

**INSTALLATION ACTION PLAN
FOR
DEFENSE ENVIRONMENTAL
RESTORATION PROJECT SITES
FORT MONMOUTH, NEW JERSEY**

JUNE 1996

**PREPARED BY:
DIRECTORATE OF PUBLIC WORKS
ENVIRONMENTAL OFFICE**

FORT MONMOUTH

1. STATUS:

Confirmed on-post soil, ground water and surface water contamination. Non-NPL site with written agreement with state regulator.

2. TOTAL NUMBER OF DSERTS SITES: 31 Sites/13 Response Complete

3. DIFFERENT SITE TYPES:

7 Closed Landfills	2 Neutralization Pits
2 Suspected Landfills	3 Former Sewage Treatment Plants
1 Sludge Dump Site	1 Sewage Lift Station
2 Former PCB Transformer Sites	2 Indoor/Outdoor Small Arms Ranges
3 Former Pesticide Storage Areas	1 Former Training Area
2 Former Incinerator Sites	2 Water Tank Sites
1 Former Burning Area	1 Former Asbestos Storage Area
1 Former Temporary Hazardous Waste Storage Area	

4. MOST WIDESPREAD CONTAMINANTS OF CONCERN:

Trichloroethene	Petroleum/Oil/Lubricants (POL)
Tetrachloroethene	Pesticides
Chlorobenzene	Arsenic
Benzene	Cadmium
1,2 - Dichloroethene	Lead

5. MEDIA OF CONCERN:

Ground Water, Soil, Surface Water

6. COMPLETED REM/IRA/RA:

IRA - Cleanup of Solid Waste Debris at FTMM-24 (FY95) Cost: \$75.0K

7. CURRENT IRP PHASE:

RC at 13 sites	IRA at 1 site
SI at 2 sites	RA at 3 sites
RI at 3 sites	LTM at 12 sites

8. PROJECTED IRP PHASE:

RI at 1 site	RA at 2 sites
RD at 1 site	LTM at 15 sites

9. IDENTIFIED POSSIBLE REM/IRA/RA:

RA at 4 sites

10. FUNDING:

Prior Year Funds	\$ 1,539.0K
FY96 Funds	\$ 407.0K
Future Requirements	<u>\$ 3,182.0K</u>
Total	\$ 5,128.0K

11. DURATION:

Year of IRP Inception	1994
Year of IRP Completion	2009

**INSTALLATION ACTION PLAN
FOR
FORT MONMOUTH**

1. INSTALLATION INFORMATION

LOCALE (See Figure 1.1-1)

Fort Monmouth is located in the central-eastern portion of New Jersey in Monmouth County. The installation contains two subposts (Charles Wood Area and the Evans Area), in addition to the Main Post, which are located within a 12 mile radius of the Main Post. The Main Post encompasses an area of approximately 630 acres and is bounded by State Highway 35 to the west, Parkers Creek and Lafetra Creek to the north, the New Jersey Transit Railroad to the east and a residential neighborhood to the south. The Charles Wood Area is composed of approximately 511 acres and is located 1 mile west of the Main Post. The Charles Wood Area is bounded by Tinton Avenue to the north, residential development and Pine Brook Road to the south and the Garden State Parkway to the west. The Evans Area is being managed under the Base Realignment and Closure (BRAC) program which was implemented in fiscal year (FY) 1993. Environmental issues relating to the Evans Area will not be the subject of this report.

COMMAND ORGANIZATION

Major Command:	U.S. Army Materiel Command
Subcommand:	U.S. Army Communications-Electronics Command
Installation:	U.S. Garrison Fort Monmouth, Directorate of Public Works

INSTALLATION RESTORATION PROGRAM (IRP) EXECUTING AGENCY

The Directorate of Public Works is the executing agency for all IRP projects.

REGULATOR PARTICIPATION

State: New Jersey Department of Environmental Protection, Division of Responsible Party Site Remediation, Bureau of Federal Case Management

REGULATORY STATUS

Non-NPL site with written agreement with state regulator.

SIGNIFICANT CHANGES TO IRP FROM THE PREVIOUS YEAR

FY96 is the first year an Installation Action Plan is required.

2. INSTALLATION DESCRIPTION

MISSION:

Fort Monmouth is an active U.S. Army installation. The primary mission of Fort Monmouth is to provide command, administrative, and logistical support for Headquarters, U.S. Army Communications-Electronics Command (CECOM). The support provided by the installation is used by host and tenant activities in the performance of research, development, engineering, and acquisition of assigned communications and electronic systems; and the management of all materiel readiness functions associated with these systems and related equipment.

HISTORY:

The Main Post of Fort Monmouth was established on 17 June 1917 as Camp Little Silver. The site of the Main Post had formerly been a horse racetrack, but the track had been idle since 1890. The name of the Camp was changed after 3 months to Camp Alfred Vail. The initial mission of the Camp was to train Signal Corps operators for service in World War I. In the first 19 months of the Camp's existence, 129 semi-permanent structures were built, a tent camp established on the site of a former swamp, and a parade ground established on the site of a former marsh. A radio laboratory and an airfield were developed in 1918. After the war, Camp Vail was designated as the site of the Signal Corps School, the only training area for Signal Corpsmen in the country. All but four World War I structures were demolished by 1924.

In 1925 the facility became a permanent post and its name was changed to Fort Monmouth. The primary mission of Fort Monmouth continued to be Signal Corps training and electronics research. In 1934, laboratory operations were consolidated in a new facility, Squier Laboratory (Building 283). Research on radios and radar continued here until the early 1950's. During World War II, the pace of training increased tremendously at Fort Monmouth. The expanded laboratory effort was accomplished by starting new laboratories at other post facilities. Squier Laboratory continued to be the principal laboratory on Main Post until 1954. In 1955 and 1956, 72 World War II wooden structures were demolished to make room for permanent structures. These new buildings were used for residential, administration, commercial, and recreational purposes. A small number of additional administrative buildings were completed during the 1970's, 1980's and 1990's.

Camp Charles Wood was purchased in 1941 and opened in 1942. The eastern half of the property was formerly a golf course, and the western half was residential and farmland. During World War II, the Camp was used for training Signal Corpsmen. Antenna shelters were constructed on 26.5 acres of land and used by the Signal Corps Laboratory for research and development (R&D) purposes.

A new R&D facility, the Myers Center (Building 2700), was completed in 1954. R&D activities that had formerly been conducted at Squier Laboratory and some activities from the Evans Area were transferred to Myers Center. To this day, laboratories within the Myers Center facility continue to develop state of the art electronic and communications equipment for use by the U.S. Armed Forces.

ENVIRONMENTAL SETTING:

Both Main Post and Charles Wood lie within the New Jersey Coastal Plane physiographic province. These formations consist of unconsolidated deposits of clay, silt, sand, and gravel. The Coastal Plain sediments are predominantly derived from deltaic, shallow marine, and continental shelf environments. The geologic formations that outcrop on Main Post are the Red Bank and Tinton Sands. Both are medium-to-coarse grain sands that are clayey and contain glauconite. Water is encountered in these formations at shallow depths (2 to 9 ft below ground surface). The water near the surface has low dissolved solids and high calcium, magnesium, and iron content. Ground water in the shallow aquifer flows eastward towards the Atlantic Ocean, although local topography will tend to deflect the flow towards local depressions.

The land surface at Main Post is relatively flat and ranges in elevation from 4 feet above mean sea level (msl) in the east to 32 feet msl in the western end of the post. There are two creek systems on Main Post. Mill Creek and Lafetra Creek join on the post to form Parkers Creek, which flows along the northern boundary of Main Post. Husky Brook drains the southern portion of the post. Both creeks flow west-to-east into Oceanport Creek. Most of Parkers Creek, Lafetra Creek, Husky Brook, and Mill Creek are tidally influenced. The creeks are classified as wetlands by the U.S. Fish and Wildlife Service National Wetlands Inventory. The land surface at Charles Wood slopes from 72 feet msl in the southwest to 20 feet msl at the eastern end. Charles Wood is principally drained by an unnamed tributary of Wampum Brook and Wampum Brook itself. Wampum Brook eventually flows into Mill Creek, which crosses Main Post. Wampum Brook is not tidally influenced. The creeks and the lake on the golf course are classified as wetlands by the U.S. Fish and Wildlife Service.

