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EPA Superfund Record of Decision:

Naval Air Engineering Center OU 20 (Site 28 Soil & Groundwater) Lakehurst, NJ 7/7/1997

NAVAL AIR ENGINEERING STATION, Lakehurst, NJ

Final

Record of Decision for

Site 28 Soil and Groundwater

7 May 1997

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RECORD OF DECISION
DECLARATION STATEMENT
SITE 28 SOIL AND GROUNDWATER
NAVAL AIR ENGINEERING STATION

FACILITY NAME AND LOCATION

Naval Air Engineering Station
Lakehurst, New Jersey 08733

STATEMENT OF BASIS AND PURPOSE

This decision document presents the final remedy to address Site 28 soil and groundwater at the Naval Air Engineering Station in Lakehurst, New Jersey. The selected alternative was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan.

This decision is based on information contained in the Remedial Investigation (RI) Report (October 1992), the Endangerment Assessment (EA) Report (October 1992), the Focused Feasibility Study for Site 28 (July 1996), the Proposed Plan for Site 28 (February 1997), and sampling data obtained from the Site 28 interim pump and treat facility (March 1993 - October 1996). These reports and other information used in the remedy selection process are part of the Administrative Record file for Site 28, which is available for public review at the Ocean County Library in Toms River, New Jersey.

This document provides background information on the Site, presents the selected alternative and reviews the public's response to the Proposed Plan.

Both the United States Environmental Protection Agency (USEPA), Region II Regional Administrator and the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) concur with the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

The selected alternative to address groundwater at Site 28 is continued operation of the existing groundwater treatment facility with a sparge/vapor extraction system installed to accelerate the remediation of the higher areas of soil and groundwater contamination. The objectives of the selected actions are to:

1) protect human health and the environment by reducing the downgradient migration of contaminated groundwater; 2) remediate the source areas with the highest concentration of

contamination; and 3) reduce site contamination to applicable or relevant and appropriate requirements (ARARs).

STATUTORY DETERMINATIONS

This final action for Site 28 is protective of human health and the environment. The results of this action will attain Federal and State applicable or relevant and appropriate requirements (ARARs).

28 April 1997

Captain Leroy Farr (Date)
Commanding Officer
Naval Air Engineering Station
Lakehurst, New Jersey

With the concurrence of:

7-7-97

Jeanne Fox (Date)
Regional Administrator
U.S. Environmental Protection Agency, Region II

DECISION SUMMARY
RECORD OF DECISION
SITE 28 SOIL AND GROUNDWATER
NAVAL AIR ENGINEERING STATION

SITE DESCRIPTION

The Naval Air Engineering Station (NAES) is located in Jackson and Manchester Townships, Ocean County, New Jersey, approximately 14 miles inland from the Atlantic Ocean (Figure 1). NAES is approximately 7,400 acres and is bordered by Route 547 to the east, the Fort Dix Military Reservation to the west, woodland to the north (portions of which are within Colliers Mill Wildlife Management Area), Lakehurst Borough and woodland, including the Manchester Wildlife Management Area, to the south. NAES and the surrounding area are located within the Pinelands National Reserve, the most extensive undeveloped land tract of the Middle Atlantic Seaboard. The groundwater at NAES is currently classified by NJDEP as Class I-PL (Pinelands).

NAES lies within the Outer Coastal Plain physiographic province, which is characterized by gently rolling terrain with minimal relief. Surface elevations within NAES range from a low of approximately 60 feet above mean sea level in the east central part of the base, to a high of approximately 190 feet above mean sea level in the southwestern part of the base. Maximum relief occurs in the southwestern part of the base because of its proximity to the more rolling terrain of the Inner Coastal Plain. Surface slopes are generally less than five percent.

NAES lies within the Toms River Drainage Basin. The basin is relatively small (191 square miles) and the residence time for surface drainage waters is short. Drainage from NAES discharges to the Ridgeway Branch to the north and to the Black and Union Branches to the south. All three streams discharge into the Toms River. Several headwater tributaries to these branches originate at NAES. Northern tributaries to the Ridgeway Branch include the Elisha, Success, Harris and Obhanan Ridgeway Branches. The southern tributaries to the Black and Union Branches include the North Ruckles and Middle Ruckles Branches and Manapaqua Brook. The Ridgeway and Union Branches then feed Pine Lake; located approximately 2.5 miles east of NAES before joining Toms River. Storm drainage from NAES is divided between the north and south, discharging into the Ridgeway Branch and Union Branch, respectively. The Paint Branch, located in the east-central part of the base, is a relatively small stream which feeds the Manapaqua Brook.

Three small water bodies are located in the western portion of NAES: Bass Lake, Clubhouse Lake, and Pickerel Pond. NAES also contains over 1,300 acres of flood-prone areas, occurring primarily in the south-central part of the base, and approximately 1,300 acres of prime agricultural land in the western portion of the base.

There are 913 acres on the eastern portion of NAES that lie within Manchester Township and the remaining acreage is in Jackson Township. The combined population of Lakehurst Borough,

Manchester and Jackson Townships, is approximately 65,400, for an area of approximately 185 square miles. The average population density of Manchester and Jackson Townships is 169 persons per square mile.

The areas surrounding NAES are, in general, not heavily developed. The closest commercial area is located near the southeastern section of the facility in the borough of Lakehurst. This is primarily a residential area with some commercial establishments but no industry. To the north and south are State wildlife management areas which are essentially undeveloped. Adjacent to and south of NAES are commercial cranberry bogs, the drainage from which crosses the southeast section of NAES property.

For the combined area of Manchester and Jackson Townships, approximately 41 percent of the land is vacant (undeveloped), 57 percent is residential, one percent is commercial and the remaining one percent is industrial or farmed. For Lakehurst Borough, 83 percent of the land is residential, 11 percent is vacant, and the remaining 6 percent commercially developed.

In the vicinity of NAES, water is generally supplied to the populace by municipal supply wells. Some private wells exist that provide drinking water, however, the majority are for irrigation only. In Lakehurst Borough there is a well field consisting of seven 50-foot deep wells, located approximately two-thirds of a mile south of the eastern portion of NAES. Three of the seven wells (four of the wells are rarely operated) are pumped at an average rate of 70 to 90 gallons per minute and supply drinking water for a population of approximately 3,000. Jackson Township operates one supply well in the Legler area, approximately one-quarter mile north of NAES, which supplies water to a very small population (probably less than 1,000) in the immediate vicinity of NAES.

The history of the site dates back to 1916, when the Eddystone Chemical Company leased property from the Manchester Land Development Company to develop an experimental firing range for the testing of chemical artillery shells. In 1919, the U.S. Army assumed control of the site and named it Camp Kendrick. Camp Kendrick was turned over to the Navy and formally commissioned Naval Air Station (NAS) Lakehurst, New Jersey on June 28, 1921. The Naval Air Engineering Center (NAEC) was moved from the Naval Base, Philadelphia to Lakehurst in December 1974. At that time, NAEC became the host activity, thus, the new name NAEC. In January 1992, NAEC was renamed the Naval Air Warfare Center Aircraft Division Lakehurst (NAWCADLKE), due to a reorganization within the Department of the Navy. In January 1994, the NAWCADLKE was renamed the Naval Air Engineering Station (NAES), due to continued reorganization within the Department of the Navy.

Currently, NAES's mission is to support programs of technology development, engineering, developmental evaluation and verification, systems integration, limited manufacturing, procurement, integrated logistic support management, and fleet engineering support for Aircraft-Platform Interface (API) systems. This includes terminal guidance, recovery, handling, propulsion support, avionics support, servicing and maintenance, aircraft/weapons/ship compatibility, and takeoff. The Station provides, operates, and maintains product evaluation and verification sites.

aviation and other facilities, and support services (including development of equipment and instrumentation) for API systems and other Department of Defense programs. The Station also provides facilities and support services for tenant activities and units as designed by appropriate authority.

NAES and its tenant activities now occupy more than 300 buildings, built between 1919 and 1996, totaling over 2,845,000 square feet. The command also operates and maintains: two 5,000-foot long runways, a 12,000-foot long test runway, one-mile long jet car test track, four one and one-quarter mile long jet car test tracks, a parachute jump circle, a 79-acre golf course, and a 3,500-acre conservation area.

In the past, the various operations and activities at the Station required the use, handling, storage and occasionally the on-site disposal of hazardous substances. During the operational period of the facility, there have been documented, reported or suspected releases of these substances into the environment.

SITE HISTORY

Site 28 is located approximately 2,800 feet from the southern boundary of the NAES in the central portion of the Base (Figure 2). Site 28 is located in NAES Superfund Area E. The Site is partially developed and includes various facility buildings, including Building 307, known as the Westfield Hangar (Figure 3). There is a shallow groundwater table at Site 28 at a depth of approximately 7 to 9 feet. Groundwater at the site flows in an easterly direction toward the Paint Branch which flows approximately 300 feet to the northeast of the site.

INITIAL INVESTIGATIONS

As part of the DOD Installation Restoration Program and the Navy Assessment and Control of Installation Pollutants (NACIP) program, an initial Assessment Study was conducted in 1983 to identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous materials operations.

Based on information from historical records, aerial photographs, field inspections, and personnel interviews, the study identified a total of 44 potentially contaminated sites. An additional site, Bomarc, was also investigated by NAES. The Bomarc Site is the responsibility of the U.S. Air Force and is located on Fort Dix adjacent to the western portion of NAES. A Remedial Investigation (RI) was recommended to confirm or deny the existence of the suspected contamination and to quantify the extent of any problems which may exist. Following further review of available data by Navy personnel, it was decided that 42 of the 44 sites should be included in the Remedial Investigation. Two potentially contaminated sites, an ordnance site (Site 41) and an Advanced Underground Storage Facility (Site 43), were deleted from the Remedial Investigation because they had already been addressed through previous investigations or standard removal procedures.

In 1987 NAES was designated as a National Priorities List (NPL) or Superfund site under the federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

REMEDIAL INVESTIGATIONS

Investigations at Site 28 were initiated from 1981 to 1984 by NAES, with the installation of two groundwater monitoring wells, which were monitored on a regular basis for the presence of free product. A trace of fuel was detected in 1984. Additional actions conducted at these sites include:

PHASE I REMEDIAL INVESTIGATION (1985-1986)

Analysis of groundwater samples collected from monitoring wells at the site revealed no contamination. Low levels of toluene were detected in a sample from a supply well at the site. A detailed description of the investigations and results is contained in the Focused Feasibility Study for Site 28.

