

FINAL
1996-1997
SITE MANAGEMENT PLAN
NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA
CONTRACT TASK ORDER 0306
MARCH 6, 1996

Prepared for:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
Norfolk, Virginia

Under:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
AST	Aboveground Storage Tank
AWQC	Ambient Water Quality Criteria
Baker	Baker Environmental, Inc.
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHF	Contaminated Hazard Factors
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosives Ordnance Disposal
EPIC	Environmental Photographic Interpretation Center
FFA	Federal Facilities Agreement
FY	Fiscal Year
HRSD	Hampton Roads Sanitation District
IAS	Initial Assessment Study
IRP	Installation Restoration Program
LANTDIV	Atlantic Division, Naval Facilities Engineering Command
MPF	Migration Pathway Factor
NEDED	Naval Explosives Development Engineering Department
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	Operable Unit
PCB	Polychlorinated Biphenyl
PGDN	Propylene glycol dinitrate
PRAP	Proposed Remedial Action Plan
PRG	Region IX Preliminary Remediation Goal values
PW	Public Works
RA	Remedial Action
RAGS	Risk Assessment Guidance for Superfund
RD	Remedial Design
RF	Receptor Factor
RI	Remedial Investigation
ROD	Record of Decision

SI	Site Investigation
SMP	Site Management Plan
SSA	Site Screening Area
SSP	Site Screening Process
STP	Sewage Treatment Plant
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TNT	Trinitrotoluene
TRC	Technical Review Committee
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
WES	Waterways Experimental Station
WPNSTA Yorktown	Naval Weapons Station Yorktown, Yorktown, Virginia

1.0 INTRODUCTION

This report presents the Site Management Plan (SMP) for Naval Weapons Station Yorktown, Yorktown, Virginia (WPNSTA Yorktown). As part of the Federal Facilities Agreement (FFA), the SMP is required as the management tool for planning, reviewing, and setting priorities for all remedial response activities to be conducted at the facility. The SMP is updated annually to revise priorities of activities as work progresses and additional information becomes available. This SMP presents the rationale for the sequence of future investigation and remediation activities to be completed and the estimated schedule for completion of these activities, with detailed schedules and deadlines presented for Fiscal Years (FY) 1996 and 1997, as required by the FFA. The use of an SMP allows for annual adjustment in scheduled activities for reasons such as Federal budgetary constraints, changes in scope of investigation/remediation activities or other unanticipated events without modifying the FFA.

Section XII of the FFA requires that the SMP include the detailed scheduling of activities for two fiscal years, annual updating of the scheduled activities, and review and approval by the U.S. Environmental Protection Agency (USEPA) Region III and the Commonwealth of Virginia. As part of the FFA development and by mutual consent of the Navy and the USEPA, several RCRA Solid Waste Management Units (SWMUs) have been included for investigation and evaluation under the FFA. There are 15 former SWMUs, two areas identified in the Environmental Photographic Interpretation Center (EPIC) study, two areas of concern (AOC), and one former Installation Restoration Program (IRP) site to be investigated. These 19 areas have been termed Site Screening Areas (SSAs) and are listed in Appendix A of the FFA. Also, two SSAs and one site have been added for investigation and evaluation which were not included in the FFA. Scheduled activities for the 17 sites and 21 SSAs are presented in this SMP.

1.1 Facility Description

WPNSTA Yorktown is a 10,624 acre installation located on the Virginia Peninsula in York and James City Counties and the City of Newport News (Figure 1-1). The installation is bounded on the northwest by the Naval Supply Center Cheatham Annex, the Virginia Emergency Fuel Farm, and the future community development of Whittaker's Mill; on the northeast by the York River and the Colonial National Historic Parkway; on the southwest by Route 143 and Interstate 64; and on the southeast by Route 238 and the community of Lackey.

WPNSTA Yorktown, originally named the U.S. Mine Depot, was established in 1918 to support the laying of mines in the North Sea during World War I. The establishment of the depot was the culmination of a search process, begun in 1917 at the request of Congress, to locate an Atlantic coast site for a weapons handling and storage facility. For 20 years after World War I, the depot received, reclaimed, stored, and issued mines, depth charges, and related materials. During World War II, the facility was expanded to include three additional trinitrotoluene (TNT) loading plants and new torpedo overhaul facilities. A research and development laboratory for experimentation with high explosives was established in 1944. In 1947, a quality evaluation laboratory was developed to monitor special tasks assigned to the facility, which included the design and development of depth charges and advanced underwater weapons. On August 7, 1959, the U.S. Mine Depot was redesignated the U.S. Naval Weapons Station. The primary mission of WPNSTA Yorktown is to provide ordnance, technical support, and related services to sustain the war-fighting capability of the armed forces in support of national military strategy. The long-term plans for the facility are the same as the present plans, with land use also generally the same as at present (Base Master Plan, 1991).

1.2 Environmental Status and Previous Investigations

The environmental condition of WPNSTA Yorktown is being investigated through the Department of Defense's Installation Restoration Program (IRP). On October 15, 1992, WPNSTA Yorktown was included on the National Priorities List (NPL) primarily due to the facility's proximity to wetlands and the potential impact on the surrounding environment.

Previous investigation reports completed through the IRP include the Initial Assessment Study (IAS) (July 1984), two Confirmation Study Reports (June 1986 and June 1988), a Remedial Investigation (RI) Interim Report (July 1991), a Site 21 Site Inspection Report (February 1992), a Focused Biological Sampling and Risk Evaluation Report (April 1993b), and a Round One RI Report (July 1993a).

The purpose of the IAS (C. C. Johnson & Associates, Inc. and CH2M Hill, July 1984) was to identify and assess sites posing a potential threat to human health and/or the environment due to contamination from past operations. A total of 19 potentially contaminated sites was identified based on information from historical records, aerial photographs, field inspections, and personnel

interviews. Each site was evaluated for the type of contamination, migration pathways, and pollutant receptors. The IAS concluded that 15 of the 19 sites were of sufficient threat to human health or the environment to warrant Confirmation Studies.

Two rounds of data were obtained during the Confirmation Study. During the first round of sampling, conducted in the winter of 1986, environmental samples were collected from the 15 sites identified in the IAS. This effort was documented in the "Confirmation Study Step IA (Verification), Round One," (Dames and Moore, June 1986). The initial sampling effort included:

- Installation and sampling of 26 monitoring wells.
- Collection of 21 surface water and sediment samples.
- Collection of 26 surface soil samples.
- Chemical analysis of the samples collected.

The second round of sampling was conducted during November and December 1987. The Round Two effort included:

- Collection of 26 groundwater samples from the previously installed wells.
- Collection of 26 surface water and 32 sediment samples.
- Collection of 12 surface soil samples.
- Chemical analysis of the samples collected.

The results of the analyses and comparisons with appropriate regulatory standards were presented in the "Confirmation Study Step IA (Verification), Round Two," (Dames and Moore, June 1988). The results of these field efforts were combined and summarized in the Draft RI Interim Report (Dames & Moore, February 1989). This report was subsequently revised by Versar in 1991 to incorporate comments from the Technical Review Committee (TRC); this report is referred to as the RI Interim Report. The RI Interim Report recommended that further RI activities be completed at 14 of the 15 sites for which data were available.

In November 1990, WPNSTA Yorktown personnel identified an additional site (Site 21, the Battery and Drum Disposal Area) that had not been included in the previous investigations. A Site Investigation (SI) at Site 21 was conducted in October 1991. Three monitoring wells were installed

and sampled, and surface and subsurface soil samples were collected. The results of this investigation were presented in the "Draft Final Site Inspection Report, Site 21-Battery and Drum Disposal Area, Naval Weapons Station Yorktown, Yorktown, Virginia" (Baker/Weston, February 1992).

The Focused Biological Sampling and Preliminary Risk Evaluation Report (Baker/Weston, April 1993b) summarized the results of a limited biological tissue, surface water, and sediment sampling effort conducted in October 1992. The primary object of the sampling program was to evaluate the potential human health risk associated with consumption of fish and shellfish taken from select waters within WPNSTA Yorktown.

The RI Interim Report recommended that 14 of the 15 sites be included for further study. However, based on evaluation of the available data, all 15 sites were recommended for further study during the Round One RI. In addition, based on the data obtained from the SI at Site 21, this site also was included in the Round One study (Baker/Weston, July 1993a).

The Round One RI sampling effort included:

- Geophysical investigations
- Biota investigations
- Tidal investigations
- Aquifer testing
- Monitoring well installation (23 wells)
- Collection of 51 groundwater samples (22 new wells, 29 existing wells; one newly installed well was dry)
- Collection of 196 surface water and sediment samples
- Collection of 115 surface soil samples
- Collection of 48 subsurface soil samples
- Chemical analysis of the samples collected

The results of the Round One RI indicated that further investigation was needed at all of the 16 sites, with the exception of Site 5, to better define the nature and/or extent of contamination associated with each site. A No Action Record of Decision (ROD) was finalized in September, 1994 for Site 5.

The Round Two RI was conducted for Sites 6, 7, 12, 16 and SSA 16 and Background for the York River Drainage Area in 1994 and Sites 9 and 19 in 1995 to supplement the Round One RI. Additional soil, subsurface soil, surface water, sediment and groundwater samples and biota were collected.

In addition to the Round Two RI, SSAs 1, 3, 6, 7, 12, and 15 were investigated during 1994. Environmental media including surface soil, subsurface soil, groundwater, surface water and sediment were investigated at those SSAs having potential impacts to these media.

SSAs 2, 17, 18, and 19 were investigated in early 1995. Again, surface soil, subsurface soil, groundwater, surface water and sediment were investigated where applicable.

Subsequent to the 1994 and 1995 investigations RI Reports and Site Screening Process (SSP) Reports were generated for sites and SSAs. The following reports have been submitted in Draft form to USEPA Region III and the Commonwealth of Virginia:

RI Reports

- Site 12

PRAP/RODs

- Site 12

SSP Reports

- SSAs 1, 6, 7, 15
- SSAs 2, 17, 18, 19

The following reports have been submitted in Final form to USEPA Region III and the Commonwealth of Virginia:

RI Reports

- Site 16/SSA 16

PRAPs/RODs

- Site 5 (No Further Remedial Action)
- Site 16/SSA 16 (No Further Remedial Action with Institutional Controls)

Miscellaneous

- York River Background Report
- WES Treatability Study Work Plan
- Sites 4 and 21 Post Removal Confirmatory Sampling Report and Baseline Risk Assessment
- Soil Assessment Report for SSA 12

Operable Units (OUs) have been determined for the following sites:

Site 5 - OU I

Site 16/SSA 16 - OU II

Operable Unit No. I (Site 5)

A "No Action" Record of Decision for Site 5 was signed in September 1994. There are no other IRP activities associated with this site. Site 5 will be delisted from the IRP.

Operable Unit No. II (Site 16/SSA 16)

A "No Further Remedial Action with Institutional Controls" Record of Decision for Site 16/SSA 16 was signed in September 1995. There are no other IRP activities associated with this site.

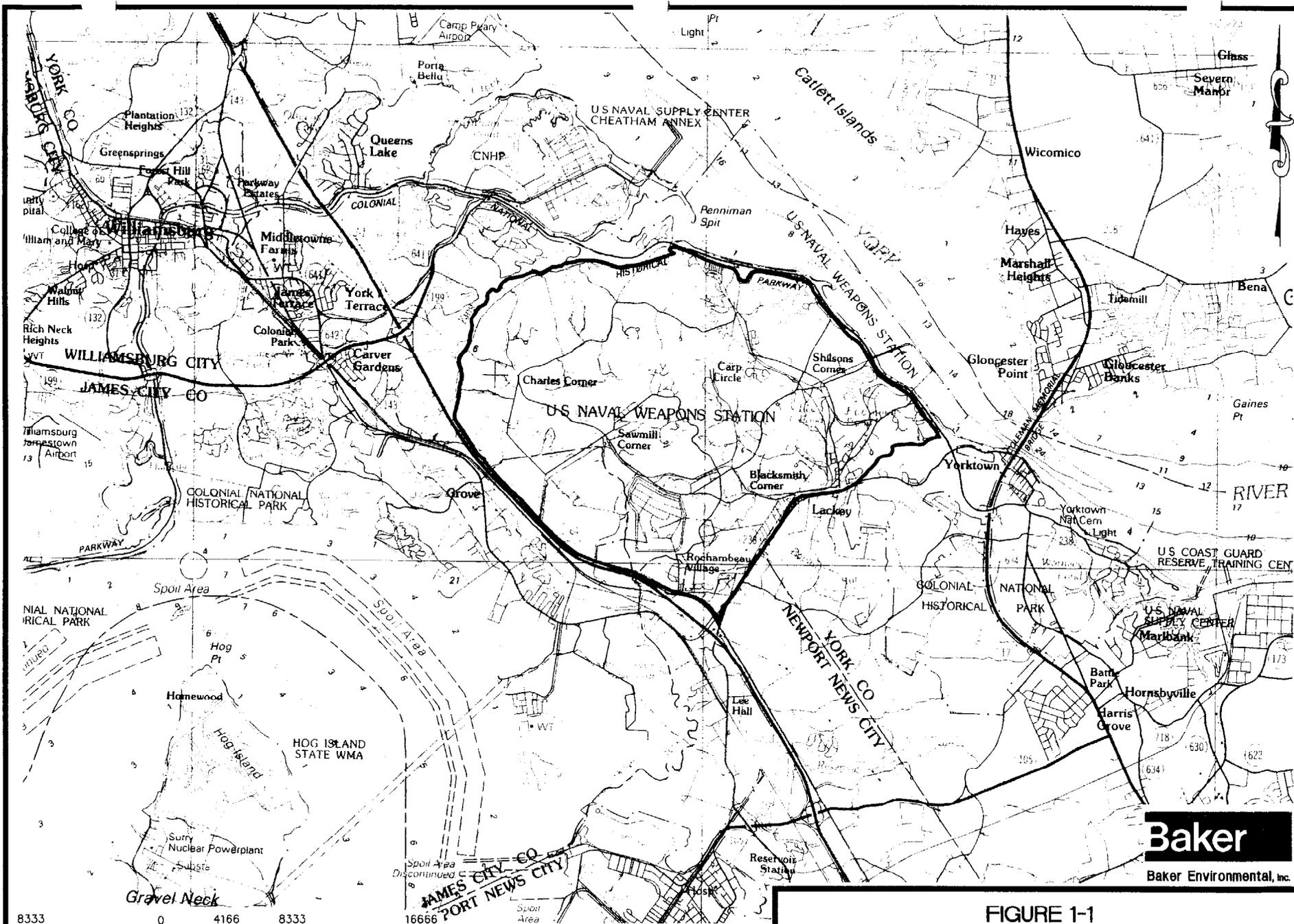
In addition to Round One and Round Two RIs, Habitat Evaluations were conducted for each of the IRP sites in early September of 1993 and late August of 1994. The results of these evaluations were compiled into a single comprehensive report which qualitatively evaluates the habitat at each IRP

site. Results of the Habitat Evaluation provide important information for Work Plan preparation and ecological risk assessments presented in the most recent and forthcoming RI reports.

1.3 Report Organization

The remainder of this report contains five sections. Section 2.0 presents a brief description of the sites and SSAs. Section 3.0 presents a summary of the procedures to be followed as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process that will be used at WPNSTA Yorktown. Section 4.0 presents the system used to rank the sites implementing a risk-based, worst-first model. Section 5.0 provides the schedules for the planned activities at the Station and the assumptions used to develop these schedules. Section 6.0 provides the references used in preparing this document.

SECTION 1.0 FIGURES



Baker
Baker Environmental, Inc.

FIGURE 1-1
LOCATION OF NAVAL WEAPONS STATION YORKTOWN
YORKTOWN, VIRGINIA

SOURCE: U.S.G.S. 1:100,000-SCALE PLANIMETRIC
MAP, WILLIAMSBURG, VIRGINIA, 1984.

2.0 SITE AND SSA DESCRIPTIONS

This section presents a brief description of each of the current RI/FS sites and SSAs. Table 2-1 lists these areas and Figure 2-1 depicts their approximate sizes and locations.

2.1 Site Descriptions

This section describes the history of the disposal practices at each of the recently investigated RI/FS sites. The information presented is from previous studies (C.C. Johnson & Associates and CH2M Hill, 1984; USEPA, December 1992) and has been updated based on additional historical review and discussions with WPNSTA Yorktown personnel. The site descriptions are presented in numerical order for ease of reference.

2.1.1 Site 1 - Dudley Road Landfill

Site 1 is a 6-acre area located just north of the headwaters of Indian Field Creek. The landfill was in use from approximately 1965 to 1979 for general disposal, with one area used for disposal of plastic lens grinding waste until 1983. Wastes disposed in this landfill include asbestos insulation from steam piping; empty oil, grease, paint, and solvent containers; nitramine-contaminated carbon; household appliances; scrap metal banding; construction rubble; plastic lens grinding wastes; tree limbs; lumber; packaging wastes; electrical wires; and waste oil. The landfill received an estimated 255 tons of waste during the time in which the site was in use. In addition, there is an abandoned sand reclamation pit on the eastern edge of the site and a pond in the western portion of the landfill area. Seasonal ponding also occurs in the southeastern section of the site. Today, the landfill is covered by 2 feet of soil and the abandoned sand reclamation area is covered by 8 feet of soil.

2.1.2 Site 2 - Turkey Road Landfill

Site 2 is a 5-acre landfill located east of Turkey Road in a wetland area adjacent to the southern branch of Felgates Creek. Operations at the landfill reportedly began in the 1940s and ceased in 1981. Wastes disposed in this landfill include mercury and carbon-zinc batteries, tree stumps and limbs, construction rubble, missile hardware (e.g., wings, fins and power packs), electrical devices, and unidentified drums and/or tanks. Waste quantities have been estimated at 240 tons during the

period of use. Hard waste material (mine casings) is primarily located along the tributaries to the southern branch of Felgates Creek. A removal of hard waste material was conducted during the summer of 1994 at Site 2.

2.1.3 Site 3 - Group 16 Magazine Landfill

Site 3 is a 2-acre area located behind the Group 16 magazines, just south of Site 1 (separated by a ravine), along the headwaters of Indian Field Creek. The landfill area was reportedly in use from 1940 to 1970. Wastes disposed at this site include solvents, sludge from boiler cleaning operations, grease trap wastes, Imhoff tank skimmings containing oil and grease, and animal carcasses. This landfill received an estimated 90 tons of waste during the time in which the site was in use. Currently, most of the site, which is overgrown with trees, is covered by 2 feet of soil with some scattered surface debris.

2.1.4 Site 4 - Burning Pad Residue Landfill

Site 4 is a 6-acre landfill located adjacent to the explosives burning facility just south of West Road. This area was in use between 1940 and 1975. Carbon-zinc batteries from underwater weapons, burning pad residues, tree stumps, fly ash from coal-fired burners, mine casings, electrical equipment, and transformers were reportedly buried at this site. A large battery disposal area has been identified in the southeastern portion of the site. In addition, construction debris, pipes, glass, concrete, bottles, cans, and drums have been discovered in various locations within the 6-acre area. An ash pile is present in the northeastern corner of the site. The landfill received an estimated 595 tons of waste during the time in which the site was in use. A removal action was conducted at Site 4 during the summer of 1994 and the area has been revegetated.

2.1.5 Site 5 - Surplus Transformer Storage Area

Site 5 is located near Barracks Road in the northeastern portion of the Station adjacent to the south end of Building 76. Site 5 is also referred to as OU I. The area is approximately 1,000 square feet in size and is fenced. Two concrete pads are located within the fenced area; the remainder of the area is covered with gravel. This site was used from 1940 to 1981 as a storage area for surplus polychlorinated biphenyl (PCB)-containing transformers which were stored on and around the two

large concrete pads. After 1981, only non-leaking transformers were stored at this location. Currently, the stored transformers have been removed and the site is no longer used as a transformer storage area.

An estimated 300 pounds of PCB-containing fluids reportedly leaked from stored transformers. A cleanup effort, conducted in December 1982, included the removal of contaminated soils at Site 5. However, the success of this removal effort was not documented (i.e., no information on the amount of soil removed, verification samples, and type and source of backfill). The recently completed Round One RI investigation and a Risk Evaluation confirmed that the contaminated soils were successfully removed during this effort. Based on the results of the Risk Evaluation and limited confirmational sampling by USEPA, a No Action ROD was finalized for Site 5 on September 29, 1994.

2.1.6 Site 6 - Explosives-Contaminated Wastewater Impoundment

Site 6 is a 3-acre, unlined, surface impoundment located adjacent to wetlands along a small tributary to the main branch of Felgates Creek. This area was in use between 1942 and 1975 and received contaminated wastewaters from the explosives reclamation facility at Building 109 and from weapons loading operations at Building 110 (AOC C and SWMU 179). In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage way. A National Pollutant Discharge Elimination System (NPDES) permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to the Hampton Roads Sanitation District (HRSD). Currently, the impoundment collects only surface runoff from the area between Buildings 109 and 110. In addition, north of the impoundment and northwest of Building 1249, a previously excavated area has been identified via aerial photography. This area is currently wooded, but a concrete foundation, drums, and concrete rubble are evident.

2.1.7 Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area

Site 7 is a drainage area approximately 300 feet long located adjacent to wetlands and along a small tributary to Felgates Creek, approximately one mile upstream from the confluence of Felgates Creek and the York River. This drainage area received nitramine-contaminated wastewater from Loading

Plant 3 between the years 1945 and 1975. In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage way. An NPDES permit was granted by the USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage area and receives no discharge from the Plant 3 complex.

2.1.8 Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area

Site 8 is a 300-foot drainage way located along the eastern branch of Felgates Creek, approximately 1.5 miles from the confluence of the creek and the York River. This area received wastewater from the Naval Explosives Development Engineering Department (NEDED) complex (Building 456) from 1940 to 1975. The wastewater reportedly contained unspecified solvents, spent/neutralized acids, and nitramine compounds. In 1975, a carbon adsorption tower was installed to treat the contaminated wastewater prior to discharge into the drainage area. An NPDES permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage area.

2.1.9 Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area

Site 9 is a 600-foot drainage ditch located just east of Lee Pond, which empties into the eastern branch of Felgates Creek and topographically downslope from Site 19 (Section 2.1.15). This area was reportedly in use from the late 1930s to 1975. Contaminants in the wastewater from Plant 1 (Building 10) included nitramine compounds as well as organic solvents. During the more than 40 years that the drainage area was used, an estimated 6,800 pounds of nitramine- and solvent-contaminated material may have been discharged to the area. A carbon adsorption tower was installed in 1975 to treat the contaminated wastewater prior to discharge into the drainage area. An NPDES permit was granted by USEPA Region III to allow this discharge. In 1986, the effluent from the tower was diverted to the sanitary sewer and ultimately to HRSD. Currently, the site has reverted to a natural drainage way for surface runoff from surrounding areas and receives no discharge from the Plant 1 complex. A limited removal action was conducted for hard waste present at Site 9 in the natural drainage way between Bollman Road and Lee Pond during the summer and early fall of 1994.

2.1.10 Site 11 - Abandoned Explosives Burning Pits

Site 11 is an area of approximately 0.5-acres located south of Dudley Road, east of Main Road, west of Site 1, and north of a drainage channel leading to Indian Field Creek. This area was used from 1930 to 1950 for burning ordnance and ordnance-contaminated waste. Ashes and residues from the open burning of nitramine-containing wastes and sludges are potentially present at the site. During the 20 years that the pits were used approximately 200 pounds of nitramine waste residues may have been deposited. Currently, the area is thickly vegetated.

2.1.11 Site 12 - Barracks Road Landfill

Site 12 is a 4-acre landfill located east of Barracks Road, north of the community of Lackey, and northwest of the Colonial National Historical Park along a drainage swale leading to Ballard Creek. This area was in operation from approximately 1925 to the mid-1960s. Wastes reported to have been disposed include refuse, scrap wood, and nitramine-contaminated packaging. Because this facility was the predecessor to the Dudley Road Landfill (Site 1), it is likely that wastes similar to those identified at Site 1 (Section 2.1.1), including solvents, were also disposed in this area. The landfill received an estimated 1,400 tons of waste during the time the site was in use. Adjacent to the landfill are two incinerators (SWMU 142 and SWMU 143) formerly used to burn a variety of waste, both industrial and nonindustrial. Incineration ash from incineration activities was disposed on the hillside behind the incinerator buildings. Scrap metal, charred wood and cloth, and medicine bottles were observed in the ash. Located approximately 400 feet east of Site 12 is the Wood/Debris Disposal Area (formerly SWMU 164 and now considered a part of Site 12), which is approximately 4 acres in size. This area consists of a steep ravine in which wooden pallets and construction debris have been disposed. Each area is currently vegetated and drains toward Ballard Creek.

2.1.12 Site 16 - West Road Landfill

Site 16 is a 5-acre area located adjacent to West Road near Indian Field Road. This site was operated from the early 1950s to the early 1960s. Wastes reported to have been disposed include dry carbon-zinc (Leclanche) batteries, banding materials, pressure transmitting fluid, unknown types of chemicals, and 55-gallon drums (contents unknown). A recent investigation at this site confirmed the presence of drums, scrap metal, batteries, mine casings, and construction debris. Another waste

area was also identified beneath one of the drum piles. This waste area consisted of glass containers, cans, and newspapers. Landfill boundaries are not evident from visual observation of the area. The site is wooded, except for the northern portion along West Road, which is covered with grasses. A removal action was conducted at Site 16 during the summer of 1994 to eliminate drums, scrap metal, batteries, and construction debris.

2.1.13 Site 17 - Holm Road Landfill

Site 17 is a 2-acre landfill located south of Holm Road and east of Main Road. The site was operated for approximately 10 years, from the 1950s to the 1960s. Wastes reportedly disposed include acid batteries from underwater weapons, hydraulic fluids (Dolconik) from the demilling of torpedoes, other types of hydraulic fluids, drums from the Public Works Department and ordnance production shops, and scrap metal. An estimated 60 tons of waste was deposited during the period the landfill was in use. Currently, the site is overgrown with mature trees and no evidence of surficial waste is apparent. In addition, results from the geophysical investigation of this site during the Round One RI did not indicate any evidence of buried material.

2.1.14 Site 18 - Building 476 Discharge Area

Site 18 is a one-quarter mile long, unlined drainage ditch located north of Building 476 in the southeastern area of the installation along a small tributary leading to Lee Pond. This area was in use for approximately 20 years from the 1940s to the 1960s. The discharge into the area reportedly contained battery acid waste, consisting of hydrochloric acid or calcium hydroxide and dissolved metals such as lead, cadmium, nickel, and antimony. An estimated 100 to 200 pounds of metals may have been discharged during the operational period. Battery acid waste no longer discharges from Building 476 into this drainage way.

2.1.15 Site 19 - Conveyor Belt Soils at Building 10

Site 19 is a 500-foot long soil strip located beneath and around Building 10, approximately 300 feet from Site 9 and connected to Site 9 via a concrete drainage channel. Nitramine-contaminated soils were reported beneath the conveyor belt between Buildings 10 and 98. In 1973-1974, soils below the conveyor belt were removed; however, later tests indicated that contamination remains.

2.1.16 Site 21 - Battery and Drum Disposal Area

Site 21 covers approximately 1 acre and is located south of West Road adjacent to the ravine that separates Site 21 from Site 4. Historical information for this site is limited. Wastes identified in this area include various sized cans and drums, dry carbon-zinc batteries (Leclanche), empty solvent containers, and scrap metal. A removal action was conducted at Site 21 during the summer of 1994 to remove batteries, drums and debris. The site has been revegetated in those areas affected by the removal.

2.1.17 Site 22 - Burn Pad

Site 22 is located in the central portion of the facility between Sites 4 and 21. A circular array of 11 steel burning pans was used for burning waste plastic explosives and spent solvents. The pans surround a 150-foot inch diameter circular area. Currently the burn pad is not in use and the area is relatively clean, with limited scattered debris. Analytical data are not currently available for environmental media at the Site 22.

2.2 Site Screening Area (SSA) Descriptions

This section describes the history of past disposal practices at each of the SSAs currently included in the FFA and the two SSAs which have been added for investigation and evaluation which were not included in the FFA. As these are primarily newly identified areas, there is limited information available. The information contained in the following sections has been adapted from USEPA Region III's "RCRA Solid Waste Management Unit Investigation," (December 1992) and "Study Area Analysis, Yorktown Naval Weapons Station Yorktown, Yorktown, Virginia," Volume 1 (November 1992).

