

21.0 SITE 22 – LOWER SUBBASE – PIER 33 (OU 4)

This five-year review is being conducted for Site 22 at the request of the USEPA. The site is still being investigated under CERCLA, and no decision documents have been prepared for the site.

21.1 HISTORY AND SITE CHRONOLOGY

A list of important Site 22 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Final Site Inspection Report, Pier 33 and Berth 16 completed.	1995
Final Lower Subbase RI Report completed.	1999
Final FS for soil and groundwater at the Lower Subbase being prepared.	TBD

21.2 BACKGROUND

Pier 33 is located at the Lower Subbase along the Thames River and includes Pier 33, Building 175, and approximately 800 feet of property in the area of Pier 33, Building 175, and Amberjack Road. The site map is included as Figure 21-1. The site's location relative to other IR sites is shown on Figure 1-2.

Building 175 was originally used to house several above-ground battery acid storage tanks (Atlantic, 1995a). The building was completely filled with large above-ground storage tanks. Transfer lines from the battery acid storage tanks extended along Amberjack Road in trenches to the piers (Atlantic, 1995a). These storage tanks and the associated transfer piping have been removed. There are no known or reported spills from the storage tanks or transfer system. Building 175 is currently used for miscellaneous storage and administrative purposes. No underground steam or fuel-oil utilities service Building 175.

A 1,000-gallon, underground fuel storage tank was located adjacent to the southern side of Building 175. The age and type of the tank are unknown. Based on a tank test performed on May 22, 1990, no leakage was identified. Stained soil was observed around the fill pipe of the UST, and concentrations of TPH detected in shallow and deep soil samples collected in the vicinity of the UST exceeded state and Federal criteria (Atlantic, 1995a). This information indicated that the UST was the source of the TPH contamination; this tank has since been excavated, removed, and replaced by a new 1,000-gallon UST. A 250-gallon, underground diesel fuel storage tank is located adjacent to the northern side of Building 175. This tank services an emergency generator for the sewage lift station. The age and type of this tank are unknown.

Zone 5 consists of Site 22. The area was investigated during the Pier 33 and Berth 16/Former Incinerator Site Investigation (Atlantic, 1995a) and the Lower Subbase Remedial Investigation (TtNUS, 1999b).

No. 2 fuel oil was detected in subsurface soils in front of Building 175 during the 1995 Site Investigation at were several details and TPH. Additional investigation of site operations and sediment analysis of the storm sewer system were recommended to determine the extent and source of sediment contamination. Removal and disposal of contaminated sediment and modification of any site operations identified as a contributor to the contaminated sediment were also recommended.

Additional soil, groundwater and sediment sampling (in the adjacent Thames River) were conducted at this zone in conjunction with the Lower Subbase RI. The Lower Subbase RI Report (TtNUS, 1999b) recommended that Zone 5 proceed to an FS to evaluate appropriate remedial alternatives. Because of the extensive amount of underground utilities in Zone 5 and the sensitive nature of the activities conducted at this location (i.e., national security), the FS for this zone should focus to the extent possible on alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives. A "hot spot" removal action for the petroleum contamination in the soil of Zone 5 should also be included in one of the alternatives evaluated during the FS. It was also recommended that the FS evaluate limited action scenarios for the groundwater and storm sewer system of Zone 5, in conjunction with the soil remedial alternatives. A combination of monitored natural attenuation and a tiered groundwater monitoring program should be evaluated for the groundwater. These recommendations are based on the following information:

- The nature and extent of organic and inorganic contamination in the soil and groundwater are well defined to the extent practical considering limitations presented by existing infrastructure.
- The contamination detected at Zone 5 is related to the former UST used to store heating oil and not to the battery acid above-ground storage tanks (ASTs) that were in Building 175. The UST has been replaced; therefore, the main source of the contamination has been eliminated.
- Monitored natural attenuation or bioremediation could be feasible alternatives for the petroleum contamination in the soil.
- Evidence suggests that limited organic contamination may be migrating from the site. Natural attenuation processes seem to be at work in the groundwater. These processes can reduce concentrations of petroleum contamination that reach the aquifer and convert the petroleum contamination to a less toxic form. Monitored natural attenuation should be further evaluated as part of the remedial strategy for the Zone 5 to confirm the effectiveness of these processes. The

monitored natural attenuation program should include or be part of a tiered groundwater monitoring program, similar to those currently being implemented at other NSB-NLON IRP sites. These programs confirm or disprove that contamination present in the soil is mobile and impacting other media and allow for further actions to be completed if the results show significant impacts.

- The baseline HHRA indicates that there are minimal risks to human receptors. None of the risks were in excess of the USEPA acceptable risk range, but the risk to the hypothetical future resident under the RME scenario slightly exceeded the CTDEP risk level. In addition, lead was not a COC for this zone; therefore, modeling was not necessary to evaluate exposure to lead.
- Although reported concentrations of TPH in site soil samples exceeded the state RSRs for direct exposure and pollutant mobility, the chemical-specific risk assessment for those compounds, assumed to be the major constituents of the observed TPH contamination, indicated minimal risks to potential human receptors.
- The zone is generally covered with pavement and a building, which minimizes direct exposure to the contaminated soil by human receptors.
- Elevated levels of inorganics, particularly lead, were detected in the sediment collected from a catch basin between Zones 5 and 6. Both zones contribute surface water to this catch basin. Slightly elevated levels of inorganics were also detected in the surface water samples collected from the storm sewer system for the National Pollution Discharge Elimination System (NPDES) permit. Therefore, the storm sewer system in Zone 5 may be acting as a migration pathway for inorganic contaminants. The lead contamination is believed to be the result of storage of lead ballast in this area and surface water runoff. The Navy has eliminated the storage of ballast in this area.
- The storm sewer system in Zone 5 is a potential migration pathway for contaminants present in the groundwater.
- The ERA for the Thames River adjacent to Zone 5 shows that the risks to ecological receptors in this area are relatively low.
- The groundwater at Zone 5 is not currently or anticipated to be used in the future as a potable water source because it is brackish; therefore, there is no imminent threat to human health.
- The Thames River provides significant dilution and mixing which minimizes the impact of contaminant migration from Zone 5.

The Navy subsequently cleaned the Lower Subbase storm sewer catch basins in August 2000. Two catch basins in Zone 5 were cleaned by Fleet Environmental using a vacuum truck. The material removed from the catch basins was containerized, tested (TCLP/TPH), and properly disposed off-site. The storm sewer lines were not surveyed or repaired during the effort. An FS is currently being generated for the Navy by EA Engineering.

21.3 REMEDIAL ACTIONS

21.3.1 Remedy Selection

A final remedy has not been implemented at Site 22. Conclusions cannot be made to support the determination that the remedy at Site 22 is protective of human health and the environment. An FS is currently being prepared to evaluate remedial alternative for the site. The Lower Subbase RI (TtNUS, 1999b) recommended that the FS for Zone 5, which includes Site 22, focus, to the extent possible, on alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives.

21.3.2 Remedy Implementation

A final remedy has not yet been chosen for Site 22. However, the Navy implemented an IR Site Use Restriction Instruction in October 2000 (Navy, 2000b) for ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater.

21.4 FIVE-YEAR REVIEW FINDINGS

21.4.1 Site Inspection

A site inspection conducted at Site 22 on April 10, 2001 included visual observations of the areas surrounding Building 175. Representatives of the Navy, USEPA, CTDEP, and TtNUS participated in the inspection. Conditions during the inspection were favorable, with mild temperatures and no precipitation. No signs of visual contamination or notable signs of impacts from the site were observed. Appendix A contains photographs taken of the site during the inspection.

The site is located within Zone 5 of the Lower Subbase, which consists of Pier 33, Building 175, and approximately 400 linear feet of additional river front property adjacent to these two structures. The area is covered with pavement or buildings and is adjacent to the Thames River and railroad. There is no short-term or long-term plan to convert this area to any other use.

