Explosive Ordnance Safety

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U.S. Army Corps of Engineers
Engineering & Support Center, Huntsville

Explosive Ordnance Safety

The U.S. Army Corps of Engineers Engineering & Support Center, Huntsville is currently the Ordnance and Explosives Center of Expertise (OE CX) and Design Center. In this capacity, it is committed to the safe management of all unexploded ordnance found at active installations or formerly used defense sites across the country. Especially important in this mission is ensuring public safety through education and awareness programs.

Explosive ordnance includes:

- Bombs
- Artillery projectiles, rockets, mortars
- Land mines and grenades
- Guided missiles
- Torpedoes and depth charges
- Flares and pyrotechnic devices
- Bulk explosives and propellants

Unexploded projectile

Ordnance collected from a former firing range as "souvenirs".

The key thing to remember when dealing with explosive ordnance, is that it was designed to destroy materiel and kill or maim people. Regardless of its age explosive ordnance retains its lethality.

Explosive ordnance may be found in virtually any location where defense activities have taken place. In fact, the majority of the explosive ordnance that has been found was manufactured between 1914-1953. Even the Civil War era ordnance being found can be just as deadly as it was the day it was manufactured.

Explosive Ordnance Safety

With age, some of these items become more sensitive to movement. Military explosives are designed to withstand long periods of storage under varied and often unfavorable conditions. Depending on climatic and soil conditions the ordnance may appear to be brand new or rusty and deteriorated. In either situation, these ordnance items can detonate if handled.

Historically, a 10% dud ratio was anticipated for explosive ordnance, which accounts for much of the unexploded ordnance at defense sites where training was conducted. Sites which were used as practice ranges for artillery are especially dangerous.

Training and practice ammunition can contain some type of spotting charge which simulates explosive impact. The spotting charge can vary from a few grains of black powder to several pounds of high explosives. NEVER assume that practice means inert. Even the least sensitive explosives may detonate if exposed to careless and improper handling.

The cardinal rule that is observed by professional ordnance response teams in any location or operation involving the potential for explosives or ammunition is to limit exposures to a minimum number of personnel, for a minimum amount of time, consistent with safe and efficient operation. Leave ordnance handling to the professionals.

An unfired projectile with case

Chemical filled land mine

For anyone else, the rules are:

- NEVER APPROACH a suspected explosive ordnance item.
- AVOID THE AREA where unexploded ordnance is located.
- NEVER ATTEMPT TO MOVE OR DISTURB explosive ordnance.
- NEVER ATTEMPT TO DISASSEMBLE any explosive ordnance item.
- NEVER TRANSMIT radio signals near explosive ordnance.
- REPORT ORDNANCE to authorities (law enforcement, fire department, etc.)

If you locate anything that looks like it might be explosive ordnance or if you have a "war trophy" that you suspect might be live, report it to local law enforcement. They know how to contact the experts. Leave the explosive ordnance handling to the professionals. It takes trained experts to make assessments of these situations and to remove any explosive hazard.

NEVER

TOUCH, REMOVE, OR DISTURB ANY ORDNANCE OR SUSPECTED ORDNANCE ITEMS

FUDS

Cleaning Up Formerly Used Defense Sites

The Defense Environmental Restoration Program includes the provisions for cleaning up Formerly Used Defense Sites (FUDS). This comprehensive program is dedicated to the goal of removing environmental contamination at sites formerly owned, leased, possessed, or otherwise under the jurisdiction of the Department of Defense at the time of their contamination.

FUDS are found in every part of the United States and its territories. Many of the sites are now schools, recreation areas, farmlands, residential areas, and commercial properties. Because of the potential risks to the public at FUDS, Congress gave the Department of Defense its authority for cleaning up these sites by establishing the Defense Environmental Restoration Program (DERP) in 1986.

