minimum)	SW-846 8270	Semi-Volatile organic compounds TCL list	Confirmation
Soil	10 (minimum)	SW-846 8140, 8150	Organophosphorous Pesticides, chlorinated herbicides (TCL)	Confirmation
Soil	10 (minimum)	EPA 8080	Organochlorine pesticides and PCBs (TCL)	Confirmation
Trip Blank (water)	2	SW-846, 8240	Volable Organics, TCL list	QA/QC
Field Blank (water)	2	Same as drummed liquids	Same as drummed liquids	QA/QC
Equipment Rinsate Blank (water)	3	Same as drummed liquids	Same as drummed liquids	QA/QC
Wastes ¹	TBD	EPA 1010	Ignitability	Waste Characterization
Wastes ¹	TBD	Sec. 7.3.4.1	Reactive Sulfide	Waste Characterization

**TABLE G-1
MEDIA SAMPLES FOR OFF-SITE ANALYSES**

Media	Number of Samples	Analytical Method	Parameter	Purpose
Wastes ¹	TBD	Sec. 7.3.3.2	Reactive Cyanide	Waste Characterization
Wastes ¹	TBD	EPA 1311/TCL, TAL	TCLP	Waste Characterization
Wastes ¹	TBD	EPA 9040/9045	pH	Waste Characterization

¹ - Analysis for both liquid and solid waste samples.

TBD - To be determined. TAL - Target Analyte List. TCL - Target Compound List.

**TABLE G-2
SAMPLING PARAMETERS**

Analyte	Analytical Method	Sample Container	Preservation	Holding Time
<i>Solids/Soils Analyses</i>				
TAL Metals	EPA 6010, 7471	1 x 250 mL glass	Refrigerate to 4°C	Mercury: 28 d Metals: 180 d
Semi-Volatiles (TCL)	EPA 8270	1 x 250 mL glass	Refrigerate to 4°C	7/40 days after extraction
PCBs Pesticides/ Herbicides (TCL)	EPA 8080, 8140, 8150	1 x 250 mL glass	Refrigerate to 4°C	7/40 days after extraction
Volatiles	EPA 8240	2 x 4 oz glass	Refrigerate to 4°C	14 days
<i>Solid/Liquid Waste Samples</i>				
Ignitability	EPA 1010	1 x 250 ml glass	None	ASAP
Corrosivity - pH ¹	EPA 9040	1 x 500 ml plastic	Refrigerate to 4°C	ASAP
Corrosivity - pH ²	EPA 9045	1 x 250 ml glass	Refrigerate to 4°C	ASAP
Sulfide Reactivity ¹	Sec. 7.3.4.1	1 x 500 ml glass	Refrigerate to 4°C 2 mL zinc acetate NaOH to pH > 9	7 days
Sulfide Reactivity ²	Sec. 7.3.4.1	1 x 250 ml glass	Refrigerate to 4°C	7 days
Cyanide Reactivity ¹	Sec. 7.3.3.2	1 x 1 L plastic	Refrigerate to 4°C NaOH pH > 12	14 days
Cyanide Reactivity ²	Sec. 7.3.3.2	1 x 250 ml glass	Refrigerate to 4°C	14 days
TCLP - Organics ^{3,4}	EPA 8240, 8270, 8080	2 x 40 ml VOA vials 1 x 500 ml glass	Refrigerate to 4°C	8240: 14 d 8270/8080: 7 d
TCLP - Inorganics ^{3,4}	EPA 6010, 7470	2 x 250 ml plastic	HNO ₃ to pH < 2	Mercury: 28 d Metals: 180 d
<i>Water/Liquids Analyses</i>				

**TABLE G-2
SAMPLING PARAMETERS**

Analyte	Analytical Method	Sample Container	Preservation	Holding Time
TAL Metals	EPA 6010, 7470	1 x 500 mL plastic	HNO ₃ to pH < 2, refrigerate to 40°C	Mercury: 28d other metals: 180d
Semivolatiles (TCL)	EPA 8270	2 x 1 L amber glass	Refrigerate to 40°C	7/40 days after extraction
PCBs Pesticides / Herbicides (TCL)	EPA 8080, 8140, 8150	1 x 1 L amber glass	Refrigerate to 40°C	7/40 days after extraction
Volatiles (TCL)	EPA 8240	3 x 40 mL glass Vials	HCL to pH < 2 Refrigerate to 40°C	14 days

¹ = Liquid samples only.

² = Solid samples only.

³ = 14 days for extraction and 40 days from extraction to analysis.

⁴ = For solid samples, submit one 250 mL glass jar of sample extraction by EPA Method 1311.

TAL - Target Analyte List. TCL - Target Compound List.

APPENDIX H
DATA MANAGEMENT PLAN

1.0 PROJECT DESCRIPTION

This Data Management Plan (DMP) is prepared for the Naval Air Station (NAS) Memphis Corrective Action Interim Measure for SWMU #66 and SWMU #67.

2.0 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions concerning remediation. DQOs are determined based on the end uses of the data and are established prior to data collection. DQOs help to ensure that all data collected are legally and scientifically defensible.

2.1 DATA QUALITY OBJECTIVES PROCESS

The data quality objectives (DQO) process consists of three stages. The three stages are:

- Stage 1: Identify Decision Types
- Stage 2: Identify Data uses/needs
- Stage 3: Design Data Collection Program

Stage 1 of the DQO process defines the types of decisions which will be made by identifying data users, evaluating available data, developing a conceptual model, and specifying objectives for the project. Identified data users include federal state and local (if applicable) regulatory agencies and U.S. Naval Facilities Engineering Command Southern Division representatives for this project and the program. Evaluation of available data include summarizing the existing data for input into the site conceptual model and using the existing data for design of the additional work envisioned for this project. The site conceptual model will be developed by utilizing the existing data to formulate hypotheses regarding the nature and extent of contamination, the site-specific fate and transport mechanisms as well as available remedial alternatives. From the developed site conceptual model, and the available remedial alternatives, specific objectives (i.e., performance goals) will be developed for this project.

Stage 2 of the DQO process identifies the data uses and data needs for this project. The data uses for NAS Memphis center around two concepts. The first is to conduct disposal analysis of drums and visibly contaminated soils. The second concept is to collect confirmation soil samples after debris removal.

Stage 3 of the DQO process involves design of the data collection program. This stage results in the specification of the analytical methods as well as the quality and quantity of data necessary to be obtained in order to make the appropriate decisions. This information is summarized in the work plan and provided in more detail in this DMP.

2.2 CHEMICAL DATA OBJECTIVES

The analytical laboratory selected for this project will be approved by SouthDiv before

samples are sent for off-site analysis. Off-site analyses include volatiles, semi-volatiles, RCRA metals, PCBs, pesticides and herbicides. In order to establish the uses for which the laboratory data is suitable, confirmation samples will be validated at DQO Analytical Level C and waste characterization samples at Level E (EPA Levels III and V, respectively).

As stated above, the chemical data objectives are to be formulated for this project. The first objective is to visually inspect and chemically analyze drum contents; if presented. There is no existing information on drum volumes or previous samples collected, if any.

The second objective is to evaluate the success of the debris removal action. Four verification samples plus one field duplicate from each site will be collected at each site and analyzed by a NEESA laboratory for RCRA metals, volatiles, semi-volatiles, PCBs and pesticides/herbicides.

2.3 ANALYTICAL DATA QUALITY OBJECTIVES

DQOs for analytical data will be defined through assessment of the following:

- Precision - the degree to which a measurement is reproducible, determined by comparison of sample duplicates or designated laboratory matrix spike/matrix spike duplicates. Typically precision of 20% is acceptable for laboratory generated duplicates.
- Accuracy - expressed as the percent recovery of a compound from a sample spiked with known concentrations of target compounds for each analytical method. Accuracy for metals analysis typically lies between 75 and 125%, while values for organics are compound specific.
- Completeness - a measure of the amount of valid data obtained from an analytical data set compared with the amount that would be expected to be obtained under normal sampling and analytical conditions. Completeness goals for this project have been established at 90%.
- Comparability - the confidence with which one data set can be compared to another.
- Representativeness - the degree to which data represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition.

Analytical quality assurance objectives are established to ensure the quality of the analytical data produced by the laboratory.

2.4 LABORATORY DELIVERABLES

Confirmation sampling will be conducted under Level C QC procedures identified in NEESA 20.2-047B, *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program*, Second Revision, June 1988. For all samples analyzed according to Level C requirements, the laboratory deliverables found in Table H-1 are necessary. Waste characterization sampling will be in accordance with Level E QC requirements. Laboratory deliverables for this phase consist of the sample data, method blank data and the control chart from the blank spike.

2.5 DATA VALIDATION/VERIFICATION

Data validation is a systematic procedure of reviewing a body of data against a set of established criteria to provide a specified level of assurance of its validity prior to use. Data resulting from off-site chemical analysis will be validated at DQO Analytical Level C and Level E using NEEPA Guidelines. The validation process will include checks for internal consistency, checks for transmittal errors, and checks for verification of laboratory capability. Evaluation of these criteria will involve review of:

- Duplicate field sample analysis
- Spiked addition recoveries
- Instrument calibrations
- Detection Limits
- Intra laboratory comparisons
- Holding Times
- Database entry accuracy
- Data normality outliers
- Accuracy of electronic data transfer

At the completion of the data validation process, the reviewer will prepare a summary of the results and specify the uses for which the data is suitable. Qualified data will be flagged and qualifiers will be retained at all subsequent stages of data interpretation.

3.0 PROJECT ORGANIZATION

As prime contractor, MK will be responsible for the following:

- Project Management
- Quality Assurance/Quality Control
- Worker Health and Safety
- Planning
- Data evaluation and reporting
- Subcontractor supervision

Key personnel with extensive experience in hazardous waste site investigations will be selected for the following project positions:

- Project Manager

- Site Quality Control Supervisor
- Analytical Chemistry Manager
- Site Health and Safety Officer

Resumes of key personnel will be presented before mobilization.

4.0 FIELD DOCUMENTATION OF ACTIVITIES

Field activities to be conducted during this investigation include:

- Visual investigation and inventory of the disposal area;
- Construction of temporary roads, run-on / run-off control, access control devices;
- Clearing and grubbing of the area, as necessary, to perform the interim measure;
- Field screening of the drums, debris and soil with a photoionization detector or similar device, additional screening for health and safety requirements are described in the SSHP sections 7.2, and 7.3;
- Removal, identification, segregation, decontamination, transportation, and disposal of debris;
- Excavation, stockpiling, sampling, and disposal of visually contaminated soils;
- Confirmatory screening of disposal area for remaining debris using a metal detector;
- Confirmatory sampling;
- Backfilling and restoration of the excavated area;
- Drum sampling;
- Drum Disposal.

4.1 FIELD DOCUMENTATION

During the field investigation, all sampling information will be recorded using field logs maintained by the field teams. Each of the components of the field documentation is described below.