21.4.2 Document and Analytical Data Review

The final Lower Subbase RI Report (TtNUS, 1999b) was reviewed for this five-year review. An FS is currently being completed to evaluate alternatives for remedial action at the site. It is expected that a decision document will be signed for the zone prior to the Second Five-Year Review and additional information regarding the document will be provided at that time.

21.4.3 ARAR and Site-Specific Action Level Changes

A ROD has not been signed for Zone 5, and therefore it cannot be determined at this time if the remedial actions are protective of human health and the environment.

Also, since a ROD has not been implemented for Zone 5, ARARs and site-specific action levels have not been reviewed to determine if there is a question on the protectiveness of the remedy.

21.5 ASSESSMENT

A final remedy has not been implemented at Zone 5. Conclusions cannot be made to support the determination that the remedy at Zone 5 is protective of human health and the environment. The results of the Lower Subbase RI do not indicate any imminent threats to human health or the environment.

The Navy has an IR Site Use Restriction instruction in place as of October 2000 at NSB-NLON. This policy restricts ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater at IR sites.

21.6 DEFICIENCIES

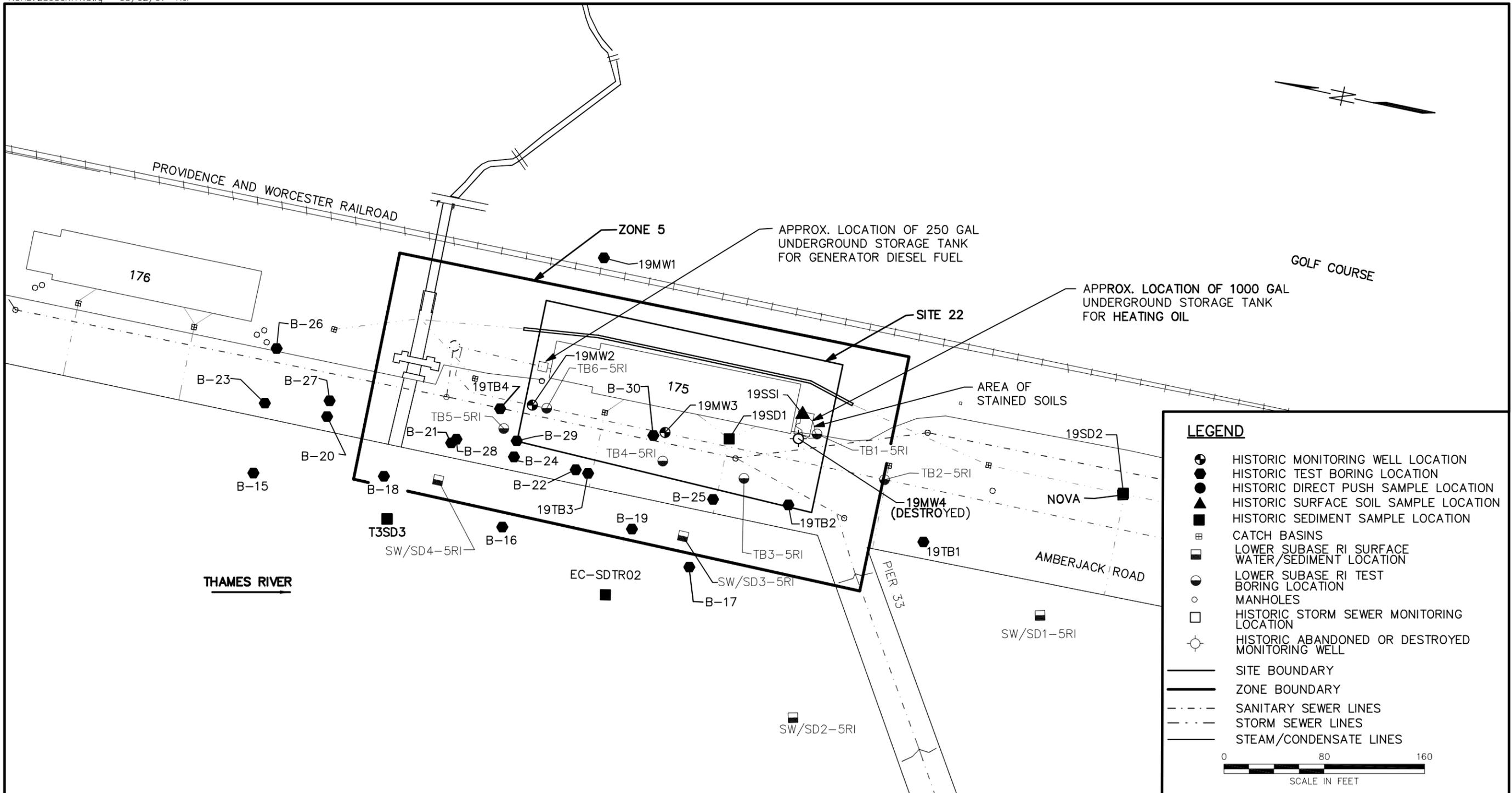
A final remedy has not been selected for Zone 5, therefore deficiencies cannot be determined at this time.

21.7 RECOMMENDATIONS AND REQUIRED ACTIONS

It is recommended that the FS be completed to determine the appropriate remedial action for the zone that is protective of human health and the environment. An appropriate decision document should be prepared after the FS is completed to document the selected remedial alternative. In addition, it is recommended that the IR Site Use Restriction instruction be enforced.

21.8 PROTECTIVENESS STATEMENT

A remedy for Zone 5 has not yet been selected by the Navy, USEPA, and CTDEP. The results of the Lower Subbase RI (TtNUS, 1999b) do not indicate any imminent threats to human health or the environment under current land use scenarios. The Navy has an IR Site Use Restriction policy in place regarding ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater at IR sites.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY HJP	DATE 5/2/01	 Tetra Tech NUS, Inc. SITE MAP SITE 22 - PIER 33 NSB-NLON GROTON, CONNECTICUT	CONTRACT NO. 2863	OWNER NO. 0816
							CHECKED BY	DATE		APPROVED BY	DATE
							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO.	REV.
										FIGURE 21-1	0

22.0 SITE 23 – TANK FARM

This five-year review is being conducted for Site 23 as a matter of policy since soil removal actions have taken place but a remedy for the groundwater has not been completed. The soil at Site 23 was investigated and remediated under the CTDEP RCRA UST Program. As such, no decision documents have been prepared for the soil OU. Groundwater associated with the site is currently being investigated under CERCLA.

22.1 HISTORY AND SITE CHRONOLOGY

A list of important Site 23 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Crystal Lake drained and dredged to allow for construction of nine concrete USTs.	1940's
Decommissioning and demolition of Tank OT-6.	1970's
Tanks OT-7 through OT-9 decommissioned.	1990
New Tank OT-10 installed and Tanks OT-4 and OT-5 decommissioned.	1990
Tanks OT-1 through OT-3 removed from service.	1991
Waste Oil Tank OT-5 investigated for demolition and closure.	1994
Site Investigation of Tank Farm completed to define extent of soil and groundwater contamination in the UST farm.	1997
Free-product removal and soil excavation completed at OT-8.	February 1998
Hydrogeologic study at the Tank Farm conducted to provide information to complete the design of a replacement storm sewer system.	1998
Tank Farm in the vicinity of OT-2 and OT-3 further investigated because weathered diesel fuel was detected in the storm sewers.	1999
Contaminated soil and free product remediated during storm drainage system rehabilitation by the Navy's RAC.	2000
Draft Final Basewide Groundwater OU RI completed.	August 2001

22.2 BACKGROUND

In the early 1940s, Crystal Lake was drained and dredged to allow for construction of the nine concrete USTs (see Figure 22-1). When construction was complete, the former lake bed was reportedly filled with soils excavated from a small hill west of the Tank Farm (Site 23) and graded to create a level surface for development at NSB-NLON. The location of Site 23 relative to the other IR sites is shown on Figure 1-2.