The Monmouth County Soil Survey classified most of the soil on Main Post as urban land (developed land with disturbed soils) and labeled the soil as udorthent soils (soils altered by excavating or filling). The small portion of the post that is otherwise classified includes a mixture of soil types (loam, clay, sandy loam, etc.) and has low-to-moderate permeability and is poorly-to-well drained. Soils at Charles Wood are sandy loam to loamy sand with moderate permeability and are poorly-to-well drained. A relatively small portion of the soils is classified as udorthent. The geologic formations that outcrop on Charles Wood are the Tinton and Hornerstown Sands. The Hornerstown Sand is a fine-to-coarse grain sand, clayey, and contains glauconite. Because of the high silt and clay content, the Hornerstown sand most likely serves as an aquitard or aquiclude rather than as an aquifer.

3. CONTAMINATION ASSESSMENT

A. ASSESSMENT OVERVIEW

Suspected hazardous waste sites were initially identified at Fort Monmouth in a 1980 report prepared by the U.S. Army Environmental Center (USAEC), formerly known as the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). This report identified 37 sites with known or suspected waste materials on the Main Post and the two subposts (Charles Wood and Evans Area). In February of 1993, the Directorate of Public Works (DPW) entered into a written agreement with the New Jersey Department of Environmental Protection (NJDEP) to investigate all areas of known or suspected contamination. The regulatory requirements for implementing this action are outlined in New Jersey Administrative Code (N.J.A.C.) 7:26D, Cleanup Standards for Contaminated Sites and N.J.A.C. 7:26E, Technical Requirements for Site Remediation. Following this agreement, a Preliminary Assessment (PA) was implemented to investigate each of the 37 sites, plus 8 additional sites which were identified by the DPW and the NJDEP. The PA commenced in August of 1993 and was completed in December of that same year. With the onset of BRAC 93, all Evans related issues were removed from further consideration under the PA phase. The CECOM BRAC Office became the lead agency for managing all BRAC 93 program initiatives for the Evans Area. With the removal of the Evans sites from further consideration, a total of 32 sites became the subject of this investigation. Twenty-one of the sites are located on the Main Post and eleven sites are located in the Charles Wood Area. The 32 areas of environmental concern include closed landfills, suspected landfills, a sludge dump, former PCB transformer sites, former pesticide storage and mixing areas, closed incinerator sites, former sewage treatment plants, neutralization pits, indoor/outdoor small arms ranges, a former training area and a former temporary hazardous waste storage area.

A Site Investigation Work Plan was developed concurrently during the PA phase. The Preliminary Assessment/Site Investigation Work Plan outlines field activities for investigating 23 sites (thirteen Main Post sites and ten Charles Wood sites). A "No Further Action" determination was proposed for 9 sites (eight Main Post sites and one Charles Wood site). The Preliminary Assessment/Site Investigation Work Plan was submitted to the NJDEP in December of 1993 and subsequently approved by said agency in April, 1994. Implementation of the Site Investigation Work Plan commenced in November of 1994. Field activities conducted under the Site Investigation (SI) phase included surface geophysical investigations, surface and subsurface soil sampling, sediment and surface water sampling, ground water monitor well installation and sampling and tidal monitoring. In general, a majority of the environmental samples collected were analyzed for a full Target Compound List (TCL) + 30 scan, a Target Analyte List (TAL) scan and cyanide. A breakdown of the TCL + 30 scan includes analyzes for the following types of compounds: volatile organics, base neutral acid extractables, pesticides, herbicides and polychlorinated biphenyls (PCBs). A TAL scan includes analyzes for 23 metals. Field activities under the SI phase were completed in May of 1995.

Sample results from the SI were evaluated by comparing them to NJDEP regulatory standards (N.J.A.C. 7:26D) and background sample results. Sample results were first compared to NJDEP regulatory standards. If a sample result exceeded the regulatory criteria, then it was compared against the maximum background concentration. Compounds that exceeded the regulatory standard and the established background at a particular site were classified as compounds of concern. The primary compounds of concern identified in the SI report include Trichloroethene (TCE), Tetrachloroethene (PCE), Chlorobenzene, Benzene, 1,2 - Dichloroethene, Total Petroleum Hydrocarbons (TPH), Pesticides, Arsenic, Cadmium and Lead. These compounds were identified in soil, sediment, surface water and ground water.

The Final SI Report was completed and presented to the NJDEP in December of 1995. The SI phase identified 16 sites with contaminant levels above NJDEP regulatory standards in one or more environmental medias. Contaminant levels at five sites are below regulatory concern. Two areas of concern are still in the SI phase. The Final SI Report includes recommendations for the 20 areas of concern. Several factors were considered before our site specific recommendations were finalized, they include: degree regulatory standards were exceeded, environmental media impacted, human and ecological receptors, feasibility for cleanup, natural attenuation versus active remediation, and the economic impact. Recommendations listed in the report include: long term surface and ground water monitoring, further delineation of contaminants, a remedial design/remedial action for soils and ground water impacted by volatile organic compounds and several remedial actions involving the removal and disposal of contaminated soil. The NJDEP conditionally approved the Final SI Report in April of 1996. A follow up meeting was held on 14 May 96 with the NJDEP to discuss outstanding issues and to seek clarification on several fronts. The DPW will be responding in writing to the NJDEP in the June/July 96 time frame.

An in-house program to monitor surface water and ground water on a long term basis is currently being developed within the DPW. Twelve areas of concern (DSERTS sites FTMM-02, 03, 04, 05, 08, 12, 14, 16, 18, 22, 23 & 28) have been identified for the monitoring program. The DPW maintains a NJDEP certified analytical laboratory which has grown tremendously over the last several years. The laboratory is staffed with highly qualified contractor personnel. The initial laboratory expansion was attributed to supporting the in-house underground storage tank removal program. The current expansion is being driven by multiple Defense Environmental Restoration Project (DERP) sites requiring long term monitoring. The expansion which is underway includes leasing two gas chromatography/mass spectrometry (GC/MS) units and two atomic absorption units. The leases are set up to run for a period of 3 years. At the end of the lease period, the instruments become the property of the DPW. Defense Environmental Restoration Account (DERA) funding under A-106 Project # FM0096F118 is being used to pay for the equipment leases. In addition, the same project funding is being utilized to staff two man years to support the long term monitoring program. A GC/MS chemist and a field sampler have been added to the contractor staff. The DPW estimates that a cost savings of \$ 4,644,400.00 will be realized over a ten year period by conducting the long term monitoring program in-house versus contracting out the required services.

Two areas of concern (DSERTS sites FTMM-24 & 25), both suspected landfills, are still in the SI phase. Exploratory trenching will be performed at each site to determine if subsurface disposal of waste materials occurred at the sites. The trenching work will be performed by our in-house staff and work is currently scheduled for the June/July 96 time frame. If no waste materials are identified at the sites, a "No Further Action" determination shall be requested from the NJDEP. In the event waste materials are identified, soil and ground water samples will have to be collected to evaluate the impact the waste materials have had on the site.

Four areas of concern (DSERTS sites FTMM-05, 22, 23 & 29) have been identified as requiring additional Remedial Investigation (RI) work. The M-5 site (FTMM-05) exhibits elevated levels of PCE within ground water. The compound of concern exceeds the NJDEP Ground Water Quality Criteria by a factor of 109. An A-106 project (FM0096F135) has been identified for FY97 DERA funding to further investigate the source and extent of the PCE contamination. The CW-1 site (DSERTS site FTMM-22) exhibits high levels of TCE, PCE and 1,2 - Dichloroethene within site soil and ground water. Compounds of concern exceed the NJDEP Ground Water Quality Criteria by a factor of 913. A soil gas survey has been completed and three additional monitoring wells have been installed at the site under the RI phase. The results of the RI have determined that the compounds of concern are migrating both horizontally and vertically in site soil and ground water. The CW-2 site (DSERTS site FTMM-23) exhibits levels of PCE slightly above NJDEP Ground Water Quality Criteria. A soil gas survey has been completed at the site under the RI phase. Soil gas survey data indicates a minimal impact to the surrounding environment. The CW-2 site will be included in the long term monitoring program. The CW-7 site (DSERTS site FTMM-29) exhibits elevated levels of PCBs within site soil. The compound of concern exceeds the NJDEP Soil Cleanup Criteria by a factor of 204. Under the RI phase, additional soil samples will be collected to further delineate the extent of the PCB contamination at the site. This work is currently scheduled for the late May, early June 96 time frame. An A-106 project (FM0096F137) has been identified for FY97 DERA funding to actively remediate the site.