2.2.1 Site Screening Area 1 - Building 428 Teague Road Disposal Area

SSA 1 is approximately 7.2 acres in size and is located northeast of Building 428, in the northeast portion of the installation along the facility boundary. The York River is located to the north of SSA 1 and Roosevelt Pond bounds the area to the west/northwest. The area is wooded and bisected by a railroad track that was constructed in 1919 and operated until 1989. Disposal activities

reportedly began in 1940 and ceased in 1960. A pier fire occurred in the mid-1950s and debris from this fire may have been disposed in this area (1955 to 1957). Aerial photography suggests that past waste storage practices occurred at SSA 1 (primarily in 1945). From 1960 to the present there has been no evidence of waste storage or release. However, a land survey, conducted in the fall of 1993 as part of a removal action, indicated discrete piles of debris that appear to have been dumped on top of native soils, while other areas of debris appear to be partially buried. The debris was identified as concrete rubble; scrap metal; wooden pilings and railroad ties; empty fuel cans; empty, open; and corroded drums (four drums were found to contain unknown liquids); scrap metal; asbestos pipe insulation; and shingles. A removal action was conducted during the summer and early fall to remove surface debris present at SSA 1.

2.2.2 Site Screening Area 2 - Former EOD Burning/Disposal Area

SSA 2 is an irregular, U-shaped area located at the north end of the existing Explosives Ordnance Disposal (EOD) range and occupying an area of approximately 2.3 acres. The area is currently wooded and strewn with non-explosive arming devices, MK 46 shipping containers, various types of scrap metal, and debris. Numerous earthen berms and depressions indicate that bulldozers and other earth-moving equipment throughout the site. Demolition records indicate that the area was the original site of the EOD range and was actively used throughout the 1950s and 1960s for routine destruction of ordnance. The area was closed in 1970 and operations were moved south to the present EOD range location. Anecdotal information indicates that the move was prompted by growing concerns that range operations might cause forest fires in the wooded areas bordering the site.

2.2.3 Site Screening Area 3 - Fire Training Pits and Vicinity

SSA 3 occupies an area of approximately 2.7 acres, and is located just north of Main Road and Site 16, the West Road Landfill, in the north central portion of the facility. The area consists of three concrete oil pits; one is T-shaped and the other two are rectangular. One rectangular pit is located at the eastern end of the field, the second rectangular pit is located in the western end of the field, and the T-shaped pit is located in the central section of the field, where a patch of stressed vegetation is evident. Berms were built around each of the pit areas in 1986 and a roof was added to each area in 1991. Debris was reportedly placed in each of the pits, doused with jet fuel and set

on fire. In addition, in the vicinity of the pits, there appeared to be portions of a tanker trailer that was formerly used for confined space entry training. The trailer is open on the bottom and placed directly on the soil. The inside of the trailer is blackened and burned.

2.2.4 Site Screening Area 4 - Weapons Casing/Drum Disposal Area

SSA 4 occupies approximately one-half acre between Main Road and Bypass Road at the headwaters of one of the tributaries leading to Roosevelt Pond. The area consists of a ravine in which debris, including weapons casings and drums, has been deposited. There is a flat, grassy area just along the roadway, indicating that this area may be an old landfill. Some of the material in the ravine may be present as a result of landfilling activities. A removal action was conducted at SSA 4 during the summer and early fall of 1994 to remove surface debris in the ravine.

2.2.5 Site Screening Area 5 - Bypass Road Landfill

SSA 5 is located just north of Bypass Road and covers approximately 0.9 acres. This area consists of a ravine in which debris is evident. A small stream passes through the site and exits from a culvert that begins south of Bypass Road. The small stream is the second tributary which flows into Roosevelt Pond. Both Bypass Road and the railroad system were constructed in 1919 and are still in use.

Metal debris, with lesser amounts of concrete and miscellaneous materials, is present at SSA 5. Two empty drums also are present. No wood materials were identified among the surface debris piles.

2.2.6 Site Screening Area 6 - Aviation Field and Environs

SSA 6 is a large area (approximately 69 acres in size) located in the northern portion of the facility. It is bounded by Bellfield Road to the north, Diggs Road to the east, and Main Road to the south and west. The SSA consists of open grassy areas, storage sheds, a helicopter landing pad, and open storage areas with materials stacked on pallets. Historically, the area was used as an aviation field until 1927, after which it was used for storage of munitions in underground caches. Batteries and cables coated with antifoulants containing PCB-1254 and mercury compounds also may have been buried or stored at this location. Aerial photography indicates that peak storage activity occurred

in 1968. No storage of liquid or hazardous waste was reported or observed. However, sludges from the Sewage Treatment Plant (STP) #1 were reportedly disposed in the southeastern portion of SSA 6. In addition, the area in which the helicopter landing pad is currently located may have been used briefly as an explosives burning area. Today, bulk materials such as mine casings, rocket containers, rocket parts, and empty otto fuel tanks are stored in the storage area.

The excavation area, referred to as SWMU #28 in USEPA Region III's Solid Waste Management Unit Investigation Report (1993), formally was listed as a part of SSA 6. However, because the excavation area is located south of Main Road, it has been included in the Remedial Investigation of Site 6, the Explosive-Contaminated Wastewater Impoundment, and will not be addressed in this investigation.

2.2.7 Site Screening Area 7 - Building 373 Rocket Plant/Group 18 Magazines/Main Road Disposal Area

SSA 7, the Rocket Plant, is approximately 14.3 acres in size and is located at the northern end of Main Road (bordering the facility and the main branch of Felgates Creek), just north of Site 6 (Explosive-Contaminated Wastewater Impoundment) and west of SSA 6. Approximately 6 acres of the area wooded. The open areas include:

- Building 373, the Rocket Plant, located in the southwest portion of the site. Explosive loading operations take place in this building.
- Group 18 magazine area, located in the clearing north of the Rocket Plant area. Two bunkers not currently in use also are found in this clearing.
- Main Road Disposal Area, an area of inert mine casings, located south of Main Road on the eastern portion of SSA 7. Many of these inert mine casings are partially buried.

Prior to the 1960s, wash/rinse water from the cleanup of formulation/pouring equipment drained into a settling basin within the building for removal of suspended solids. The solids were open burned at Site 4 (Burning Pad Residue Landfill). The wash/rinse water subsequently was discharged into

Felgates Creek. The discharge line to the creek was plugged in the early 1960s and a 220-gallon underground storage tank (UST), constructed of brick and mortar, was installed to contain the wash/rinse water. From the 1960s to 1980s, the UST received batch wastes from NEDED assembly operations of 2.75-inch rockets as well as the wash/rinse waters. Once the tank was filled, the water was filtered through a carbon unit and discharged to the sanitary sewer system. The UST was closed in the early 1980s when the current aboveground storage tank (AST) was installed. Materials contained within the tanks consisted of binders, curatives, catalysts, stabilizers, and explosives.

In addition to the above areas, USEPA Region III personnel reportedly found "hard waste" (empty mine casings and other miscellaneous wastes) in the woods south/southeast of SSA 7. These hard wastes will be the subject of a removal action during FY 95/96.

2.2.8 Site Screening Area 8 - Building 350 Rail Roundhouse Maintenance Area Trench Outfall

SSA 8 occupies an area of approximately 0.4 acres, and is located outside Building 350, on the railroad tracks, in the southeastern corner of the Station. Underneath the building there are two concrete trenches, which were used to access train engines from below. The trenches reportedly collected drippings generated during train maintenance. The floors of the trenches appear heavily stained; however, the trench drains have reportedly been plugged. Material in the trenches may have drained to the trench outfall and under the road toward the wooded area east of Site 18.

2.2.9 Site Screening Area 9 - Building 1751 Chemistry Laboratory Neutralization Unit and Drainage Area

SSA 9 occupies an area of approximately 1.9 acres, and is located adjacent to Building 1751 in the north central portion of the facility (near Site 8, the NEDED Explosives-Contaminated Wastewater Discharge Area). This SSA consists of a below-grade cylindrical unit into which acids from the Chemistry Lab are discharged for neutralization. The integrity of the unit is unknown it is below ground. In addition, there are four underground septic tanks in the area. Historical records indicate that industrial waste may have been stored in these tanks.

2.2.10 Site Screening Area 10 - Building 28 X-Ray Facility Tank Drain Field

SSA 10 is located at Building 28 in the south central portion of the installation and occupies an area of approximately 5.8 acres. The area consists of a septic tank and drain field that receives sanitary wastewater from the X-Ray Facility at Building 28. Before silver recovery units were installed, the tanks may have stored hazardous wastes. Stressed vegetation is apparent in this area.

2.2.11 Site Screening Area 11 - Building 3 Neutralization Unit

SSA 11 is located at the southeast corner of Building 3 in the eastern section of the facility (southwest of Site 12) and occupies an area of approximately 0.2 acres. SSA 11 consists of an open, metal tank (approximately 3 feet by 5 feet by 3 feet deep) and associated trench and sump. This tank was apparently used for neutralization of wastes from an unknown process, but has been inactive for at least 15 years. Cracks and pitting are evident in the trench and sump.

2.2.12 Site Screening Area 12 - Public Works Storage Yard/Building 683 Vicinity

SSA 12 is approximately 1.5 acres in size and is located in the Public Works (PW) storage yard and the surrounding area in the eastern portion of the facility near Site 12 and SSAs 11 and 13. One area consists of a field, approximately 150 feet by 300 feet, in which waste generated by the Public Works Department is stored. Drums of used motor oil and used batteries were observed on pallets and directly on the ground. Historically, the area was used to store old tires. Another area, located outside Building 645, consists of a fenced in yard used to store electrical transformers and other electrical equipment. Historical records indicate that wastes may have been stored in this area in the past. In addition, there is a formerly wooded area where demolition debris was reportedly deposited. Concrete debris is visible at the edge of the area. Currently, approximately one-half of the area is used for vehicle storage.

2.2.13 Site Screening Area 13 - Building 529 Battery Drainage Area

SSA 13 occupies an area of approximately one-half of an acre and is located at Building 529 in the eastern portion of the facility near Site 12 and SSAs 11 and 12. The area consists of pavement

where neutralized battery washwater was released and migrated to a storm drain approximately 100 feet away. The pavement is currently worn, with some vegetation apparent.

2.2.14 Site Screening Area 14 - Building 537 Discharge to Felgates Creek

SSA 14 occupies an area of approximately 0.4 acres, and is located outside of Building 537 between Site 8 and SSA 9, in the north central portion of the facility. This SSA consists of a pipe leading from the building, through which nitramine-contaminated wastewater was reportedly discharged to Felgates Creek. Some rubble and rusted piping were found where this pipe was reportedly located.

2.2.15 Site Screening Area 15 - Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area

SSA 15 is comprised of the Sewage Treatment Plant #1/Sludge Drying Beds and Discharge Area. It is located in the southeastern corner of the installation, east of Buildings 3 and 4 and south of Site 12 (Barracks Road Landfill). This site covers approximately 0.3 acres and consists of an Imhoff tank, a trickling filter, a sludge drying bed, and a chlorination unit. Wastewater reportedly entered the Imhoff tank, which operated as a primary settling basin for the waste. The water then was passed through the trickling filter for biological treatment and pumped back to the Imhoff tank for secondary settling. The water was chlorinated in the chlorination unit and discharged to a tributary of Ballard Creek. Sludge from the Imhoff tank periodically was removed and placed in the sludge drying bed. STP #1 received managed only sanitary waste from physical plants and the Officer's Club located nearby, but may have treated nitramine-containing and other industrial wastewater. WPNSTA Yorktown personnel that have reported, during the operation of STP #1, a mercury-containing bearing on the trickling filter cracked, allowing mercury to be released. Also, WPNSTA Yorktown personnel indicated that sludges from SSA 15 were brought to SSA 6 and landfarmed. Currently, rainwater fills the trickling filter and Imhoff tank, and substantial vegetation is present in the drying bed.

2.2.16 Site Screening Area 16 - Building 402 Metal Disposal Area and Environs

SSA 16 is located on West Road, just west of Building 402 and encompasses the northern area of Site 16. The area is a large dirt field, approximately 0.4 acres in size, where scrap metal was stored. Dumpsters containing scrap metal are located on the lower southwest side of the yard; scrap metal and empty drums are also scattered over the ground surface near these dumpsters. This area was reportedly used for scrap metal storage prior to the construction of the Hazardous Waste Storage Facility.

2.2.17 Site Screening Area 17 - Building 1456 Mark 46 Waste Otto Fuel Tank

SSA 17, which occupies an area of approximately 2.5 acres, is located northwest of SSA 18 in the central portion of the facility. This area consists of an inactive, 5,000-gallon, underground steel tank and a network of ancillary drain pipes; the tank is located under the parking apron. This tank was used to store waste otto fuel generated during cleaning procedures associated with MK 46 torpedo activities. Waste otto fuel is a mixture of otto fuel and water which potentially contained oils, denatured ethyl alcohol, detergent, and trace amounts of cyanide. Presently, the MK 46 torpedo shop accumulates waste otto fuel in compatible, 55-gallon drums, which are stored for less than 90 days prior to transport off site for disposal. The tank is currently scheduled to be removed in FY 95.

2.2.18 Site Screening Area 18 - Building 1816 Mark 48 Waste Otto Fuel Tank

SSA 18 is located in the central portion of the facility at Building 1816 north of Sharpe Road and west of the intersection of Sharpe Road and Lee Road. Within this area, which is approximately 6.7 acres in size, there is a below-grade, 2,500-gallon concrete tank and network of ancillary drain pipes that was used formerly to store waste otto fuel. This fuel consists of a mixture of otto fuel and water, which may have also contained oils, denatured ethyl alcohol, detergent, and trace amounts of cyanide, halogenated hydrocarbons, and heavy metals. In late 1987, waste otto fuel was discovered leaking from the tank. The fuel was removed, the tank was cleaned, and a RCRA closure permit was filed. In February 1992, the Commonwealth of Virginia approved a closure and post-closure plan for this tank. However, in September 1992, the closure approval was rescinded. There is also an 8,000-gallon underground fuel tank located in the vicinity, which is included in the FY 94/95 scheduled removal action. Currently, removal actions for both tanks are underway.

2.2.19 Site Screening Area 19 - Beaver Road/Ponds 11 and 12 Drainage Area and Environs

SSA 19, which occupies an area of approximately 164 acres, is located in the northwestern section of the facility and encompasses the area surrounding the EOD range, including drainage into Ponds 11 and 12. The area is used for explosive waste destruction. Soil is stacked approximately 40 feet above ground surface, holes are dug about 12 to 20 feet into the mound of soil, the holes are filled with explosive ordnance and backfilled. The explosives are detonated; the same soil is used repeatedly. During the winter, this area is covered and grass is grown to prevent erosion. Unlined settling ponds collect runoff, through pipes, from this area. Effluent from these ponds may discharge to nearby Ponds 11 and 12 and ultimately to King Creek and the York River. In addition, nine metal containers of varying sizes are used for burning explosive waste when hotter burning is required. This type of burning is performed one to two times per year, primarily in the summer.

2.2.20 Site Screening Area 20 - Lee Pond

Lee Pond is an approximately 4.1 acre pond located in the east central portion of the Station. The pond receives drainage from Building 10 at Site 9 located due east of the pond. The drainage area is approximately 500 to 600 feet in length and was subjected to a limited removal action in 1994. Lee Pond also receives stormwater runoff from the industrial area and sites therein such as Site 18.

Lee Pond empties into a channel which in turn flows around the Site 16/SSA 16 study area into Felgates Creek. The pond has been subjected to limited investigations by the Commonwealth of Virginia in 1994 and a Focused Biological Sampling and Preliminary Risk Evaluation (Baker, 1993). Water levels in Lee Pond are raised and lowered during summer and winter respectively for support of the local ecology.

2.2.21 Site Screening Area 21 - Roosevelt Pond

Roosevelt Pond is an approximately 22.2 acre pond located in the eastern portion of the Station. The pond receives stormwater from the industrial area and sites therein such as SSAs 4, 5, and 12.

Roosevelt Pond empties into the York River. The pond has been subjected to limited investigations by the Commonwealth of Virginia in 1994 and a Focused Biological Sampling and Preliminary Risk Evaluation (Baker, 1993).

SECTION 2.0 FIGURES

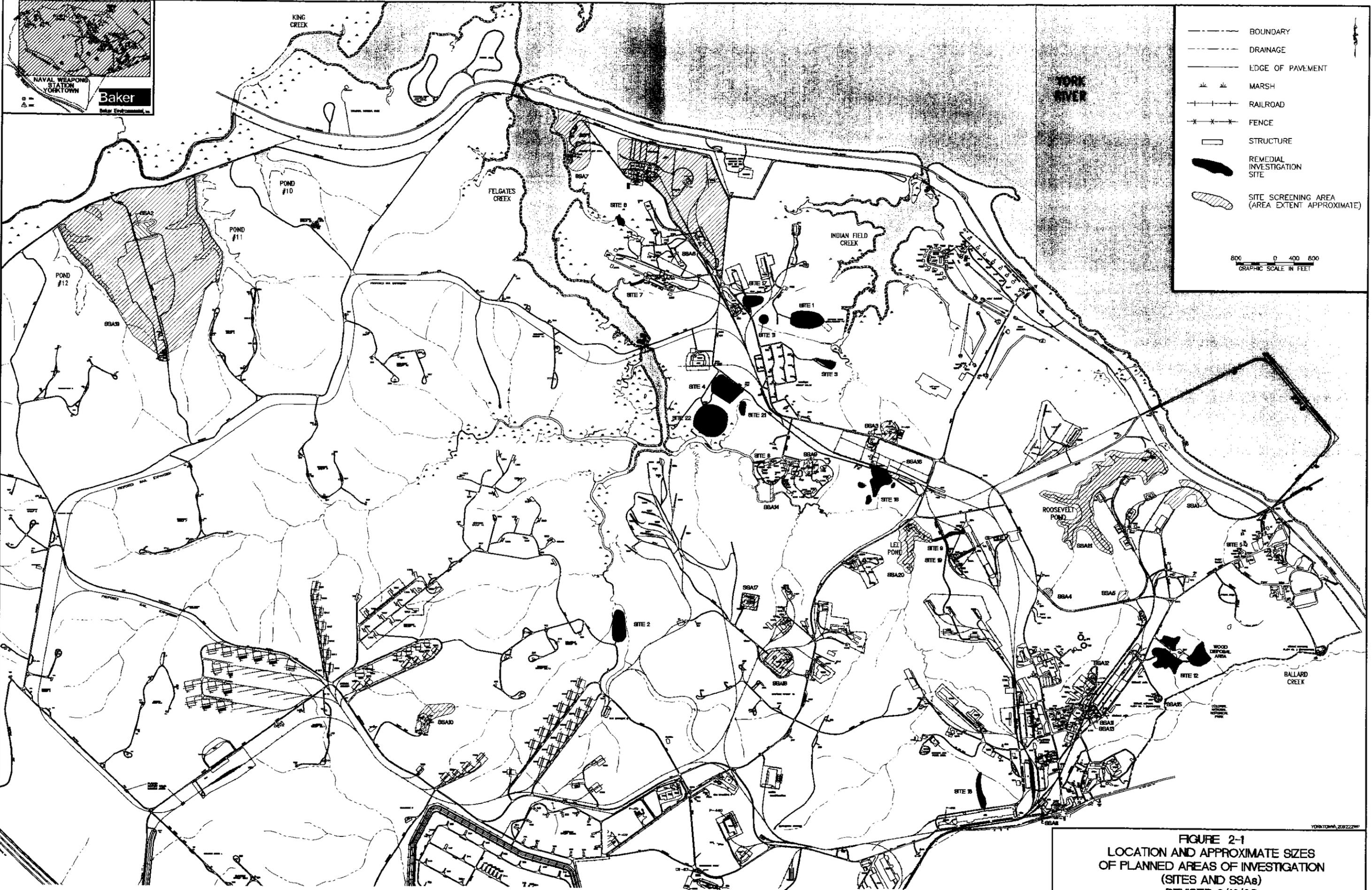
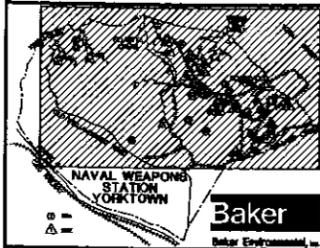


FIGURE 2-1
LOCATION AND APPROXIMATE SIZES
OF PLANNED AREAS OF INVESTIGATION
(SITES AND SSAs)
REVISED 9/12/95

SOURCE: NAVAL WEAPONS STATION, YORKTOWN, VIRGINIA.

NAVAL WEAPONS STATION YORKTOWN YORKTOWN, VIRGINIA

SECTION 2.0 TABLES

TABLE 2-1
SITES AND SITE SCREENING AREAS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Site No.	Site Name	SSA No.	SSA Name
1	Dudley Road Landfill	1	Building 428 Teague Road Disposal Area
2	Turkey Road Landfill	2	Former Explosives Ordnance Disposal (EOD) Burning/Disposal Area
3	Group 16 Magazine Landfill	3	Fire Training Pits and Vicinity
4	Burning Pad Residue Landfill	4	Weapons Casing/Drum Disposal Area
5	Surplus Transformer Storage Area	5	Bypass Road Landfill
6	Explosives-Contaminated Wastewater Impoundment	6	Aviation Field/Excavation Area and Environs
7	Plant 3 Explosives-Contaminated Wastewater Discharge Area	7	Building 373 Rocket Plant Group 18 Magazines Main Road Disposal Area
8	Naval Explosives Development Engineering Department (NEDED) Explosives-Contaminated Wastewater Discharge Area	8	Building 350 Rail Roundhouse Maintenance Area Trench Outfall
9	Plant 1 Explosives-Contaminated Wastewater Discharge Area	9	Building 1751 Chemistry Laboratory Neutralization Unit and Drainage Area
11	Abandoned Explosives Burning Pits	10	Building 28 X-Ray Facility Drain Field
12	Barracks Road Landfill	11	Building 3 Neutralization Unit
16	West Road Landfill	12	Public Works Storage Yard/ Building 683 Vicinity
17	Holm Road Landfill	13	Building 529 Battery Drainage Area
18	Building 476 Discharge Area	14	Building 537 Discharge to Felgates Creek
19	Conveyor Belt Soils at Building 10	15	Sewage Treatment Plant (STP) #1 Sludge Drying Beds and Discharge Area
21	Battery and Drum Disposal Area	16	Building 402 Metal Disposal Area and Environs
22	Burn Pad	17	Building 1456 Mark 46 Waste Otto Tank
		18	Building 1816 Mark 48 Waste Otto Tank
		19	Beaver Road/Ponds 11 and 12 Drainage Area and Environs
		20	Lee Pond
		21	Roosevelt Pond

3.0 CERCLA PROCESS ACTIVITIES

The investigation and remediation activities to be completed at identified sites at WPNSTA Yorktown will follow the guidelines established by the USEPA as part of the CERCLA process. Once an SSA has been identified as potentially containing contaminated media (soil, sediment, groundwater, etc.) and the site screening investigation and risk screening process (both limited in scope) have determined that a potential risk to human health and/or the environment exists, the SSA will be subjected to full Remedial Investigation/Feasibility Study (RI/FS) process. However, a removal action and/or an interim remedial action may also be appropriate. The decision to implement one or a combination of these actions at either already established RI/FS sites or SSAs is dependent upon the nature and extent of contamination at the site, how well it is characterized, the degree of associated human health and/or environmental risks, and the complexity of the potential remedial actions (i.e., how apparent the optimal remedy is). CERCLA processes are described below.

3.1 RI/FS Process

The RI/FS process is generally the longest step in investigating and remediating CERCLA sites. Figure 3-1 outlines the steps to remedial action under the RI/FS process. For the RI/FS, a full RI, Baseline Risk Assessment, and FS are completed, along with a Proposed Remedial Action Plan (PRAP) prior to the formal public comment period. After the public comments have been addressed as part of the Responsiveness Summary in the ROD, the ROD is placed in the Administrative Record. Subsequent to completion of the ROD, remedial design (RD) activities are initiated, followed by the implementation of the remedial action (RA).

Presumptive remedies are also part of the RI/FS process. Presumptive remedies apply to certain types of sites such as landfills which received a variety of waste types and where containment of these wastes is the preferred remedial alternative. Candidate sites for presumptive remedies should be identified early in the investigative process. Once identified, presumptive remedy sites follow the same general process as presented in Figure 3-1, but have streamlined RIs and FSs. Streamlined

RI/FS documents evaluate the sites and site dynamics, evaluate risks and bypasses the initial screening and identification of remedial alternatives other than containment.

3.2 Removal Actions

Removal actions are those actions taken to clean up or remove released hazardous substances from the environment. In addition, a removal action may also be implemented to mitigate, minimize, or prevent damage to human health and the environment from a release or threat of a release by limiting exposure to the hazardous substances (i.e., security fencing or access limitation). Removal actions are classified as either time-critical or non-time-critical. Time-critical removal actions are taken when there is an imminent threat to human health and the environment, such as corroded drums of wastes that are leaking into groundwater. Non-time-critical removal actions are defined as actions that, based on the degree of potential risk to human health and/or the environment, may be delayed for six months or more before on-site cleanup is initiated.

All removal actions currently planned at WPNSTA Yorktown are classified as non-time-critical removal actions. A removal action may be completed any time during the RI/FS process; however, it will often begin prior to the completion of the RI/FS to mitigate the spread of contamination.

Figure 3-2 shows the general process for non-time-critical removal actions. Rather than preparing an FS, an Engineering Evaluation/Cost Analysis (EE/CA) is completed which focuses only on the substances to be removed and not on all potentially contaminated media (other contaminated media will be addressed as part of the RI/FS process). Because the scope of a removal action is typically smaller than a final, full-scale remedial action, the time frames for completion of the EE/CA, related design efforts, and implementation of the removal action are much shorter than for a full scale FS. The opportunity for public involvement is similar to the FS, with a public comment period and a Removal Action Memorandum completed to document the evaluation and choice of removal action procedures. It should be noted that a removal action may become the final remedial action if the risk screening/assessment results indicate that further remediation is not required for protection of human health and the environment. Where no further action is required at a site that has undergone a

removal action, a no action ROD will be signed between the concerned parties in order to remove the site from the program.

3.3 Interim (Early) Remedial Actions

Early remedial actions are those activities which are designed to provide temporary mitigation of potential risks posed by a site until a final remedial action is selected. As with removal actions, early remedial actions usually take place prior to initiation of a full-scale FS because of the risks posed by the contamination in the area. For example, installation of a groundwater pump and treat system to control plume migration would be considered an early remedial action. Initiation of an early remedial action early in the CERCLA process might reduce costs in the long term by limiting the extent of contaminant migration.

The early remedial action process is shown in Figure 3-3. Rather than preparing an FS, a Focused FS is completed, as is an early action ROD to document the activities to be performed. Design and implementation activities follow. It should be noted that an early remedial action may become the final remedial action if the risk screening/assessment results for protection of human health and the environment indicate that further remediation is not required.

3.4 Presumptive Remedies

Presumptive Remedies help to streamline the site cleanup process by eliminating the need for initial identification and screening of alternatives during the FS. Presumptive Remedies are preferred technologies for common categories of sites based on historical patterns of remedy selection at similar types of sites. The selection of a presumptive remedy must be considered at the beginning of the RI/FS process so that particular attention can be paid to the risk evaluation, areas of potential contaminant migration and identification of hot spots.

