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FINAL

INTERIM REMEDIAL ACTION RECORD OF DECISION FOR THE SHALLOW AQUIFER AT THE HADNOT POINT INDUSTRIAL AREA OPERABLE UNIT MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0017

Prepared For:

DEPARTMENT OF THE NAVY
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DECLARATION

Site Name and Location

Hadnot Point Industrial Area (Site 78)
Marine Corps Base Camp Lejeune
Onslow County, North Carolina

Statement of Basis and Purpose

This decision document presents the selected interim remedial action (IRA) for the shallow aquifer at the Hadnot Point Industrial Area (HPIA), Marine Corps Base (MCB) Camp Lejeune (CLEJ), Onslow County, North Carolina which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based upon the administrative record for the Site.

The Navy/Marine Corps has obtained concurrence from the State of North Carolina and the United States Environmental Protection Agency (EPA) Region IV on this interim action.

Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present a current or potential threat to public health, welfare, or the environment.

Description of Selected Remedy

This IRA is the first remedial action to be taken at the HPIA Operable Unit, of which the HPIA (Site 78) is a part. This IRA, which addresses only the shallow aquifer at Site 78, is being proposed to protect human health from exposure to benzene, trichloroethylene (TCE), 1,2-dichloroethene (1,2-DCE), and various metals in the shallow aquifer. This IRA addresses the threat posed by the shallow aquifer but is not the final action planned for the site. Subsequent actions are planned to fully address all of the impacted media at the site (i.e., soils,

and deeper aquifers) and to address all of the sites within the HPIA Operable Unit which are not included in the scope of this IRA.

The principal threat at this time involves the potential migration of the contaminant plumes in the shallow aquifer away from the site and into the deeper (drinking water) aquifer. The primary goal of the IRA is to contain the contaminated groundwater in the shallow aquifer thereby preventing the human consumption of contaminated groundwater. Upon completion of the Final Remedial Investigation and Feasibility Study (RI/FS) for the entire HPIA Operable Unit, this interim remedy will be incorporated into the design of the final remedy specified in the Final ROD.

The major components of the selected remedy for this IRA include:

- Collecting the contaminated groundwater in the shallow aquifer at Site 78 through a series of extraction wells installed within the two groundwater plumes.

- Pretreating the extracted groundwater for oil and grease via oil/water separators and then for inorganics via a chemical removal system consisting of but not limited to precipitation units, chemical reduction units, and sedimentation systems.

- Treating the volatile compounds (i.e., TCE and benzene) via on-site air stripper, and if necessary, an activated carbon unit. The need for the activated carbon unit will be determined from the results of a laboratory bench-scale treatability study.

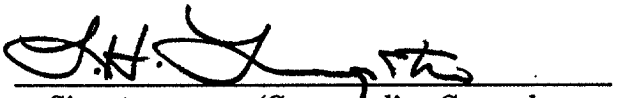
- Sending the treated groundwater to an existing sewage treatment plant (STP) located within MCB CLEJ for discharge to the New River.

- Institutional controls: restricting the use of nearby water supply wells (which are screened in the deeper aquifer), and restricting the installation of any new water supply wells in the area.

- Conducting a long-term groundwater monitoring program to monitor the effectiveness of the IRA.

Statutory Determinations

This interim remedial action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements directly associated with this action, and is cost-effective. In addition, this interim remedial action utilizes permanent solutions and alternative treatment technologies (or resource recovery) to the maximum extent practicable, given the limited scope of the action. Since this interim remedial action does not constitute the final remedy for the HPIA Operable Unit (only for the shallow aquifer at Site 78), the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed at the time of the final response action. Subsequent actions are planned to fully address the principal human health and environmental risks posed by the HPIA Operable Unit.



Signature (Commanding General, MCB Camp Lejeune)

23 Sept 92

Date

FINAL

INTERIM REMEDIAL ACTION
RECORD OF DECISION
FOR THE SHALLOW AQUIFER
AT THE HADNOT POINT INDUSTRIAL AREA OPERABLE UNIT
MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

1.0 SITE LOCATION AND DESCRIPTION

The Hadnot Point Industrial Area (HPIA) Site is located within Marine Corps Base (MCB) Camp Lejeune (CLEJ) in Onslow County, North Carolina. The HPIA Site is approximately 15 miles southeast of Jacksonville, North Carolina and 6 miles south of North Carolina State Road 24 (Figure 1). The approximately 500 acre site is bordered by Holcomb Boulevard to the northwest, Sneads Ferry Road to the northeast, Louis Street to the southeast, and Main Service Road to the southwest (Figure 2).

The HPIA Site (Site 78) plus two other sites make up the overall HPIA Operable Unit. The two additional sites include Site 21 (the Transformer Storage Yard), and Site 24 (the Industrial Area Fly Ash Dump). Figure 2 identifies the location of these other two sites. Sites 21 and 24 are not included in the scope of the selected Interim Remedial Action (IRA) but will be part of the Final Remedial Investigation and Feasibility Study (RI/FS) for the entire HPIA Operable Unit. In addition, please note that this document presents the Record of Decision (ROD) for only the shallow aquifer at Site 78. Upon completion of the RI/FS for the entire HPIA Operable Unit, a Final ROD will be prepared to present the selected remedial actions for all contaminated media at the operable unit.

The HPIA, constructed in the late 1930's, was the first industrial complex at MCB CLEJ. It was comprised of approximately 75 buildings and facilities including: maintenance shops, gas stations, administrative offices, commissaries, snack bars, warehouses, storage yards, and a dry cleaning facility. A steam plant and training facility occupy the southwest portion of the HPIA.

In addition to Sites 21, 24 and 78, a fuel tank farm (Site 22) is located within the physical boundaries of the HPIA Operable Unit. The fuel farm is an underground storage tank facility which is not being administered under Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) regulations. Therefore the site is not included as part of the HPIA Operable Unit. At the present time, a fuel recovery/groundwater treatment system is in operation at the tank farm.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Several of the areas within the HPIA have been investigated for potential contamination due to Marine Corps operations and activities resulting in the generation of potentially hazardous

