

APPENDIX A
Sites Closed out Based on a Site Investigation Leading to No Further Action

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APPENDIX A.1

Site Name: Army National Guard (ANG) Chemical Spill-7 Organizational Maintenance Shop 6

Site Description

Two Organizational Maintenance Shops (OMS) are currently operated by the Massachusetts Army National Guard (ARNG). OMS-6 is located in Building 2806, which was constructed in 1966. Between 1966 and 1974, it was used as a vehicle maintenance shop by ANG. Since then, the shop has been responsible for the maintenance of 140 ARNG vehicles (see Figure 1). A 10,000-gallon unleaded gasoline underground storage tank (UST) is also at OMS-6; this tank has been investigated as Study Area FS-20 and is not included as part of Study Area CS-7. Floor drains at OMS-6 discharge into the storm drainage system. Waste generated at the study area includes waste oil (500 gallons/year), solvents (50 gallons/year), and waste battery electrolyte (35 gallons/year). In the past, waste oil was temporarily stored in a UST prior to disposal off base. This UST was leak-tested in February 1985 and found to be tight. Waste solvents were stored in 55-gallon drums. Until 1985, battery acid was neutralized and discharged to the sanitary sewer. Waste oil and solvents were disposed of off base by the Defense Reutilization and Marketing Office (DRMO). Currently, waste oil is drummed, stored in Building 4600, and sent to the Ft. Devens, Massachusetts DRMO for disposal. Parts-cleaning solvent is provided and disposed of by an outside contractor. Battery acid is currently disposed of through the Ft. Devens, Massachusetts DRMO. No significant spills were reported at this study area.

Discussion of Remedial Objectives

On the basis of information collected during the Preliminary Assessment (PA) study for this area evaluation, including use of the Hazardous Assessment Rating Methodology (HARM) process, this site was recommended for No Further Action (NFA) based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was concurred by the following regulatory authorities within this report:

Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.



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Statement of the Continued Protection of Human Health and the Environment

Based on these waste disposal practices, no potential for hazardous waste contamination exists at this study area, and the site remains protective of human health and the environment.



APPENDIX A.2

Site Name: Chemical Spill-9 Former Main USAF Motor Pool

Site Description

Study Area CS-9 is a former motor pool located on the northeast side of Connery Avenue (Figure 1). During the Site Investigation (SI), the northern end of Study Area CS-9 contained a bicycle motorcross (BMX) racetrack used by the surrounding communities. According to a BMX track official, in 1993 the track was used one night per week with some special events scheduled on weekend days through the fall. The BMX track is accessed by Beebee Road. As part of the landfill cap construction project, a chain link fence was erected to encompass Beebee Road and the BMX track, restricting access to the LF-1 cover. The BMX track is still active. Except for the BMX track, the study area was nearly level, with most of its surface covered with aging asphalt. Small pine trees and shrubs grew through cracks in the pavement at the study area. No soil staining was evident at the exploration locations. The main base landfill, Area of Contamination (AOC) LF-1, is located north of Study Area CS-9.

From 1941 to 1946, Study Area CS-9 was used by the U.S. Army as a motor pool and vehicle maintenance area. Based on observations during the SI, the motor pool-related buildings have been removed, and most of the study area is unused. Wastes potentially generated during operations included oil, halogenated and nonhalogenated solvents, paint residues, battery electrolytes, antifreeze, and some motor gasoline.

Study Area CS-9 was evaluated as part of the Task 6 Records Search. According to the record search, the U.S. Air Force (USAF) also operated a motor pool at this location from 1955 to 1967. Features observed near the racetrack included former grease and wash racks and an abandoned motor gasoline (MOGAS) refueling system. Wastes potentially generated during operations included oil, halogenated and nonhalogenated solvents, paint residues, battery electrolytes, antifreeze, and a limited amount of MOGAS (E.C. Jordan Co., 1986). During operational periods, vehicle maintenance wastes were reportedly disposed of onto the ground (E.C. Jordan Co., 1986). During SI field investigations, leaching well and sump structures were identified as possible points for waste collection. Four leaching wells and four sumps were located at the former vehicle service areas.

A fifth leaching well was located at the former MOGAS fuel pump island adjacent to the BMX track. The MOGAS refueling system included three USTs and an associated abandoned fuel pump island. AT-19 and AT-20 were 5,000-gallon-capacity steel USTs, each installed in 1941, and a 12,000-gallon-capacity steel UST installed in 1959. According to National Guard Bureau (NGB) records, the USTs were scheduled for removal in 1985 (E.C. Jordan Co., 1986). With the permission of the Commonwealth of Massachusetts, the NGB excavated the tanks in 1985 and moved them elsewhere on the MMR.

The primary source of soil contaminants at Study Area CS-9 is potential releases from the piping network, the sump structures, and grease racks. Intermittent spills of fuel and maintenance fluids represent another potential source of soil contaminants at the study area. Groundwater



underlying this study area is migrating from the Main Base Landfill (AOC LF-1) located immediately upgradient.

Study Area CS-9 soils identified to be contaminated were excavated between March and June of 1994 as part of an accelerated removal action. Uncontaminated soil from the study area and excavated sump structures were used as subgrade fill material in the Main Base Landfill (AOC LF-1) cover system. Contaminated soils were initially stockpiled at AOC CS-4 but were later relocated to AOC FTA-1, where they received treatment in a low-temperature thermal treatment unit (TTU) between August and October of 1995. Approximately 3,663 tons of soil from Study Area CS-9 was treated in the TTU. Following treatment, soils were stockpiled in an on-site storage area and are currently scheduled for use as backfill material for the FTA-1 soil excavation proposed for October of 1996.

Possible contaminant transport pathways include the spills and infiltration of motor pool-related wastes, percolation of contaminants through the soil, and the migration of groundwater containing dissolved-phase contaminants. The potential human receptors include future residents and construction workers. The potential ecological receptors include small mammals and birds.

Discussion of Remedial Objectives

The objectives of this decision document are to describe the history of Study Area CS-9, present results of the SI at Study Area CS-9, present results of the human health and ecological preliminary risk evaluations (PREs), and explain why No Further Action is appropriate for this site.

The subsurface soil and groundwater data indicate that motor pool-related compounds have not migrated vertically within the overburden. Groundwater results showed low levels of fuel- and solvent-type compounds that are likely migrating from upgradient at AOC LF-1, rather than from this study area.

PREs were conducted for human health and the environment. Results of these PREs suggested no unacceptable risks to human health or ecological receptors.

A Remedial Action (RA) summary report has been prepared to provide a detailed summary of Study Area CS-9 soil treatment activities and certification that the RA is completed. *MMR Decision Document Study Area CS-9, Final, June 1998* summarizes the SI findings and results for Study Area CS-9 and provides the rationale for the No Further Action decision.

On the basis of these findings, there is no evidence of significant environmental contamination remaining at Study Area CS-9 that would pose an unacceptable threat to human health or the environment. Concurrence on this decision has been provided by the following regulatory authorities:

Frank J. Ciavattieri, Deputy Director
Office of Site Remediation and Restoration
EPA

1 December 1997



March 1999

Paul Taurasi
Regional Director
Comm. of Mass. DEP

1 May 1998

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

The soil at Study Area CS-9 that may have been contaminated and, therefore, a potential risk to human and ecological receptors has been excavated and received treatment in a low-temperature TTU. Following treatment, soils were stockpiled in an on-site storage area and used as backfill material for the FTA-1 soil excavation. The sump structures and remainder of the soil from this area were excavated and have been used as fill material beneath the AOC LF-1 landfill cover system.

The potential risks posed by contaminants in the soil have been eliminated by excavating the surface soil. The site remains protective of human health and the environment.



APPENDIX A.3

Site Name: Chemical Spill-10 ANG Tank Wash Operable Unit

Site Description

Site CS-10, located on the eastern boundary of MMR (Figure 1), was developed in 1962 as a Boeing Michigan Aeronautical Research Center (BOMARC) ground-to-air missile defense site. In 1973, the BOMARC facility was decommissioned and transferred from USAF to ANG control. In 1978, Unit Training Equipment Site (UTES) was established at this site. The currently operating tank wash facility for tracked vehicles and heavy trucks at Site CS-10 began operation in 1983; it is located west of the old missile shelter area. Wash water is fed to an oil/water separator. Effluent from the separator drains to a ditch just south of the washing platform.