3.5 Treatability Studies

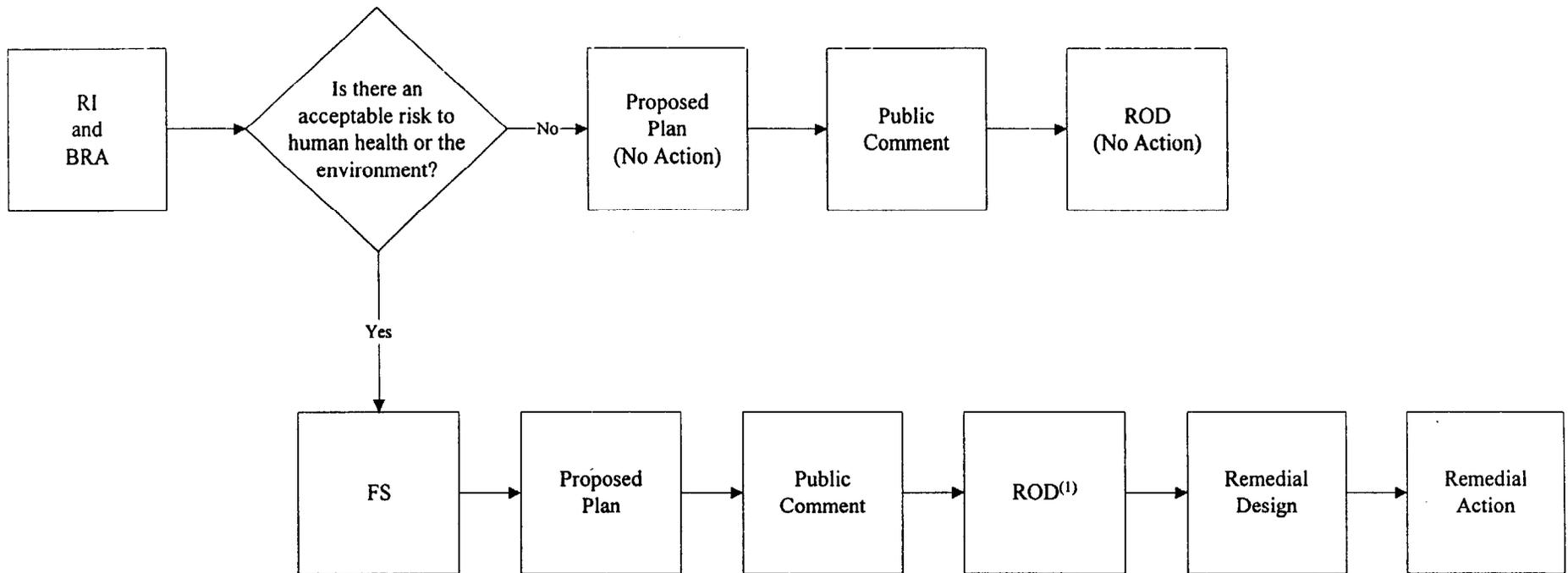
Treatability studies will be conducted prior to finalization of FS reports to better evaluate a particular technology's performance. Treatability studies are conducted to:

- Provide sufficient data to allow treatment alternatives to be fully developed and evaluated
- Support the remedial design of a selected alternative
- Reduce cost and performance uncertainties for treatment alternatives to acceptable levels to aid in remedy selection.

Treatability studies for explosives-contaminated soils will be conducted in FY 1995 concurrent with ongoing IR activities. These studies should provide data for FSs involving explosives- contaminated sites by early 1996.

SECTION 3.0 FIGURES

FIGURE 3-1
RI/FS PROCESS

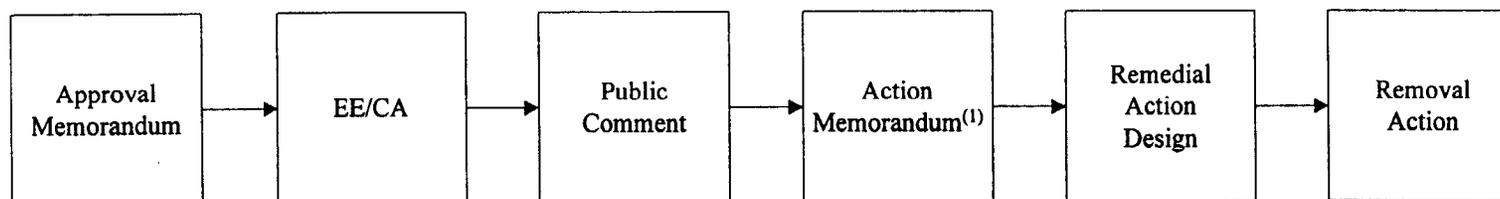


- RI = Remedial Investigation
- BRA = Baseline Risk Assessment
- FS = Feasibility Study
- ROD = Record of Decision (including Responsiveness Summary)

⁽¹⁾ Includes summary of any Interim Remedial Actions or Removal Actions for the Operable Unit.

FIGURE 3-2

NON-TIME CRITICAL REMOVAL ACTION PROCESS

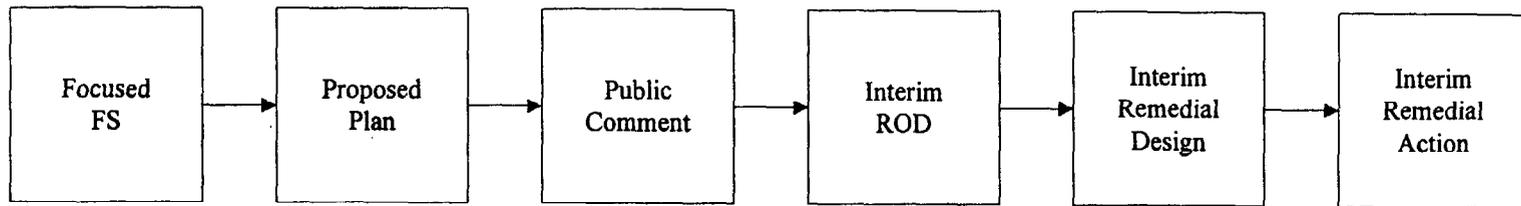


EE/CA = Engineering Evaluation/Cost Analysis

⁽¹⁾ Includes Responsiveness Summary to Public Comment.

FIGURE 3-3

INTERIM REMEDIAL ACTION PROCESS



FS = Feasibility Study
ROD = Record of Decision

4.0 SITE RANKING

The site ranking methodology has been developed to rank sites so that the worst sites, as defined by the greatest detected concentration of specific compounds (usually based on a limited amount of data), in conjunction with the compounds' toxicity, potential for human and/or ecological exposure, and potential for contaminant migration, are prioritized. This ranking methodology is a site management tool to indicate, by actual media concentrations, toxicity, potential exposure, and potential migration, which sites may pose the greatest risk to human health and/or the environment and focus study and remediation on these sites. The methodology is both quantitative and qualitative in nature, as presented in the following sections. For SSAs that have no chemical data, those closest to the boundary of the facility will be studied first to ensure that any potential off-Station contaminant migration is identified and treated, as appropriate. These areas will undergo the Site Screening Process (as defined in the FFA, Subsection 9.3). Figure 4-1 presents the points at which decisions will be made to determine the fate of each SSA (i.e., whether an RI/FS will be performed on the area, or whether the area does not pose a threat to public health, welfare, or the environment and, therefore, should be removed from further study).

4.1 Site Ranking - Quantitative Analysis

For the quantitative screening analysis, human health was evaluated by assuming that groundwater was used as tap water (both ingestion and inhalation exposure scenarios were included in the tap water determination) and soil contact was assumed to be residential (including both ingestion and dermal contact scenarios), as described in the USEPA Region IX Preliminary Remediation Goal (PRG) values (USEPA Region IX, updated biannually) (USEPA, 1994). Ecological risk was determined for the aquatic environment only (surface water and sediment), since benchmark values for terrestrial ecological risk are not readily available. Note that surface water has not been considered as tap water in the screening methodology because; 1) surface water is almost exclusively treated before use, 2) significant dilution occurs between source and intake, and 3) surface water in the vicinity of the majority of Navy sites is brackish.

To initially rank the sites, Contaminant Hazard Factors (CHF) for human health (carcinogenic and noncarcinogenic) and ecological risk were calculated. These CHF values were determined by dividing the maximum detected concentration of particular compounds in the environmental media

(soil, groundwater, surface water and/or sediment) by the corresponding, most recent USEPA Region IX PRG value, Federal Ambient Water Quality Criteria (AWQC), and/or National Oceanographic Atmospheric Administration (NOAA) sediment screening value. Appendix A presents the ratios calculated for each sampled environmental medium at each of the 16 sites at WPNSTA Yorktown.

Equations for these calculations are as follows:

Human Contaminant Hazard Factor Calculation - Groundwater

Carcinogens

$$CHF_{gwc} = \sum (C_{max} / PRG)$$

Noncarcinogens

$$CHF_{gwnc} = \sum (C_{max} / PRG)$$

where: CHF_{gwc} = Contaminant Hazard Factor, sum of groundwater carcinogenic ratios
 C_{max} = Maximum detected concentration (µg/L)
 PRG = USEPA Region IX tap water PRG (µg/L)
 CHF_{gwnc} = Contaminant Hazard Factor, sum of groundwater noncarcinogenic ratios

Human Contaminant Hazard Factor Calculation - Soil

Carcinogens

$$CHF_{ssc} = \sum (C_{max} / PRG)$$

Noncarcinogens

$$CHF_{ssnc} = \sum (C_{max} / PRG)$$

where: CHF_{ssc} = Contaminant Hazard Factor, sum of surface soil carcinogenic ratios
 C_{max} = Maximum detected concentration (mg/kg)
 PRG = USEPA Region IX residential soil PRG (mg/kg)
 CHF_{ssnc} = Contaminant Hazard Factor, sum of surface soil noncarcinogenic ratios

Ecological Contaminant Hazard Factor Calculation - Surface Water/Sediment

Surface Water

$$CHF_{sw} = \sum (C_{max} / AWQC)$$

Sediment

$$CHF_{sd} = \sum (C_{max} / NOAA)$$

where: CHF_{sw} = Contaminant Hazard Factor, sum of surface water ratios
 C_{maxsw} = Maximum detected concentration surface water (µg/L)

AWQC = Ambient Water Quality Criteria ($\mu\text{g/L}$)
CHF_{sd} = Contaminant Hazard Factor, sum of sediment ratios
C_{maxsd} = Maximum detected concentration sediment (mg/kg)
NOAA = Sediment screening value (mg/kg)

4.2 Site Ranking - Qualitative Analysis

Once the quantitative assessment was complete, a qualitative assessment addressing potential exposure and potential migration was performed. This analysis was conducted to ensure that where human and/or ecological exposure to the contaminated media exists and the potential for contaminant migration is high, these sites are investigated before sites with less potential to impact human health and the environment. This analysis was performed by asking and answering four questions regarding the potential receptors at a site and four questions regarding potential contaminant migration (the migration question was the same question asked for each environmental media: groundwater, surface soil, surface water, and sediment). Table 4-1 summarizes the initial ratios calculated and the answers to the qualitative questions.

4.2.1 Receptor Factor

The Receptor Factor (RF) was used to identify the actual and/or potentially exposed human and ecological populations at each site. The RF was determined for each of the four environmental media for which data were collected.

4.2.1.1 Groundwater

For human receptors potentially exposed to contaminated groundwater, one of the following three statements was selected to represent conditions at a particular site:

- a) Groundwater is currently used for human activities (i.e., drinking, agriculture, recreation).
- b) Groundwater is not currently used for human activities (i.e., drinking, agriculture, recreation), but may be in the future.

- c) In the future groundwater will not be used for human activities (i.e., drinking, agriculture, recreation) because of high salinity, chlorides, total suspended solids, etc.

4.2.1.2 Surface Soil

For human receptors potentially exposed to contaminated surface soil, one of the following three statements was selected to represent conditions at a particular site:

- a) There are sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) present in the area and/or the area is routinely used by non-sensitive receptors (i.e., workers, individuals undergoing training).
- b) Sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) may be to be present in the area and/or the area is occasionally used by non-sensitive receptors (i.e., workers, individuals undergoing training).
- c) Sensitive receptors (i.e., children, elderly, hospital patients, pregnant women) are not present in the area and/or the area is not used by non-sensitive receptors (i.e., workers, individuals undergoing training).

4.2.1.3 Sediment

For aquatic ecological receptors potentially exposed to contaminated sediment, one of the following three statements was selected to represent conditions at a particular site (these are the same statements used to represent the conditions for surface water receptors):

- a) Evidence exists that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist on or are near the site.

- b) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. have not yet been identified on or near the site, but may be identified in the future.
- c) It is unlikely that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist; or if they do exist, they are protected by natural conditions (e.g. hydraulic gradient, attenuation, dilution).

4.2.1.4 Surface Water

For aquatic ecological receptors potentially exposed to contaminated surface water, one of the following three statements was selected to represent conditions at a particular site:

- a) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist on or near the site.
- b) Habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. have not yet been identified on or near the site, but may be identified in the future.
- c) It is unlikely that habitats containing federal and/or state threatened or listed endangered species, wetland areas, migratory bird habitats, etc. exist; or if they exist, are protected by natural conditions (e.g. hydraulic gradient, attenuation, dilution).

4.2.2 **Migration Pathway Factor**

The Migration Pathway Factor (MPF) was used to identify the likelihood of off-site contaminant migration in any of the environmental media at the site. The MPF was determined for each media sampled at a particular site by selecting one of the following statements that applies to the sampled environmental media:

- a) There is physical evidence/analytical data indicating off-site contaminant migration.
- b) There is no current indication of off-site migration, but the potential for migration exists.
- c) Present engineering structures and/or physical/chemical properties of the detected constituents greatly restrict the potential for off-site migration.

4.2.3 Quantification of Qualitative Questions - Adjusted Ratios

Both the receptor factor and the migration pathway factor were quantified to incorporate the results of the qualitative media evaluation by adjusting the media-specific CHF to account for the influence(s) of potential human and/or ecological receptors and potential contaminant migration. Table 4-2 presents the adjusted risk ratios per sample media.

4.2.3.1 Quantification of Receptor Factor

The media-specific CHF was adjusted in the following manner to account for potential human and/or ecological receptors:

- If the selected response to the groundwater RF was (a) the carcinogenic CHF for groundwater multiplied by a factor of 100 and the noncarcinogenic CHF was multiplied by a factor of 10. If the selected response was (b) the carcinogenic CHF for groundwater was multiplied by a factor of 10 and the noncarcinogenic CHF was multiplied by a factor of 5.
- If the selected response to the surface soil RF was (a) the carcinogenic CHF for surface soil was multiplied by a factor of 100 and the noncarcinogenic CHF was multiplied by a factor of 10. If the selected response was (b) the carcinogenic CHF for surface soil was multiplied by a factor of 10 and the noncarcinogenic CHF was multiplied by a factor of 5.

- If the selected response to the surface water RF was (a) the surface water CHF was multiplied by a factor of 10. If the selected response was (b) the surface water CHF was multiplied by a factor of 5.
- If the selected response to the sediment RF was (a) the sediment CHF was multiplied by a factor of 10. If the selected response was (b) the sediment CHF was multiplied by a factor of 5.

The carcinogenic multiplier of 100 was developed to account for the target risk range for carcinogens, between 1×10^{-4} and 1×10^{-6} . The noncarcinogenic multiplier of 10 was developed using the uncertainty factor approach as defined in the USEPA's Risk Assessment Guidance for Superfund (RAGS) (USEPA, 1989). The factor of 10 was used to account for different mechanisms of action and effects on differing organ systems by various chemicals. These factors were used to ensure that sites with a greater probability of actual human exposure would rank higher than those sites at which potential or no human contact is anticipated. The ecological multiplier of 10 was included to ensure that sites impacting federal and/or state threatened or listed endangered species, wetlands, migratory bird habitats, etc. would have higher investigative priority than sites at which these habitats are not apparent (e.g., drainage ditches). The quantification values for RF responses of (b) were selected to give higher priority to those sites that have the potential to affect human health and the environment over sites that have little or no potential to affect human health or the environment.

4.2.3.2 Quantification of Migration Pathway Factor

The media-specific CHF was also adjusted to account for potential contaminant migration in the following manner:

- If the selected response to the groundwater MPF was (a), both the carcinogenic and noncarcinogenic CHF values for groundwater were multiplied by a factor of 10. If the selected response was (b), the carcinogenic and noncarcinogenic CHF values for groundwater were multiplied by a factor of 5.

- If the selected response to the surface soil MPF was (a), both the carcinogenic and noncarcinogenic CHF values for surface soil were multiplied by a factor of 10. If the selected response was (b), the carcinogenic and noncarcinogenic CHF values for surface soil were multiplied by a factor of 5.
- If the selected response to the surface water MPF was (a), the surface water CHF was multiplied by a factor of 10. If the selected response was (b), the surface water CHF was multiplied by a factor of 5.
- If the selected response to the sediment MPF was (a), the sediment CHF was multiplied by a factor of 10. If the selected response was (b), the sediment CHF was multiplied by a factor of 5.

These factors were chosen to increase the priority of those sites with evidence of, or the potential for, off-site contaminant migration, respectively.

4.3 Total Site Risk Screening Values

Table 4-3 presents the summarized, adjusted risk ratios for carcinogenic, noncarcinogenic, and ecological risks at each of the 16 sites investigated in the Round One RI. Once the adjusted values for each media were determined, carcinogenic, noncarcinogenic, and ecological adjusted ratios across media were summed. That is:

- For human health, the adjusted carcinogenic values for groundwater and soil were added for a total site carcinogenic risk screening value.
- Also for human health, the adjusted noncarcinogenic values for groundwater and soil were added for a total site noncarcinogenic risk screening value.
- For ecological risk, the adjusted surface water and sediment values were added to determine the total ecological risk screening value for each site.

For human health, the total site carcinogenic and noncarcinogenic risk screening values were determined in the following manner:

Human Health Risk Screening Value

Carcinogens

$$RSV_c = Adj_{gwc} + Adj_{ssc}$$

Noncarcinogens

$$RSV_{nc} = Adj_{gwnc} + Adj_{ssnc}$$

where: RSV_c = Total carcinogenic risk screening value (soil/groundwater)
 Adj_{gwc} = Adjusted groundwater carcinogenic value
 Adj_{ssc} = Adjusted surface soil carcinogenic value
 RSV_{nc} = Total noncarcinogenic risk screening value (soil/groundwater)
 Adj_{gwnc} = Adjusted groundwater noncarcinogenic value
 Adj_{ssnc} = Adjusted surface soil noncarcinogenic value

For ecological risk, the total site risk screening value was determined in the following manner:

Ecological Risk Screening Value

$$RSV_{eco} = Adj_{sw} + Adj_{sd}$$

where: RSV_{eco} = Total ecological risk screening value (surface water/sediment)
 Adj_{sw} = Adjusted surface water value
 Adj_{sd} = Adjusted sediment value

4.4 Site Ranking Summary

These site risk screening values were then ranked with the lowest non-zero (or non "--") value in each category (i.e., the least potential risk) receiving a score of 1. Categories with no available data were not considered in the site ranking. In this case, that particular category was normalized to ensure that all three categories were evaluated on the same relative scale. To determine this normalization factor, the number of entries from the longest column was determined and designated " N_{max} ". N_{max} was then divided by the number of entries in each of the other two columns to calculate the normalization factor for that category/column. Ranks within categories containing entries less than N_{max} were multiplied by the calculated normalization factor.

Once the ranks were normalized, the rank sum method was used to evaluate carcinogenic, noncarcinogenic, and ecological parameters together. Since these are distinctly different measurements, the actual ratios cannot be summed; rather the ranks were summed to allow for addition of unlike terms. The site with the highest sum of the normalized rank was then considered to be the worst site based on chemical concentration, toxicity, and exposure. Table 4-4 lists the sites in order of rank on a worst-first priority basis.

4.5 Site and SSA Investigation Prioritization

With the exception of Site 22 (for which no analytical data are available), the above ranking system was used to aid in the prioritization of investigation activities at WPNSTA Yorktown within the SMP. Site 22 could potentially be a source of contamination to the unnamed stream which lies between Sites 4 and 21 and flows past Site 22. The unnamed stream flows into Felgates Creek. As a result, Site 22 was prioritized with Sites 4 and 21.

RI/FS report writing is currently underway for Sites 6, 7, and 12. These reports, generated during FY 1995, are, or will soon be under review by USEPA Region III and the Commonwealth of Virginia. A No Further Remedial Action ROD with institutional controls has been signed by all parties for Site 16/SSA 16. A Post Removal Confirmatory Sampling Report and Baseline Risk Assessment has been finalized for Sites 4 and 21. In addition to these activities, the field investigation, RI/FS report writing, PRAP and ROD preparation for Sites 9 and 19 have been funded in FY 1995. The work plan, field investigation, RI/FS report writing, PRAP and ROD preparation for Sites 1 and 3 have also been added to FY 1995 funded activities.

Site ranking (presented in Section 4.4) and additional factors, such as current funding allocation, completion of removal actions, proximity of sites to one another, and sites having similar physical characteristics have been considered to prioritize the investigation of the remaining sites. The following list presents the order in which the sites currently are planned to be investigated during FY 1996 and FY 1997:

- Sites 1 and 3 - Work Plan, Field Investigation, Round Two RI/FS reports (based on site ranking, proximity to one another, and proximity to Felgates Creek)

- Sites 4, 21, and 22 - Work Plan, Field Investigation, Round Two RI/FS reports (based on the results, of the Round One RI, removal action confirmatory sampling results and conclusions of the supplemental RI Report).
- Sites 11 and 17 - Work Plan, Field Investigation, Round Two RI/FS reports (based on site ranking, proximity to one another, and proximity to Felgates Creek)
- Site 2 - Work Plans, Field Investigation, Round Two RI/FS reports (based on site ranking and proximity to Felgates Creek)
- Sites 8 and 18 - Work Plan, Field Investigation, Round Two RI/FS reports (based on site ranking and physical similarities of these sites)

Analytical data are available for SSAs 1, 2, 6, 7, 15, 17, 18, and 19. These SSAs are currently being subjected to the SSP. The SSAs which are to be retained for further investigation based on the outcome of the SSP will be ranked accordingly using the site ranking system. SSA 20 (Lee Pond) and SSA 21 (Roosevelt Pond) data also are available. Therefore, SSAs 20 and 21 also will be evaluated using site ranking even though the data have not been subjected to the SSP.

There are insufficient data to rank the remaining SSAs in the same manner as the IRP sites so SSAs closest to the border of the facility will be investigated first. The order for the SSA investigations is:

- SSAs 8, 11, 12, and 13 - (SSA 12 soil investigated in 1994)
- SSAs 3, 9, and 14
- SSAs 4, 5, and 10
- SSA 20
- SSA 21

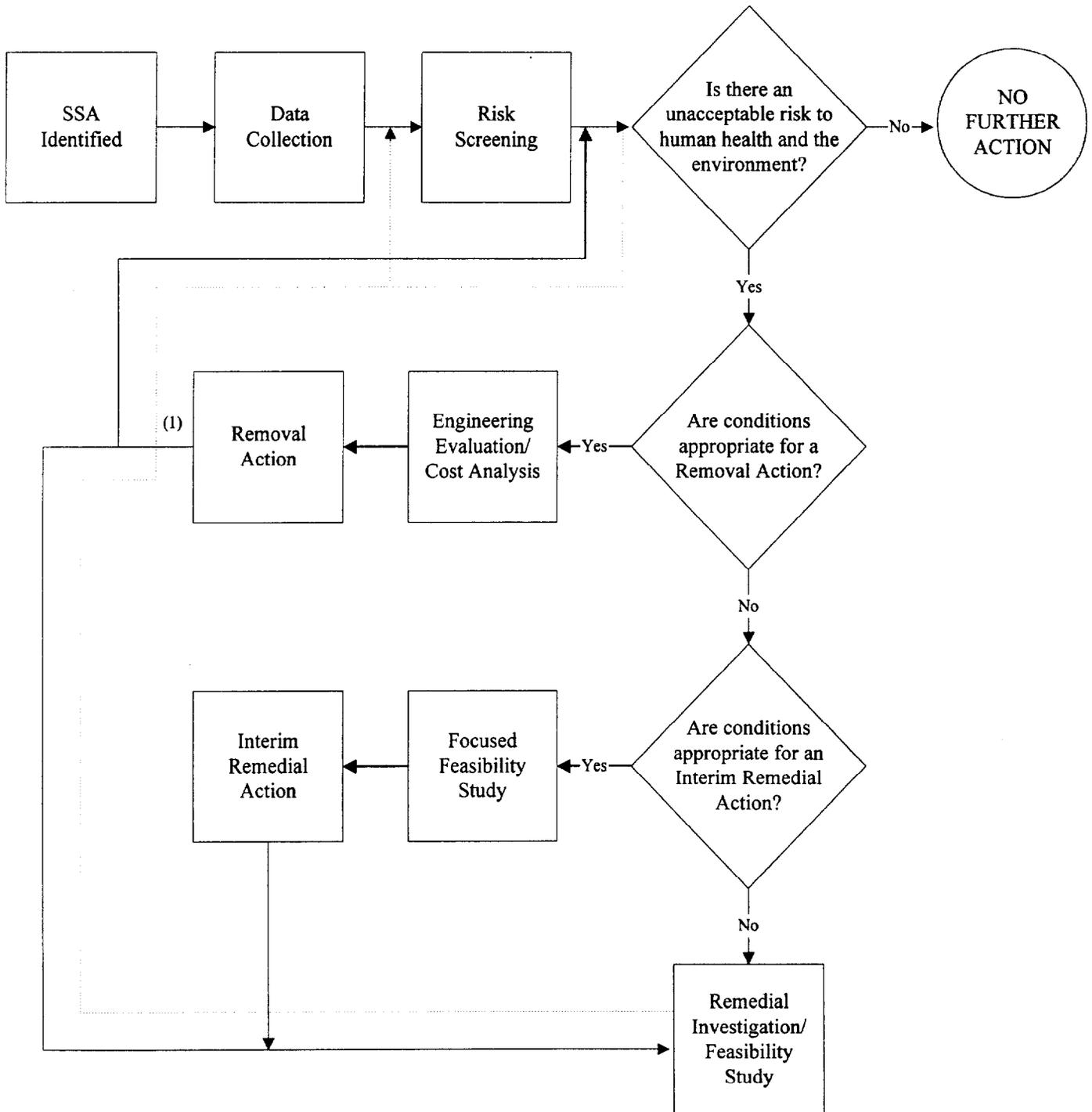
The order in which SSA 20 is to be investigated may change pending the results of site ranking. However, SSA 20 is potentially affected by contamination present at Sites 9 and 19 or Site 18 and storm water runoff from the industrial area. Regardless of the results of site ranking, SSA 20 will be investigated only after Sites 9, 18, and 19 are investigated and potential sources to SSA 20 are identified.

The order in which SSA 21 is to be investigated also may change pending the results of site ranking. However, SSA 21 is potentially affected by contamination present at SSAs 4, 5, and 12 and stormwater runoff from the industrial area. Regardless of the results of site ranking, SSA 21 will be investigated only after SSAs 4, 5, and 12 are investigated and potential sources to SSA 21 are identified.

SECTION 4.0 FIGURES

FIGURE 4-1

KEY DECISION POINTS DURING THE SITE SCREENING AND RI/FS PROCESSES



(1) Steps taken following the Removal Action will depend on the point at which the action is taken during the site screening and RI/FS processes.