4.1.1 Field Activity Log

The designated field team leader will maintain a Field Activity Log in a bound notebook. In this log, the field team leader will record the on-site activities in real time, including all individuals on site and sampling information, such as sample location, sample number, number of bottles collected, etc. If multiple activities are taking place at one time, the field team leader will record this in the Field Activity Log and the other field team will use a second bound notebook to record their activities. Recorded information will include, as a minimum, the following:

- Project name and number
- Individuals on site (including site visitors and agency personnel)
- Sample locations and depths
- Current date, pertinent times (in military time), and ambient weather conditions

- Results of air monitoring and personal protective equipment levels
- Sample numbers, number/type of containers, sample time and date
- Analyses requested and laboratory assignments
- Samplers' name and signatures
- Type of sample collected
- Other notes and information, as required

Notes will be written on sequentially numbered pages with indelible ink. Corrections to log entries will be made by striking incorrect entries with a single line and initialing and dating the strike-out. At the end of each day, any unused space at the bottom of the last page will be "x-ed" out, initialed and dated by all persons making entries in the notebook that day.

4.1.2 Daily Safety and Health Log

The designated Site Safety and Health Officer (SSHO) will maintain a separate bound Safety and Health Log. The SSHO will record types of monitoring conducted during the day, instruments used (including instrument number), instrument calibration, time and results of monitoring, personal protective equipment used, and any problems or unusual circumstances encountered. Additional information regarding this log will be discussed in the Site Safety and Health Plan (SSHP).

4.2 CALIBRATION AND MAINTENANCE OF FIELD INSTRUMENTS

Measurements that affect the quality of an activity or operation will be taken only with instruments, tools, gauges, or other measuring devices that are controlled, calibrated, adjusted and maintained at predetermined intervals to a specified accuracy. The calibration and maintenance of field equipment and instrumentation will be in accordance with manufacturer's specifications or applicable test specifications, and shall be documented in the Field Activity or Site Safety and Health Logbooks. Air monitoring equipment used for personnel exposure monitoring will be calibrated daily, or after long periods of non-use during the day.

Preventive maintenance programs will, as a minimum, be established for equipment that would otherwise be subject to breakdown, when the breakdown could lead to safety hazards, environmental contamination, or loss of completeness and accuracy in data. The program will include a schedule of the important preventative maintenance tasks that will be carried out to minimize downtime of measurement systems, and a list of any critical spare parts that need to be on hand to minimize downtime.

5.0 SAMPLE DOCUMENTATION, PACKAGING, AND SHIPPING

5.1 SAMPLE DOCUMENTATION

All sample documentation for samples collected at the site will be in compliance with the procedures outlined in this section, regardless of the sample media. Any deviations or

discrepancies will be addressed to the Project Manager. Approved deviations or changes in the Sampling Plan will be recorded in the Field Activity Log.

5.1.1 Chain of Custody

Each sample will be identified on a chain of custody record. Information recorded will include, at a minimum, site name, sampler name(s), date and time of sample collection, sample matrix, identification code unique to each sample, sample location, number of containers with the same sample code, analyses requested for each sample, sample preservation and signature blocks for each individual who has custody for the sample(s).

5.1.2 Sample Labels

All sample labels used on sample containers will include, at a minimum, a sample identification code, sample location, date and time of sample collection, site name, preservative and samplers initials. The label will adhere to the container and the writing on it will be in indelible ink. The label will be secondarily affixed to the container with clear adhesive tape completely covering the label. Instructions for constructing a sample identification code are included in the SAP.

5.2 PACKAGING AND SHIPPING

Packaging and shipping of samples will vary depending upon sample media, contaminant concentration, preservation technique, and sample container. A waterproof metal or equivalent strength plastic ice chest or cooler will be used for packaging and shipping samples. All samples collected will be packaged and shipped to conform with DOT requirements. The laboratory will be notified prior to shipment of all samples.

6.0 LABORATORY ANALYTICAL PROCEDURES

The most current version of "Test Methods for Evaluating Solid Waste Physical/Chemical Methods" will be used by the contract laboratory for the organic and inorganic analyses.

6.1 ANALYTICAL METHODOLOGY

An off-site laboratory will be contracted to produce Level C analytical data. Table G-1 of the Sampling and Analysis Plan details the number of samples and analytical methods to be used.

6.2 SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES

All sample containers will be provided by the analytical laboratories. The containers will be cleaned to EPA protocol and either pre-preserved or the necessary amount of

preservative will be provided by the laboratory in a separate container for field preservation. Table G-2 contains sample container and preservative criteria.

All samples collected during the field investigation and submitted to laboratories for chemical analyses will be preserved according to EPA standards.

Sample preservation and temperature shall be checked immediately upon receipt of samples at the laboratory. The results of these checks will be recorded on the chain-of-custody form submitted with the sample.

6.3 QUALITY CONTROL SAMPLES

Field blank, field duplicate, equipment blank and trip blank samples will be collected as field QC checks.

Laboratory QC samples will be analyzed, and will include, where appropriate, method blanks, laboratory matrix spike/matrix spike duplicate samples, sample duplicates, etc.. These will be run concurrently with the analytical batch to which they are assigned.

6.3.1 Laboratory Matrix Spike/Matrix Spike Duplicate

The laboratory designated matrix spike (MS) is a sample spiked with known concentrations of target analytes which are taken through the entire analytical procedure and the recovery of the analytes calculated. The laboratory matrix spike sample will be analyzed at a rate of one in 20 samples or one per analytical batch for each matrix, whichever is greater frequency, for all methods. Tables 2 through 8 contain MS/MSD recovery criteria for laboratories.

The laboratory matrix spike duplicate (MSD) is also spiked with the same concentrations of selected analytes of interest as the laboratory designated MS, at the same frequency. The two spiked aliquots are processed separately and the results compared to evaluate the effects of the matrix on the precision of the method.

6.3.2 Method Blank

The laboratory method blank is carried through each step of the analytical method to examine the potential for cross-contamination. The laboratory method blank will be analyzed at a rate of 1 in 20 samples or one per analytical batch, whichever is the greater frequency, for all methods.

6.4 METHOD SPECIFIC DATA QUALITY OBJECTIVES

The method specific data quality objectives will be provided by the laboratory performing the chemical analyses for the samples collected for this project.

6.5 QUALITY CONTROL CHECKS

6.5.1 Sample Handling in the Laboratory

Upon receipt, all samples will proceed through an orderly processing sequence (as defined in the laboratory QA/QC Plan) specifically designed to ensure continuous integrity of both the sample and other information pertinent to the analysis.

All samples will be carefully checked and verified for proper chain-of-custody (COC) records, preservation, broken or leaking sample containers, proper label identification, and any associated discrepancies. These items will be documented by use of a laboratory receipt form. If any samples arrive leaking or broken, or the custody seal on the shipment coolers is not intact, the Project Manager will be notified of the problem(s) immediately. The lab receipt form showing that samples integrity was compromised should accompany lab data reports.

If no discrepancies are identified, the sample COC record will be signed, and the samples will subsequently be assigned a unique laboratory identification number by the laboratory for tracking and filing. The laboratory QA system and the use of an internal COC procedure will ensure that the samples are appropriately tracked from storage through the laboratory until the analytical process is complete.

Analytical and procedural information and activities will be documented with the use of Standard Operating Procedures (SOPs), a laboratory data management system, laboratory benchsheets, laboratory notebooks, and orderly project files containing any information pertinent to the analysis or integrity of the results.

The contracted laboratory will provide a written QA/QC program which discusses rules and guidelines to ensure the reliability and validity of all analytical work conducted in their laboratory. Compliance with the QA/QC program is coordinated and monitored by designated laboratory quality assurance personnel.

The laboratory will document, in each data package provided, that both initial and ongoing instrument and analytical QC functions have been met. Corrective action will be initiated on any samples analyzed in non-conformance with the QC criteria.

6.5.2 Method Specific Quality Control

Method quality control checks will be analyzed as outlined in the individual methods for each analysis performed.

6.6 DATA REDUCTION, VALIDATION, AND REPORTING

6.6.1 Data Reduction and Validation

The laboratory will perform in-house analytical data reduction and review of chemical

analyses under the direction of the laboratory's technical staff, QA Officer will perform data validation, and Lab Project Manager will primarily review data reports for this project. These individuals are responsible for evaluating the quality of the data and indicating which, if any, data may be listed as "unacceptable" and/or which should be considered potentially unreliable. A report by the personnel assessing data quality will be submitted to the Laboratory Project Manager or designee with every data package prior to transmittal to the client.

Data reduction, review, and reporting by the laboratory will be conducted as follows:

- Raw data produced by the analyst are reduced and checked by the analyst following laboratory SOPs and the analytical methodology.
- A data review specialist will independently review the data to check that quality control criteria have been attained. (Data Validation)
- Upon acceptance of the data package by the independent reviewer, a report is generated and sent to the Laboratory Project Manager.
- The laboratory QA/QC director or his/her designee randomly reviews, at a minimum, five percent of all project reports produced by the laboratory.
- Data set reports will be prepared and submitted to the MK Project Chemist on an ongoing basis by the laboratory.

Complete data reduction and reporting procedures will be those specified by the laboratory Quality Assurance Project Plan.

6.6.2 Data Reporting

The specific data items in each analytical data set submitted to MK will include, but will not be limited to, the following items:

- Cover sheet listing the samples included in the report and narrative comments describing problems encountered during analysis;
- Copies of signed COC records;
- Tabulated results of the compounds identified and quantitated;
- Laboratory deliverables discussed in Section 2.4;
- Calculations of detection (reporting) limits;
- Raw data system printouts (or legible photocopies);

- Photocopies of laboratory notebooks relevant to the analytical data set.
- Electronic data transmitted with format specified in the contract

6.7 PREVENTIVE MAINTENANCE AND CALIBRATION

The approved laboratory will be responsible for the maintenance of laboratory instruments and equipment. Instruments and measurements made as part of the analytical methodology will be as specified in the method, without modification. The laboratory's QA program ensures that only trained personnel perform routine maintenance on all major instruments and that repairs are performed by trained laboratory personnel or service technicians employed by the instrument manufacturer or representative. Instrument maintenance will be appropriately documented through the use of instrument logs which will be included in the laboratory project file.

6.8 CORRECTIVE MEASURES

When errors, deficiencies, or out-of-control situations exist, the laboratory QA program provides systematic procedures, called corrective actions, to resolve problems and restore proper functioning to the analytical system.

The Laboratory Operations Manager or designee will review the data generated to ensure that all quality control samples have been analyzed as specified in the protocol. Where sample results fall outside of the acceptable ranges for accuracy and precision, deficiencies will be reported to MK's Project Chemist, who will immediately report the discrepancies to the Project Manager. Corrective actions will be defined by the MK Project Chemist in conjunction with the QA Manager and documented appropriately.