PHASE II REMEDIAL INVESTIGATION (1988)

Groundwater samples were collected for analysis from three monitoring wells and one supply well at the site. Organic contaminants were detected in one monitoring well. Floating fuel product was also detected in this well. Analysis of four soil samples collected at the site revealed petroleum hydrocarbon and semi-volatile organic contamination in one of the samples and slightly elevated levels of beryllium and cadmium in another. A sediment sample collected from the Paint Branch downgradient from the site also contained cadmium. A detailed description of the investigations and results is contained in the Focused Feasibility Study for Site 28.

REMEDIAL INVESTIGATION - PHASE II ADDENDUM (1990)

A soil gas and groundwater screening survey was implemented at Site 28. The results confirmed the presence of benzene, toluene and xylene as well as other petroleum hydrocarbons. The source of contamination was determined to be the discharge of gasoline into the groundwater as a result of a leak unearthed in the subsurface piping running from an above ground gasoline tank to Building 308. The zone of groundwater contamination was found to extend at least 150 feet from the source in a downgradient (easterly) direction. The width of the contaminant plume varied from about 50 to 70 feet, decreasing in the downgradient direction.

SOIL REMOVAL ACTION (1990)

On August 8, 1990, based on the results of the soil gas/groundwater survey, soil was excavated from an area northeast of Building 308 to expose a copper gasoline pipe running from an above ground gasoline tank into the building. A gasoline leak was observed at one of the pipe couplings and repaired (the piping was later removed and replaced with above ground piping). During the period 9 - 13 August, eight test pits were dug in the area northeast of Building 308. Based on observations made in these test pits, soil was excavated from an area measuring approximately 60 ft. long, 20-40 ft. wide and 7-8 ft. deep. Approximately 65 cubic yards of visually contaminated

soil was segregated and transferred to a nearby on-site hazardous waste storage area for disposal at an approved off-site facility.

AQUIFER CHARACTERIZATION STUDY (1991)

In January 1991, an aquifer characterization study was performed at Site 28. One recovery well (RW-1) and one observation well (OW-1) were installed approximately 200 feet downgradient of the former gasoline leak area. A 24-hour pumping test was conducted on the recovery well to estimate aquifer parameters. This information was required to design a groundwater remediation system capable of capturing and treating the contaminated plume resulting from the gasoline release.

INTERIM REMEDIAL ACTION - SITE 28 PUMP & TREAT (1991)

The Navy determined in the spring of 1991, that it had sufficient data to perform an interim remedial action at Site 28. Although an in-depth risk assessment and comprehensive feasibility study had not been completed, a decision to implement an interim remedial action to halt groundwater plume migration and treat groundwater contamination at Site 28 was made by the NAES with the concurrence of the USEPA and NJDEP. An interim Focused Feasibility Study for the remedial action at Site 28 was submitted on April 29, 1991. The Proposed Plan was submitted to the public on June 13, 1991. A Record of Decision, indicating the selected interim remedial action was signed by the EPA, with NJDEP concurrence, on September 16, 1991.

The interim remedial action includes groundwater pumping, treatment and recharge of treated water back to the aquifer. Groundwater is extracted via two wells at a combined rate of 100 gallons per minute (gpm). The existing recovery well (RW-1) located downgradient of the gasoline leak area is pumped at 50 gpm. A new recovery well (RW-2) which was installed at the source area was pumped at 50 gpm. After several months of pumping, the pumping rate of the source area well was increased to 60 gpm to attempt to capture the higher levels of contamination. In the spring of 1997, RW-2 was replaced with an new recovery well screened closer to the water table to improve the recovery of contaminated groundwater for treatment. Figure 3 indicates the recovery well and treatment system locations.

The extracted groundwater is pretreated to remove metals, free product and solids. To treat the volatile organic compounds (VOCs) in the groundwater, the water is passed through air stripping columns. Granular activated carbon polishing filters are used for residual VOC and semi-volatile organic compounds (SVOC) removal. The air stripper emissions are treated by granular activated air filters before being discharged to the atmosphere. The treated water is recharged to the aquifer at an irrigation/subsurface infiltration area located upgradient of the contaminated groundwater to form a "closed loop" treatment system.

The treatment system was designed by the Navy and awarded for construction in September 1991. Construction of the facility was completed and operations began in February 1993. This interim remedial action was implemented to halt the spread of contaminated groundwater from entering the downgradient Paint Branch.

The interim action cost $1.3 million for construction of the treatment system. In addition, yearly operational costs include: approximately $320,000 per year to operate and maintain the system, approximately $70,000 per year for power, and approximately $120,000 per year for project oversight.

ADDITIONAL SOIL INVESTIGATION (November 1995)

On November 20, 1995, NAES performed field screening of Site 28 soil at 12 locations with the assistance of representatives from the NJDEP and the USEPA. The results of the field screening indicated the continued presence of moderate levels of volatile organics in subsurface soil. The extent of the remaining subsurface soil contamination is limited to the area of the original gasoline leak at the corner of Building 308 and approximately 30-40 feet in the northeasterly direction.

INVESTIGATION SUMMARY

A Remedial Investigation at Site 28 had revealed the existence of groundwater contamination. The table on page 9 provides a summary of volatile organic contaminants detected above applicable EPA or State groundwater standards.

Subsequent investigations conducted at the Site in July and August 1990 revealed a leak in subsurface gasoline piping running from a 300 gallon above-ground gasoline tank into Building 308. The leak, which is believed to be the source of volatile organic contamination at the Site, was repaired. The underground piping was later replaced with above ground piping. Following the detection and repair of the leak, during the period 9 - 13 August 1990, a soil removal action was implemented at the Site. All visually contaminated soil was removed for proper disposal off-base.

On September 16, 1991, an interim Record of Decision was issued by the Navy and USEPA for recovery and treatment of groundwater at Site 28. The NJDEP also concurred with the interim Record of Decision.

Based on the results of the interim remedial action for groundwater, it appears that the existing system is not capable of remediating the groundwater contamination to meet applicable or relevant and appropriate requirements (ARARs). It appears that the higher levels of contamination located at the source area continue to be a source of the low levels of groundwater contamination throughout the site. Modifications to the groundwater recovery system will allow the highest levels ("hot spots") of contamination to be captured for remediation. Refer to the Feasibility Study for Site 28 groundwater for additional information concerning treatment system performance.

Additional remedial actions will be implemented as part of the final alternative for Site 28 to reduce source area soil and groundwater contamination.

Volatile Organic Compounds Detected in Groundwater Which Exceeded EPA MCLs and/or NJDEP PQLs

Contaminant	Highest Detected Concentration During Remedial Investigation (ug/l)	Highest Detected Concentration During Operation of Interim Treatment (ug/l)	Latest Sampling Round (October 1996) (ug/l)	EPA MCL (ug/l)	NJDEP PQL (ug/l)
Benzene	880	6	ND	5	1
Ethylbenzene	1100	1100	70	700	5
Toluene	5100	1400	63	1000	5
Xylenes	12,000	7900	1130	10,000	2
Bromodichloroethane*	ND	4	ND	-	1
Chloroform*	ND	19	ND	100	1
Tetrachloroethane	ND	54	ND	5	1
1,1,1-Trichloroethane	ND	5	ND	200	1

* These compounds were detected during the beginning of treatment system operation and may be due to the use of sodium hypochlorite for pretreatment. This chemical has been removed from use and these chemicals have not been detected in Site 28 monitoring wells since March 1993.

MCL - maximum contaminant levels
PQL - practical quantitation levels
ND - not detected

Primary Maximum Contaminant Levels (MCLs) are Federally enforceable contaminant levels allowable in public drinking water supplies. They have been established from health-based data by EPA's Office of Drinking Water Regulations (40 CFR 141) established under the authority of the Safe Drinking Water Act. MCLs are periodically revised as more information becomes available. When MCLs are not available, proposed MCLs were used as the comparison criteria for some analytes.

On 13 January 1993, the revised N.J.A.C. 7:9-6 which includes the Groundwater Quality Criteria was signed. The criteria establish the groundwater classifications for the Pinelands, including Class I-PL (Preservation Area) and Class I-PL (Protection Area). The actual groundwater criteria are the natural quality and background quality, respectively (N.J.A.C. 7:9-6.7). However, for some constituents natural quality is often much lower than can be measured in a laboratory, therefore, some measureable criteria are necessary to determine compliance. Practical Quantitation Levels (PQLs) are the lowest concentration of a constituent that can be reliably achieved among laboratories within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs will be used to determine compliance with groundwater quality criteria for Class I-PL groundwater.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for Site 28 was issued to interested parties on December 30, 1996. On December 21 and 22, 1996, a newspaper notification inviting public comment on the Proposed Plan appeared in The Ocean County Observer and The Asbury Park Press. The comment period was held from January 7, 1997 to February 7, 1997. The newspaper notification also identified the Ocean County Library as the location of the Information Repository.

A Public Meeting was held on January 15, 1997 at the Manchester Branch of the Ocean County Library from 6:00 to 8:00 p.m. At this meeting representatives from the Navy, USEPA and NJDEP were available to answer questions concerning Site 28 and the preferred alternative. The attendance list is provided in this Record of Decision as Appendix A. Comments received and responses provided during the public hearing are included in the Responsiveness Summary, which is part of this Record of Decision. A transcript of the meeting is available as part of the Administrative Record.

During the public comment period from January 7, 1997 through February 7, 1997, no written comments were received from the public pertaining to Site 28. On February 4, 1997, the NJDEP submitted additional written comments to the Proposed Plan for Site 28. The Proposed Plan was revised to include these comments. A copy of the final Proposed Plan for Site 28, dated February 5, 1997, has been placed in the Administrative Record for NAES located at the Ocean County Library, Toms River NJ.

This decision document presents the selected alternative (i.e., continued groundwater treatment and sparge/vapor extraction) for Site 28, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan (NCP). The decision for Site 28 is based on the information contained in the Administrative Record, which is available for public review at the Ocean County Library, 101 Washington Street, Toms River, New Jersey.