Each of the nine USTs had a holding capacity of 750,000 gallons. No. 6 fuel oil was stored in tanks OT-1 through OT-3 from the date of construction until they were removed from service in the summer of 1991. Tanks OT-7 through OT-9 were decommissioned in the summer of 1990 and were used exclusively for storage of diesel during all 48 years of service.

A reduced demand for diesel fuel at NSB-NLON in the mid-1970s led to the decommissioning and demolition of tank OT-6. The reduced demand for diesel also led to the modification of tank OT-5 for waste oil storage purposes. Tank OT-4 was used to store tank bottom wastes from OT-1. Tank OT-5 was used as part of an oil/water separator system. Tanks OT-4 and OT-5 were reportedly decommissioned after the installation of a new 30,000-gallon waste oil underground tank (OT-10) in 1990. For further information regarding OT-5, see Section 9.0. Tanks OT-1 through OT-9 have been demolished and closed in place. Tank closure was accomplished following RCRA closure requirements by cleaning the tanks, demolishing the tank roof supports, and allowing the roof to collapse into the tank. The void was then filled with gravel, and the site was restored using soil and topsoil.

Evidence of releases of petroleum products from these tanks and their associated piping and, possibly, from other nearby sources was detected during previous investigations. Historical sampling locations are shown on Figure 22-1. Both soil and groundwater contamination have been identified. Petroleum hydrocarbons have been detected periodically at the outfall of the Tank Farm storm sewer system. A number of petroleum releases were documented by the Navy in the vicinity of the Tank Farm at NSB-NLON from 1989 through 1999.

The Tank Farm features are shown on Figure 22-1 and include the following:

- Nine former 110-foot-diameter, 11-foot-high USTs (OT-1 to OT-9)
- A 30,000-gallon, double-walled UST (OT-10)
- An oil/water separator (at OT-10)
- A 10,000-gallon waste oil tank (at OT-10)
- A fuel oil loading area adjacent to Building 482
- Tanker truck dumping pad and trough (at OT-10)
- Associated UST piping systems
- The MWR Recreation Center (Building 461)
- Buildings 310, 322, and O-831
- Six baseball/softball fields
- A restroom facility (Building 445)
- Air sparging /soil vapor extraction (AS/SVE) facility for Navel Exchange (NEX) service station
- Two 150,000-gallon diesel ASTs

East of the Tank Farm are two high-rise barracks (Buildings 442 and 447). The site is bounded to the south by Crystal Lake Road. Located on Crystal Lake Road are four rental units, a long-term parking facility, and a dry cleaning facility.

The Base command building (Building 138), legal services (Building 137), and public works (Building 135) lie to the west. The Tank Farm is bounded on the north side by Tang Avenue. A carpentry and maintenance building (Building 406), the NEX department store and grocery store, the NEX gasoline service station (Building 428), and warehouses (Buildings 408, 409, and 410) are located on the northern side of Tang Avenue. Six baseball/recreational fields and a number of parking areas are located above the Tank Farm.

Product Transfer Lines

Product (No. 6 fuel oil or diesel fuel) was historically delivered via barge to a pier, where it was pumped via pipelines to the Tank Farm USTs through the Building 332 valve house. Product was transferred via pipeline from the USTs to the power plant or the submarines at the Lower Subbase on an as-needed basis.

The No. 6 fuel oil transfer lines were situated within concrete-lined trenches but were removed because No. 6 fuel oil is no longer used at NSB-NLON. The diesel lines have no trenches. Portions of the diesel fuel lines on the Lower Base were recently replaced. The lines located on the Upper Base are cathodically protected.

Storm Drainage System

The Tank Farm originally contained an extensive drainage system consisting of numerous catch basins, corrugated metal pipe, perforated corrugated metal pipe, vitrified clay pipe, and reinforced concrete pipe. According to NSB-NLON personnel, the drainage system served approximately one-third of the entire facility. Portions of the drainage system were installed with perforated corrugated metal pipe to depress the water table in the Tank Farm. The surface water and groundwater collected by the storm sewer system ultimately discharge to a boomed area of the Thames River, adjacent to the Goss Cove Landfill. Based on known elevations of storm sewer catch basins, the elevation of the drainage system is below the process piping.

The drainage system was rehabilitated in 2000. The original combined groundwater and stormwater system was separated into a deep groundwater and a new shallow stormwater system. The old deteriorated pipes in the groundwater collection system were slip-lined to improve their integrity and conductance. The old

tank ring-drains (French drains) were not rehabilitated, but their connection with the groundwater collection system was maintained. Groundwater sampling and analysis from the groundwater collection system is currently ongoing, and the results will be used to determine if some form of further action is required for groundwater.

As part of the drainage system rehabilitation project, contaminated soil and free product were also remediated. Contaminated soil and free product, which were previously identified during the Tank Farm Site Investigation Addendum in the vicinity of the former UST OT-3, were removed and disposed off site.

Tank Underdrain System

The nine former USTs (OT-1 to OT-9) at the Tank Farm were each rated for a nominal capacity of 750,000 gallons or approximately 100,000 cubic feet. Each tank was approximately 110 feet in diameter and 11 feet in depth. Depending on the season, the depth to groundwater in some areas of the site may be as little as 2 feet below grade. Groundwater at a depth of 2 feet would convert to a hydraulic pressure of 2.6 pounds per square inch exerted over the entire floor of one empty tank or an upward force of approximately 1,400 tons. The floor of the tank would rise, with or without its walls.

Tank stability was obtained using a combination of a site-wide drainage system, a series of columns inside the tanks, and an underdrain system. A site-wide stormwater drainage/dewatering system was installed and french drains were installed around OT-1, OT-2, OT-3, OT-4, and OT-5. A series of 37 columns transmitted the weight of the tank roof and overlying fill to the floor of the tank.

22.3 REMEDIAL ACTIONS

22.3.1 Remedy Selection

A final remedy has not been implemented at Site 23. The Navy has conducted three removal actions to address the contamination identified in the soil. Soil and free product were removed in the vicinity of OT-8 and OT-3 during the removal actions. Contaminated soil was also removed along Tang Avenue. The remedial goal for the removal actions at OT-8 and Tang Avenue was 2,500 mg/kg for TPH. This is the CTDEP DEC for commercial/industrial land use. In addition, BTEX compounds were historically detected in the groundwater in the Tank Farm, and it was determined that the contamination was related to leaking USTs from an adjacent site (NEX Gas Station). The leaking USTs have been repaired and an AS/SVE system was installed to address the associated BTEX plumes.

The draft final Basewide Groundwater OU RI (TtNUS, 2001e) recommends evaluating the results of the current sampling and analysis program for the groundwater collection system to determine if an FS or

NFA ROD is required for the groundwater OU. The groundwater OU is currently proceeding through the CERCLA process.

22.3.2 Remedy Implementation

At the time this five-year review was conducted, no detailed information (e.g., PRGs, volumes, etc.) regarding the removal actions that were conducted under the RCRA program at Site 23 was available.

A Remedial Action Contract Closeout Report was submitted to the Navy, USEPA, and CTDEP in July 1998 by Foster Wheeler that documented the excavations conducted to address free product and soil contamination at Site 23. In the submittal letter, Foster Wheeler stated that the actions were conducted in accordance with the Corrective Action Plan contained in the Site Investigation Report submitted on September 15, 1997. Approximately 783 tons of petroleum impacted soil was removed from Site 23 during the removal actions near OT-8 and Tang Avenue.

A final remedy has not yet been chosen for groundwater at Site 23. The Basewide Groundwater OU is expected to have a completed FS in March 2002.