The laboratory will follow the procedures in the respective method for performing corrective action and reporting the data with qualifiers, if appropriate. MK will evaluate the effect of any deviations in relation to the project Data Quality Objectives. Corrective action may include, but not necessarily limited to:

- Re-analyzing suspect samples
- Re-sampling and analyzing
- Evaluating and amending sampling and/or analytical procedures
- Accepting qualified data with an acknowledged level of uncertainty
- Discarding the data

6.9 LABORATORY DATA REPORT

Laboratory data reports will be issued for each workorder generated by the laboratory. A workorder is generated for a single client's samples, received by the laboratory on the

same day. The deliverable components of the data report are listed below:

- Case Narrative/Data Flags
- Data Package Checklist
- Sample Delivery Group Worksheet
- Data Report (analyte, method, detection limit, date and time of analysis and results for each sample)
- Method Blank Summary
- Matrix Spike/Matrix Spike Duplicate
- Surrogate Recovery Information
- Field and Laboratory Blank Summaries
- Deficient Incident Report
- Dilution Factors
- Chain-of-Custody Records
- Laboratory Sample Preparation Data Sheets
- Extraction/Digestion Logs

As appropriate, each of these deliverable components are given for each of the types of analyses that are conducted.

7.0 QUALITY ASSURANCE PROGRAM

7.1 SYSTEM AUDITS

System audit(s) will be performed by the MK Site Quality Control Supervisor (SQCS) or designee during the course of the field activities. Evaluations will be made of ongoing field work, as well as any other activity affecting the quality. The primary purpose of the system audit is to verify and document that field activities are being performed efficiently and in conformance with approved standards and procedures, federal and state regulatory requirements, sound engineering and environmental practices, and contract requirements.

The audits will include an objective examination of work areas, activities, and processes; review of documents and records; interviews with project personnel, and review of procedures associated with the project. Audit results will be documented and the audit report submitted to the SQCS for action. The SQCS will investigate any adverse audit findings, determine the root cause (if necessary), schedule corrective action, and respond in writing to the report as requested. The Project Manager will report periodically on the status of corrective actions taken, until all required actions are completed.

7.2 SURVEILLANCE

Quality assurance surveillance will be performed as necessary, using performance-based concepts for monitoring and/or observing activities, to verify conformance to specified

program requirements. Surveillance are considered to be snap-shots of compliance during a given time and generally focus on one specific area of review, rather than entire program effectiveness. Surveillance will be conducted at the discretion of the SQCS and may be initiated when the quality of an activity appears to be in jeopardy due to noncompliance with the applicable project plans; an overview less formal than an audit is desirable; or formal audits of an activity, project subcontractor, etc., may not be required.

7.3 LABORATORY EVALUATION

MK will obtain a copy of the laboratory's Quality Assurance Plan and evaluate its experience, capability, and adequacy prior to sending samples. Documentation of this evaluation will be retained in project files.

7.4 CORRECTIVE ACTION PROGRAM

A corrective action program will be implemented to ensure that conditions adverse to quality are identified promptly and corrected as soon as practical. In the case of significant conditions adverse to quality, the root cause of the condition will be determined, and corrective action taken to preclude reoccurrence. These actions will be documented and reported to appropriate levels of management.

Corrective actions may be the result of internal audits and surveillance or when laboratory analytical results appear unusual, questionable, or quality control criteria are exceeded. When quality control criteria are exceeded, information justifying poor recovery or precision will be requested from the laboratory and documented.

7.4.1 Reporting and Resolution of Quality Problems

Significant quality problems and conditions will be identified, reported, and corrected in accordance with the following requirements:

- Existing, developing, or potentially out-of-control quality conditions will be promptly reported to the Project Manager for evaluation and action. The Project Manager will notify the SouthDiv Technical Manager verbally as soon as possible of all non-routine occurrences, followed by a written report of the non routine occurrence within 48 hours. These reports will include identification of the problems, corrective actions taken, and verbal or written instructions received from SouthDiv personnel.
- Reports documenting quality problems and their resolution, including lessons learned from significant quality problems and adverse conditions, will be routinely disseminated to all affected project personnel.

7.4.2 Laboratory Corrective Action

The MK Project Chemist or designee will review the data generated to ensure that all quality control samples have been analyzed as specified in the methods. This review will

include calibration procedures, frequency, and results. Instrument maintenance logs also may be checked. Recoveries of laboratory matrix spike/matrix spike duplicate samples and surrogates will be checked for consistency with method accuracy. RPDs of laboratory matrix spike/matrix spike duplicates will be checked for consistency with method precision. Where sample results fall outside of the acceptable ranges for accuracy and precision as given in individual methods, discrepancies will be reported immediately to the QA Manager. Corrective actions will be defined by the Project Chemist in conjunction with the QA Manager and documented appropriately.

The contracted laboratory will have an internal quality assurance corrective action program which includes verification that QC data are not outside acceptable windows for precision and accuracy, blanks or control samples do not contain contaminants above acceptable levels, undesirable trends detected in spike recoveries or RPDs between duplicates are corrected, there are no unusual changes in detection limits, holding times have not been exceeded, and deficiencies detected by the laboratory QA department during internal or external audits, or from results of performance evaluation samples, are corrected.

7.4.3. Recurring Conditions Adverse to Quality

For recurring quality problems where corrective actions have not been effective, the SQCS as needed, will do the following:

- Determine the events leading to the occurrence of the quality problems
- Develop an understanding of the technical and work activities associated with the quality problems
- Ascertain the implications of the quality problem
- Determine the extent to which similar quality problems (or precursors to the problems) have been recognized by the responsible task manager, the effectiveness of any corrective actions that were taken, and impacts on completed work
- Consider stopping work associated with the applicable activity
- Recommend actions that can be taken by the responsible task manager to preclude recurrence

8.0 REFERENCES

U.S. Navy, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program (NEESA 20.2-047B)

U.S. Army Corps of Engineers. 1990. ER 1110-1-263, "Engineering and Design, Chemical Data Quality Management for Hazardous Waste Remedial Activities."

U.S. Army Corps of Engineers. "A-E Guidance for Developing A-E Quality Management Procedures for Site Investigative Activities."

U.S. Department of Commerce. 1974. Climatic Atlas of the United States.

U.S. Environmental Protection Agency, "Functional Guidelines for Data Validation, Organic Analyses", 1994

U.S. Environmental Protection Agency, "Functional Guidelines for Data Validation, Inorganic Analyses", 1994

**TABLE H-1...
DATA SET DELIVERABLES FOR LEVEL C QA**

Contaminants	Method Requirements	Deliverables
<i>Organics</i>	Method blank spikes with results and control charts. Run with each batch of samples processed.	Control chart
	Results to be reported on CLP Form 1. Sample results using CLP data flags.	Form 1 1/Sample chromatograms/and mass spectra
	Surrogate recovery from samples reported on CLP Form 2. Surrogates to be used in volatiles, semivolatiles, pesticides/PCBs. For volatiles by GC, the names of surrogates should be changed to reflect the surrogate used.	Form 2
	Matrix spike/spike duplicate 1 spike and spike duplicate per 20 samples of similar matrix reported on Form 3.	Form 3
	Method blank reported on CLP Form 4. For volatiles by GC, a similar format will be used as CLP Form 4 for blanks.	Form 4
	GC/MS Tuning for volatiles/semi-volatiles. Report results on Form 5.	Form 5
	Initial calibration data reported on Form 6. For volatiles by GC, the initial calibration data with response factors must be reported. For pesticides/PCB data Form 9 must be used for calibration data.	Form 6 No Form Form 9
	Continuing calibration data, the response factors and their percent differences from the initial must be reported.	No Form
	Internal Standard Area for volatiles and semivolatiles.	Form 8

**TABLE H-1
DATA SET DELIVERABLES FOR LEVEL C QA**

Contaminants	Method Requirements	Deliverables
	<p>For pesticides/PCB data, the CLP Form 9 must be presented.</p> <p>No chromatograms or mass spectra are presented for calibration. These data should be filed in the laboratory and available if problems arise in reviewing/validating the data. The calibration information should be available for checking during on-site audits.</p>	Form 9
	Internal standard area for GC/MS analyses CLP Form VIII shall be supplied.	Form 8
	Second column confirmation shall be done for all GC work when compounds are detected above reporting limits. Chromatograms of confirmation must be provided.	Chromatograms
<i>Metals</i>	Sample results with CLP flagging system.	Form 1
	Initial and continuing calibration.	Form 2, Part 1 only
	Blanks 10% frequency	Form 3
	Method blank taken through digestion (1/20 samples of same matrix).	Form 3
	ICP interference check sample.	Form 4
	Matrix spike recovery (1 per 20 samples of similar matrix).	Form 5, Part 1
	Postdigestion spike sample recovery for ICP metals. Only done if predigest spike recovery exceed CLP limits.	Form 5, Part 2 (never used for GFAA work)
	Postdigest spike for GFAA.	Recovery will be noted on raw data
	Duplicates (1 per 20 samples will be split and digested as separate)	Form 6 samples
	Method blank spike information will be plotted on control chart, one per batch of samples processed.	Control chart

TABLE H-1
DATA SET DELIVERABLES FOR LEVEL C QA

Contaminants	Method Requirements	Deliverables
	Standard addition. The decision process outlined in CLP page E-3 will be used to determine when standard additions are required.	Form 8
	Holding times	Form 10
<i>Wet Chemistry</i>	Blank spike 1/batch	Control chart
	Method blank 1/batch	Report result, no format
	Sample results	Report result, no format
	Matrix spike/spike duplicate or calibration information	Report result if applicable
	Calibration check report percent RSD or percent difference from initial calibration	Report percent or percent difference, no format

**TABLE H-2
VOLATILE ORGANIC COMPOUNDS BY SW-846 METHOD 8240**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment ^a µg/kg	Water & Spike Recovery	Soil/Sediment & Spike Recovery
Chloromethane	10	10	D-273	D-273
Bromomethane	10	10	D-242	D-242
Vinyl Chloride	5	5	D-251	D-251
Chloroethane	10	10	14-230	-
Methylene Chloride	5	5	D-221	D-221
1,1-Dichloroethene	5	5	23-150 ^b	26-133 ^b
1,1-Dichloroethene	5	5	59-155	59-155
1,2-Dichloroethene (total)	5	5	54-156	54-156
Acetone	10	10	10-150 ^c	10-150 ^c
Carbon Disulfide	5	5	10-150 ^c	10-150 ^c
Chloroform	5	5	57-138	57-138
1,2-Dichloroethane	5	5	49-155	49-155
2-Butanone	10	10	10-150 ^c	10-150 ^c
1,1,1-Trichloroethane	5	5	52-162	52-162
Carbon Tetrachloride	5	5	70-140	70-140
Vinyl Acetate	5	5	10-150 ^c	10-150 ^c
Bromodichloromethane	5	5	35-155	35-155
1,1,2,2-Tetrachloroethane	5	5	46-157	46-157
1, 2-Dichloropropane	5	5	D-210	D-210
trans-1, 3-Dichloropropene	5	5	17-183	17-183
Trichloroethene	5	5	41-149 ^b	43-151 ^b
Dibromomethane	5	5	53-149	53-149
1,1,2-Trichloroethane	5	5	52-150	52-150
Benzene	5	5	35-155 ^b	59-150 ^b

**TABLE H-2
VOLATILE ORGANIC COMPOUNDS BY SW-846 METHOD 8240**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment ^a µg/kg	Water & Spike Recovery	Soil/Sediment & Spike Recovery
cis-1,3-Dichloropropene	5	5	D-227	D-227
Bromoform	5	5	45-169	45-169
2-Hexanone	50	50	10-150 ^c	10-150 ^c
4-Methyl-2-pentanone	50	50	10-150 ^c	10-150 ^c
Tetrachloroethene	5	5	64-148	64-148
Toluene	5	5	32-154 ^b	46-150 ^b
Chlorobenzene	5	5	45-153 ^b	52-149 ^b
Ethyl Benzene	5	5	37-162	37-162
Styrene	5	5	10-150 ^c	10-150 ^c
Total Xylenes	5	5	10-150 ^c	10-150 ^c

NOTE: Spike values not listed are not provided in SW-846.