SCOPE AND ROLE OF RESPONSE ACTION

Studies conducted at Site 28 had shown that the groundwater and soil in this area had been contaminated with gasoline as a result of a leaking subsurface pipe coupling. The Navy implemented interim remedial actions to address the contamination prior to the implementation of a final action which is described in this document.

GROUNDWATER REMEDIAL ACTIONS

Based on the levels of contamination detected in Site 28 groundwater during Phase I and II of the Remedial Investigation, an interim Focused Feasibility Study (April 29, 1991) was prepared to evaluate alternatives for controlling the migration of contaminated groundwater. The 1991 Site 28 Focused Feasibility Study indicated that the implementation of an interim action consisting of groundwater pumping, treatment and recharge would be most effective at containing the groundwater contaminants.

An interim Record of Decision was issued on September 16, 1991. This decision document presented the selected remedial action for Site 28. Documentation supporting the interim action conducted at Site 28 can be found in the Administrative Record for the NAES, at the Ocean County Library in Toms River, NJ.

The decision to recover and treat groundwater at Site 28 was made to protect human health and the environment by preventing the further migration of groundwater contamination. This document summarizes all remedial actions taken to remediate Site 28 soil and groundwater and evaluates alternatives necessary to meet ARARs for all media.

SOIL REMOVAL ACTION

On August 8, 1990, a gasoline leak was discovered and repaired at Site 28. During the period August 9 - 13, eight test pits were dug in the area northeast of Building 308 to identify the extent of soil contamination caused by the leak. Based on observations made in these test pits, soil was excavated from an area measuring approximately 60 ft. long, 20-40 ft. wide and 7-8 ft. deep. Of the excavated soil, approximately 65 cubic yards of visually contaminated soil was segregated and transferred to a nearby on-site hazardous waste storage area for disposal at an approved off-site facility.

SUMMARY OF SITE RISKS

In April 1992, an overall endangerment assessment for NAES was conducted. Based on available information, NAES was considered to be a potential public health concern because of the risk to human health caused by the possibility of exposure to hazardous substances via contaminated groundwater, soil, sediment, and surface water.

SITE 28 RISK.

This is a summary of the Endangerment Assessment (EA) addendum findings for Site 28. The assessment of this site was conducted using all available data generated during previous remedial investigations (RI). This summary will discuss (1) the chemicals identified by the EA addendum as contaminants of concern (COCs), (2) the land use assumptions upon which estimates of potential human exposure to site contaminants are based, (3) the quantitative estimates of carcinogenic risk and noncarcinogenic hazard, and (4) a summary interpretation of the EA findings with regard to need for site remediation.

CONTAMINANTS OF CONCERN

For Site 28, contaminants of concern were determined to be the following: Benzene, Ethylbenzene, Toluene, Xylenes, 2-Methylnaphthalene and Naphthalene.

LAND USE AND EXPOSURE ASSUMPTIONS

Four different scenarios representing current and potential future land uses were evaluated to assess applicability to the site. Evaluated scenarios included military, light industrial, construction and

residential land uses. For each of these scenarios, human exposure is effected by mechanisms that include direct contact, inhalation and ingestion.

Based on current land use conditions within Site 28, a light industrial land use scenario was quantified for direct exposure to contaminated groundwater via incidental ingestion.

Although future residential land use conditions were not investigated as part of the risk characterization for Site 28, groundwater cleanup levels are based on residential land use assumptions.

HUMAN HEALTH RISK AND HAZARD FINDINGS

Based on the highest levels of contaminants found at Site 28, the Hazard Index for noncarcinogens is 0.45 which is below the EPA's Hazard Index criteria value of 1.0. The Hazard Index values ranged from a minimum value of 2.93×10^{-2} for naphthalene to a maximum of 2.5×10^{-1} for toluene. Carcinogenic risk estimates for groundwater in Site 28 are within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} and above New Jersey's acceptable risk of 1×10^{-6}. The overall area groundwater risk represented by the sum of the chemical-specific risk estimates is 8.92×10^{-5}. Benzene was the only compound that contributed to the carcinogenic risk.

Based on the highest levels of contaminants detected since the interim remedial action was implemented at Site 28, hazards for noncarcinogens are 0.25 which is below the EPA's Hazard Index criteria value of 1.0. The hazard index values ranged from a minimum value of 2.93×10^{-2} for naphthalene to a maximum of 1.08×10^{-1} for ethylbenzene. Carcinogenic risk estimates for groundwater at Site 28 are below EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} and New Jersey's acceptable risk of 1×10^{-6}. The overall area groundwater risk represented by the sum of the chemical-specific risk estimates is 6.08×10^{-7}. Benzene was the only compound that contributed to the carcinogenic risk.

These risk numbers are based on non-residential assumptions. If residential assumptions are used, the risk numbers would be higher and may fall out of the EPA acceptable risk range.

ECOLOGICAL ASSESSMENT

As part of the Endangerment Assessment, a Baseline Ecological Evaluation (BEE) was conducted to obtain a description of the ecosystems at NAES. Currently, it does not appear that groundwater is having an impact on the ecology of the Site. Flow net analysis indicates that although some of the site groundwater discharges into the Paint Branch, most of the groundwater flows under the Paint Branch in an easterly direction. There are no other potential exposure pathways to ecological receptors identified for Site 28.

ENDANGERMENT SUMMARY

In summary, the results of the EA indicate that contaminants present in groundwater at Site 28 may pose a concern relative to current and potential future exposed populations. Therefore, alternatives for the remediation of soil and groundwater contamination at this Site are warranted.

SUMMARY OF REMEDIAL ALTERNATIVES

Under CERCLA, the alternative selected must be protective of human health and the environment, in accordance with statutory requirements and cost effective. Permanent solutions to contamination are to be achieved wherever possible. The remedial alternatives considered for the site are summarized below. Detailed descriptions of the remedial alternatives can be found in the FFS (July 1996), which is available in the Administrative Record for NAES.

All the alternatives presented include the establishment of a classification exception area (CEA) pursuant to N.J.A.C. 7:9-6.6.

The alternatives 1G through 5G are the final remedial alternatives for groundwater. The alternatives 1S through 4S are the final remedial alternatives for soil. The final remedial action conducted at Site 28 will involve the combination of groundwater and soil remedial actions.

ALTERNATIVE SUMMARY - GROUNDWATER TREATMENT

ALTERNATIVE 1G: NO ACTION

Estimated Construction Cost: $ 69,100
Estimated Net O&M Cost: $ 0
Estimated Implementation Time Frame: immediately

The groundwater contamination present at Site 28 is the result of a past gasoline leak which occurred at the site. The leaking pipeline was removed. However, soil which may be contaminated at Site 28 may still provide a source of contamination for groundwater. This alternative involves no action to control or remove contamination at Site 28. Under this alternative, the existing treatment of groundwater would be discontinued and the equipment abandoned or removed.

This alternative has been included to provide a baseline for the comparison of other alternatives.

ALTERNATIVE 2G: NATURAL REMEDIATION/GROUNDWATER MONITORING - DISCONTINUE EXISTING GROUNDWATER TREATMENT

Estimated Cost: $ 164,100
Estimated Net O&M Cost: $ 82,600/yr
Estimated Implementation Time Frame: 1 year

This alternative involves groundwater monitoring of the aquifer and study of the natural remediation processes occurring within the Site. The existing groundwater treatment system would be discontinued. Extensive monitoring of the plume extent and migration would be monitored through the existing well network and additional monitoring wells if necessary. Contaminants

would not be treated but would be allowed to reduce naturally. The natural remediation occurring at the site would be studied to determine if the microorganisms at the site have the potential to degrade the VOCs to harmless products.

Under this alternative, no further action to control the source would be taken.

Additional costs involve the installation of up to 5 additional monitoring wells and an initial restoration study to prove that this process will effectively remediate the Area. Yearly operation and maintenance costs include quarterly sampling and analysis and project oversight.

ALTERNATIVE 3G: EXISTING RECOVERY SYSTEM WITH POTENTIAL MODIFICATIONS TO TREATMENT SYSTEM

Construction Cost: $ 1.3 million
Estimated Additional Construction Cost: $ 0
Estimated Net O&M Cost: $ 443,000/yr
Estimated Implementation Time Frame: already implemented

This alternative involves groundwater pumping from the existing downgradient recovery well RW-1. This well is pumped at 40 gallons per minute (gpm). A recovery well located at the source area (RW-2) will continue to be pumped at 60 gpm. Figure 3 provides the location of existing treatment system and recovery wells. The pumping rates of the two recovery wells may be adjusted to optimize groundwater contaminant capture based upon continuing evaluation during system O&M.

At the existing treatment facility, a tank serves as an initial flow equalizer. A pretreatment unit is used for metals, free product and solids removal. Air stripping columns and granular activated carbon polishing filters are used to treat the volatile organic contaminants in the extracted groundwater. The air stripper emissions are treated by granular activated carbon air filters and clean air is discharged to the atmosphere. Treated groundwater which meets Primary Safe Drinking Water Standards is recharged to the aquifer via spray irrigation during temperate months and is infiltrated back into the aquifer through an underground piping system during winter months. The treated water is discharged upgradient of the recovery wells to form a closed-loop system. The construction cost provided for this alternative was the cost to build the existing facility. No additional construction cost would be incurred under this alternative.

Natural remediation processes occurring at the Site would also be considered part of this alternative.

Modifications to the sampling frequency would be included under this alternative. Based on previous sampling results, it is appropriate to reduce the frequency of sampling. The sampling of monitoring wells will be reduced from quarterly to biannually for VOCs and annually for SVOCs and metals. The frequency of sampling for semi-volatile organic compounds in the treatment process will also be reduced to annually for system influent and quarterly for system effluent. The

following modifications may also be implemented based on future influent data from the recovery system.

MODIFICATIONS TO TREATMENT

Under this alternative, three potential modifications to the existing treatment system will be developed individually. Costs associated with each should be considered additional to those shown in Alternative 3G.

The individual development presented here is conducted to aid any future decision making processes which center on treatment system optimization.

Treatment system modifications could include one or several of the following alternatives.