22.4 FIVE-YEAR REVIEW FINDINGS

22.4.1 Site Inspection

A site inspection conducted at Site 23 on April 10, 2001 included visual observations of the tank farm area, that is currently used as a recreational area (softball fields, jogging track, etc.). Representatives of the Navy, USEPA, CTDEP, and TtNUS participated in the inspection. Conditions during the inspection were favorable, with mild temperatures and no precipitation. During the inspection, the flush-mount monitoring well ERM-19 was missing a lid. The Navy stated during the inspection that sampling of the groundwater collection system will continue until sufficient data is collected to determine the appropriate remedial actions for the groundwater OU. Appendix A contains photographs taken of the site during the review.

Site 23 is a partially fenced area that is currently used for recreation. Groundwater at Site 23 is not used for human consumption and it is not likely to be used for human consumption in the foreseeable future because of its current classification (i.e., GB groundwater that indicates that it is not suitable for direct human consumption without treatment). There are no short-term or long-term plans to convert this area to any other use.

22.4.2 Document and Analytical Data Review

The Basewide Groundwater OU RI report (TtNUS, 2001e) was reviewed for this five-year review. Removal action documentation and the Remedial Action Closeout Reports (Foster Wheeler, July 1998) for the removal actions conducted under RCRA were not available for review. A summary of the RI Report conclusions for Site 23 is presented below.

Petroleum contamination related to the former USTs and their associated piping was identified during previous investigations at Site 23. The Navy has conducted three removal actions to address the identified contamination. Soil and free product were removed in the vicinity of OT-8 and OT-3 during the removal actions. Contaminated soil was also removed along Tank Avenue. In addition, BTEX compounds were historically detected in the groundwater in the Tank Farm, and it was determined that the contamination was related to leaking USTs from an adjacent site (i.e., NEX Gas Station). The leaking USTs have been repaired and an AS/SVE system was installed to address the associated BTEX plumes.

Petroleum contamination was also historically detected in stormwater/groundwater collected from the Tank Farm. This stormwater/groundwater discharged to the Thames River adjacent to the Goss Cove Landfill. Typically, the contamination was detected during a storm event when high surface water flow rates passed through the combined storm sewer/groundwater collection system. To minimize this problem, the combined system was separated into a shallow surface water collection system and a deep groundwater collection system. A sampling and analysis program is currently being conducted to determine if any further action for the groundwater is necessary prior to discharge to the Thames River. Preliminary results from the program indicate that treatment may not be necessary, but a final decision on treatment will be made after more data are collected and the Navy consults further with the regulators (USEPA and CTDEP).

The objectives of the Basewide Groundwater OU RI at Site 23 were to further characterize the nature and extent of groundwater contamination and to quantify the risks to human receptors from the groundwater. Groundwater sampling results for Site 23 indicate that the water quality is generally good, with only sporadic, low-concentration detections of VOCs, SVOCs, and metals in site monitoring wells. A preliminary evaluation of natural attenuation data indicated that biodegradation and other natural attenuation processes might be acting to reduce organic contaminants to relatively insignificant levels in the Tank Farm. However, it was not recommended that a monitored natural attenuation alternative be pursued for the site.

The HHRA determined that risks posed by exposure of construction workers to groundwater at Site 23 are within USEPA and CTDEP acceptable levels, assuming that the workers are exposed to the maximum observed concentrations of site contaminants. Risks for hypothetical future adult residents

exposed to groundwater at Site 23 were less than or within USEPA and CTDEP acceptable levels, assuming that the resident is exposed to the maximum observed concentrations of site contaminants. However, the chemical-specific ILCR for PCE exceeded CTDEP's target level of 1×10^{-6} for individual chemicals, although the maximum detected concentration for PCE was less than its CTDEP RSR. The IEUBK model indicated no adverse effects are anticipated for hypothetical future child residents exposed to lead in the groundwater at Site 23.

Based on the results of the risk assessment and the fact that the groundwater at Site 23 is not used for human consumption and it is not likely to be used for human consumption in the foreseeable future because of its current classification (i.e., GB groundwater which indicates it is not suitable for direct human consumption without treatment), an FS is not currently warranted for this site. However, it is recommended that the decision for preparation of an FS for the groundwater OU at the Tank Farm be postponed until site conditions stabilize and the results of the current sampling and analysis program for the groundwater collection system determine the trends in groundwater contaminant concentrations. If the results of the monitoring program support that there are no unacceptable risks to human health or the environment, then an FS will not be prepared and the Navy will pursue a NFA ROD for the groundwater OU. If the results suggest that further actions are required, then the Navy will prepare an FS for the groundwater OU to develop appropriate remedial alternatives (TtNUS, 2001e).

22.4.3 ARAR and Site-Specific Action Level Changes

The Navy has conducted three removal actions to address the contamination identified in the soil. Soil and free product were removed in the vicinity of OT-8 and OT-3 during the removal actions. Contaminated soil was also removed along Tank Avenue. In addition, BTEX compounds were historically detected in the groundwater in the Tank Farm and it was determined that the contamination was related to leaking USTs from an adjacent site (NEX Gas Station). The leaking USTs have been repaired and an AS/SVE system was installed to address the associated BTEX plumes. These investigations and removal actions have been conducted under the RCRA program. Since a ROD has not been signed for Site 23, ARARs and site-specific action levels have not been reviewed to determine if there is a question on the protectiveness of the remedy.

22.5 ASSESSMENT

A final remedy has not been implemented at Site 23 for groundwater. Conclusions cannot be made to support the determination that the remedy at Site 23 is protective of human health and the environment.

The Navy has an IR Site Use Restriction instruction in place as of October 2000 at NSB-NLON [SOPA (ADMIN) NLONINST 5090.18]. The policy restricts ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater at IR sites.

22.6 DEFICIENCIES

A final remedy has not been implemented at Site 23, therefore deficiencies cannot be determined at this time.

22.7 RECOMMENDATIONS AND REQUIRED ACTIONS

It is recommended that the decision for preparation of an FS for the groundwater OU at the Tank Farm be postponed until site conditions stabilize and the results of the current sampling and analysis program of the groundwater collection system determine the trends in groundwater contaminant concentrations. If the results of the monitoring program support that there are no unacceptable risks to human health or the environment, then an FS will not be prepared and the Navy will pursue an NFA ROD for the groundwater OU. If the results suggest that further actions are required, then the Navy will prepare an FS for the groundwater OU to develop appropriate remedial alternatives. Also, it is recommended that there be enforcement of the IR Site Use Restriction instruction (Navy, 2000b).

22.8 PROTECTIVENESS STATEMENT

Previous removal actions completed under RCRA have addressed the soil OU at Site 23. A remedy for the groundwater OU at Site 23 has not yet been selected by the Navy, USEPA and CTDEP. Current land use controls should minimize exposure to contaminated groundwater.



LEGEND

- ⊕ Groundwater OU RI Well
- Existing Monitoring Well
- ⦿ Destroyed Monitoring Well
- Historical Temporary Well/Soil Boring
- Historical Soil Boring
- ⊙ Air Sparging Well
- ⦿ Vapor Testing Point
- ⊖ Vapor Extraction Well
- Former Tank Location
- Structure
- Southern Region Boundary



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE
							J. LAMEY	7/1/99
							CHECKED BY	DATE
							COST/SCHEDULE-AREA	
							SCALE	
							AS NOTED	

Tetra Tech NUS, Inc.

SITE MAP
SITE 23-TANK FARM
NSB-NLON, GROTON, CT

CONTRACT NUMBER 2863	OWNER NUMBER 0816
APPROVED BY DPC	DATE 2-21-01
APPROVED BY	DATE
DRAWING NO. FIGURE 22-1	REV 0

23.0 SITE 24 – LOWER SUBBASE – CENTRAL PAINT ACCUMULATION AREA (OU 4)

This five-year review is being conducted for Site 24 at the request of the USEPA. This site is still being investigated under CERCLA. No decision documents have been prepared for the site.