^a Medium soil/sediment detection limits for volatile compounds are 125 times the individual soil/sediment detection limits

^b Laboratory-derived values.

^c Value based on approximation of ranges found in Method 8240.

^d Detectable. In most cases, this value will be greater than zero and less than the detection limit. The cells above which have a D followed by some number indicate a range between the detectable limit (i.e., lower limit) and the upper limit. The number followed by D represents the upper limit.

**TABLE H-3
BASE/NEUTRAL COMPOUNDS BY SW-846 METHOD 8270**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment ^a µg/kg	Water % Spike Recover	Soil/Sediment % Spike Recovery
bis (2-Chloroethyl)ether	10	660	12-158	12-158
1,3-Dichlorobenzene	10	660	D-172	D-172
1,4-Dichlorobenzene	10	660	5-92 ^b	26-110 ^b
Benzyl alcohol	20	1,300	10-150 ^c	10-150 ^c
1,2-Dichlorobenzene	10	660	32-129	32-129
bis (2-Chloroisopropyl)ether	10	660	36-166	36-166
N-Nitroso-Di-n-propylamine	10	660	22-114 ^b	9-125 ^b
Hexachloroethane	10	660	40-113	40-113
Nitrobenzene	10	660	35-180	35-180
Isophorone	10	660	21-196	21-196
Benzoic Acid	50	3,300	10-150 ^c	10-150 ^c
bis(2-chloroethoxy)methane	10	660	33-184	33-184
1,2,4-Trichlorobenzene	10	660	6-101 ^b	29-122 ^b
Naphthalene	10	660	21-133	21-133
4-Chloroaniline	20	1,300	10-150 ^c	10-150 ^c
Hexachlorobutadiene	10	660	24-116	24-116
2-Methylnaphthalene	10	660	21-133 ^d	21-133 ^d
Hexachlorocyclopentadiene	10	660	D-111	D-111
2-Chloronaphthalene	10	660	60-118	60-118
2-Nitroaniline	50	3,300	10-150 ^c	10-150 ^c
Dimethyl phthalate	10	660	D-112	D-112
Acenaphthylene	10	660	33-146	33-146
3-Nitroaniline	50	3,300	10-150 ^c	10-150 ^c
Acenaphthene	10	660	27-116 ^b	33-127 ^b
Dibenzofuran	10	660	10-150 ^c	10-150 ^c

**TABLE H-3
BASE/NEUTRAL COMPOUNDS BY SW-846 METHOD 8270**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment ^a µg/kg	Water % Spike Recover	Soil/Sediment % Spike Recovery
2,4-Dinitrotoluene	10	660	22-129 ^b	10-140 ^b
2,6-Dinitrotoluene	10	660	50-158	50-158
Diethylphthalate	10	660	D-114	D-114
4-Chlorophenyl phenyl ether	10	660	D-114	D-114
Fluorene	10	660	59-121	59-121
4-Nitroaniline	20	ND	10-150 ^c	10-150 ^c
N-Nitrosodiphenylamine	10	660	22-114 ^d	9-125 ^d
4-Bromophenyl phenyl ether	10	660	53-127	53-127
Hexachlorobenzene	10	660	D-152	D-152
Phenanthrene	10	660	54-120	54-120
Anthracene	10	660	27-133	27-133
Di-n-butylphthalate	10	ND	1-118	1-118
Fluoranthene	10	660	26-137	26-137
Pyrene	10	660	29-157 ^b	D-183 ^b
Butyl benzyl phthalate	10	660	30-136	30-136
3,3'-Dichlorobenzidine	20	1,300	D-262	D-262
Benz(a)anthracene	10	660	33-143	33-143
bis(2-Ethylhexyl)phthalate	10	660	8-158	8-158
Chrysene	10	660	17-168	17-168
Di-n-octyl phthalate	10	660	4-146	4-146
Benzo(b)fluoranthene	10	660	24-159	24-159
Benzo(k)fluoranthene	10	660	11-162	11-162
Benzo(a)pyrene	10	660	17-163	17-163
Indeno(1, 2, #-cd)pyrene	10	660	D-171	D-171

**TABLE H-3
BASE/NEUTRAL COMPOUNDS BY SW-846 METHOD 8270**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water μg/l	Soil/Sediment ^a μg/kg	Water % Spike Recover	Soil/Sediment % Spike Recovery

Note: Spike values not listed are not provided in SW-846.

^a Medium soil/sediment detection limits for TCL compounds are 60 times the individual soil/sediment detection limits.

^b Laboratory-derived control limits.

^c Value based upon approximation of limits for all compounds in Method 8270.

^d Value based on naphthalene.

D Detectable. In most cases, this value will be greater than zero and less than the detection limit. The cells above which have a D followed by some number indicate a range between the detectable limit (i.e. lower limit) and the upper limit. The number followed by D represents the upper limit.

**TABLE H-4
ACID COMPOUNDS BY SW-846 METHOD 8270**

Compound	Estimated Quantitation Limit		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment ^a µg/kg	Water % Spike Recover	Soil/Sediment % Spike Recovery
Phenol	10	660	1-81 ^b	20-116 ^b
2-Chlorophenol	10	660	15-121 ^b	18-114 ^b
2-Methylphenol	10	660	5-112 ^c	5-112 ^c
4-Methylphenol	10	660	5-112 ^c	5-112 ^c
2-Nitrophenol	10	660	29-182	29-182
2,4-Dimethylphenol	10	660	32-119	24-118
2,4-Dichlorophenol	10	660	39-135	44-119
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	20	1,300	29-119 ^b	18-129 ^b
2,4,6-Trichlorophenol	10	660	37-144	37-144
2,4,5-Trichlorophenol	10	660	37-144 ^d	37-114 ^d
2,4-Dinitrophenol	10	660	D-191	D-191
4,6-Dinitro-2-methylphenol	50	3,300	D-181	30-136
4-Nitrophenol	50	3,300	D-109 ^b	D-237 ^b
Pentachlorophenol	50	3,300	D-136 ^b	D-152 ^b

NOTE: Spike values not listed are not provided in SW-846.

^a Medium soil/sediment detection limits for TCL compounds are 60 times the individual soil/sediment detection limits

^b Laboratory-derived control limits.

^c Value based on phenol

^d Value based on 2,4,6-trichlorophenol

D Detectable. In most cases, this value will be greater than zero and less than the detection limit. The cells above which have a D followed by some number indicate a range between the detectable limit (i.e. lower limit) and the upper limit. The number followed by D represents the upper limit.

**TABLE H-5
PESTICIDE/PCB COMPONENTS BY SW-846 METHOD 8080**

Compound	Detection Limits		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment µg/kg	Water % Spike Recovery	Soil/Sediment % Spike Recovery
alpha-BHC	0.025	1.0	37-14	37-134
beta-BHC	0.025	1.0	17-147	17-147
delta-BHC	0.025	1.0	19-140	19-140
gamma-BHC (Lindane)	0.025	1.0	59-122 ^b	58-118 ^b
Heptachlor	0.025	1.0	25-125 ^b	54-119 ^b
Aldrin	0.025	1.0	19-119 ^b	51-121 ^b
Heptachlor Epoxide	0.025	1.0	37-142	37-142
Endosulfan I	0.05	2.0	45-153	45-153
Dieldrin	0.05	2.0	61-123 ^b	65-118 ^b
4,4'-DDE	0.05	2.0	30-147	30-147
Endrin	0.05	2.0	59-140 ^b	43-155 ^b
Endosulfan II	0.05	2.0	D-202	D-202
4,4'-DDD	0.05	2.0	25-160	25-160
Endrin Ketone	0.10	5.0	10-150 ^c	10-150 ^c
Methoxychlor	0.4	16.0	10-150 ^c	10-150 ^c
alpha-Chlordane	0.2	8.0	45-119	45-119
gamma-Toxaphene	1.0	50.0	41-126	41-126
Aroclor-1016	0.5	2.0	50-114	50-114
Aroclor-1221	0.5	2.0	15-178	15-178
Aroclor-1232	0.5	2.0	10-215	10-210
Aroclor-1242	0.5	2.0	39-150	39-150
Aroclor-1248	0.5	2.0	38-158	38-158
Aroclor-1254	0.5	2.0	29-131	29-131
Aroclor-1260	0.5	2.0	8-127	8-127

**TABLE H-5
PESTICIDE/PCB COMPONENTS BY SW-846 METHOD 8080**

Compound	Detection Limits		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment µg/kg	Water % Spike Recovery	Soil/Sediment % Spike Recovery

Note: Spike values not listed are not provided in SW-846.

^a These limits are for selected compounds and are advisory only. Medium soil/sediment detection limits for pesticide compounds are 15 times the individual soil/sediment detection limits.

^b Laboratory-derived values

^c Value based on approximation of ranges for all pesticides in Method 8080.

D Detectable. In most cases, this value will be greater than zero and less than the detection limit. The cells above which have a D followed by some number indicates a range between the detectable limit (i.e. lower limit) and the upper limit. The number followed by D represents the upper limit.

**TABLE H-6
ORGANOPHOSPHORUS PESTICIDE COMPOUNDS BY SW-846 METHOD 8140**

Compound	Detection Limits		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment µg/kg	Water % Spike Recovery	Soil/Sediment % Spike Recovery
Azinphos Methyl	1	1	35-110	35-110
Chlorpyrifos	1	1	87-109	87-109
Dimethoate	1	1	10-150 ^a	10-150 ^a
Diazinon	1	1	55-79	55-79
Disulfoton	1	1	64-110	64-110
Mevinphos	1	1	41-72	41-72
Naled	1	1	62-94	62-94
Parathion methyl	1	1	34-163	50-138
Phorate	1	1	45-80	45-80
Malathion	1	1	35-121 ^b	18-162 ^b
Parathion	1	1	34-163	50-138
Ethion	1	1	10-150 ^c	10-150 ^c

Note: Spike values not listed are not provided in SW-846.
^a Values based on approximation of ranges for other organophorus pesticides in Method 8140.
^b Laboratory-derived values
^c Based on parathion.