The tank wash facility was issued a permit to discharge effluent to the ground by the Massachusetts Department of Environmental Quality Engineering in August 1986. At the time the permit was issued, U.S. Army Environmental Hygiene Agency (AEHA) installed three monitoring wells in the tank wash vicinity. One well (AEHA-1A) is hydrogeologically upgradient, and two wells (AEHA-10 and AEHA-11) are hydrogeologically downgradient of the facility. Tank wash effluent and samples from the AEHA monitoring wells are analyzed twice annually for oil and grease, surfactants, volatile organic compounds (VOCs) and pH according to *Guidelines Establishing Test Procedures for the Analysis of the Pollutants under the Clean Water Act* (40 CFR 136). VOCs have not been detected in any samples to date. Detected concentrations of oil and grease, and surfactants are below discharge limits.

No public drinking water wells are located within 0.5 miles of the tank wash facility. In addition, no homes located within 0.5 miles of the Tank Wash Operable Unit receive water from private drinking water wells.

Discussion of Remedial Objectives

SI area studies and monitoring were completed to evaluate the surface and subsurface conditions regarding the presence or absence of hazardous materials. Based on the findings contained in the report titled *Installation Restoration Program, Decision Document, Site CS-10 Tank Wash Operable Unit, February 1990*, a No Further Action decision is made. This decision has regulatory concurrence by the following authority:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.



Statement of the Continued Protection of Human Health and the Environment

SI studies and sampling of the tank wash effluent and three AEHA monitoring wells show no significant contamination of soil or groundwater in the Tank Wash Operable Unit vicinity. Significant chemical source areas were not found through soil gas and boring investigations, and analytical data do not indicate that the tank wash effluent has impacted groundwater quality. Monitoring of the tank wash effluent and AEHA wells will continue according to conditions of the discharge permit and the site remains protective of human health and the environment.



APPENDIX A.4

Site Name: Coal Yard-2 Former United States Air Force/Air National Guard Coal Yard Storage Yard

Site Description

Coal Yard-2 (CY-2), shown in Figure 1, is located less than 1,000 feet from the southern MMR boundary and approximately 1/2-mile northwest of the base sewage treatment plant (STP). Portions of CY-2 are located within the 18.6 acres leased to the municipalities of Falmouth, Sandwich, and Mashpee for a regional solid waste transfer station.

Coal was stockpiled at CY-2 from 1957 to 1984. Most of the coal was piled on a bituminous paved surface. Two railroad spurs, originally used for loading and unloading coal, transect the paved section of the site. North of the paved area, up to 2 feet of coal remains in piles on the ground surface. Runoff from the coal piles is channeled into storm drains that discharge onto the ground at the northern and southern corners of the paved area. A natural northeast-southwest trending natural drainage swale is located at the southeastern section of the site, which extends south of the MMR boundary. The swale has been interrupted just inside the MMR boundary by fill along the right-of-way of Kittredge Road.

Discussion of Remedial Objectives

The objectives of the Decision Document was to describe the history of MMR Site Coal Yard 2 (CY-2), to present the results of investigations at CY-2, and to explain why No Further Action will be taken at this site. This site was initially identified in the PA of MMR (ORNL, 1986) conducted by E.C. Jordan Co. (Jordan). Site CY-2 was further investigated by Jordan in 1988; on the basis of these results, the site was recommended for No Further Action.

A No Further Action decision was made in a report titled *Installation Restoration Program Decision Document Site Coal Yard-2 for Massachusetts Military Reservation, Cape Cod, MA, October 1988*. Regulatory concurrence for this decision was obtained by the following regulatory authorities:

Paul Marchessault (in a separate letter) United States Environmental Protection Agency, Region 1	16 May 1994
Robert E. Donovan Commonwealth of Massachusetts Department of Environmental Protection	18 January 1989

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Site investigations have detected no significant contamination in the soils or groundwater at this



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site. Residual surface coal will be removed as a good housekeeping measure; therefore, no future contamination of soils or groundwater is likely. On the basis of these findings, there is no significant evidence of environmental risk at the CY-2 site.



APPENDIX A.5

Site Name: Fuel Spill-15 Runway # 5 Fuel Spill

Site Description

In the early 1960s, a plane crashed and burned at the end of Runway No. 5, resulting in a spill of approximately 200 gallons of aviation gasoline (AVGAS) (see Figure 1). The spilled fuel also burned, therefore limiting the amount of fuel that might have otherwise contaminated the soil.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Because the fuel burned as a result of the crash, the potential for contaminant migration into the underlying soils and groundwater was negligible. The site remains protective of human health and the environment.



APPENDIX A.6

Site Name: Fuel Spill-16 Helicopter Maintenance

Site Description

In 1982, a tanker truck spill of approximately 200 gallons of JP-4 was reported. The spill occurred on the tarmac ramp outside Building 2816 (see Figure 1). The spill was washed off onto the surrounding ground. The volume of spilled material would initially have partially volatilized into the atmosphere. Therefore, less than 200 gallons of jet fuel (JP-4) would have been involved.

Based on estimates of petroleum migration in soils (American Petroleum Institute, 1972) a volume of at least 4,000 gallons would be required for JP-4 to reach the water table as a "free-product" phase under the conditions present in this area of MMR. The spilled JP-4 is therefore expected to be completely sorbed to the sands of the vadose zone and to remain entirely within the unsaturated soil zone.

As oil from a spill moves downward through an unconsolidated substrate, a small amount is sorbed to the surface of each particle. Where the available soil surface area is large relative to the volume of oil, the oil will penetrate to a point of residual saturation where the entire oil volume is sorbed to particles and no "free product" flows farther. The volume of soil required to immobilize a given amount of oil depends on two factors: the porosity of the soil and the nature (viscosity) of the hydrocarbon. For the JP-4 spill of 200 gallons a soil volume of approximately 25 cy of soil would be expected to contain all of the spill at its "maximum residual saturation." If the oil were washed to a 1- to 3-square-yard area at the edge of the tarmac, it would be expected to be absorbed in the upper 8 to 25 feet of soil.

After sorption the aromatic compounds would be expected to volatilize and be dissolved in infiltrating water. Because of the age of the spill, the originally present soluble components would have since been lost and degraded. The residual hydrocarbon transformations would also be expected to have stabilized and exhausted all nutrients such that no further transformations would be expected to solubilize additional material.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:



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Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

The amount of material spilled was very small. The small volume of material that would have infiltrated the soil would have remained in the soils and would have since been subject to volatilization and both chemical and biological degradation. Therefore, there is no potential for significant contamination to have reached the water table. Given this information, No Further Action was deemed necessary, and the site remains protective of human health and the environment.



APPENDIX A.7

Site Name: Fuel Spill-20 Current Product Tank 88**Site Description**

Current Product Tank No. 88 (Site FS-20) is a 12,500-gallon UST located adjacent to Building 2806 (OMS-6) near the ANG helicopter flight line (Figure 1). The tank, in use since 1968 to store MOGAS, was identified as a potentially leaking tank. Based on an estimated maximum leakage rate of 2.5 liters per hour, up to 108,000 gallons may have been lost over the 18-year life of the tank (E.C. Jordan Co., 1986). Tanks are assumed to leak for life at the rate they leaked upon testing for estimation of total spill volume. However, if a leak is present, it is probably located in the filler pipe, and the quantity lost is at least an order of magnitude lower than the initial estimate.

Discussion of Remedial Objectives

Jordan's assessment of analytical results at Site FS-20 is based on review of historical data for the site and interpretation of findings. Field gas chromatographic results, as well as analytical data reported at estimated levels below contract-required detection limits (CRDLs), were used to interpret the validated analytical results.