23.1 HISTORY AND SITE CHRONOLOGY

A list of important Site 24 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Building 174 was refitted to contain boat anchor sandblasting and painting activities.	1982
Building 174 used as the primary paint storage facility for all paints used for boat maintenance activities.	Late 1980s
Final Lower Subbase RI Report completed.	1999
Final FS for soil and groundwater at the Lower Subbase being prepared.	TBD

23.2 BACKGROUND

Site 24 - Central Paint Accumulation Area (Building 174) is located in the northern section of the Lower Subbase along the Thames River, immediately east of Pier 32. The site map is included as Figure 23-1. The location of Site 24 relative to other IR sites is shown on Figure 1-2.

In 1982, Building 174 was refitted to contain boat anchor sandblasting and painting activities (USEPA, 1995). Also, in the late 1980s, the building was used as the primary paint storage facility for all paints used for boat maintenance activities (USEPA 1995).

No investigations of the soil or groundwater were conducted at this site prior to the Lower Subbase RI. Soil, groundwater, and sediment sampling (in the adjacent Thames River) were conducted at this site in conjunction with the Lower Subbase RI (TtNUS, 1999b). For investigation purposes, Site 24 and the surrounding area were identified as Zone 6. Because of this approach, the remainder of this section only discusses information in terms of Zone 6.

The Lower Subbase RI Report (TtNUS, 1999b) recommended that Zone 6 proceed to an FS to evaluate appropriate remedial alternatives. Because of the extensive amount of underground utilities in Zone 6 and the sensitive nature of the activities conducted at this location (i.e., national security), the FS for this

zone should focus, to the extent possible, on alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives. It was also recommended that the FS evaluate limited action scenarios for the groundwater and storm sewer system of Zone 6, in conjunction with the soil remedial alternatives. A tiered groundwater monitoring program should be evaluated during the FS. These recommendations are based on the following information:

- The nature and extent of organic and inorganic contamination in the soil are well defined to the extent practical considering limitations from existing infrastructures. Organic and inorganic contamination was infrequently detected at low concentrations in the groundwater.
- The contaminants generally detected at Zone 6 are related to petroleum hydrocarbons and not to the historic operations at Site 24 - Central Paint Accumulation Area.
- The baseline HHRA indicates that there are minimal risks to human receptors and they are not in excess of the USEPA acceptable risk range, and only the hypothetical future resident under the RME scenario slightly exceeds the CTDEP risk level. The baseline HHRA indicates that there are minimal risks to human receptors. Noncarcinogenic risks for all receptor groups were less than the USEPA and CTDEP acceptable limit. Carcinogenic risks for all receptors were either less than or within USEPA's acceptable target risk range of 1E-4 to 1E-6. With the exception of the future resident under the RME scenario, all cancer risks were less than the CTDEP acceptable risk level of 1E-5. Benz(a)pyrene and arsenic were the main contributors to the cancer risk for the future resident. In addition, lead was not a COC for this zone; therefore, modeling was not necessary to evaluate exposure to lead.
- Although reported concentrations of TPH in site soil samples exceeded the state RSRs for direct exposure and pollutant mobility, the chemical-specific risk assessment for those compounds assumed to be the major constituents of the observed TPH contamination (PAHs) indicated minimal risks to potential human receptors.
- Evidence suggests that organic contamination is generally not migrating from the site but that limited inorganic contamination may be migrating from the site. Natural attenuation processes seem to be at work in the groundwater. These processes can reduce concentrations of petroleum contamination that reaches the aquifer and convert the petroleum contamination to a less toxic form. Groundwater monitoring will confirm natural attenuation and the limited migration of inorganics.
- A tiered groundwater monitoring program will allow for further actions to be completed if the results show significant impacts.

- The ERA for the Thames River adjacent to Zone 6 shows that the risks to ecological receptors in this area are relatively low.
- The Thames River provides significant dilution and mixing, which minimizes the impact of any contaminant migration from Zone 6.
- The zone is generally covered with pavement and a building, which minimizes direct exposure to the contaminated soil by human receptors.
- The groundwater at Zone 6 is not currently or anticipated to be used in the future as a potable water source because it is brackish (classified by CTDEP as GB groundwater); therefore, there is no imminent threat to human health.
- Elevated levels of inorganics, particularly lead, were detected in the sediment collected from a catch basin between Zones 5 and 6. Both zones contribute surface water to this catch basin. Slightly elevated levels of inorganics were also detected in the surface water samples collected from the storm sewer system for the NPDES permit. Therefore, the storm sewer system in Zone 6 may be acting as a migration pathway for inorganic contaminants. The lead contamination is believed to be the result of storage of lead ballast in this area and surface water runoff. The Navy has eliminated the storage of ballast in this area.
- The storm sewer in Zone 6 is a potential migration pathway for contaminants present in the groundwater.

The Navy subsequently cleaned the Lower Subbase storm sewer catch basins in August 2000. Two catch basins in Zone 6 were cleaned by Fleet Environmental using a vacuum truck. The material removed from the catch basins was containerized, tested (TCLP/TPH), and properly disposed off-site. The storm sewer lines were not surveyed or repaired during the effort. An FS is currently being generated for the Navy by EA Engineering.

23.3 REMEDIAL ACTIONS

23.3.1 Remedy Selection

A final remedy has not been implemented at Zone 6. Conclusions can not be made to support the determination that the remedy at Zone 6 is protective of human health and the environment. An FS is currently being prepared to evaluate remedial alternatives for this zone. The Lower Subbase RI

recommended that the FS for Zone 6 should focus to the extent possible on alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives.

23.3.2 Remedy Implementation

A final remedy has not been chosen for Zone 6. The date for finalization of the FS for the Lower Subbase zones is to be determined at this time. After the FS is finalized, a remedy will be selected by the Navy, USEPA, and CTDEP.

23.4 FIVE-YEAR REVIEW FINDINGS

23.4.1 Site Inspection

A site inspection conducted at Site 24 on April 10, 2001 included visual observations of the areas surrounding Building 174. Representatives of the Navy, USEPA, CTDEP, and TtNUS participated in the inspection. Conditions during the inspection were favorable, with mild temperatures and no precipitation. No signs of visual contamination or notable signs of impacts from the site were observed. Appendix A contains photographs that were taken of the site during the inspection.

The area is covered with pavement or buildings and is adjacent to the Thames River. There are no short-term or long-term plans to convert this area to any other use. The Lower Subbase is a high-security area at NSB-NLON.

23.4.2 Document and Analytical Data Review

The final Lower Subbase RI Report (TtNUS, 1999b) was reviewed for this five-year review. The RI recommended that the soil and groundwater OUs proceed to an FS to evaluate appropriate remedial alternatives. An FS is currently being completed to evaluate alternatives for remedial action at the site. It is expected that a decision document will be signed for the zone prior to the Second Five-Year Review and additional information regarding the document will be provided at that time.

23.4.3 ARAR and Site-Specific Action Level Changes

A ROD has not been signed for Zone 6, and therefore it cannot be determined at this time if the remedial actions are protective of human health and the environment.

Also, since a ROD has not been signed for Zone 6, ARARs and site-specific action levels have not been reviewed to determine if there is a question on the protectiveness of the remedy.

23.5 ASSESSMENT

A final remedy has not been selected for Zone 6. Conclusions cannot be made to support the determination that the remedy at Zone 6 is protective of human health and the environment. The results of the Lower Subbase RI do not indicate any imminent threats to human health or the environment.

The Navy has an IR Site Use Restriction instruction in place as of October 2000 at NSB-NLON [SOPA (ADMIN) NLONINST 5090.18]. The policy restricts ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater at IR sites.