One area of concern has been identified as requiring a Remedial Design (RD). The CW-1 site (DSERTS site FTMM-22) exhibits high levels of TCE, PCE and 1,2 - Dichloroethene in ground water. Data gathered under the RI phase has determined that compounds of concern are migrating both horizontally and vertically in site soil and ground water. An A-106 project (FM0096F133) has been identified for FY97 DERA funding to perform a RD at the CW-1 site. The RD will focus on three potential treatment technologies, they include: in-stu bioremediation, air sparging/soil vapor extraction (SVE) treatment and vacuum-vaporizer (UVB) treatment.

Six areas of concern (DSERTS sites FTMM-15, 16, 18, 22, 26 & 29) have been identified as requiring a Remedial Action (RA). RA's for the M-15 site (FTMM-15), M-16 site (FTMM-16) and the CW-4 site (FTMM-26) all involve the removal and offsite disposal of soils contaminated by pesticides and heavy metals. FY96 DERA funding has been received to execute these three projects. Cleanup work is scheduled to start in the

July/August 96 time frame. The RA for the M-18 site (FTMM-18) involves the removal and the offsite disposal of soil contaminated by gasoline and diesel fuel. The source of the contamination is from military vehicles and emergency field generators. Excavation of the contaminated soil will be performed by our in-house staff and work is scheduled to start in the July/August 96 time frame. The M-18 site will be included in the long term monitoring program. The RA for the CW-1 site (DSERTS site FTMM-22) will be implemented based on the results of the RD plan. An A-106 project (FM0096F134) has been identified for FY97 DERA funding to implement a remedial action at the CW-1 site. The CW-1 site will be included in the long term monitoring program. The RA for the CW-7 site (DSERTS site FTMM-29) involves the removal and offsite disposal of soil contaminated by PCBs. An A-106 project (FM0096F137) has been identified for FY97 DERA funds to implement a remedial action at the CW-7 site.

Table 1 lists all previous studies completed at Fort Monmouth.

TABLE 1

PREVIOUS STUDIES AT FORT MONMOUTH

1. U.S. Army Toxic and Hazardous Materials Agency, May 1980, Installation Assessment of Fort Monmouth, Report No. 171, Aberdeen Proving Ground, Maryland.
2. U.S. Army Communications-Electronics Command, Historical Office, July 1985, A Concise History of Fort Monmouth, New Jersey.
3. Harland Bartholomew & Associates, Inc., May 1987, Analytical/Environmental Assessment Report on Plans for Future Development At Fort Monmouth, Richmond, Virginia.
4. U.S. Army Toxic and Hazardous Materials Agency, June 1988, Update of the Initial Assessment of Fort Monmouth and Subinstallations: Charles Wood Area and Evans Area, Report No. 171, Aberdeen Proving Ground, Maryland.
5. Roy F. Weston, Inc., December 1993, Investigation of Suspected Hazardous Waste Sites at Fort Monmouth, New Jersey, West Chester, Pennsylvania.
6. Roy F. Weston, Inc., October 1994, Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Chemical Data Acquisition Plan, West Chester, Pennsylvania.
7. Roy F. Weston, Inc., October 1994, Site Investigation, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, Safety, Health and Emergency Response Plan, West Chester, Pennsylvania.
8. Roy F. Weston, Inc., December 1995, Final Site Investigation Report, Fort Monmouth, New Jersey, Main Post and Charles Wood Areas, West Chester, Pennsylvania.

B. SITE DESCRIPTIONS

M-2 Landfill (FTMM-02):

The M-2 landfill is located in the southwestern corner of the Main Post, on the south bank of Mill Creek. The 6.5 acre landfill operated from 1964 until 1968. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Metal, concrete and other types of landfill debris can be observed protruding from the stream bank along Mill Creek. A future corrective action project to stabilize the stream bank may be required. Under the SI phase, three monitoring wells were installed to evaluate ground water quality. In addition, surface water samples were collected from Mill Creek. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Chlorobenzene, arsenic and lead were detected in downgradient monitoring wells above NJDEP Ground Water Quality Criteria. Chlorobenzene was also detected in an upgradient monitoring well above NJDEP Ground Water Quality Criteria. TCE and PCE were detected in surface water above NJDEP Surface Water Criteria.

Contaminant of Concern: TCE, PCE, chlorobenzene, arsenic, lead

Media of Concern: Ground water, surface water

RRSE Rating: 1A (High with regulator agreement)

Completed IRP Phase to Date: PA/SI

Current IRP Phase: Long term monitoring (A-106 # FM0096F118)

Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of surface water and ground water at the M-2 landfill has been approved by the NJDEP. A future corrective action project to stabilize the stream bank along Mill Creek may be required.

M-3 Landfill (FTMM-03):

The M-3 landfill is located between North Drive and Lafetra Creek in the west-central part of the Main Post. The 5.9 acre landfill operated from 1959 until 1964. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Under the SI phase, three monitoring wells were installed to evaluate ground water quality. In addition, surface water samples were collected from Lafetra Creek. All

(FTMM-03 continued)

samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Chlorobenzene and lead were detected in downgradient monitoring wells above NJDEP Ground Water Quality Criteria. No compounds of concern were detected in surface water samples collected during the SI phase. Surface water samples collected under a now expired New Jersey Pollutant Discharge Elimination System (NJPDES) permit identified PCE above NJDEP Surface Water Criteria.

Contaminant of Concern: PCE, chlorobenzene, lead
Media of Concern: Ground water, surface water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of surface water and ground water at the M-3 landfill has been approved by the NJDEP.

M-4 Landfill (FTMM-04):

The M-4 landfill is located in the area bounded by Avenue of Memories to the south, North Drive to the north, Mill Creek to the west and Wilson Avenue to the east. The 1.4 acre landfill operated from 1955 until 1956. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Under the SI phase, three monitoring wells were installed to evaluate ground water quality. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. A single pesticide (4,4 DDT) was detected in an upgradient monitoring well above NJDEP Ground Water Quality Criteria.

Contaminant of Concern: 4,4 DDT
Media of Concern: Ground water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of ground water at the M-4 landfill has been approved by the NJDEP.

M-5 Landfill (FTMM-05):

The M-5 landfill is located just north of the M-4 landfill in the area bounded by North Drive to the south, an unpaved road south of Building 198 to the north, Wilson Avenue to the east and Mill and Parkers Creek to the west. The 3.2 acre landfill operated from 1952 until 1959. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Under the SI phase, two monitoring wells were installed to evaluate ground water quality. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Elevated levels of PCE were detected in an upgradient monitoring well. The compound of concern exceeds the NJDEP Ground Water Quality Criteria by a factor of 109. Surface water samples collected under a now expired NJPDES permit identified PCE above NJDEP Surface Water Criteria.

Contaminant of Concern: PCE
Media of Concern: Ground water, surface water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Remedial Investigation (A-106 # FM0096F135)

Recommendation for future response: An A-106 project (FM0096F135) has been identified for FY97 DERA funding to further investigate the source and extent of the PCE contamination.

M-6 Burning Area (FTMM-06):

The M-6 burning area consisted of open-air wood burning in small pits located within the M-3 landfill. Specific pit locations cannot be discerned from aerial photographs or site reconnaissance. According to interviews with Fort Monmouth personnel, the open-air wood burning practices were conducted to reduce the volume of waste materials being placed into the M-3 landfill. The investigation of the M-6 site was incorporated into field activities referenced for the M-3 landfill (FTMM-03).

M-7 Burning Area (FTMM-07):

The 1980 Installation Assessment (IA) report prepared by USAEC identified the M-7 burning site as a potential area of concern. The M-7 burning area was a former incinerator located within Building 697. The site is located in the north central area of the Main Post near the M-8 landfill. The incinerator was used until 1990 for burning classified documents. Since 1990, disposal of classified papers involves shredding the documents.

(FTMM-07 continued)

Prior to closure, the incinerator operated under a NJDEP air permit. The incinerator was dismantled in November of 1993.

Contaminant of Concern: CO, CO2, Particulates
Media of Concern: Air
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-8 Landfill (FTMM-08):

The M-8 landfill is located north of Buildings 692 and 697 in a bend of Parkers Creek. The 7.2 acre landfill operated from 1962 until 1981. Following closure of the M-8 landfill, all solid wastes generated at Fort Monmouth were directed to the Monmouth County landfill. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Under the SI phase, four monitoring wells were installed to evaluate ground water quality. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Benzene and chlorobenzene were detected in downgradient monitoring wells above NJDEP Ground Water Quality Criteria. PCE was detected in an upgradient monitoring well above NJDEP Ground Water Quality Criteria.

Contaminant of Concern: PCE, benzene, chlorobenzene
Media of Concern: Ground water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of ground water at the M-8 landfill has been approved by the NJDEP.

