Prepare in quintuplicate (original and 4 copies)

CONTRACTOR DRAWINGS & INFORMATION SUBMITTAL
NORTHNAVFACENGCOM 4335/3 (Rev. 6/80)

CONTROL NO. 5

CONTRACT NO.	DELIVERY ORDER	ACTIVITY LOCATION
N62472-94-D-0398	0017 Mod. #8	Naval Weapons Station Earle, Colts Neck, NJ

PROJECT TITLE:
PAINT CHIP AND SLUDGE DISPOSAL AREA

FROM:	DATE
Foster Wheeler Environmental Corp. - Program QCM: Akram Aziz	February 12, 1998
TO:	DATE
COTR: P. BRIEGEL (3 COPIES)	February 12, 1998

1. THE CONTRACTOR SUBMITTALS LISTED BELOW ARE FORWARDED FOR YOUR REVIEW AND RECOMMENDATIONS.
   (a) APPLY APPROPRIATE STAMP IMPRINT TO EACH SUBMITTAL AND INDICATE REVIEW COMMENTS, AS REQUIRED.
   (b) RETAIN ONE (1) COPY OF THIS TRANSMITTAL FORM AND RETURN REMAINING COPIES WITH REVIEWED SUBMITTALS TO ROICC.
2. THESE SUBMITTALS SHOULD BE RETURNED TO THIS OFFICE BY _____
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[x] ROICC **T. DUNN (2 COPIES)** [x] ENVIR. COORD **G. Goepfert (4 copies)** [ ]

2/12/98
SIGNATURE AND DATE

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1. THE SUBMITTALS LISTED BELOW HAVE BEEN REVIEWED AND ARE APPROVED/DISAPPROVED AS SHOWN BELOW AND ON EACH STAMP IMPRINT.

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FOR COMMANDING OFFICER, NORTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND — DATE

ITEM NO.	SUBMITTAL DESCRIPTION	PREPARED/ SUBMITTED BY	APPROVED	DISAPPROVED	REMARKS
5	SD-18, Records	A. Aziz			
	Final Work Plan for Paint Chip and				
	Sludge Disposal Area				

FOSTER WHEELER ENVIRONMENTAL CORPORATION

TO: Contracting Officer
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, PA 19113
Attn: P. Briegel

FROM: Mike Heffron, P.G.

DATE: February 12, 1998

SUBJECT: US NAVY CONTRACT NO. N62472-94-D-0398
DELIVERY ORDER 30017-MOD. NO. 8
NAVAL WEAPONS STATION-EARLE
FINALIZATION OF WORK PLAN FOR
SITE 19

Following are responses to the Navy's comments received from Greg Goepfert, comments during the Pre-Construction Meeting February 11, 1998, the NJDEP and U.S. EPA.

1. **COMMENT: Page 1-** Consult with Station Forester (Mr. Gentile: (732) 866-2295) for proper specification on topsoil, seed and trees used for site restoration.

   RESPONSE: Foster Wheeler Environmental contacted Mr. Gentile for specifications on topsoil, seed and tree restoration and incorporated his specifications in the final Work Plan

2. **COMMENT: Page 6-** I believe the "Proposed Plan" and the final "Record of Decision (ROD)" were the governing documentation of Public Approval for this project, not the "E.E.C.A."

   RESPONSE: The reference to the E.E.C.A was removed from the final Work Plan, and reference to the Proposed Plan and ROD were added to the Work Plan.

3. **COMMENT: Page 9, Paragraph 3.8-** Are you sure that MW19-07 will not be affected by excavation activities?

   RESPONSE: MW19-07 will not be affected by excavation activities. The monitoring well is to the southeast of the area that needs to be excavated.

2300 LINCOLN HIGHWAY EAST, ONE OXFORD VALLEY, SUITE 200, LANGHORNE, PA 19047-1829
TEL: 215-702-4000 FAX: 215-702-4045

4. **COMMENT: Page 15, Table 4-1-** Shouldn't PCE be included in the soil analysis for off-site disposal?

   RESPONSE: The full TCLP analysis indicated includes TCLP volatiles analysis which includes the analysis of PCE and other volatile organics.

5. **COMMENT: Page 12 -** It is a Navy requirement that a New Jersey Certified Lab be used to perform analysis work.

   RESPONSE: A statement saying that a New Jersey Certified Laboratory shall be used was added to Page 13 of the Work Plan.

6. **COMMENT: Page 23, Paragraph 5.2.3-** New Jersey Regulation 7:26E has just been revised (Technical Requirements for Site Remediation). Consult revision for any applicable changes.

   RESPONSE: The Work Plan was prepared utilizing the latest NJDEP Guidance (January 1998). There were no changes to 7:26E that were applicable to this site remediation effort.

7. **COMMENT: Page 24, Paragraph 5.2.4, Page 27, Paragraph 8.2 -** If decon water tests as "non-hazardous" perhaps it can be disposed of on-site, with the approval of the NJDEP.

   RESPONSE: The Work Plan was revised to reflect the fact that the decon water may disposed on site based on the analytical results, and with the approval of the NJDEP.

8. **COMMENT: Page 27, Paragraph 8.3 -** All manifests and shipping papers must be typed.

   RESPONSE: The statement "all manifests and shipping papers must be typed" was added to Section 8.3 of the Work Plan.

9. **COMMENT: Page 28, Paragraph 8.5 -** The Environmental Division must be notified if drums or containers of waste will be on-site.

   RESPONSE: A sentence was added to Section 8.5 to reflect the fact that the NWS-Earle Environmental Department will be notified of drums and containers on-site.

10. **COMMENT: General -** Contractor must advise Environmental and Safety Divisions of all hazardous materials brought on to Station and provide monthly usage.

    RESPONSE: This statement was added to Section 8.5 of the Work Plan.

11. **COMMENT: General** - Provide hatched drawing of work area prior to initiation of work, and a drawing of post excavation sampling points and results.

RESPONSE: Figure 3-1 was added to the Work Plan to depict the area to be excavated, in hatched marks, and the locations of the post excavation sampling points. The results shall be added to a figure which will go into the close-out report.

12. **COMMENT: Page 8-9, Paragraph 3.5** - How will stormwater runoff be controlled during the coarse of work? Note that all containers must be covered at the completion of the workday to minimize the potential of stormwater contact with tainted soils.

RESPONSE: Page 10 of the Work Plan discusses stormwater management procedures. A statement that all containers/piles shall be covered at the end of each work day was also added to page 10 of the Work Plan.

13. **COMMENT: Page 6 Paragraph 1** - All sediment samples shall be compared to the March 1991 "Guidance to Sediment Quality Evaluations", not the Soil Cleanup Criteria.

RESPONSE: The Work Plan was revised to reflect the fact that the analytical data from the sediment samples must comply with the NJDEP Guidance to Sediment Quality Evaluations and other ARARs.

14. **COMMENT:** It is recommended that MW19-05 remain open. This well along with, MW19-02 and MW19-07 would form an acceptable, post remedial monitoring network, since the ground water flow is to the west in this area.