23.6 DEFICIENCIES

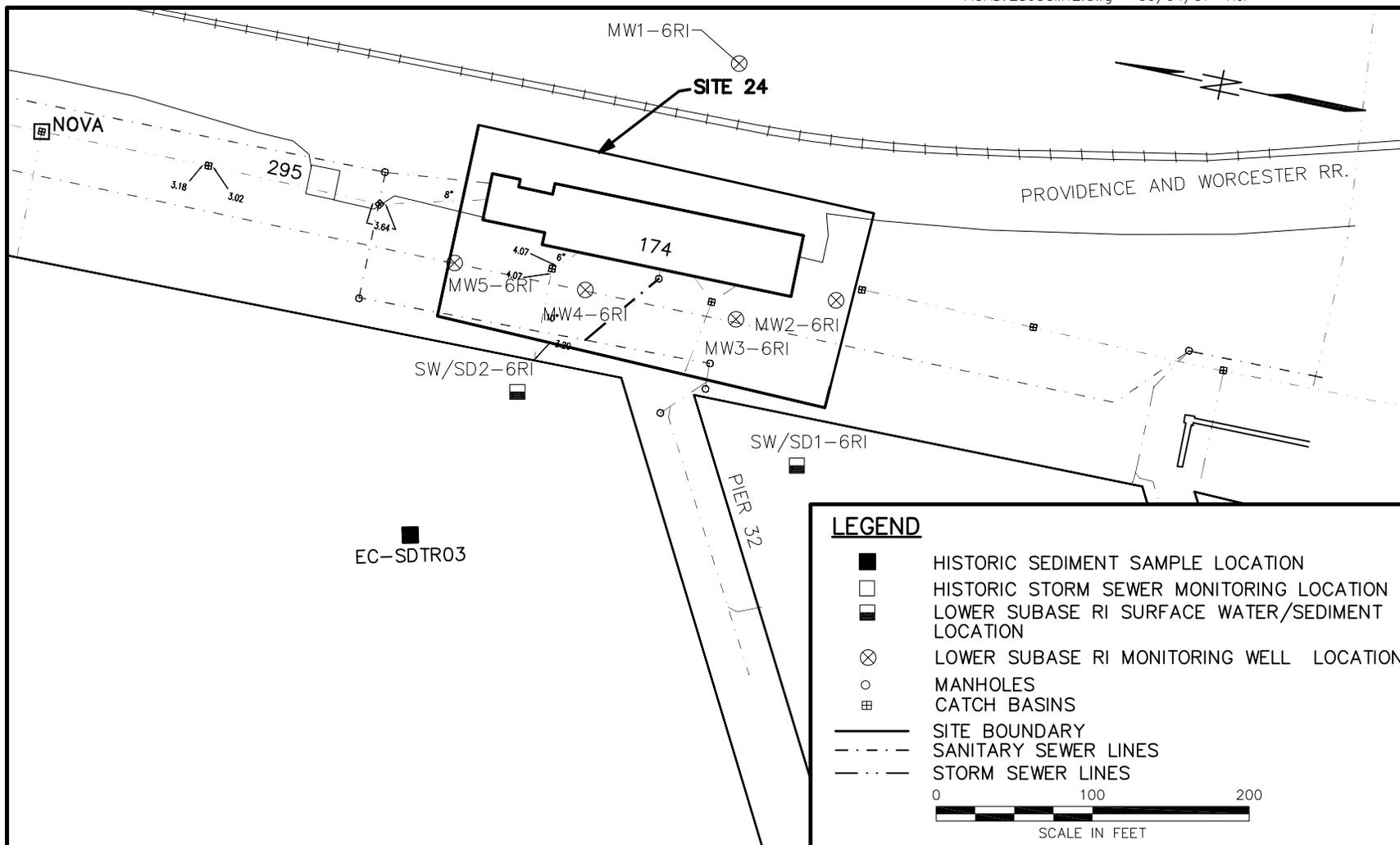
A final remedy has not yet been selected for Site 24, therefore deficiencies cannot be determined at this time.

23.7 RECOMMENDATIONS AND REQUIRED ACTIONS

It is recommended that the FS be completed to determine the recommended remedial action for Zone 6 that is protective of human health and the environment. An appropriate decision document should be prepared after the FS is completed to document the selected remedial alternative. Also, it is recommended that there be enforcement of the IR Site Use Restriction instruction (Navy, 2000b).

23.8 PROTECTIVENESS STATEMENT

A remedy at Site 24 has not yet been selected by the Navy, USEPA, and CTDEP. The results of the Lower Subbase RI do not indicate any imminent threats to human health or the environment under current land use scenarios. Current land use controls should minimize exposure to currently contaminated soil and groundwater.



DRAWN BY HJP	DATE 5/2/01	Tetra Tech NUS, Inc.	CONTRACT NO. 2863	OWNER NO. 0816
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA		SITE MAP SITE 24-CENTRAL PAINT ACCUMULATION AREA A (BUILDING 174) NSB-NLON GROTON, CONNECTICUT	APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO.	FIGURE 23-1
			REV.	0

24.0 SITE 25 – LOWER SUBBASE – CLASSIFIED MATERIALS INCINERATOR (OU 4)

This five-year review is being conducted for Site 25 at the request of the USEPA. This site is still being investigated under CERCLA. No decision documents have been prepared for the site.

24.1 HISTORY AND SITE CHRONOLOGY

A list of important Site 25 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Classified materials and solid wastes were burned in the incinerator.	1944-1963
Incinerator demolished.	1979
Final Site Inspection Report for Pier 33 and Berth 16 completed.	1995
Final Lower Subbase RI Report completed.	1999
FS for soil and groundwater at the Lower Subbase being prepared.	TBD

24.2 BACKGROUND

Site 25 consists of the former classified materials incinerator located on the Lower Subbase, approximately 300 feet east of Pier 17. The site map is included as Figure 20-1. The site's location relative to other IR sites is shown on Figure 1-2.

It has been reported that, between 1944 and 1963, facilities within former Building 97 (current Building 478) were used to burn classified materials and other solid wastes generated at NSB-NLON (USEPA, 1995). All materials generated by base operations that were not salvageable were incinerated at Site 25. Residual ash produced by materials burning were disposed in the Goss Cove Landfill (USEPA, 1995). Adjacent to the incinerator was a dumpster-cleaning operation. The incinerator became inoperable in 1963 and operations ceased. The incinerator was demolished in 1979, and Buildings 456 and 478 were constructed.

The Site Inspection completed for the site included soil gas surveys, a utility-inspection, drilling soil borings, installing monitoring wells and soil, groundwater, and sediment sampling (Atlantic, 1995a). Petroleum and metal contamination was identified during the Site Inspection.

Soil, groundwater, and sediment sampling (in the adjacent Thames River) and analysis were completed for this site in conjunction with the Lower Subbase RI (TtNUS, 1999b). This site was evaluated collectively

with Site 21 as Zone 7 during the RI. Because of this approach, the remainder of this section only discusses information in terms of Zone 7.