SECTION 4.0 TABLES

TABLE 4-1

SUMMARY OF INITIAL RATIOS AND ANSWERS TO QUALITATIVE QUESTIONS
 SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
 NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

SITE NO.	Groundwater				Soil				Sediment			Surface Water		
	CAR	NON	RF	MPF	CAR	NON	RF	MPF	ECO	RF	MPF	ECO	RF	MPF
1	7,293.33	17.30	c	a	24.50	0.37	b	c	13.14	a	b	98.75	a	b
2	2,437.02	14.05	c	b	--	--	--	--	36.59	a	a	7.02	a	a
3	1,307.48	75.51	c	a	6.02	0.50	b	b	--	--	--	1.00	a	b
4	1,464.11	35.63	c	a	25.43	4.00	b	b	681.62	a	a	543.58	a	a
5	--	--	--	--	14.00	--	b	c	--	--	--	--	--	--
6	333.25	7.16	c	b	6.81	0.11	b	b	44.57	a	a	47.13	a	b
7	5,573.82	68.65	c	b	4.12	0.47	b	b	23.58	a	b	67.70	a	b
8	313.20	8.83	c	b	4.19	0.20	b	b	15.48	a	b	10.49	a	b
9	1,290.90	119.91	c	a	24.08	1.85	b	b	296.06	a	b	6.19	a	a
11	1,890.51	7.28	c	b	--	0.03	b	b	1.20	a	b	238.40	a	b
12	34.18	29.55	c	a	52.90	6.26	b	b	815.65	a	b	508.59	a	a
16	776.92	25.66	c	a	13.24	2.21	b	b	6.55	a	b	391.05	a	b
17	2,470.95	23.60	c	b	71.69	2.23	c	b	--	--	--	--	--	--
18	378.67	74.62	c	c	--	--	b	c	7.88	a	b	16.61	a	b
19	0.03	20.16	c	a	35.49	3.24	b	a	248.14	a	a	--	--	--
21	1,033.04	166.10	c	b	31.11	4.30	a	b	--	--	--	--	--	--

Notes: CAR Carcinogenic values RF Receptor factor
 NON Noncarcinogenic values MPF Migration pathway factor
 ECO Ecological values -- Not detected or not analyzed

a, b, c - defined on pages 4-6 and 4-7

TABLE 4-2

**ADJUSTED RISK RATIOS PER MEDIA
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA**

SITE NO.	Groundwater		Soil		Sediment	Surface Water
	adj-CAR	adj-NON	adj-CAR	adj-NON	adj-ECO	adj-ECO
1	72,933.33	172.97	244.97	1.85	657.00	4,937.50
2	12,185.10	70.25	--	--	3,659.00	702.00
3	13,074.80	751.10	301.00	12.50	--	50.00
4	14,641.10	356.30	1,271.50	99.98	68,162.00	54,358.20
5	--	--	140.00	--	--	--
6	1,666.25	35.80	340.50	2.75	4,457.20	2,356.50
7	27,869.10	343.25	206.15	11.75	1,178.75	3,385.35
8	1,566.02	44.15	209.65	5.10	774.05	524.25
9	12,908.96	1,199.10	1,204.20	46.25	14,802.80	619.00
11	9,452.55	36.40	--	0.75	60.00	11,919.85
12	341.80	295.50	2,645.20	156.50	40,782.50	50,859.30
16	7,769.20	256.60	661.85	55.25	327.50	19,552.40
17	12,354.75	117.99	358.45	11.15	--	--
18	378.67	74.62	--	--	393.85	830.25
19	0.30	201.60	3,549.30	161.95	24,814.10	--
21	5,165.20	830.48	15,555.00	215.00	--	--

Notes: adj-CAR Adjusted carcinogenic values
adj-NON Adjusted noncarcinogenic values
adj-ECO Adjusted ecological values
-- Not detected or not analyzed

TABLE 4-3

**SUMMARY OF TOTAL ADJUSTED RISK RATIOS
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA**

SITE NUMBER	CARCINOGENS	NONCARCINOGENS	ECOLOGICAL
1	73,178	175	5,594
2	12,185	70	4,361
3	13,376	768	50
4	15,913	456	122,520
5	140	--	--
6	2,007	39	6,814
7	28,075	355	4,564
8	1,776	49	1,298
9	14,113	1,245	15,422
11	9,453	37	11,980
12	2,987	452	91,642
16	8,431	312	19,880
17	12,713	129	--
18	379	75	1,224
19	3,550	364	24,814
21	20,720	1,045	--

-- Not detected or not analyzed

TABLE 4-4

SITE RANKING
SITES 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 16, 17, 18, 19, AND 21
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Site Number	Ranking						Sum of Rank	Sites in Order of Rank
	CAR	Norm. CAR	NON	Norm. NON	ECO	Norm. ECO		
1	16	16	7	7	6	7	30	Site 4 (42)
2	9	9	4	4	4	5	18	Site 9 (39)
3	11	11	13	14	1	1	26	Site 12 (32)
4	13	13	12	13	13	16	42	Site 7 (31)
5	1	1	--	0	--	0	1	Site 19 (31)
6	4	4	2	2	7	9	15	Site 1 (30)
7	15	15	9	10	5	6	31	Site 21 (29)
8	3	3	3	3	3	4	10	Site 16 (28)
9	12	12	15	16	9	11	39	Site 3 (26)
11	8	8	1	1	8	10	19	Site 11 (19)
12	5	5	11	12	12	15	32	Site 2 (18)
16	7	7	8	9	10	12	28	Site 17 (16)
17	10	10	6	6	--	0	16	Site 6 (15)
18	2	2	5	5	2	2	9	Site 8 (10)
19	6	6	10	11	11	14	31	Site 18 (10)
21	14	14	14	15	--	0	29	Site 5 (1)

Notes: CAR Ranking of carcinogenic scores
NON Ranking of noncarcinogenic scores
ECO Ranking of ecological scores
Norm. Normalized scores
-- Not detected or not analyzed

5.0 SITE MANAGEMENT PLAN SCHEDULES

This section presents the project schedules for the sites and SSAs identified in Section 2.0 and prioritized in Section 4.0. Schedules depicting the major project activities for each site and SSA are provided. In addition, specific submittal deadlines planned for fiscal years 1995 and 1996 have been developed. Appendix B presents actions (removal actions and finalized reports) which have been completed. Appendix C presents sites and SSAs that will undergo removal actions. Appendix D presents the detailed schedules for activities that were funded in FY 1994/1995. Appendix E presents detailed schedules for those activities funded during FY 1995/1996. Detailed master schedules for sites potentially undergoing RI, Baseline Risk Assessment, or FS activities in FY 1996 are included in Appendix F and activities in FY 1997 are included in Appendix G. Appendix H presents summary schedules, including target dates, for all activities scheduled to begin after FY 1997.

5.1 Scheduling Assumptions

Assumptions regarding document review periods and deviations from the FFA are discussed in the following sections.

5.1.1 Federal Facility Agreement Assumptions

RI/FS and RD/RA deliverables are classified as "primary" or "secondary" documents in the FFA, as shown in Table 5-1. A primary document is typically a major, discrete portion of an RI/FS or RD/RA activity, whereas a secondary document may be a discrete portion of a primary document or may serve as a feeder document to a primary document. The project schedules have been developed using the primary and secondary document review and comment process specified in the FFA. This process is summarized in Table 5-2.

The time required for review will vary according to the length and complexity of the document. In an effort to expedite document finalization, the draft document review period has been decreased from the FFA 60-day duration to a 30-day period for the secondary documents listed below:

- Treatability Study Work Plan
- Treatability Study Report
- Engineering Evaluation/Cost Analysis Report
- Removal Action Memorandum

These secondary documents are expected to be short in length and relatively straightforward in nature compared to the other primary and secondary documents.

5.1.2 Document Preparation, Field Investigation, and Sample Analysis/Validation Assumptions

Durations for work plan preparation and field investigation activities have been based on the available information for the sites, while taking into account the overall complexity of each area (e.g., size, media types, potential receptors, proximity to other sites). The sampling efforts needed to support RI/FS activities (i.e., required to fill existing risk-, hydrogeologic-, and engineering-related data gaps) also were taken into account. These factors will be more thoroughly evaluated during development of the work plans.

Work Plan development, field investigation, and sample analysis/validation activities for the sites and SSAs have been combined to optimize coordination of these efforts (e.g., document review, field mobilization/demobilization, database management). The site/SSA groupings and estimated work plan (both RI and SSP) and field investigation durations are summarized in Table 5-3.

The work plan durations represent the estimated time required to generate the first draft document (referred to as the Preliminary Draft). The field investigation durations include the time required for subcontractor procurement and mobilization of equipment and personnel.

With respect to sample analysis, a 28-day duration is the contractual turnaround time for NEESA-approved laboratories. Thirty days, however, is a more realistic estimate for receipt of analytical data. Therefore, 30 days was assumed for receipt of all laboratory analyses. For data validation, a 14-day duration was assumed for all analytical data, which is also the standard turnaround time for the data validation firms currently under contract with Baker.

For preparation of other RI/FS and RD/RA documents, "typical" or "average" durations were assumed based on prior experience in preparing these reports. Assumptions concerning document preparation are outlined in Table 5-4. More accurate estimates of document preparation times can be made in subsequent SMPs as more data become available; estimates will be updated in each site-specific work plan.

5.2 Site Management Plan (SMP) Schedules

This section presents the proposed activities and schedules for the sites and SSAs identified in Section 2.0 and prioritized in Section 4.0 of the SMP. Figure 5-1 presents the overall schedules for completion of activities FY 1999. Figure 5-2 presents schedules and deliverable dates for IR Program activities from FY 1996 through FY 1997. Figure 5-3 presents schedules and deliverable dates for IR Program activities from FY 1998 through FY 1999. Appendix C presents the schedules for removal actions. Detailed SMP schedules for the RI/FS/RD activities are presented in Appendix D for work funded during or prior to 1994. Appendices E, F, and G presents detailed SMP schedules for RI/FS/RD activities funded (or to be funded) during FY 1995, FY 1996, and FY 1997. Appendix E also presents a detailed schedule for ongoing soil treatability study work. Appendix H presents detailed schedules for those activities to be funded in FY 1998 and beyond.

The basic strategy employed during development of the SMP schedules was to overlap the RI/FS and RD/RA activities to the maximum extent practicable in order to compress the entire project schedule. The amount of overlap was based on the degree of dependency between the various tasks and documents. Key dependencies and related assumptions are outlined below.

- Remedial Investigation: Preparation of the Preliminary Draft RI was assumed to start once all the analytical data are received prior to completion of data validation. Certain RI tasks can begin before the data are validated; to prevent duplication of effort, this overlap was assumed to be two weeks.
- Feasibility Study: Many FS tasks are dependent on the nature and extent of contamination which is determined in the RI document. Preparation of the

Preliminary Draft FS was assumed to start approximately two months following the start of the RI for those future sites which require an FS.

- **Proposed Plan:** Preparation of the Preliminary Draft Proposed Plan was assumed to start at the same time as work on the FS. For those sites which require an FS, the PRAP may start one week later than the FS depending on the complexity of the FS. As comments are received from USEPA and the Commonwealth of Virginia on the FS, modifications to the PRAP will be made concurrently.
- **Public Comment Period:** The 45 day public comment period on the PRAP will begin when the final PRAP is submitted. Public comments on the PRAP can then be considered and addressed in the Responsiveness Summary section of the ROD.
- **Record of Decision:** Preparation of the ROD will generally begin approximately two months after the start of the FS and PRAP. The final ROD will incorporate all public comments received during the Public Comment Period.
- **Remedial Design:** The RD was assumed to start when the Final PRAP is submitted. Full scale preparation of the RD will; however, not begin until concurrence with the selected alternative(s) is obtained.

5.2.1 Proposed Removal Actions

Removal actions are currently planned for SSAs 3 and 7 in FY 1996.

The removal action planned for SSA 3 involves removal of the fire training pits. The removal action at SSA 7 involves removal of surficial source material(s). Schedules for these removal actions are presented in Appendix C.

5.2.2 RI/FS and RD/RA Schedules

The prioritization of remedial investigation activities at the 17 RI/FS sites and the site screening process activities at the 21 SSAs has been presented in Section 4.0. Appendix C through Appendix G present detailed schedules, including submittal deadlines and target dates, for the activities beginning in FY 1994 through FY 1997 through their completion. Table 5-5 presents primary and secondary deliverables by month.

5.2.3 Treatability Study Schedule

Treatability studies are planned for nitramine-contaminated soil present at Sites 6, 7, and 19 to support selection of a remedial technology, should remedial action be required for these and other explosives contaminated sites. The proposed schedule for treatability studies being conducted by the U.S. Army Corps of Engineers Waterways Experiment Station (WES) in Vicksburg, Mississippi is presented in Appendix E, in Figure E-1. A Draft Treatability Study Work Plan has been completed by WES and bench scale treatability study work continues.

Treatability studies using white rot fungus also will be conducted by Mycotech Corporation beginning in FY 1995 and concluding in FY 1996. Schedules are, however, not currently available for this treatability study. Schedules for the white rot studies will be provided in the Draft Final FY 96/97 SMP.

WES, Navy, USEPA Region III, and Baker personnel selected the following remediation technologies for investigation by WES using bench scale reactors:

- Anaerobic Bioslurry
- Anaerobic Biocell
- Aerobic Bioslurry
- Aerobic Biocell
- Slurry Oxidation (SlurOx)

The WES treatability study is divided into seven phases that entail soil sample selection and preparation (Phase I), microbial systems evaluation (Phase II), desorption enhancement evaluation using surfactants (Phase III), bioslurry bench studies and biocell bench studies (Phases IV and V), slurox bench studies (Phase VI) and report preparation (Phase VII). Phase I is expected to take approximately 2 months. Phases II and III will be performed concurrently and should take 3 months to complete. Phase IV will take an additional 6 months to complete. Phases V and VI will run concurrently with Phase IV (approximately 7 to 8 months). Finally, Phase VII is expected to take one month for an accumulative time requirement of 14 months.

WES provides monthly updates to the Navy during the bench scale treatability study. Baker will continue to compile the monthly progress reports and generate quarterly reports for USEPA Region III and Commonwealth of Virginia review while the treatability study is ongoing. Quarterly reports will allow for the evaluation of each technology and, should these technologies prove to be effective, FS reports will be developed to implement one of the technologies. If one of the bioremediation technologies is selected as a remedial alternative for one of the explosives contaminated sites, a ROD will be developed that identifies one of the bioremediation technologies as the remedial alternative and a proven technology as a backup alternative. A pilot scale study for the selected technology will be proposed during the design phase and will be necessary to determine how bioremediation technologies may be affected by site specific conditions. Sites for which bioremediation technologies will be proposed first include Sites 6, 7, 9, and 19. FS reports for Sites 6 and 7 closely coincide with the issuance of the WES draft treatability study report in 1996.

5.2.4 Presumptive Remedies

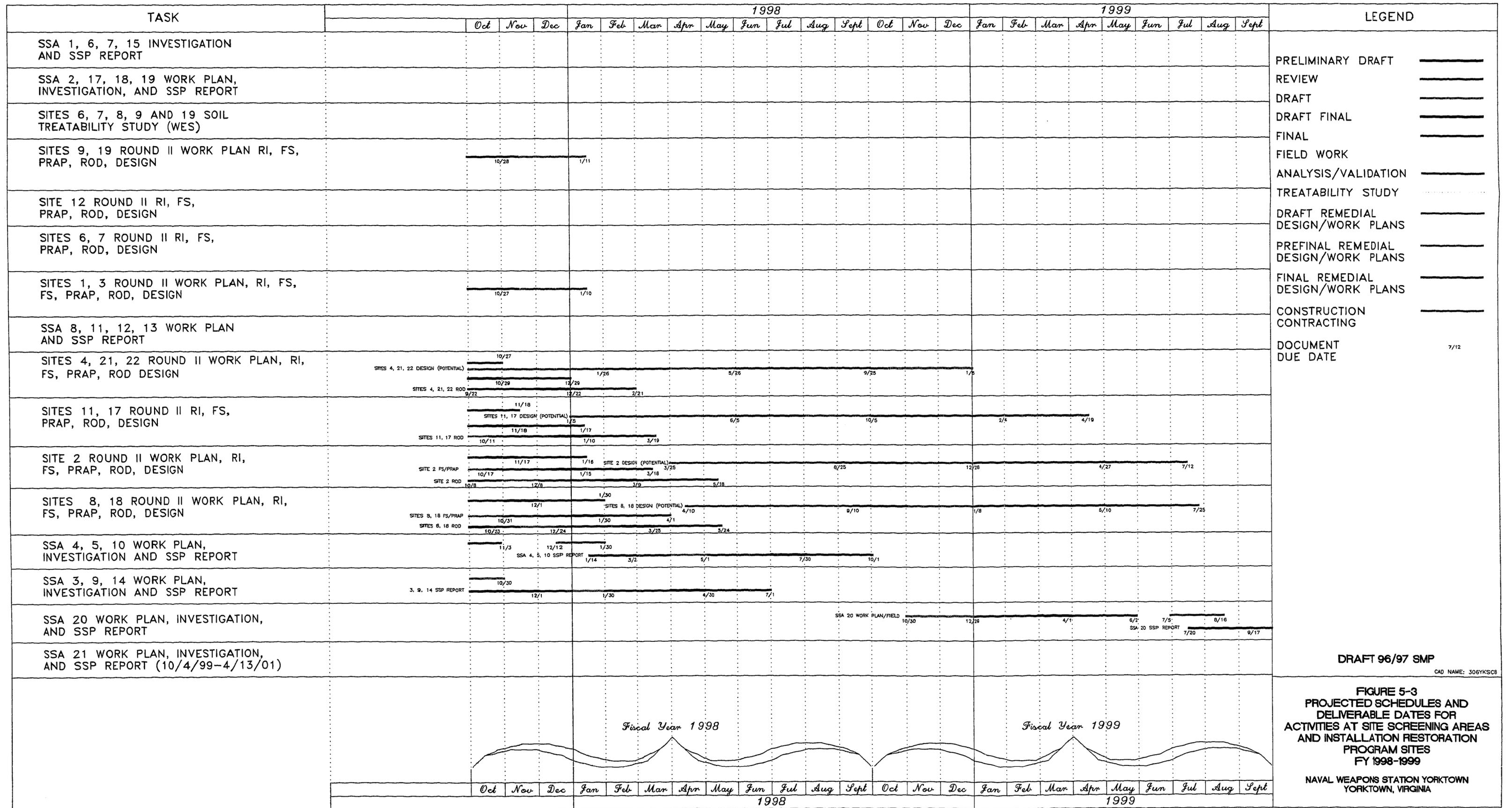
Presumptive remedies are preferred technologies for common categories of sites based on historical patterns of remedy selection and USEPA's scientific and engineering evaluation of performance data on technology implementation. The objective of presumptive remedies is to use past agency experience to streamline site investigation and speed up selection of cleanup actions by eliminating the need for the initial identification and screening of alternatives during the FS.

Presumptive remedies evolve from the expectation that containment will be the likely focus at sites having wastes that pose relatively low, long-term threats or where treatment is impracticable. Presumptive remedies typically apply to municipal and CERCLA landfills as types of sites where treatment of the waste may be impractical because of their size and the heterogeneity of their contents.

Several sites at WPNSTA, Yorktown could potentially be candidate sites for presumptive remedies. These sites include Site 1, the former Dudley Road Landfill; Site 2, the Former Turkey Road Landfill; Site 4, the Weapons Casing/Drum Disposal Area; and Site 21, the Battery and Drum Disposal Area.

The potential use of a presumptive remedy at these sites will also be evaluated in FY 1996, or FY 1997 as RI/FS efforts are completed.

SECTION 5.0 FIGURES



SECTION 5.0 TABLES

TABLE 5-1

**PRIMARY AND SECONDARY DOCUMENTS AS DEFINED IN THE FFA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA**

Primary Documents	Secondary Documents
Site Screening Process Work Plans	Health and Safety Plans
Site Screening Process Reports	Non-Time Critical Removal Action Plans
RI/FS and FFS Work Plans	Pilot/Treatability Study Work Plans
Remedial Investigation Reports	Pilot/Treatability Study Reports
FS and FFS Reports	N/A
Proposed Plans	Engineering Evaluation/Cost Analysis Reports
	Well Closure Methods and Procedures
Final Remedial Designs	N/A
Remedial Action Work Plans <ul style="list-style-type: none"> • Remedial Action Sampling Plan • Remedial Action Construction Quality Assurance Plan • Remedial Action Environmental Monitoring Plan 	Preliminary Conceptual Design or Equivalent Documents
Remedial Action Completion Reports	Prefinal Remedial Designs
Operation and Maintenance Plans	Periodic Review Assessment Reports
Site Management Plan	Removal Action Memorandums
Community Relations Plan (for submission only)	N/A
Long-Term Remedial Action Monitoring Plan (for submission only)	N/A

RI/FS = Remedial Investigation/Feasibility Study

FFS = Focused Feasibility Study

N/A = Not Applicable

TABLE 5-2

**PRIMARY AND SECONDARY DOCUMENT REVIEW PROCESS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA**

Primary Document	Review Duration	Secondary Document	Review Duration
Draft Document	60 Days	Draft Document	60 Days
Incorporation of Comments	60 Days*	Incorporation of Comments	30 Days
Draft Final Document	30 Days**	N/A	
Final Document		Final Document	

N/A - Not Applicable

* Although the FFA provides 60 days for the incorporation of comments on draft documents, schedules presented herein provide 30 days. Thirty days is considered to be sufficient for incorporation of EPA/State comments.

** If comments are adequately addressed in the draft final document, the final document will be submitted one week following receipt of USEPA's and Commonwealth of Virginia's "No additional comments at this time" letter.

TABLE 5-3

**ESTIMATED WORK PLAN AND FIELD INVESTIGATION DURATIONS FOR SITES AND SSAs
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA**

Site No.	Work Plan Duration (Months)	Field Investigation (Months)	SSA No.	Work Plan Duration (Months)	Field Investigation (Months)
6, 7, 12, 16, SSA 16	2	5	1, 6, 7, 15	1.5	1.5
9, 19	2	2	2, 17, 18, 19	1.5	1.5
1, 3	2	1.5	8, 11, 12, 13	1.0	1.5
4, 21, 22	2	1.5	4, 5, 10	1.0	1.5
2	2	1.5	3, 9, 14	1.0	1.5
11, 17	2	1.5			
8, 18	2				

Notes: For all SSAs, a geophysical investigation was assumed to occur during work plan development to aid in the selection of sample locations.

TABLE 5-4

**DOCUMENT PREPARATION DURATIONS
NAVAL WEAPONS STATION YORKTOWN,
YORKTOWN, VIRGINIA**

Document	Duration (Months) ⁽¹⁾
Site Screening Area Report	2
Remedial Investigation Report	2
Feasibility Study	2
Proposed Plan	2
Record of Decision	1
Draft Remedial Design/Work Plans	5
Prefinal Remedial Design/Work Plan	2
Final Design/Work Plan	2
Engineering Evaluation/Cost Analysis	2
Removal Action Memorandum	1
30% Removal Action Design	1
90% Removal Action Design	2
Final Removal Action Design	1
Treatability Study Work Plan	2
Treatability Study Report	1

⁽¹⁾ Durations represent estimated time required to complete Preliminary Draft Documents.

TABLE 5-5

FINAL 1996/1997 SITE MANAGEMENT PLAN
 PRIMARY AND SECONDARY DELIVERABLES BY MONTH
 WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
October 13, 1995 October 20, 1995	291 311	Site 16/SSA 16 Site 12	RI/FS RI/FS	Final ROD Draft PRAP	NA December 20, 1995
November 8, 1995 November 16, 1995 November 17, 1995	228 302 297	SSAs 1,6,7,15 SSAs 2,17,18,19 Sites 4 & 21	Site Screening Process Site Screening Process Confirmation Sampling and Baseline Risk Assessment	Draft Final SSP Report Draft Final SSP Report Final Post Removal Conformational Sampling Report and Baseline Risk Assessment	January 31, 1996 January 31, 1996 NA
December 13, 1995 December 15, 1995	318 320	Sites 1 & 3 SSAs 8,11,12,13	Work Plan Work Plan	Draft Final Work Plan Draft Work Plan	February 1, 1996 February 13, 1996
January 30, 1996	319	Sites 6 & 7	Work Plan	Draft Work Plan Letter Addendum	February 6, 1996
February 12, 1996 February 29, 1996	319 318	Sites 6 & 7 Sites 1 & 3	Work Plan Work Plan	Final Work Plan Letter Addendum Final Work Plan	NA NA
March 5, 1996 March 6, 1996 March 13, 1996 March 31, 1996 March 31, 1996	334 306 320 228 302	Sites 9 & 19 NA SSAs 8,11,12,13 SSAs 1,6,7,15 SSAs 2,17,18,19	RI/FS Site Management Plan Work Plan Site Screening Process Site Screening Process	Draft RI Final 96/97 SMP Final Work Plan Final SSP Report Final SSP Report	May 6, 1996 NA NA NA NA
April 11, 1996 April 12, 1996 April 19, 1996 April 26, 1996 April 29, 1996 April 30, 1996	311 320 311 311 311 209	Site 12 SSAs 8,11,12,13 Site 12 Site 12 Site 12 NA	RI/FS Site Screening Process RI/FS RI/FS RI/FS Treatability Study	Draft Final RI Draft SSP Report Draft Final FS Draft Final PRAP Draft ROD Draft WES Bench-Scale Treatability Study Report	May 13, 1996 June 11, 1996 May 20, 1996 May 27, 1996 June 20, 1996 May 29, 1996
May 1, 1996 May 8, 1996 May 24, 1996 May 27, 1996 May 31, 1996	334 334 319 334 311	Sites 9 & 19 Sites 9 & 19 Sites 6 & 7 Sites 9 & 19 Site 12	RI/FS RI/FS RI/FS RI/FS RI/FS	Draft FS Draft PRAP Draft RI Draft ROD Final RI	July 1, 1996 July 8, 1996 July 23, 1996 July 25, 1996 NA

TABLE 5-5 (Continued)

FINAL 1996/1997 SITE MANAGEMENT PLAN
 PRIMARY AND SECONDARY DELIVERABLES BY MONTH
 WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
June 3, 1996	311	Site 12	RI/FS	Final FS	NA
June 5, 1996	311	Site 12	RI/FS	Final PRAP	NA
June 5, 1996	334	Sites 9 & 19	RI/FS	Draft Final RI	July 5, 1996
June 12, 1996	209	NA	Treatability Study	Final WES Bench-Scale Treatability Study Report	NA
June 13, 1996	351	NA	Site Management Plan	Draft 97/98 SMP	August 12, 1996
June 22, 1996	354	Sites 11 & 17	Work Plan	Draft Work Plan	August 21, 1996
June 24, 1996	349	Sites 4,21,22	Work Plan	Draft Work Plan	August 23, 1996
June 29, 1996	318	Sites 1 & 3	RI/FS	Draft RI	August 29, 1996
July 5, 1996	311	Site 12	RI/FS	Draft Final ROD	August 5, 1996
July 11, 1996	320	SSAs 8,11,12,13	Site Screening Process	Final SSP Report	NA
July 31, 1996	318	Sites 1 & 3	RI/FS	Draft FS	September 29, 1996
July 31, 1996	318	Sites 1 & 3	RI/FS	Draft PRAP	September 29, 1996
August 1, 1996	334	Sites 9 & 19	RI/FS	Draft Final FS	September 2, 1996
August 5, 1996	334	Sites 9 & 19	RI/FS	Final RI	NA
August 8, 1996	334	Sites 9 & 19	RI/FS	Draft Final PRAP	September 9, 1996
August 15, 1996	311	Site 12	RI/FS	Final ROD	NA
August 21, 1996	319	Sites 6 & 7	RI/FS	Draft Final RI	September 19, 1996
August 26, 1996	334	Sites 9 & 19	RI/FS	Draft Final ROD	September 25, 1996
August 27, 1996	319	Sites 6 & 7	RI/FS	Draft FS	October 25, 1996
August 30, 1996	-	Site 2	Work Plan	Draft Work Plan	October 29, 1996
September 3, 1996	319	Sites 6 & 7	RI/FS	Draft PRAP	November 1, 1996
September 12, 1996	351	NA	Site Management Plan	Draft Final 97/98 SMP	October 14, 1996
September 20, 1996	354	Sites 11 & 17	Work Plan	Draft Final Work Plan	October 19, 1996
September 20, 1996	349	Sites 4,21,22	Work Plan	Draft Final Work Plan	October 23, 1996
September 23, 1996	318	Sites 1 & 3	RI/FS	Draft Final RI	October 29, 1996
September 23, 1996	318	Sites 1 & 3	RI/FS	Draft ROD	November 29, 1996
September 29, 1996					
September 29, 1996					

TABLE 5-5 (Continued)

FINAL 1996/1997 SITE MANAGEMENT PLAN
 PRIMARY AND SECONDARY DELIVERABLES BY MONTH
 WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
October 2, 1996	334	Sites 9 & 19	RI/FS	Final FS	NA
October 3, 1996	-	Sites 8 & 18	Work Plan	Draft Work Plan	December 2, 1996
October 9, 1996	334	Sites 9 & 19	RI/FS	Final PRAP	NA
October 18, 1996	319	Sites 6 & 7	RI/FS	Final RI	NA
October 25, 1996	334	Sites 9 & 19	RI/FS	Final ROD	NA
October 29, 1996	318	Sites 1 & 3	RI/FS	Draft Final FS	November 30, 1996
October 29, 1996	318	Sites 1 & 3	RI/FS	Draft Final PRAP	November 30, 1996
November 1, 1996	-	Site 12	Remedial Design	Draft Design	January 2, 1997
November 16, 1996	319	Sites 6 & 7	RI/FS	Draft ROD	January 14, 1997
November 19, 1996	354	Sites 11 & 17	Work Plan	Final Work Plan	NA
November 19, 1996	349	Sites 4,21,22	Work Plan	Final Work Plan	NA
November 19, 1996	319	Sites 6 & 7	RI/FS	Draft Final FS	December 27, 1996
November 22, 1996	-	Site 2	Work Plan	Draft Final Work Plan	December 30, 1996
November 22, 1996	318	Sites 1 & 3	RI/FS	Final RI	NA
November 25, 1996					
November 29, 1996					
November 30, 1996					
December 2, 1996	319	Sites 6 & 7	RI/FS	Draft Final PRAP	December 31, 1996
December 28, 1996	318	Sites 1 & 3	RI/FS	Final FS	NA
December 28, 1996	318	Sites 1 & 3	RI/FS	Final PRAP	NA
December 30, 1996	318	Sites 1 & 3	RI/FS	Draft Final ROD	January 27, 1997
January 3, 1997	-	Sites 8 & 18	Work Plan	Draft Final Work Plan	February 3, 1997
January 17, 1997	351	NA	Site Management Plan	Final 97/98 SMP	NA
January 24, 1997	319	Sites 6 & 7	RI/FS	Final FS	NA
January 29, 1997	319	Sites 6 & 7	RI/FS	Final PRAP	NA
January 29, 1997	-	Site 2	Work Plan	Final Work Plan	NA
February 12, 1997	319	Sites 6 & 7	RI/FS	Draft Final ROD	March 12, 1997
February 25, 1997	-	Sites 1 & 3	Remedial Design	Draft Design	April 28, 1997
February 28, 1997	-	SSAs 3,9,14	Work Plan	Draft Work Plan	April 29, 1997
February 28, 1997	-	Sites 9 & 19	Remedial Design	Draft Design	April 29, 1997
March 3, 1997	-	Site 12	Remedial Design	Draft Final Design	May 2, 1997
March 5, 1997	-	Sites 8 & 18	Work Plan	Final Work Plan	NA