RESPONSE: All monitoring wells shall remain in place, none shall be abandoned. The Work Plan was revised to remove the abandonment of any monitoring wells.

15. **COMMENT:** Excavation and removal of any soil and sediments found to exceed the soil and sediment clean-up standards subsequent to post-excavation sampling (e.g., if the post-excavation samples reveal that not all of the contaminated material was removed, the work plan does not address the additional work required).

RESPONSE: A statement was added to Section 3.5 to clarify that if the confirmatory soil samples, or post excavation samples, reveal concentrations above the cleanup criteria for soils or sediments, the area will be excavated and samples recollected.

16. **COMMENT:** The topsoil used as backfill should be anlayzed to ensure that non-acidic soils are used for backfill and reseeding.

RESPONSE: Table 4-1 was modified to reflect the analysis of the topsoil for parameters indicating acidic soil.

FINAL
WORK PLAN
FOR
SITE 19: PAINT CHIP AND SLUDGE DISPOSAL AREA
AT
NAVAL WEAPONS STATION - EARLE
COLTS NECK, NEW JERSEY

Issued:

February 12, 1998

Prepared for:

Naval Facilities Engineering Command
10 Industrial Highway
Lester, PA 19113

Prepared by:

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REMEDIAL ACTION CONTRACT N62472-94-D-0398
DELIVERY ORDER NO. 0017
MODIFICATION NO. 8

Revision	Date	Prepared By:	Approved By:	Pages Affected
1	February 12, 1998	M. Heffron, P.G.	J. Gorgol, P.E.	1, 6, 8, 10, 11, 13, 16, 25, 26, 29, 30

CD97#20/97749

FINAL
WORK PLAN
FOR SITE 19
PAINT CHIP AND SLUDGE DISPOSAL AREA
AT
NAVAL WEAPONS STATION - EARLE
COLTS NECK, NEW JERSEY

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1.0 INTRODUCTION/ PROJECT OBJECTIVES

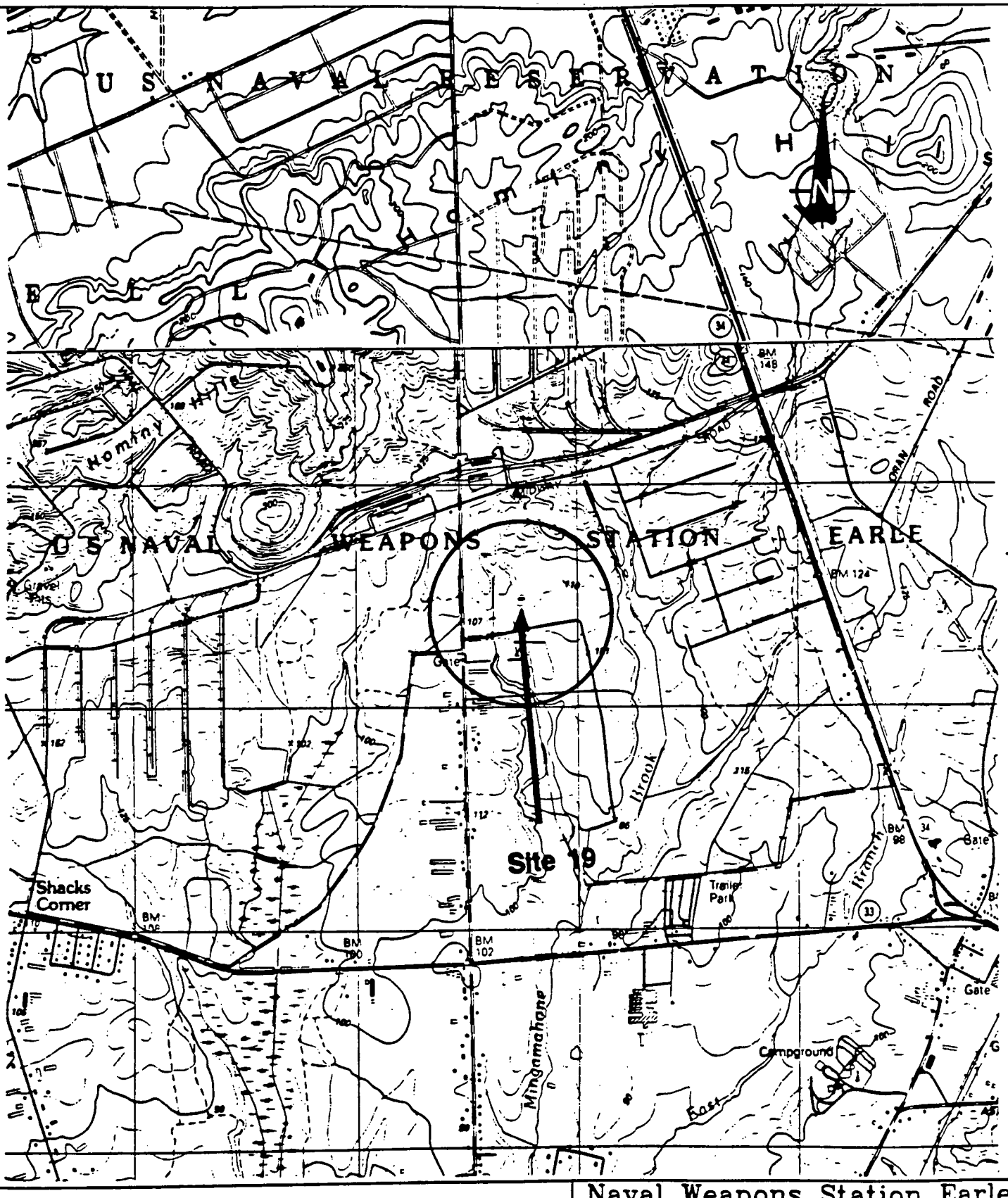
Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) has been contracted by the Northern Division, Naval Facilities Engineering Command (NORTHDIV) to excavate and dispose of contaminated soil at Site 19, near the former location of Building S-34, at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. This Work Plan is being submitted to satisfy one of the pre-construction submittal requirements included in paragraph 1.2.1, Pre- and Post-Construction Documentation of the Statement of Services for Delivery Order No. 0017, Modification No. 4 under Remedial Action Contract No. N62472-94-D-0398. A Health and Safety Plan shall be submitted as separate submittal documents.

Project objectives include the excavation and disposal of all soil found to be contaminated in and around a small settling pond and drainage ditch at the site. Contaminated soil and sediment present in the settling pond and drainage ditch shall be transported to an off-site disposal facility to be determined based on waste characterization analysis done prior to excavation. The drainage pipe under the asphalt shall be removed as part of the remediation. The settling pond shall be backfilled with clean fill, graded to match the surrounding terrain, and restored with asphalt. The drainage ditch shall be restored with topsoil, seed, and trees, as per specifications in Section 3.9.