Phenanthrene was the only organic compound detected in soil samples. It was found at levels below the CRDL in the soil sample from the water table (59 to 61 feet below ground surface). Phenanthrene is in the class of 2- and 3-aromatic-ring polyaromatic hydrocarbons (PAHs), which are not considered to have carcinogenic properties. PAHs were not detected in the other soil or groundwater samples. The levels of metals detected in the soil samples found at the product tank No. 88 site are low and similar to background concentrations for metals in soil found in the eastern United States. Based on sampling, levels of contamination in the soil at Site FS-20 are not above regulatory levels; therefore, soil at the site is unlikely to impact groundwater quality.

The groundwater sample collected from MW-1 indicates that site soils have not impacted groundwater quality. VOCs and semivolatile organic compounds (SVOCs) were not detected above CRDLs in the groundwater sample.

Manganese was detected in the groundwater at 15 micrograms per liter ($\mu\text{g/L}$). A secondary maximum contaminant level and a Massachusetts groundwater standard of 50 $\mu\text{g/L}$ exist for this compound. The level detected at MW-1 is below the regulatory standards. Manganese also has a very low order of acute oral toxicity. Manganese is ingested by humans as part of regular dietary intake; the average daily consumption per person of manganese in food is 3 to 7 mg (National Academy of Sciences, 1977).

Based on these findings, a No Further Action decision was made and documented in *Installation Restoration Program Decision Document, Site FS-20, Current Product Tank No. 88, Massachusetts Military Reservation, February 1990*. Concurrence on this decision is provided by the following regulatory authorities:



March 1999

Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

The site investigation study, which included one test pit and one monitoring well near Product Tank No. 88, indicates no contamination of soil or groundwater at Site FS-20 that poses any health or environmental risks. The soil contains metals at background concentration levels, and only one sample contained an organic constituent (i.e., phenanthrene) at a level below CRDLs. Contaminant source areas do not appear to exist in site soils. Manganese was detected in the groundwater at a level below the state groundwater standard for this compound. Other inorganic chemicals, VOCs, and SVOCs were not detected in groundwater at the site. The absence of residual contamination suggests that neither soil or groundwater quality has been impacted from historical leaks and that the site remains protective of human health and the environment.



APPENDIX A.8

Site Name: Fuel Spill-25 Building 167 Area Fuel Spill

Site Description

Study Area FS-25 covers approximately 1 acre on the southeast portion of MMR (Figure 1). The study area consists of a parking area located immediately northeast of Building 167 on Izzea Street and the approximately 2,000 cy of soil which was excavated from this area in November 1989 and stored temporarily on Taxiway E.

In November 1989, excavation for upgrading the parking lot revealed petroleum-stained soils. Reportedly, some of the soils had a diesel fuel-like odor, which was further substantiated by positive readings on a field photoionization detector (PID). Under direction of the Otis ANG Base civil engineering staff, approximately 2,000 cy of soil was excavated and temporarily stockpiled on abandoned Taxiway E. The age and source of the soil staining are unknown. Possible sources of identified petroleum contamination include heavy equipment maintenance, refueling operations, and/or runoff from the nearby flight line area.

In December 1989, the NGB initiated an investigation program, which involved the collection of soil samples from the excavation site and stockpiled soils on Taxiway E.

The NGB, in consultation with EPA, backfilled the excavation with soils found to contain a total petroleum hydrocarbon (TPH) concentration below the revised target cleanup level; that location is now paved with asphalt. Approximately 100 cy of soil evaluated to have TPH concentrations exceeding the target clean-up level remains on Taxiway E. The 100 cy of soil was treated as part of the thermal treatment of soils from Areas of Contamination FTA-1 and CS-4 (ABB-ES, 1991).

Discussion of Remedial Objectives

In developing remedial objectives for remediating Study Area FS-25 soils, soil contaminant concentrations were compared to applicable standards and/or guidance. No ARARs have been promulgated for contaminants in soil. A Massachusetts policy for excavated petroleum-contaminated soils (DEQE, 1989) was reviewed; however, this policy was not considered directly applicable for Study Area FS-25 because it was developed for virgin petroleum spills (e.g., from leaking USTs). Because the source of Study Area FS-25 soil contamination is unknown, it cannot be assumed that the source of contamination was not waste oil from heavy equipment maintenance or other nonvirgin sources.

Without promulgated ARARs, contaminant concentrations were compared to health- and risk-based policies and guidelines. In the preliminary risk evaluation, carcinogenic and noncarcinogenic risks were calculated and compared with federal limits established in the NCP. The results of the RA based on an average TPH concentration for the stockpiled soils indicated that Study Area FS-25 soils do not pose a significant risk (E.C. Jordan. Co., 1991a).

Because it was considered possible that the stockpiled soils would be returned to the excavation site, the potential impact associated with contaminants from the FS-25 Study Area soils leaching



to groundwater was assessed, using the EPA Organic Leachate Model (OLM) (Federal Register, 1986; 51 FR 41088). As a worst case, ABB-ES assumed that all the stockpiled soil would be returned to the existing excavation and that the soil would be exposed to infiltrating precipitation. Average concentrations of TPHs (expressed as hexane, ethylbenzene, and naphthalene) and 1,1-dichloroethylene (DCE) in soils were used in the OLM to predict the leachate produced due to infiltration. Concentration of these compounds in the leachate concentration was then used in a mass-balance equation to obtain the estimated concentration of the contaminant in groundwater just downgradient of the study area. The calculations and results are present in Appendix A of the feasibility study (E.C. Jordan, 1991b).

To evaluate the impact of the predicted concentrations in groundwater, carcinogenic and noncarcinogenic risk from exposure to 1,1-DCE was calculated to be 3.09×10^{-6} . The total noncarcinogenic hazard index (HI) resulting from exposure to the four modeled compounds was estimated at 0.02. These results indicate that no significant risks are posed by contaminants leaching to groundwater. A soil target level for TPHs was calculated from target groundwater concentrations calculated for the three representative compounds. The target level, based on OLM assumptions for the FS-25 Study Area, was calculated to be 97,800 parts per million (ppm) for the study area composition of TPHs, which is significantly greater than any detected TPH concentration. Thus, any alternative involving placement of the stockpiled soils into the excavation will not pose a risk to groundwater due to contaminant leaching, and no remedial objective was developed for the groundwater-leaching scenario.

Based on the findings of the Technical Report and Feasibility Study, a No Further Action decision is contained in *Installation Restoration Program Decision Document Fuel Spill Site 25 (FS-25) Excavation Site, Final, June 1997*. Regulatory concurrence on this decision is made by the following regulatory authorities:

Paula Fitzsimmons
Chief, Superfund II Branch
United States, Environmental Protection Agency

18 March 1997

Paul Taurasi
Regional Director
Commonwealth of Massachusetts
Department of Environmental Protection

23 October 1996

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Based on findings of the technical report and feasibility study, soils returned to the original excavation having TPH concentrations of less than 1,235 ppm are not considered to pose a threat



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to human health and the environment. The area is now paved over and remains protective of human health and the environment.



APPENDIX A.9

Site Name: Fuel Spill-27 Connery Avenue Telephone Line Soil Excavation

Site Description

Study area FS-27 designates the location of soil stockpiled beneath the overhead power lines off Guenther Road at MMR. Refer to Figure 1 for a map showing the location of Study Area FS-27.

The soil stockpiles, likely contaminated with petroleum hydrocarbons, originated from the installation of approximately 22,000 linear feet of underground fiber optic communication lines (FOCL) at MMR, by an Air National Guard (ANG) contractor, in the fall of 1989. Installation of the FOCL took place along Connery Avenue, West Hospital Road, North Inner Road, and Generals Boulevard.

Two additional areas at MMR are related to FS-27. The first is an embankment behind Building 5202, where excess soil from the installation trenches for the FOCL was used as fill. The second related area is the route of the FOCL, where the soil that was contaminated with petroleum hydrocarbons originated.

While some of the soil from FOCL installation trenches was placed in the Main Base Landfill, the majority of soil was stockpiled beneath the overhead power lines off Guenther Road. Excess soil was used as fill for the embankment behind Building 5202. In the fall of 1990, some soil from the Guenther Road Stockpile was temporarily used as backfill during the excavation of a UST at FS-26 (USCG).