ALTERNATIVE 3GT1 ELIMINATION OF pH ADJUSTMENT FOR TREATMENT

Sodium hydroxide is currently used in the Site 28 treatment process for pH adjustment. The pH of the plant influent is raised to allow metal hydroxides to precipitate out of solution. The use of this chemical is currently increasing the sodium content in the Area groundwater. Under this alternative the reduction and possible elimination of pH adjustment would be investigated. The cost savings resulting from the elimination of sodium hydroxide for treatment would be approximately $4000 per year. However, this change would not be made to save money but to eliminate the introduction of sodium into Area groundwater. The effects of this change on treatment system performance would be investigated to determine implementability.

ALTERNATIVE 3GT2 ELIMINATION OF PRETREATMENT

If contaminant levels entering the treatment facility do not increase above the existing levels, once the recovery well at the source area is operating, the elimination of pretreatment will be investigated. This would involve the elimination of oxidation/flocculation/precipitation. These processes are currently used at Site 28 to remove metals and solids from the system influent. The elimination of pretreatment may cause excessive iron to buildup in air strippers and carbon units. The precipitated iron may also block subsurface infiltration piping. The cost to implement this alternative would be approximately $5000 to redirect system piping. Additional costs would be incurred based on how much iron impacts the treatment and infiltration systems.

ALTERNATIVE 3GT3 OPEN AERATION TO TREAT GROUNDWATER

Based on the existing levels of VOCs in the treatment system influent, controls on air emissions are not required. If the influent levels from the replacement recovery wells to be installed continue to meet these requirements, the use of alternate open aeration treatment would be investigated. The use of this technology would require no pretreatment of groundwater. However, the level of contaminants entering the system would have to meet the NJDEP air pollution control requirements. The discharge requirements would have to meet applicable Federal and State requirements. The cost to implement this type of treatment varies depending on the type of open aeration system chosen.

If the use of open aeration is implemented, the use of surface infiltration basins may be required to return treated water back to the aquifer. This type of discharge system would be more capable of handling precipitated iron than subsurface infiltration since the basins are more easily maintained.

If system modifications are implemented, an air permit equivalency would be obtained from the NJDEP if required.

ALTERNATIVE 4G: MODIFICATIONS TO RECOVERY AND TREATMENT SYSTEM

Estimated Construction Cost: $ 1.3 million
Estimated Additional Construction Cost: $ 75,600
Estimated Net O&M Cost: $ 443,000/yr
Estimated Implementation Time Frame: 1 year

This alternative would utilize the existing treatment system, however changes in recovery well locations or pumping intervals would be implemented. Modifications to the existing groundwater recovery system would be made based on the results of the interim treatment system performance and quarterly data and additional modeling conducted in February 1996.

An additional recovery well would be installed near MW-1, which appears to be in the downgradient direction of the plume, to enhance plume recovery and limit migration. RW-1 would be pumped at a reduced rate or pumping would be discontinued based on monitoring results once the new well has begun pumping. The construction cost provided for this alternative was the cost to build the existing facility. An additional construction cost of $75,600 would be incurred under this alternative.

Natural remediation processes occurring at the Site would also be considered part of this alternative.

Modifications to the sampling frequency would also be included as part of this alternative. Based on previous sampling results, it is appropriate to reduce the frequency of sampling. The sampling of monitoring wells will be reduced from quarterly to biannually for VOCs and annually for SVOCs and metals. The sampling of deep monitoring wells that have not detected any contamination may be discontinued. The frequency of sampling for semi-volatile organic compounds in the treatment process will also be reduced to annually for system influent and quarterly for system effluent.

ADDITIONAL MODIFICATIONS TO TREATMENT

Under this alternative, three potential modifications to the existing treatment system will be developed individually. Costs associated with each should be considered additional to those shown in Alternative 4G.

The individual development presented here is conducted to aid any future decision making processes which center on treatment system optimization.

The influent data from the recovery system proposed as alternative 4G will be reviewed to determine if modifications to the current treatment system are possible. These modifications could include one or several of the following alternatives.

ALTERNATIVE 4GT1 ELIMINATION OF pH ADJUSTMENT FOR TREATMENT

Sodium hydroxide is currently used in the Site 28 treatment process for pH adjustment. The pH of the plant influent is raised to allow metal hydroxides to precipitate out of solution. The use of this chemical is currently increasing the sodium content in the Area groundwater. Under this alternative the reduction and possible elimination of pH adjustment would be investigated. The cost savings resulting from the elimination of sodium hydroxide for treatment would be approximately $4000 per year. However, this change would not be made to save money but to eliminate the introduction of sodium into Area groundwater. The effects of this change on treatment system performance would be investigated to determine implementability.

ALTERNATIVE 4GT2 ELIMINATION OF PRETREATMENT

If contaminant levels entering the treatment facility do not increase above the existing levels, once the new recovery scenario is implemented, the elimination of pretreatment will be investigated. This would involve the elimination of oxidation/flocculation/precipitation. These processes are currently used at Site 28 to remove metals and solids from the system influent. The elimination of pretreatment may cause excessive iron to buildup in air strippers and carbon units. The precipitated iron may also block subsurface infiltration piping. The cost to implement this alternative would be approximately $5000 to redirect system piping. Additional costs would be incurred based on how much iron impacts the treatment and infiltration systems.

ALTERNATIVE 4GT3 OPEN AERATION TO TREAT GROUNDWATER

Based on the existing levels of VOCs in the treatment system influent, controls on air emissions are not required. If the influent levels from the new recovery wells to be installed under alternative 4G continue to meet these requirements, the use of alternate open aeration treatment would be investigated. The use of this technology would require no pretreatment of groundwater. However, the level of contaminants entering the system would have to meet the NJDEP air pollution control requirements. The discharge requirements would have to meet applicable Federal and State requirements. The cost to implement this type of treatment varies depending on the type of open aeration system chosen.

If the use of open aeration is implemented, the use of surface infiltration basins may be required to return treated water back to the aquifer. This type of discharge system would be more capable of handling precipitated iron than subsurface infiltration since the basins are more easily maintained.

If system modifications are implemented, an air permit equivalency would be obtained from the NJDEP if required.

ALTERNATIVE 5G: GROUNDWATER SPARGING

Estimated Construction Cost: $82,600 (includes vapor extraction)
Estimated Net O&M Cost: $58,400/yr (includes vapor extraction)
Estimated Implementation Time Frame: 1 year

This alternative would involve the modeling, design and construction of a groundwater sparge system within the upgradient higher area of groundwater contamination at Site 28. This sparge system would be designed and constructed in conjunction with a vapor extraction system which is proposed as a remedial alternative for soil. The systems would be designed to remediate both groundwater and soil contamination at the "source" area and eliminate the continuing source of groundwater contamination.

The abandonment of the present groundwater treatment system would be considered based upon the performance of the sparge system.

System performance would be monitored through scheduled monitoring well and soil vapor sampling.

ALTERNATIVE SUMMARY - SOIL TREATMENT

ALTERNATIVE 1S: NO ACTION

Estimated Construction Cost: $ 0
Estimated Net O&M Cost: $ 0
Estimated Implementation Time Frame: N/A

This alternative involves no action to control or remove contamination at Site 28. The existing soil contamination would continue to act as a source of groundwater contamination.

This alternative has been included to provide a baseline for the comparison of other alternatives.

ALTERNATIVE 2S: NATURAL REMEDIATION

Estimated Cost: $ 164,100 (included as part of Alternative 2G)
Estimated Net O&M Cost: $ 82,600/yr
Estimated Implementation Time Frame: 1 year

This alternative involves no additional interim actions at Site 28 other than monitoring of soil contaminant levels and study of the natural remediation processes occurring. Contaminants in soil would not be treated but would be allowed to reduce naturally. The natural remediation occurring at the site would be studied to determine if the microorganisms at the site have the potential to degrade the VOCs to harmless products.

Under this alternative, no further action to control the source would be taken.

Yearly operation and maintenance costs include quarterly sampling and analysis of soil within the source area and project oversight.

ALTERNATIVE 3S: EXCAVATION/RECYCLING OF CONTAMINATED SOIL

Estimated Construction Cost: $ 21,000
Estimated Net O&M Cost: $ 0
Estimated Implementation Time Frame: 3 months

Based on additional soil sampling conducted at Site 28, the area of soil contamination appears to be limited to the corner of Building 308 where the gasoline leak occurred. Elevated levels were detected six feet below the ground surface to the water table which was encountered at approximately 7.5 feet. The estimated quantity of soil to be excavated for recycling is 25 yd^3. The area of contamination is located next to and possibly beneath the northeast corner of building 308. Therefore, excavation would require bracing and support of the structure.

ALTERNATIVE 4S: VAPOR EXTRACTION

Estimated Construction Cost: $82,600 (includes groundwater sparging)
Estimated Net O&M Cost: $58,400/yr
Estimated Implementation Time Frame: 1 year

This alternative involves the installation of a vapor extraction system at the area of remaining soil contamination at Site 28. The system would be designed in combination with a groundwater sparge system to remediate both groundwater and soil contamination within the higher level "source" area.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against the nine evaluation criteria which are summarized below.

1. **Overall Protection of Human Health and The Environment** draws on the assessments conducted under other evaluation criteria and considers how the alternative addresses site risks through treatment, engineering, or institutional controls.

2. **Long-Term Effectiveness and Permanence** evaluates the ability of an alternative to provide long term protection of human health and the environment and the magnitude of residual risk posed by untreated wastes or treatment residuals.

3. **Reduction of Toxicity, Mobility or Volume Through Treatment** evaluates an alternative's ability to reduce risks through treatment technology.

4. **Short-Term Effectiveness** addresses the cleanup time frame and any adverse impacts posed by the alternative during the construction and implementation phase, until cleanup goals are achieved.

5. **Implementability** is an evaluation of the technical feasibility, administrative feasibility, and availability of services and material required to implement the alternative.

6. **Cost** includes an evaluation of capital costs, annual operation and maintenance (O&M) costs.

7. **Compliance With ARARs** evaluates the ability of an alternative to meet Applicable or Relevant and Appropriate Requirements (ARARs) established through Federal and State statutes and/or provides the basis for invoking a waiver.

8. **Agency Acceptance** indicates the EPA's and the State's response to the alternatives in terms of technical and administrative issues and concerns.