M-9 Former PCB Transformer Site (FTMM-09):

The 1980 IA report (USAEC) identified the M-9 site as a PCB transformer location. The site identified in the IA is where Bldgs. 1150 and 1152 are located. These buildings are found in the western portion of the Main Post, south of Avenue of Memories. Records review and site reconnaissance work conducted under the PA phase revealed no transformers at the M-9 site were leaking in 1980 or at any other time. Prior to 1989, the policy at Fort Monmouth was to label all transformers as containing PCBs unless available test data proved otherwise. An A-106 project (FM0089F005) was implemented in 1989 to sample and test all transformers with no available data for PCB content. The survey was completed in 1990. Test results for the transformers located at the M-9 site revealed PCB levels all below 50 parts per million (ppm). Under the Toxic Substance Control Act (TSCA), all transformers containing PCBs at levels less than 50 ppm are considered Non-PCB Class Equipment.

Contaminant of Concern: PCBs
Media of Concern: Soil, concrete
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response complete
Future IRP Phase: Response complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-10 Asbestos Storage Area (FTMM-10):

The 1980 IA report (USAEC) identified the M-10 site as an asbestos storage area. The report identifies the site as being adjacent to Bldg. 1220 which is located in the northwest area of the Main Post. Bldg. 1220 is the main boiler plant which provides heat and hot water for all buildings located in the 1200 area. Interviews with DPW personnel indicate that the storage area was located across the street to the west of Bldg. 1220. Containers of new spray-on asbestos were stored in a metal shed until they were used elsewhere in the facility. The shed has sheet metal walls and is built on a concrete pad. The primary purpose of the shed has always been to store machine parts for the boiler plant. Under the PA phase, the metal shed was inspected for evidence of asbestos containing materials, none were found.

Contaminant of Concern: Asbestos
Media of Concern: Air, soil, concrete
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response complete
Future IRP Phase: Response complete

(FTMM-10 continued)

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-11 Elevated Water Tank (FTMM-11):

The 1980 IA report (USAEC) identified the M-11 site as a potential area of concern. The M-11 site consists of a large elevated tank that contains water. The tank was constructed in the 1940s and is located in the center of the Main Post. The tank is used to boost the water pressure in the water distribution system for fire-fighting purposes. Under the PA phase, site reconnaissance work revealed no visible stains, stressed soil or vegetation at the site. In addition, no visible debris such as paint chips were observed.

Contaminant of Concern: Lead
Media of Concern: Soil
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response complete
Future IRP Phase: Response complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-12 Landfill (FTMM-12):

The M-12 landfill is located on the Main Post, on the south side of Husky Brook, west of Murphy Drive. Dates of operation for the 1.4 acre landfill are unknown. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Metal, concrete and other types of landfill debris can be observed protruding from the stream bank along Husky Brook. A future corrective action project to stabilize the stream bank may be required. Under the SI phase, three monitoring wells were installed to evaluate ground water quality. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Arsenic, cadmium, mercury and lead were detected in site monitoring wells slightly below NJDEP Ground Water Quality Criteria. Surface water samples collected under a now expired NJPDES permit identified TCE, 1,2 - Dichloroethene, 1,1,1 - Trichloroethane, arsenic and mercury above NJDEP Surface Water Criteria.

(FTMM-12 continued)

Contaminant of Concern: TCE, 1,2 - Dichloroethene,
1,1,1 - Trichloroethane, arsenic, mercury
Media of Concern: Ground water, surface water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of surface water and ground water at the M-12 landfill has been approved by the NJDEP. A future corrective action project to stabilize the stream bank along Husky Brook may be required.

M-13 Pathogenic Waste Incinerator (FTMM-13):

The 1980 IA report (USAEC) identified the M-13 site as a potential area of concern. The pathogenic waste incinerator formerly located on the west side of Bldg. 1076 was constructed in 1975. Bldg. 1076 is the site of a boiler plant which provides heat and hot water for Patterson Army Community Hospital (Bldg. 1075). The incinerator was approximately 5-ft-by-6-ft-by-6-ft-high metal unit which was propane fired. The incinerator was used to burn medical waste generated from the hospital. The unit was tested for compliance with NJDEP air standards and achieved compliance at a maximum charging rate of 57 lbs/hr in 1977. No state permit was required because the incinerator was operating before the 1977 revision to the Clean Air Act (CAA). In accordance with a written agreement with the NJDEP, the pathogenic waste incinerator was taken out of service in December of 1992. A contract for offsite disposal of all generated medical waste was established prior to unit closure. Under the PA phase, site reconnaissance work revealed no ash or debris in or around the incinerator unit. The incinerator was dismantled in November of 1993.

Contaminant of Concern: CO, CO2, Particulates
Media of Concern: Air
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-14 Landfill (FTMM-14):

The M-14 landfill is located on the Main Post, on the north side of Husky Brook, west of Murphy Drive. The 6.9 acre landfill operated from 1965 until 1966. The types of materials disposed of in the landfill have been reported to include: construction debris, scrap metal, asbestos containing materials, vegetative waste, unwashed containers which previously held hazardous materials/wastes, outdated photographic chemicals, small quantities of outdated drugs, sludge from the sewage treatment plant, soot and boiler scale, incinerator ash, oil spill debris, oil filters, batteries, fluorescent tubes, and electronic components. Metal, concrete and other types of landfill debris can be observed protruding from the stream bank along Husky Brook. A future corrective action project to stabilize the stream bank may be required. Under the SI phase, three monitoring wells were installed to evaluate ground water quality. In addition, surface water samples were collected from Husky Brook. All samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. Lead was detected in one downgradient monitoring well above NJDEP Ground Water Quality Criteria. Lead and 1,2 - Dichloroethene were detected in surface water samples slightly below NJDEP Surface Water Quality Criteria. Surface water samples collected under a now expired NJPDES permit identified TCE, 1,2 - Dichloroethene, 1,1,1 - Trichloroethane, lead and mercury above NJDEP Surface Water Criteria.

Contaminant of Concern: TCE, 1,2 - Dichloroethene,
1,1,1 - Trichloroethane, lead, mercury
Media of Concern: Ground water, surface water
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of surface water and ground water at the M-12 landfill has been approved by the NJDEP. A future corrective action project to stabilize the stream bank along Husky Brook may be required.

M-15 Water Tank (FTMM-15):

The 1980 IA report (USAEC) identified the M-15 site as a potential area of concern. A 500,000 gallon above ground storage tank is located at the M-15 site. The tank was built in 1941 and is of steel construction. It has always been used for the storage of potable water. The tank is located in the northeast section of the Main Post next to Parkers Creek which is a tributary of the Shrewsbury river. Under the SI phase, environmental contaminants in the form of pesticides and heavy metals were identified in site soil. Two pesticides, 4,4-DDE and 4,4-DDT, were identified above NJDEP Direct Contact Soil Cleanup Criteria. It has been determined that the pesticide contamination is the result of past over spraying practices. Three heavy metals, cadmium, lead and zinc, were also identified above NJDEP

(FTMM-15 continued)

Direct Contact Soil Cleanup Criteria. Environmental sampling has confirmed that the contaminants are migrating horizontally towards Parkers Creek. FY96 DERA funding has been received to implement a corrective action at the M-15 site. The selected remedial alternative involves removing the contaminated soil from the site thereby eliminating the contaminants of concern. Cleanup work is scheduled to start in the July/August 96 time frame.

Contaminant of Concern: 4,4-DDE, 4,4-DDT, cadmium, lead, zinc

Media of Concern: Soil

RRSE Rating: 1A (High with regulator agreement)

Completed IRP Phase to Date: PA/SI

Current IRP Phase: Remedial Action (A-106 # FM0096F119)

Future IRP Phase: Response Complete

Recommendation for future response: Following the corrective action phase, the site shall be resampled and the data submitted to NJDEP. A no further action letter from the NJDEP shall be requested for the site.