TABLE 5-5 (Continued)

FINAL 1996/1997 SITE MANAGEMENT PLAN
 PRIMARY AND SECONDARY DELIVERABLES BY MONTH
 WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
April 10, 1997	319	Sites 6 & 7	RI/FS	Final ROD	NA
May 28, 1997 May 29, 1997	349 -	Sites 4,21,22 SSAs 3,9,14	RI/FS Work Plan	Draft RI Draft Final Work Plan	July 28, 1997 June 30, 1997
June 2, 1997 June 19, 1997 June 27, 1997 June 30, 1997	- 354 - -	SSAs 4,5,10 Sites 11 & 17 Sites 1 & 3 Sites 9 & 19	Work Plan RI/FS Remedial Design Remedial Design	Draft Work Plan Draft RI Draft Final Design Draft Final Design	August 1, 1997 August 19, 1997 August 26, 1997 August 29, 1997
July 2, 1997 July 30, 1997 July 30, 1997	- 349 -	Site 12 Sites 4,21,22 SSAs 3,9,14	Remedial Design RI/FS Work Plan	Final Design Draft FS Final Work Plan	July 17, 1997 September 29, 1997 NA
August 4, 1997 August 18, 1997 August 19, 1997 August 27, 1997 August 28, 1997	349 - 354 349 354	Sites 4,21,22 Site 2 Sites 11 & 17 Sites 4,21,22 Sites 11 & 17	RI/FS RI/FS RI/FS RI/FS RI/FS	Draft PRAP Draft RI Draft FS Draft Final RI Draft PRAP	October 3, 1997 October 17, 1997 October 18, 1997 September 26, 1997 October 28, 1997
September 2, 1997 September 2, 1997 September 18, 1997 September 22, 1997	- - 354 349	Sites 8 & 18 SSAs 4,5,10 Sites 11 & 17 Sites 4,21,22	RI/FS Work Plan RI/FS RI/FS	Draft RI Draft Final Work Plan Draft Final RI Draft ROD	October 31, 1997 October 2, 1997 October 18, 1997 November 21, 1997
October 11, 1997 October 17, 1997 October 17, 1997 October 24, 1997 October 27, 1997 October 27, 1997 October 28, 1997 October 29, 1997 October 31, 1997	354 - - 349 - - 349 - -	Sites 11 & 17 Site 2 Site 2 Sites 4,21,22 Sites 1 & 3 Sites 9 & 19 Sites 4,21,22 Sites 8 & 18	RI/FS RI/FS RI/FS RI/FS Remedial Design Remedial Design RI/FS RI/FS	Draft ROD Draft FS Draft PRAP Final RI Final Design Final Design Draft Final FS Draft FS	December 10, 1997 December 16, 1997 December 23, 1997 NA November 11, 1997 November 12, 1997 November 28, 1997 December 30, 1997

TABLE 5-5 (Continued)

**FINAL 1996/1997 SITE MANAGEMENT PLAN
PRIMARY AND SECONDARY DELIVERABLES BY MONTH
WPNSTA YORKTOWN, YORKTOWN, VIRGINIA**

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
November 3, 1997	349	Sites 4,21,22	RI/FS	Draft Final PRAP	December 3, 1997
November 3, 1997	-	SSAs 4,5,10	Work Plan	Final Work Plan	NA
November 10, 1997	-	Sites 8 & 18	RI/FS	Draft PRAP	January 9, 1998
November 17, 1997	-	Site 2	RI/FS	Draft Final RI	December 17, 1997
November 17, 1997	354	Sites 11 & 17	RI/FS	Final RI	NA
November 18, 1997	354	Sites 11 & 17	RI/FS	Draft Final FS	December 18, 1997
November 18, 1997	354	Sites 11 & 17	RI/FS	Draft Final PRAP	December 27, 1997
November 18, 1997					
November 27, 1997					
December 1, 1997	-	Sites 8 & 18	RI/FS	Draft Final RI	December 31, 1997
December 8, 1997	-	Site 2	RI/FS	Draft ROD	February 6, 1998
December 22, 1997	349	Sites 4,21,22	RI/FS	Draft Final ROD	January 21, 1998
December 24, 1997	-	Sites 8 & 18	RI/FS	Draft ROD	February 23, 1998
December 29, 1997	349	Sites 4,21,22	RI/FS	Final FS	NA
January 2, 1998	349	Sites 4,21,22	RI/FS	Final PRAP	NA
January 10, 1998	354	Sites 11 & 17	RI/FS	Draft Final ROD	February 10, 1998
January 15, 1998	-	Site 2	RI/FS	Draft Final FS	February 16, 1998
January 16, 1998	-	Site 2	RI/FS	Final RI	NA
January 17, 1998	354	Sites 11 & 17	RI/FS	Final FS	NA
January 22, 1998	-	Site 2	RI/FS	Draft Final PRAP	February 23, 1998
January 26, 1998	-	Sites 4,21,22	Remedial Design	Draft Design	March 27, 1998
January 27, 1998	-	Sites 11 & 17	RI/FS	Final PRAP	NA
January 30, 1998	-	Sites 8 & 18	RI/FS	Final RI	NA
January 30, 1998	-	Sites 8 & 18	RI/FS	Draft Final FS	March 2, 1998
January 30, 1998	-	SSAs 3,9,14	Site Screening Process	Draft SSP Report	March 31, 1998
February 9, 1998	-	Sites 8 & 18	RI/FS	Draft Final PRAP	March 11, 1998
March 9, 1998	-	Site 2	RI/FS	Draft Final ROD	April 9, 1998
March 18, 1998	-	Site 2	RI/FS	Final FS	NA
March 19, 1998	354	Sites 11 & 17	RI/FS	Final ROD	NA
March 25, 1998	-	Site 2	RI/FS	Final PRAP	NA
March 25, 1998	-	Sites 8 & 18	RI/FS	Draft Final ROD	April 24, 1998

TABLE 5-5 (Continued)

FINAL 1996/1997 SITE MANAGEMENT PLAN
 PRIMARY AND SECONDARY DELIVERABLES BY MONTH
 WPNSTA YORKTOWN, YORKTOWN, VIRGINIA

Anticipated Submittal Date	CTO Number	Sites/SSAs	Deliverable	Document Submittal	EPA/State Review Complete By
April 1, 1998	-	Sites 8 & 18	RI/FS	Final FS	NA
April 10, 1998	-	Sites 8 & 18	RI/FS	Final PRAP	NA
April 30, 1998	-	SSAs 3,9,14	Site Screening Process	Draft Final SSP Report	June 1, 1998
May 1, 1998	-	SSAs 4,5,10	Site Screening Process	Draft SSP Report	June 30, 1998
May 18, 1998	-	Site 2	RI/FS	Final ROD	NA
May 26, 1998	-	Sites 4,21,22	Remedial Design	Draft Final Design	July 27, 1998
July 1, 1998	-	SSAs 3,9,14	Site Screening Process	Final SSP Report	NA
July 30, 1998	-	SSAs 4,5,10	Site Screening Process	Draft Final SSP Report	August 31, 1998
September 25, 1998	-	Sites 4,21,22	Remedial Design	Final Design	October 12, 1998
October 1, 1998	-	SSAs 4,5,10	Site Screening Process	Final SSP Report	NA
September 27, 1999	318	Sites 1 & 3	RI/FS	Final ROD	NA
September 29, 2000	349	Sites 4,21,22	RI/FS	Final ROD	NA
September 29, 2000	-	Sites 8 & 18	RI/FS	Final ROD	NA

Notes:

CTO - Contract Task Order. Deliverables having CTO numbers are funded.

NA - Not Applicable

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APPENDIX A
QUANTITATIVE SITE RANKING
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

APPENDIX A
QUANTITATIVE SITE RANKING
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

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APPENDIX A-8	SITE 8 - NEEDED EXPLOSIVES-CONTAMINATED WASTEWATER DISCHARGE AREA
APPENDIX A-9	SITE 9 - PLANT 1 EXPLOSIVES-CONTAMINATED WASTEWATER DISCHARGE AREA
APPENDIX A-10	SITE 11 - ABANDONED EXPLOSIVES BURNING PITS
APPENDIX A-11	SITE 12 - BARRACKS ROAD LANDFILL
APPENDIX A-12	SITE 16 - WEST ROAD LANDFILL
APPENDIX A-13	SITE 17 - HOLM ROAD LANDFILL
APPENDIX A-14	SITE 18 - BUILDING 476 DISCHARGE AREA
APPENDIX A-15	SITE 19 - CONVEYOR BELT SOILS AT BUILDING 10
APPENDIX A-16	SITE 21 - BATTERY AND DRUM DISPOSAL AREA

APPENDIX A-1
SITE 1 - DUDLEY ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Trichloroethane, 1,1,2-	28	0.3	93.33
Trichloroethene	18,000	2.5	7,200.00
TOTAL			7,293.33
NONCARCINOGENIC			
Aluminum	10,500	36,500	0.29
Cadmium	5.9	18.3	0.32
Dichloroethene, 1,2-	1,000	69.2	14.45
Manganese	355	182.5	1.95
Nitrates	8,200	58,400	0.14
Zinc	1,650	10,950	0.15
TOTAL			17.30

Notes:

PRG values based on ingestion of tap water.

PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	24.3	1.0	24.30
Bis(2-ethylhexyl)phthalate	12	60.8	0.20
TOTAL			24.50
NONCARCINOGENIC			
Copper	5.9	2,905.1	0.002
Lead	21.4	500	0.04
Manganese	127	391.1	0.32
Zinc	29.3	23,464.3	0.001
TOTAL			0.37

Notes:

PRG values based on residential soil ingestion.

PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 1 - Dudley Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	11.2	2	5.60
Chromium	89.6	80	1.12
Nickel	162	30	5.40
Zinc	122	120	1.02
TOTAL			13.14

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
 Site 1 - Dudley Road Landfill
 Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	31	12	2.58
Lead	278	3.2	86.88
Mercury	0.11	0.012	9.17
Nickel	20.3	160	0.13
TOTAL			98.76

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-2
SITE 2 - TURKEY ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	110	0.048666	2,260.30
Beryllium	3.5	0.019806	176.71
TOTAL			2,437.01
NONCARCINOGENIC			
Aluminum	35,800	36,500	0.98
Barium	197	2,555	0.08
Cadmium	4.5	18.3	0.25
Lead	20.9	4	5.23
Manganese	1,360	182.5	7.45
Nickel	34.8	730	0.05
Nitrates	470	58,400	0.008
Zinc	136	10,950	0.01
TOTAL			14.06

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Arsenic	11.7	33	0.36
Cadmium	2.4	5	0.48
Chromium	44.5	80	0.56
Copper	10.7	70	0.15
DDE	0.003	0.002	1.50
Lead	19	35	0.54
Mercury	0.11	0.15	0.73
Nickel	21.2	30	0.71
Silver	28.4	1	28.40
Zinc	116	120	0.97
TOTAL			34.40

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 2 - Turkey Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	5.2	190	0.03
Cadmium	4.1	1.1	3.73
Copper	7.7	12	0.64
Lead	7.9	3.2	2.47
Nickel	24.7	160	0.15
TOTAL			7.02

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 22.5 ug/l; however, the value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-3
SITE 3 - GROUP 16 MAGAZINE LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

**Quantitative Site Ranking - Groundwater
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	23.3	0.019806	1,176.41
Chloroform	29	0.3	96.67
Trichloroethene	86	2.5	34.40
TOTAL			1,307.48
NONCARCINOGENIC			
Aluminum	202,000	36,500	5.53
Antimony	44	14.6	3.01
Barium	1,220	2,555	0.48
Cadmium	29.7	18.3	1.62
Dichloroethene,1,2-	61	69.2	0.88
Lead	146	4	36.50
Manganese	4,810	182.5	26.36
Mercury	0.54	10.9	0.05
Nickel	594	730	0.81
Zinc	2,840	10,950	0.26
TOTAL			75.50

Notes:

PRG values based on ingestion of tap water.
 PRG value for mercury is based on inorganic compounds.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	6	1.0	6.00
Chromium	18.4	938.9	0.02
TOTAL			6.02
NONCARCINOGENIC			
Copper	7.3	2,905.1	0.003
Lead	24.4	500	0.05
Manganese	171	391.1	0.44
Nickel	8.6	1,564.3	0.005
Zinc	67.4	23,464.3	0.003
TOTAL			0.50

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Surface Water
Site 3 - Group 16 Magazine Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	12	12	1.00
TOTAL			1.00

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-4
SITE 4 - BURNING PAD RESIDUE LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

**Quantitative Site Ranking - Groundwater
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	20.6	0.048666	423.29
Beryllium	20.2	0.019806	1,019.89
Dichloroethene, 1,1-	1	0.1	10.00
RDX	3.3	0.8	4.13
Trichloroethene	17	2.5	6.80
TOTAL			1,464.11
NONCARCINOGENIC			
Aluminum	70,800	36,500	1.94
Antimony	45.7	14.6	3.13
Barium	287	2,555	0.11
Cadmium	5.2	18.3	0.28
Dichloroethene, 1,2-	20	69.2	0.29
HMX	1.1	1,825	0.001
Lead	49.2	4	12.30
Manganese	3,140	182.5	17.21
Mercury	0.19	10.9	0.02
Nickel	209	730	0.29
Trichloroethane, 1,1,1-	2	1,506	0.001
Zinc	735	10,950	0.07
TOTAL			35.64

Notes:

PRG values based on ingestion of tap water.
 PRG value for mercury is based on inorganic compounds.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1254	0.044	0.1	0.44
Arsenic	6.9	1	6.90
Benzo(a)pyrene	0.9	0.1	9.00
Benzo(b)fluoranthene	1.4	1.2	1.17
Benzo(k)fluoranthene	0.95	1.2	0.79
Beryllium	0.35	0.4	0.88
Bis(2-ethylhexyl)phthalate	5.3	60.8	0.09
Chromium	10.6	938.9	0.01
Methylene Chloride	0.086	22.3	0.004
RDX	47	7.7	6.10
Trinitrotoluene,2,4,6-	92.6	1703.3	0.05
TOTAL			25.44
NONCARCINOGENIC			
Aluminum	52,700	78,214.3	0.67
Antimony	62.5	31.3	2.00
Barium	91.8	5,475	0.02
Cadmium	4.7	39.1	0.12
Dinitrotoluene,2,4-	0.43	78.2	0.005
Fluoranthene	2	1,564.3	0.001
HMX	58	1,955.4	0.03
Lead	135	500	0.27
Manganese	312	391.1	0.80
Mercury	1.4	23.5	0.06
Nickel	7.9	1,564.3	0.005
Trichloroethane,1,1,1-	0.023	300	0.00007
Zinc	540	23,464.3	0.02
TOTAL			4.00

Notes: PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

**Quantitative Site Ranking - Sediment
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	43.1	2	21.55
Arsenic	9.7	33	0.29
Cadmium	2.99	5	0.60
Chlordane, alpha	0.04	0.0005	80.00
Chlordane, gamma	0.033	0.0005	66.00
Chromium	30.6	80	0.38
Copper	33.6	70	0.48
DDD	0.91	0.002	455.00
DDE	0.056	0.002	28.00
DDT	0.015	0.001	15.00
Lead	32.5	35	0.93
Mercury	0.34	0.15	2.27
Nickel	33.6	30	1.12
Zinc	1,200	120	10.00
TOTAL			681.62

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 4 - Burning Pad Residue Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Antimony	44.1	30	1.47
Arsenic	43.4	190	0.23
Beryllium	2.2	5.3	0.42
Cadmium	11.6	1.1	10.55
Chromium	46	210	0.22
Dinitrotoluene,2,4-	0.44	230	0.002
Lead	215	3.2	67.19
Mercury	5.56	0.012	463.33
Nickel	29	160	0.18
TOTAL			543.59

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Nitramine compounds were detected at high concentrations (i.e., HMX at 19 ug/l; RDX at 170 ug/l; 1,3,5-TNB at 2.6 ug/l; 1,3-DNB at 0.34 ug/l; nitrobenzene at 0.38 ug/l; 2,4,6-TNT at 8.3 ug/l; and 2,4-DNT at 0.44 ug/l). There is no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Zinc was detected in the surface water at this site at a concentration of 3,880 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-5
SITE 5 - SURPLUS TRANSFORMER STORAGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Soil
Site 5 - Surplus Transformer Storage Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1260	1.4	0.1	14.00
TOTAL			14.00

Notes:

PRG values based on residential soil ingestion.
 PRG values calculated for highest of carcinogenic values.

APPENDIX A-6
SITE 6 - EXPLOSIVES-CONTAMINATED
WASTEWATER IMPOUNDMENT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Dichloroethene, 1,1-	16	0.1	160.00
RDX	17	0.8	21.25
Trichloroethene	380	2.5	152.00
TOTAL			333.25
NONCARCINOGENIC			
Antimony	57.2	14.6	3.92
Cadmium	4.5	18.3	0.25
Dichloroethene, 1,2-	86	69.2	1.24
HMX	7.6	1,825	0.004
Manganese	319	182.5	1.75
TOTAL			7.16

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	6.4	1.0	6.40
Bis(2-ethylhexyl)phthalate	0.45	60.8	0.007
Chromium	25.1	938.9	0.03
RDX	2.9	7.7	0.38
TOTAL			6.82
NONCARCINOGENIC			
Copper	5.5	2,905.1	0.002
HMX	5.6	1,955.4	0.003
Lead	50.3	500	0.10
Zinc	214	23,464.3	0.009
TOTAL			0.11

Notes:

PRG values based on residential soil ingestion.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	48.2	2	24.10
Benzo(a)pyrene	0.31	0.4	0.78
Cadmium	9.8	5	1.96
Chromium	94.8	80	1.19
Copper	130	70	1.86
Fluoranthene	0.84	0.6	1.40
Lead	68.1	35	1.95
Nickel	100	30	3.33
Pyrene	0.93	0.35	2.66
Zinc	643	120	5.36
TOTAL			44.59

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Volatile and nitramine compounds were detected at very high concentrations (i.e., TCE at 180 mg/kg; 1,1,1-TCA at 190 mg/kg; HMX at 710 mg/kg; RDX at 160 mg/kg). There are no sediment quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Quantitative Site Ranking - Surface Water
Site 6 - Explosives-Contaminated Wastewater Impoundment
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Chromium	61.2	210	0.29
Copper	50.3	12	4.19
Lead	78.8	3.2	24.63
Mercury	0.21	0.012	17.50
Nickel	84.2	160	0.53
TOTAL			47.14

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Nitramine compounds were detected at high concentrations (i.e., HMX at 12 ug/l; RDX at 33 ug/l; 2,4,6-TNT at 36 ug/l). There are no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

APPENDIX A-7
SITE 7 - PLANT 3 EXPLOSIVES-CONTAMINATED
WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	18	0.01981	908.63
Dichloroethene,1,1-	160	0.1	1,600.00
Dinitrotoluene,2,6-	19	0.1	190.00
RDX	2,300	0.8	2,875.00
TOTAL			5,573.63
NONCARCINOGENIC			
Aluminum	126,000	36,500	3.45
Cadmium	12.6	18.3	0.69
Dichloroethane,1,1-	58	1,006.9	0.06
HMX	190	1,825	0.10
Lead	61	4	15.25
Manganese	6,790	182.5	37.21
Mercury	0.23	10.9	0.02
Nickel	328	730	0.45
Nitrobenzene	0.59	18.3	0.03
Trichloroethane,1,1,1-	9,900	1,506	6.57
Trinitrobenzene,1,3,5-	8.5	1.8	4.72
Zinc	985	10,950	0.09
TOTAL			68.64

Notes:

- PRG values based on ingestion of tap water.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	2.1	1.0	2.10
Beryllium	0.8	0.4	2.00
Bis(2-ethylhexyl)phthalate	0.53	60.8	0.009
TOTAL			4.11
NONCARCINOGENIC			
Chromium	13.6	391.1	0.03
Manganese	181	391.1	0.46
Nickel	9.1	1,564.3	0.006
Zinc	31.9	23,464.3	0.001
TOTAL			0.50

Notes:

PRG values based on residential soil ingestion.

PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	30.4	2	15.20
Cadmium	5.8	1.16	1.16
Copper	79.4	1.13	1.13
Lead	95.3	35	2.72
Zinc	403	120	3.36
TOTAL			23.57

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 7 - Plant 3 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Chromium	77.8	210	0.37
Copper	137	12	11.42
Lead	114	3.2	35.63
Mercury	0.24	0.012	20.00
Nickel	47.1	160	0.29
TOTAL			67.71

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 590 ug/l; however, this value was not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-8
SITE 8 - NEDED EXPLOSIVES-CONTAMINATED
WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	4.5	0.0198	227.27
RDX	64	0.8	80.00
Trichloroethene	15	2.5	6.00
TOTAL			313.27
NONCARCINOGENIC			
Aluminum	27,700	36,500	0.76
HMX	13	1,825	0.007
Lead	20.2	4	5.05
Manganese	547	182.5	3.00
Zinc	216	10,950	0.02
TOTAL			8.84

Notes:

PRG values based on ingestion of tap water.

PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1254	0.019	0.1	0.19
Arsenic	2.6	1	2.60
DDD	0.0022	3.5	0.001
DDE	0.0031	2.5	0.001
Dieldrin	0.0031	0.1	0.03
RDX	3.4	7.7	0.44
Trichloroethene	0.032	14.4	0.002
Vinyl Chloride	0.009	0.0097	0.93
TOTAL			4.19
NONCARCINOGENIC			
Copper	20.6	2,905.1	0.007
Dichloroethene, 1,2-	0.09	281.8	0.0003
HMX	2.8	1,955.4	0.0007
Lead	62.7	500	0.13
Nickel	12.4	1,564.3	0.008
Vanadium	29.8	547.5	0.05
Zinc	165	23,464.3	0.007
TOTAL			0.20

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Lead	38.7	35	1.11
Mercury	2	0.15	13.33
Zinc	125	120	1.04
TOTAL			15.48

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 8 - NEDED Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Copper	6.1	12	0.51
Lead	31.5	3.2	9.84
Nickel	21.3	160	0.13
TOTAL			10.48

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-9
SITE 9 -PLANT 1 EXPLOSIVES-CONTAMINATED
WASTEWATER DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	25.3	0.0198	1,277.39
Trinitrotoluene,2,4,6-	2,300	170.3	13.51
TOTAL			1,290.90
NONCARCINOGENIC			
Aluminum	85,300	36,500	2.34
Barium	2,070	2,555	0.81
Cadmium	5.8	18.3	0.32
Dinitrotoluene,2,4-	12	73	0.16
Lead	248	4	62.00
Manganese	9,130	182.5	50.03
Mercury	1.82	10.9	0.17
Nickel	164	730	0.23
Trinitrobenzene,1,3,5-	6.3	1.8	3.50
Zinc	3,940	10,950	0.36
TOTAL			119.92

Notes:

- PRG values based on ingestion of tap water.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	19.7	1	19.70
Benzo(a)anthracene	0.55	1.2	0.46
Benzo(b)fluoranthene	0.62	1.2	0.52
Beryllium	0.86	0.4	2.15
Chromium	19.3	938.9	0.02
Chrysene	0.59	116.7	0.005
Trinitrotoluene,2,4,6-	2,100	1,703.3	1.23
TOTAL			24.09
NONCARCINOGENIC			
Copper	23.5	2,905.1	0.008
Dinitrotoluene,2,4-	3.2	78.2	0.04
Fluoranthene	1.1	1,564.3	0.001
Lead	64.7	500	0.13
Mercury	1.01	23.5	0.04
Nickel	8.6	1,564.3	0.005
Trinitrobenzene,1,3,5-	3	2	1.50
Vanadium	60.6	547.5	0.11
Zinc	175	23,464.3	0.007
TOTAL			1.84

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Acenaphthene	1.6	0.15	10.67
Anthracene	2.3	0.085	27.06
Arsenic	35.1	33	1.06
Benzo(a)anthracene	7.5	0.23	32.61
Benzo(a)pyrene	6	0.4	15.00
Copper	94.2	70	1.35
Chrysene	8.6	0.4	21.50
Dibenz(a,h)anthracene	1.5	0.06	25.00
Fluoranthene	10	0.6	16.67
Fluorene	1.9	0.035	54.29
Lead	266	35	7.60
Mercury	0.55	0.15	3.67
Phenanthrene	9.1	0.225	40.44
Pyrene	12	0.35	34.29
Zinc	442	120	3.68
TOTAL			294.89

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 9 - Plant 1 Explosives-Contaminated Wastewater Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Dinitrotoluene,2,4-	0.38	230	0.002
Dinitrotoluene,2,6-	0.29	230	0.001
Lead	19.8	3.2	6.19
TOTAL			6.19

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

APPENDIX A-10
SITE 11 - ABANDONED EXPLOSIVES BURNING PITS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

**Quantitative Site Ranking - Groundwater
 Site 11 - Abandoned Explosives Burning Pits
 Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	90.3	0.048666	1,855.50
RDX	28	0.8	35.00
TOTAL			1,890.50
NONCARCINOGENIC			
Aluminum	14,500	36,500	0.40
Cadmium	10.3	18.3	0.56
HMX	4.2	1,825	0.002
Lead	20.7	4	5.18
Manganese	206	182.5	1.13
Zinc	134	10,950	0.01
TOTAL			7.28

Notes:

PRG values based on ingestion of tap water.

PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
NONCARCINOGENIC			
Barium	98.2	5,475	0.02
Copper	26.5	2,905.1	0.009
TOTAL			0.03

Notes:

- PRG values based on residential soil ingestion.
- PRG values calculated for highest of noncarcinogenic values.