9. **Community Acceptance** evaluates the issues and concerns the public may have regarding the alternatives.

The first two criteria, protection of human health and the environment and compliance with Applicable or Appropriate Requirements (ARARs) are considered by the EPA to be threshold criteria which each alternative must meet. The next five are balancing criteria, and the final two are considered modifying criteria.

ANALYSIS OF ALTERNATIVES

COMPARATIVE ANALYSIS OF ALTERNATIVES - GROUNDWATER

Overall Protection of Human Health and Environment -
Alternative 4G provides overall protection of human health and the environment through treatment of both higher and downgradient groundwater contaminant areas and extensive monitoring. An additional downgradient recovery well will be installed to remove and treat downgradient lower levels of contamination.

Alternative 3G provides protection of human health and the environment through continuation of existing treatment of groundwater and extensive monitoring.

Alternative 5G provides protection of human health and the environment through treatment of areas of higher levels of groundwater contamination.

Alternative 2G, which offers no groundwater treatment, may provide protection of human health through extensive monitoring of groundwater migration and natural remediation.

Alternative 1G, which offers no groundwater treatment or monitoring, is not protective.

Long-Term Effectiveness and Permanence -
Alternative 4G provides an effective and permanent option for protection of human health and the environment through removal and treatment of both higher and downgradient levels of contamination. Long term permanence is ensured since monitoring wells throughout and downgradient of the plume are monitored until all levels within the plume have been reduced below ARARs. The estimated time for this alternative to meet ARARs through the combined effects of treatment and natural remediation is approximately 5 years.

Alternative 5G will accelerate the remediation of contaminated groundwater and remove the continued source of groundwater contamination.

Alternative 3G would provide long-term protection of human health through the removal and treatment of higher levels of contamination. The estimated time for this alternative to meet ARARs through the combined effects of treatment and natural remediation is approximately 5 years.

Alternative 2G provides no active treatment and is not considered to be effective at remediating the aquifer. The current levels of contamination appear to be too high for natural remediation to effectively control contaminant migration. This alternative would be effective toward the closing stages of remediation when pumping is no longer an effective option.

Alternative 1G provides no treatment and is not considered effective.

Reduction of Toxicity, Mobility or Volume Through Treatment -
Alternative 4G recovers and treats the largest area of contamination. The toxicity, mobility and volume are reduced through capture and treatment of the plume.

Alternative 3G recovers and treats contamination at the source area and as it migrates to the existing downgradient recovery well.

Alternative 5G volatilizes the higher area of contamination for recovery and removal through vapor extraction.

Alternative Nos. 1G and 2G offer no reduction of toxicity, mobility or volume through treatment of the contaminated media.

Short-Term Effectiveness -
Remedial action Alternatives 3G and 4G in the short-term, would halt the continued migration of contaminated groundwater downgradient of residual source areas. The estimated cleanup duration for Alternative 3G or Alternative 4G is approximately 5 years to reach ARARs. The predictions for these alternatives are only applicable if combined with an alternative to remove soil contamination. Otherwise, cleanup will take much longer.

Alternative 5G would be effective in the short term at accelerating the rate of contaminant removal. Modeling has not been conducted to determine the time to reach ARARs under this alternative. However, it is believed that the implementation of a sparge system can achieve ARARs in less than 5 years.

Alternative 2G is effective at monitoring the movement of contamination but would not prevent the short term migration of contamination. This alternative would achieve ARARs in 10-15 years.

Alternative 1G provides no treatment of groundwater and is not considered to be effective in the short-term because residual risks are not reduced. This alternative would achieve ARARs in 10-15 years.

Implementability -
Alternative 1G offers the greatest implementability. This alternative involves the shutdown of the existing treatment facility and no further action.

Alternative 3G is the current interim remedy. This alternative requires continued operation and maintenance of the existing treatment facility.

Alternative 2G involves the shut down of treatment and continued monitoring of the aquifer. This alternative can be implemented in several months with the initiation of a study to determine the natural remediation occurring within the aquifer.

Alternative 4G would be more difficult to implement due to the construction of an additional recovery well and associated piping.

Alternative 5G would involve the design and construction of a small scale sparge system.

Cost -
Alternative 1G, the no action alternative, has the lowest associated cost. Alternative 2G the natural remediation/long-term monitoring alternative has the second lowest cost. The cost for Alternative 3G involves operation and maintenance costs only and is therefore the lowest cost treatment option. Alternative 4G involves the construction of additional groundwater recovery wells. Alternative 5G involves the design and construction of a groundwater sparge system.

Compliance with ARARs -

EPA considers drinking water Maximum Contaminant Levels (MCLs) and because of the location of NAES within the Pinelands, State Water Quality Standards for Class I-PL areas, which default to Practical Quantitation Levels (PQLs), whichever is more stringent for each contaminant of concern. to be ARARs.

Alternative 1G does not comply with ARARs because no remedial action takes place. Alternative 2G will not reduce contamination to meet ARARs in a reasonable time frame before the contamination migrates to areas that could potentially harm human health and the environment. Alternatives 3G, 4G and 5G are designed to meet ARARs. Alternative 5G would accelerate the remediation of groundwater and allow for a more rapid attainment of ARARs.

It is estimated that under alternatives 3G and 4G ARARs would be attained in 5 years. With the addition of a sparge system under alternative 5G ARARs would be achieved in less than 5 years.

An air permit equivalency would be obtained from the NJDEP, if required, for modifications to existing systems or additional treatment systems to be installed.

Agency and Community Acceptance -
Agency and Community Acceptance are addressed in the Responsiveness Summary of this document.

COMPARATIVE ANALYSIS OF ALTERNATIVES - SOIL

Overall Protection of Human Health and Environment -
Alternative 3S provides overall protection of human health and the environment through removal of contaminated soil which may be acting as a continuing source of groundwater contamination. Alternative 4S provides overall protection of human health and the environment through treatment of both groundwater and soil contamination within the higher area of contamination.

Alternative 2S, offers protection of human health and the environment through long-term monitoring. Contaminant reduction would take place over time through natural remediation.

Alternative 1S, which offers no contaminant treatment or monitoring, is the least protective alternative.

Long-Term Effectiveness and Permanence -
Alternative 3S provides the overall most effective and permanent options for protection of human health and the environment through removal of higher levels of soil contamination. Alternative 4S provides long-term effectiveness through treatment of soil and groundwater. There is a bias for treatment of contamination over removal.

Alternative 2S may provide long-term permanence through natural remediation of the sites. This alternative would provide long-term protection of human health through long-term monitoring until ARARs are met through natural remediation.

Alternative 1S provides no active treatment and is not considered to be effective at remediating the soil. The current levels of soil contamination may still be impacting groundwater conditions at the sites. This alternative provides no long-term effectiveness.

Reduction of Toxicity, Mobility or Volume Through Treatment-
Alternative 4S reduces the toxicity, mobility and volume of contamination through recovery and treatment of contamination in Site 28 soil and groundwater.

Alternative 3S would reduce toxicity, mobility or volume through treatment. The contaminated soil would be excavated and removed from the Site for recycling.

Alternative 1S and 2S offer no reduction of toxicity, mobility or volume through treatment of the contaminated media.

Short-Term Effectiveness -
Remedial action Alternatives 3S and 4S in the short-term, would remove the continued source of groundwater contamination through treatment or removal of soil contamination.

Alternatives 2S and 1S are not effective at reducing contamination in the short term.

Implementability -
Alternative 1S consists of no action and is easily implementable.

Alternative 2S would involve the implementation of a natural remediation study and continued soil monitoring.

Alternative 3S involves excavation and post excavation sampling. To implement this alternative, a shoring system would have to be designed for Bldg. 308 to prohibit settling of the structure during excavation.

Alternative 4S involves the modeling, design and construction of a small scale vapor extraction/sparge system to treat the elevated "source" area of contamination.

Cost -
Alternative No. 1S, the no action alternative, has the lowest associated cost. Alternative No. 2S, the restoration alternative, has the second lowest cost which includes study and additional sampling. Alternative 3S involves cost for excavation, disposal, post excavation sampling and shoring. Alternative 4S includes costs for modeling, design, vapor extraction system construction and continued monitoring.

Compliance with ARARs -
There are no ARARs for soil contamination, however, the New Jersey Soil Cleanup Criteria are to be considered (TBC) criteria, particularly the Impact to Groundwater Criteria.

Alternative No. 1S does not attain ARARs because no remedial action takes place. Alternative No. 2S does not actively remove or treat contamination but would eventually meet TBCs through natural remediation of contamination. Alternatives 3S and 4S are designed to remove soil contamination and aid in groundwater remediation through active treatment or removal of residual soil source areas.

An air permit equivalency would be obtained from the NJDEP, if required, for modifications to existing systems or additional treatment systems to be installed.

Agency and Community Acceptance -
Agency and Community Acceptance will not be addressed in this document.

THE SELECTED ALTERNATIVE

The selected alternatives to address groundwater and soil at Site 28 are Alternatives 3G, 5G and 4S: Existing Recovery System with Potential Modifications to Treatment and Vapor Extraction/Sparging.

The NAES will continue to operate the existing groundwater treatment system. Also, a sparge/vapor extraction system will be designed and installed to accelerate the remediation of the areas of higher groundwater and soil contamination. Additional modifications (3GT1-3GT3) to treatment are also included as part of the selected action and could be implemented based on future system influent concentrations.

A classification exception area (CEA) will be established pursuant to N.J.A.C. 7.9-6.6.

The objectives of the selected action are to: 1) protect human health and the environment by reducing the downgradient migration of contaminated groundwater; 2) remediate source areas with the highest concentration of contaminants; and 3) ensure groundwater quality complies with ARARs.

STATUTORY DETERMINATIONS

Under CERCLA, the alternative selected must protect both human health and the environment, be cost effective and comply with statutory requirements. Permanent solutions to contamination problems are to be achieved whenever possible.

Based on the consideration of alternatives, Alternatives 3G, 5G and 4S have been selected as the preferred alternatives to address the groundwater and soil at Site 28 for the following reasons:

- The selected alternatives will provide protection of human health and the environment through active treatment of both soil and groundwater. The remedial systems will be designed to meet ARARs. Extensive monitoring will be used to ensure protection of human health.