M-16 Former Pesticide Storage Area (FTMM-16):

A former pesticide storage and mixing area was located at the M-16 site. The facility (Bldg. 498) is a brick structure and was constructed in 1939. Pesticide management practices were conducted at the site until the late 1950's. Following this, the operation was moved to Bldg. 65. Under the SI phase, a total of 10 pesticides compounds were detected above laboratory quantitative limits in site soil. Five pesticide compounds were found at concentrations exceeding the NJDEP Direct Contact Soil Cleanup Criteria. The M-16 site is located within 50 feet of two family housing units and both sets of quarters have several small children residing within them. Furthermore, environmental sampling has confirmed that the contaminants are migrating horizontally in the direction of Oceanport Creek. The creek is located approximately 250 feet down gradient of the M-16 site. FY96 DERA funding has been received to implement a corrective action at the M-16 site. The selected remedial alternative involves removing the contaminated soil from the site thereby eliminating the contaminants of concern. The contaminated soil in question contains spill residues from unused commercial chemical products as defined by 40 CFR Part 261.33 paragraph (e) and (f). In accordance with said regulation, the soil must be managed as a RCRA listed hazardous waste. Being a listed hazardous waste, all contaminated soils must be incinerated at a RCRA Part B Permitted Facility in accordance with the Land Disposal Restrictions cited under 40 CFR Part 268. Cleanup work is scheduled to start in the July/August 96 time frame.

(FTMM-16 continued)

Contaminant of Concern: Aldrin, Lindane, Heptachlor, Dieldrin,
4,4-DDE, 4,4-DDD, 4,4 DDT, Endrin Ketone,
alpha-Chlordane, gamma-Chlordane

Media of Concern: Soil

RRSE Rating: 1A (High with regulator agreement)

Completed IRP Phase to Date: PA/SI

Current IRP Phase: Remedial Action (A-106 # FM0096F120)

Future IRP Phase: Response Complete

Recommendation for future response: Following the corrective action phase, the site shall be resampled and the data submitted to NJDEP. A no further action letter from the NJDEP shall be requested for the site.

M-17 Former Pesticide Storage Area (FTMM-17):

Pesticide storage and mixing operations were moved from the M-16 site (FTMM-16) to the M-17 site (FTMM-17) in the late 1950's. Pesticide operations at the M-17 site continued there until the early 1980's. Prior to closing the M-17 site, an outside contract was established for pesticide services. The former pesticide operation was located in Bldg. 65. Prior to demolition, Bldg. 65 was located southeastern section of the Main Post. In March 1990, 16 soil samples were collected from eight borings, two of which were located outside the building. Soil samples were collected from 6 to 12 inches bgs and from a deeper interval (6 inches beginning at either 38, 41, 48, or 60 inches bgs. Each soil sample was analyzed for a complete pesticide scan. A monitoring well was installed outside the former pesticide storage room during the removal of an UST. The only pesticide compound to be identified was chlordane. It was detected in two of the sixteen soil samples. Chlordane was detected in two separate borings, one located inside the building and the other just outside the structure. Both chlordane detections were at 6-12 inch interval. The chlordane result for the interior boring measured 47 mg/kg and 1.4 mg/kg for the soil sample collected from the building exterior. The localized nature of these detections and the concentrations is consistent with termite control practices used on base until 15 April 1988, when all use of chlordane was banned in the United States. Chlordane was not detected in ground water samples collected from the monitoring well located approximately 1 ft east of the soil boring in which chlordane was detected outside the building.

Contaminant of Concern: Chlordane

Media of Concern: Soil

RRSE Rating: 3A (Low with regulator agreement)

Completed IRP Phase to Date: PA/SI

Current IRP Phase: Response Complete

Future IRP Phase: Response Complete

(FTMM-17 continued)

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

M-18 Former Training Area (FTMM-18):

The M-18 site is a former training area utilized by the Army Signal School and other Army units. The M-18 site is located on the Main Post, between Parkers Creek to the north and Bldgs. 283, 289, 293 and 294 to the south. The 4.1 acre site is partially paved and the remaining portion is an open sandy area. A tidal marsh adjoins the site. The 1980 IA report (USAEC) identifies diesel and gasoline generators along with other types of military vehicles being used at this site. The report goes on to state that numerous fuel spills occurred at the site as a result of these activities. Under the SI phase, nine soil borings in a grid pattern were drilled at the site. Two soil samples were collected from each boring, either 6 to 12 inches or 12 to 18 inches below the bottom of the asphalt (to avoid bias) and either from intervals with visible staining or from just above the water table. Soil samples were analyzed for volatile organic compounds (VOCs) and Total Petroleum Hydrocarbons (TPHs). Four soil samples from three boring locations had TPH values above NJDEP Direct Contact Soil Cleanup Criteria. Two soil boring locations were converted to monitoring wells in order to evaluate ground water quality. One existing monitoring well was also used to evaluate ground water quality. Ground water samples were analyzed for TCL + 30 parameters, TAL metals and TPH. Arsenic, lead and 4,4 DDD were detected in downgradient monitoring wells above NJDEP Ground Water Quality Criteria.

Contaminant of Concern: Arsenic, lead, 4,4 DDD, POL
Media of Concern: Ground water, soil
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Corrective Action for contaminated soil
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of ground water at the M-18 site has been approved by the NJDEP. Soils contaminated by POL will be excavated and disposed of offsite. Soils will be sent to a thermal treatment facility. Cleanup work is scheduled to start in the July/August 96 time frame.

AOC-3 Former Main Post Sanitary Treatment Plant (FTMM-19):

The former sanitary treatment plant (STP) was located on Parkers Creek north of Sherrill Avenue, between Bldg. 292 to the east and Bldg. 697 to the west. This site was identified by the NJDEP as an Area of Concern (AOC) in a 8 June 1990 letter. The STP was built in 1941 to handle 700,000 gallons of sewage per day. As described in the 1980 IA report (USAEC), the STP consisted of a bar screen and grit chamber, comminutor, primary and secondary settling tanks, a mixing and aeration tank, and a baffled contact chlorination tank. Effluent from the STP was discharged to Parkers Creek. Sludge was treated in a three-stage anaerobic digester and discharged to underdrained sandbeds for drying. According to the IA and DPW employees, sludge was transported to the Charles Wood golf course and to landfills. The STP was closed on 3 September 1975 when the Main Post sewer system was connected to the Northeast Monmouth County Regional Sewerage Authority (NEMCRSA) system. In 1981, all sludges and supernatant liquids were removed from the STP and the facility was cleaned and disinfected. The removal contractor was Modern Transportation Co. of Kearny, New Jersey. The physical facility was demolished in 1983. At present, this area is flat and grass covered. Under the SI phase, two soil samples were collected in the former area of the sludge drying beds. In addition, one sediment sample was collected from the former wastewater discharge point at Parkers Creek. All three samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. No compounds of concern were detected above NJDEP Direct Contact Soil Cleanup Criteria or Sediment Criteria.

Contaminant of Concern: Organics, metals, cyanide
Media of Concern: Soil, sediment
RRSE Rating: 2A (Medium with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

Pre-1941 Former Main Post Sanitary Treatment Plant (FTMM-20):

The pre-1941 STP for the Main Post was located on Parkers Creek in an area north of Allen Avenue in approximately the same location as current Bldg. 259. The date of construction and period of operation are unknown, although the STP presumably operated until the second Main Post STP (AOC-3) came on line in 1941. Under the SI phase, one sediment sample was collected from the former wastewater discharge point at Parkers Creek. The sediment sample was analyzed for TAL metals. Arsenic, cadmium, chromium and zinc were detected at concentrations slightly exceeding NJDEP Sediment Criteria and background levels.

(FTMM-20 continued)

Contaminant of Concern: Arsenic, cadmium, chromium, zinc
Media of Concern: Sediment
RRSE Rating: 2A (Medium with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Remedial Investigation
Future IRP Phase: Response Complete

Recommendation for future response: Additional sediment samples will be collected and analyzed to delineate the extent of the metals contamination. It is anticipated that the new data will facilitate a “No Further Action” determination from the NJDEP. Sampling should commence in the October/November 96 time frame.

Former Main Post Firing Range (FTMM-21):

Evidence of an outdoor pistol range located in the 1200 area of the Main Post was uncovered during preparation of the PA report. The former range was located just east of Bldg. 1220, along North Drive. A long-term DPW employee indicated that the pistol range was operational between the late 1930’s and the early 1950’s. The range was closed with the onset of construction activities in the 1200 area. Small arms training was moved to Naval Weapons Station Earle following closure of the Main Post facility. The former location of the pistol range has been developed for some forty years, no evidence of the former range exists at this time. Grounds in the general vicinity of the former range which were not affected by construction are completely grass covered.