2.0 PROJECT LOCATION AND DESCRIPTION

NWS-Earle is located in east-central Monmouth County in the town of Colts Neck, New Jersey. Building S-34 was formerly located on the Mainside portion of the NWS-Earle facility, off of Tulagi Road. Site 19 is located south of the former location of Building S-34. A branch of the Mingamahone Brook runs from north to south adjacent to the eastern side of Site 19. Refer to Figure 2-1 for the location of Site 19. The site is a 300-foot circular area that is surrounded by woodlands. Refer to Figure 2-2 for site layout. The topography is relatively flat, approximately 150 feet above MSL.

Site 19 is an ordnance maintenance area where paint chips and paint sludge were discharged to a topographic depression near Building S-34. The site was in operation from the early 1940s until the early 1960s. Paint slurries and solvent residues were discharged into the open drainage swale. Half of Site 19, from the former location of Building S-34 south to the site perimeter, is paved. The remainder of the clearing has a gravel surface. The depression that received the sludge discharge is an approximately 50-foot diameter, 5 to 10-foot deep settling pond which is located in the center of the 300-foot clearing. The former settling pond is covered with trees, ranging in size in size from 2 inches in diameter to 10 inches in diameter. A 12 inch diameter concrete drain pipe runs underground from the settling pond to a small drainage ditch to the southwest. The drain pipe is located under a paved area of the site. The drainage ditch runs from the



0 .5 1 Mile

Source: U.S.G.S. 7.5 Min. Topographic Map
Marlboro & Farmingdale, NJ Quadrangles

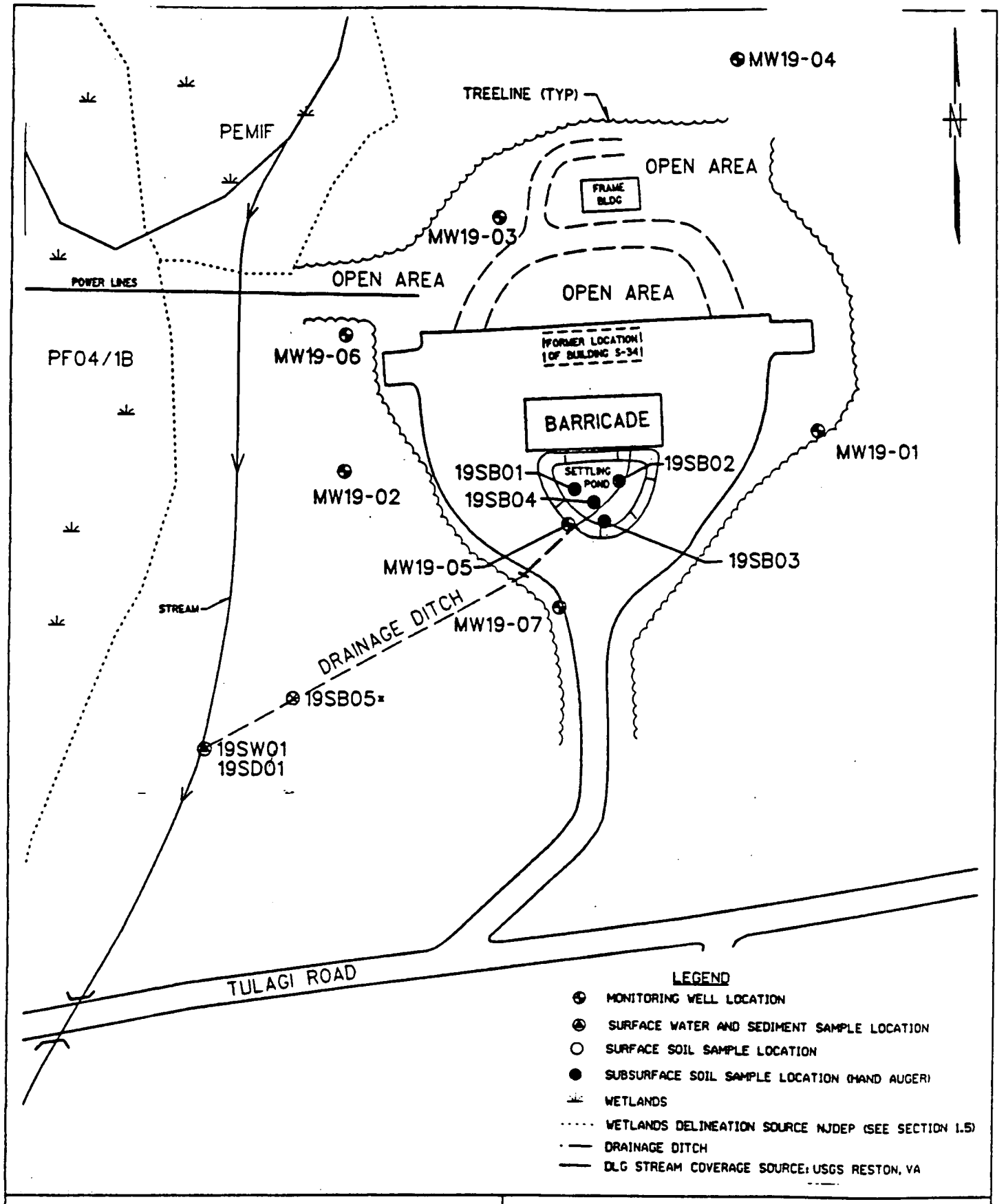
Naval Weapons Station Earle
Site 19
Colts Neck, NJ

Figure 2-1

Site Location Map

FOSTER WHEELER ENVIRONMENTAL CORPORATION

navyroc\siteloc.dwg



0 100 200
SCALE IN FEET

NAVAL WEAPONS STATION, EARLE

SITE 19

FIGURE 2.2
SITE LAYOUT MAP

FOSTER WHEELER ENVIRONMENTAL CORPORATION

pond to the southwest towards a wetlands area and a branch of the Mingamahone Brook. The drainage ditch is approximately 10 feet wide and 275 feet long. The drainage ditch is located in a wooded area, and there are some trees located in the drainage ditch. General groundwater flow direction is toward the west. Wetland are located on the opposite side of the branch of Mingamahone Brook, approximately 100 feet from the southwestern extent to the excavation activities.

2.1 PREVIOUS INVESTIGATIONS

A Site Inspection Study (SI) was conducted at Site 19 in 1993 to determine the number of potential contamination sources, compile histories of waste-handling and disposal practices at the site, and acquire data on the types of contaminants present and potential human health and/or environmental receptors. During this SI, three monitoring wells were installed to go with the three existing monitoring wells, and soil, sediment, surface water, and groundwater samples were collected and analyzed. Cadmium, lead, and zinc were detected in on-site soils at concentrations above background soil concentrations.

A Phase I Remedial Investigation (RI) was conducted between June and October 1995 to determine the nature and extent of contamination. Activities included sampling and analysis of surface water and sediment from the confluence of the drainage ditch and Mingamahone Brook, surface and subsurface soil sampling and analysis, drilling and installation of one shallow permanent monitoring well (MW19-07), sampling and analysis of the newly installed well and the six existing wells and a measurement of the static-water levels in the wells. Refer to Figure 2-2 for all sampling locations and monitoring well locations.