**TABLE H-7
POLYCYCLIC HYDROCARBON COMPOUNDS**

Compound	Detection Limits		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment µg/kg	Water % Spike Recovery	Soil/Sediment % Spike Recovery
Naphthalene	10	500	16-105 ^a	D-122
Acenaphthlene	10	500	D-139	D-139
Acenaphthene	10	500	D-124	D-124
Fluorene	1	50	D-142	D-142
Phenanthrene	1	50	D-155	D-155
Anthracene	1	50	6-162 ^a	D-126
Fluoranthene	2.5	125	47-128 ^a	14-123 ^a
Pyrene	2.5	125	D-140	D-140
Benzo(a)anthracene	1	50	12-135	12-135
Chrysene	1	50	43-118	D-199
Benzo(b)fluoranthene	1	50	6-150	6-150
Benzo(k)fluoranthene	1	50	D-159	D-159
Benzo(a)PYRENE	1	50	D-128	D-128
Dibenzo(a,h)anthracene	2.5	125	D-110	D-110
Benzo(g,h,i)perylene	2.5	125	D-116	D-116
Indeno(1,2,3-cd)pyrene	1	50	D-116	D-116
1-methylnaphthalene	10	500	D-122 ^b	D-122 ^b
2-methylnaphthalene	10	500	D-122 ^b	D-122 ^b

Notes: Spike value not listed are not provided in Sw-846.

^a Laboratory-derived values.

^b Value based on naphthalene by Method 8310.

D Detectable. In most cases, this value will be greater than zero and less than the detection limit. The cells above which have a D followed by some number indicate a range between the detectable limit (i.e. lower limit) and the upper limit. The number followed by D represents the upper limit.

**TABLE H-8
HERBICIDE COMPOUNDS BY SW-846 METHOD 8150**

Compound	Detection Limits		QC Criteria - Matrix Spike	
	Water µg/l	Soil/Sediment µg/kg	Water % Spike Recovery	Soil/Sediment % Spike Recovery
2,4-dichlorophenoxyacetic acid	0.5	1000	58-120 ^a	28-131 ^a
2-(2,4,5-trichlorophenoxy) propanoic acid (Silvex)	0.5	1000	60-149 ^a	16-154 ^a
4-(2,4-dichlorophenoxy) butanoic acid	0.5	1000	87-99	87-99
2,4,5-trichlorophenoxyacetic acid	0.5	1000	68-88	68-88

Note:

^a Laboratory-derived values.

**APPENDIX I
RESPONSES TO COMMENTS**

**CHRIS BARTKU
COMMENTS FOR MEMPHIS WORK PLAN**

General

1. Technically edit the document e.g. RI/FS should be RFI.
 - A. Reviewed, changes made.
2. Tab all Appendices.
 - A. Included in document sent to Charleston for distribution.
3. Utilize an associate specialized in RCRA regulations to beef up these Work Plans e.g. no vague references such as "...adherence to appropriate State and Federal regulations"
 - A. The document was reviewed by a Regulatory Specialist who incorporated regulatory comments and made other appropriate changes.

Specific

1. Table of Contents, Appendix F
This should read Subcontracting Plan
 - A. Change was made.
2. Need a Community Relations Plan section per '89 RFI Guidance and Interim Measures Guidance (OSWER Dir 9902.4), contact Southern Division's BEC David Porter to mesh project CRP with RAB and EAH CRP (CRP section may simply reference EAH's CRP and add project specific details such as inclusion of the Work Plans in the RAB library, I don't know).
 - A. During a phone conversation with Chris Bartku I was instructed to contact Lawson Anderson about obtaining the CRP and to reference the existing document in the Work Plan. The current CRP has been referenced in the Work Plan in Section 2.2, 2.4.7, and 2.6.
3. Section 2.1, 1st Paragraph
There are no ARARs for RCRA.
 - A. Changed to applicable regulations.
4. Section 2.1
Check on first ARAR name, "guidance for...Guidance"
 - A. Reference to this USEPA guidance has been deleted, referencing only applicable compliance requirements.

5. Section 2.1
How about 1989 RFI Guidance, 40 CFR 264, DQOs for RRAs Guidance, EPA Region IV SOPQAM, etc.
 - A. References were made for all documents except the Region IV SOPQAM. We did not have access to this document, it has been ordered and will be referenced in an addendum if necessary, it was not referenced in this revision.

6. Section 2.2
MK will notify in writing for approval removal of on-site trees, and proposed changes to any physical features of the property such as construction of permanent roadbeds.
 - A. Change was made. The text indicates that the contractor shall notify NAS Memphis. Also changed Environmental Protection Plan as appropriate.

7. Section 2.4.1, last bullet
Make two bullets, "Backfilling if required" and "restoration of the site to control run off".
 - A. Change made

8. Section 2.4.5, last bullet, first Paragraph
Sampling will be determined by the SSHO? How about by the PM or PE instead.
 - A. Added section on Surveying, 2.4.5, renumbered Removal of Debris to 2.4.6. Changed "SSHO" to "project manager and SSHO"

9. Section 2.4.5.1
Do we have to triple rinse empty drums? I thought if they were empty then they are not hazardous waste per 40 CFR 261.7 (I don't want to generate washwater if I don't have to) triple rinsing is for P listed wastes.
 - A. The section is now numbered 2.4.6.1, the section was reworded as follows:

"40 CFR 261.7(b) defines an empty drum as a drum which contains less than one inch of material or 3 percent by weight of its capacity. Empty drums and tanks shall be screened using a photoionization detector (PID) and visually inspected. If PID levels above background are detected, the empty drums and tanks shall be moved to a temporary staging area where they will be rinsed with a solution of detergent and water. Drums shall be triple rinsed if acute hazardous wastes listed in 40 CFR Part 261.31, 263.32 or 261.33(e), are suspected (i.e., labeling). Where no hazardous wastes are detected or suspected, the drums shall be crushed and staged for salvage. All rinseate shall be collected. After rinsing, the empty containers shall be screened and rinsed again, if necessary. When "clean," the drums shall be crushed for salvage."

10. Section 2.4.5.2

Don't use the terminology Solid Waste because hazardous waste is a solid waste too.

- A. Reference to "solid waste" was changed to "nonhazardous solid waste" where appropriate.

- 11. Section 2.4.5.2
May want to say suspect ACM will be tested prior to handling because we may test debris other than floor tiles (e.g. some siding and roof insulation, pipe insulation, etc.), also precisely state how material will be removed, stored, tested, and are we going to sample the environment (air, soils) during and after removal?
 - A. Section 2.4.6.3 was added to address ACM.

- 12. Section 2.4.5.3
Include a state like, "if a tree is growing through soil suspected to be contaminated, the tree will be cut flush to grade. The tree will be disposed of as a nonhazardous land clearing waste. The stump will be declared the same as the suspect soil" also, mention this section does not include sediments or soil.
 - A. Section was renumbered 2.4.6.4, Changes were made to incorporate comments.

- 13. Section 2.4.5.3
State exactly what you will use (e.g. 6" sand base, 30 mil HDPE liner, 6" sand cover, liner draped over hay bales) and state it will meet standards in 40 CFR 265.xx, no empty drums in the storage area, discuss treatment standards in the LDRs as it relates to debris on this site.
 - A. This section is now 2.4.6.5. The decontamination pad description has been expanded.

- 14. Section 2.4.6
Do not recommend storing soils in a pile in a bermed area from different drum locations (one drum location with soil that exceeds an overpack or roll-off quantity may be okay). Please expand, we (Southern Division) need a hazardous waste determination document to review prior to advising NAS Memphis to proceed with signing the manifests, this document should be identified in the DMP and schedule, the document should outline how MK determined the waste codes.
 - A. Section number is now 2.4.7. All removed suspect contaminated soil will be stored in lined roll-off containers until disposal characterization is completed. Also revised SAP, and Waste Management Plan.

- 15. Section 2.4.9
EZs and SZs have not previously been defined in the report.
 - A. The section is renumbered 2.4.10. The work zones have been more clearly defined and abbreviations defined in Section 2.4.4.

16. Section 2.5.1
For each site? Approximate size, location, etc.
- A. Details for the decontamination facilities have been added.
17. Section 2.6
Modify to fit this project, e.g. reference to design specifications is erroneous-there is only these Work Plans, it appears the majority of field work will be accomplished in one month or less whereas you are proposing monthly progress reports to the regulators (is this also during storage?), design and construction certification may be closure certification by EAH, etc. You may want this information in the DMP.
- A. The reporting procedures have been modified to comply with the Community Relations Plan.
18. Section 3.0
States no permits required but you mention elsewhere possible disposal of decon liquids through WWTP/POTW reference here.
- A. Reference to POTW is made here.
19. Section 4.0
Mention Appendix D is an EPP
- A. Reference was incorporated.
20. Section 7.0
Modify schedule to reflect negotiations (once completed)
- A. The schedule has been modified to reflect the best available information. The schedule will be updated to reflect the final negotiations.
21. Appendix E, Waste Management Plan
Too vague, what if you have to exceed GT 90 day storage because we can't get the modification and subsequent subcontracted disposal of a roll-off of haz soil (unexpected accomplished in time-are you going to use NAS's storage facility? What is the decon area going to look like and how is washwater going to be managed, how about PPE, how about plastic soil covers, haybales, silt fences, what is the storage area going to look like, are you going to have sandbagged containment of overpacks, etc. quote regs and specific guidance sections as well as equipment names, materials you plan to use to keep the verbiage brief. I guess you may reference the SAP which has some of this information. Try not to be repetitive.
- A. More details have been provided.
22. Sampling and Analysis Plan, Appendix G, Section 2.0
We better include the EPA Region IV SOPQAM and DQOs for RRAs as guidelines too

based on EPA's comments on Memphis's SWMU 45. 20.2-047 should only be used as a guideline where more protective/conservative or where EPA and state guidance is lacking.

A. MK has ordered the Region IV SOPQAM, however, we have not yet received it. Reference to 20.2-047 was based on MK's contract requirements. MK is happy to accommodate your request, however, is a change necessary to the contract to follow the Region IV SOPQAM? Please advise us on the proper direction to proceed.

23. Sampling and Analysis Plan, Appendix G, Section 2.0, 2nd Paragraph
RFI not RI/FS, facility should be site, remediation should be source removal, add a paragraph that delineates what MK will be doing and what EAH will be doing (e.g. MK will not demobilize until soil analytical results are obtained. MK will disseminate these results in accordance with the DMP. Additional removal and/or analytical will be conducted by MK at the direction of the Navy. The Navy will look at the facility wide RFI analytical results, will confer with EAH and the regulatory agencies, and will decide if remaining contaminant concentrations (if any) are indicative of a waste source that will require additional removal or are indicative of residues that do not pose an immediate threat to human health or the environment and thus will trigger the end of the ICM).

A. Plan modified to incorporate comments.

24. Section 2.1, 2nd Paragraph
Where is Table G-2

A. Table was improperly numbered, change made.

25. Appendix G, Table G-1

What is the difference between drum samples and drum contents (for disposal)? I assume the drum samples is for characterizing the waste please explain, what list of VOA's/Semi-VOA's? Need to reference Appendix H). What about field screening for drum segregation? Wouldn't the number of samples be one per group of like drums? How would this sample be taken? Generally, work on all Parameters to be more specific as well as tell me what you based your sample numbers on, also where is decon washwater sampling and PPE discussed? This table obviously opens up a lot of questions that may later be answered somewhere but need to be identified if the Work Plan is to make sense. (e.g. may say 8240, 8270, 8080, 8140, etc. here to summarize).

