

**EXPLANATION OF SIGNIFICANT DIFFERENCE
OUTDOOR SOIL REMEDIATION
ARMY MATERIALS TECHNOLOGY LABORATORY
WATERTOWN, MASSACHUSETTS**

12 JANUARY 1998

Introduction

This document provides members of the community with an explanation of a modification that was made to the selected remedy for soils described in the Proposed Plan and Record of Decision (ROD; September 1996) for the Army Materials Technology Laboratory (MTL) in Watertown, Massachusetts. The modification described below pertains only to Zones 1, 2, and 4 within the 37 acres of MTL bounded between North Beacon Street to the south and Arsenal Street to the north.

After summarizing the history of the MTL facility, this document reviews the selected remedial action alternative described in the Proposed Plan and Record of Decision and provides details about the modification to the selected remedy. This process of documenting differences in the remedial action is known as an Explanation of Significant Difference (ESD).

Legal Authority

This ESD document has been written to meet the requirements in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117 (c), the National Contingency Plan (NCP), and U.S. Environmental Protection Agency (USEPA) guidance which states that if the lead agency determines that differences in the remedial action significantly change, but do not fundamentally alter the remedy selected in the Record of Decision (ROD) with respect to scope, performance, or cost, the lead agency shall publish an explanation of the significant differences between the remedial action being undertaken and the remedial action set forth in the ROD and the reasons such changes are being made. Under CERCLA and the MTL Federal Facility Agreement, the Department of the Army is the lead agency for the soil remediation at MTL; and the USEPA and the Commonwealth of Massachusetts Department of Environmental Protection (MADEP) are oversight agencies.

This ESD will become part of the Administrative Record file for MTL. The Administrative record file is a collection of documents that form the basis for the selection of an environmental response action. Both the ESD and the administrative record file are available for public review at the Watertown Free Library and the MTL installation.

History of MTL

The Watertown Arsenal was established in 1816 by President James Madison and was originally used for the storage, cleaning, repair, and issue of small arms and ordnance supplies. During the 1800s, this mission was expanded to include ammunition and pyrotechnics development; materials testing and experimentation with paint, lubricants, and cartridges; and development/testing of breech-loading steel guns and cartridges for field and siege guns. The mission, staff, and facilities continued to expand until after World War II, at which time the facility encompassed 131 acres, including 53 buildings and structures, and employed approximately 10,000 people. In 1960, the U.S. Army's first materials research nuclear reactor was completed at the Watertown Arsenal, and it was used actively in molecular and atomic structure research activities until 1970 when it was deactivated.

Arms development and testing continued at the facility until an operational phase-down was initiated in 1967. At the time of the phase-down, much of the Watertown Arsenal property was transferred to the General Services Administration (GSA), and in 1968 approximately 55 acres were sold to the town of Watertown and subsequently used for the construction of apartment buildings, the Arsenal Mall, and a public park and playground. Of the 47.5 acres retained by the Army, 36.5 acres became the Army Materials and Mechanics Research Center (AMMRC), which was designated a historical landmark by the American Society of Metals in 1983. The facility discontinued operations on 29 September 1995 and has since reverted to caretaker status.

In 1988, the site was placed on the Base Realignment and Closure (BRAC) list. The site was also first listed in January 1987 by MADEP as a Location-To-Be-Investigated (LTBI). Investigations relating to facility closure started in 1988. These investigations were performed in accordance with the Massachusetts Contingency Plan (MCP) with MADEP oversight. On 30 May 1994 the site was placed on the National Priorities List (NPL) under CERCLA, commonly known as the Superfund Program. As a result, there has been a division of regulatory authority between MADEP and the USEPA (Region I). The USEPA, is the regulatory authority over the Soil and Groundwater Operable Unit for the facility, to which this ESD is applicable.

In July 1992, the U.S. Army Corps of Engineers (USACE) began decommissioning the research reactor and the depleted uranium facilities. The reactor building (Building 100) and Building 241 were completely removed and an extensive cleanup of depleted uranium was completed in Buildings 37, 39, 43, 97, 292, 311, 312, and 313. The bulk of the cleanup was performed by the summer of 1993, and by 1995 the radiological decontamination and decommissioning of MTL was completed. The U.S. Nuclear Regulatory Commission terminated the reactor license in September 1993, and the remaining facility licenses were terminated in July 1997.

In September 1996, the Record of Decision (ROD) was signed for the remediation of soil throughout the site. The contingency remedy outlined in the Proposed Plan, which was excavation and off-site disposal/reuse, was selected for the twenty (20) soil areas identified for

remediation. Remedial activities at these identified areas on the 37 acres were performed between November 1996 and November 1997.