2.1.1 Surface Water and Wetlands

One surface water sample (19SW01) was collected in June 1995 from the confluence of a drainage ditch and a branch of the Mingamahone Brook (Figure 2-2) to determine if compounds related to the historical use of the site are leaving the disposal area. The sample was analyzed for TCL VOCs, TCL SVOC, TCL pesticides/PCBs, and TAL metals. It was found that concentrations of metals in the site-related surface water sample were similar to the range of background samples. However, Beta-BHC and endosulfan I were each above detection levels in the sample and not detected in the background surface water samples.

Wetlands were identified to the west and northwest of Site 19, 60-100 feet due west of the nearby branch of the Mingamahone Brook (Figure 2-2). The wetlands were identified in the NJDEP Graphical Information System (GIS) Digital Data and United States Geological Society (USGS) Drainage Basin Data. No wetlands shall be impacted during the excavation activities at the site.

2.1.2 Groundwater

Six groundwater samples were collected at Site 19, 19GW01 through 19GW03 and 19GW05 through 19GW07 (Figure 2-2). Monitoring well MW19-04 was dry and therefore was not sampled. No organics were detected in any of the samples. Generally, low levels of metals were detected in the background groundwater samples. Antimony, arsenic, cadmium, thallium, and zinc were detected at levels greater than background in one monitoring well, MW19-07, which is located adjacent to the drainage ditch approximately 60 feet south-southwest of the former disposal area. Barium and zinc were detected at levels greater than background in monitoring well MW19-03.

2.1.3 Surface and Subsurface Soil

Nine site-related soil samples (19SB01-00 through 19SB04-00, 19SB01-03 through 19SB04-03, and 19SB05-02) were collected at Site 19 (Figure 2-2). These samples were collected to investigate the impact of site activities on surfical soils, to determine if metals had migrated downward from the surface and to provide data on the depth and extent of soil impacts.

Concentrations of cadmium, lead, and zinc in soil sample 19SB03-00 were greater than the NJDEP Soil Clean-Up Criteria. Soil sample 19SB03-00 was collected from 0 to 2 feet below grade and contained some paint chips. In addition, zinc was detected at levels slightly greater than background in sample 19SB02-00 and barium was present at levels greater than background in samples 19SB01-01, 19SB01-03, 19SB02-00, 19SB02-03, 19SB03-00, and 19SB04-03. Appendix A contains the soil sample locations and a summary of the analytical results. Appendix B contains the NJDEP Soil Clean-Up Criteria.

Sample 19SB03-00 revealed an elevated level of total chromium; hexavalent chromium analysis indicated that 70 to 90 percent of the chromium present is attributable to hexavalent chromium. Two other samples (19SB02-00 and 19SB03-03) revealed slightly elevated total chromium readings; hexavalent chromium analysis indicated that approximately 20 percent of the chromium present in these two samples is in the form of hexavalent chromium.

PCE was detected only in the four surface soil samples. The PCE concentrations were 4 ug/kg in each sample. PCE was not detected in background surface or subsurface soil samples.

2.1.4 Sediment

One site-related sediment sample (19SD01) was collected at Site 19 (Figure 2-2). This sample exhibited total chromium at a level seven times the upper range of background samples. Aluminum, iron, manganese, and vanadium were detected at levels slightly greater than background. The concentrations of inorganics were not above any NJDEP

Soil Clean-Up Criteria. Concentrations of inorganics, polyaromatic hydrocarbons (PAHs) and pesticides were detected in the sediment sample above the Applicable or Relevant and Appropriate Requirements (ARARs) and the NJDEP concentrations in "Guidance to Sediment Quality Evaluations."

3.0 SCOPE OF WORK

The objectives of this effort are to clear all vegetation and trees from areas to be excavated, remove and dispose of contaminated soil in the settling pond to a depth of two feet and to remove drainage ditch sediments, to a depth of 6 inches, between the pond outfall and the branch of the Mingamahone Brook. The existing drainage conduit will be removed as part of the remediation. Confirmatory samples will be collected from the pond and the ditch and analyzed for TAL inorganics and TCL organic compounds. After Navy approval, the settling pond will be backfilled to match the surrounding grade and restored with asphalt. The drainage ditch will be restored with topsoil, seed, and trees.

3.1 TASK 1 - PROJECT PLANNING/MANAGEMENT

Project Planning/Management activities include the preparation of pre-construction submittals, coordinating utility requirements, mobilization to the site, and providing home office support functions during the estimated period of performance. The subtasks involved in Project Planning/Management are described below.

3.1.1 Subtask 1A - Pre-Construction Submittals

Foster Wheeler Environmental will prepare and submit the following pre-construction documents to the Navy:

Work Plan
The Work Plan presents Foster Wheeler Environmental's approach to executing the project, including the site description, statement of work, procurement approach, system information, materials, engineering data, transportation and disposal data, and sampling and analytical requirements. The Proposed Plan and Final Record of Decision (ROD) for site 19 were submitted to EPA, The NJDEP, and made available for public comment. This work plan reflects the remedial alternative in The ROD.

Health and Safety Plan (HASP)
The HASP includes Foster Wheeler Environmental's approach to providing for the health and safety of its employees during the project.

3.1.2 Subtask 1B - Mobilization

Mobilization will consist of contacting appropriate Navy personnel at NWS Earle to arrange for contractor passes and to coordinate support requirements for excavation of the sanitary sewer lines and associated sludge/sediment. A utility survey shall be conducted to determine all utility lines in the area. Utilities, primarily electric, shall be locked and tagged out and/or terminated at the source. Subsurface utilities shall be located by NWS-Earle Public Works personnel. A dig permit shall be obtained from NWS-Earle Public Works prior to any drilling or excavation work.

A decontamination pad (decon pad) shall be constructed in order to facilitate the decontamination of heavy equipment. The decon pad shall be constructed of bermed plastic atop the asphalt area. Plywood or some other protective material shall be placed atop the plastic to prevent damage to the plastic by the heavy equipment. The decon pad shall be sloped towards a collection sump in order to pump the decon water from the sump into drums.

3.1.3 Subtask 1C - Home Office Support

Foster Wheeler Environmental's Langhorne, Pennsylvania office will provide home office support and on-site task oversight for the project. Home office support includes coordinating subcontractors, and preparation of the required progress, financial and technical reports.

3.2 TASK 2 - PERMIT AND REPORT PREPARATION/SUBMISSION

3.2.1 Subtask 2A- Dig Permit

Foster Wheeler Environmental shall contact the NWS-Earle Public Works Department to obtain a dig permit and have all utilities marked-out prior to excavation activities.

3.2.2 Subtask 2B- Preparation of a Soil Erosion and Sediment Control Permit

Since the proposed excavation involves the disturbance of less than 5,000 square feet of land surface, a Soil Erosion and Sediment Control Permit Application and NPDES Stormwater Permits are not required, however, soil erosion and sediment control measures shall be implemented during the excavation and backfilling operations.