**Quantitative Site Ranking - Sediment
 Site 11 - Abandoned Explosives Burning Pits
 Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Mercury	0.18	0.15	1.20
TOTAL			1.20

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 11 - Abandoned Explosives Burning Pits
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	143	190	0.75
Chromium	71.6	210	0.34
Copper	258	12	21.50
Lead	300	3.2	93.75
Mercury	1.46	0.012	121.67
Nickel	61.9	160	0.39
TOTAL			238.40

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 904 ug/l; however, this value was not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-11
SITE 12 - BARRACKS ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Chloroform	2	0.3	6.67
RDX	4.4	0.8	5.50
Trichloroethene	55	2.5	22.00
Trinitrotoluene,2,4,6-	1.5	170.3	0.009
TOTAL			34.18
NONCARCINOGENIC			
Acetone	14	768.4	0.02
Aluminum	17,200	36,500	0.47
Antimony	46.3	14.6	3.17
Cadmium	7.4	18.3	0.40
Dichloroethene,1,2-	4	69.2	0.06
Lead	27.3	4	6.83
Manganese	3,300	182.5	18.08
Trinitrobenzene,1,3,5-	0.91	1.8	0.51
Zinc	160	10,950	0.02
TOTAL			29.56

Notes:

PRG values based on ingestion of tap water.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.2	1	28.20
Benzo(a)anthracene	1.4	1.2	1.17
Benzo(a)pyrene	1.2	0.1	12.00
Benzo(b)fluoranthene	1.9	1.2	1.58
Benzo(k)fluoranthene	1.5	1.2	1.25
Beryllium	1.8	0.4	4.50
Bis(2-ethylhexyl)phthalate	4.4	60.8	0.07
Chlordane, alpha-	0.084	0.7	0.12
Chlordane, gamma-	0.084	0.7	0.12
Chromium	44.9	928.9	0.05
Chrysene	1.5	116.7	0.01
DDD	0.35	3.5	0.10
DDE	3.6	2.5	1.44
DDT	5.7	2.5	2.28
Trinitrotoluene, 2,4,6-	15	1,703.3	0.009
TOTAL			52.90
NONCARCINOGENIC			
Aluminum	17,400	78,214.3	0.22
Barium	1,180	5,475	0.22
Cadmium	30.6	39.1	0.78
Copper	720	2,905.1	0.25
Fluoranthene	4.1	1,564.3	0.003
Lead	1,200	500	2.40
Manganese	760	391.1	1.94
Mercury	2.87	23.5	0.12
Nickel	49.6	1564.3	0.03
Vanadium	93.1	547.5	0.17
Zinc	2,950	23,464.3	0.13
TOTAL			6.26

Notes: PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 12 Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Benzo(a)anthracene	0.14	0.23	0.61
Benzo(a)pyrene	0.11	0.4	0.28
Cadmium	8.2	5	1.64
Chlordane, alpha	0.116	0.0005	232.00
Chlordane, gamma	0.116	0.0005	232.00
Chrysene	0.12	0.4	0.30
DDD	0.18	0.002	90.00
DDE	0.052	0.002	26.00
DDT	0.22	0.001	220.00
Fluoranthene	0.3	0.6	0.50
Lead	59.4	35	1.70
Mercury	0.24	0.15	1.60
Phenanthrene	0.12	0.225	0.53
Pyrene	0.18	0.35	0.51
Silver	3	1	3.00
Zinc	286	120	2.38
TOTAL			813.05

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

Quantitative Site Ranking - Surface Water
Site 12 - Barracks Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Cadmium	15.5	1.1	14.09
Copper	15.1	12	1.26
DDT	0.46	0.001	460.00
Lead	42	3.2	13.13
Mercury	0.24	0.012	20.00
Nickel	19	160	0.12
Trichloroethene	4	21,900	0.0002
TOTAL			508.60

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 100 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-12
SITE 16 - WEST ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
 Site 16 - West Road Landfill
 Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	17.8	0.04866	365.76
Beryllium	7.8	0.0198	393.94
Dichlorobenzene, 1,4-	4	0.7	5.71
Dichloroethene, 1,1-	1	0.1	10.00
RDX	1.3	0.8	1.63
TOTAL			777.04
NONCARCINOGENIC			
Aluminum	102,000	36,500	2.80
Antimony	48.3	14.6	3.31
Barium	362	2,555	0.14
Cadmium	5.7	18.3	0.31
Chlorobenzene	6	51.7	0.12
Dichloroethane, 1,1,1-	3	1,006.9	0.003
Lead	56	4	14.00
Manganese	857	182.5	4.70
Mercury	0.25	10.9	0.02
Nickel	167	730	0.23
Phenol	1	21,900	0.00005
Trichloroethane, 1,1,1-	3	1,506	0.002
Zinc	376	10,950	0.03
TOTAL			25.67

Notes:

- PRG values based on ingestion of tap water.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Aroclor 1248	0.024	0.1	0.24
Aroclor 1254	0.88	0.1	8.80
Aroclor 1260	0.12	0.1	1.20
Arsenic	1.7	1	1.70
Beryllium	0.47	0.4	1.18
Bis(2-ethylhexyl)phthalate	0.59	60.8	0.01
Chromium	26.3	938.9	0.03
DDD	0.0023	3.5	0.001
DDE	0.0065	2.5	0.003
DDT	0.0019	2.5	0.001
Dieldrin	0.0077	0.1	0.08
TOTAL			13.25
NONCARCINOGENIC			
Aluminum	4,630	78,214.3	0.06
Barium	36.8	5,475	0.007
Cadmium	13.6	39.1	0.35
Lead	258	500	0.52
Manganese	470	391.1	1.20
Mercury	1.08	23.5	0.05
Nickel	18.3	1,564.3	0.01
Zinc	559	23,464.3	0.02
TOTAL			2.22

Notes:

- PRG values based on residential soil ingestion.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Anthracene	0.021	0.085	0.25
Arsenic	6.5	33	0.20
Benzo(a)anthracene	0.074	0.23	0.32
Benzo(a)pyrene	0.05	0.4	0.13
Cadmium	1.8	5	0.36
Chromium	17.2	80	0.22
Chrysene	0.075	0.4	0.19
Copper	8.3	70	0.12
Fluoranthene	0.19	0.6	0.32
Lead	17.9	35	0.51
Nickel	28.6	30	0.95
Phenanthrene	0.077	0.225	0.34
Pyrene	0.081	0.35	0.23
Zinc	149	120	1.24
TOTAL			5.38

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

**Quantitative Site Ranking - Surface Water
Site 16 - West Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Antimony	62.8	30	2.09
Arsenic	47.4	190	0.25
Beryllium	26.3	5.3	4.96
Cadmium	46.6	1.1	42.36
Chromium	517	210	2.46
Lead	293	3.2	91.56
Mercury	2.91	0.012	242.50
Nickel	775	160	4.84
Phenol	27	2,560	0.01
TOTAL			391.03

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Volatile compounds were detected at high concentrations (i.e., 1,1-DCE at 2 ug/l; 1,1-DCA at 5 ug/l; 1,1,1-TCA at 8 ug/l; and 4-methylphenol at 850 ug/l). There are no surface water quality criteria for these compounds; thus, although these levels may indicate a potential problem, none will be evident via this manner of site ranking.

Zinc was detected in the surface water at this site at a concentration of 4,890 ug/l; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-13
SITE 17 - HOLM ROAD LANDFILL
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Soil
 Site 17 - Holm Road Landfill
 Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	2.8	1.0	2.80
Benzo(a)anthracene	2.5	1.2	2.08
Benzo(a)pyrene	5	0.1	50.00
Benzo(b)fluoranthene	3	1.2	2.50
Benzo(k)fluoranthene	2.8	1.2	2.33
Chrysene	2.6	116.7	0.02
Dibenz(a,h)anthracene	0.97	0.1	9.70
Indeno(1,2,3-cd)pyrene	2.7	1.2	2.25
TOTAL			71.68
NONCARCINOGENIC			
Anthracene	3.6	1.9	1.89
Fluoranthene	1.8	1,564.3	0.001
Manganese	128	391.1	0.33
Mercury	0.08	23.5	0.003
Pyrene	3.9	1,173.2	0.003
Zinc	26.9	23,464.3	0.001
TOTAL			2.23

Notes:

PRG values based on residential soil ingestion.
 PRG value for mercury is based on inorganic compounds.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Groundwater
Site 17 - Holm Road Landfill
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	106	0.048666	2,178.11
Beryllium	5.8	0.019806	292.84
TOTAL			2,470.95
NONCARCINOGENIC			
Aluminum	164,000	36,500	4.49
Lead	65.4	4	16.35
Manganese	405	182.5	2.22
Mercury	0.36	10.9	0.03
Nickel	351	730	0.48
Zinc	231	10,950	0.02
TOTAL			23.55

Notes:

- PRG values based on ingestion of tap water.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

APPENDIX A-14
SITE 18 - BUILDING 476 DISCHARGE AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Quantitative Site Ranking - Groundwater
Site 18 - Building 476 Discharge Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Beryllium	7.5	0.019806	378.67
TOTAL			378.67
NONCARCINOGENIC			
Aluminum	144,000	36,500	3.95
Barium	505	2,555	0.20
Cadmium	12.6	18.3	0.69
Lead	260	4	65.00
Manganese	849	182.5	4.65
Mercury	0.73	10.9	0.07
Nickel	23.2	730	0.03
Zinc	357	10,950	0.03
TOTAL			74.62

Notes:

- PRG values based on ingestion of tap water.
- PRG value for mercury is based on inorganic compounds.
- PRG values calculated for highest of carcinogenic or noncarcinogenic values.

**Quantitative Site Ranking - Sediment
 Site 18 - Building 476 Discharge Area
 Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Antimony	12.8	2.00	6.40
Arsenic	1.9	33	0.06
Chromium	18	80	0.23
Copper	29	70	0.41
Lead	8.3	35	0.24
Nickel	5.3	30	0.18
Zinc	44	120	0.37
TOTAL			7.89

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

**Quantitative Site Ranking - Surface Water
 Site 18 - Building 476 Discharge Area
 Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	AWQC Value (ug/l)	Ratio of Measured Conc. to AWQC
Arsenic	4.1	190	0.02
Copper	199	12	16.58
TOTAL			16.60

Notes:

AWQC value based on freshwater chronic criteria. Values exceeding these criteria indicate the potential for adverse ecological effects to occur.

Zinc was detected in the surface water at this site at a concentration of 369 ug/L; however, this value is not included in the ranking process due to an error in the Navy database system. This error will be corrected as soon as possible.

APPENDIX A-15
SITE 19 - CONVEYOR BELT SOILS AT BUILDING 10
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

**Quantitative Site Ranking - Groundwater
 Site 19 - Conveyor Belt Soils at Building 10
 Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Trinitrotoluene,2,4,6-	5.1	170.3	0.03
TOTAL			0.03
NONCARCINOGENIC			
Aluminum	4,510	36,500	0.12
Cadmium	4.5	18.3	0.25
Manganese	3,480	182.5	19.07
Trinitrobenzene,1,3,5-	1.3	1.8	0.72
TOTAL			20.16

Notes:

PRG values based on ingestion of tap water.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Soil
Site 19 - Conveyor Belt Soils at Building 10
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.3	1	28.30
Beryllium	2.6	0.4	6.50
Chromium	28.7	938.9	0.03
Dinitrotoluene,2,6-	0.77	1.3	0.59
Trinitrotoluene,2,4,6-	120	1703.3	0.07
TOTAL			35.49
NONCARCINOGENIC			
Copper	14.9	2,905.1	0.005
Dinitrotoluene,2,4-	1.3	78.2	0.02
Lead	49.9	500	0.10
Manganese	220	391.1	0.56
Nickel	20	1,564.3	0.01
Trinitrobenzene,1,3,5-	4.9	2	2.45
Vanadium	49.1	547.5	0.09
Zinc	69.1	23,464.3	0.003
TOTAL			3.24

Notes:

PRG values based on residential soil ingestion.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

Quantitative Site Ranking - Sediment
Site 19 - Conveyor Belt Soils at Building 10
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	NOAA ER-L Value (mg/kg)	Ratio of Measured Conc. to ER-L
Anthracene	0.4	0.085	4.70
Benzo(a)anthracene	1.6	0.23	6.96
Benzo(a)pyrene	1.2	0.4	3.00
Chrysene	8.2	0.4	20.50
Dibenz(a,h)anthracene	0.46	0.06	7.67
Fluoranthene	27	0.6	45.00
Fluorene	0.23	0.035	6.57
Phenanthrene	26	0.225	115.56
Pyrene	13	0.35	37.14
Zinc	125	120	1.04
TOTAL			248.14

Notes:

NOAA ER-L is the effects range low level. Concentrations exceeding this level indicate the potential for an adverse ecological effect to occur.

APPENDIX A-16
SITE 21 - BATTERY AND DRUM DISPOSAL AREA
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

**Quantitative Site Ranking - Groundwater
Site 21 - Battery and Drum Disposal Area
Naval Weapons Station Yorktown, Yorktown, Virginia**

Parameter	Measured Concentration (ug/l)	Region IX PRG (2/94) (ug/l)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	5.8	0.048666	119.18
Beryllium	18.1	0.019806	913.86
TOTAL			1,032.36
NONCARCINOGENIC			
Aluminum	80,300	36,500	2.20
Barium	412	2,555	0.16
Cadmium	145	18.3	7.92
Lead	83	4	20.75
Manganese	7,870	182.5	43.12
Mercury	0.25	10.9	0.02
Nickel	117	730	0.16
Nitrates	25,100	58,400	0.43
Zinc	999,999	10,950	91.32
TOTAL			166.08

Notes:

PRG values based on ingestion of tap water.
 PRG value for mercury is based on inorganic compounds.
 PRG values calculated for highest of carcinogenic or noncarcinogenic values.

The actual zinc concentration in the groundwater was 2,490,000 ug/l; however, the Navy database fields are not large enough to accommodate a number above 999,999.00.

Quantitative Site Ranking - Soil
Site 21 - Battery and Drum Disposal Area
Naval Weapons Station Yorktown, Yorktown, Virginia

Parameter	Measured Concentration (mg/kg)	Region IX PRG (2/94) (mg/kg)	Ratio of Measured Conc. to PRG
CARCINOGENIC			
Arsenic	28.3	1	28.30
Beryllium	0.57	0.4	1.43
Benzo(b)fluoranthene	0.99	1.2	0.83
Benzo(k)fluoranthene	0.54	1.2	0.45
Bis(2-ethylhexyl)phthalate	2.1	60.8	0.04
Chromium	28.4	938.9	0.03
Chrysene	0.52	116.7	0.004
Pentachlorophenol	0.29	7.1	0.04
TOTAL			31.12
NONCARCINOGENIC			
Aluminum	13,700	78,214.3	0.18
Barium	72.8	5,475	0.01
Cadmium	8.6	39.1	0.22
Lead	113	500	0.23
Manganese	1,380	391.1	3.52
Mercury	0.76	23.5	0.03
Nickel	9.2	1,564	0.006
Pyrene	0.98	1,173	0.001
Styrene	0.02	13,000	0.000002
Trichloroethane, 1,1,1-	0.014	300	0.00004
Toluene	0.035	280	0.0001
Xylene	0.004	99	0.00004
Zinc	2,160	23,464.3	0.09
TOTAL			4.29

Notes:

PRG values based on residential soil ingestion.
PRG value for mercury is based on inorganic compounds.
PRG values calculated for highest of carcinogenic or noncarcinogenic values.

APPENDIX B
DETAILED ACTUAL SCHEDULES FOR COMPLETED ACTIONS
(REMOVAL ACTIONS AND FINALIZED REPORTS)
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure B - 1
FY 1994: Site 5 Risk Assessment, Proposed Plan, and Record of Decision
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1994												1995					
				Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
SITE 5	393ed	9/1/93	9/29/94	[Solid black bar from Sep 1993 to Sep 1994]																	
RISK ASSESSMENT	275ed	9/1/93	6/3/94	[Solid black bar from Sep 1993 to Jun 1994]																	
Preliminary Draft	61ed	9/1/93	11/1/93	[Solid black bar from Sep 1993 to Nov 1993]																	
Review (Navy)	29ed	11/1/93	11/30/93	[Hatched bar from Nov 1993 to Nov 1993]																	
Draft	30ed	11/30/93	12/30/93	[Solid black bar from Dec 1993 to Dec 1993]																	
Review (EPA/State)	60ed	12/30/93	2/28/94	[Hatched bar from Jan 1994 to Feb 1994]																	
Draft Final	60ed	2/28/94	4/29/94	[Solid black bar from Mar 1994 to Apr 1994]																	
Final	35ed	4/29/94	6/3/94	[Solid black bar from May 1994 to Jun 1994]																	
PROPOSED PLAN	212ed	11/1/93	6/1/94	[Solid black bar from Nov 1993 to Jun 1994]																	
Preliminary Draft	30ed	11/1/93	12/1/93	[Solid black bar from Nov 1993 to Dec 1993]																	
Review (Navy)	33ed	12/1/93	1/3/94	[Hatched bar from Dec 1993 to Jan 1994]																	
Draft	28ed	1/3/94	1/31/94	[Solid black bar from Jan 1994 to Jan 1994]																	
Review (EPA/State)	60ed	1/31/94	4/1/94	[Hatched bar from Feb 1994 to Apr 1994]																	
Draft Final	31ed	4/1/94	5/2/94	[Solid black bar from Apr 1994 to Apr 1994]																	
Final	30ed	5/2/94	6/1/94	[Solid black bar from May 1994 to Jun 1994]																	
PUBLIC COMMENT PERIOD	45ed	6/5/94	7/20/94	[Solid black bar from Jun 1994 to Jul 1994]																	

Figure B - 4
FY 1993: Removal Action at Sites 2, 9 and SSA 4
Naval Weapons Station Yorktown, Yorktown, Virginia

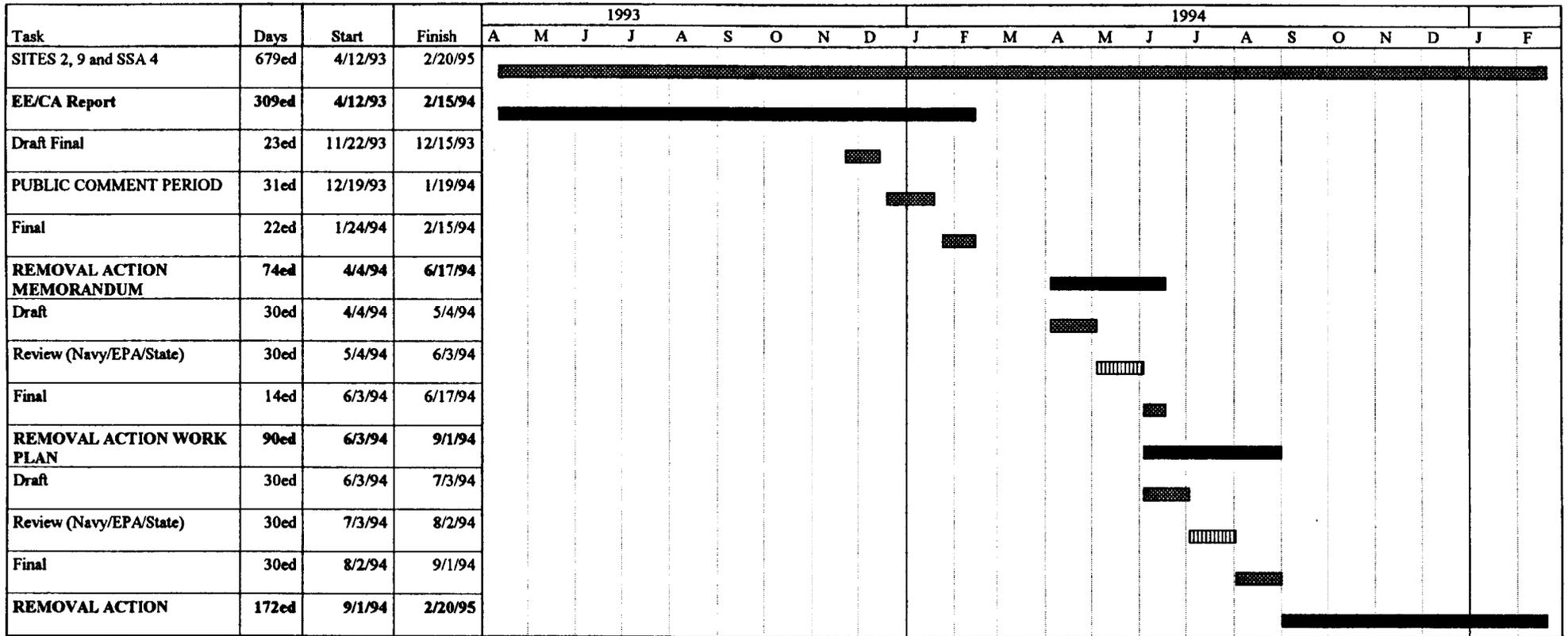
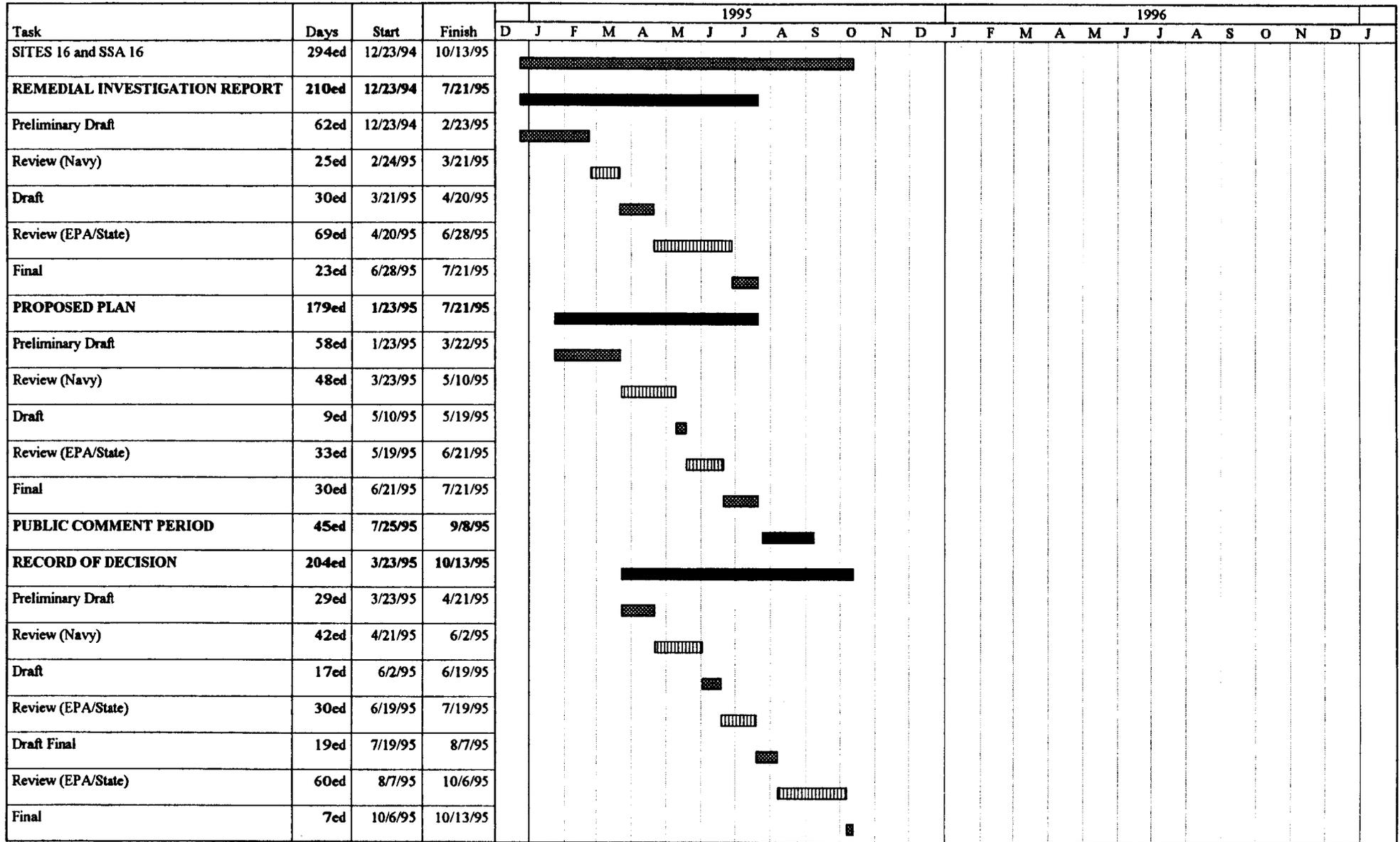


Figure B - 8
FY 1994: York River Basin Background Report
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1995											
				Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
YORK RIVER BASIN BACKGROUND REPORT	288ed	12/1/94	9/15/95	[Solid black bar spanning Dec 1994 to Sep 1995]											
Preliminary Draft	90ed	12/1/94	3/1/95	[Dotted bar spanning Dec 1994 to Feb 1995]											
Review (Navy)	30ed	3/1/95	3/31/95	[Hatched bar spanning Mar 1995]											
Draft	17ed	3/31/95	4/17/95	[Solid black bar spanning Mar 31 to Apr 17, 1995]											
Review (EPA/State)	60ed	4/17/95	6/16/95	[Hatched bar spanning Apr 17 to Jun 16, 1995]											
Final	35ed	6/16/95	7/21/95	[Dotted bar spanning Jun 16 to Jul 21, 1995]											

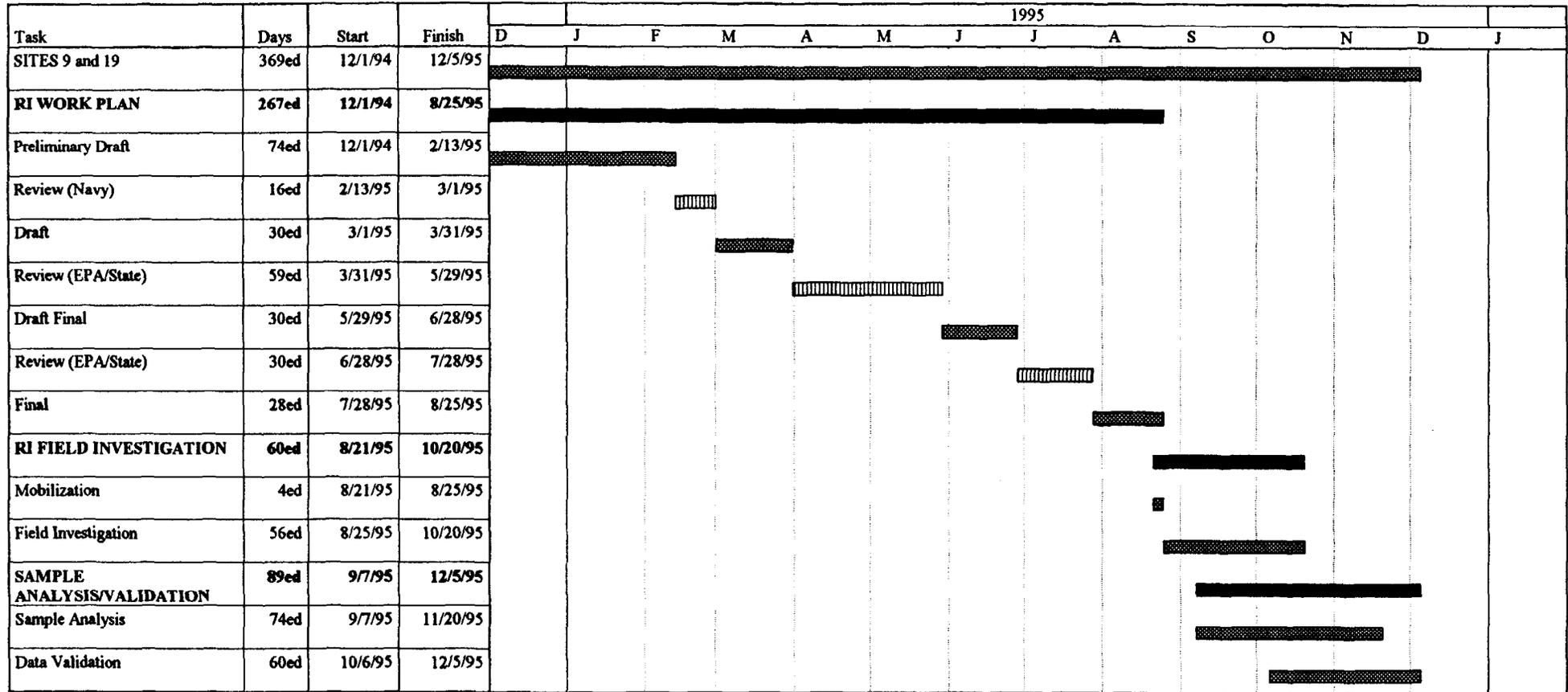
NOTE: The Draft Final Deliverable was not submitted due to limited Government comments.

Figure B - 10
FY 1995: Site 16 and SSA 16 Remedial Investigation, Feasibility Study, Proposed Plan, and Record of Decision
Naval Weapons Station Yorktown, Yorktown, Virginia



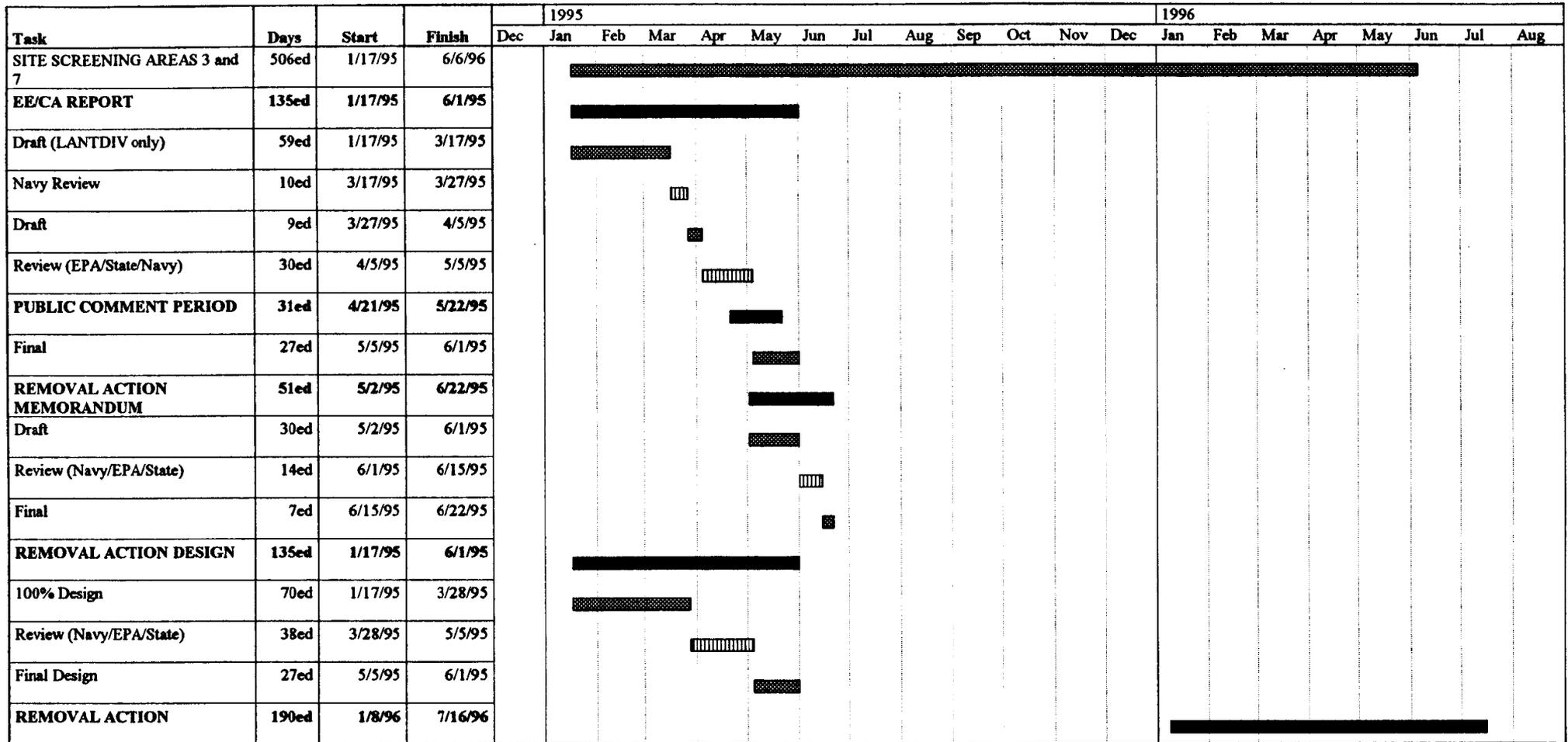
NOTE: The Draft Final Deliverable was not submitted due to limited Government comments.