The Lower Subbase RI Report (TiNUS, 1999b) recommended that Zone 7, which includes Site 21 - Berth 16, Site 25 - Classified Materials Incinerator, and Transformers at Building 157, Vault 31, proceed to an FS for evaluation of appropriate remedial alternatives for the soil. Because of the extensive amount of underground utilities in Zone 7 and the sensitive nature of the activities conducted at this location (i.e., national security), the FS for this zone should focus, to the extent possible, on alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives. "Hot spot" removal actions for the lead contamination should also be evaluated during the FS. In addition, it is recommended that the FS evaluate limited action scenarios for the groundwater and storm sewer system of Zone 7 in conjunction with the soil remedial alternatives. The scenario should include a tiered groundwater monitoring program. These recommendations are based on the following information:

- The nature and extent of organic and inorganic contamination in the soil are well defined to the extent practical considering limitations from existing infrastructures.
- The baseline HHRA indicates that carcinogenic risks for full-time employees and hypothetical future residents under the RME scenario are in excess of the USEPA acceptable risk range and the CTDEP cumulative target ILCR. Noncarcinogenic risks for all receptor groups were less than the USEPA and CTDEP acceptable limit of one, except for the construction workers under the RME scenario. Although the RME HI for the construction workers slightly exceeded unity, adverse impacts are not anticipated since the major contributors (antimony and manganese) to the cumulative risk do not affect the same target organs. Cumulative risks to each individual target organ are expected to be less than unity. In addition, modeling performed to evaluate exposure to lead showed that all receptors (i.e., small children, fetuses of pregnant women, future employees, and construction workers) are at risk in Zone 7. These elevated risks (for lead, as well as other chemicals) assume that, sometime in the future, soils currently covered by pavement or buildings would be exposed and available for human contact.
- Evidence suggests that inorganic contamination (mainly lead) is migrating from the soil to the groundwater.
- Natural attenuation or bioremediation could be feasible alternatives for the petroleum contamination in the soil.

- The Navy has decommissioned the fuel lines that were once within Zone 7. Therefore, the historic source of petroleum contamination has been eliminated.
- The zone is covered with pavement or buildings, which minimizes direct exposure to the contaminated soil by human receptors.
- The data do not suggest that the petroleum contamination in the soil is significantly migrating to the groundwater. In addition, natural attenuation processes seem to be at work in the groundwater. These processes can reduce concentrations of petroleum contamination that reach the aquifer and convert the petroleum contamination to a less toxic form. Groundwater monitoring will confirm this information.
- A tiered groundwater monitoring program will allow for further actions to be completed if the results show significant impacts.
- The source of the lead contamination in the groundwater is the unsaturated soil of Zone 7. Appropriate remedial alternatives for the Zone 7 soil will be evaluated in the FS. Once the appropriate actions are taken, concentrations of lead in the groundwater will decrease.
- The ERA for the Thames River adjacent to Zone 7 shows that maximum concentrations of several non-AVS inorganics in Zone 7 sediments near the Lower Subase exceeded conservative guidelines (e.g., ER-Ls) indicating that potential risks may be present. The AVS/SEM analysis suggests that cadmium, copper, nickel, lead, and zinc are not bioavailable. Beryllium, cobalt, and vanadium were retained as COCs since no conservative sediment guidelines were available; no alternate guideline was available for barium, for which the maximum detected concentration exceeded the conservative guideline. They were concluded to not be of ecological significance in the NSB-NLON Phase II RI ERA for the Thames River. Benzo(a)pyrene was the only organic in Zone 7 sediments that had maximum and average concentrations in excess of guidelines. HQ values were low, 1.39 for the maximum concentration and 1.11 for the average concentration. The maximum concentration of benzo(a)pyrene was much less than its ER-M. Significant toxicity was not observed in Zone 7 sediment toxicity tests from the NSB-NLON Phase II RI using *Leptocheirus*. Survival of *Ampelisca* was significantly lower than survival in reference sediments. Significant mortality was not observed in Pier 17 EA toxicity tests with *Ampelisca*. The Pier 17 EA benthic community analyses concluded that the Pier 15 benthic community was relatively health, and the Pier 17 benthic community appeared to be disturbed. Significant bioaccumulation of some PAHs were observed Pier 17 EA bioaccumulation studies with *Macoma* and *Nereis*. Some bioaccumulation of PCBs was noted in *Nereis* but not in *Macoma*. Significant bioaccumulation of inorganics was not observed in either species. Low

concentrations of some inorganics and pesticides were detected in a blue mussel sample collected in Zone 7. The weight of evidence appears to be equivocal, suggesting significant potential risks to sediment-dwelling organisms from contaminants in Zone 7 near Pier 17 but not near Pier 15. However, most of the Pier 15 and Pier 17 sediments have been subsequently dredged making interpretation of biological analyses from historical studies difficult. Sediments were replaced with "clean" fill after dredging, which may have ameliorated some of the potential risks. The NSB-NLON Phase II RI suggested that potential risk in the Lower Subbase were confined to the Piers 15 and 17 area.

- The groundwater at Zone 7 is not currently or anticipated to be used in the future as a potable water source because it is brackish (CTDEP classified as GB); therefore, there is no imminent threat to human health.
- The Thames River provides significant dilution and mixing, which minimizes the impact of any contaminant migration from Zone 7.
- The storm sewer in Zone 7 is a potential migration pathway for contaminant present in the groundwater.

The Navy subsequently cleaned the Lower Subbase storm sewer catch basins in August 2000. Five catch basins in Zone 7 were cleaned by Fleet Environmental using a vacuum truck. The material removed from the catch basins was containerized, tested (TCLP/TPH), and properly disposed off-site. The storm sewer lines were not surveyed or repaired during the effort. An FS is currently being generated for the Navy by EA Engineering.

24.3 REMEDIAL ACTIONS

24.3.1 Remedy Selection

A final remedy has not been selected for Zone 7. Conclusions cannot be made to support the determination that the remedy at Zone 7 is protective of human health and the environment. An FS is currently being prepared to evaluate remedial alternatives for soil at the zone. The Lower Subbase RI recommended that the FS for Zone 7 evaluate appropriate remedial alternatives for the soil. Because of the extensive amount of underground utilities in Zone 7 and the sensitive nature of the activities conducted at this location (i.e., national security), the FS should focus, to the extent possible, on the evaluation of alternatives that rely on institutional controls to limit exposure to contaminated soil and passive and/or in-situ remedial alternatives. "Hot spot" removal actions for the lead contamination should

also be evaluated during the FS. In addition, it was recommended that the FS evaluate limited action scenarios for the groundwater and storm sewer system.

24.3.2 Remedy Implementation

A final remedy has not been chosen for Zone 7 at this time. The date for finalization of the FS for the Lower Subbase zones is to be determined at this time. After the FS is finalized, a remedy will be selected by the Navy, USEPA, and CTDEP.

24.4 FIVE-YEAR REVIEW FINDINGS

24.4.1 Site Inspection

A site inspection conducted at Site 25 on April 10, 2001 included visual observations of the areas surrounding Buildings 456 and 478. Representatives of the Navy, USEPA, CTDEP, and TtNUS participated in the inspection. Conditions during the inspection were favorable, with mild temperatures and no precipitation. No signs of visual contamination or notable signs of impacts from the site were observed. Appendix A contains photographs taken of the site during the inspection.

The area is covered with pavement or buildings and is adjacent to the Thames River. The Lower Subbase is a high-security area at NSB-NLON. There are no short-term or long-term plans to convert this area to any other use.

24.4.2 Document and Analytical Data Review

The final Lower Subbase RI Report (TtNUS, 1999b) was reviewed for this five-year review. The RI recommended that the soil and groundwater OUs proceed to an FS to evaluate appropriate remedial alternatives. An FS to evaluate alternatives for remedial action at the zone is currently being completed. It is expected that a decision document will be signed for the zone prior to the Second Five-Year Review and additional information regarding the document will be provided at that time.

24.4.3 ARAR and Site-Specific Action Level Changes

A ROD has not been signed for Zone 7, and therefore it cannot be determined at this time if the remedial actions are protective of human health and the environment.

Also, since a ROD has not been signed for Zone 7, ARARs and site-specific action levels have not been reviewed to determine if there is a question on the protectiveness of the remedy.

24.5 ASSESSMENT

A final remedy has not been selected at Zone 7. Conclusions cannot be made to support the determination that the remedy at Zone 7 is protective of human health and the environment. The results of the Lower Subbase RI do not indicate any imminent threats to human health or the environment.