A. Based on phone conversations with Chris Bartku and assumptions provided, each drum will be tested for disposal parameters. Table has been modified to incorporate all waste streams.

26. Appendix G, Section 2.1.1, 5th Bullet
Table G-1 is referenced here, why?

A. Improperly referenced G-1, changed to G-2.

27. Appendix G, Section 2.2

You keep mentioning clean closure, "The purpose of these samples is to verify clean standards for closure after removal...sampling is intended to confirm that the areas re considered clean and that they can be closed..." Identify what you mean by closure e.g. 40 CFR 265, "Clean" concentration-wise conservatively means background for VOA's; I think we need to address some different scenarios somewhere in this document, i.e. "MK will take 4 total background soil samples at each site from two different locations. Each location will include a 1-12 inch and 12-24 inch composited sampling interval which will be taken immediately upon arriving on site. The samples will be sent to a laboratory for analytical parameters that match Table G-1. The lab will not dispose of the background soil samples in case additional compounds are later discovered that will require additional analysis. These site background samples will be used to compare to later soil analytical results. For closure purpose, after drums and source removal is completed and visibly contaminated soil is removed, samples will be obtained in all soil removal locations (two samples per location consisting of a 1-12 inch composite and 12-24 inch composite). If any compounds determined to be site related are greater than background, then clean closure will not be attempted during the ICM. As mentioned above, any concentration above background will be scrutinized by the Navy to determine if additional soil removal is warranted. If any soil contamination is discovered that is indicative of a hazardous waste, even if final confirmatory soil analytical results are at background concentrations, then groundwater and potentially surface water samples will be taken by EAH at a later date to ensure clean closure can be met. Therefore, clean closure will only be attempted during the time frame of the ICM if no sampling results from the source material (drums) or underlying soils have constituent concentrations greater than site background. In this case, MK will provide the appropriate information and EAH will prepare the closure documentation and certification."

- A. As per original discussions, worst case, low lying areas, and areas from under drums will be sampled for confirmation samples. After conversation with Lawson Anderson and based on assumptions that were sent by Chris Bartku we have left the background samples out of this scope of work. Modifications were made removing reference to clean closure.

28. Appendix G, Section 2.2.1 and 2.2.2

Identify the reference for proposed sampling strategy; identify whether the samples are grab or composite; identify that the samples are biased; why nine inches? Recommend consistency by using a 1-12 and 12-24 inch composite; recommend above sampling under each drum having GT 1" product and the sampling you recommend; duplicates, rinseates, etc. should be referenced and included in Table G-1.

- A. Surface samples need to be taken to a maximum depth of 12 inches for use in risk assessments if necessary. Changed sample depth to 0-12 inches. Sampling plan has been modified for more clarity.

29. Appendix G, Section 2.2.3

Include use of HNU during soil sampling; including procedure for taking multiple samples identified above; delete bentonite chips.

- A. Added use of field screening devices for observational method. The use of bentonite chips is standard procedure for filling holes resulting from sampling it was not eliminated from the Work Plan.
30. Appendix G, Section 2.3
Add sampling procedure contingency section in case liquids are discovered in drums (e.g highly likely we will at least encounter rain water GT 1").
- A. Contingency added.
31. Appendix G, Section 2.4
Beef up discussion to include comments on 2.2 above such as, "a drum with GT 1" solid will be sampled and analyzed for compounds identified in Table G-1 characterization. Visibly contaminated soils and product that has spilled directly around the drum will be excavated and combined with the drum contents. The drum will be overpacked with the spilled product and excavated soil and will be labelled "hazardous waste pending analysis" (see XXX for a further discussion on labelling).
- A. Modification made to incorporate comment.
32. Appendix G
Characterization analytical results will be used to determine whether additional TCLP testing will be required. TCLP testing will be performed if required to meet LDRs with the sample being taken from the combined overpack material." Blah, blah, blah.
- A. Changes were made to include only hazardous waste characterization for waste disposal, no additional characterization is necessary.
33. Appendix G, Section 2.5
Add liquids based on 2.3 comment above
- A. Liquids have been added to Table G-2.
34. Appendix G, Section 2.6
Reference Table in Appendix H; reference EPA DQOs for RRAs and NEESA 20.2-047b; just go into detail in one location in the document please (I would recommend having the field and lab QA/QC sampling details in this section (the SAP) and make the Chemical Data Acquisition Plan a Data Management Plan, only).
- A. Reference to the EPA DQOs was inadvertently not included in this revision. An addendum can be provided. The Sampling and Analysis Plan and the Data Management Plan (previously CDAP) have been revised eliminating repetition and inconsistencies.
35. Appendix G, Section 3.1
Which will it be? Have you contacted EAH to discuss use of what I assume is a permanent decon area for all RFI field work?

- A. The SSHP and 49 CFR 1910.120 require a contamination reduction zone located at the site to prevent off site transport of contamination.
36. Appendix G, Section 3.2
The nitric acid rinse is a new twist for me, identify what reference you are obtaining this from.
- A. With unknown materials, one contaminant concern is metals, nitric acid is commonly referenced in EPA SOPs to decontaminate equipment with exposure to metal contamination. An addendum can be issued deleting the use of nitric acid.
37. Appendix G, Section 4.0
Seems kind of meaningless
- A. Section removed
38. Appendix G, Section 5.0
Again, don't duplicate in CDAP or vice versa, ensure numbering is consistent with EAH's RFI work and so state in this document; we wanted MK to use as much of EAH's already approved Work Plan (e.g. QA/QC as possible. Have you seen them or contacted someone for a copy?
- A. Numbering pursuant to QEP 6.1 (MK standard for SouthDiv). An addendum referring to the referenced RFI numbering system can be issued.
39. Appendix G, Section 6.0
"Laboratory samples will be managed in accordance with the sampling procedure." What does this mean under IDW? Here we can simply state Laboratory wastes will be managed under 261.4(d) and the laboratory will keep the waste samples for disposal, will thus become the generator, and will comply with treatment and storage prior to disposal to comply with RCRA hazardous waste regulations. I'd recommend MK utilize an associate familiar with RCRA to beef up those Work Plans.
- A. Deleted, covered in Appendix E.
40. Appendix G, Section 6.1 and 6.2
Delete since discussed in another area (also not an IDW in this project).
- A. Deleted covered in section E.
41. Appendix G, Section 6.3
Also in another area.
- A. Deleted covered in section E.
42. Appendix G, Section 6.4
Be more specific, "Contaminated PPE will be placed in...drums after use. Drums will

be transported to a landfill for ultimate disposal." What type of landfill, are you going to segregate your PPE by site, by drum location, also discuss scenarios e.g. if HW is drums, PPE HW, if no HW, PPE in on-site dumpster.

- A. Sampling is not practical as a large volume is necessary to make up the required 100 g sample. If hazardous waste disposal is required, the PPE should be included as hazardous waste. If no hazardous waste is found it will be disposed as solid nonhazardous waste. More clarification in the plan can be provided if necessary.

- 43. Appendix H,
Recommend CDAP be called a Data Management Plan in accordance with OSWER Dir 9902.4.

- A. Change made.

- 44. Appendix H
I just read the same project description in the environmental conditions report. Let's not have it in both places.

- A. Redundant information deleted, only included in work plan with brief reference to site as necessary for continuity.

- 45. Appendix H, Section 2.2
I only need EPA DQO level IV for the background and final round of soil samples, all other DQO levels shall be the minimum required by the disposal facility or POTW; NEESA approved lab (not necessarily CLP).

- A. Only level III is required for RCRA. Level III will be used for confirmatory soil samples, and the minimum required by the disposal facilities will be used for disposal. This comment has been resolved based on conversations with Lawson Anderson, Ensafe and Chris Bartku. The sampling plan refers to using SW-846 methods with the TAL/TCL analyte list for confirmatory and background soil samples.

- 46. Appendix H.
Does the DMP tell us what kind of survey map we will get at the end of the project? As-built drawings? Analytical results and in what format? I want a flow chart of deliverables that parallels the schedule with distribution and number of copies which will include persons such as the NTR, EAH, RPM, BEC, Regulators, RAB library, etc. from the start of the project until the end.

- A. A section defining survey requirements is included in work plan section 2.4.5. A flow chart listing the deliverables was not included, however the details of the items to be included in the report are provided in Section 2.6. Additional details can be provided in an addendum.

**KEN FULMAR
COMMENTS FOR MEMPHIS WORK PLAN**

General

Comments 1-3 were not included in the comments received from Ken.

4. The work plan seems to be very thorough. It appears to be written for a much larger job than we have with these two small sites.
 - A. Comment noted.
5. We have also received the cost estimate and it seems excessive for the amount and type of work at these two sites.
 - A. The cost estimate has been revised to incorporate the comments and assumptions from you and Chris Bartku. Negotiations are pending.

**LAWSON ANDERSON
COMMENTS FOR MEMPHIS WORK PLAN**

Summary and Conclusions

The work plan is short and concise, while the appendices are long and redundant. In order to understand the work plan, the appendices must constantly be cross-referenced. The overall understanding and flow of the document would be greatly increased if the important part of each appendix was included in the text of the work plan. The work plan does not appear to define any specific actions to clean up the site, such as an inventory of the debris, or segregating the debris into recyclable/solid waste/landscape/potentially hazardous, or how wastes will be containerized. Overall, the work plan is too general and gives no specifics on the work to be performed, other than supervision of subcontractors.

- A. Specific comments have been addressed and should address this general comment.

General

1. Title of work plan needs to be specific.

A. Changed as per Mark Taylor's comment.
2. Phone numbers for Morrison Knudsen project personnel would be helpful.

A. Specific personnel have not been selected for on site management yet. A phone list is provided in the SSHP.

Specific

1. Section 1
NAS Memphis' RCRA permit also has notification requirements.

A. The references to notifications in Section 1 have been deleted. The RCRA permit requirements have been referenced in the notifications Section 2.
2. Is a temporary road necessary to either SWMU and would it be cost effective versus driving a little farther in a backhoe?

A. The existing roads into the area will require some temporary modifications to support the truck traffic. The modifications are expected to be leveling the terrain and placement of some gravel in low or wet areas. No permanent roads are being proposed. The intent of the temporary road modifications is to allow the equipment to access the site. The wording in the work plan has been modified to clarify the temporary roads.
3. Section 2
What constitutes visually contaminated soil?