3.2.3 Subtask 2C-Preparation of Post Remediation Report

Foster Wheeler Environmental shall prepare a Post Remediation Report in accordance with N.J.A.C. 7:26E-6.6. The report shall include the delineation activities completed, location and quantities of soil removal, analytical results and disposal data.

3.3 TASK 3- CLEARING AND GRUBBING

A brush-hog and a chain saw shall be used to clear cut the vegetation and trees in the settling pond and drainage ditch prior to excavation. A chipper shall be used to mulch the brush and small trees at the site. The mulch shall be used where appropriate at the site, and the remainder transported off-site for disposal. The larger trees shall be cut into logs and disposed off-site.

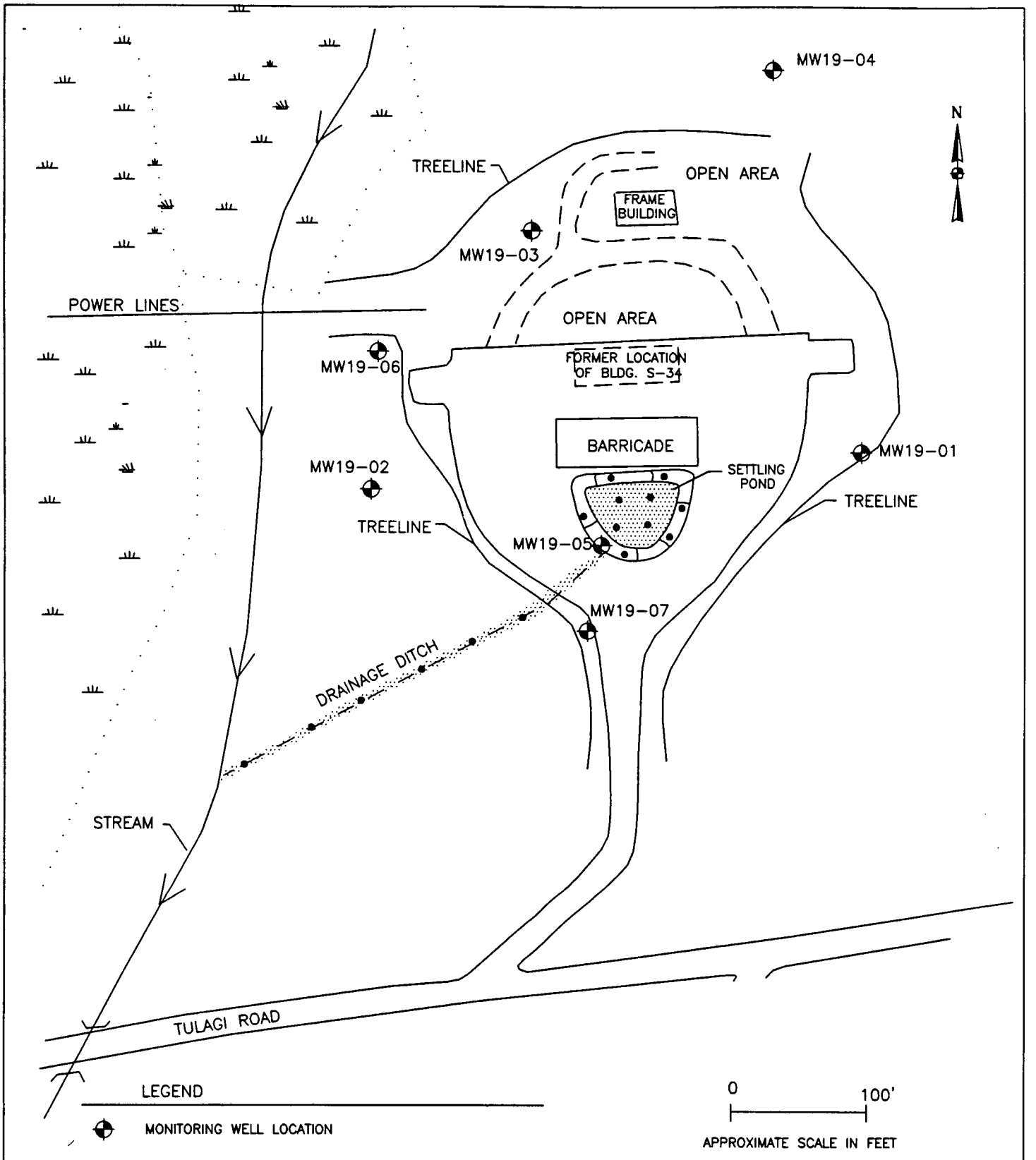
3.4 TASK 4- CHARACTERIZATION SAMPLING

Subsurface soil samples shall be collected in order to characterize the waste for off-site transportation and disposal. Characterization of the soils prior to excavation shall allow direct loading of the soils during the excavation activities. Stainless steel hand augers shall be used to collect the soil samples for waste characterization. Sample locations at Site 19 will be selected for every 20 cubic yards of excavated material for the first 100 cubic yards then one for every 100 cubic yards of material thereafter. Since waste characterization sampling will take place before the actual excavation, the number of samples will be based upon estimates of the quantity of material to be excavated. Sample locations will be selected based upon the results of previous investigations. The Sampling and Analysis Plan and Field Investigation Program in Sections 4 and 5 details the sample collection methodology and the laboratory analyses.

3.5 TASK 5 - REMOVAL OF CONTAMINATED SOIL

The contaminated soil from the settling pond and the drainage ditch shall be excavated with a CAT 312 tracked excavator, or equivalent, and a CAT D-4 dozer or equivalent. The area to be excavated is outlined in Figure 3.1. Care will be taken to ensure that none of the existing monitoring wells are disturbed during the soil excavation activities. Since the waste characterization samples are to be obtained prior to the excavation activities, the soil can be loaded directly into trucks for off-site disposal. The trucks shall be backed down the paved access road off of Tulagi Road to Site 19. The soil loading area shall be covered with plastic. The trucks shall be loaded on the asphalt area covered with plastic. The plastic-lined loading area shall be kept free of soils in order to prevent truck tires from coming in contact with contaminated soils.

The two areas to be excavated include the former settling pond and the drainage ditch which runs southwest from the settling pond to a branch of the Mingamahoe Brook. Approximately two (2) feet of soil will be removed from the settling pond, which is approximately 50 feet in diameter. The top approximately six (6) inches of soil in the drainage ditch shall also be excavated and disposed off-site. The drainage ditch is approximately 275 feet long by 10 feet between the pond outfall and the branch of the Mingamohone Brook. A dozer shall be used to excavate the top six (6) inches of the soils from the drainage ditch and push the soils up to the northeastern end of the ditch in order for the tracked excavator to access the soils for loading. An estimated 325 yds^3 of contaminated soil shall be removed from the settling pond and drainage ditch at Site 19.



LEGEND

- MONITORING WELL LOCATION
- CONFIRMATORY SOIL SAMPLE LOCATION
- AREA TO BE EXCAVATED
- WETLANDS
- WETLANDS DELINEATION SOURCE NJDEPE (SEE SECTION 1.5)
- DRAINAGE DITCH

Naval Weapons Station – Earle
Site 19

Figure 3-1
Area to be Excavated

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Any soils which are stockpiled or in containers shall be covered with plastic at the end of each work day to minimize storm-water contact with tainted soils.