Discussion of Remedial Objectives

MMR Decision Document Study Area Fuel Spill Site No. 27, December 1997 was prepared to support a No Further Action decision at Study Area Fuel Spill 27 (FS-27) and related areas at MMR.

This decision document summarizes evaluations of data that conclude No Further Action is needed on defined media at Study Area FS-27.

The objectives of this decision document are to

- describe and provide the history of Study Area FS-27,
- present results of investigations at Study Area FS-27, and
- explain why No Further Action is appropriate for the defined media.

This document is a summary of information contained in the *Final Preliminary Assessment Report for Study Areas FS-26 and FS-27* (CDM Federal Programs Corp., June 1993), and in the *Final Site Inspection Report, Study Areas CS-1, CS-2, CS-6/FS-22, FS-26 and FS-27* (CDM Federal Programs Corp., August 1996). Additionally, applicable risk sections contained in the *Revised Draft, Site Inspection Report, Study Areas CS-1, CS-2, CS-6/FS-22, FS-26 and FS-27* (CDM Federal Programs Corp., December 1995) and the *Preliminary Risk Evaluation Letter Report for Study Areas FS-26 and FS-27* (CDM Federal Programs Corp., January 1996) have



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The No Further Action decision made in the decision document had concurrence from the following regulatory authorities:

Paula Fitzsimmons
Chief, Superfund II Branch
United States, Environmental Protection Agency

18 March 1997

This document is currently awaiting DEP signature

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

Field PID and analytical data provide evidence that a petroleum product, or products, were released at FS-27. VOCs and SVOCs are present, but field screening analyses detected no TPH concentrations above 100 ppm in surface soil. Those VOCs and SVOCs present in samples collected from Study Area FS-27 stockpiled soils and media from related areas indicate that most of the compounds typically found in fuels have degraded and weathered.

All calculated human health risk values are within EPA criteria. Results of the ecological PRE indicate that burrowing mammals and passerine birds may be impacted by site contaminants, but given the amount and quality of wildlife habitat, ecological impact by site-related chemicals is unlikely. Therefore, No Further Action is deemed necessary for the defined media.

Statement of the Continued Protection of Human Health and the Environment

A PRE was performed for FS-27 and associated areas. A Preliminary Risk Assessment (PRA) was also performed on portions of the study area at which the PRE indicated additional assessment was prudent. Both the PRE and PRA were conducted according to protocols delineated in the *MMR Risk Assessment Handbook (RAH)*, (Automated Sciences Group [ASG], 1993) and in accordance with EPA guidance *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual* (EPA, 1989), *Risk Assessment Guidance for Superfund Volume II: Environmental Evaluation Manual* (EPA, 1989), and other EPA guidance.

All calculated human health risk values are within EPA criteria.



APPENDIX A.10

Site Name: Landfill-3 Northeast Landfill**Site Description**

Based on observations made during an August 22, 1996 visit to the LF-3 study area, the site occupies less than 1 acre near the northeastern edge of MMR (Figure 1). The study area consists of several piles of sand located along the eastern upland edge of a deep, steeply sloping kettle depression. The entire area is wooded except for the sand piles and an unrelated, adjoining area (approximately 20 × 40 feet) that has been recently graded. The study area is accessed via a dirt road, which enters the northeastern (C-16) training area of MMR from Route 130 in Sandwich, Massachusetts. A locked gate marks the point where the dirt road crosses the MMR boundary.

In the spring of 1985 the Facility Engineer (FE) of Camp Edwards noticed an unauthorized disposal area while traveling along the dirt road. The disposal area reportedly included "all manner of household items; trash; construction debris such as Sheetrock waste, concrete piles, dimensional lumber scraps; as well as mattresses, old furniture, and brush piles. There was no evidence of any hazardous waste, empty fuel or paint cans, or drums."

Subsequently, at the FE's direction "approximately two 5-ton dump truck loads of debris" were removed from the disposal area and taken to the main base landfill. In addition, due to the vehicular safety hazard posed by the proximity of the road to the newly exposed steep slope of the kettle depression, the FE instructed the Roads and Grounds foreman to build up the shoulder of the road by dumping clean fill (sand) over the area, thereby restricting vehicular access to the edge of the depression. The Roads and Grounds foreman took the additional measure of installing gates on the dirt road at the access points to MMR from Route 130 to the south and Route 6 to the north to prevent further unauthorized dumping at this or any other areas along the dirt road.

On August 6, 1996 representatives from EPA, Department of Environmental Protection, Army and AFCEE/MMR conducted a site visit at the LF-3 study area. At the time of the visit, the area was observed to be overgrown with trees and shrubs, except for numerous piles of sand located along the upland edge of a steeply sloping kettle depression.

No evidence of waste, debris, or contamination was visible along the edge of the kettle depression or in proximity to the sand piles. An abandoned tire and a rusted fireplace grate were observed along the side of the dirt road in close proximity to the gate (intact and locked) marking the MMR boundary, approximately 100 yards from the sand piles.

Discussion of Remedial Objectives

Based on information obtained from individuals directly involved in the removal of waste from LF-3 study area and the recently observed conditions at the study area, where no waste or evidence of waste or contamination exists, the LF-3 study area is not considered to pose a threat to human health or the environment.



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Based on findings, a No Further Action decision was presented in *Massachusetts Military Reservation Final Decision Document Landfill 3, April 1997*. Regulatory concurrence in this document is provided by the following regulatory authorities:

Paula Fitzsimmons
Chief, Superfund II Branch
United States, Environmental Protection Agency

18 March 1997

Paul Taurasi
Regional Director
Commonwealth of Massachusetts
Department of Environmental Protection

2 April 1997

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Because the waste disposed at the study area was not hazardous and was removed from the study area more than 11 years ago and placed with clean sand, there is no current or future risk of exposure to contamination associated with the LF-3 study area.



APPENDIX A.11

Site Name: Landfill-6 USN Rubble Landfill

Site Description

Study Area LF-6 is a former U.S. Navy (USN) landfill, located just west of Runway 5 (see Figure 1). It was used as debris and rubble fill area during expansion of the taxiway area and has since been paved over. Based on this reported use, no evidence of hazardous waste disposal exists.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:

Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

There is no evidence that hazardous wastes were disposed of at this location. Therefore, no potential for contamination or contaminant migration exists, and the site remains protective of human health and the environment.



APPENDIX A.12

Site Name: Landfill-7 Radar Tube Burial Ground

Site Description

Study Area LF-7 is located in a gravel pit north of the present sanitary landfill (see Figure 1). It is an area where radioactive electron tubes removed from EC-121 aircraft radar sets were reportedly buried. Since approximately 200 tubes/year were removed from aircraft between 1955 and 1970, it is estimated that as many as 3,000 tubes may be buried. In response to discussions with the EPA on May 19, 1992, ANG investigated the nature of the radioactive isotopes used in the radar tubes disposed at LF-7. ANG and USAF radiation safety officers and bioenvironmental engineering staff were consulted on the nature of the radioactive isotopes used in the electron tubes. However, the stock number of the radar units in which the tubes were installed could not be positively identified. Therefore, the exact isotope identification could not be established.

Based on discussions with ANG and USAF personnel, the most likely radioactive isotopes used in the electron tubes were cesium-137, tritium, nickel-63, cobalt-60, and radium-226. It is also possible that other isotopes were used, since the electron tube manufacturers were required to meet certain performance specifications but the radioactive isotope used in each tube was not specified.

These tubes are believed to have contained very low, near background, levels of radioactive material ranging from 10^{-7} to 10^{-9} picocuries (pCi). Using the estimated number of tubes and their pCi range, the total radioactivity at this study area is calculated to be 3×10^{-4} to 3×10^{-6} pCi. If this entire amount of radioactivity were contained in one (1) liter of water, the level of radioactivity would be, at worst, 3×10^{-4} pCi/L. The EPA Interim Primary Drinking Water Standards for radium and gross alpha radioactivity are 5 pCi/L and 15 pCi/L, respectively. The worst-case concentrations calculated above are negligible compared to federal standards. Actual concentrations maybe considerably lower than the worst-case scenario calculation.