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Formerly Used Defense Sites

The U.S. Army Corps of Engineers
Ordnance and Explosives Center of Expertise & Design Center

Formerly Used Defense Sites (FUDS)

The Goals of FUDS cleanup include the following:

- Identification, investigation, and removal of hazardous waste contamination.
- Correction of other environmental damage; such as, detection and disposal of unexploded ordnance
- Demolition and removal of unsafe buildings and structures.

To be eligible for cleanup under the FUDS program, a site must have been owned, leased, or possessed by the Department of Defense, or under its jurisdiction at the time the contamination occurred. The hazards must be the result of defense-related activities at the site.

Examples of sites which are ineligible for cleanup under FUDS include cemeteries, areas outside United States jurisdiction, Corps of Engineers civil works sites, sites contaminated by acts of war, and areas without historical records.

Program Management

The U.S. Army Corps of Engineers is the Department of Defense Executive Agent for the FUDS program. Headquarters, U.S. Army Corps of Engineers, develops the overall FUDS program policies and provides funding to the geographic Corps districts and divisions who will perform the FUDS cleanup.

Funding is established according to the priority of the sites being considered for cleanup. Sites which present the greatest potential risk to human health are assigned the highest priority.

Cleanup efforts have no predefined time limits. Every FUDS action is unique, and the duration of the cleanup project depends on several factors, such as:

- Size of the project site
- What activities are required
- How much funding is available

Phases/Public Involvement

The FUDS program is implemented in three major phases:

- Inventory Phase — reviewing historical records for the site to determine FUDS eligibility and to determine the severity of the potential environmental problems.
- Study Phase — conducting a site visit and contamination evaluation to define the types of hazards that exist and, through stakeholder consensus, recommend cleanup alternatives.
- Response — removal, neutralization, and remediation of the site hazards. (Removals may be performed during any phase, if warranted.)

The FUDS cleanup is complete when a post-cleanup inspection verifies that contamination reduction goals developed by the stakeholders have been reached.

The key to successful FUDS cleanup is the teamwork between the Corps, Federal and State/local regulatory agencies, and the local community. Public meetings, workshops, and personal contacts provide valuable information to the project's decision-makers. Feedback to the public is provided through public awareness programs and publication of project documents for public review and comment. In many communities, a Restoration Advisory Board is established to review the progress of the FUDS project and to provide additional communication between the Corps and the community. This board is jointly chaired by representatives from the Corps and the local community.

If you ever find anything that looks like it might be explosive ordnance or explosive munitions, or if you have an ordnance "souvenir", report it to the local law enforcement officials. They will be able to supply experts to make a safe determination of the risks you might be facing. Above all, use prudent judgement and remember ...