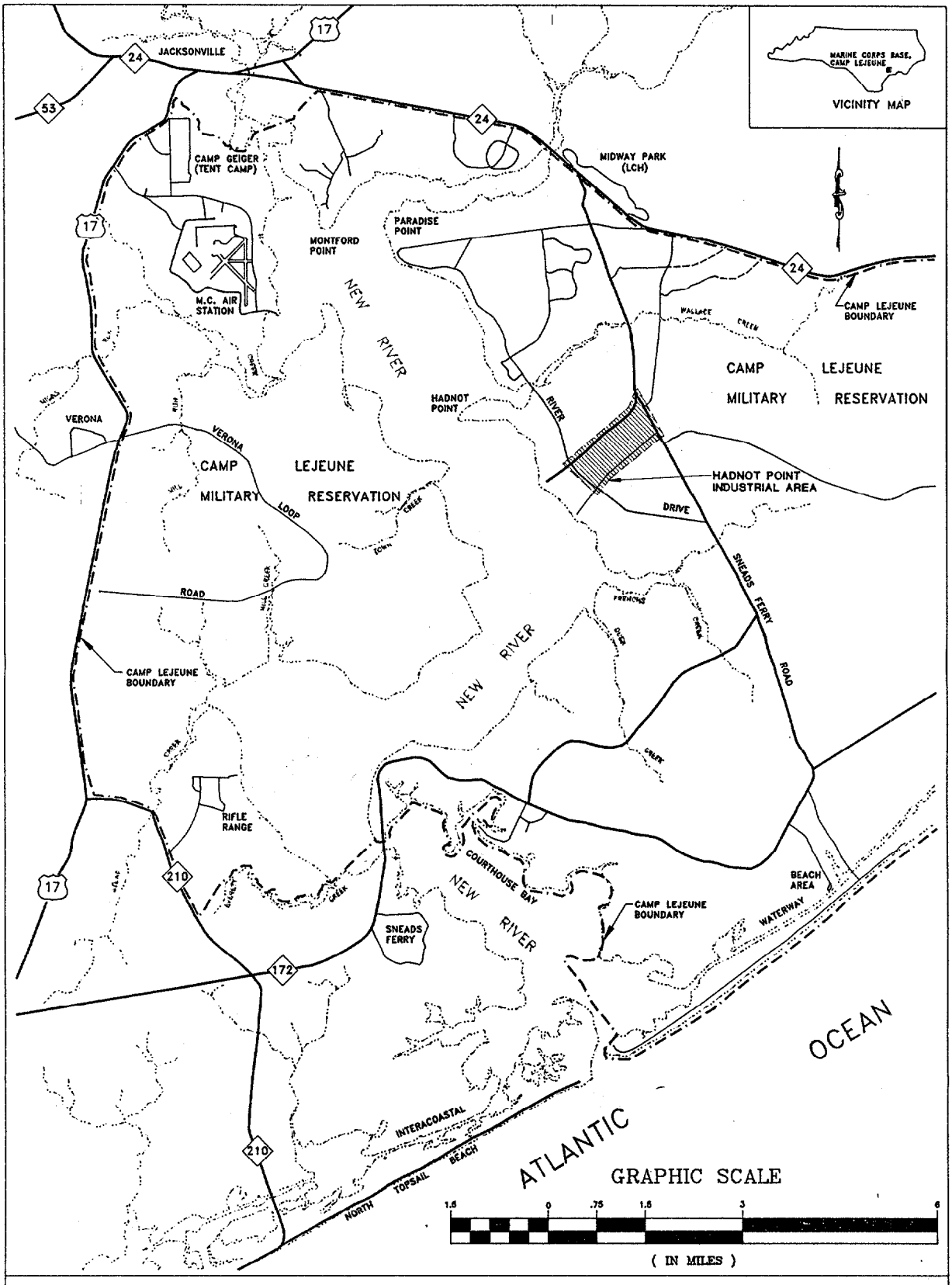
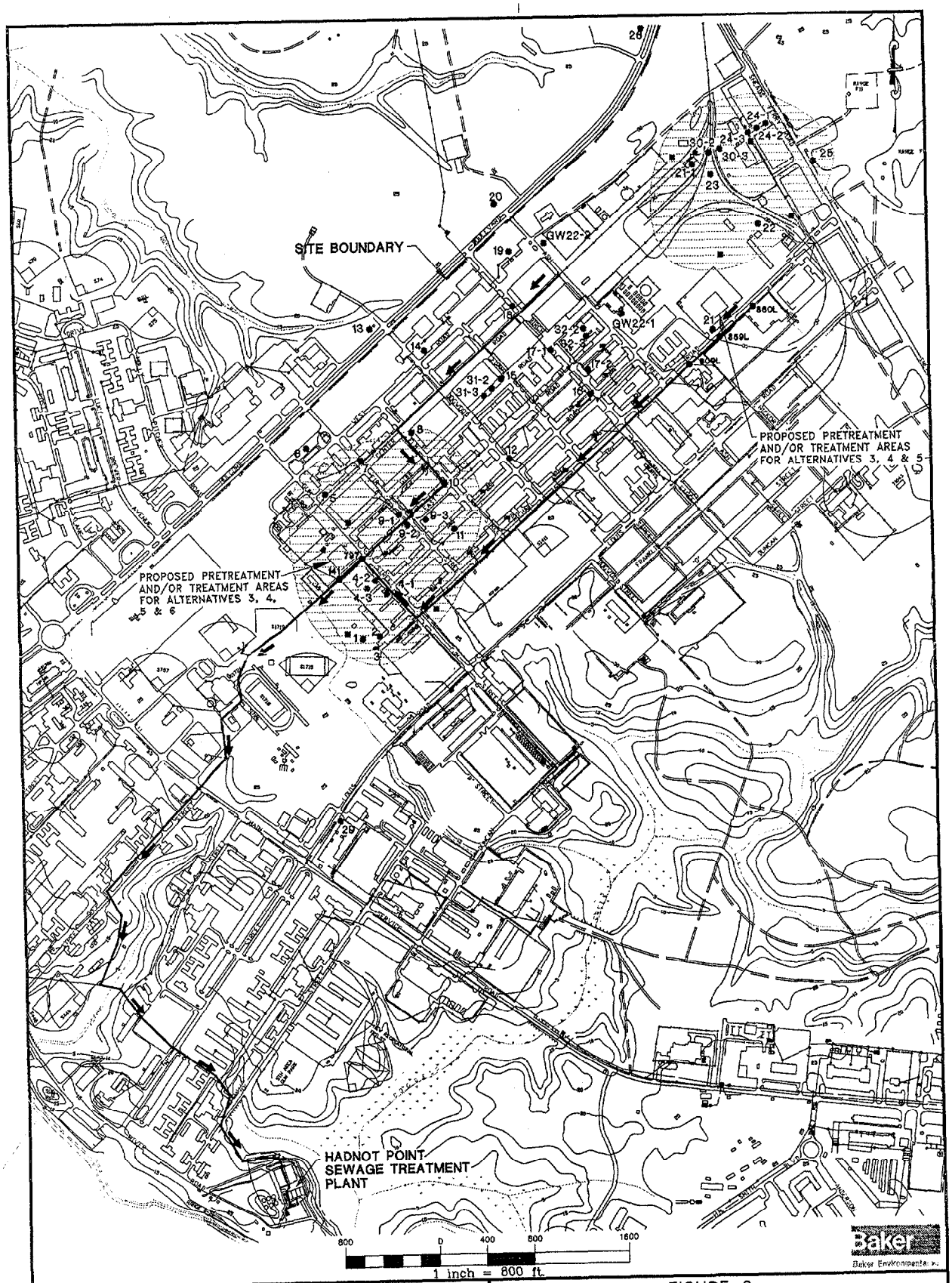


FIGURE 1
LOCATION MAP
MCB CAMP LEJEUNE, NORTH CAROLINA



LEGEND

- 29 EXISTING MONITORING WELL LOCATION
- APPROXIMATE SOURCE AREA OF GROUNDWATER CONTAMINATION IN THE SHALLOW AQUIFER
- PROPOSED EXTRACTION WELL LOCATION
- MANHOLES
- PROPOSED SEWER LINES TO BE USED

SOURCE: LANTDIV, FEBRUARY 1992

FIGURE 2

LOCATION OF INITIAL PHASE EXTRACTION WELLS, ON-SITE TREATMENT SYSTEMS AND PROPOSED SANITARY SEWER LINES HADNOT POINT INDUSTRIAL AREA

MCB CAMP LEJEUNE, NORTH CAROLINA

wastes. The investigations indicate that contamination has resulted at HPIA due to former improper waste disposal, underground storage tank leakage, solvent spills, and sludge disposal.

Since 1983, various investigation and sampling activities have been conducted at the HPIA. On October 4, 1989, Camp Lejeune was placed on the National Priorities List (NPL). The Department of the Navy (DoN), the EPA, and the North Carolina Department of Environment, Health and Natural Resources (N.C. DEHNR) entered into a Federal Facilities Agreement on February 13, 1991. The studies that have been conducted at the HPIA Site (with respect to the shallow aquifer) are briefly summarized below.

In 1983, an Initial Assessment Study (IAS) was conducted at Camp Lejeune by Water and Air Research, a consulting firm. The study identified a number of areas within Camp Lejeune, including HPIA, as potential sources of contamination.