- The treatment systems described in the selected alternative have already been implemented and will continue to be operated with modifications made to enhance system performance.

- The selected alternatives are cost effective.

RECORD OF DECISION
RESPONSIVENESS SUMMARY
SITE 28 SOIL AND GROUNDWATER
NAVAL AIR ENGINEERING STATION

The purpose of this responsiveness summary is to review public response to the Proposed Plan for Site 28. It also documents the Navy's consideration of comments during the decision making process and provides answers to any comments raised during the public comment period.

The responsiveness summary for Site 28 is divided into the following sections:

OVERVIEW - This section briefly describes the remedial alternative recommended in the proposed plan and any impacts on the proposed plan due to public comment.

BACKGROUND ON COMMUNITY INVOLVEMENT - This section describes community relations activities conducted with respect to the area of concern.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS - This section summarizes verbal and written comments received during the public meeting and public comment period.

OVERVIEW

Site 28 is located at the NAES in Ocean County, Lakehurst, New Jersey. This responsiveness summary addresses public response to the Proposed Plan, proposing continued operation of the existing groundwater treatment system with potential modifications to the treatment system to enhance system performance and vapor extraction/sparging to treat the source area.

The Proposed Plan and other supporting information are available for public review at the information repository located at the Ocean County Library, 101 Washington Street, Toms River, New Jersey.

BACKGROUND ON COMMUNITY INVOLVEMENT

This section provides a brief history of community participation in the investigation and interim remedial planning activities conducted for Site 28. Throughout the investigation period, the USEPA and NJDEP have been reviewing work plans and reports and have been providing comments and recommendations which are incorporated into the appropriate documents. A Technical Review Committee (TRC), consisting of representatives of the Navy, the USEPA, the NJDEP, the Ocean County Board of Health, the New Jersey Pinelands Commission, other agencies and communities surrounding NAES was formed and has been holding periodic meetings to maintain open lines of communication and to inform all parties of current activities.

Prior to public release of site-specific documents, NAES's public relations staff compiled a list of local public officials who demonstrated or were expected to have an interest in the investigation. Local environmental interest groups were also identified and included on this list. The list is attached as Appendix B to this Record of Decision.

On December 21 and 22, 1996, a newspaper notification inviting public comment on the Proposed Plan appeared in The Ocean County Observer and The Asbury Park Press. The public notice summarized the Proposed Plan and the preferred alternative. The announcement also identified the time and location of a Public Meeting and specified a public comment period, and the address to which written comments could be sent. Public comments were accepted from January 7, 1997 to February 7, 1997. The newspaper notification also identified the Ocean County Library as the location of the Information Repository.

A Public Meeting was held on January 15, 1997, from 6:00 to 8:00 p.m. at the Manchester Branch of the Ocean County Library, Colonial Drive, Manchester, New Jersey. At this meeting representatives from the Navy, USEPA and NJDEP were available to answer questions concerning Site 28 and the preferred alternative. NAES representatives present included: CAPT Leroy Farr, Commanding Officer; CAPT Michael Dougherty, Executive Officer; Robert Kirkbright, Director of Public Works Engineering; Lucy Bottomley, Supervisory Environmental Engineer; and Environmental Branch personnel: Dorothy Peterson, Greg Bury, Ray Hahn, Jill Sarafin, Bob Previte, Michael Figura, Carol Uhrich, Larry Lemig, Bill Korosec, and Joe Rhyner: and Carole Ancelin, Public Affairs Officer. Mr. Jeff Gratz, represented the USEPA's Federal Facility Section; Ms. Donna Gaffigan represented the NJDEP's Bureau of Federal Case Management and Mr. Kevin Schick represented the NJDEP's Bureau of Environmental Evaluation and Risk Assessment. The complete attendance list is provided in Appendix A.

SUMMARY OF MAJOR QUESTIONS AND COMMENTS

Written Comments

During the public comment period from January 7, 1997 through February 7, 1997, no written comments were received from the public pertaining to Site 28.

On February 4, 1997, the NJDEP submitted additional written comments to the Proposed Plan for Site 28. The Proposed Plan was revised to include these comments. A copy of the final Proposed Plan for Site 28, dated February 5, 1997, has been placed in the Administrative Record for NAES located at the Ocean County Library, Toms River NJ.

Public Meeting Comments

No questions or comments concerning Site 28 were received at the Public Meeting held on January 15, 1997. A transcript of the Public Meeting is provided in the Administrative Record at the Ocean County Library, Toms River NJ.

APPENDIX A

Attendance List for Public Meeting Held
January 15, 1997

NAVAL AIR ENGINEERING STATION
Public Meeting January 15, 1997

SIGN-IN SHEET

NAME	ADDRESS (for future mailings)	HOW DID YOU HEAR OF THE MEETING? CIRCLE ONE
COLEMAN John	9 P Robin LAKEHURST NJ 08733	POSTERS RADIO NEWSPAPER MAIL
Bill Shaw	79 Circle DR Lakehurst NJ	POSTERS RADIO NEWSPAPER MAIL
Tony PICARONI	NAWCAD/NAES LAKE	POSTERS RADIO NEWSPAPER MAIL
Kevin W. Pace	PO Box 328, Lakehurst, NJ	POSTERS RADIO NEWSPAPER MAIL
Ann E. Kozl	865-A Liverpool Circle LAKEHURST, N.J. 08733	POSTERS RADIO NEWSPAPER MAIL
Anthony J. Kozl	"	POSTERS RADIO NEWSPAPER MAIL
Stephen Rudowski	NAES Safety.	POSTERS RADIO NEWSPAPER MAIL
Bill Korosec	NAES	POSTERS RADIO NEWSPAPER MAIL
LARRY CEMIG	NAES	POSTERS RADIO NEWSPAPER MAIL
BOB KIRKBRIGHT	NAES	POSTERS RADIO NEWSPAPER MAIL
Donna L Gaffigan	NJDEP	POSTERS RADIO NEWSPAPER MAIL
LAWRENCE L. LYON	NAES	POSTERS RADIO NEWSPAPER MAIL
David Folis	NAWCAD TRN	POSTERS RADIO NEWSPAPER MAIL
[illegible]	Asbury Park Press	POSTERS RADIO NEWSPAPER MAIL
Susan MACADAM	15 Harrison Pl. Lakehurst.	POSTERS RADIO NEWSPAPER MAIL Library

NAVAL AIR ENGINEERING STATION
Public Meeting January 15, 1997

SIGN-IN SHEET

NAME	ADDRESS (for future mailings)	HOW DID YOU HEAR OF THE MEETING? CIRCLE ONE
Dorothy Peterson	NAES	POSTERS RADIO NEWSPAPER MAIL
Bob Previte	NAES	POSTERS RADIO NEWSPAPER MAIL
Carole [illegible]	NAES/NAWCAD	POSTERS RADIO NEWSPAPER MAIL
Cindy Vosse	733 Sixth Ave, Toms River NJ 08757	POSTERS RADIO NEWSPAPER MAIL work
Lucy Bottomley	NAES	POSTERS RADIO NEWSPAPER MAIL
[illegible]	NAES	POSTERS RADIO NEWSPAPER MAIL work
Bob Carr	Lakehurst	POSTERS RADIO NEWSPAPER MAIL
Hilda Cooper	2132 Rt 37 Lakehurst NJ 08733	POSTERS RADIO NEWSPAPER MAIL
Bill Cooper	2132 Rt 37 Lakehurst NJ 08733	POSTERS RADIO NEWSPAPER MAIL
CAPT LeRoy Farr	NAES Lakehurst	POSTERS RADIO NEWSPAPER MAIL
Theresa Lettman	1491 Broadway Blvd Manchester Twp.	POSTERS RADIO NEWSPAPER MAIL
Jeff Gratz	EPA Region II	POSTERS RADIO NEWSPAPER MAIL
[illegible]	[illegible] DR STR, N.J.	POSTERS RADIO NEWSPAPER MAIL
Kevin Schick	NJDEP/SRP/AEERA	POSTERS RADIO NEWSPAPER MAIL
		POSTERS RADIO NEWSPAPER MAIL

→ PLEASE CONTINUE ON BACK →

SIGN IN SHEET

Larry Moniz	O.C. Observer
Marie Sailer Fey	Borough of Lakehurst 5 Union Ave Lakehurst, N.J. 08733
Capt Mike Doyle	NAES LAKEHURST
[illegible]	
Mike Figura	NAES Heritage Minerals.
John J. Ford	
Carl Jablonski	NAW LKHST.
Bob Waters	Manchester Twp.
Dr Fred Felice	Super Ocean County Vo-Tech
GARY SYLVESTER	- MANCHESTER TWP DEPT. OF PW. / UTILITIES
MAURA HORN	MONTGOMERY WATSON
Bud [illegible]	Dover Twp.
[illegible]	Manchester Twp Env Comm.
GREG MINNICK	NAWC LKE / TOMS RIVER
John Berryman	204 Oak St Lakehurst
JOHN HARRINGTON	COUNCILMAN MANCHESTER

updated 2-18-97

APPENDIX B
LIST OF CONCERNED PARTIES

Naval Air Engineering Station - Lakehurst

Captain L. Farr (908) 323-2380
Commanding Officer
Naval Air Engineering Station
Lakehurst, NJ 08733-5000

Ms. Carole Ancelin, Public Affairs (908) 323-2811
Naval Air Engineering Station
Lakehurst, NJ 08733-5000

Commander Mike Murtha (908) 323-2601
Public Works Officer
Naval Air Engineering Station
Lakehurst, NJ 08733-5000

Northern Division, Naval Facilities Engineering Command

Mr. Lonnie Monaco (610) 595-0567
Northern Division
Naval Facilities Engineering Command
Code 182
10 Industrial Highway
Mail Stop 82
Lester, PA 19113-2090

Federal Elected Officials

Senator Frank R. Lautenberg (609) 757-5353
208 White Horse Pike
Suite 18-19
Barrington, NJ 08007

Senator Robert Torricelli (201) 639-2860
1 Newark Center
16th Floor
Newark, NJ 07102

Congressman Dick Zimmer (908) 788-1952
36 West Main St.
Suite 201
Freehold, NJ 07728

Congressman Christopher H. Smith (908) 350-2300
100 Lacey Road
Suite 38A
Whiting, NJ 08759