The Navy has an IR Site Use Restriction instruction in place as of October 2000 at NSB-NLON [SOPA (ADMIN) NLONINST 5090.18]. The policy restricts ground surface disturbance of soils and/or groundwater at IR sites.

24.6 DEFICIENCIES

A final remedy has not yet been implemented for Zone 7, and therefore deficiencies cannot be determined at this time.

24.7 RECOMMENDATIONS AND REQUIRED ACTIONS

It is recommended that the FS be completed to determine the appropriate remedial action for Zone 7 that is protective of human health and the environment. An appropriate decision document should be prepared after the FS is completed to document the selected remedial alternative. Also, it is recommended that there be enforcement of the IR Site Use Restriction instruction (Navy, 2000b).

24.8 PROTECTIVENESS STATEMENT

A remedy for Zone 7 has not yet been evaluated and agreed upon by the Navy, USEPA, and CTDEP. The results of the Lower Subbase RI do not indicate any imminent threats to human health or the environment under current land use scenario. Current land use controls should minimize exposure to currently contaminated soil and groundwater.

25.0 BASEWIDE CONCLUSIONS AND RECOMMENDATIONS

The basewide conclusions and recommendations are presented below. These conclusions and recommendations are provided in the form of a basewide protectiveness statement and summary of the requirements of the next five-year review.

25.1 PROTECTIVENESS STATEMENT

The remedial actions that have been completed for the sites at NSB-NLON are protective of human health and the environment. Remedial actions to address immediate threats from exposure to soil and sediment have been implemented (Sites 1, 2, 3, 4, 6, 8, 9, 14, 15, and 23) or are expected to be implemented by the end of the Year 2001 [Sites 3 (new source area), 17, and 20]. The Navy is continuing CERCLA investigations of the remaining IR sites and Basewide Groundwater OU. Additionally, the Navy has an IR Site Use Restriction instruction in place as of October 2000 that restricts ground surface disturbance of soils or any subsurface disturbance of soils and/or groundwater at IR sites.

This five-year review shows that the Navy is generally meeting the requirements of the RODs for the sites at NSB-NLON. The deficiencies identified during the review and the approach to address the deficiencies are provided in Table 25-1.

25.2 NEXT REVIEW

Five-year reviews are required by statute or as a matter of policy, depending on the RAOs defined in the ROD and the remedial actions that were completed at the sites. NSB-NLON has sites requiring statutory and policy five-year reviews. This report represents the First Five-Year Review conducted at NSB-NLON. The next five-year review will be required in December 2006 (i.e., within 5 years of the signature date of this review). A summary of the anticipated requirements for the next five-year review is provided below.

The next five-year review should include a detailed review of the cost for implementing the remedial action at Site 8 and the Groundwater Monitoring Program to confirm that the remedy is proceeding as planned. The review should also include a detailed evaluation of the monitoring activities at Sites 2, 3, and 6 because, at the time of this review, these activities had only occurred for approximately 1 to 2 years. The O&M plans for Sites 2, 6, and 8 were not complete at the time of this review; therefore, the plans should be implemented and a review of the O&M costs should be completed during the next five-year review. The review should also verify that New London Instruction 5090.18 (Navy, 2000b) for institutional controls is being properly implemented.

25.2.1 Statutory Review

Sites 2, 6, and 8 will require a statutory review during the next five-year review for NSB-NLON. The next review of Sites 2, 6, and 8 will require the review of the annual long-term monitoring reports. Five-year reviews will continue at Sites 2, 6, and 8 because hazardous substances, pollutants, and contaminants remain at the sites that will not allow for the unlimited use or unrestricted exposure.

25.2.2 Policy Review

Sites 3, 4, 9, 14, 15, 17, 20, and 23 will require policy five-year reviews until the remedial actions are completed and the clean-up levels are achieved, resulting in unlimited use and unrestricted exposure.

An EE/CA and Action Memorandum should be prepared for a NTCRA for the soil and waste associated with the new source area north of Stream 5. In addition, the NTCRA should be completed. The next review for Site 3 will require the review of the completion report and any subsequent monitoring reports. The groundwater associated with this site is also being addressed by the Basewide Groundwater OU. The results of the long-term restoration activities will also need to be reviewed.

The results of the NTCRA for soil and waste at Site 14, completed in May 2001, will be summarized in a post-removal action report. The next review for Site 14 will require the review of the completion report. The groundwater associated with this site is also being addressed by the Basewide Groundwater OU.

A removal action was conducted at Site 17; however, not all contamination was addressed during the action. This site is still under investigation under CERCLA. During the next review, the remedial action that is recommended in the FS and agreed upon in the ROD for the site should be reviewed.

Site 20 has a signed ROD for soil and sediment; however, the removal action had not been completed at the time this review was conducted. The next review for Site 20 will require the review of completion reports for soil and sediment removal and any subsequent monitoring reports.

At Sites 9, 15, and 23 removal actions have been completed for the soil OUs and no hazardous substances remain on site that would limit use or restrict exposure. A NFA PRAP and ROD should be prepared for the Site 9 soil OU prior to the next five-year review. The groundwater OU for these sites is being addressed by the Basewide Groundwater OU RI (TtNUS, 2001e) and the groundwater may still contain contamination that would not allow for unlimited or unrestricted use. The next five-year review will require the review of the ROD that is prepared to document the remedial alternatives selected and implemented for the Basewide Groundwater OU.

The soil OUs associated with Sites 1 and 4 were addressed during the IRA at Site 2. Sites 1 and 4 have NFA decision documents for their soil OUs because the sites do not pose a threat to human health or the environment. The groundwater associated with both sites is currently being monitored through the Groundwater Monitoring Plan implemented at Site 2.

25.2.3 USEPA Recommended Review

Sites 7, 10, 11, 13, 16, 18, 19, 21, 22, 24, and 25 were included in this five-year review at the request of the USEPA. NFA PRAPs and RODs should be prepared for the Site 16 soil OU and the Site 18 soil and groundwater OUs prior to the next five-year review. No RODs have been prepared that identify the selected remedial action for the remaining sites, and no remedial actions have been conducted at these sites. These sites are currently being investigated under CERCLA. It is anticipated that RODs for these sites will be completed and remedial actions will be in progress at the time of the next review. The next review will update the appropriate sections to discuss the remedial actions that occurred at these sites.

TABLE 25-1

**DEFICIENCIES IDENTIFIED DURING THE FIRST FIVE-YEAR REVIEW
NSB-NLON, GROTON, CONNECTICUT**

Deficiency	Effects Protectiveness		Recommendation to Address Deficiency
	Current	Future	
Site 2 – Area A Landfill			
Lack of O&M of cap system	N	Y	Prepare and implement O&M plan.
Improper storage of heavy equipment on cap	N	Y	Prepare and implement O&M plan.
Maintenance/abandonment of MWs	N	Y	Conduct MW maintenance/abandonment.
Depression in rip rap along toe of the landfill	N	Y	Investigate and repair area.
Site 3 – Area A Downstream/OBDA			
New source area north of Stream 5	Y	Y	Prepare EE/CA and AM and conduct NTCRA.
Lack of monitoring well maintenance	N	N	Conduct MW maintenance/abandonment.
Proper stabilization of the southern bank of Stream 5	N	N	Stabilize southern bank of Stream 5.
Site 6 – DRMO			
Lack of O&M of cap system	N	Y	Prepare and implement O&M plan.
Area of possible settlement	N	Y	Investigate and repair area.
Maintenance of MWs and sampling equipment	N	Y	Conduct MW and equipment maintenance.
Site 9 – OT-5			
ROD for soil OU	N	N	Prepare NFA PRAP and ROD for soil OU.
Site 15 – SASDA			
Groundwater contamination detected during RI, NFA ROD may need to be revised	Y	Y	Revise ROD once RI/FS is completed.

MW – Monitoring Well.

AM – Action Memorandum.

Other abbreviations used in the table can be found in the Acronyms list.