Contaminant of Concern: Lead
Media of Concern: Soil
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

CW-1 Wastewater Treatment Lime Pit (FTMM-22):

The CW-1 site is one of two wastewater treatment lime pits located next to the Myers Center facility (Bldg. 2700). The Myers Center facility is located in the Charles Woods area of Fort Monmouth at the intersection of Pearl Harbor Avenue and Corregidor Road. The CW-1 wastewater treatment lime pit can be found in the courtyard area of Bldg. 2700. The wastewater treatment lime pit was constructed concurrently with the Myers Center facility

(FTMM-22 continued)

Recommendation for future response: An A-106 project (FM0096F133) has been identified for 1st Qt FY97 DERA funding to conduct a Remedial Design for the CW-1 site. The remedial design will investigate three potential treatment technologies and may include one or more of the following types: conventional pump and treat, air sparging/soil vapor extraction and vacuum-vaporizer treatment. A second A-106 project (FM0096F134) has been identified for 3rd Qt FY97 DERA funding to implement the Remedial Action phase of the project.

CW-2 Wastewater Treatment Lime Pit (FTMM-23):

The CW-2 site is the second wastewater treatment lime pit located next to the Myers Center facility (Bldg. 2700). The CW-2 wastewater treatment lime pit is located on the east side of the Myers Center facility, near the former electrical substation. The wastewater treatment lime pit was constructed concurrently with the Myers Center facility in 1952. The pit was designed to treat corrosive wastes generated from laboratory activities operating within the facility. The pit is a concrete vault measuring 7 by 13 by 8 feet in height and contains limestone chips. Corrosive waste discharge lines originating from the south and east wings of Bldg. 2700 are plumbed to the pit. The effluent discharge line exiting the pit is connected to the sanitary sewer. In FY92, DPW personnel collected limestone and sludge samples from the pit to evaluate the potential for environmental contaminants being present. Analytical testing of the sample material identified elevated levels of organic contaminants. A cleanup action ensued which generated ninety-one 55 gallon drums of RCRA waste. Following the cleanup action, fresh limestone chips were placed into the pit as a precautionary measure. Current hazardous waste management practices prohibit the discharge of corrosive wastes into wastewater treatment lime pit system. Due to the presence of organic contaminants being identified in the pit prior to the cleanup action, the focus of the SI was to evaluate the potential impact to soil and ground water. Under the SI phase, soil borings were drilled on each side of the lime pit. In the absence of field instrument readings and visible staining, one soil sample was collected from each boring at an interval just above the water table. In addition, each boring was converted to a monitoring well in order to evaluate ground water quality. Both soil and ground water samples were analyzed for TCL + 30 parameters and TAL metals. In reference to the four soil samples, only PCBs were detected in one soil sample slightly above NJDEP Direct Contact Soil Cleanup Criteria. PCE was detected in one downgradient monitoring well slightly above NJDEP Ground Water Quality Criteria. Under the RI phase, a passive soil gas survey commenced at the CW-2 site in December of 1995. The purpose of the soil gas survey was to delineate the lateral extent of soil contamination at the site and to use the survey data to aid in the placement of additional monitoring wells if required. Results of the soil gas survey were negative.

(FTMM-23 continued)

Contaminant of Concern: PCE, PCBs
Media of Concern: Ground water, soil
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI, RI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of ground water at the CW-2 wastewater treatment lime pit has been approved by the NJDEP.

CW-3 Suspected Landfill (FTMM-24):

The 1980 IA report (USAEC) identified the CW-3 site as a former landfill area. The suspected landfill is located in the southwestern part of the Charles Wood area, otherwise known as the 2600 area. According to the IA report, administrative-type wastes and wood debris were placed into the one acre landfill during 1940's. Interviews with long term DPW employees conducted during the PA phase study concluded that a landfill did not exist at the site in question. During the 1980's and into the early 1990's the CW-3 site was utilized as a surface dump for the accumulation of construction debris. Materials observed at the site during the PA phase included: concrete, brick, asphalt, wood demolition debris, wood pallets, vegetative debris, metal and PVC pipes. In order to proceed with the investigation of the suspected landfill, all construction debris covering the site needed to be removed. An A-106 project (FM0094F086) was identified and FY95 DERA funding was received to execute the project. Cleanup of the construction debris started in October 1994 and was completed in May 1995.

Contaminant of Concern: Metals, organics
Media of Concern: Ground water, soil
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA, IRA
Current IRP Phase: SI
Future IRP Phase:

Recommendation for future response: Exploratory trenching will be performed at the site to determine if subsurface disposal of waste materials occurred. The trenching work will be performed by our in-house staff and work is currently scheduled for the June/July 96 time frame. If no waste materials are identified at the site, a no further action determination shall be requested from the NJDEP. In the event waste materials are identified, soil and ground water samples will have to be collected to evaluate the impact the waste materials have had on the site.

CW-3A Suspected Landfill (FTMM-25):

The CW-3A site was identified as a suspected landfill area during the PA phase study. Interviews with long term DPW employees suggested that a former landfill may be present at the site in question. The suspected landfill is located north of the Pulse Power facility (Bldg. 2707) which is also located in the southwestern part of the Charles Wood area.

Contaminant of Concern: Metals, organics
Media of Concern: Groundwater, soil
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: SI
Future IRP Phase:

Recommendation for future response: Exploratory trenching will be performed at the site to determine if subsurface disposal of waste materials occurred. The trenching work will be performed by our in-house staff and work is currently scheduled for the June/July 96 time frame. If no waste materials are identified at the site, a “No Further Action” determination shall be requested from the NJDEP. In the event waste materials are identified, soil and ground water samples will have to be collected to evaluate the impact the waste materials have had on the site.

CW-4 Indoor Small Arms Range (FTMM-26):

An indoor small arms range is located at the CW-4 site. The range is a one story concrete structure (Bldg. 2537) which was built in 1945. Spent rounds and shell casings are visible at the surface of a bare patch of soil approximately 5 feet in diameter northeast of the building. The area of contamination is located within 10 feet of a side entrance to the facility. Environmental sampling has confirmed the presence of lead in soil at the CW-4 site. Lead levels are above NJDEP Direct Contact Soil Cleanup Criteria. Sampling has also confirmed that the lead is migrating vertically in the soil column. The Youth Activity Center (Bldg. 2566) is located approximately 250 feet from the area of concern. FY96 DERA funding has been received to implement a corrective action at the CW-4 site. The selected remedial alternative involves removing the spent rounds, casings and contaminated soil from the site thereby eliminating the contaminants of concern. Cleanup work is scheduled to start in the July/August 96 time frame.

Contaminant of Concern: Lead
Media of Concern: Soil
RRSE Rating: 1A (High with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Remedial Action (A-106 # FM0096F121)
Future IRP Phase: Response Complete

(FTMM-26 continued)

Recommendation for future response: Following the corrective action phase, the site shall be resampled and the data submitted to NJDEP. A no further action letter from the NJDEP shall be requested for the site.

CW-5 Former Charles Wood Sanitary Treatment Plant (FTMM-27):

The former sanitary treatment plant (STP) was located in the center of the Charles Wood area, bounded by Hope Road to the east, Corregidor Road to the north, Guam Lane to the west, and Laboratory Road to the south. The STP was built in 1942 to handle 800,000 gallons of sewage per day. As described in the 1980 IA report (USAEC), the STP consisted of a grit chamber screen, comminutor, primary and secondary settling tanks, biofilters, and a baffled contact chlorination tank. Sludge was treated in two anaerobic digesters and discharged to underdrained sand beds for final drying. Supernatant liquid from digester sludge and drainage from the sand beds were recycled through the STP for additional treatment. The chlorinated effluent was discharged to a tributary of Wampum Brook on the east side of Hope Road. According to the IA and DPW employees, sludge was transported to the Charles Wood golf course and to landfills. The STP was closed on 29 October 1975 when the Charles Wood sewer system was connected to the NEMCRSA system. In 1981, all sludges and supernatant liquids were removed from the STP and the facility was cleaned and disinfected. The removal contractor was Modern Transportation Co. of Kearny, New Jersey. Mercury used in the distributor seal on the biofilter was removed and disposed of by the Directorate of Logistics. The physical facility was demolished in 1983. In 1993, a youth center was constructed on the site. Under the SI phase, two soil samples were collected in the former area of the sludge drying beds. In addition, one sediment sample was collected from the former wastewater discharge point. All three samples were analyzed for TCL + 30 parameters, TAL metals and cyanide. No compounds of concern were detected above NJDEP Direct Contact Soil Cleanup Criteria or Sediment Criteria.