Because of the uncertainty in the identification of the isotope(s) disposed at LF-7, specific discussions regarding the radioactive half-lives cannot be made. The half-lives of the likely isotopes used in the radar electron tubes extend from approximately 5 to 1,620 years. Therefore, the radioactivity in these tubes, which were disposed between 1955 and 1970, is calculated to range from less than 1 percent to 100 percent of that present when the tubes were initially disposed.

Three annual monitoring events have been conducted to date (27 June 1991, 25 June 1992, 17 July 1993) resulting in no radiation levels above background detected. LF-7 measures 20×20 feet; monitoring covers the entire area of the site.

Radiological assessment of tube burials at other USAF study areas, performed as part of the overall USAF IRP, has not reported radiological contaminant migration or human health hazards in association with such study areas.



Discussion of Remedial Objectives

Study Area LF-7 will be operated in full accordance with policy letter of August 9, 1988. This policy specifies that areas used for disposal of low-level radioactive wastes will be appropriately fenced to prevent unauthorized entry, marked with appropriate radioactive warning labels, and monitored annually to verify that actual levels of radioactivity remain acceptable. In addition to the fencing surrounding the disposal site, and in response to EPA concerns, an area surrounding LF-7 will be posted by the ANG to prevent excavation. The area to be posted will be determined by the based on the existing site conditions (i.e., tree cover, accessibility).

The annual radiological survey will be conducted with a Model 471RF survey meter or equivalent. The 20 x 20 foot area will be surveyed at the ground surface and 3 feet above. While this instrument does not detect alpha radiation, monitoring for alpha radiation is not necessary as long as the soil is not disturbed. If the soil is disturbed, air sampling will be conducted to detect alpha radiation. High- and/or low-volume air samplers will be used. Air filters will be screened on site with zinc sulfide (ZnS) scintillation counter or gas proportional counter or be sent off site for laboratory analysis.

These institutional controls will be implemented as long as MMR remains a military base. Levels of radioactivity considered acceptable are (1) less than two times background or (2) 2 milliRoentgen/hour, whichever is lower (Nuclear Regulatory Commission regulations 10 CFR 20.105).

Based on annual monitoring to date, no radiation has been detected above background. A No Further Action recommendation was put forth in a report titled *Installation Restoration Program, Decision Document Radar Tube Burial Landfill (LF-7 Study Area) Massachusetts Military Reservation, Cape Cod, Massachusetts; Final, November 1993.*

Regulatory concurrence with No Further Action authorized by the following:

David Webster United States Environmental Protection Agency, Region 1	9 December 1993
George Crombie Commonwealth of Massachusetts Department of Environmental Protection	27 January 1994

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Based on the level of radioactive materials contained in these tubes, the potential hazard from the disposed radar tubes is negligible. Radiological studies at similar disposal study areas have not indicated contamination or human health impact. The risk does not trigger actions under the



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NCP. This is confirmed by three years of annual monitoring resulting in no concentration above background detected.



APPENDIX A.13

Site Name: United States Coast Guard Chemical Spill-5 Carpentry Shop

Site Description

The Carpentry Shop, located in Building 3456, has operated since 1970 (see Figure 1). Approximately 110 gallons of turpentine is used annually to clean brushes and rollers used in paint application. Only very small quantities of waste paint and turpentine are spilled while being transferred to 55-gallon drums of waste thinner. The drums of waste thinner are stored in a designated area and periodically removed by a DRMO contractor for off-base disposal. Because turpentine is readily biodegradable and only small spill quantities are involved, no significant potential for contamination is considered to exist.

Discussion of Remedial Objectives:

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Because of the nature and small quantities of materials involved, no potential for contamination or contaminant migration exists, and the site remains protective of human health and the environment.



APPENDIX A.14

Site Name: United States Coast Guard Chemical Spill-7 Dry-Cleaning Facility

Site Description

The dry-cleaning facility located in the base launderette (Building 1131) operated from the mid-1960s to 1975 (see Figure 1). Prior to 1975, it was under USAF control. Reportedly, since 1975 the dry-cleaning machines have been nonoperational.

Two 55-gallon drums containing Dowchlor were present in Building 1131 at the time of the on-study area records search. The drums were removed in February 1986 by the United States Coast Guard (USCG) and shipped to DRMO.

The launderette has two coin-operated dry-cleaning machines. When operational, these machines used Dowchlor as the dry-cleaning compound. Dowchlor, which was 96 percent perchloroethylene (PCE), is no longer produced.

The drums of Dowchlor were stored in a utility room located in the back of the building. They were positioned horizontally and were connected to the dry-cleaning units by rubber hoses. Reportedly, during an inspection, a bucket acting as a catch basin was observed beneath one of the drums. According to those who used the facility, the dry-cleaning machines periodically leaked fluid onto the floor in the laundry room. Fluids, possibly including dry-cleaning compound, were also observed on the utility room floor where the drums were stored. Leaking and spilled fluids in Building 1131 are channeled into building floor drains, which empty into the sanitary sewer system.

Because of the potential for past leakage and spills within Building 1131, the dry-cleaning facility could have potentially contributed a source of contamination to Study Area CS-16/CS-17, the MMR Sewage Treatment Plant/Sludge Disposal Area. By itself, however, the dry-cleaning facility is not a study area, since there is no possibility of contaminants having entered either the soils of the groundwater at this location.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal.

This decision for No Further Action required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:



March 1999

Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Potential for contaminant migration from Study Area USCG CS-7 via the sanitary sewer system was evaluated as part of the IRP investigation of the MMR Sewage Treatment Plant (Study Area CS-16). However, no potential exists for contamination or contaminant migration at the study area itself, and the area remains protective of human health and the environment.



APPENDIX A.15

Site Name: United States Coast Guard Fuel Spill-26 Building 3444 Fuel Tank Area

Site Description

Study Area FS-26 (USCG) is located at the intersection of two unnamed paved roads at the southwesterly end of Building 3444 (see Figure 1), a USCG warehouse located at the juncture of Turpentine Road, Lee Road, and Beaman Road on MMR, Cape Cod, Massachusetts.

The study area is the former location of a 3000-gallon UST that contained No. 2 heating oil. In 1990, the USCG contracted Mason Environmental Services to remove the UST located adjacent to Building 3444. The removal was initiated as a result of the UST's status as an abandoned tank, as defined by the Massachusetts Board of Fire Prevention Regulations (527 Code of Massachusetts Regulations 9.22).

During removal of the UST, it was noted that the fill pipe was loose and that there was fuel oil staining on the top and sides of the UST at the fill pipe location. The tank was intact when removed, and overburden soils covering it were not affected by fuel oil contamination except at the fill pipe location. Soils around and beneath the UST were screened with a PID according to guidance in Massachusetts Department of Environmental Protection Policy #WSC-400-89, *Jar Headspace Analytical Screening Procedure*. Those soils found to exceed 10 ppm total organic vapor were conveyed to an on-site virgin petroleum-contaminated soil (VPCS) stockpile. The excavation was terminated at a depth of 27 feet, partly because the potential existed for undermining the structure of Building 3444. Approximately 70 cy of VPCS was secured on site as a result of this excavation activity. The VPCS was later disposed of off site by another USCG contractor.

Soil samples collected from the sidewalls and bottom of the UST excavation were field-screened using headspace methods then submitted to a state-certified laboratory for analysis for TPH using EPA Method 418.1. These sidewall soil samples had TPH concentrations ranging from below detection limits to 30 ppm. The sample from the bottom of the hole had a TPH concentration of 180 ppm. All sample results quantified TPH concentrations below the proposed soil target cleanup levels at MMR.

Fill material was brought from another area of MMR to backfill the excavation. Field-screening and subsequent laboratory analysis for TPH revealed that this material was contaminated. The NGB, in consultation with EPA, subsequently excavated and stockpiled this material. Clean backfill material was brought from off base and placed in the excavation.