Between 1984 and 1988, Environmental Science and Engineering, Inc. (ESE) conducted a Confirmation Study, which is analogous to an RI/FS performed for EPA on Federal Superfund sites. The Confirmation Study was divided into two investigative steps: the Verification Step and the Characterization Step.

The Verification Step took place from April 1984 through January 1985. Results of this investigation indicated the presence of volatile organic compounds (VOCs) within the shallow aquifer in the vicinity of HPIA fuel tank farm and in water supply well 602. The maximum contaminant concentrations observed in the groundwater included 17,000 µg/L of benzene and 27,000 µg/L toluene collected from the tank farm area. Benzene was also detected in supply well 602 at concentrations of 38 µg/L, which exceeds the Federal maximum contaminant level (MCL) of 5 µg/L.

Due to the results of the Verification Step, supply well 602 was closed and other wells in the area were sampled. Four additional supply wells (601, 608, 634, and 637) were found to have elevated levels of VOCs, including trichloroethylene (TCE) in wells 601 and 608 and methylene chloride in well 634.

In 1986, the Characterization Step was conducted for HPIA to determine the extent of the VOC contamination identified. During the Characterization Step, multiple tasks were completed, including: a soil gas survey to target areas identified as being potentially

contaminated, installation of 27 shallow (25 foot), 3 intermediate (75 foot), and 3 deep (150 foot) monitoring wells, sampling of all HPIA monitoring wells and nearby water supply wells, and aquifer testing to evaluate the hydraulic parameters of the deep aquifer.

Results of the characterization study revealed that five of the areas within HPIA showed elevated levels of VOCs in soil gas: 1) Buildings 901, 902 and 903; 2) Building 1100; 3) Buildings 1101, 1102, 1202, 1301, and 1302; 4) Buildings 1502, 1601; and 5) Buildings 1709 and 1710. Results of the shallow monitoring well analyses revealed the presence of elevated levels of a number of petroleum related compounds, including: benzene, xylene, ethylbenzene, trans-1,2-dichloroethene (trans-1,2-DCE), TCE, oil and grease, and lead. Inorganics, including mercury, were detected in several of the deep aquifer wells, but detected levels were within Federal MCLs or ambient water quality criteria guidelines (AWQCs).

Baker Environmental, Inc. (Baker) prepared an IRA RI and an IRA FS for the HPIA during 1991-1992. These studies focused on the shallow groundwater aquifer beneath the HPIA and were based solely on data generated during previous field investigations. The purpose of the IRA RI was to consolidate currently available information on the shallow aquifer and to develop the basis and supporting documentation for preparation of the IRA FS. The deep aquifer is currently being investigated and will be addressed separately.

The IRA FS prepared by Baker considered various interim remedial actions which may be taken to contain and/or remediate contamination in the shallow aquifer at Site 78 (the HPIA).

Based on the results of the above-mentioned studies and investigations, two contaminated groundwater plumes have been identified in the shallow aquifer at the HPIA Site. The contaminants of concern contained in these plumes include: benzene, 1,2-DCE, TCE, antimony, arsenic, beryllium, chromium, lead, iron, manganese, mercury, nickel and oil & grease. One of the plumes is located in the northeast portion of the site, the other in the southwest portion of the site (Figure 2).

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The IRA RI/FS and the IRA Proposed Plan for shallow aquifer at the HPIA Site was released to the public on May 14, 1992. These documents were made available to the public in the administrative record at information repositories maintained at the Onslow County Public Library and at the MCB CLEJ library. Also, all addressees on the HPIA mailing list were sent

a copy of the Final Proposed Plan and Fact Sheet. The notice of availability of the Proposed Plan and RI/FS documents was published in the "Jacksonville Daily News" on May 6-14, 1992, and in the "Globe" (MCB Camp Lejeune newspaper) on May 7, 1992. A public comment period was held from May 14 to June 14, 1992. In addition, a public meeting was held on May 14, 1992. At this meeting, representatives from Navy/Marine Corps discussed the IRA alternatives currently under consideration and addressed community concerns. Response to the comments received during the comment period is included in the Responsiveness Summary, which is part of this IRA ROD.

This decision document presents the selected IRA for the shallow aquifer at the HPIA Site, MCB Camp Lejeune, Onslow County, North Carolina, chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Contingency Plan (NCP). The decision for this Site is based on the administrative record.

4.0 SCOPE AND ROLE OF THE OPERABLE UNIT

The proposed IRA for the HPIA Site is a component of the overall site strategy in that it restricts the migration of the contaminant plumes identified in the shallow aquifer. Implementation of this IRA will reduce the potential for the migration of the contaminated groundwater both horizontally and vertically, which in turn will reduce the risk to human exposure through continued contamination of the aquifer. In addition, this IRA will reduce any potential threat to environmental receptors. This IRA is consistent with future plans for complete remediation of the HPIA Operable Unit and will not preclude implementation of a comprehensive final remedy.

Subsequent actions are planned to fully address all of the contaminated media within the HPIA Operable Unit. The overall site remediation strategy will include the remediation of the other two sites within the HPIA Operable Unit (i.e., the Transformer Storage Area, Site 21, and the Fly Ash Dump Area, Site 24).

5.0 SITE CHARACTERISTICS

The hydrologic system at CLEJ consists of an unconfined aquifer (water table) and underlying semiconfined aquifers. The unconfined aquifer extends from the water table to the first significant confining layer, approximately 25 feet below land surface. The water table within

HPIA ranged at an elevation between 8.48 and 25.56 mean sea level during January 1991. Groundwater flow in the shallow aquifer is predominantly to the southwest in the southern portion of portion of the site and to the west-southwest in the northern and central portions of the site.

As previously stated, various investigation and sampling activities have been conducted at the HPIA since 1983. During these studies, shallow, intermediate, and deep groundwater monitoring wells have been installed and sampled. The analytical results detected two plumes of groundwater contamination containing the following contaminants of concern: benzene, TCE, 1,2-DCE, and various metals including arsenic, antimony, beryllium, chromium, lead, iron, manganese, mercury, and nickel (Figure 2). Many of these compounds were detected at levels greater than the Federal Drinking Water Regulations and/or the North Carolina Water Quality Criteria for Groundwater. Table 1 presents a summary of the detected contaminants of concern for the shallow aquifer from a January 1991 sampling event. The Federal and North Carolina standards with respect to each of these contaminants are also identified on Table 1.

Since the shallow aquifer and the deep aquifer (a drinking water source) at the HPIA Site are interconnected, there is potential human and environmental exposure to the contaminants detected in the shallow aquifer. In addition, there is also potential for human exposure to the shallow aquifer contaminants due to migration towards the New River. The primary pathway of exposure would be through ingestion of contaminated water by humans, aquatic life, and/or wildlife.

6.0 SUMMARY OF SITE RISKS

The results of the IRA RI identified two contaminated plumes within the shallow aquifer at Site 78. Multiple contaminants were detected above MCLs and therefore formed the basis for proceeding with an IRA. These plumes can potentially impact drinking water supply wells in the area. In 1986, VOCs were identified in five on-site supply wells screened in the deeper aquifer (currently being addressed as part of the additional studies at the site), and subsequently, the wells were closed. It is not known whether or not the contaminants detected in the shallow aquifer have contributed to the contamination of these deeper wells.