Remedial Investigation Results

The Remedial Investigation Report defined the nature and extent of contamination at the site. The remedial investigation for the Soil and Groundwater Operable Unit consisted of surface soil sampling, as well as the advancement of soil borings and the installation of monitoring wells for subsurface soil and groundwater sample collection. Soil sample analysis results indicated that polycyclic aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyl compounds (PCBs) were present on the site, primarily in shallow soils. The *Baseline Risk Assessment of Human Health Effects* (presented in the *Phase 2 Remedial Investigation Report*; May 1994) indicated that some of the detected soil contaminant concentrations posed a risk to human health.

Due to this risk, clean-up alternatives to remediate the soils were developed in the Feasibility Study (FS; January 1996) and were detailed in the Proposed Plan (April 1996). The Proposed Plan put forth the Army's preferred alternative (on-site chemical oxidation) and a contingency remedy (excavation and off-site reuse/disposal). Following issuance of the Proposed Plan, in-situ (via soil borings) Toxicity Characteristic Leaching Procedure (TCLP) sampling and analysis was conducted at several locations throughout the site. Analytical results indicated TCLP toxicity (and therefore hazardous waste classification) at only one of the locations sampled (based on TCLP results for lead). Therefore, the original costs for the excavation and off-site reuse/disposal alternative detailed in the FS were adjusted downward to account for a lesser volume of TCLP hazardous soil than originally anticipated.

Due to this adjustment, the total cost for excavation and off-site reuse/disposal became equivalent to the cost for the preferred alternative documented in the Proposed Plan (on-site chemical oxidation). In addition, the implementation duration of the excavation and off-site reuse/disposal alternative was found to be approximately one year shorter than for on-site chemical oxidation. Therefore, between issuance of the Proposed Plan (April 1996) and the ROD (September 1996), the U.S. Army's preferred remedial alternative for the soils was revised from on-site chemical oxidation to excavation and off-site reuse/disposal. Both the USEPA and the MADEP concurred with the selected remedy detailed in the September 1996 ROD, and it was further supported by the former Watertown Arsenal Reuse Committee (now known as the Watertown Arsenal Development Corporation) and the Restoration Advisory Board (RAB).

Summary of the Selected Remedy for Soil Remediation

The U.S. Army's selected remedy for soils at MTL consists of the excavation and off-site reuse of the soils for beneficial use as landfill daily cover or as aggregate mix for asphalt batching. Based on the RI results, areas of MTL were identified for excavation. Excavation work at all of the areas on the 37 acre parcel and 2 of the 5 areas in the 12-acre River Park has been completed. Soil samples were collected from the excavations for laboratory analysis to confirm that identified soils above the risk-based clean-up goals were removed. The excavations were

backfilled using clean borrow material obtained from an off-site source. Site restoration and transportation/disposal activities were completed in December 1997.

Soil clean-up goals were established for different zones at MTL based on the intended future use of particular areas of MTL. The clean-up goals were developed to provide for a future mixed use of the site, including residential, commercial, and recreational scenarios.

The Need for an ESD

Soil clean-up goals for organic contaminants were developed in the *Baseline Risk Assessment of Human Health Effects* that was contained in the *Phase 2 Remedial Investigation Report for the Army Materials Technology Laboratory* dated May 1994. The Baseline Risk Assessment was performed in accordance with guidance documents from the MADEP and USEPA, and was consistent with the requirements of both CERCLA and the MCP.

However, during remediation excavation activities it was realized that in the commercial zones, Zones 1 and 2, a more realistic and appropriate exposure scenario for soils at a depth greater than 1 foot below ground surface (bgs) would be that of a construction worker. Because the Baseline Risk Assessment did not include the construction worker exposure scenario, additional risk assessment work was performed. The construction worker exposure scenario recognizes that periodic maintenance and/or installation of subsurface utilities/structures will be required in the future. In general, the construction worker exposure scenario differs from the commercial exposure scenario by evaluating risks from contaminated soils below one foot from ground surface using an exposure duration that mimics the potential need to perform periodic subsurface utility work. The top one foot of soil meets the appropriate risk-based clean-up goals for the zone. In addition, the construction worker exposure scenario is recognized as an appropriate risk scenario for the public benefit reuse areas (Zone 4) because the "open space" user will not be excavating below one foot and will be protected by the one foot of soil meeting its risk-based clean-up goals.

Description of the Significant Difference from the ROD

The difference from the ROD, as explained in this ESD, is that less soil was excavated at depth in Zones 1, 2, and 4. This change still results in a remedy that is protective of human health based on the future reuse of the property.