Silt fences and hay bales shall be installed in order to control erosion and prevent the migration of sediments off-site during the excavation and backfilling operations. The bottom of the silt fence shall be buried such that the fence is approximately 2 feet below grade with one foot of the filter fabric below grade. Due to the close proximity of a branch of Mingamohone Brook, hay bales shall also be placed in front of the silt fences to ensure optimal erosion control. The hay bales shall be buried a minimum of four inches in the soil. The barriers shall be constructed in such a manner as to prevent water from bypassing the ends of the barriers. The silt fence and hay bales shall be removed after they have served their usefulness as to not impede or block storm flow drainage.

If confirmatory soil samples, discussed in Task 7, reveal concentrations above NJDEP clean-up criteria, additional soil shall be excavated and confirmatory soil samples will be recollected.

3.6 TASK 6- EXCAVATION OF DRAINAGE PIPE

There is a drainage pipe which presently runs from the settling pond, southwest under the paved area, to discharge into the open drainage ditch to the southwest. The 12 inch diameter concrete drainage pipe shall be excavated. The concrete shall be broken into section, no larger than 2 feet by 2 feet, and disposed off site along with the excavated soils.

3.7 TASK 7- POST EXCAVATION SAMPLING

Post excavation soil samples shall be collected in order to establish that all affected soils/sediments were excavated and the remaining soils are below the NJDEP Clean-Up Criteria, and the sediments are below the NJDEP Guidance to Sediment Quality Evalutions.

In accordance with NJDEP, confirmatory soil samples will be collected from the middle of the excavated sidewalls at a frequency of one sample for every 30 linear feet of excavation and from the floor of the excavation at a frequency of one sample for every 900 square feet of bottom area. It is estimated that ten (10) to twelve (12) confirmatory samples shall be collected and analyzed for TAL inorganics and TCL organic compounds.

Confirmatory soil samples shall be taken from the bottom of the drainage ditch at a frequency of one sample every 30 linear feet. It is estimated that up to six (6) confirmatory soil samples shall be collected and analyzed for TAL inorganics and TCL organic compounds.

3.8 TASK 8- EQUIPMENT DECONTAMINATION

The excavator bucket, and any other equipment that comes into contact with contaminated soils, shall be decontaminated with a pressure washer. The decon water shall be collected, containerized in 55 gallon drums, analyzed, and disposed of appropriately.

3.9 TASK 9- BACKFILL OF EXCAVATION

The excavated settling pond shall be backfilled and paved to match the surrounding grade following Navy review of confirmatory sample analysis and determination of soil analyses meeting the NJDEP criteria. The excavated settling pond shall be backfilled with certified-clean sand to a depth of approximately six (6) inches below grade. The sand shall be backfilled in six (6) to nine (9) inch lifts and compacted with a hand-operated, plate type, vibratory or other suitable hand tampering device. Crushed stone, crushed gravel or crushed slag, free of lumps or balls or clay or other objectionable matter, shall be used to create a three (3) inch thick subgrade for the asphalt. Immediately upon placing the subgrade material uniformly, the material shall be compacted with steel faced, vibratory or pneumatic-tire rollers or other suitable compacting equipment. Three (3) inches of asphalt shall be place over the former pond in a manner which will match the existing grade of the surrounding asphalt area. The asphalt shall be compacted with steel faced, vibratory or pneumatic-tire rollers or other suitable compacting equipment

The excavated drainage ditch shall be backfilled following Navy review of confirmatory sample analysis and determination of soil analyses meeting the NJDEP criteria. The top six (6) inches of soil removed from the drainage ditch shall be backfilled with certified-clean topsoil. The drainage ditch area shall be reseeded with local grass seed. In accordance with specifications by NWS - Earle, the seeding mix shall be comprised of 20% Perennial Ryegrass, 60% Tall Fescue, and 20% annual Ryegrass. Seeding shall occur between March 15 and April 30 and shall be sown at a rate of 5 pounds per 1,000 square feet. The seed shall be sown uniformly by machine or hand seed, not hand broad casting. The seeding shall also include the application of lime and fertilizer. Lime shall be worked into the top 3 inches of topsoil at a rate of 5 pounds per 1,000 square feet. The fertilizer shall be a 10-6-4 fertilizer, containing a minimum of 10% nitrogen, 6% available phosphoric acid, and 4% soluble potash. The fertilizer shall be worked into the top 2 inches at a rate of 20 pounds per 1,000 square feet. All seeded areas shall be mulched with straw. Mulch shall be spread in a continuous blanket of sufficient thickness to completely hide soil from view. Silt fences will be left in place until the seed takes root and the erosion potential decreases. Up to ten scrub pine trees, one to three feet tall, will be planted in the area adjacent to the drainage ditch excavation to replace the trees removed during the soil removal.

4.0 FIELD SAMPLING AND ANALYSIS PLAN

4.1 INTRODUCTION

Foster Wheeler Environmental Corporation (FWENC) is submitting this Sampling and Analysis Plan (SAP) for excavation and disposal of contaminated soil at Site 19, near the former location of Building S-34, at the Naval Weapons Station (NWS) Earle located in Colts Neck, NJ. The samples are being collected as waste characterization and post-excavation confirmatory samples. The analytical results will be reviewed by the Navy to confirm that the remediated site meets NJDEP Clean-Up Criteria prior to backfill of the excavations. This work is being performed under Delivery Order No. 0017 to Navy Contract N62472-94-D-0398

The SAP presents the procedures to be followed during excavation and sampling of the Site 19 settling pond and drainage ditch. The SAP specifically addresses the following areas:

- Analytical Requirements
- Responsibilities of Site Personnel
- Sample Analytical Program
- Sample Packing and Shipping
- Documentation
- Field Sampling Program
- Quality Assurance/Quality Control
- Procedures for Field Changes and Corrective Actions

The Quality Assurance Project Plan (QAPP), which has been submitted as a separate document, establishes the structure of the quality assurance plan for field activities. Site-specific Standard Operating Procedures have been included (Section 5.1) to describe the sampling procedures. Any modifications necessary to these SOPs due to field conditions or other unforeseen situations shall be recorded in the site logbook, documented on the appropriate Change Request Forms (CRF) by site personnel, and approved by the Senior Project Engineer/Manager (See Section 4.2).

4.2 PERSONNEL RESPONSIBILITIES

The project team will include the following personnel:

The Senior Project Engineer/Manager (SPEM) has final responsibility for the development of the SAP and management of the project team.

The Project Superintendent (PS) is responsible for assuring that proper collection, packaging, preservation, and shipping of samples is performed in accordance with the SAP. In addition, the PS is responsible for coordinating with the subcontracted laboratory during sample analysis and for reviewing the analytical data received from the laboratory.

The Site Health and Safety Officer (SHSO) is responsible for the safety of all site personnel as detailed in the site-specific Health and Safety Plan (HASP), presented under separate cover.