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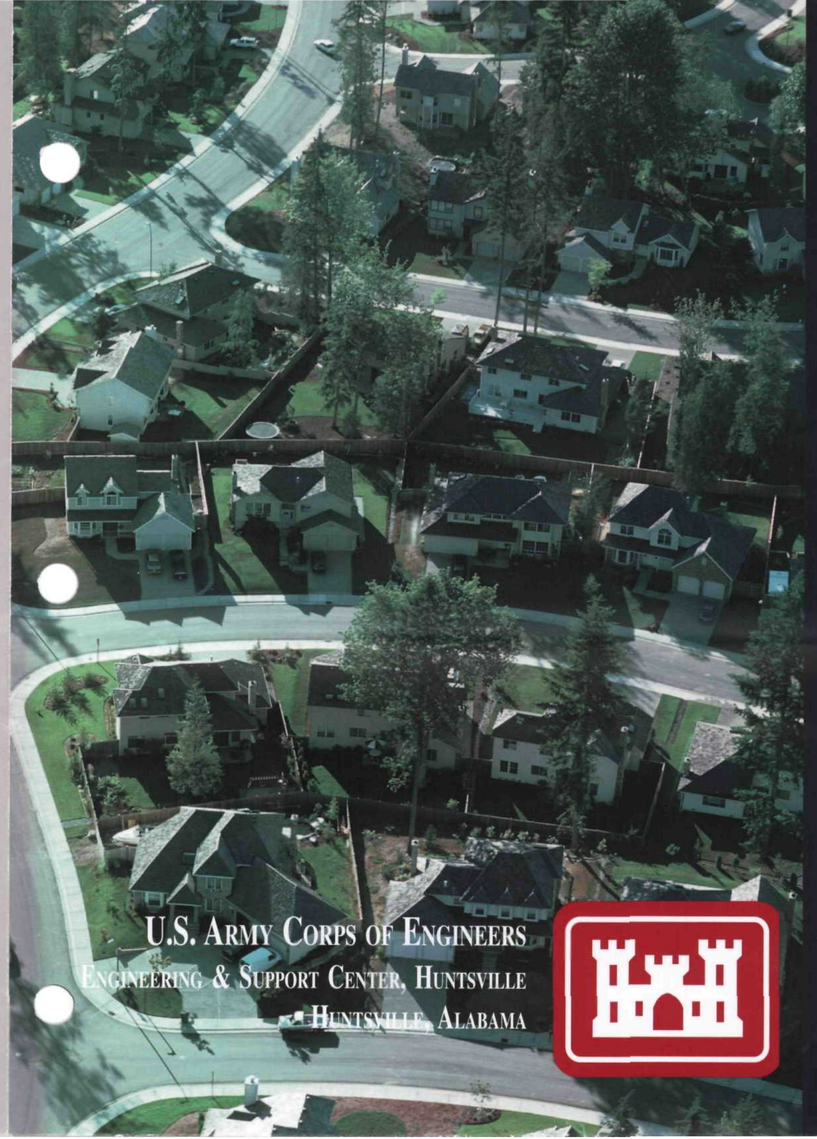

Ordnance and Explosives Center of Expertise & Design Center

U.S. Army Corps of Engineers

Engineering & Support Center, Huntsville

Huntsville, Alabama

Meeting the Challenge — In Excellence and Expertise of Ordnance & Explosives

MISSION: To eliminate or reduce the imminent danger to the public that is posed by ordnance and explosives at current or formerly used defense sites through education, OE response, and quality assurance.

Ordnance and explosives hazards exist throughout the nation on both formerly used sites and active Department of Defense installations. In 1990, the Huntsville Center of the U.S. Army Corps of Engineers was designated as the Ordnance and Explosives Center of Expertise (OE CX) and Design Center to meet the goals of the Defense Environmental Restoration Program and the Base Realignment and Closure Acts. These goals are to:

- Reduce risk to the public through response actions for sites containing ordnance and explosives
- Execute response actions with minimum risk to the persons performing the on-site actions
- Provide advice to Corps Headquarters and to the Corps districts and divisions who will actively participate in the management of ordnance response projects
- Maximize project acceptance through open, participatory decision making.

The OE CX and Design Center is called upon to provide support services under three major categories of ordnance response programs:

- Formerly Used Defense Sites (FUDS)
- Installation Restoration/Base Realignment and Closure (IR/BRAC)
- Other Sites (where the expertise of the CX and Design Center is necessary to manage the risks associated with environmental problems)

While all three have similar end results, the processes, schedules, and priorities can be very different.

Partnering

Partnering is the concept employed to manage all OE projects. It has proven to be successful beyond expectations.

The OE CX and Design Center acts as technical manager for each project.

- Provides technical expertise
- Brings the huge experience base necessary to accurately identify and evaluate ordnance hazards
- Response recommendations are derived from past successes

The Corps District Office acts as the project manager for projects in its geographic area, providing better support due to:

- Familiarity with the local area and the members of the community —enhances public participation and communication
- Local presence — provides better response, direction, and coordination of the project

Ordnance and Explosives Center of Expertise & Design Center Organization

The OE CX and Design Center is a single organization composed of two separate entities:

- The Center of Expertise, which provides technical advice, procedural guidance and criteria, and quality assurance.
- The Design Center, which carries out most of the project execution activities.