Discussion of Remedial Objectives

The objectives of the decision document were to describe the history of Study Area FS-26 (USCG), present results of investigations at Study Area FS-26 (USCG), detail the nature and extent of residual soil contamination as determined by analysis of subsurface soil samples from around the former UST location, consider/appraise the absence of groundwater contamination as determined by analysis of groundwater samples from a water table monitoring well located in the former tank pit, and document that No Further Action is appropriate at the FS-26 (USCG) site.



Information is contained in *Remedial Response Action for Building #3444* (Mason Environmental Services, 1992), *Final Preliminary Assessment Report for Study Areas FS-26 and FS-27* (CDM Federal Programs Corp. June 1993), and *Revised Draft Site Inspection Report, Study Areas CS-1, CS-2, CS-6/FS-22, FS-26 and FS-27* (CDM Federal Programs Corp. December 1995).

This decision for No Further Action being required is documented in a report titled *Massachusetts Military Reservation Final Decision Document Study Area US Coast Guard Fuel Spill Site No. 26, July 1997*. Regulatory concurrence with this decision was provided by the following authorities:

Paula Fitzsimmons 18 March 1997
Chief, Superfund II Branch
United States, Environmental Protection Agency

Paul Taurasi 22 May 1997
Regional Director
Commonwealth of Massachusetts
Department of Environmental Protection

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Data collected during the Site Investigation did not indicate that any significant contamination exists at Study Area FS-26 (USCG). Risk evaluations conducted on that data indicate there is no risk to human health or the environment. The site excavation has been filled, and the site remains protective of human health and the environment.



APPENDIX A.16

Site Name: United States Coast Guard Landfill-1 Rubble Landfill

Site Description

Study Area LF-1 (USCG) is an area that was used for disposal of asphalt and debris generated during a runway extension project completed in the 1950s. The study area is located on the south side of Taxiway "D," southwest of Study Area CS-2 (USCG) (Figure 1). The debris was placed on a slope along the southern side of Taxiway "D."

Discussion of Remedial Objectives

The objectives of the decision document was to describe the history of Study area LF-1 (USCG) present results of site characterization investigations at Study Area LF-1 (USCG); present results of the human PRE; and explain why No Further Action is appropriate for this site.

A No Further Action decision was presented in *Installation Restoration Program Decision Document Study Area LF-1 (USCG) Massachusetts Military Reservation, Cape Cod, MA; Final December 1995*. Regulatory concurrence with this decision was provided by the following authorities:

Mary Jane O'Donnell Acting chief, Superfund II Branch, United States Environmental Protection Agency, Region 1	29 September 1995
George Crombie Regional Director, South East Region Commonwealth of Massachusetts Department of Environmental Protection	4 December 1995

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

In 1988 and 1989, decision documents were written that included Study Area LF-1 (USCG). In both documents, the lack of apparent sources of hazardous subset construction debris was cited as the reason for No Further Action at this area. At the request of EPA and Massachusetts Department of Environmental Protection (MADEP), a groundwater monitoring well was installed downgradient of the landfill to confirm that groundwater quality had not been impacted. Results of the groundwater analysis indicate that there has been minimal impact, if any, to groundwater. The source of chloromethane and methylene chloride, if not laboratory artifacts, is unknown; however, each was present in only one sampling round at 1 to 2 µg/L. These concentrations are well below health-based Hazard Equivalent Concentration (HECs) and drinking water standards.



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On the basis of the decision documents, there is no evidence of significant environmental contamination at the USCG Former Rubble/Debris Landfill (i.e., Study Area LF-1 [USCG]) posing an unacceptable threat to human health or the environment.



APPENDIX A.17

Site Name: United States Coast Guard Landfill-2 Rubble Landfill

Site Description

Study Area USCG LF-2, located north of the present Base Exchange Store (BX) service station (see Figure 1), is where concrete blocks were dumped. A site study was done at this location in 1986 by an architectural engineering firm. Sections of asphalt and concrete were found at the study area. In addition, the area was determined to be low lying with poor drainage, making it unsuitable as a building site. No evidence of hazardous waste disposal was found.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was concurred by the following regulatory authorities within this report:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

There is no evidence of disposal of hazardous waste at this study area; therefore, no potential for contamination or contaminant migration exists. The site remains protective of human health and the environment.



APPENDIX A.18

Site Name: United States Coast Guard Landfill-3 Rubble Landfill

Site Description

Study Area USCG LF-3 is located just south of the entrance to the USCG Transmitter Station (see Figure 1). USCG LF-3 is a demolition rubble and debris landfill, which most recently received sand and gravel excavated during construction of a new dispensary building. Since the dispensary building study area was a wooded, nonindustrial area located on high ground, it is likely that the excavated soil was clean and dry. No written or visual evidence of disposal of hazardous wastes exists.

Discussion of Remedial Objectives

On the basis of information collected during the PA study for this area evaluation, including use of the HARM process, this site was recommended for NFA based on the absence of evidence of significant hazardous waste disposal and the nature and age of the study area.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was provided by the following regulatory authorities within this report:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

Because there is no evidence of disposal of hazardous wastes, there is no potential for contamination or contaminant migration, and the site remains protective of human health and the environment.



Appendix A.19

Site Name: Veterans Administration Chemical Spill-12 VA Cemetery Roads and Grounds Shop

Site Description

The Veterans Administration (VA) roads and grounds shop maintains the national cemetery of Massachusetts (see Figure 1) and has operated since 1980. All roads and grounds equipment is housed and maintained at the shop location. Currently the majority of pesticides and herbicides used at the cemetery are applied in powder or granular form and do not require mixing. However, those that required mixing with water were prepared on the tarmac. Any overflow from preparation activity was flushed with water. Containers were rinsed and the rinseate is sprayed at the point of application or used as dilutant for subsequent mixing operations, as appropriate.

Vehicle maintenance and washing occurred in three bays within the maintenance building. Floor drains from these bays, as well as from the flammable and toxic materials storage area, discharged to an oil/water separator, from which the water flowed into a leaching pit. All waste petroleum, oil, and lubricants (POL) and petroleum distillate solvent waste were temporarily stored in a 600-gallon UST and were periodically disposed of off base by a DRMO disposal contractor.

No significant spills of waste POL, petroleum distillate solvent waste, herbicides, or pesticides were recorded during the nine-year history of operations at this study area.

The VA maintains the Roads and Grounds Shop, including those operations that pertain to protection of the environment. As with other parts of MMR, the ANG Civil Engineering (CE) Department also has general responsibility for environmental protection on base. Because of the good operating record in this area, little attention has been necessary to upgrade, replace, or refurbish hazardous waste handling practices. However, should such engineering be required in the future, ANG CE would assist the VA in the effort.

Discussion of Remedial Objectives

A preliminary investigation was conducted by E.C. Jordon Co. which included interviews, past and present usage research, record reviews and on-site inspections and are described in a separate PA report (ORNL 1986b). On the basis of this information, including use of the HARM process, it was concluded that no evidence of hazardous waste exists at this area of concern and that No Further Action is necessary.

This decision for No Further Action being required is documented in a report titled *Decision Document for 11 Study Areas, Massachusetts Military Reservation Installation Restoration Program, August 1990*.

Mutual concurrence in the decision for No Further Action was concurred by the following regulatory authorities within this report:



March 1999

Frank Ciavattieri
United States Environmental Protection Agency, Region 1

21 May 1991

Robert Donovan
Commonwealth of Massachusetts
Department of Environmental Protection

11 July 1991

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

There is no evidence of past disposal or spills of hazardous wastes at this study area. Therefore, no contamination or contaminant migration exists, and the site remains protective of human health and the environment.



APPENDIX A.20

Site Name: Veterans Administration Landfill-5 VA Cemetery Rubble Landfill

Site Description

LF-5 is located in the vicinity of the Veterans Administration (VA) Cemetery (see Figure 1). It was used as a debris and concrete rubble fill area. No evidence exists, visual or reported, that any hazardous substances have ever been disposed of at this study area.