Figure B - 11
 FY 1995: Sites 9 and 19 Work Plan/Field Investigation
 Naval Weapons Station Yorktown, Yorktown, Virginia



APPENDIX C
DETAILED SCHEDULES FOR REMOVAL ACTIONS
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure C - 1
FY 1996: Removal Action at Site Screening Areas 3 and 7
Naval Weapons Station Yorktown, Yorktown, Virginia

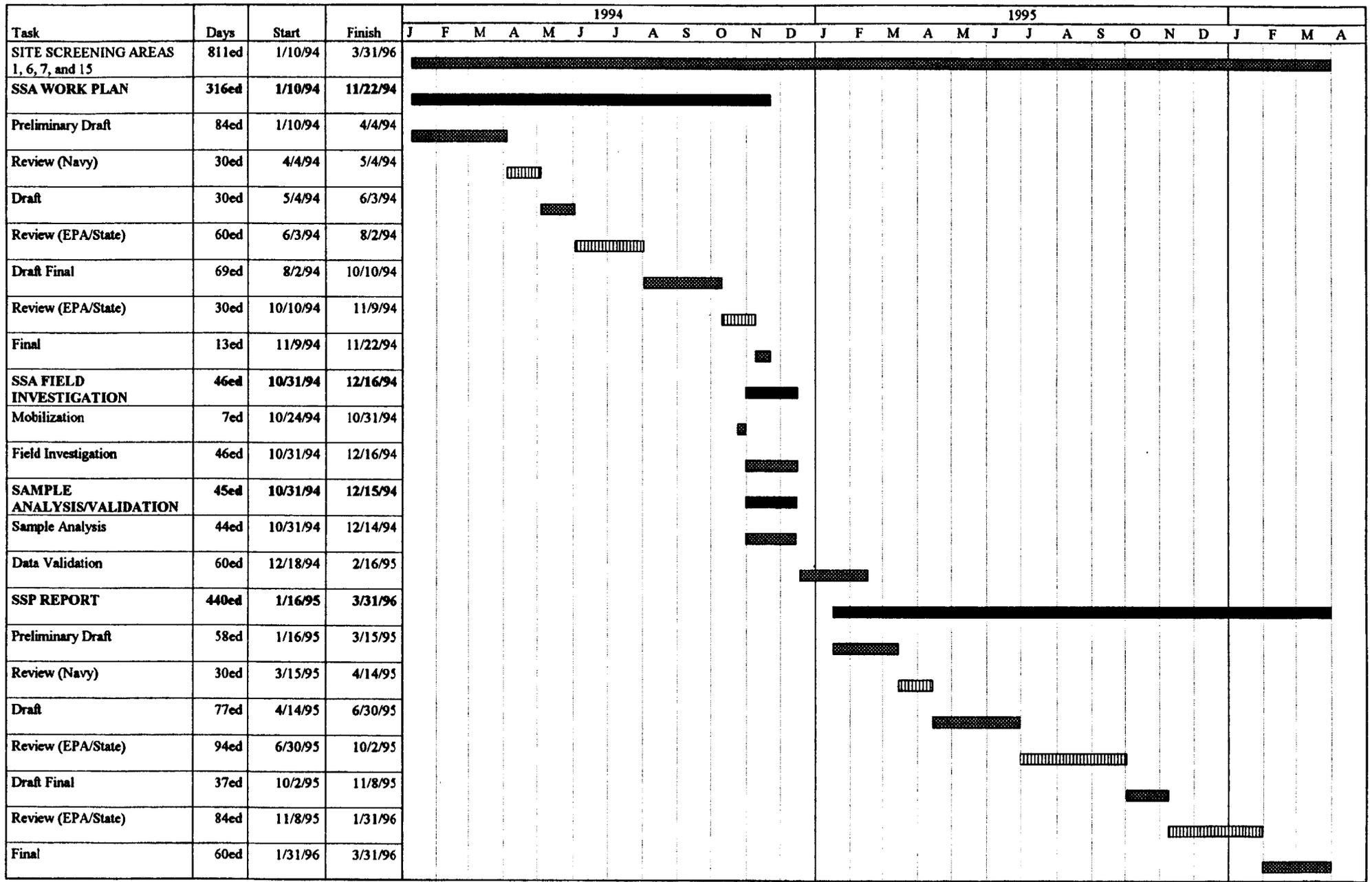


Note: A draft copy of the EE/CA was submitted to LANTDIV for comments prior to submitting a draft copy to USEPA.

APPENDIX D
DETAILED SCHEDULES FOR
INVESTIGATIVE WORK: FY 1994
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure D - 1

FY 1994: Site Screening Areas 1, 6, 7, and 15 Work Plan/Field Investigation/SSP Report
 Naval Weapons Station Yorktown, Yorktown, Virginia



APPENDIX E
DETAILED SCHEDULES: FY 1995
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure E - 1
 FY 1995: Bench-Scale Treatability Study
 Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Description	Days	Start	Finish	1995												1996											
					Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul		
PHASE I	SOIL CHARACTERIZATION / SOIL COLLECTION	125ed	10/1/94	2/3/95																								
Task 1	Soil Characterization	93ed	10/1/94	1/2/95																								
	Project Scope Development	61ed	10/1/94	12/1/94																								
	Soil Characterization Work Plan	61ed	10/1/94	12/1/94																								
	Navy Review	7ed	12/1/94	12/8/94																								
	Field Preparation/Mobilization	5ed	12/5/94	12/10/94																								
	Field Investigation	5ed	12/12/94	12/17/94																								
	Laboratory Analysis	20ed	12/13/94	1/2/95																								
Task 2	Soil Characterization Evaluation	7ed	1/5/95	1/12/95																								
	Meeting @LANTDIV	0ed	1/5/95	1/5/95																								
	Meeting Summary	6ed	1/6/95	1/12/95																								
Task 3	Soil Sample Collection	21ed	1/13/95	2/3/95																								
	Field Preparation	2ed	1/13/95	1/15/95																								
	Soil Collection	3ed	1/16/95	1/19/95																								
	Laboratory Analysis	7ed	1/19/95	1/26/95																								
	W.E.S Collection	1d	1/30/95	1/30/95																								
	Documentation/Reporting	18ed	1/16/95	2/3/95																								

Figure E - 1
FY 1995: Bench-Scale Treatability Study
Naval Weapons Station Yorktown, Yorktown, Virginia

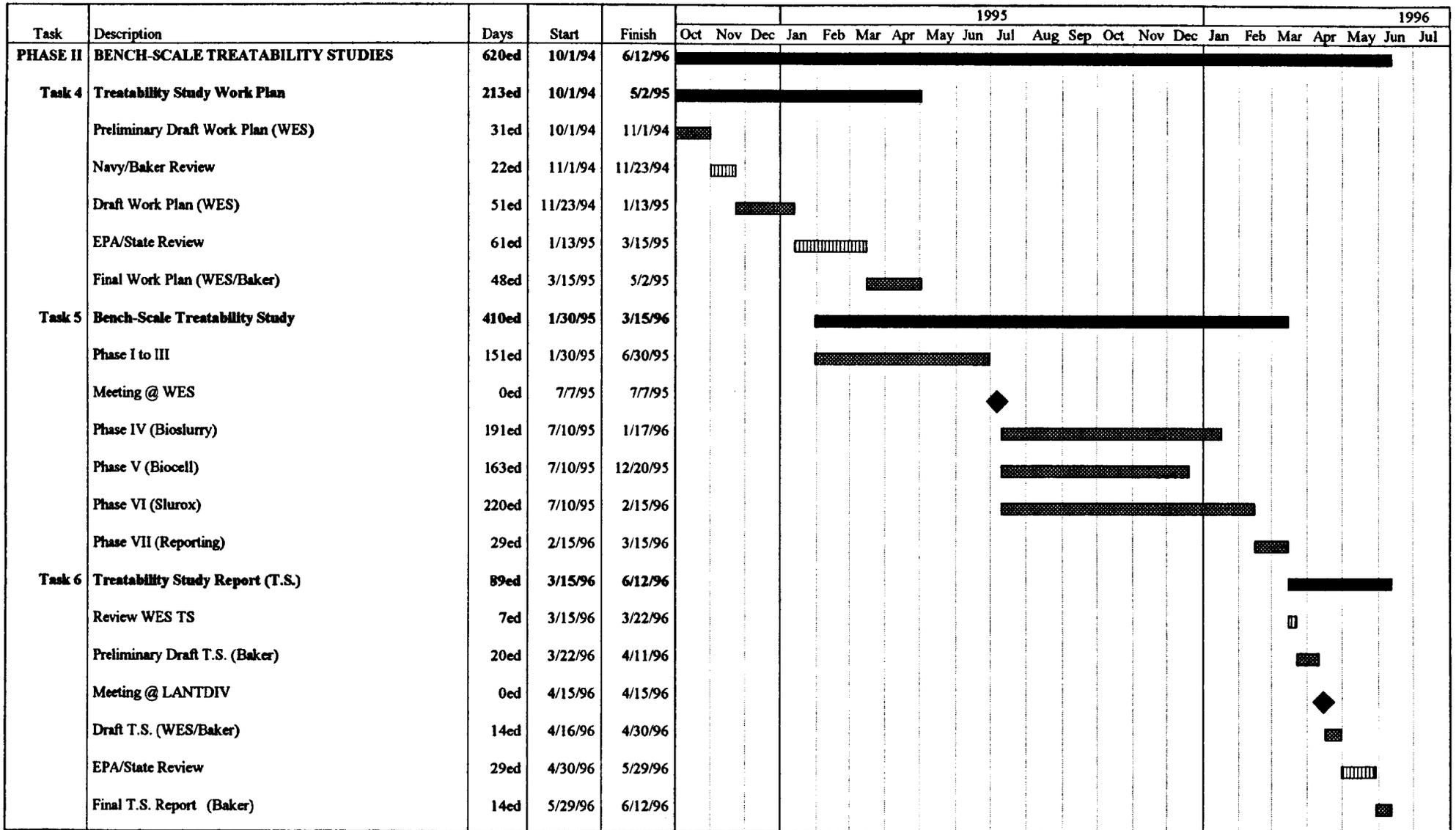
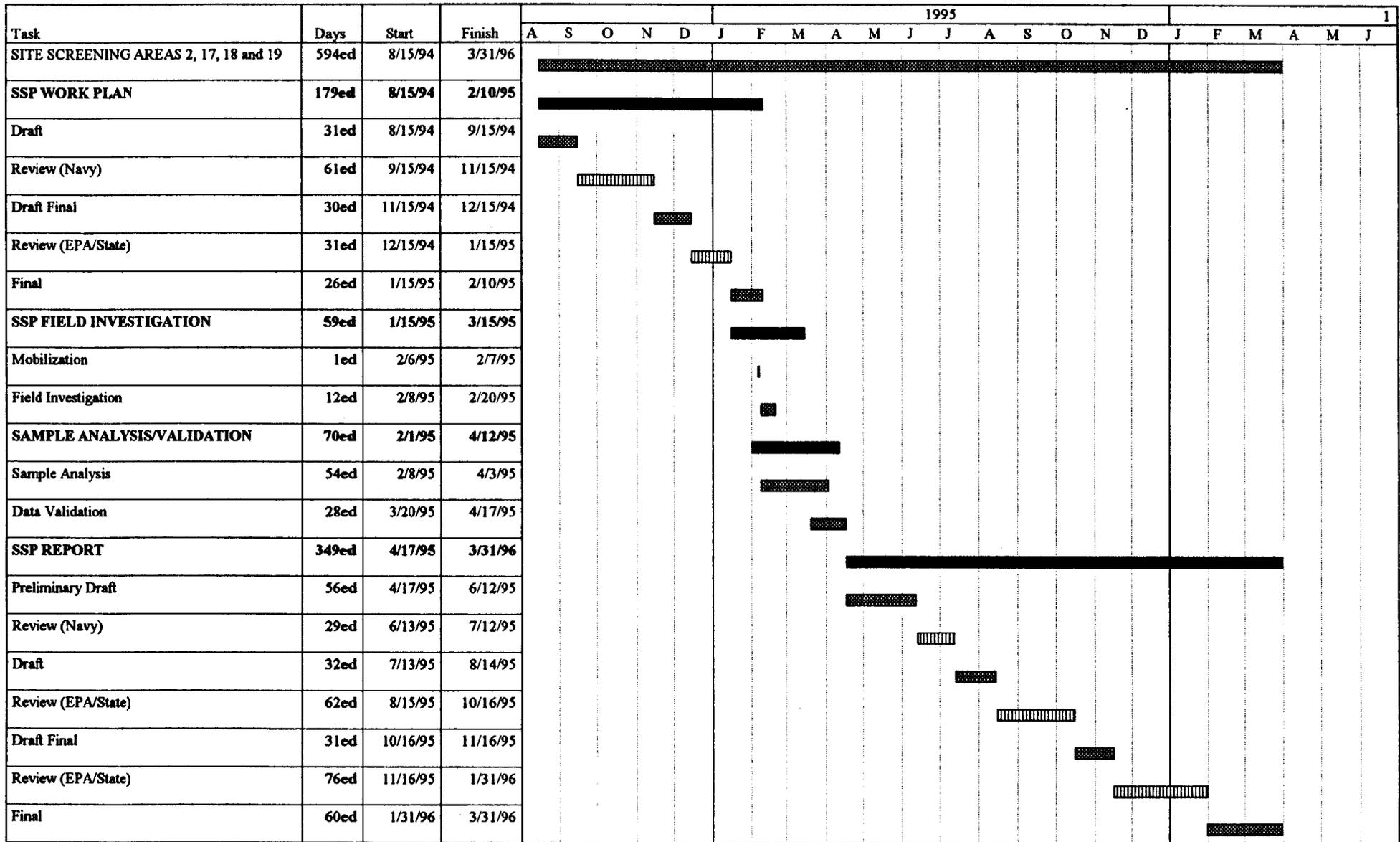


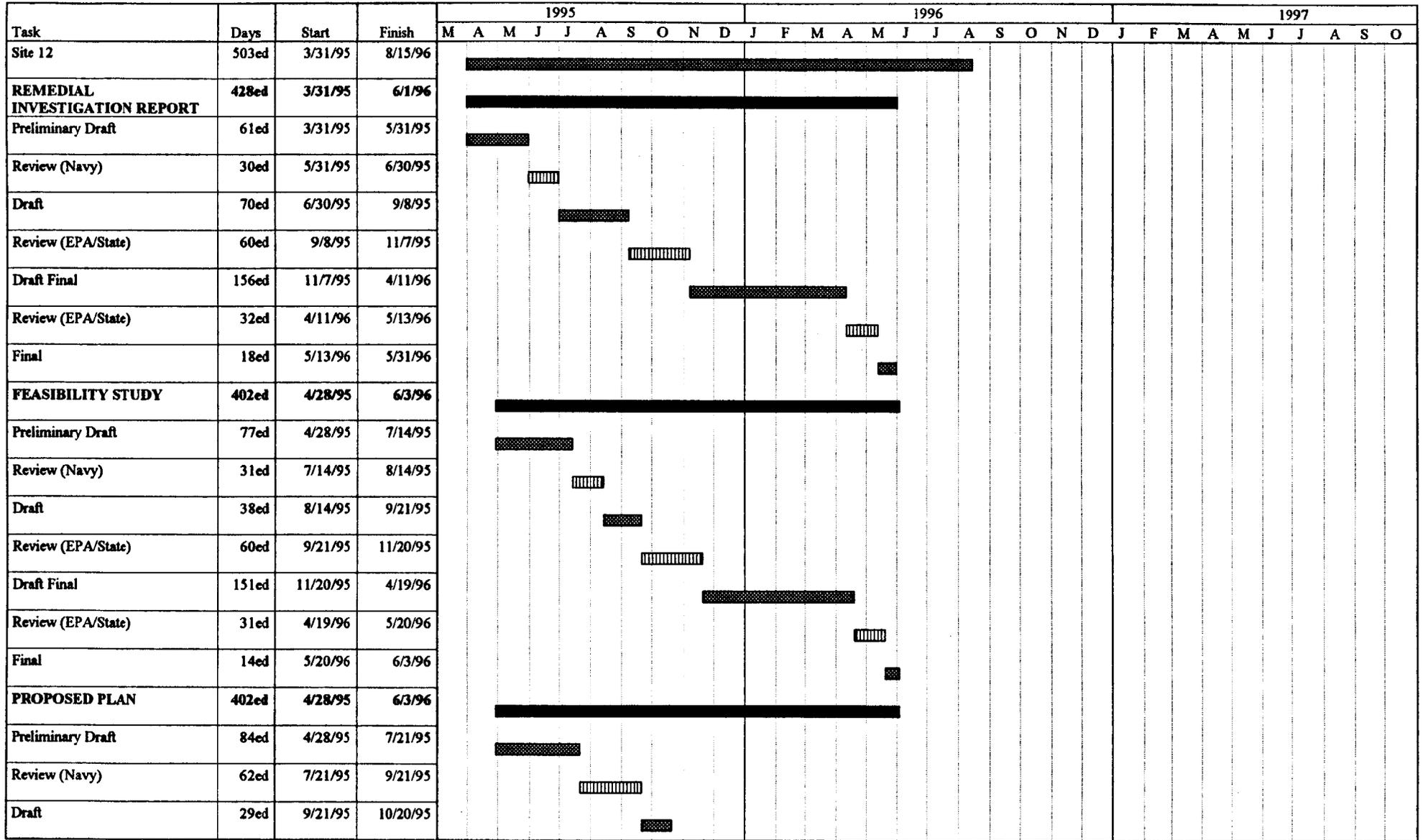
Figure E - 2
FY 1995: Site Screening Areas 2, 17, 18 and 19 Work Plan/Field Investigation/SSP Report
Naval Weapons Station Yorktown, Yorktown, Virginia



Note: Work Plan Production was funded in FY 1994.

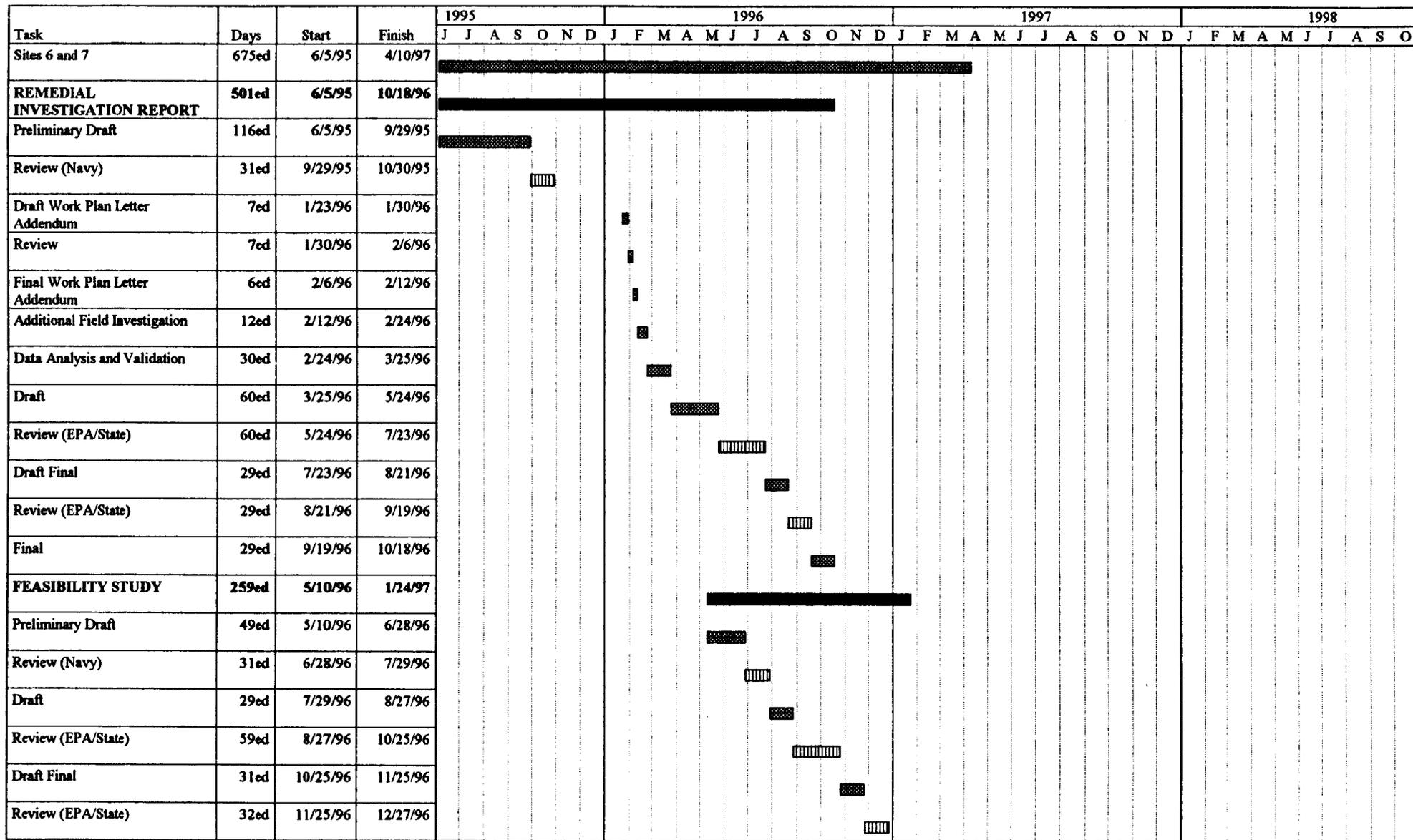
Figure E - 3

FY 1995: Site 12 Remedial Investigation/Feasibility Study/Proposed Plan/Record of Decision
 Naval Weapons Station Yorktown, Yorktown, Virginia



NOTE: Public Comment Period will close prior to finalization of the Record of Decision.

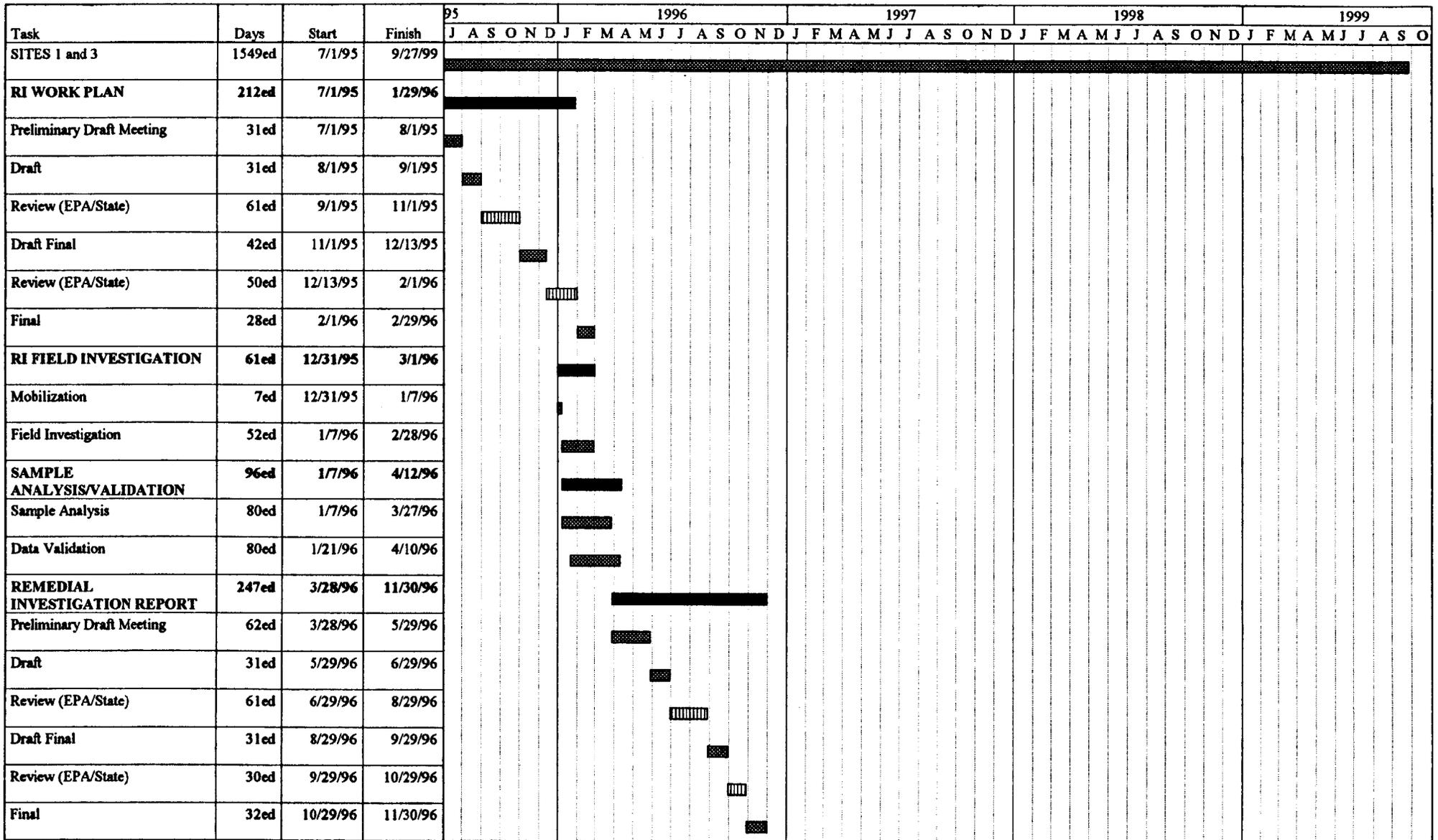
Figure E - 4
FY 1995: Sites 6 and 7 Remedial Investigation/Feasibility Study/Proposed Plan/Record of Decision
Naval Weapons Station Yorktown, Yorktown, Virginia



NOTE: Public Comment Period will close prior to finalization of the Record of Decision.