The OE CX and Design Center together perform their duties using the elements of three major groups:

- OE TEAM: Project safety, planning and design, ordnance identification and characterization, technical assistance for response efforts.
- ENGINEERING DIRECTORATE: Civil and environmental engineering support, mapping, cost estimating, Geographic Information System, database maintenance for life cycle project management.
- CONTRACTING DIRECTORATE: Contracting support.

Ordnance and Explosives Innovative Technology Program

The OE CX and Design Center is constantly searching for innovations that can improve response and remediation of ordnance and explosives cleanup projects. The Innovative Technology Advocate monitors other Government agencies and private industry to identify technology that could improve existing processes for:

- Ordnance and explosives assessment
- Removal methods and procedures
- Treatment of OE materials

The goal of the OE Innovative Technology Program is to promote the application and integration of existing technology across all phases of the ordnance and explosives cleanup mission to:

- Maximize efficiency,
- Reduce costs, and
- Maintain the highest possible degree of public and worker safety .

Ordnance and Explosives Center of Expertise & Design Center Responsibilities

The OE CX and Design Center is the primary source of assistance to Headquarters, U.S. Army Corps of Engineers, for all phases of ordnance response, including prioritizing, assessment, and removal.

The CX provides technical advice and services to the Department of Defense Explosives Safety Board, the Surgeon General, and the Corps districts and divisions with ordnance project management responsibilities. Other responsibilities include:

- Developing and implementing criteria for site-specific equipment selections
- Developing technology assessment criteria
- Developing and maintaining quality assurance oversight procedures for ordnance design and removal activities
- Evaluating technical adequacy of statements of work and work plans
- Establishing safety procedures to ensure maximum public and worker safety during all phases of OE response.

The Design Center has several unique responsibilities:

- Identifying the locations and levels of risk for ordnance, explosives, and chemical warfare materiel nationwide
- Removing the imminent ordnance, explosive, and chemical warfare materials hazards at defense sites
- Cleaning up and closing out OE projects at defense sites
- Providing ordnance response services, upon request, at active and closing installations, and construction or Superfund sites

One of the most important responsibilities during any OE project is keeping the public informed about the sites in their geographic area. This is accomplished through the joint efforts of the Corps District offices and the Army's Public Affairs office. When an ordnance and explosives-contaminated site is discovered, it is critical that the public is made aware of:

- The potential dangers of exposed ordnance (including ordnance "souvenirs"), and
- How the response to the site will affect their community.

Future Challenges

The future holds many challenges for the CX and Design Center. In an era of austere budgets and programmatic cutbacks, it will continue to be necessary to "do more with less." Tomorrow challenges include:

- Safe and effective management of ordnance response projects.
- Developing a more quantifiable measure of acceptable risk at ordnance cleanup sites.
- Standardizing fund allocations within specific programs for new budget levels.
- Completing the development of a new technology to accurately locate buried ordnance.
- And many more. . .

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Policies and Procedures Development

Among the policies and procedures that have been developed out of the partnership between the OE CX and Design Center and Corps Headquarters are:

- Standing Operating Procedures (SOPs)
- Statements of Work for contract specifications
- Site safety and health plans
- Work standards for unexploded ordnance contractors
- Procedural requirements for archives searches
- Procedural requirements for the Administrative Record
- Procedures for time-critical removal actions
- Safety submission policy and procedures
- Removal action planning documents
- Quality Management Plan
- System Safety Management Plan
- Procedures for establishing and conducting Restoration Advisory Boards

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- The potential dangers of exposed ordnance (including ordnance "souvenirs"), and
- How the response to the site will affect their community.

Training

A vital part of ordnance and explosive removal actions is training everyone who is exposed to the hazards at the cleanup site. This responsibility is shared by the CX and the Design Center, and it is being accomplished with great success:

- A Strategic Training Plan is in place to define the courses needed and to identify the Corps members who must attend
- Training programs are developed and presented as new capabilities are introduced to the staff.

Internal training programs are developed and presented to site project managers to help them understand environmental projects.