As part of the IRA RI, a qualitative baseline risk assessment was conducted with respect to the shallow aquifer at the HPIA Site. The risk assessment identified potential human and

BLE 1

SUMMARY OF CONTAMINANTS OF CONCERN DETE THE SHALLOW GROUNDWATER AQUIFER, JANUARY 1991

Potential Contaminants of Concern	HPGW1	HPGW2	HPGW3	HPGW4-1	HPGW5	HPGW6	HPGW7	HPGW8	HPGW9-1	HPGW10	HPGW11	HPGW12	HPGW13	HPGW14	HPGW15	HPGW16
VOCs (µg/l): Benzene	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<	5<
1,2-Dichloroethene (1,2,-DCE)	73	5<	5<	5<	5<	5<	5<	5<	1200	5<	5<	5<	5<	5<	7	5<
Trichloroethene (TCE)	91	5<	5<	0.9J	5<	5<	5<	2J	14000	5<	5<	5<	5<	5<	4J	5<
Inorganics (µg/l): Chromium	87	64.3	16.7	187	3.6B	1590	313	91.8	66.4	310	140	25.5	48.9	127	21.4	209
Iron	64100	34800	10400	100000	3100	265000	65700	40900	19800	119000	31800	5600	33500	87200	4800	47200
Lead	16.6	29.4	11.4	66.6	13.6	60.7	112	54.1	128	186	45.2	15.7	9	66.5	16.6	100
Manganese	168	77	53.9	425	162	487	136	46.5	45	255	103	18.3	30.3	80	18.3	98.3
Antimony	13.3<	15.6B	46.5B	21.9B	13.3<	13.3<	22<	22	17.6B	22<	22<	22<	13.3<	13.3<	22<	22<
Arsenic	8B	24.1	15.6	15.5	1.5<	31.5	18.3	28.4	3B	39.9	9.1B	1.8<	47	45.6	1.8<	17.3
Beryllium	6	1.7B	1.2B	6.7	0.86B	20	4.8B	2.1	0.79B	5.6	2.1<	2.1<	0.59B	2.7B	2.1<	5.3
Mercury	0.1<	0.1<	0.1<	0.1<	0.1<	1.4	0.25	0.13	0.1<	0.82	0.1B	0.1<	0.1<	0.26	0.1<	0.13B
Nickel	31.3B	16.9B	12.1B	57	5.2<	161	50.7	25.2	15.1B	92.2	23.6B	11<	21.2B	41.6	11<	41

Potential Contaminants of Concern	HPGW17-1	HPGW18	HPGW19	HPGW20	HPGW21	HPGW22	HPGW23	HPGW24	HPGW25	HPGW26	HPGW29	22GW1	22GW2	North Carolina Water Quality Criteria (µg/l)	Federal Drinking Water MCLs (µg/l)
VOCs (µg/l): Benzene	5<	N/A	5<	5<	5<	5<	24	3J	5<	5<	5<	7900	5<	1	5
1,2-Dichloroethene (1,2,-DCE)	5<	N/A	0.8J	5<	5<	5<	8900	42000D	5<	5<	5<	5<	5<	--	--
Trichloroethene (TCE)	5<	N/A	2J	5<	3J	5<	3700	180	5<	5<	5<	5J	5<	2.8	5
Inorganics (ug/l): Chromium	37	N/A	13.8	424	45	79.8	76.3	26.3	205	13	179	457	26.3	50	100
Iron	10500	N/A	36200	152000	56600	24400	23300	19200	46600	19000	76200	101000	16200	300	--
Lead	23.7	N/A	31.7	20	49.4	39.4	45	21.4	71.6	9	29.1	307	16.2	50	15
Manganese	31.3	N/A	79	217	136	94.1	68.8	54.8	118	10.6B	236	284	763	50	--
Antimony	22<	N/A	13.3	21.9B	13.3<	24.6B	24.6B	22<	13.3<	13.3<	13.3<	20.9B	13.3	--	6
Arsenic	1.8<	N/A	5B	49.4	12.1	7.2B	6.6B	4.2B	13.2	1.5<	25.6	50.3	11	50	50
Beryllium	2.1<	N/A	2.3B	9.5	3.7B	0.6B	1B	2.1<	2.8B	0.5<	8.7	5.8	0.5	0.5	4
Mercury	0.1<	N/A	N/A	0.5	0.1<	0.1<	0.1<	0.1<	0.1<	0.1<	0.1<	0.35	0.1	1.1	2
Nickel	11.9B	N/A	7.3B	168	30.8B	23.2B	33.2B	14<	39.2B	5.2<	93.5	186	17	150	100

Notes:

N/A = Not analyzed
< = Compound was analyzed, but not detected at the listed detection limit
J = Value is estimated
B = Reported value is < contract required detection limit, but > instrument detection limit (IDL)
D = Compound identified in an analysis at a secondary dilution factor
-- = Not established

environmental receptors to any contamination attributable to the site, identified potential pathways of exposure, quantified the exposure levels, and evaluated the potential human and/or environmental risk. The results of this qualitative risk assessment indicated that there are potential human and environmental receptors to the contamination of the shallow aquifer at Site 78.

The groundwater analyses detected several organic and inorganic compounds in the shallow aquifer at Site 78. Table 2 presents a frequency summary of the compounds detected in the northern most groundwater plume with respect to Federal Drinking Water MCLs and North Carolina Water Quality Standards for Groundwater. Ten organic compounds and nine inorganic compounds exceeded at least one of the Federal or North Carolina standards. The risk assessment evaluated that TCE, antimony, arsenic, beryllium, chromium, iron, lead, manganese, and nickel are the contaminants of concern for this plume.

Table 3 presents a summary of the compounds detected in the southern most groundwater plume with respect to the Federal and North Carolina standards. Four organic compounds and nine inorganic compounds exceeded at least one of the Federal or North Carolina standards. The risk assessment determined that TCE, 1,2-DCE, antimony, arsenic, beryllium, chromium, iron, lead, manganese, mercury, and nickel are the contaminants of concern for this plume.

A quantitative risk assessment will be completed when the Final RI/FS for the entire HPIA Operable Unit is conducted.

7.0 DESCRIPTION OF ALTERNATIVES

Extraction and treatment of the contaminated groundwater is an element of each of the treatment alternatives evaluated for the shallow aquifer at the HPIA Site, with the exception of two "no action" alternatives. The seven interim remedial action alternatives evaluated in the IRA FS for the containment/ remediation of the contaminant plumes in the shallow aquifer at the HPIA Site are:

Alternative 1: No Action
Alternative 2: No Action With Institutional Controls
Alternative 3: Biological Treatment at the Sewage Treatment Plant (STP)
Alternative 4: Physical/Chemical Treatment (Air Stripping)