Congressman Frank Pallone, Jr. (201) 571-1140
540 Broadway
Room 118
Long Branch, NJ 07740

State Elected Officials

Senator Leonard T. Connors, Jr. (609) 693-6700
620 West Lacey Road
Forked River, NJ 08731

Assemblyman Jefferey Moran (609) 693-6700
620 West Lacey Road
Forked River, NJ 08731

Assemblyman Christopher J. Connors (609) 693-6700
620 West Lacey Road
Forked River, NJ 08731

Other Federal Agencies

Mr. Steve Aoyama (404) 639-6070
Agency for Toxic Substances and
Disease Registry
1600 Clifton Road
Mail Stop E-56
Atlanta, GA 30333

New Jersey Pinelands Commission

Mr. Todd DeJesus (609) 894-9342
The Pinelands Commission
P. O. Box 7
New Lisbon, NJ 08064

Ocean County Officials

Mr. Alan W. Avery, Jr., Director (908) 929-2054
Ocean County Planning Board
P.O. Box 2191
Toms River, NJ 08754-2191

Mr. John C. Bartlett, Director (908) 244-2121
Ocean County Board of Freeholders
P.O. Box 2191
Toms River, NJ 08754

Mr. Joseph Przywara, Acting Health Coordinator (908) 341-9700
Ocean County Health Department
P.O. Box 2191
175 Sunset Avenue
Toms River, NJ 08754

Mr. A. Jerome Walnut, Chairman (908) 505-3671
Ocean County Environmental Agency
1623 Whitesville Road
Toms River, NJ 08755

Dover Township Officials

Hon. George Whittman (908) 341-1000
Mayor of Dover Township
P.O. Box 728
33 Washington Street
Toms River, NJ 08753

Ms. Janet Larson, Chairperson (908) 341-1000
Dover Township Environmental Commission
P.O. Box 728
33 Washington Street
Toms River, NJ 08754

Manchester Township Officials

Hon. Jane Cardo Cameron (908) 657-8121
Mayor of Manchester Township
One Colonial Drive
Lakehurst, NJ 08733

Mr. Warren Sweeney, Chairman
Manchester Township Environmental Commission
One Colonial Drive
Lakehurst, NJ 08733

Jackson Township Officials

Vicki Rickabaugh, Mayor
Municipal Building
95 W. Veterans Highway
Jackson, NJ 08527

Mr. Richard Bizub, Chairman (908) 928-0900
Jackson Township Environmental Commission
128 Willow Drive
Jackson, NJ 08527

Borough of Lakehurst Officials

Hon. Stephen Childers (908) 657-4141
Mayor of Lakehurst Borough
5 Union Avenue
Lakehurst, NJ 08733

Mr. Robert J. Morris (908) 657-4141
Municipal Clerk, Borough of Lakehurst
5 Union Avenue
Lakehurst, NJ 08733

Plumsted Township Officials

Hon. Ronald S. Dancer (609) 758-2241
Mayor of Plumsted Township
P.O. Box 398
New Egypt, NJ 08533-0398

Community Groups and Interested Citizens

Pine Lake Park Association
100 Oakdale Drive
Toms River, NJ 08754

Mr. Holmes Ertley (908) 657-4690
699C Friar Court
Lakehurst, NJ 08733

Mr. John Lewis (908) 657-1890
315 Beckerville Road
Lakehurst, NJ 08733

Ms. Candy Vesce
733 Sixth Ave.
Pine Lake Park
Toms River, NJ 08757

Ms. Theresa Lettman
Pinelands Preservation Alliance
120-34B White Bogs Road
Browns Mills, NJ 08015

(609) 893-4747

Ms. Susan Marshall
1716 Ninth Ave.
Toms River, NJ 08757

Ms. Gisela Tsambikou
1162 Beacon St.
Pine Lake Park
Toms River, NJ 08757

Mr. Dieter Rand
3288 Johnson Ave.
Lakehurst, NJ 08733

Mr. & Mrs. Blackwell Albertson
135 Beckerville Rd.
Lakehurst, NJ 08733

Heritage Minerals, Inc.
Attn: Ms. Adele Hovnanian
One Hovchild Plaza
4000 Route 66
Tinton Falls, NJ 07753

Chuck Lindstrom
526-D Crescent Ave.
Jackson, NJ 08527

Ben Epstein
Ocean County Citizens for Clean Water
2230 Agin Court Road
Toms River, NJ 08733

Media Organizations

Advance News (908) 657-8936
2048 Route 37 West
Lakehurst, NJ 08733

Alyn Ackerman 1-800-822-9770
Asbury Park Press
3601 Highway 66
P.O. Box 1550
Neptune, NJ 07754-1550

Ms. Debra Coombe (908) 244-7171
Newark Star Ledger
44 Washington Street
Toms River, NJ 08753

New Egypt Press (609) 758-2112
37 Main Street
P.O. Box 288
New Egypt, NJ 08533

Ocean County Leader (908) 899-1000
P.O. Box 1771
Point Pleasant Beach, NJ 08742

Ms. Lisa Peterson (908) 793-0147
Ocean County Review
P.O. Box 8
Seaside Heights, NJ 08751

Ocean County Reporter (908) 349-1501
8 Robbins Street
P.O. Box 908
Toms River, NJ 08753

Mr. Sam Christopher (908) 349-3000
Ocean County Observer
8 Robbins Street
CN 2449
Toms River, NJ 08753

Radio

Mr. Shawn Marsh
WJLK Radio
Press Plaza
Asbury Park, NJ 07712
(908) 774-7700

Ms. Joan Jones
WJRZ Radio
22 West Water Street
P.O. Box 100
Toms River, NJ 08754
(908) 270-5757

Mr. Doug Doyle
WOBM Radio
U.S. Highway 9
Bayville, NJ 08721
(908) 269-0927

Mr. Gary Myervich
Adelphia Cable
830 Highway 37 West
Toms River, NJ 08753
(908) 341-8818

Mr. Abi Montefiore
Monmouth Cable
P.O. Box 58
Belmar, NJ 07719
(908) 681-8222

Federal and State Case Managers

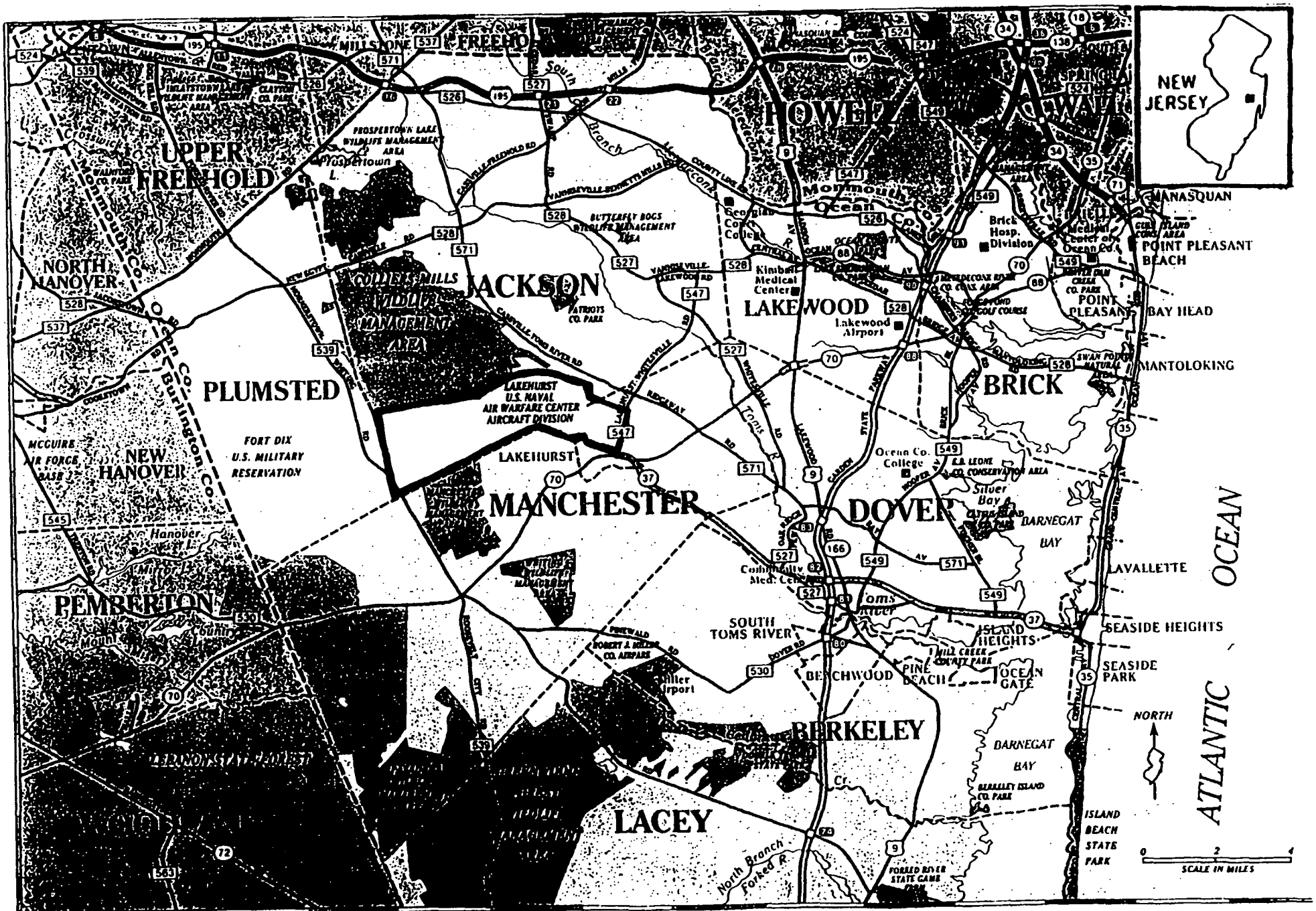
Mr. Jeffrey Gratz, Project Manager (212) 637-4320
U.S. Environmental Protection Agency
Region II
290 Broadway
18th Floor East
New York, NY 10007-1866

Ms. Donna Gaffigan, Case Manager (609) 633-1455
Bureau of Federal Case Management, CN 028
New Jersey Department of Environmental
Protection
401 East State Street
Trenton, NJ 08625-0028