Contaminant of Concern: Organics, metals, cyanide
Media of Concern: Soil, sediment
RRSE Rating: 2A (Medium with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

CW-6 Former Pesticide Storage Building 2044 (FTMM-28):

Building 2044 is part of a small complex of buildings located in the southwest section of Charles Wood golf course. The complex also includes Bldg. 2070, a large metal shed and two smaller metal igloos. The buildings are currently used to store course maintenance and landscaping equipment, such as mowers and tractors. The golf course maintenance complex may predate the purchase of the golf course by the Army. Pesticides and herbicides may have been stored and mixed in this area prior to Army ownership of the property. The 1980 IA report (USAEC) contains a 1979 inventory of pesticides and herbicides that were used on the golf course and stored in Bldg. 2044. Pesticides that were present in significant quantities include: malathion, floriabile sevin, resmethrin, Borocel IV, chlordane, and Dibrom. The IA also discusses a pest control program that was in effect in 1979. The compounds that were used in large quantities include carbaryl (sevin), malathion, chlordane, and diazinon. Some of the herbicides mentioned in the IA include 2,4-D, Dacthal, 2,4,5-T, and sodium arsenite. The course groundskeeper, who has been part of the grounds crew for 33 years (1960 to 1993) was interviewed during the PA phase. The groundskeeper stated that pesticides and herbicides were also stored inside the two metal igloos and former mixing activities generally took place directly outside the two igloos. Pesticides and herbicide are not currently stored or mixed on-site. The facility has hired an outside contractor to come in and apply pesticides and herbicides. Under the SI phase, soil borings were completed at two locations where pesticide mixing was documented to occur. Two soil samples were collected from each boring, one surface sample and the other sample from the interval just above the water table. In addition, each boring was converted to a monitoring well in order to evaluate ground water quality. Both soil and ground water samples were analyzed for TCL + 30 parameters. Dieldrin was identified in one soil sample slightly above NJDEP Direct Contact Soil Cleanup Criteria. Benzene was detected in one ground water sample above NJDEP Ground Water Quality Criteria.

Contaminant of Concern: Benzene, Dieldrin,
Media of Concern: Ground water, soil
RRSE Rating: 2A (Medium with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Long term monitoring (A-106 # FM0096F118)
Future IRP Phase: Long term monitoring (A-106 # FM0096F118)

Recommendation for future response: Long term monitoring of ground water at the CW-6 site has been approved by the NJDEP.

CW-7 Former PCB Transformer Location (FTMM-29):

The 1980 IA report (USAEC) identified the CW-7 site as a PCB transformer location. Prior to its removal, the referenced transformer was located near the front entrance of the Officers Club (Bldg. 2000). The Officers Club is located on the same grounds as the Charles Wood golf course. Prior to 1989, the policy at Fort Monmouth was to label all

(FTMM-29 continued)

transformers as containing PCBs unless available test data proved otherwise. An A-106 project (FM0089F005) was implemented in 1989 to sample and test all transformers with no available data for PCB content. The survey was completed in 1990. Test results for the transformers located at the CW-7 site revealed PCB levels at 223,091 ppm. The PCB Class Transformer was removed from service on 10 September 1990 and shipped for offsite disposal on 24 September 1990. Under the SI phase, four surface soil samples were collected to evaluate the potential impact the transformer had on site soils. PCBs were detected above NJDEP Direct Contact Soil Cleanup Criteria in all four samples. The sample with the highest PCB concentration was 204 times greater than the applicable standard. The NJDEP cleanup action level for PCBs in soil is 0.49 mg/kg. Sampling conducted under the SI phase demonstrates PCBs are migrating horizontally within the soil column. In May of 1996, a remedial investigation was implemented to completely delineate PCB levels both horizontally and vertically within the soil column. The remedial investigation was a combination of field screening techniques and sample collection for laboratory analysis. Field screening data has identified PCBs as migrating vertically within the soil column. Laboratory data will be available in the June/July time frame.

Contaminant of Concern: PCBs

Media of Concern: Soil

RRSE Rating: 1A (High with regulator agreement)

Completed IRP Phase to Date: PA/SI

Current IRP Phase: Remedial Investigation (A-106 # FM0092F029)

Future IRP Phase: Remedial Action (A-106 # FM0096F137)

Recommendation for future response: An A-106 project (FM0096F137) has been identified for FY97 DERA funding to implement a corrective action at the CW-7 site. The selected remedial alternative involves removing the contaminated soil from the site thereby eliminating the contaminants of concern.

CW-8 Sewage Lift Pumping Station (FTMM-30):

The 1980 IA report (USAEC) identified the CW-8 site as a potential area of concern. The CW-8 site is a sewage lift station (Bldg. 2603) located north of the Wherry Housing area off Pinebrook Road. This site was misidentified in the IA as an STP. There has never been an STP at this site. A 1940 aerial photograph shows this area as being heavily wooded. The sewage lift station was constructed in 1954 when the Wherry Housing area was built to pump sewage into the forced main that went to the Charles Wood STP (CW-5). The lift station building appears on several aerial photographs dating from 1957 through 1986. At present, the sewage lift station is connected to the NEMCRSA system.

(FTMM-30 continued)

Contaminant of Concern: Organics, metals,
Media of Concern: Soil, sediment
RRSE Rating: Not evaluated
Completed IRP Phase to Date: PA
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

CW-9 Sludge Dump (FTMM-31):

A sludge dump (CW-9) as identified in the 1980 IA report (USAEC) was located in the southwest section of Charles Wood golf course, south and southeast of Bldg. 2070 and west of Green 11 and Tee 12. Since the 1940s, sludge generated from both the Main Post and Charles Wood STPs were stored in this area before being used as a soil conditioner and fertilizer on the golf course. Sludge piles are visible on aerial photographs dating from 1957 through 1981. Under the SI phase, two monitoring wells were installed, one subsurface soil sample and nine surface soil samples were collected to evaluate the impact to ground water and soil as a result of past site activities. All samples were analyzed for TCL + 30 parameters and TAL metals. No compounds of concern were detected above NJDEP Direct Contact Soil Cleanup Criteria or Ground Water Quality Standards.

Contaminant of Concern: Organics, metals,
Media of Concern: Ground water, soil
RRSE Rating: 3A (Low with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

AOC-7 Temporary Hazardous Waste Storage Area (FTMM-32):

This site was identified by the NJDEP as an Area of Concern (AOC) in a 8 June 1990 letter. A temporary hazardous waste storage area (AOC-7) was located in the southwest section of the Charles Wood area. The site is an unpaved, open sandy lot, approximately one acre in size, surrounded by a 7-ft-high fence. The site is just east of Bldg. 2708. According to DPW records, the site was used for a six month period in 1987 for the temporary storage of hazardous waste (in drums). During the PA phase study, an interview was conducted with

(FTMM-32 continued)

the Hazardous Waste Disposal Officer who was present at the time of the drum operation. Comments made by the Disposal Officer confirm that the site was used for a six month period in 1987 to accumulate drums of hazardous waste. Drums were stored on pallets along the interior fence line at the site. At the end of the six month period, all drums stored at the site were removed by a permitted hazardous waste disposal company. Following this action, the area was no longer used for the temporary storage of hazardous waste. Under the SI phase, six soil borings were drilled at the site and samples collected in order to evaluate the potential impact to site soil as a result of the former hazardous waste accumulation activities. Soil boring locations were biased towards the fence line which coincides with the areas of drum storage. In the absence of field instrument readings and visible staining, one soil sample was collected from each boring at an interval just above the water table. All six soil samples were analyzed for TCL+30 parameters and TAL metals. No compounds of concern were detected above NJDEP Direct Contact Soil Cleanup Criteria.

Contaminant of Concern: Organics, metals
Media of Concern: Soil
RRSE Rating: 3A (Low with regulator agreement)
Completed IRP Phase to Date: PA/SI
Current IRP Phase: Response Complete
Future IRP Phase: Response Complete

Recommendation for future response: “No Further Action” determination approved by the NJDEP.

4. IRP SUMMARY CHARTS

DEFENSE SITE ENVIRONMENTAL RESTORATION TRACKING SYSTEM

PHASE SUMMARY

1996/05/24

Program Category: IRP, OHW, BD/DR

Installations: 1

Sites: 35

Phase / Status / Sites

PA				SI			
C	U	F	RC	C	U	F	RC
33	2	0	8	22	3	0	13
RI/FS				RD			
C	U	F	RC	C	U	F	RC
0	3	2	0	0	0	1	0
RA				O&M			
C	U	F	RC	C	U	F	RC
0	0	6	0	0	0	1	0

Remedy / Status / Sites (Actions)

IRA		
C	U	F
0 (0)	0 (0)	0 (0)
FRA		
C	U	F
0 (0)	0 (0)	0 (0)

RIP Total: 0
 RC Total: 21
 SC Total: 8
 O&M = N Total: 34

5. SCHEDULE

The schedule of IRP work completed to date and planned through completion of all restoration work at Fort Monmouth is detailed below.