A preliminary investigation was conducted by E.C. Jordon Co. which included interviews, past and present usage research, record reviews and on-site inspections and are described in a separate PA report (ORNL 1986b). On the basis of this information, it was concluded that no evidence of hazardous waste exists at this area of concern and that No Further Action is necessary. Regulatory concurrence with this decision is provided in a report titled "*Decision Document for 11 Study Areas, MMR Installation Restoration Program, August 1990*" (HAZWRAP). Regulatory concurrence is provided by the following authorities:

Frank Ciavattieri United States Environmental Protection Agency, Region 1	21 May 1991
Robert Donovan Commonwealth of Massachusetts Department of Environmental Protection	11 July 1991

Discussion of Remedial Objectives

The remedial objectives of this site were to

- identify and evaluate past hazardous material disposal on the area of concern and
- determine the presence or absence of hazardous materials at the area of concern.

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

No Further Action is required.

Statement of the Continued Protection of Human Health and the Environment

There is no evidence that hazardous wastes were disposed of at this location. Therefore, no potential for contamination or contaminant migration exists.



APPENDIX B
Sites Closed Based on a Record of Decision

List of Sites

- B.1 Fuel Spill-12 Source
- B.2 Landfill-1 MMR Main Sanitary Landfill Source
- B.3 United States Coast Guard Chemical Spill-1 Transmitter Site (LTM only)
- B.4 United States Coast Guard Chemical Spill-3 BX Service Station



APPENDIX B.1

Site Name: Fuel Spill-12 Source

Site Description

As shown in Figure 2, AOC FS-12 is located west of Route 130 and north of Snake Pond in the Township of Sandwich. AOC FS-12 is in a wooded area that can be reached from State Route 130 by way of Greenway Road. The abandoned fuel pipeline runs along the north shoulder of Greenway Road, and the leak occurred at or near the unpaved road providing access to artillery range "L."

The nearest public access area is Camp Good News, a youth recreation and camping facility located in the rural setting immediately east of the boundary. Ponds and wetlands are located to the south of AOC FS-12.

AOC FS-12 is the location of a leak in an abandoned fuel pipeline along the base border in the Town of Sandwich. The pipeline carried both jet fuel and aviation gasoline during its use from 1965 to 1973. The leak was reported to have occurred in 1972. The FS-12 source area was subsequently identified as an approximately 11-acre area of contaminated vadose zone soil, groundwater, and floating product.

Since October 1995, AFCEE has removed over 44,580 pounds of contaminants using a remedial process called vapor extraction and air sparging. Contaminant removal has been completed; confirmation testing continues to ensure that the FS-12 source area has been cleaned up.

Discussion of Remedial Objectives

Based on calculations from the risk assessment, the risk values calculated for current/future exposure to groundwater indicate carcinogenic risk for human exposure to the groundwater. Two media, subsurface soil and groundwater, would require immediate attention for cleanup.

Therefore, general Remedial Action Objectives (RAOs) were provided for subsurface soil and the groundwater.

For subsurface soil, the RAOs include (1) preventing direct contact or ingestion of the soil and (2) preventing migration of benzene and ethylene dibromide (EDB) with concentrations that would contribute to groundwater concentrations greater than federal/state MCLs.

For groundwater, the RAOs include preventing the ingestion of water with concentrations of benzene and EDB equal to or in excess of the MCLs.

The remedial action utilized an air sparging/soil venting system to achieve in situ air stripping and biodegradation of petroleum-derived hydrocarbons from subsurface soils in the FS-12 AOC. Compressed air was supplied through 22 air sparging wells and withdrawn from the contaminated soil region by 21 soil venting wells. The wells were positioned to maintain a net negative pressure over this area of influence during operation of the air sparging system,



eliminating the potential for off-site migration of vapors generated as a result of the air sparging system.

Petroleum-derived contaminants in the soil vapor drawn from the venting wells include benzene, toluene, ethylbenzene, and xylene (BTEX). These contaminants were removed by passing the soil vapor through a catalytic oxidation unit. Trace amounts of EDB may also be present. Since EDB is not readily removed by thermal oxidization, effluent from the catalytic oxidation unit then passes through a carbon adsorption unit.

The Remedial Action Work Plan, Addendum No. 2 for Phase 2 discusses in detail the system operating schedule, baseline and operational sampling and analysis requirements, and closure criteria. The decision to deviate from the operational schedule and permanently terminate operation of the system was made by the IRP office, in consultation with regulatory agencies and HAZWRAP after review of monthly performance and monitoring data.

During demobilization, the site was cleared of any articles or features that could pose a threat to human health or the environment.

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

This decision document represents the selected removal action for the AOC FS-12 site in MMR on Cape Cod, Massachusetts, developed in accordance with CERCLA as amended and not inconsistent with the NCP.

Conditions at AOC FS-12 meet the NCP criteria for a removal action, which has been completed as planned.

Statement of the Continued Protection of Human Health and the Environment

Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain: Since the contaminated soils at AOC FS-12 were located approximately 70–90 feet below grade, there are no current threats to human health due to inhalation, ingestion, or dermal contact.

Actual or potential contamination of drinking water supplies: Soils contaminated with fuel-related organic compounds at AOC FS-12 are currently acting as a source of groundwater contamination. The contaminated groundwater plume threatens downgradient recreational ponds, wetlands, and the Town of Sandwich drinking water supply.

Hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release: None identified.

Actual or potential exposure to hazardous substances, pollutants, or contaminants by nearby populations or the food chain: Since the contaminated soils at AOC FS-12 were located



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approximately 70–90 feet below grade, exposure of contaminants at the source area to ecological populations or the food chain was not a risk.



APPENDIX B.2

Site Name: Landfill-1 MMR Main Sanitary Landfill Source

Site Description

AOC Main Base Landfill Number 1 (LF-1) Source Area is located on the southern half of MMR and is bounded by Turpentine and Frank Perkins Road to the east and west, and Herbert Road and Connery Avenue to the north and south, respectively (Figure 2).

Discussion of Remedial Objectives

The interim remedial plan, referred to as a preferred alternative, addressed AOC LF-1 Source control and recommends a method of minimizing further contamination from occurring using containment options evaluated during the Focused Feasibility Study (FFS).

The proposed remedy was selected to take action to protect human health and the environment in the short term while additional information is collected to better assess the response of the aquifer and contaminants for remediation efforts. Thus, the selected remedy is an interim remedy. The interim remedy will operate for a minimum of five years, during which time a final remedial action plan for AOC LF-1 Source Area will be developed. A final ROD for AOC LF-1 Source Area will be based on the data collected during the design, operation, and monitoring for the interim remedy and the findings of further characterization of the groundwater downgradient of 1947, 1951, and 1957 cells.

In summary, the interim remedy consists of (1) constructing a landfill cover system on the 1970 Cell, Post-1970 Cell, and Kettle Hole; (2) conducting postclosure maintenance and monitoring of the cover system on these cells for a minimum of 30 years after the completion of the cover; (3) monitoring landfill gas and groundwater quality semiannually and submitting results for regulatory agency review; and (4) NGB and appropriate regulatory agencies reviewing the effectiveness of the AOC LF-1 source interim remedial action every five years.

The interim remedial actions addressed the following response objectives:

- reduced contaminant leaching to groundwater,
- minimized migration of liquids through closed landfill cells, and
- maintain compatibility with the final remedial measures.

In 1993, EPA approved and MADEP concurred with the *Record of Decision Interim Remedial Action, Main Base Landfill (AOC LF-1) Source Area Operable Unit, Final January 1993*. The following regulatory authorities concurred with the course of action:

Julie Belaga
 Regional Administrator
 United States Environmental Protection Agency, Region 1
 14 January 1993

Daniel S. Greenbaum
 Commissioner
 Commonwealth of Massachusetts
 Department of Environmental Protection
 4 January 1993



In EPA's comments dated 30 September 1996 on AFCEE's responses to comments on the July 1996 *Draft AOC LF-1 Main Base Landfill Site Closure Report*, Paul Marchessault, EPA Region 1, found the comments to have been adequately addressed and the report ready to be finalized. Leonard Pinaud, MADEP, approved closure in a letter dated 3 October 1996. The report was finalized in September 1996. As required by the ROD and stipulated in the Postclosure Monitoring Plan, the long-term monitoring program according to the schedule contained in the closure report has now commenced.