TABLE 2

FREQUENCY SUMMARY OF GROUNDWATER ANALYTICAL DATA COLLECTED FROM THE NORTHERN GROUNDWATER PLUME, JANUARY 1991

Compound	Frequency of Detects	Standards		No. of Detects Greater than Standards	
		North Carolina Water Quality Criteria for Groundwater (µg/L)	Drinking Water MCLs (µg/L)	North Carolina	Drinking Water MCLs
ORGANICS:					
Acetone	2/12	NS(1)	NS	--	--
Benzene	3/12	1	5	3/3	2/3
Carbon Disulfide	4/12	NS	NS	--	--
Dichloroethene, 1,2-	2/12	0.38	5	2/2	1/2
Dichloroethene, 1,1-	1/12	7	7	1/1	1/1
Dichloroethene (total), 1,2-	3/12	NS	NS	--	--
Ethylbenzene	4/12	29	700	1/4	1/4
Methylene chloride	4/12	5	5(2)	1/4	1/4
Tetrachloroethylene	1/12	0.7	5	1/1	0/1
Toluene	3/12	1000	1000	1/3	1/3
Trichloroethane, 1,1,2-	1/12	NS	5(3)	--	0/1
Trichloroethylene	5/12	2.8	5	4/5	3/5
Vinyl chloride	1/12	0.015	2	1/1	1/1
Xylene (total)	4/12	400	10000	1/4	0/4
SEMI-VOLATILES:					
Acenaphthene	2/12	NS	NS	--	--
bis(2-Ethylhexyl)phthalate	1/12	NS	NS	--	--
Dibenzofuran	1/12	NS	NS	--	--
Fluorene	1/12	NS	NS	--	--
2-Methylnaphthalene	2/12	NS	NS	--	--
2-Methylphenol	1/12	NS	NS	--	--
Naphthalene	2/12	NS	NS	--	--
INORGANICS:					
Aluminum	12/12	NS	NS	--	--
Antimony	4/12	NS	6(3)	--	4/12
Arsenic	10/12	50	50	1/10	1/10
Barium	12/12	1000	2000	0/12	0/12
Beryllium	8/12	NS	4(3)	--	6/8
Calcium	12/12	NS	NS	--	--
Chromium	12/12	50	100	6/12	4/12
Cobalt	7/12	NS	NS	--	--
Copper	12/12	1000	1300(4)	0/12	0/12
Iron	12/12	300	NS	12/12	--
Lead	12/12	50	15(4)	3/12	11/12

TABLE 2 (Continued)

FREQUENCY SUMMARY OF GROUNDWATER ANALYTICAL DATA COLLECTED FROM THE NORTHERN GROUNDWATER PLUME, JANUARY 1991

Compound	Frequency of Detects	Standards		No. of Detects Greater than Standards	
		North Carolina Water Quality Criteria for Groundwater (µg/L)	Drinking Water MCLs (µg/L)	North Carolina	Drinking Water MCLs
INORGANICS: (Cont.)					
Magnesium	12/12	NS	NS	--	--
Manganese	12/12	50	NS	10/12	--
Mercury	3/12	1.1	2	0/3	0/3
Nickel	10/12	150	100(3)	2/10	2/10
Potassium	12/12	NS	NS	--	--
Selenium	2/12	10	50	0/2	0/2
Silver	6/12	50	NS	0/6	--
Sodium	12/12	NS	NS	--	--
Thallium	1/12	NS	2(3)	--	1/1
Vanadium	12/12	NS	NS	--	--
Zinc	12/12	5000	NS	0/12	--
PESTICIDES:					
Dieldrin	1/12	--	--	--	--

(1) NS: Denotes no standard established
(2) Proposed maximum contaminant level (MCL)
(3) Effective date: January 17, 1994
(4) MCL is Action level for Public Water Supply System

TABLE 3

FREQUENCY SUMMARY OF GROUNDWATER ANALYTICAL DATA COLLECTED FROM THE SOUTHERN GROUNDWATER PLUME, JANUARY 1991

Compound	Frequency of Detects	Standards		No. of Detects Greater than Standards	
		North Carolina Water Quality Criteria for Groundwater (µg/L)	Drinking Water MCLs (µg/L)	North Carolina	Drinking Water MCLs
ORGANICS:					
Acetone	2/16	NS(1)	NS	--	--
Carbon Disulfide	2/16	NS	NS	--	--
Chloroform	1/16	0.19	NS	1/1	--
Dichloroethene (total), 1,2-	3/16	NS	NS	--	--
Ethylbenzene	1/16	29	700	1/1	1/1
Methylene Chloride	4/16	5	5(2)	0/4	0/4
Toluene	1/16	1000	1000	0/1	0/1
Trichloroethene	5/16	2.8	5	3/5	2/5
Xylene (total)	1/16	400	10000	1/1	0/1
SEMI-VOLATILES:					
bix(2-Ethylhexyl)phthalate	2/16	NS	NS	--	--
Methylnaphthalene,2-	1/16	NS	NS	--	--
Naphthalene	1/16	NS	NS	--	--
INORGANICS:					
Aluminum	16/16	NS	NS	--	--
Antimony	4/16	NS	6(3)	--	4/4
Arsenic	13/16	50	50	0/13	0/13
Barium	6/16	1000	2000	1/16	1/16
Beryllium	12/16	NS	4(3)	--	9/12
Calcium	6/16	NS	NS	--	--
Chromium	16/16	50	100	11/16	7/16
Cobalt	10/16	NS	NS	--	--
Copper	16/16	1000(4)	1300(4)	0/16	0/16
Iron	16/16	300	NS	16/16	--
Lead	16/16	50	15(4)	7/16	13/16
Magnesium	16/16	NS	NS	--	--
Manganese	16/16	50	NS	11/16	--
Mercury	6/16	1	2	1/6	0/6
Nickel	12/16	150	100(3)	1/12	1/12
Potassium	16/16	NS	NS	--	--
Selenium	7/16	10	50	0/7	0/7
Silver	5/16	50	NS	0/5	--
Sodium	16/16	NS	NS	--	--
Vanadium	15/16	NS	NS	--	--
Zinc	16/16	5000	NS	0/16	--

(1) NS: Denotes no standard established
(2) Proposed maximum contaminant level (MCL)
(3) Effective date: January 17, 1994
(4) MCL is Action level for Public Water Supply System

Alternative 5: Physical/Chemical Treatment (Carbon Adsorption)

Alternative 6: On-site Thermal Treatment

Alternative 7: Off-site RCRA Facility

These alternatives are intended to prevent the spread of contaminated groundwater by halting the migration of the contaminated shallow groundwater plume early in the Superfund process. The final alternative for the shallow aquifer may require alteration and refinement, based on monitoring results and the evaluation of data collected during implementation of interim remedial action.

A brief overview of each of the interim remedial action alternatives is included below. All costs and implementation times are estimated.

Alternative 1: No Action

There are no costs associated with the No Action Alternative.

The No Action Alternative is required by the NCP to be considered through the nine point evaluation criteria summarized on Table 4. It provides a baseline for comparison of other alternatives. Under the No Action Alternative, no remedial measures would be undertaken at the HPIA Site at the present time. Potential health risks would remain associated with the current potential exposure by ingestion of contaminated groundwater.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) would not be met with this alternative.

Alternative 2: No Action With Institutional Controls

Capital cost:	$0 (Minimal)
Annual Operation and Maintenance (O&M) Costs:	$60,000 for Years 1 through 30
Present Worth (PW):	$970,000
Months to Implement:	15

Under the No Action With Institutional Controls Alternative, the groundwater in the shallow aquifer will be left as is and no remedial actions will be implemented. This alternative includes quarterly sampling of 20 existing monitoring wells at the HPIA Site. In addition, use

TABLE 4
GLOSSARY OF EVALUATION CRITERIA

- **Overall Protection of Human Health and Environment** - addresses whether or not an alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment engineering controls or institutional controls.

- **Compliance with ARARs** - addresses whether or not an alternative will meet all of the applicable or relevant and appropriate requirements (ARARs) or other Federal and State environmental statutes and/or provide grounds for invoking a waiver.

- **Long-term Effectiveness and Permanence** - refers to the magnitude of residual risk and the ability of an alternative to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

- **Reduction of Toxicity, Mobility, or Volume through Treatment** - is the anticipated performance of the treatment options that may be employed in an alternative.

- **Short-term Effectiveness** - refers to the speed with which the alternative achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

- **Implementability** - is the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the chosen solution.

- **Cost** - includes capital and operation and maintenance costs. For comparative purposes, presents present worth values.

- **State Acceptance** - indicates whether, based on its review of the RI and FS reports and the Interim Action Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

- **Community Acceptance** - will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI and FS reports and the Interim Action Proposed Plan.

of the aquifer and installation of new water wells will be restricted. Like the No Action Alternative, potential health risks would remain associated with the current potential exposure by ingestion of contaminated groundwater.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) would not be met with this alternative.