The New Jersey certified Laboratory Subcontractor is responsible for supplying all services (including labor), equipment, and material required to perform the analysis of the environmental samples. The laboratory subcontractors are responsible for following all specified methodology protocols, including quality assurance/quality control (QA/QC) requirements. In addition, the laboratory subcontractors are responsible for the proper disposal, including all associated costs, of the environmental samples upon completion of the analytical work.

4.3 FIELD SAMPLING ACTIVITIES

This section addresses the field investigation activities, including:

- Sample Tracking System
- Sample Analytical Requirements
- Sample Packaging and Shipping
- Sample Documentation

4.3.1 Sample Tracking System

The objective of the sample identification system is to provide a framework for developing sample numbers that are unique to that sample and convey information regarding sample type that will enable data users to easily identify sample locations. The sample designation is established in order to integrate the data into the Navy's Geographical Information System (GIS).

The first two number of the sample tracking system shall refer to this site specific location, which in our case is Site 19. All soil sample identifiers shall begin with the number 19. For example 19SS01 would refer to Site 19 soil sample one. In order to identify the specific sample, the date and round shall be appended to the sample name. 19SS01-97-1 would refer to Site 19, soil sample number 1, taken from the first round in 1997. A "D" would be added to the sample nomenclature to indicate a duplicate sample.

For the purposes of this sampling effort, the following characters shall be assigned to identify the various matrices:

WC = Waste characterization SS = Soil sample
WW = Wastewater (decon fluids)

For example, 19WC01-97-1 would be waste characterization number 1, collected at Site 19 during the first round of sampling in 1997.

A cumulative sampling master log will be maintained as the field program progresses. The samples taken will be referenced to each sampling location in the site logbook.

All location information for the samples will be recorded in the field sampling logbook (Section 4.3.4).

4.3.2 Sample Analytical Requirements

Table 4-1 specifies location, number of samples, matrix, laboratory analyses, and rationale for each sample type. Specific procedures governing sample preservation are presented below.

Reagents required for sample preservation will be added to the sample containers by the laboratory prior to their shipment to the field or added in the field. In general, aqueous samples of low concentration organics (or soil samples of low or medium concentration organics) are cooled to 4°C. Medium and high hazard aqueous or high hazard soil samples are not preserved. Low concentration aqueous samples for TPH are acidified with H_2SO_4, while medium concentration and high hazard aqueous metal samples are not preserved. Soil samples for metals are not preserved.

The soil samples to be analyzed for volatile organics shall be collected and preserved in accordance with NJDEP's Methodology for the Field Extraction/Preservation of Soil Samples with Methanol for Volatile Organic Compounds, which is contained in Appendix C.

The following subsections describe the procedures for preparing and adding chemical preservatives. In most cases, preservatives will be added to the sample bottleware by the subcontracted laboratory prior to shipment to the site.

Addition of the following acids and solvents are specified for sample preservation:

Acid/Base Acidification		*Concentration*	*Amount for Normality*
H_2SO_4 *	1:1 dilution of concentrated H_2SO_4	18N	2-5 ml
Methanol	2.5:1 volume of methanol to weight of soil ratio	--	--

*Amount of acid to add (at the specified strength) per liter of water to reduce the sample pH to less than 2, assuming that the water is initially at pH 7, and is poorly buffered and does not contain particulate matter.

These reagents should be reagent (AR) grade and should be diluted to the required concentration with double-distilled, deionized water.

The approximate volumes needed to acidify one liter of neutral water to a pH of less than 2 (or raise the pH to 12) are shown in the last column of the above table. These volumes are only approximate; if the water is more alkaline, contains inorganic or organic buffers, or contains suspended particles, more acid may be required. The final pH must be checked using narrow range pH-paper.

Sample acidification should proceed as follows:

1. Check initial pH of sample with wide range (0-14) pH paper.

2. Fill sample bottle to within 5-10 ml of final desired volume and add about 1/2 of the estimated acid required, stir gently and check pH with medium range pH paper (pH 0-6).

3. Add acid a few drops at a time while stirring gently. Check for final pH using narrow range (0-2.5) pH paper; when desired pH is reached, cap sample bottle and seal.

Never dip pH paper into the sample; apply a drop of sample to the pH paper while using the stirring rod.

TABLE 4-1
NAVAL WEAPONS STATION-EARLE
DELIVERY ORDER 0017-MODIFICATION NO. 4
SAMPLING AND ANALYSIS REQUIREMENTS

Media	*Analyses*	*Frequency*	*Quantity*	*Method*	*Rationale*
Soil	TPH, TOX, PCBs, ignitability, corrosivity, reactive cyanide, reactive sulfide, moisture content, RCRA metals (including Cu, Ni, Zn), and full TCLP	Waste characterization samples; one sample for every 20 yds^3 for first 100 yds^3 of excavated material, one sample for every 100 yds^3 thereafter.	10-12	TPH:EPA 413 TOX: SW846 Method 3540A/9020A PCBs-SW846, 8080 Ign: SW-846 Method 1020 Corr: SW846 Method 1110 React: SW846 Chapter 7 TAL metals-EPA SW846 Full TCLP SW846 1311with applicable. methods following.	Analytical results used for waste characterization for selection of material transporter and disposal facility.
Soil	TCL volatile and semi-volatile organics TAL Metals	Confirmatory soil samples from every 30 linear feet of sidewall and every 900 square feet of base.	18*	TCL volatiles: SW846, 8240 TCL semi-volatiles SW846, 8270 TAL metals SW846, 6010/7000	Analytical results used to insure site meets NJDEP direct contact residential standards prior to backfilling operations.
Field Blank	TCL volatiles and semi-volatile orgaincs TAL metals	One per sampling episode	1	TCL volatiles: SW846, 8240 TCL semi-volatiles SW846, 8270 TAL metals SW846, 6010/7000	To ensure proper quality assurance/quality control during sampling operations.
Decon Water	TCL volatiles and semi-volatile orgaincs TAL metals	One sample for all decon water generated.	1	TCL volatiles: SW846, 8240 TCL semi-volatiles SW846, 8270 TAL metals SW846, 6010/7000	Analytical results used for waste characterization for off-site transportation and disposal of decon water generated at the site.
Topsoil	Iron Sulfide	One sample 0-3 inches deep One sample 3-6 inches deep One sample 6-9 inches deep One sample 9-12 inches deep	4	Iron sulfide (Iron producing soil)	To ensure the topsoil backfilled is not of an acidic nature.

* Quantities includes duplicate quality assurance samples

4.3.3 Sample Packaging and Shipping

The objective of the sample packaging and shipping requirements are to maintain sample integrity from the time a sample is collected until it is received at the analytical laboratory. Chain-of-custody (COC) forms, sample labels, custody seals, and other sample documents will be completed to maintain sample integrity. Specific procedures for packaging and shipping of environmental samples are presented below. These procedures were obtained from the NJDEP Field Sampling Procedures Manual.