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

Long-term monitoring as well as operation and maintenance activities will continue. The site will be reviewed again in five years.

Statement of the Continued Protection of Human Health and the Environment

The interim remedy has been completed and long-term monitoring has commenced. Postclosure monitoring shows that there are no indications that the integrity of the cells is degrading or that vent gases will require an active management system. Monitoring results indicate that the site remains protective of human health and the environment.



APPENDIX B.3

Site Name: United States Coast Guard Chemical Spill-1 Transmitter Site
 Long Term Monitoring (LTM) only

Site Description

The USCG Transmitter Station, designated AOC CS-1 (USCG) is located adjacent to the eastern boundary of MMR (Figure 2).

Discussion of Remedial Objectives

Record of Decision, US Coast Guard Transmitter Station (AOC CS-1 USCG), Final, September 1995 presented the selected No-Action decision for the MMR AOC CS-1 (USCG), chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986. To the extent practicable, the NCP was considered. The decision to select this remedial action is based on the administrative record file for this AOC, which was developed in accordance with Section 113(k) of CERCLA and is available for public review at the information repositories located at (1) the Falmouth Public Library, Falmouth, Massachusetts; (2) the ANG IRP Office at Otis ANG Base, Massachusetts; and (3) the EPA regional office at 90 Canal Street, Boston, Massachusetts.

NGB selected the alternative, which was approved by the following regulatory agencies:

Linda Murphy Divisional Director, Waste Management Division United States Environmental Protection Agency, Region 1	29 September 1995
George Crombie Regional Director Commonwealth of Massachusetts Department of Environmental Protection	29 September 1995

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

The long term monitoring for this site will continue as planned.

Statement of the Continued Protection of Human Health and the Environment

NGB, acting as executive agent of the USCG, and EPA, with concurrence of the Commonwealth of Massachusetts, have determined that No Action is necessary to address the contamination at AOC CS-1 (USCG). However, groundwater monitoring will be performed at well WW-7 for a period of five years to provide information over time on the levels of VOCs detected in this well and on the sporadic detection of inorganics in groundwater at this AOC. These compounds were detected below state and federal MCLs at this site. The chemicals at this AOC are at concentrations below those considered to present human health or ecological threats.



APPENDIX B.4

Site Name: United States Coast Guard Chemical Spill-3 BX Service Station

Site Description

AOC CS-3 (USCG) occupies approximately 3.5 acres in the south central portion of the MMR, north of Lee Road. The AOC is the former location of an automobile service and gasoline station. Currently, the site is mostly paved with a landscaped grassy area, a gravel parking lot in the eastern portion of the site, and aboveground storage tanks in the west-northwest corner of the site (Figure 2). The site is currently a gasoline station, convenience store, and garden shop known as the "3-in-1." Access to the site is unrestricted. Areas north, east, and west of AOC CS-3 (USCG) are grassy and wooded. The south side of Lee Road includes an open grassy space, several buildings, and a paved parking area. The base hospital is located approximately 1,000 feet northwest of the site.

Available documentation shows that activities may have introduced hazardous substances to the AOC occurred from 1951 to 1979. MOGAS was stored and dispensed, and maintenance operations were performed generating POL wastes. These waste materials were temporarily stored in a UST, Abandoned Tank (AT-23). Grease, oil, and other wastes were reportedly disposed of in a leaching well located at the eastern edge of Building 5202. Unleaded, regular, and premium grades of gasoline are currently dispensed at the fuel island, and waste oil is stored in an AST located behind the 3-in-1.

In 1985, AT-23 was found to be leaking. The UST and associated petroleum-contaminated soils were removed from the site, and a replacement aboveground tank was installed. Testing of the soil and groundwater at AOC CS-3 (USCG) identified that levels of TPH, VOCs, SVOCs, pesticides, and metals were low (below base action levels). However, due to the detection of contaminants in a water supply well downgradient of the AOC across Lee Road, the AOC received a HARM score sufficient to qualify it for further investigation (E.C. Jordan Co., 1986).

In 1994, three former gasoline USTs (Current Product Tanks [CPTs]-40, 41, and 42) were removed and replaced with aboveground tanks as part of the Fuels Upgrade Program in 1994. Approximately 340 cubic yards of contaminated soils was removed from the tank grave, and clean soils were backfilled.

The remedial investigation (RI) recommended "removal of the leaching well and the associated discharge pipes" and "removal of subsurface soils and sediments associated with the leaching well as part of the Drainage Structure Removal Program (DSRP)." Sediment and sludge inside the leaching well were removed during the DSRP, but the leaching well and associated discharge pipes (Orangeburg pipes) were not removed because they are partly buried beneath Building 5202 and removal of them would cause structural damage to the building. The leaching well was filled with concrete. Surface soil and subsurface soil samples collected around the pipes and the pipes' out-fall area showed limited contamination. A stockpile of soils that had been excavated during trenching for the construction of an optical cable line through another AOC on the base, FS-27, is located north of Building 5202. As a precaution, this area was sampled during the RI. Sampling confirmed that the stockpile was not contaminated.



Discussion of Remedial Objectives

The preliminary records review for AOC CS-3 (USCG) was conducted and issued as the SI in 1986. The RI was conducted to characterize the nature and distribution of contaminants at AOC CS-3 (USCG) during 1991.

Several source areas were investigated at AOC CS-3 (USCG), including the embankment (soil pile from FS-27), the former USTs CPT-40, -41, and -42, the former UST CPT-43, the former UST at AT-23, and the abandoned leaching well with Orangeburg pipes. Orangeburg pipes are perforated clay tile pipes that serve as overflow drainage for the leaching well during high-flow episodes. Surface and subsurface soil samples were collected from these locations.

Compounds detected sporadically in surface and subsurface soil samples included TPH, VOCs (i.e., 1,2-dichloromethane, toluene, xylenes, and ketones), SVOCs [i.e., bis-2(ethylhexyl) phthalate, benzo(a)pyrene, benzo(b)fluoranthene], and pesticides [i.e., chlordane, dichlorodiphenyltrichloroethane (DDT)]. Detected concentrations of these compounds and metals were below the MMR soil action levels.

A ground-penetrating radar (GPR) survey was conducted to locate the former UST, CPT-43. This 10,000-gallon tank was reportedly installed in the 1970s for storing diesel fuel. However, there is no record that the tank was ever used. The GPR survey could not locate this tank.

Groundwater was sampled from five borings and six wells in the vicinity of AOC CS-3 (USCG) during the RI field effort in 1993 and 1994. Groundwater samples contained sporadic detections of VOCs (i.e., 1,2-dichloromethane, ethylbenzene, toluene, xylenes, and ketones), SVOCs (i.e., trimethylbenzenes), and metals (i.e., mercury, lead, and thallium). Detected concentrations of these compounds and metals were below the MMR groundwater action levels.

AFCEE, USCG, and EPA, with concurrence of the Commonwealth of Massachusetts, have determined that no remedial action is necessary at AOC CS-3 (USCG). The No Further Action decision is documented in *IRP Record of Decision, AOC CS-3 (USCG) 3-in-1 Store, MMR, Cape Cod, Massachusetts, Final, September 1998*. Regulatory concurrence was provided by the following authorities:

Frank Ciavattieri for
Patricia L. Meaney
Director, Office of Site Remediation and Restoration
US Environmental Protection Agency

30 September 1998



Paul Taurasi, P.E.
Regional Director
Commonwealth of Massachusetts
Department of Environmental Protection

29 September 1998

Areas of Noncompliance

There are no areas of noncompliance.

Recommendations

AFCEE and EPA have determined that no further CERCLA action is required at AOC CS-3 (USCG). Because levels of chemicals detected in the soil and groundwater at this AOC do not pose an unacceptable risk to human health or the environment, No Further Action will be undertaken.

Statement of the Continued Protection of Human Health and the Environment

A risk assessment was conducted to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with AOC CS-3 (USCG). The risk assessment was conducted using a phased approach, as described in the MMR IRP Risk Handbook (Automated Sciences Group, Inc., 1994). No chemical levels detected in the soil and groundwater at this site pose an unacceptable risk to human health or the environment.