A. PAST MILESTONES BY PHASE:

PA Initiation	Aug	1993
PA Completion	Dec	1993
SI Initiation	Nov	1994
IRA - CW-3 Site, Debris Cleanup (FTMM-24)	May	1995
SI Completion	Dec	1995
RI - CW-2 Site, Soil Gas Survey (FTMM-23)	Jan	1996

B. PROJECTED MILESTONES BY PHASE:

SI - CW-3 Suspected Landfill (FTMM-24)	Jul	1996
SI - CW-3A Suspected Landfill (FTMM-25)	Jul	1996
RI - CW-7 PCB Transformer Location (FTMM-29)	Jul	1996
RI - CW-1 Site, Treatment Pit (FTMM-22)	Jul	1996
IRA - M-18 Site, Soil Cleanup (FTMM-18)	Jul	1996
LTM - Begin Groundwater and Surface Water Monitoring at 12 sites (FTMM-02, 03, 04, 05, 08, 12, 14, 16, 18, 22, 23 & 28)	Aug	1996
RA - M-15 Site, Soil Cleanup (FTMM-15)	Sep	1996
RA - M-16 Site, Soil Cleanup (FTMM-16)	Sep	1996
RA - CW-4 Site, Soil Cleanup (FTMM-26)	Sep	1996
RI - Begin RI for M-5 Landfill (FTMM-05)	Oct	1996
RD - Begin Design for CW-1 Site (FTMM-22)	Oct	1996
RI - Complete RI for M-5 Landfill (FTMM-05)	Dec	1996
RA - CW-7 Site, Soil Cleanup (FTMM-29)	Dec	1996
RD - Complete Design for CW-1 Site (FTMM-22)	Mar	1997
RA - Begin RA for CW-1 Site (FTMM-22)	Jul	1997
IRA - M-2 Landfill, Bank Stabilization (FTMM-02)	Sep	1998
IRA - M-12 Landfill, Bank Stabilization (FTMM-12)	Sep	1998
IRA - M-14 Landfill, Bank Stabilization (FTMM-14)	Sep	1998
RA - Complete RA for CW-1 Site (FTMM-22)	Sep	2005
LTM - Complete Groundwater and Surface Water Monitoring at 12 sites (FTMM-02, 03, 04, 05, 08, 12, 14, 16, 18, 22, 23 & 28)	Sep	2009

Projected Completion Date of IRP: Sep 2009

6. REMOVAL/INTERIM REMEDIAL/REMEDIAL ACTION ASSESSMENT

Thirty-two areas of concern (FTMM-01 through FTMM-32) were the focus of the PA phase study. At its completion, twenty-three sites (FTMM-02, 03, 04, 05, 06, 08, 12, 14, 15, 16, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 31 & 32) required further investigation. Nine sites (FTMM-01, 07, 09, 10, 11, 13, 17, 21 & 30) are listed for "No Further Action". Under the SI phase, twenty-three areas of concern became the focus of the study. At its completion, sixteen sites (FTMM-02, 03, 04, 05, 08, 12, 14, 15, 16, 18, 20, 22, 23, 26, 28 & 29) required additional RI, RD, IRA, RA and/or LTM work. Two sites (FTMM-24 & 25) remain in the SI phase and five sites (FTMM-06, 19, 27, 31 & 32) are listed for "No Further Action". Sites requiring RI phase work include: FTMM-05, 20, 22, 23 & 29. One site (FTMM-22) has been identified for RD work. Sites requiring RA phase work include: FTMM-15, 16, 22, 26 & 29. One site (FTMM-18) has been identified for IRA work and three sites (FTMM-02, 12 & 14) have been identified for potential IRA work.

PAST REM/IRA/RA:

- * FTMM-24, CW-3A Suspected Landfill Site, IRA involving the removal and disposal of construction debris, May 95 (FY95), \$75.0K

CURRENT REM/IRA/RA/LTM:

- * FTMM-15, (M-15) Water Tank Site, RA involving the removal and disposal of contaminated soil, September 96 (FY96) \$10.0K
- * FTMM-16, (M-16) Former Pesticide Storage Area, RA involving the removal and disposal of contaminated soil, September 96 (FY96) \$105.0K
- * FTMM-26, (CW-4) Small Arms Range, RA involving the removal and disposal of contaminated soil, September 96 (FY96) \$12.0K
- * FTMM-02, 03, 04, 05, 08, 12, 14, 16, 18, 22, 23 & 28, Multiple DERP sites requiring LTM of ground water and surface water, (FY96) \$270.0K

FUTURE REM/IRA/RA:

- * FTMM-22, (CW-1) Wastewater Treatment Lime Pit, RA involving the treatment of TCE, PCE and 1,2-Dichloroethene in soil and ground water, (FY97) \$330.0K
- * FTMM-29, (CW-7) Former PCB Transformer Location, RA involving the removal and disposal of contaminated soil, (FY97) \$50.0K

POSSIBLE FUTURE REM/IRA/RA:

- * FTMM-02, 12 & 14, Closed Landfill Sites, IRA's involving stream bank stabilization,

7. COORDINATION SHEET

PREPARED BY:

JOSEPH M. FALLON, CHMM
DERP Project Manager
Directorate of Public Works
Fort Monmouth

Date

REVIEWED BY:

JAMES OTT, P.E.
Director, Public Works
Fort Monmouth

Date

JOSEPH COCCO, JR.
CECOM DERP Project Manager

Date

JOHN H. NOLAN III
Colonel, JA
Staff Judge Advocate
CECOM Legal Office

Date

8. CONCURRENCE

INSTALLATION

JOEL G. HIMSL
LTC, MP
Garrison Commander
Fort Monmouth

Date

ARMY MATERIEL COMMAND

NANCY M. POMERLEAU
Chief, Environmental Quality Division

Date

ATTACHMENT 1

COST

Prior year DERA funds received by Fort Monmouth and estimates of current and projected funding have been broken down by fiscal year and phase.

PRIOR YEAR FUNDS:

FY93	PA	(32 Areas of Concern) (A-106 # FM0092F029)	125.0K	ECCP
FY94	SI	(23 Areas of Concern) (A-106 # FM0092F029)	1,000.0K	DERA
	RA	(UST Cleanup) (A-106 # FM0094F087)	<u>375.0K</u>	DERA
			\$1,375.0K	DERA
FY95	SI	(COE - S & A Funding) (A-106 # FM0092F029)	56.0K	DERA
	IRA	(CW-3 Site/FTMM-24) (A-106 # FM0094F086)	75.0K	DERA
	IRA	(CW-6 Site/FTMM-28) (A-106 # FM0095F107)	<u>33.0K</u>	DERA
			\$164.0K	DERA
TOTAL PRIOR YEAR DERA FUNDS			\$1,539.0K	DERA

CURRENT YEAR FUNDS (FY96):

FY96	SI	(COE - S & A Funding) (A-106 # FM0092F029)	10.0K	DERA
	RA	(M-15 Site/FTMM-15) (A-106 # FM0096F119)	10.0K	DERA
	RA	(M-16 Site/FTMM-16) (A-106 # FM0096F120)	105.0K	DERA
	RA	(CW-4 Site/FTMM-26) (A-106 # FM0096F121)	12.0K	DERA
	LTM	(Multiple Sites) (A-106 # FM0096F118)	<u>270.0K</u>	DERA
			\$407.0K	DERA
TOTAL CURRENT YEAR REQUIREMENTS			\$407.0K	DERA

FUNDS REQUIRED TO COMPLETION:

FY97	RI	(M-5 Site/FTMM-05) (A-106 # FM0096F135)	30.0K	DERA
	RD	(CW-1 Site/FTMM-22) (A-106 # FM0096F133)	90.0K	DERA
	RA	(CW-1 Site/FTMM-22) (A-106 # FM0096F133)	330.0K	DERA
	RA	(CW-7 Site/FTMM-29) (A-106 # FM0096F137)	50.0K	DERA
	LTM	(Multiple Sites) (A-106 # FM0096F118)	<u>272.0K</u>	DERA
			\$772.0K	DERA

FY98-05 RAOP (CW-1 Site/FTMM-22) (A-106 # FM0096F133) 640.0K DERA

FY98-09 LTM (Multiple Sites) (A-106 # FM0096F118) 1,770.0K DERA

TOTAL FUTURE REQUIREMENTS \$3,182.0K DERA

TOTAL FUNDING FROM INCEPTION TO COMPLETION \$5,128.0K DERA