- A. The section relating to visually contaminated soil has been clarified as follows: "After removal of surface debris, soil that creates a potential contamination source will be excavated. A potential contamination source shall be determined by the Project Manager. Observational methods shall be used including but not limited to: visual staining, field screening, strong odor, creates a sheen on water".
- 4. No mention is made of the heavy equipment to be used or how the debris is to be containerized.
- A. Reference is made to a drum grappler to move the drums, the other equipment will be left up to the subcontractor.
- 5. No mention is made of what knowledge will be used to dispose of the debris as nonhazardous. Will it be generator knowledge? Or will representative samples and analysis to be performed? If sampling is to be performed, where is it mentioned?
- A. Generator knowledge will be used. Samples are only expected to be taken from drums. Visual inspection shall make other determinations.
- 6. Section 2.4.5
States "sampling if necessary as determined by SSHO," , sampling of what? and why were these samples not discussed in Appendix G- sampling and analysis plan?
- A. This section is now 2.4.6. Sampling of the debris refers to primarily drum sampling. If unknown material are discovered during removal, additional screening may be required by the SSHO and disposal sampling may be required as determined by the PM. The text was changed to indicate that the PM shall be involved in the decision. No changes were made to the Sampling and Analysis Plan.
- 7. Section 2.4.5
This is the only place in the work plan the debris is split into categories, the rest of the report does not follow this format and needs to for consistency.
- A. Section number was changed to 2.4.6. The report was set up to reflect the work events for the sites. We felt this was the best way to organize the report, the report format was not changed.
- 8. Section 2.5.4.2
A disposal facility other than a landfill may be needed for tires.
- A. The section was renumbered 2.4.6.2. No change was made to the work plan, if the selected landfill can not accept or is unwilling to accept tires, proper disposal will be addressed at that time.
- 9. Section 2.5.4.3
Is it necessary to dispose of removed trees/cleared brush in a landfill?

- A. No, according to conversations with Chris Bartku. This section has been changed to provide for chipping shredding of brush, and trees on site. No off site disposal of trees is planned. The section was renumbered to 2.4.6.4.
10. Section 2.4.5.4
Why is a hazardous waste material storage area required for a group of unknown drums? These drums should be treated as hazardous for health and safety reasons, but not for disposal purposes until they are proven hazardous.
- A. The section was renumbered to 2.4.6.5. The text was not changed. Suspected hazardous waste will be treated as hazardous waste until proven otherwise.
11. Section 2.4.6
This section states visually contaminated soil and soil from around the removed debris will be placed in a bermed area covered with plastic sheeting. This could become an unpermitted waste pile, if/when it is determined that the soil is hazardous. It is unclear in the report when contaminated soil will be packaged and at what point the soil became classified as contaminated (i.e., after analysis), since this is the only place in the report packaging is mentioned. Also, surveying is briefly mentioned in this section and in one or two places elsewhere in the report. The surveying effort needs much more elaboration and definition.
- A. This section has been renumbered to 2.4.7. The section has been changed, visually contaminated soil will be staged in lined roll off containers until analysis is done. Section 2.4.5 has been added to describe surveying requirements.
12. Section 2.4.8
Samples for volatile organic analysis should not be composited.
- A. The section was renumbered to 2.4.9. The Sampling and Analysis Plan has been revised describing sampling procedures. Volatile organic samples will not be composited or homogenized.
13. Section 2.4.9
What groundwater treatment facility is this referring to?
- A. The section was renumbered to 2.4.10. The groundwater treatment facility refers to using a local POTW or on site treatment facility if available. The text in the Work Plan was not changed.
14. Section 2.6
Who will prepare monthly report to be submitted by NAS Memphis.
- A. This section has been modified to agree with the requirements of the Community Relations Plan. Monthly reporting is not required.
15. Section 7

The schedule has 5 days listed for sampling the excavation at SWMU 66 and the sampling and analysis plan states 5 samples will be obtained from the excavation, one of which is a duplicate. This allows one day per sample. This seems excessive.

- A. The schedule has been modified, changed to 2 days.
- 16. Same as above for SWMU 67. The time allotted seems excessive.
- A. The schedule has been modified, changed to 1 day.
- 17. One day each to seed SWMUs 66 and 67 seems to be an excessive amount of time.
- A. The schedule has been modified, however, the smallest unit of time that can be shown with this schedule format is 1 day.
- 18. The schedule lists the hazardous waste storage to begin on the day the drums are repacked. Is it more accurate to state the drums are unknown until the analysis is received. And the hazardous waste store begins when the contents are known to be hazardous.
- A. The regulations are not clear as to when the 90 day clock actually starts, however, based on experience with the federal regulations, it is our interpretation that the 90 storage clock starts when the waste is moved not when results from testing are obtained. This is also the more conservative approach. Ninety days after obtaining results is not always necessary to secure proper disposal.
- 19. The schedule lists no turn around time for analysis and goes straight into waste disposal approval.
- A. The schedule has been modified.
- 20. The schedule has 3 days to package nonhazardous waste, 3 days to collect recyclable material, and 1 day to repack drums. This should be more specific to reflect the categories discussed in Section 2, recyclable/solid waste/landscape/potentially hazardous.
- A. The schedule has been modified.
- 21. Section 8 - Section 8.2
Ends with the word "and" is more information missing from this section?
- A. The section has been modified, no important information was left out. The section has been removed as the number of on site personnel has changed.
- 22. Section 8 - Section 8.5
States the QC officer reports to the PMO, but PMO is not defined elsewhere in the text. Then on the next page, in the organizational chart, the name is changed to QA officer and the individual is shown in the chart to answer to the PM, not the PMO. Which is

correct?

- A. The titles have been made consistent, and abbreviations defined for clarity. The chain of command is shown in to organizational chart. PMO is defined in Section 8.1.

Appendix A - Site Specific Safety and Health Plan

23. Appendix A - Section 2.4.8

States the PWD on site will provide energy control services which will be coordinated by MK. What energy control services does this refer to? Also, this section state the job supervisor has responsibility for energy control, since the job supervisor was not previously defined, who is the job supervisor? The PM? The PE? The SSHO?

- A. Energy control services at the immediate work sites is not anticipated. However, we cannot discount the possibility of requiring energy control services if a utility run is found at the work site and isolation (lockout/tagout) may be required to safely complete the excavation and debris removal. Energy control services may be necessary if electrical supply to the temporary trailer involves tapping into the existing NAS Memphis system. If this is the case, the MK site superintendent would coordinate energy control services between the subcontractor and the Base PWD. The PWD would authorize and approve the hook-up along with temporary energy control measures during hook-up.

Job supervisor has been changed to site superintendent.

24. Appendix A - Section 3.3

Is titled "Job Supervisors", but in Section 8 of the Work Plan there was no description of a job supervisor. Is this another individual or one of the previously mentioned site workers?

- A. Job Supervisors have been replaced in the document with Site Superintendent.

25. Appendix A - Section 4.4

States the project supervisor is responsible for training, who is the project supervisor?

- A. Project supervisor has been changed to the Site Safety and Health Officer (SSHO).

26. Appendix A - Section 6.1

Refers to Tables 6-1, 6-2, and 6-3, and there are no tables corresponding to these numbers in the list of tables. It is assumed the missing tables correspond to tables 5,6, and 7, but table 7 has two different headers on the page titles, so the tables need to be corrected.

- A. Section 6 text changed to Tables 5, 6 and 7. Header corrected on pages 75 and 76 to read Table 7. Airborne Contaminant Response Criteria (continued).

27. Appendix A - Section 9.12

States personnel washing and shower facilities will be provided, this needs to be further

defined, such as where the water is coming from and if the shower will work off of pump or gravity. Please clarify and define.

- A. Details on the specifications for the shower/change room facilities is presented in the bid specification Section 01503, Part 2 Products paragraph 2.2. The shower/change room facilities and the washing facilities shall be equipped with sufficient water supply to provide adequate hot water for two 4 minute showers per worker per day at a flow rate of 3 gallons per minute. A sink is also required to wash respirators. Hot and cold water is also required for washing facilities. It is most likely the potable water supply will be delivered from another location on site and pumped into the facilities fresh water tanks and replenished as required. Electrical pumps are normally included with temporary or mobile decontamination facilities to distribute the water supply.

No change has been made to the document.

28. Appendix A - Section 14.0
States the SSHP is Appendix B, isn't the SSHP in Appendix A of the Work Plan?

- A. Reviewer is correct. It has been changed to Appendix A.

29. Appendix A - Table 1
Where is this mentioned in the text?

- A. Sentence has been added to Section 1.2 of SSHP document referring to Table 1. It was inadvertently left out.

30. Appendix A - Table 3
Need all contact names and numbers before any on-site work is performed.

- A. Agree, all names and numbers will be in place on Table 3. The only names and numbers missing are MK field staff personnel to include PM, SSHO, Project Controls and Quality Control. Subcontractor personnel name and number also need to be included. Selection of these personnel has not been finalized yet. The names and numbers list in Table 3 will be revised and provided at the NAS Memphis pre-construction meeting and posted according to the SSHP requirements before any work is performed.

Appendix B - Quality Control Plan

31. The QCP makes the entire submittal procedure unclear, much more clarity and definition is necessary.

- A. The QCP has been revised. The procedures for submittals is a reflection of the contract verbage. MK agrees the submittal process could be clarified further. Discussions with SouthDiv are on going for future work.

32. Why are the MK project engineer and SSHO not included in the quality control Meetings?

- A. The SSHO and the Project Manager will be at the QC meetings. No other MK personnel are expected on site. The SSHO will handle QC issues, and the PM will handle project engineer issues. The titles were confusing and have been changed to resolve this inconsistency.
32. Appendix B - Sections 2.1.1.2, 2.1.1.3, and 2.1.1.4
Refer to the SHSO survey, should this be the SSHO survey?
- A. The QCP and work plan were revised to be consistent.
33. On pages 5 and 6 are sections 2.1.1.1 - 2.1.1.8 numbered incorrectly?
- A. The sections are properly numbered.
34. Page 5, section 2.1.1.2 has the SHSO cited, should it cite the SSHO?
- A. It should be the SSHO, changes were made.
35. Section 3.1.1
Is the SQCS the same as the QC officer in Section 8 of the Work Plan?
- A. Yes, they refer to the same person. The documents were checked and changes made throughout the documents for consistency.
36. Figure 3-1
Does this chart correspond to the chart in section 8 of the Work Plan? And is the OC officer the same individual as the QA officer.
- A. Yes to both questions, changes were made to the documents to provide more consistency.
37. Section 4.3
States section 5.0 will "detail types and frequencies of test", there seem to be too many cross references throughout the QCP.
- A. The format of the document has not been changed, it was agreed upon with SouthDiv. However, as part of continuous improvement efforts, the format of the QCP will be reviewed and discussed with SouthDiv for future work.
39. Page 16 and 17 mention the Program Quality Manager, QC Manager, and SQCM, are these all the same person or separate individuals?
- A. Yes, they are the same person. Changes have been made to provide more consistency between documents.
40. Table 4-1
Is unclear, such as the mention of Applicable procedure (Section VII of QCP). Where is this section? And it lists QEP 8.1 and 6.1, where are these?