Alternative 3: Biological Treatment at the STP

Capital cost:	$1.3 million
Annual O&M Costs:	$334,000 for Years 1 through 30
PW:	$6.9 million
Months to Implement:	15

Alternative 3 includes groundwater extraction, pretreatment for oil and grease and for inorganic chemicals, treatment of VOCs at the existing Hadnot Point STP, and institutional controls.

Groundwater extraction would be accomplished through a phased approach. Initially, four extraction wells will be installed in each of the two contaminated plume areas (Figure 2). Based upon the results of groundwater monitoring following the first year of operation, additional extraction wells may be installed. Groundwater modeling may be employed at this time (following the first year of operation) to help select the appropriate number and location of extraction results. (For costing purposes only in the IRA FS, it was assumed that eight additional extraction wells would be installed during each of the first three years of operation for a total of 32 wells.)

The pretreatment system will consist of an oil/water gravity separator, an inorganic chemical removal system utilizing at least precipitation, chemical reduction, and sedimentation technologies. The biological system that will be utilized at the existing Hadnot Point STP consists of an aerated equalization lagoon, primary clarifiers, two trickling filters, secondary clarifiers, anaerobic digestors, and chlorine contact chambers. The effluent from the Hadnot Point STP discharges to the New River.

The same institutional controls (i.e., groundwater monitoring, aquifer-use restrictions, and well installation restrictions) identified in Alternative 2 will be included in this alternative.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) will be met with this alternative. This alternative may require an NPDES permit modification for the Hadnot Point STP. The modification may result in additional monitoring parameters and/or monitoring frequencies. This alternative should be able to meet these additional requirements.

OSHA and the State of North Carolina have established VOC air emission limits for the protection of human health and the environment. At the Hadnot Point STP, the major emissions source is the aerated lagoon. Preliminary results from air modeling efforts have concluded that the implementation of this alternative should be able to meet these established air emission limits.

The TCE-contaminated groundwater in the HPIA shallow aquifer is excluded from being considered a listed hazardous waste under the one part per million solvent exclusion provided under RCRA (40 CFR 261.3). Therefore, RCRA will not be applicable to the permitting or design of the HPIA sewage treatment system when the contaminated groundwater is introduced. However, since the extracted groundwater from HPIA is expected to contain VOCs, the sludge generated from the Hadnot Point STP would be required to be analyzed for TCLP constituents. If the sludge would exceed TCLP levels, the sludge will be required to be handled as a hazardous waste in accordance with RCRA.

Alternative 4: Physical/Chemical Treatment (Air Stripping)

Capital cost:	$1.0 million
Annual O&M Costs:	$352,000 for Years 1 through 30
PW:	$7.6 million
Months to Implement:	15

Alternative 4 is similar to Alternative 3 with the exception of the method of groundwater treatment. In general, the Air Stripping Alternative includes groundwater extraction, pretreatment for oil and grease and for inorganic chemicals, treatment for VOCs via an on-site air stripper, discharge to the Hadnot Point STP, and institutional controls. The same extraction and pretreatment systems identified in Alternative 3 and the same institutional controls identified in Alternative 2 will be included in this alternative.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) will be met with this alternative. OSHA and the State of

North Carolina VOC air emission limits may be applicable for the air stripper. These ARARs should be met with this alternative. No RCRA ARARs will apply since this alternative includes on-site treatment.

Alternative 5: Physical/Chemical Treatment (Carbon Adsorption)

Capital cost:	$940,000
Annual O&M Costs:	$400,000 for Years 1 through 30
PW:	$7.6 million
Months to Implement:	15

Alternative 5 is similar to Alternatives 3 and 4 with the exception of the method of groundwater treatment. In general, the Carbon Adsorption Alternative includes groundwater extraction, pretreatment for oil and grease and for inorganic chemicals, treatment for VOCs via on-site carbon adsorption units, discharge to the Hadnot Point STP, and institutional controls. The same extraction and pretreatment systems identified in Alternative 3 and the same institutional controls identified in Alternative 2 will be included in this alternative.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) will be met with this alternative. No air emission, NPDES, or RCRA ARARs will apply to this alternative.

Alternative 6: Thermal Treatment

Capital cost:	$1.5 million
Annual O&M Costs:	$627,000 for Years 1 through 30
PW:	$11.8 million
Months to Implement:	15

Alternative 6 is similar to Alternatives 3, 4 and 5 with the exception of the method of groundwater treatment. In general, the Thermal Treatment Alternative includes groundwater extraction, pretreatment for oil and grease and for inorganic chemicals, treatment for VOCs via an on-site liquid injection incinerator, and institutional controls. The same extraction and pretreatment systems identified in Alternative 3 and the same institutional controls identified in Alternative 2 will be included in this alternative.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) will be met with this alternative. OSHA and the State of

North Carolina VOC air emission limits may be applicable for the incinerator. These ARARs should be met with this alternative. No RCRA or NPDES ARARs will apply to this alternative.

Alternative 7: RCRA Facility

Capital cost:	$900,000
Annual O&M Costs:	$4.2 million for Years 1 through 30
PW:	$68.9 million
Months to Implement:	15

Alternative 7 is somewhat similar to Alternatives 3, 4, 5 and 6 with the exception of the method of groundwater treatment. In general, the RCRA Facility Alternative includes groundwater extraction, off-site treatment at an approved RCRA facility, and institutional controls. The same extraction system identified in Alternative 3 will be included in this alternative. No pretreatment systems are included in this alternative. The same institutional controls identified in Alternative 2 will be included in this alternative.

Chemical-specific ARARs (i.e., Federal Drinking Water Standards and North Carolina Water Quality Criteria for Groundwater) will be met with this alternative. No air emission ARARs or NPDES ARARs apply to this alternative. RCRA ARARs will apply and should be met under this alternative.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

A detailed analysis was performed on the seven IRA alternatives using the nine evaluation criteria in order to select a site remedy. A brief summary of each alternative's strengths and weaknesses with respect to the evaluation criteria follows. A glossary of the evaluation criteria has previously been noted on Table 4.

Overall Protection of Human Health and the Environment

The five "pump and treat" alternatives would provide protection of human health and the environment by reducing or controlling risk through treatment, engineering controls, or institutional controls. Each of these "pump and treat" alternatives would treat the contaminants in the extracted groundwater, thereby reducing the risks associated with

contact with the groundwater and minimizing the migration of contamination from the groundwater.

Since neither the No Action Alternative nor the No Action With Institutional Controls Alternative are protective of human health and the environment, they are not considered further in this analysis as an option for the HPIA Site.

Compliance with ARARs

An interim remedial action alternative need only address those ARARs applicable or relevant and appropriate to the limited-scope interim action. All of the treatment alternatives will meet the NPDES requirements for discharge to a surface water body. ARARs for the aquifer are Federal and North Carolina MCLs for drinking water and groundwater, respectively. In addition, applicable air emission ARARs (OSHA and North Carolina limits) and RCRA ARARs apply to several of the alternatives. The ultimate goal of all of the "pump and treat" alternatives is to meet all of the above-mentioned ARARs. The final remedial alternative (to be proposed after completion of additional studies) will provide additional information on the compliance with ARARs.

Long-Term Effectiveness and Permanence

This criteria is irrelevant to the interim action presented in this Proposed Plan. Long-term effectiveness and permanence will be evaluated as part of the final remedial action for the shallow aquifer.

Reduction of Toxicity, Mobility, or Volume of the Contaminants Through Treatment

All of the "pump and treat" alternatives would extract and treat the contaminated groundwater to reduce the toxicity, mobility, and volume of the contaminants in the water. The toxicity of the contaminants will be reduced through treatment. The mobility of the contaminants will be reduced by containment of the plumes via the extraction wells. Total volume of the contaminants will be reduced by the combination of pumping and treatment over the duration of the interim remedial action.