External training programs are developed and presented to the public for awareness and information.

If you ever find anything that looks like it might be explosive ordnance or explosive munitions, or if you have an ordnance "souvenir", report it to the local law enforcement officials. They will be able to supply experts to make a safe determination of the risks you might be facing. Above all, use prudent judgement and remember ...

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Formerly Used Defense Sites

Rising To The Challenge- Cleaning Up Formerly Used Defense Sites

One of the major components of the Defense Environmental Restoration Program involves the cleanup of Formerly Used Defense Sites, more commonly known as FUDS. The goals of this cleanup program are to:

- Identify, investigate, and remove hazardous waste contamination;
- Correction of other environmental damage; such as, the detection and disposal of unexploded ordnance; and
- Demolish and remove unsafe buildings and structures on most former Defense properties.

Generally, all property that the Department of Defense once owned or used, but no longer controls, may fall under the jurisdiction of FUDS. This includes most property formerly controlled by the Army, Navy, Air Force, or other Defense agencies, within certain eligibility limits. Many formerly used defense sites are presently colleges, residential areas, parks and recreational areas, farmlands, or industrial areas.

Cleaning up these sites must obviously be given a high priority. In fact, Congress recognized the need for protecting the public and the environment from the contamination generated by past and present defense activities. This awareness led to the establishment of the Defense Environmental Restoration Program.

Acting in compliance with DERP, the Department of Defense is committed to correcting the environmental damage, and hazards caused by activities at any time in its history.

Corps Involvement

The U.S. Army Corps of Engineers is chartered with the responsibility for environmental restoration services under the FUDS Program.

The Corps' FUDS mission is to provide for environmental restoration of sites formerly owned, leased, possessed, or otherwise under the jurisdiction of the Secretary of Defense at the time of the environmental contamination of the sites.

FUDS Eligibility

The list of potential sites that could be included in FUDS is limited by the eligibility requirements of the laws that enacted the Defense Environmental Restoration Program. Eligible sites must include one of the following criteria :

- have been owned, possessed, or leased by the Department of Defense, or otherwise under its jurisdiction (NOT a currently active installation or one slated for closure);
- possess hazardous conditions created as a result of past defense activities;
- be within the jurisdiction of the United States;
- be a manufacturing facility once owned or leased by the Department of Defense and operated by contractors;
- be a former Department of Defense sites now under the jurisdiction of the National Guard or Reserve;
- closed installations where the Department of Defense, at one time, disposed of materials or waste.

Ineligible sites include:

- ones where the current owners have used contaminated facilities or buildings, or spent money to clean up contamination or debris, and
- cemeteries, recruiting centers, United Services Organization (USO) facility, or U.S. Corps of Engineers civil work site.

Program Management

Headquarters, U.S. Army Corps of Engineers, is the overall program manager for the FUDS program. It is charged with:

- Developing policies for FUDS activities based on Department of Defense guidance
- Distributing necessary funds to Corps divisions and districts who will conduct the FUDS cleanup activities

Work is accomplished on a priority basis where the worst sites are cleaned up first. The "worst sites" are typically those in areas with the greatest potential danger to the public — where people live, work, or go to school.

Projects may be completed within two to ten years. The time required for completion of the cleanup depends upon several factors:

- The size of the site
- The overall quantity of contaminants
- The kind of activities which must be conducted
- The level of funding provided
- The number of post-cleanup activities that are required

FUDS Projects

Typical cleanup projects at FUDS fall into three general categories:

1 - Cleanup and Removal of Hazardous, Toxic, and Radioactive Waste

Containerized Hazardous, Toxic, and Radioactive Waste Projects:

- Underground and above ground storage tanks, drums, and electrical transformers

Other Hazardous Substances and Wastes:

- Contaminated landfills
- Contaminated soil
- Contaminated groundwater

2 - Building Demolition and/or Debris Removal

Structural Hazards

- Unsafe buildings over six feet tall
- Unprotected openings in a roof or elevated floor
- Deteriorated mortar or loose bricks on chimneys or stacks