Additional risk assessment work was performed to estimate the carcinogenic risks and non-cancer hazard indices from exposure to PAHs in soil for a construction worker who may be performing building construction, excavation and/or other similar types of activities in Zones 1, 2, and 4 at MTL. The construction worker exposure scenario was evaluated for soils using PAHs because the nature and extent of soil contamination encountered at MTL primarily consisted of PAHs. Furthermore, revised risk-based soil clean-up goals were developed for the PAHs of concern based on the construction worker exposure scenario. These revised clean-up goals for

PAHs were applied at Areas B, E, G, J, and L. A Final Report dated 28 May 1997 detailing the results of this additional risk assessment work is attached to this document.

In summary, the risk assessment for the construction worker scenario concluded that the PAH concentrations observed during the remedial activities exhibited an acceptable total cancer risk of less than 1E-05 and an acceptable hazard index less than 0.1. Revised risk-based PAH soil clean-up goals were then calculated using a target carcinogenic risk level of 1E-05 and a target hazard index for non-cancer health effects of 0.1. These revised PAH soil clean-up goals for the construction worker exposure scenario were subsequently used during remedial excavation activities that occurred between May and November 1997. Table 1 at the end of this section presents the revised PAH soil clean-up goals for the construction worker exposure scenario; these clean-up goals can also be found in Table 16 of the attached risk assessment report.

It is noted that the construction worker exposure scenario considers only soil at depths greater than one foot below ground surface (bgs). The U.S. Army recognized the top one foot soil horizon as surface soil, and the U.S. Army continued to use the commercial and public benefit human health risk-based PAH soil clean-up goals developed in the 1994 Baseline Risk Assessment for the top one foot of soil.

TABLE 1

PAH	units	Construction Worker Clean-up Goal for Subsurface Soil
Benzo(a)anthracene	mg/kg	1,760
Benzo(b)fluoranthene	mg/kg	1,760
Benzo(k)fluoranthene	mg/kg	17,600
Benzo(a)pyrene	mg/kg	154
Indeno(1,2,3-cd)pyrene	mg/kg	1,760
Chrysene	mg/kg	176,000
Dibenzo(a,h)anthracene	mg/kg	154

Justification for this Alternative

The U.S. Army believes that revising the PAH soil clean-up goals for non-surface soils (below 1 foot bgs) in Zones 1, 2, and 4 is both protective of human health and is cost-effective. It is believed that soils below one foot bgs are typically not accessed by the commercial worker or the periodic trespasser, and will typically be accessed only by a construction worker performing

utility work or foundation work. The revised risk assessment will not be used for the residential zone (Zone 3) or for Areas F and T which are physically located in Zone 4 but were treated as if they were located in Zone 3 because of future reuse.

The revised risk assessment analysis demonstrated that the characteristic PAH levels observed in the in-situ non-surface soils during the remedial activities are well within the acceptable total cancer risk and acceptable hazard index for the construction worker exposure scenario. By leaving this soil which meets the revised PAH soil clean-up goals for the construction worker in place, no future risk to construction workers is anticipated.

Furthermore, institutional controls will be placed on the property deed for Zones 1, 2, and 4 which will require that any soil, excavated in the future, be done so in accordance with CERCLA/ROD requirements.

Implementing the revised PAH soil clean-up goals in Zones 1, 2, and 4, the U.S. Army estimates that it has passed on a cost savings between \$250,000 and \$500,000 to the taxpayer, while at the same time, providing a permanent solution that is protective of human health.

Support Agency Comments

The USEPA and the MADEP have worked with the U.S. Army in developing the changes described in this ESD document, and comments received on the draft ESD have been incorporated into this document. Both MADEP and USEPA concur with this ESD, and this information will be made part of the administrative record file.

Affirmation of the Statutory Determinations

The proposed change to the selected remedy described in the ROD continues to satisfy all of the statutory requirements of CERCLA and the NCP. Considering the new information that has been developed and the proposed change to the selected remedy, the U.S. Army, together with the USEPA and the MADEP, believes that the remedy remains protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective. In addition, the revised remedy will provide a permanent remedy for the site.

Public Participation

As stated earlier in this fact sheet, no formal public comment period is required for documentation of an ESD. In the interest of community awareness, the U.S. Army has decided to provide this fact sheet to the RAB.

For More Information

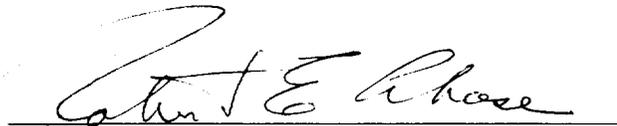
If you have questions about the ESD for MTL please contact:

Dennis Waskiewicz, Project Manager
U.S. Army Corps of Engineers, New England District
424 Trapelo Road
Waltham, MA 02254
(781) 647-8607

Declaration

For the foregoing reasons, by my signature below, I approve the issuance of this Explanation of Significant Difference for the Army Materials Technology Laboratory in Watertown, Massachusetts.

By:



Robert E. Chase
Site Director

1/12/98
Date