Short-Term Effectiveness

It is not expected that the implementation of any of the alternatives would cause adverse effects to human health and the environment. Workers could be exposed to contaminated soil or water during construction and installation of the extraction well systems. Implementation of appropriate worker health and safety precautions will mitigate any threat. No threats to the community are anticipated, due to the location and industrial nature of the activities at HPIA. All of the "pump and treat" alternatives will be effective in achieving the goal of reducing contaminant migration upon implementation. Alternatives 3, 4 and 5 would take approximately 15 months to implement. Alternatives 6 and 7 are also anticipated to require 15 months to implement since they are dependent on the availability of equipment and/or the capacity at an off-site facility.

Implementability

All of the alternatives have similar administrative difficulties (i.e., obtaining permits) that could delay implementation. Acquiring the necessary permits for off-site actions is feasible and should not adversely affect the implementability of any of the alternatives. Note that only the substantive technical requirements of permits must be met for a remedial action implemented on site. All of the alternatives are technically feasible and, therefore, implementable. The majority of the required equipment for each of the alternatives is readily available. Alternative 3 has an advantage with implementability since the biological system is in-place and operating at the existing sewage treatment plant within CLEJ. However, due to the unknown condition of the sewer line, this alternative may result in extensive construction time for relining or replacement of the sewer line.

Cost

Alternative 3 has the lowest present worth cost as compared to Alternatives 4, 5, 6 and 7. The present worth cost for Alternative 3 is approximately $6.9 million; Alternative 4 is approximately $7.6 million; Alternative 5 is $7.6 million; Alternative 6 is approximately $11.8 million; and Alternative 7 is approximately $68.9 million.

EPA/State Acceptance

The Environmental Protection Agency and the State of North Carolina DEHNR have concurred with the selection of this alternative.

Community Acceptance

No private citizens attended the public meeting held on May 14, 1992 or provided any comments during the 30-day comment period. The issues regarding the contaminated shallow aquifer at the HPIA may not be of a concern to the community. This lack of concern may be due to the location of the site within an industrial area and away from residential areas.

9.0 SELECTED REMEDY

The preferred interim remedial action alternative for reducing the potential for further migration of the contamination in the shallow aquifer at HPIA is Alternative 4: Physical/Chemical Treatment (Air Stripping). Based on available information, this alternative appears to provide the best balance with respect to the nine CERCLA evaluation criteria used to evaluate alternatives. The action will limit the extent of migration of the contamination in the shallow groundwater aquifer and reduce the concentration of contaminants in the groundwater. This interim remedial action will be consistent with any other remedial actions that are selected for the site. A description of Alternative 4 is included below.

In general, Alternative 4 includes groundwater extraction, pretreatment, groundwater treatment and discharge, and institutional controls. The on-site pretreatment system will consist of an oil/water gravity separator, and a combination of one of several inorganic removal technologies including but not limited to precipitation, chemical reduction, and sedimentation. Treatment of the VOCs in the groundwater will be conducted via an on-site air stripper. Based on the results of bench-scale treatability study, a carbon adsorbtion unit may be added to the treatment system. The treatability study will be conducted during the design of this alternative. The existing Hadnot Point STP will be used for the off-site discharge of the treated groundwater. A long-term groundwater monitoring program will be implemented, and restrictions will be placed on the use of the shallow aquifer and on the installation of new wells. Details of each of the components making up this alternative are discussed below.

Groundwater Collection System

Groundwater in the shallow aquifer at HPIA will be withdrawn through a series of extraction wells. The details of the extraction system (i.e., number, location, and pumping rates of the extraction wells) will be determined through a phased approach. Preliminary aquifer characteristics were previously estimated, based on the results of an eight-hour pump test on two wells screened in the shallow aquifer. These estimates will be confirmed or reevaluated as extraction wells are installed and the groundwater is monitored.

Initially, four 4-inch wells will be installed at each of the two groundwater plumes and pumped at a rate of two to five gpm. Additional wells will be added to the system as dictated by monitoring results. For costing purposes only, it was assumed that eight additional extraction wells (four within each plume area) will be installed at three different times during the first few years of operation. Therefore, the complete extraction system will include 32 wells. Please note that the total number of extraction wells required to successfully implement the IRA will be determined as the wells are installed, and testing and monitoring of the groundwater will provide a means of evaluating the need for additional wells. The location of these additional wells has not been determined at this time.

Pretreatment System

Once extracted, the contaminated groundwater will be pumped to an on-site pretreatment system. A pretreatment system will be located within the area of each plume. The first step in the pretreatment system will consist of a gravity oil/water separation process for the removal of floating oils and/or oily wastes that are heavier than water. The oil/water gravity separation system will include a holding tank for retention of the extracted groundwater, and a surface skimming and bottom collection system. Baffles will be included in the design of the gravity separator in order to provide additional surface area. Collected free product will be either sold to a waste oil recycler or incinerated in a RCRA-permitted facility.

The aqueous effluent from the gravity separation system will be transferred to an inorganic chemical removal system for the removal of the inorganic contaminants of concern (e.g., chromium, lead, manganese, iron, etc.). The inorganic system will include but not be limited to the following technologies: precipitation, chemical reduction, and sedimentation.

Residuals generated from the pretreatment systems will be disposed of properly.

Treatment System

The aqueous effluent from the inorganic chemical removal system will be pumped to an on-site treatment system consisting of two air stripping units (one location within each source plume area). The on-site air stripping units will be designed for the treatment of volatile organic compounds (VOCs). Residuals generated from this process will include air emissions contaminated with organics. If required, vapor recovery equipment will be added to prevent the release of stripped organics into the atmosphere. The vapor recovery equipment will generate additional waste contaminated with organics which will require proper off-site disposal or regeneration. If necessary, an activated carbon system will be included in the groundwater treatment system. The results of a laboratory bench-scale treatability study will determine whether the activated carbon system is necessary.

Discharge to the Hadnot Point STP

The treated effluent from the air stripping systems will be pumped to the closest sanitary sewer manholes for discharge to the existing biological treatment system at the Hadnot Point STP for final discharge to the New River.

The existing Hadnot Point STP, located south-southeast of the HPIA area, has an operating capacity of 8 million gallons per day. The STP is a biological treatment system consisting of an aerated equalization lagoon, primary clarifiers, trickling filters, secondary clarifiers, chlorine contact chamber, anaerobic digesters, and sludge drying beds.

The STP receives sanitary wastewater from both residential and industrial areas. The influent into the plant enters the aerated equalization lagoon (two million gallon capacity). The lagoon is aerated with five floating aerators. The aerated wastewater is pumped from the lagoon to the primary influent chamber and then to one of eight 80,000 gallon primary clarifiers. The resulting aqueous effluent form the primary clarifiers is pumped to the secondary treatment area consisting of two 1.3-million gallon trickling filters followed by two 300,000-gallon secondary clarifiers, followed by a 29,000-gallon chlorine contact chamber. Sludge and oil and grease collected in the primary and secondary clarifiers is pumped to one of six 140,000-gallon anaerobic digesters. Digested sludge is pumped to one of twenty-five drying beds. The final effluent from the chlorine contact chamber is discharged to the New River.

Under Alternative 4, the treated groundwater will be mixed in-line with the sewage the plant is currently receiving. Since the treated groundwater will be mixed with the current plant influent, STP effluent discharge and sludge disposal will continue to be handled by the STP in the same manner as currently used. The resulting effluent will be discharged to the New River.