Cave-in or Engulfment Hazards

Falling Hazards

- Open pits, manholes, silos, wells, or shafts
- Open sided platforms or floors more than 6 feet above a lower level

Climbing Hazards (more than 10 feet tall)

Drowning Hazards

- Swimming pools
- Underground missile silos
- Underground tanks

Unsafe Debris

3 - Ordnance and Explosives Identification and Removal

Explosive Ordnance

- Bombs
- Artillery projectiles, mortars and rockets
- Land mines and grenades
- Guided missiles
- Torpedoes and depth charges
- Flares and pyrotechnic devices
- Bulk explosives and propellants

Public Involvement

No two FUDS projects are ever the same, but one constant remains — success depends upon an effective partnership between the Corps, the environmental regulatory agencies, the property owners, and the public.

Throughout the decision-making and cleanup processes, public concerns and values are important considerations. The methods used to achieve the maximum public involvement include:

- Meetings
- Workshops
- Brochures
- Tours of the site

In many communities, a Restoration Advisory Board is formed to review the progress of projects at the FUDS and to maintain open lines of communication with the public. The Restoration Advisory Board is jointly chaired by a member of the FUDS project manager's staff and a representative from the community. The board membership includes representatives from the Corps of Engineers, the U.S. Environmental Protection Agency and/or the State regulatory agency, and the local community.

Most of the project documents regarding decisions, schedules, and activities on the FUDS project are provided for the public to review at libraries, the courthouse, schools, or other convenient community locations.

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Unsafe Debris

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  Torpedoes and depth charges
- Flares and pyrotechnic devices
- Bulk explosives and propellants

Chemical Warfare Materiel

Program Phases

The FUDS Program has three major phases, which follow from the overall Defense Environmental Restoration Program:

Inventory

Determine Site Eligibility

- Search records to verify previous Department of Defense ownership or usage
- Evaluate current site conditions to verify site is FUDS-eligible

Determine Need for Cleanup

- Evaluate severity of environmental problems

Study

Determine Level of Contamination

Select Environmentally-Safe Cleanup Method

Identify Other Potentially-Responsible Parties

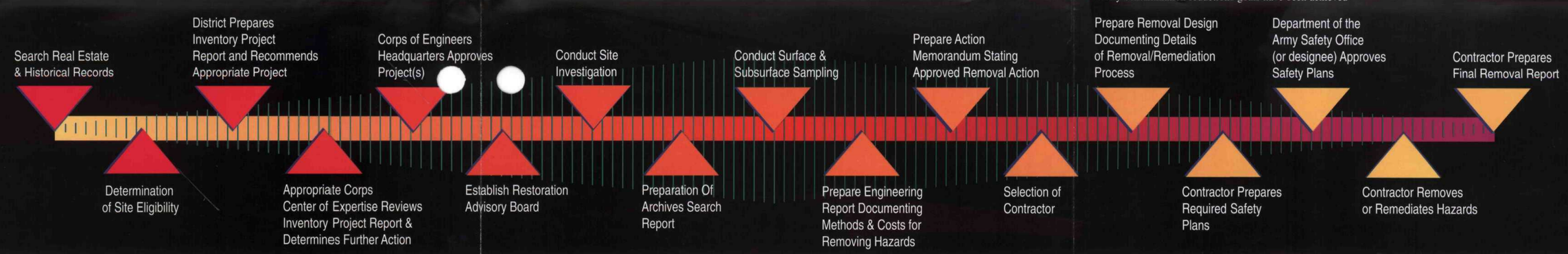
Removal/Remediation

Produce Engineering Design Implementing Selected Cleanup Method

Conduct Cleanup Activities

- Remove or neutralize contamination or hazards
- Implement monitoring program

(Removals may be performed during any phase, if warranted)

Conduct Post-Cleanup Inspection

- Verify contamination reductions goals have been achieved