Ms. Linda Welkom, Geologist (609) 292-8427
Bureau of Groundwater Pollution Abatement
New Jersey Department of Environmental
Protection
401 East State Street
Trenton, NJ 08625-0028

Mr. Kevin Schick (609) 984-1825
Bureau of Environmental Evaluation
and Risk Assessment
New Jersey Department of Environmental
Protection
401 East State Street
Trenton, NJ 08625-0028

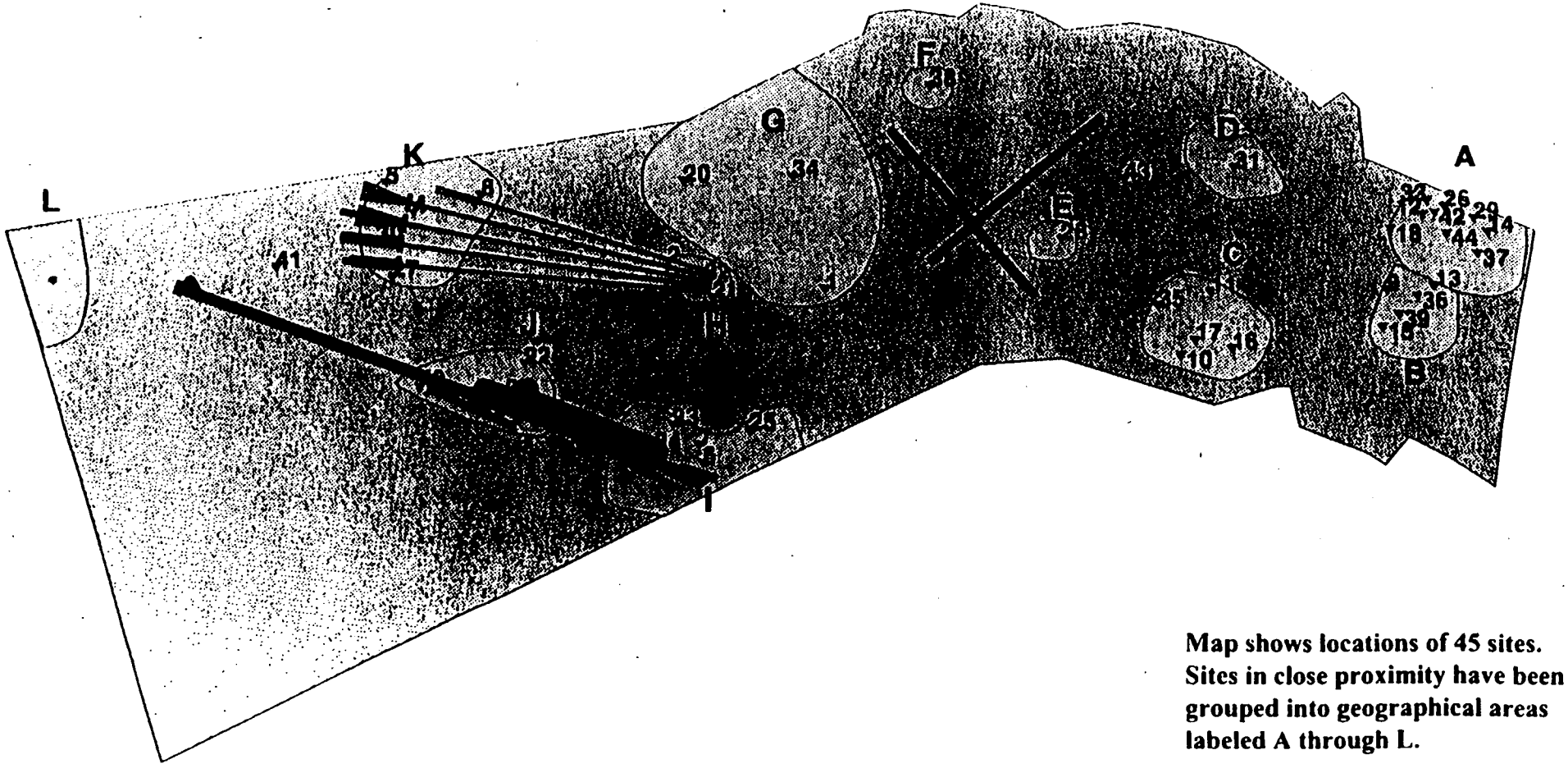
FIGURES



Naval Air Engineering Station Vicinity Map

Figure 1

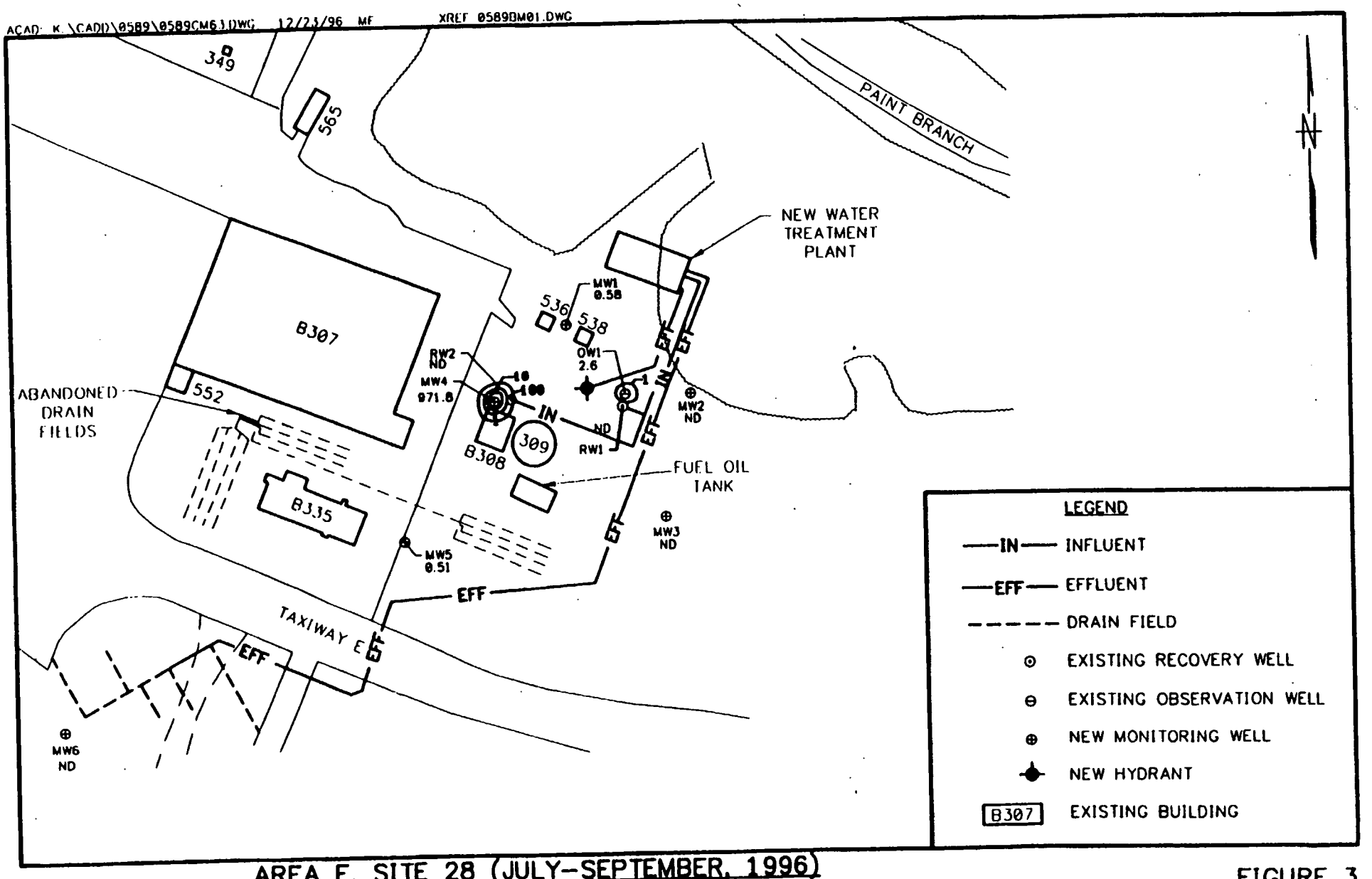
NAES Lakehurst NPL Sites



Map shows locations of 45 sites. Sites in close proximity have been grouped into geographical areas labeled A through L.

8 MARCH 1995

FIGURE 2



AREA E, SITE 28 (JULY-SEPTEMBER, 1996)
ISOCONCENTRATIONS OF TOTAL VOLATILE ORGANICS (VOC'S) IN GROUNDWATER
NAVAL AIR ENGINEERING STATION (NAES) LAKEHURST, NJ

FIGURE 3

ROD FACT SHEET

SITE

Name	NAEC Lakehurst, Area E/Site 28
Location/State	Ocean County, New Jersey
EPA Region	II
HRS Score (date)	49.48 (July 22, 1987)
Site ID #	NJ7170023744

ROD

Date Signed	July 7, 1997
Remedy/ies	Existing groundwater treatment system, addition of a sparge/vapor extraction system, additional modifications to treatment dependent upon future system influent concentrations, and establishment of a classification exception area pursuant to N.J.A.C. 7.9-6.6
Operable Unit	OU-20
Capital cost	$1,382,00(construction)
Completion	12 months for the additional enhancements
O & M	$501,400 per year for 8 years
Present worth	$4,376,600

LEAD

Remedial/Enforcement	Federal Facility
EPA/State/PRP	Navy
Primary contact (phone)	Sharon Jaffess 212-637-4396
Secondary contact (phone)	Robert Wing 212-637-4332
Main PRP(s)	Navy
PRP Contact (phone)	Lucy Bottomley 732-323-2612

WASTE

Type	Petroleum hydrocarbons, VOCs, semi-VOCs (benzene, toluene, ethylbenzene, xylene).
Medium (soil, g.w.,etc.)	Soil and groundwater
Origin	Discharge of gasoline due to a leak in a subsurface pipe running from an above ground tank to Building 308
Est. quantity	The zone of groundwater contamination extends approximately 150 feet to the east/northeast from the corner of Building 308 with a width of approximately 100 feet.