Institutional Controls

In order to track the effectiveness of the "pump and treat" method, a long-term groundwater monitoring program will be implemented. The monitoring program will include periodic sampling of approximately 20 monitoring wells. Samples will be collected on a quarterly basis for 30 years and analyzed for the constituents of concern. Restrictions will be placed on the use of the shallow aquifer, the water supply wells will remain closed, and no new wells will be permitted to be installed in the area.

Estimated Costs

The estimated capital costs associated with the Physical/Chemical Treatment (Air Stripping) Alternative is approximately $1,012,000. Operation and maintenance (O&M) costs of approximately $352,000 annually are projected for the operation of the treatment system and the sampling of 20 existing monitoring wells. Assuming a monitoring period of 30 years and an annual percentage rate of 5%, this equates to a net present worth of $7.6 million. Table 5 presents a summary of this cost estimate for the major components.

10.0 STATUTORY DETERMINATIONS

This IRA alternative is part of an overall remedy for the entire HPIA Operable Unit. This IRA alternative will provide adequate protection of human health and the environment through treatment, engineering controls, and institutional controls. Specifically, this alternative will reduce and/or eliminate the potential risks posed by the contaminated shallow aquifer at the HPIA Site. In addition, implementation of this alternative will not pose unacceptable short-term risks or cross-media impacts. This interim action will be part of an overall remedy which will attain the statutory requirement of protectiveness for the entire operable unit.

TABLE 5

ESTIMATED COSTS OF SELECTED REMEDY

Component	Estimated Cost
Capital Costs:	
Mobilization	$25,000
Extraction Well System	76,000(1)
Treatment Equipment	633,800
Demobilization	15,000
Pilot Studies	37,490
	$787,290
Engineering and Contingencies	224,940
	$1,012,230
Operation and Maintenance Costs:	
System Operation	$224,200
Effluent Sampling	18,300
Miscellaneous (Health and Safety)	52,400
Monitoring	56,600
	$351,500
TOTAL NET PRESENT VALUE (using 5% discount rate)	$7.6 Million

(1) This cost will incur during years 1 through 3.

This IRA alternative will comply with all Federal and North Carolina requirements (ARARs) which are applicable or relevant and appropriate to its implementation. Specifically, the alternative will meet the Federal Drinking Water MCLs and the North Carolina Water Quality Criteria for Groundwater for the contaminants of concern at the site. The alternative will also comply with Pretreatment Standards and NPDES criteria.

The selected remedy affords overall effectiveness proportional to its costs. This alternative is the second most cost effective of the "treatment" alternatives evaluated. The no action alternatives is more cost effective, but may not adequately protect human health and the environment. The Biological STP Treatment Alternative is slightly more cost effective, but due to the unknown condition of the sewer line, this alternative could result in significant cost increases for sewer line replacement.

The selected IRA alternative represents a permanent solution with respect to the principal threats posed by the contamination within the shallow aquifer at the HPIA Site. Therefore, this alternative utilizes permanent solutions for the shallow aquifer to the maximum extent practicable. This interim action will be part of an overall remedy which will attain the statutory requirement of utilizing permanent solutions to the maximum extent practicable for the entire HPIA Operable Unit.

Since treatment (via pretreatment and air stripping) is the principal element of this alternative, the statutory requirement with respect to preference for treatment will be attained. In addition, this interim action will be part of an overall remedy which will attain the statutory requirement of satisfying the preference for treatment that reduces toxicity, mobility, or volume as a principal element.

11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The proposed remedial action plan identified Alternative 3, Biological Treatment, as the preferred alternative. Alternative 4, Air Stripping, presented in the proposed remedial action plan and the Feasibility Study Report requires an on-site air stripper to treat the extracted groundwater. The possibility of adverse effects to the sewage treatment plant (STP) was raised by the State of North Carolina. As a result, the Navy/Marine Corps, in consultation with the EPA and North Carolina, selected Alternative 4 as the alternative providing the best balance of the nine criteria. This alternative involves treatment of the extracted groundwater prior to discharging the effluent to the Hadnot Point Industrial Area STP.

12.0 RESPONSIVENESS SUMMARY

12.1 Overview

At the time of the public comment period, MCB Camp Lejeune and the Department of the Navy (DoN) with the assistance of the United States Environmental Protection Agency (EPA) and the North Carolina Department of Environment, Health, and Natural Resources (N.C. DEHNR) selected a preferred interim remedial action alternative for the contaminated groundwater plumes in the shallow aquifer at the HPIA Operable Unit located at MCB Camp Lejeune, North Carolina. The preferred interim remedial action alternative specified in the Proposed Remedial Action Plan (PRAP) involved extracting the contaminated groundwater, pretreating the groundwater, and then discharging the pretreated water to an existing sewage treatment plant (STP) at the MCB for treatment and discharge. Treatment of the groundwater at the STP would primarily involve aeration and biological treatment (trickling filters). The treated groundwater would be discharged to a receiving river.

Judging from the comments received during the public comment period and from the attendance at the public meeting, the local community does not appear to be concerned with the proposed actions to be implemented at the site. No private citizens attended the public meeting nor did they submit any comments during the comment period.

The purpose of this responsiveness summary is to identify the comments and concerns of the local community regarding the selected interim remedial action, and to document how MCB Camp Lejeune/DoN considered these comments and concerns during the selection of the interim remedial alternative. The remainder of this responsiveness summary discusses the background on community involvement, and presents a summary of the comments received during the public meeting and public comment period along with their corresponding responses.

12.2 Background on Community Involvement

No past community interest in the contamination at the HPIA Operable Unit has been documented. This may be due to the fact that the site is located within an industrial area at the MCB.

12.3 Summary of Public Comments and Responses

Comments raised during the HPIA Operable Unit public comment period and the public meeting are summarized below. The comment period was held between May 14, 1992 and June 14, 1992. The public meeting was held on May 14, 1992. The only comments received were from the Agency for Toxic Substances and Disease Registry (ATSDR) and were technical questions/concerns regarding the selected remedial action.

1. The Agency for Toxic Substances and Disease Registry (ATSDR) asked what kind of models would be used to determine air quality at the STP.

   MCB Camp Lejeune/DoN Response: An EPA air model (SCREEN) which is a very conservative model has already been used to estimate potential air emissions resulting from implementing the STP for the treatment of the groundwater. The results from the model estimated that the concentrations of the identified VOC emissions from the STP would be below the North Carolina acceptable ambient concentrations.

2. The ATSDR wanted to know how the STP would be upgraded.

   MCB Camp Lejeune/DoN Response: Clarified the misunderstanding - the STP would not be upgraded, instead the sanitary sewer line that is planned to be used would be upgraded if required.

3. The ATSDR was concerned if the STP could handle the groundwater for treatment.

   MCB Camp Lejeune/DoN Response: It is believed that the STP will be capable of treating the groundwater, based on preliminary studies (see Final Pre-Design Report). MCB Camp Lejeune and the DoN intend to conduct treatability studies during the design of the alternative.

4. The ATSDR recommended that since the STP is in close proximity to a recreation area, air monitoring for volatile organic chemicals should be conducted for a short period of time after beginning the treatment process and again when the process is at peak capacity. Analyses should include determining concentrations of volatile organic chemicals such as benzene, vinyl chloride, and other volatiles associated with both plumes and not be confined to TCE.

MCB Camp Lejeune/DoN Response: This recommendation for air monitoring will be included in the remedial design for the site and will become a requirement during the construction start-up phase.

5. The ATSDR recommended that air monitoring stations should be at areas closest to the nearest recreational areas and should be at heights that would be representative of the breathing zone for a young child as well as an adult.

MCB Camp Lejeune/DoN Response: Air monitoring stations will be located at areas closest to the nearest recreational areas and will be at heights representative of the breathing zone for a young child as well as an adult.