- A. These are MK standard procedures provided for reference, the missing QEPs have been included in the QCP. Table 4-1 was changed to refer to Section 7 of the QCP, this was in error and the entire reference should have been deleted.
41. Section 5
Refers to the text, then the text refers to the log. This section is hard to follow. Also, documents FIC SO-01 and FIC SO-04 are referred to, where are copies of these?
- A. Information added to the QCP. The text introduces the Testing Plan and Log which are required by contract.
42. Section 6
Refers to QEP 13.1, where and what is this? Also, should the SQCS referred to be the SQCM?
- A. QEP 13.1 is an MK standard and has been added in the QCP. The SQCS and SQCM are the same person. The report inconsistency has been corrected.
43. Section 7.0
Says Appendix A of the QCP provides specific forms to be used for documentation, these forms are not in QCP Appendix A.
- A. The forms were left out of the original submittal and also missed in the resubmittal. The forms will be provided with an addendum.
44. Section 8
Refers to Section 2.1 and the Introduction of the Work Plan as listing the definable features of work, neither section has this list. What is the section suppose to say? And What does it refer to? Please clarify.
- A. Section 2.1 has been revised to clarify. MK and SouthDiv are currently negotiating the requirements for the list and schedule for the definable features of work for delivery orders.
45. Quality Execution Procedure 4.1 is inconsistent with previous definitions of PM and introduces PjM. Please clarify. Also, where is QEP 4.1 referred to in the text? QEP 4.1 refers to attachments B and C, where are these located?
- A. The inconsistencies in defining project personnel have been resolved. QEP 4.1 has been added and includes the respective attachments. A revised version of QEP 4.1 has been issued and will be included as an addendum.
46. QEP 6.1 refers to exhibits and tables, where are these located?
- A. QEP 6.1 has been added. The exhibits and tables were missed in the original submittal and in the resubmittal. They were included in the copy of the QCP provided in the bid package sent out ot perspective subcontractors and can be included in an addendum.

Appendix C - Environmental Conditions Reports

47. What new information does this appendix offer, everything stated is already in the Work Plan?
- A. The plan has been revised to eliminate redundant information, the photos are still provided for information.

Appendix E - Waste Management Plan

48. Section 3.0
Is the stockpiled soil hazardous? If the soil is hazardous, this could become an unpermitted waste pile.
- A. Reference to stockpiled soil has been removed, all excavated soil will be placed in lined roll off containers until analytical results are obtained for proper disposal. This section has been changed.
49. Section 4.0
If the groundwater is nonhazardous, does it need to go to an off-site disposal facility?
- A. No, this section has been modified.
50. Section 5.0
Decon water should be stored in closed-top drums, not open-top. The decon water goes from drums to a tanker truck, how much decon water is estimated to produced? And will a tanker truck be necessary? Also, the off-site disposal options for the decon water are only necessary after the waste is found to be hazardous, if nonhazardous, other options may be available.
- A. Section 5.0 was renumbered to Section 2.2. It was revised to incorporate comments, including specifying closed top drums, however, DOT regulations do no prohibit the use of open top drums for transporting liquid waste.
51. Section 6.0
The PPE may need to be sampled if hazardous waste was handled and the PPE contaminated.
- A. Samples are not necessary, if hazardous waste is found on site, the PPE should be disposed with the waste. It is impractical to take a TCLP sample of PPE because of the volume required to make a 100g sample. The section was renumbered to 2.3.

Appendix G. Sampling and Analysis Plan

52. There is no mention of asbestos sampling for the floor tiles referred to in Work Plan Section 1 and 2.4.5.2. Does asbestos sampling need to be included in the SAP?

- A. Asbestos sampling has not been added to the SAP.
53. Section 2.1
Refers to the HASP, is this suppose to be the SSHP? And Table G-2 is referred to where is this table?
- A. Reference to the HASP has been changed, the documents have been checked for consistency and changes made where appropriate. Table has been included in the SAP.
54. Section 2.1.1
There is no mention of trying to perform a field hazardous categorization of drum contents before sending samples to the lab. Does this mean an individual sample from every drum will be submitted for the listed analysis?
- A. It is assumed that each drum will require characterization for disposal, however, field characterization will be performed as practical to minimize the sample requirements.
55. In sections 2.2.1 and 2.2.2, what reference was used for the proposed sampling formulation? Will the samples be from areas where soil was removed or from the grid intersections? Will any samples be obtained in areas that were not excavated? Will the grids be surveyed or rough in the field?
- A. The reference to creating grids has been removed as it does not apply. Worst case sample locations including under drums and in low lying areas will be sampled. The number used is an estimate based on knowledge of the size of the site.
56. Section 2.2.2
Lists SWMU 67 as 140 feet by 100 feet, then as 150 feet by 100 feet, which is correct?
- A. The inconsistency has been clarified, based on additional information the site is described as having 2 piles, one is 100 feet by 100 feet and the other is 10 feet by 20 feet.
57. Section 2.6
Are daily equipment rinse blanks necessary? Weekly blanks are suggested.
- A. Soil sampling is only expected to require one day for each site, equipment blanks should be taken on each sampling day. Also per NEESA requirement.
58. Section 5.1
Refers to a Field Manager, who is this individual? Sampling wells and boreholes are discussed, these are not mentioned elsewhere in the report. Please clarify.
- A. The references have been removed.
59. Section 6.3
If the decon water is non-hazardous does it need to go offsite?

- A. Non hazardous decon water does not have to go off site, the reference has been removed.
- 60. Section 6.4
If some of the on-site waste is hazardous, will the PPE need to be sampled for disposal purposes?
 - A. Samples are not necessary, if hazardous waste is found on site, the PPE should be disposed with the waste. It is impractical to take a TCLP sample of PPE because of the volume required to make a 100g sample.

Appendix H - Chemical Data Acquisition Plan

- 61. The QCP is referred to as the QA/QC Plan, this needs to be clarified.
 - A. Inconsistency changed to QCP throughout documents.
- 62. MK Project Chemist is referred to for the first time, who is this individual?
 - A. The project chemist referred to in Data Management Plan will be the individual designated to review the incoming data, will be designated by the Project Manager.
- 63. Table 1
There are no notes explaining the superscript number in the table.
 - A. Subscripts removed.

**MARK TAYLOR
COMMENTS FOR MEMPHIS WORK PLAN**

General

1. The title of the document should be "Interim Measures Work Plan for SWMUs 66 and 67" in accordance with OSWER directive 9902.4
 - A. The title has been changed to be more specific.

Specific

Appendix E

2. Section 1.0
Add a bullet
 - Waste Disposal
- A. Comment incorporated

Appendix G

3. Table G-1
For drum samples, just analyze for hazardous waste characterization i.e. ignitability, corrosivity, reactivity, and TCLP.
 - A. Change made to analyze only for disposal characteristics.

**JAMES WORTHY
COMMENTS FOR MEMPHIS WORK PLAN**

Specific

1. Section 2.0 - Paragraph 2.1
Add "40 CFR 263, Standards Applicable to Transporters of Hazardous Waste"
 - A. Incorporated
2. Section 2.0 - Paragraph 2.2
Please differentiate between "hazardous materials" and "hazardous wastes". Will transportation of "hazardous materials" be involved?
 - A. Incorporated
3. Section 2.0 - Paragraph 2.2
Why would you want to make notification to the state for hazardous waste generation on a facility that has a permit? The notification has been made, unless this is an additional HSWA requirement
 - A. Reference to additional notification has been deleted.
4. Section 2.0 - Paragraph 2.4.1 and 2.4.2
I recommend against "stockpiling" of visually contaminated soil. Stockpiling of soil may trigger LDRs.
 - A. Changed to storage in lined roll off containers.
5. Section 2.0 - Paragraph 2.4.5.4
Triple rinsing is not necessary for "empty" drums, unless the drums contained a P-listed waste.
 - A. The text has been changed as follows:
"40 CFR 261.7(b) defines an empty drum as a drum which contains less than one inch of material or 3 percent by weight of its capacity. Empty drums and tanks shall be screened using a photoionization detector (PID) and visually inspected. If PID levels above background are detected, the empty drums and tanks shall be moved to a temporary staging area where they will be rinsed with a solution of detergent and water. Drums shall be triple rinsed if acute hazardous wastes listed in 40 CFR Part 261.31, 263.32 or 261.33(e), are suspected (i.e., labeling). Where no hazardous wastes are detected or suspected, the drums shall be crushed and staged for salvage. All rinseate shall be collected. After rinsing, the empty containers shall be screened and rinsed again, if necessary. When "clean," the drums shall be crushed for salvage."

6. Section 2.0 - Paragraph 2.4.5.4
Hazardous waste and hazardous material is used interchangeably. Please specify one or the other.

Ensure state regulators will not require investigation of the site where the 90-day area will be constructed. Ensure daily inspection records and a contingency plan are maintained at the 90-day area.

- A. Hazardous materials have been changed to hazardous waste where appropriate.

The reference to a site investigation needs more discussion with the regulators. It should be addressed when the regulators review the Work Plan. Inspection records and a contingency plan will be maintained if necessary.

7. Section 2.0 - Paragraph 2.4.6
Why place the excavated soil in a bermed area for sampling? Why not place into roll-off for sampling? Why not place into roll-off for sampling? Reason: Suspect HW should be treated as HW until proven otherwise.

- A. Comment incorporated.

Appendix E

8. Who will sign hazardous waste manifest? Whose EPA ID number will be used? IF NAS ID number is used, NAS personnel must be contacted to determine who will sign the manifest.

- A. NAS Memphis ID will be used. NAS Memphis will be contacted for responsible individual

9. Appendix E - Section 3.0
See previous comment on stockpiling.

- A. Comment resolved earlier.

10. Appendix E- Section 5.0
Decontamination water should be sampled, analyzed and characterized prior to transportation off-site. The water may be a hazardous waste.

- A. Comment incorporated.

11. Appendix E - Section 6.0
The PPE should be sampled, analyzed, and characterized like all other solid wastes generated during this work plan.

A. It is not necessary to sample the PPE, the PPE will be disposed of as hazardous waste if hazardous waste is found on site.

12. Appendix E - Section 7.0
Define "NAS Memphis Officer"

A. The NAS Memphis Officer refers to the designated NAS personnel, either the ROICC or the environmental officer as specified by NAS Memphis. This will be defined at the pre-construction site orientation meeting.

**CONNIE MERTING
COMMENTS FOR MEMPHIS WORK PLAN**

General

1. Table 2
Toluene OSHA PEL of 100 ppm STEL of 150 ppm
 - A. The referenced CFR, reference 5 in Section 1.4 of SSHP, along with the latest revision dated July 1, 1994 have exposure limits established for toluene as 200 ppm 8 hour TWA and the acceptable ceiling as 300 ppm. The acceptable maximum peak above the acceptable ceiling concentration for an 8 hour shift is 500 ppm for 10 minutes. The NIOSH Pocket Guide (reference 4 in Section 1.4 of SSHP) has the exposure limit listed as 100 ppm TWA and the short term exposure limit as 150 ppm. The ACGIH TLV handbook (reference 6 in Section 1.4 of SSHP) and the 1994-95 edition has the TLV-TWA listed as 50 ppm and no STEL is established. For conservatism, Table 2 value for toluene has been revised to 50 ppm.