Figure E - 5

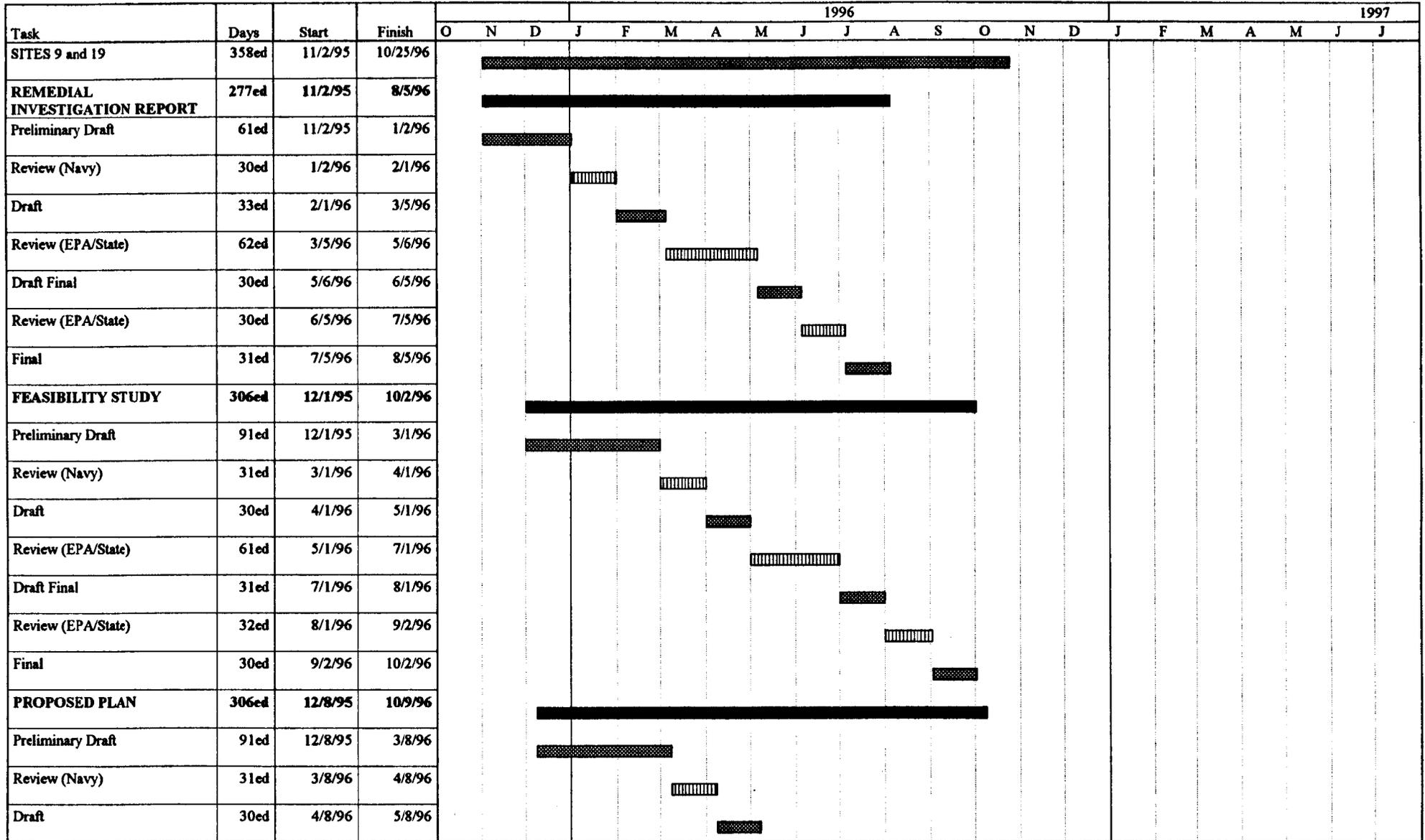
FY 1995: Sites 1 and 3 Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia



* Final ROD delayed due to funding for Remedial Action (construction).

Figure E - 6

FY 1995: Sites 9 and 19 Remedial Investigation/Feasibility Study/Proposed Plan/Record of Decision
 Naval Weapons Station Yorktown, Yorktown, Virginia



NOTE: Public Comment Period will close prior to finalization of the Record of Decision.

Figure E - 6

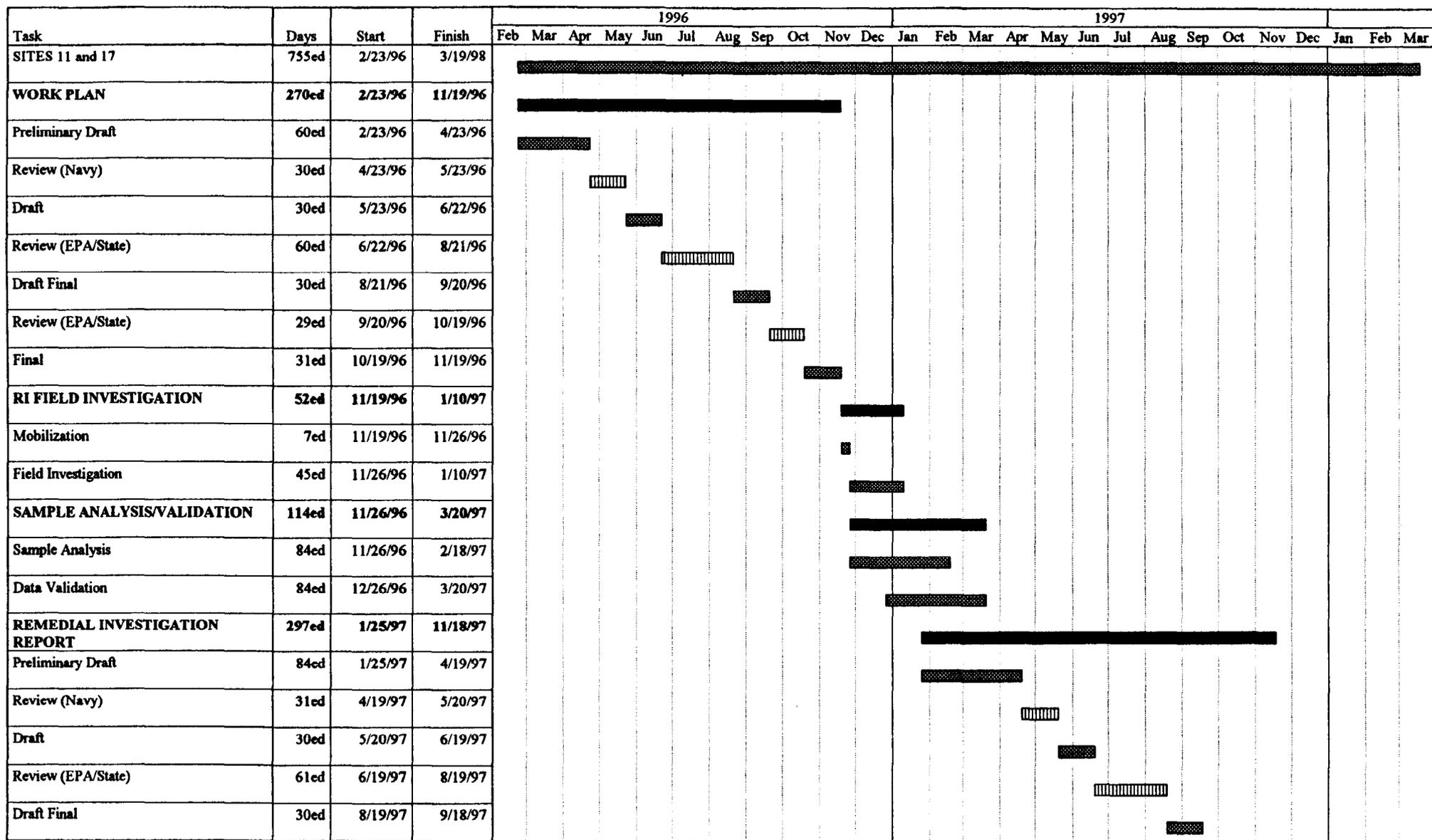
FY 1995: Sites 9 and 19 Remedial Investigation/Feasibility Study/Proposed Plan/Record of Decision
 Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1996												1997							
				O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
Review (EPA/State)	61ed	5/8/96	7/8/96																				
Draft Final	31ed	7/8/96	8/8/96																				
Review (EPA/State)	32ed	8/8/96	9/9/96																				
Final	30ed	9/9/96	10/9/96																				
PUBLIC COMMENT PERIOD	45ed	9/9/96	10/24/96																				
RECORD OF DECISION	239ed	2/29/96	10/25/96																				
Preliminary Draft	29ed	2/29/96	3/29/96																				
Review (Navy)	31ed	3/29/96	4/29/96																				
Draft	28ed	4/29/96	5/27/96																				
Review (EPA/State)	59ed	5/27/96	7/25/96																				
Draft Final	32ed	7/25/96	8/26/96																				
Review (EPA/State)	30ed	8/26/96	9/25/96																				
Final	30ed	9/25/96	10/25/96																				

NOTE: Public Comment Period will close prior to finalization of the Record of Decision.

APPENDIX F
DETAILED SCHEDULES: FY 1996
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure F - 2
 FY 1996: Sites 11 and 17, Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia



Note: Public Comment Period will close prior to finalization of the Record of Decision.

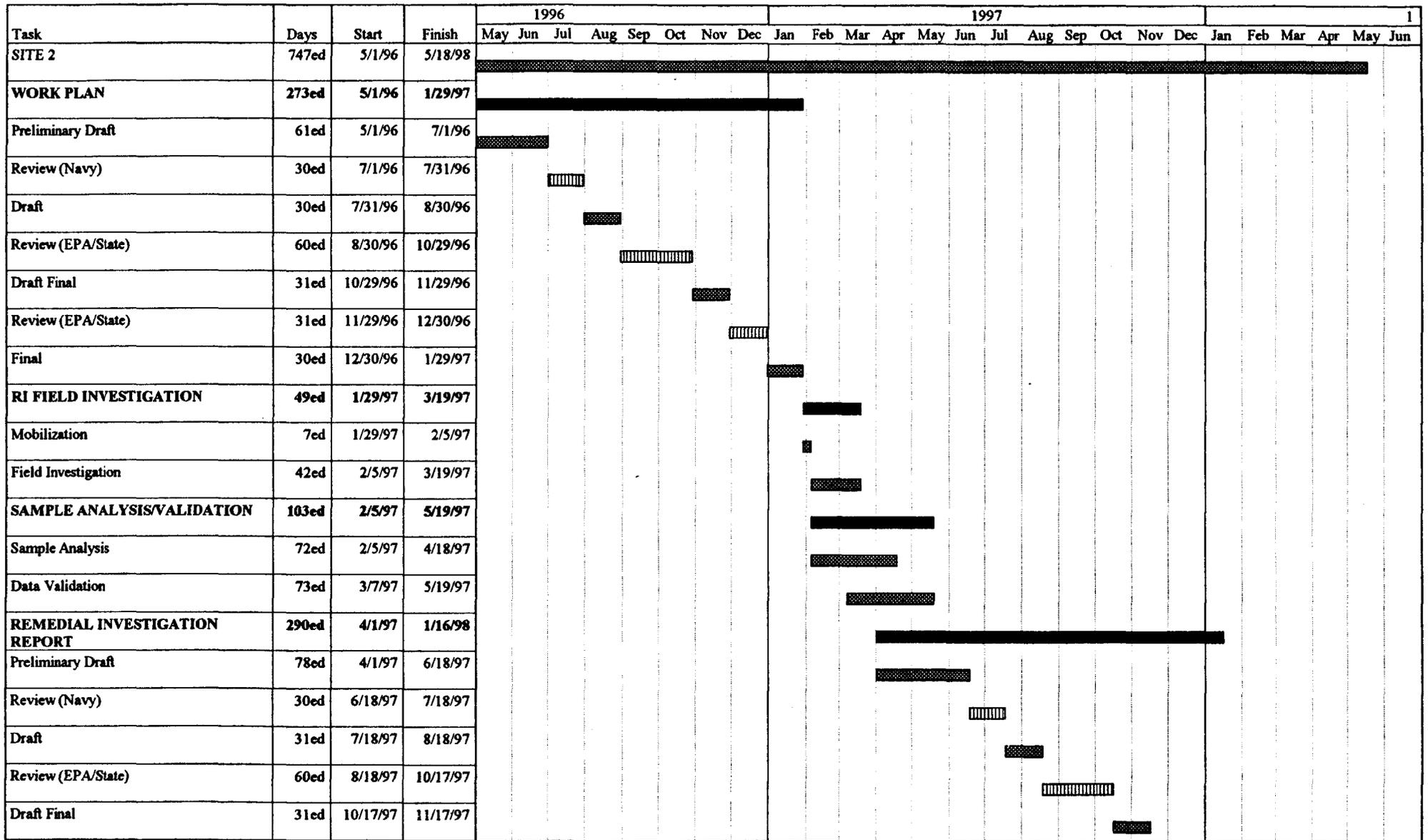
Figure F - 3
 FY 1996: Sites 4, 21, and 22, Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1996					1997					1998					1999					2000										
				J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J	M	M	J	S	N	J
Review (Navy)	31ed	7/22/97	8/22/97										■																					
Draft	31ed	8/22/97	9/22/97										■																					
Review (EPA/State)	60ed	9/22/97	11/21/97										■																					
Draft Final	31ed	11/21/97	12/22/97										■																					
Review (EPA/State)	30ed	12/22/97	1/21/98										■																					
Final*	56ed	8/4/00	9/29/00																															■

* Final ROD delayed due to funding for Remedial Action (construction). NOTE: Public Comment Period will close prior to finalization of the Record of Decision.

Figure F - 4

FY 1996: Site 2, Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia



Note: Public Comment Period will close prior to finalization of the Record of Decision.

Figure F - 5

FY 1996: Sites 8 and 18, Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1996					1997					1998					1999					2000									
				J	J	A	S	O	N	D	J	F	A	J	J	A	S	O	N	D	J	F	A	J	J	A	S	O	N	D	J	F	A
SITES 8 and 18	1579ed	6/3/96	9/29/00	[Solid black bar]																													
WORK PLAN	275ed	6/3/96	3/5/97	[Solid black bar]																													
Preliminary Draft	60ed	6/3/96	8/2/96	[Solid black bar]																													
Review (Navy)	32ed	8/2/96	9/3/96	[Solid black bar]																													
Draft	30ed	9/3/96	10/3/96	[Solid black bar]																													
Review (EPA/State)	60ed	10/3/96	12/2/96	[Solid black bar]																													
Draft Final	32ed	12/2/96	1/3/97	[Solid black bar]																													
Review (EPA/State)	31ed	1/3/97	2/3/97	[Solid black bar]																													
Final	30ed	2/3/97	3/5/97	[Solid black bar]																													
RI FIELD INVESTIGATION	40ed	3/5/97	4/14/97	[Solid black bar]																													
Mobilization	7ed	3/5/97	3/12/97	[Solid black bar]																													
Field Investigation	33ed	3/12/97	4/14/97	[Solid black bar]																													
SAMPLE ANALYSIS/VALIDATION	77ed	3/12/97	5/28/97	[Solid black bar]																													
Sample Analysis	63ed	3/12/97	5/14/97	[Solid black bar]																													
Data Validation	63ed	3/26/97	5/28/97	[Solid black bar]																													
REMEDIAL INVESTIGATION REPORT	273ed	5/2/97	1/30/98	[Solid black bar]																													
Preliminary Draft	61ed	5/2/97	7/2/97	[Solid black bar]																													
Review (Navy)	30ed	7/2/97	8/1/97	[Solid black bar]																													
Draft	32ed	8/1/97	9/2/97	[Solid black bar]																													
Review (EPA/State)	59ed	9/2/97	10/31/97	[Solid black bar]																													
Draft Final	31ed	10/31/97	12/1/97	[Solid black bar]																													

* Final ROD delayed due to funding for Remedial Action (construction). Note: Public Comment Period will close prior to finalization of the Record of Decision.

Figure F - 5

FY 1996: Sites 8 and 18, Work Plan/Field Investigation/RI Report/FS Report/PRAP/ROD
 Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1996			1997			1998			1999			2000									
				J	J	A	S	O	N	D	J	F	A	J	J	A	S	O	N	D	J	F	A	J	J
Review (Navy)	32ed	10/23/97	11/24/97																						
Draft	30ed	11/24/97	12/24/97																						
Review (EPA/State)	61ed	12/24/97	2/23/98																						
Draft Final	30ed	2/23/98	3/25/98																						
Review (EPA/State)	30ed	3/25/98	4/24/98																						
Final*	56ed	8/4/00	9/29/00																						

* Final ROD delayed due to funding for Remedial Action (construction). Note: Public Comment Period will close prior to finalization of the Record of Decision.

Figure F - 6
FY 1996: Site 12, Remedial Design
Naval Weapons Station Yorktown, Yorktown, Virginia

Task	Days	Start	Finish	1996												1997											
				J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M		
REMEDIAL DESIGN	409ed	6/3/96	7/17/97	[Solid black bar from June 1996 to July 1997]																							
Draft	151ed	6/3/96	11/1/96	[Dotted bar from June 1996 to November 1996]																							
Review (Navy/EPA/State)	62ed	11/1/96	1/2/97	[Hatched bar from November 1996 to February 1997]																							
Pre-Final	60ed	1/2/97	3/3/97	[Solid black bar from February 1997 to March 1997]																							
Review (EPA/State)	60ed	3/3/97	5/2/97	[Hatched bar from March 1997 to May 1997]																							
Final	61ed	5/2/97	7/2/97	[Solid black bar from May 1997 to July 1997]																							
Review (EPA/State)	15ed	7/2/97	7/17/97	[Hatched bar from July 1997 to July 1997]																							
CONSTRUCTION CONTRACTING	62ed	7/17/97	9/17/97	[Solid black bar from July 1997 to September 1997]																							

APPENDIX G
SUMMARY SCHEDULES: FY 1997
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure G - 2
FY 1997: SSAs 3, 9, and 14 Work Plan/Field Investigation/SSP Report
Naval Weapons Station Yorktown, Yorktown, Virginia

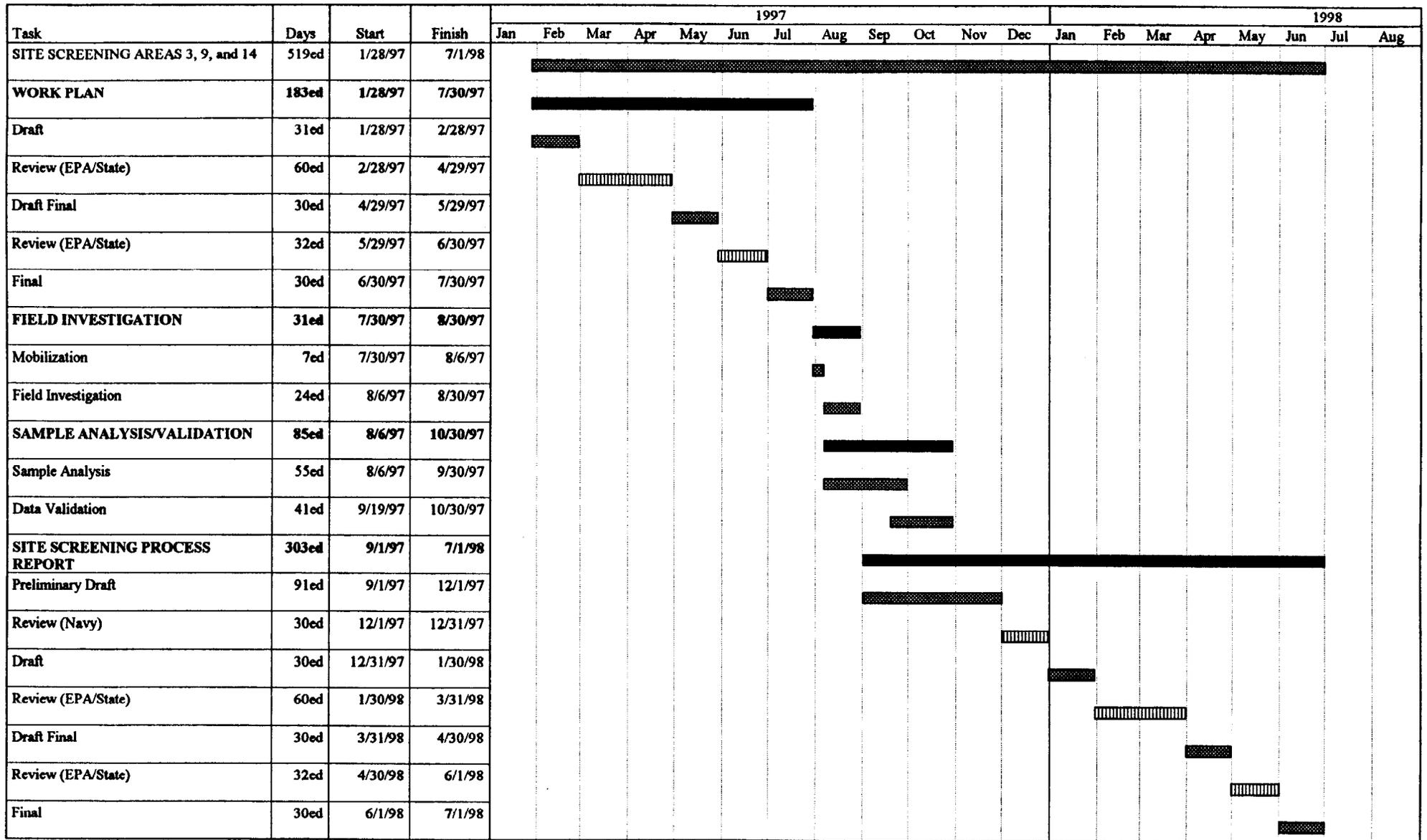
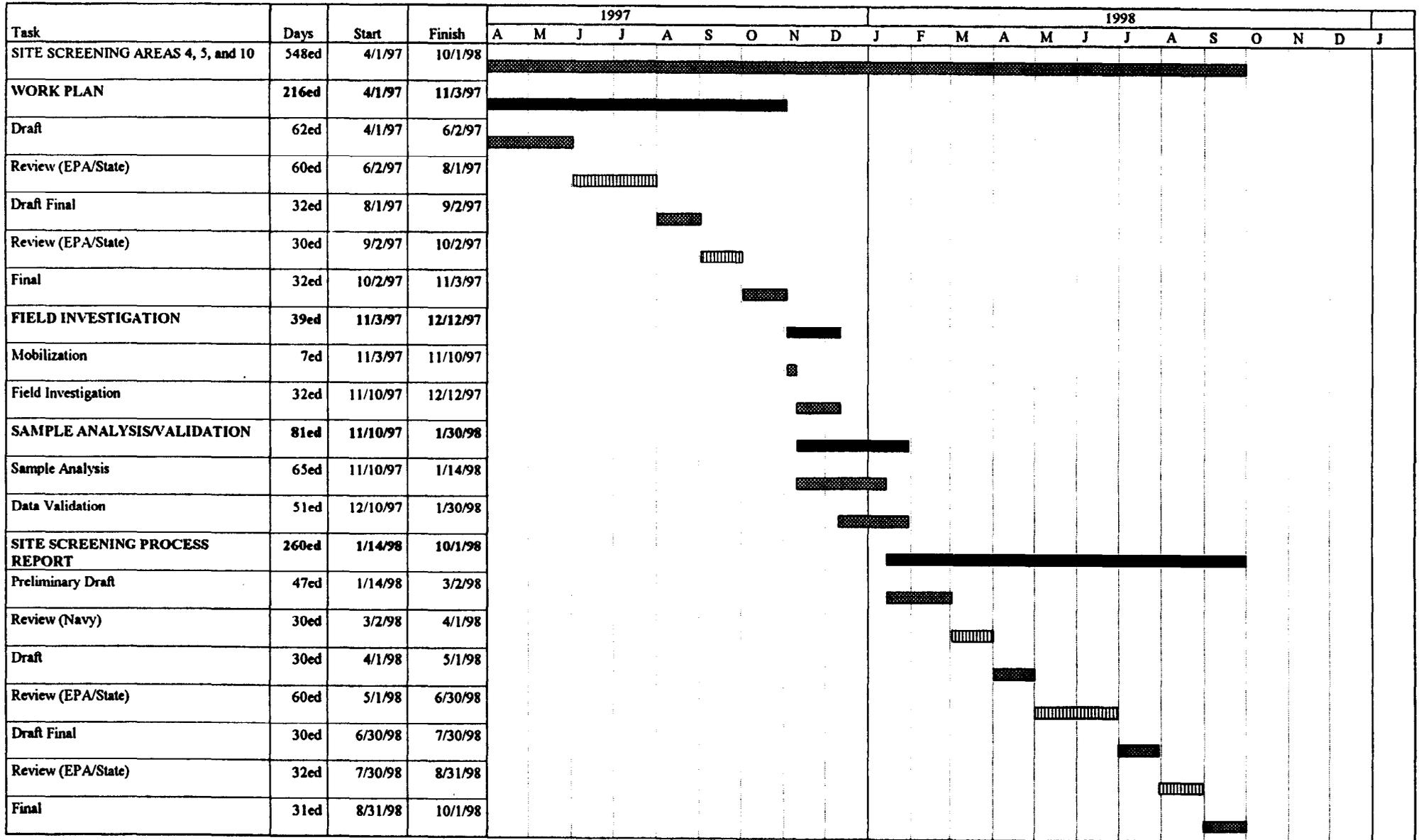


Figure G - 3
 FY 1997: SSAs 4, 5, and 10, Work Plan/Field Investigation/SSP Report
 Naval Weapons Station Yorktown, Yorktown, Virginia



APPENDIX H
DETAILED SCHEDULES: FY 1998 AND BEYOND
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure H - 1
 FY 1998 and beyond: Sites 11 and 17, Remedial Design
 Naval Weapons Station Yorktown, Yorktown, Virginia

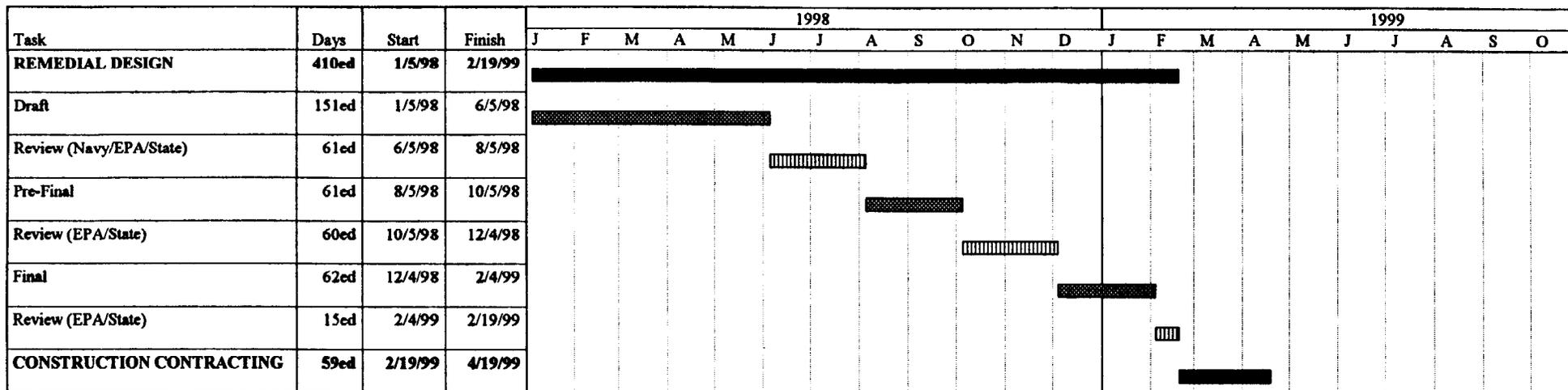


Figure H - 2
 FY 1998 and beyond: Site 2, Remedial Design
 Naval Weapons Station Yorktown, Yorktown, Virginia

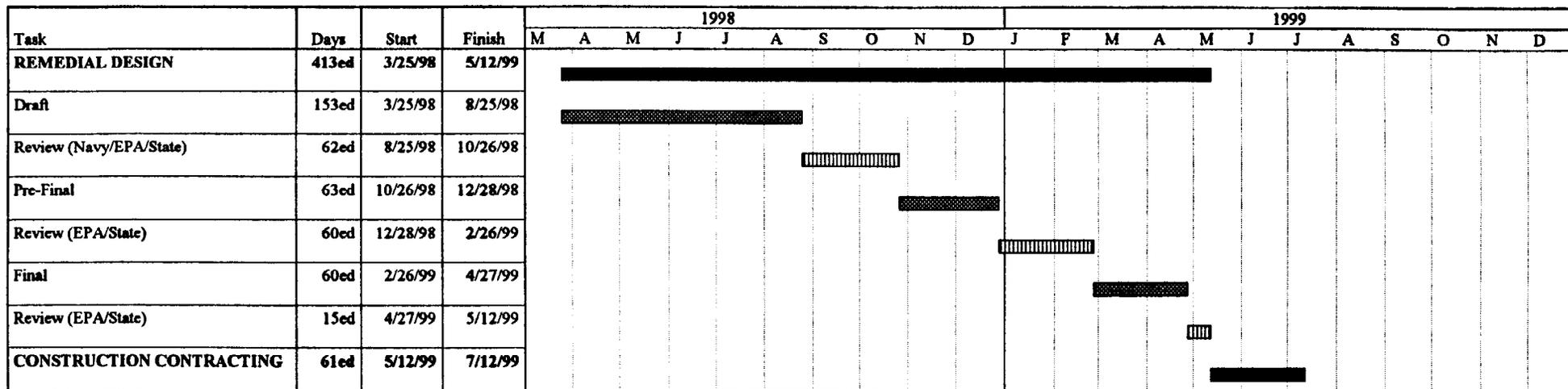


Figure H - 4

FY 1998 and beyond: SSA 20, Work Plan/Field Investigation/SSP Report
 Naval Weapons Station Yorktown, Yorktown, Virginia