4.3.3.1 Environmental Samples

Low-concentration samples will meet the volume limits for the limited quantity packaging exceptions under 49CFR173 and should be packaged for shipment as follows:

1. A sample label is attached to the sample bottle. The label should be taped over with clear packing tape to preserve legibility.

2. A picnic cooler (such as a Coleman or other sturdy cooler) is typically used as a shipping container. In preparation for shipping samples, the drain plug is taped shut from the inside and outside, and a large plastic bag is used as a liner for the cooler. Approximately 1 inch of packing material, such as asbestos-free vermiculite, perlite, or styrofoam beads, is placed in the bottom of the liner. The cooler containing methanol-preserved volatile soil samples must have the following markings on the cooler: Limited Quantity, This End Up. Each sample shall not contain more than one (1) liter of methanol or one (1) gallon of fumic acid, and the total weight of the cooler and packaging materials must not exceed 64 pounds.

3. The sample bottles are placed in the lined picnic cooler. Cardboard separators, and/or additional packing material, should be placed between the bottles to prevent breakage during shipping.

4. Aqueous samples for low or medium-level analysis must be shipped cooled to 4°C with ice. No ice is used in shipping high-level aqueous samples, or soil samples, or dioxin samples. Ice is not required in shipping soil samples, but may be utilized at the option of the sampler. All cyanide samples, however, must be shipped cooled to 4°C.

5. The lined cooler is filled with packing material (such as asbestos-free vermiculite, perlite, or styrofoam beads), and the large inner liner is taped shut. Sufficient packing materials should be used to prevent sample containers from making contact during shipment.

6. The paperwork being shipped to the laboratory is placed inside a plastic bag. The base is sealed and taped to the inside of the cooler lid. A copy of the COC form

should be included in the paperwork sent to the laboratory. The last block on the COC form should indicate the overnight carrier and airbill number. The airbill must be filled out before the samples are handed over to the carrier. The laboratory should be notified if the shipper suspects that the sample contains any substance for which the laboratory personnel should take safety precautions.

7. The cooler is taped shut with strapping tape (filament-type).

8. At least two signed custody seals are placed on the cooler, one on the front and one on the back.

9. The name and address of the shipper and consignee are placed on the exterior of the container in addition to the shipping papers. Commercial address labels may be used.
   - The DOT Proper Shipping Names and UN# are placed on the outside of the cooler:

     For methanol preserved samples: Methanol, PG II, UN1230, or
     Flammable Liquid, NOS (Methanol), PG II, UN1230
   - The words "Limited Quantity" are written on the cooler adjacent to the Proper Shipping Name and UN#. A DOT Hazard Class Label is not required for limited quantity samples.
   - Markings indicating "This End Up" with upward pointing arrows are placed on two (2) sides of the container. Commercially printed labels shall be used

10. The cooler is handled over to the overnight carrier. A Dangerous Goods airbill is necessary for shipping environmental samples if preserved with methanol or acid. A standard airbill can be used to ship the samples if there are no preservatives.

11. Arrow symbols indicating "This Way Up" should be placed on the cooler in addition to the marking and labels described above.

12. Restricted-article/Dangerous Goods airbills are used for shipment indicating the following:

    - Number of packages or number of coolers.

    - Proper shipping name and packaging group. If unknown, use FLAMMABLE SOLID, N.O.S. or FLAMMABLE LIQUID, N.O.S.

    - Hazard Class; if unknown, use flammable solid or flammable liquid.

    - Words "Limited Quantity" if inner containers meet the volume limits for limited quantities under 49CFR173.

- Identification number; if unknown, use UN1325 (for flammable solids) or UN1993 (for flammable liquids).

- Net quantity per package or amount of substance in each cooler.

- Radioactive materials section (leave blank).

- Passenger or cargo aircraft (cross off the nonapplicable). Up to 25 pounds of flammable solid per cooler can be shipped on a passenger or cargo aircraft. Up to 1 quart of flammable liquid per cooler can be shipped on a passenger aircraft, and up to 10 gallons of flammable liquids per cooler can be shipped on a cargo aircraft). Use Hazardous Materials Table (49CFR172.101) column (9) to verify quantity restrictions for other Proper Shipping Names.

- Name and title of shipper (printed).

- An emergency telephone number at which the shipper can be reached within 24-48 hours.

- Emergency Response Guide Number

- Shipper's signature.

NOTE: The penalties for improper shipment of hazardous materials are severe. A fine of $25,000 and five years imprisonment can be imposed for each violation.

4.3.3.2 Hazardous Samples

Medium- and high-concentration samples are defined as hazardous and must be packaged as follows:

1. A sample label is attached to the sample bottle. The label should be taped over with clear packaging tape to preserve legibility.

2. Each sample bottle is placed in a plastic bag, and the bag is sealed. For medium-concentration water samples, each VOA vial is wrapped in a paper towel, and the two vials are placed in one bag. As much air as possible is squeezed from the bags before sealing.

3. Each bottle is placed in a separate paint can, the paint can is filled with vermiculite, and the lid is fixed to the can. The lid must be sealed with metal clips, or with filament or evidence tape; if clips are used, the manufacturer normally recommend six clips.

4. Arrows are placed on the can to indicate which end is up.

5. The outside of each can must contain the proper DOT shipping name and identification number for the sample. The information may be placed on stickers or printed legibly. If the nature of the sample is known, 49 CFR 171-177 is consulted to determine the proper labeling and packaging requirements. A liquid sample of an uncertain nature is shipped as a flammable liquid with shipping name "FLAMMABLE LIQUID, N.O.S." and the identification number "UN1993." A solid sample of uncertain nature is shipped as a flammable solid with the shipping name "FLAMMABLE SOLID, N.O.S." and the identification number "UN1325."

6. The cans are placed upright in a cooler lined with a plastic garbage-type bag, with the drain plug taped shut inside and out. Asbestos-free vermiculite, perlite, or styrofoam is placed in the bottom of the cooler. Two sizes of paint cans are used: half-gallon and gallon. The half-gallon paint cans may be stored on top of each other; however, one-gallon cans are too high to stack. The cooler is filled with packing material and the plastic liner is taped shut.

7. The paperwork going to the laboratory is placed inside a sealable plastic bag and taped to the inside of the cooler lid. A copy of the COC form must be included in the paperwork sent to the laboratory. The sampler keeps one copy of the COC form. The laboratory should be notified if the sample is suspected of containing any substance for which laboratory personnel should take safety precautions.

8. The cooler is closed and sealed with strapping tape. At least two custody seals are placed on the outside of the cooler (one on the front and one on the back).

9. The following markings are placed on top of the cooler:

    - Proper shipping name (49 CFR 172.301)
    - DOT identification number (49 CFR 172.301)
    - Shipper's or consignee's name and address (49 CFR 172.306)
    - "This End Up", with upward pointing arrows, legibly written if shipment contains liquid hazardous materials (49 CFR 172.312). Commercial labels shall be used.

10. The following labels are required on top of the cooler (49 CFR 172.406e):

    - Appropriate hazard class label (placed next to the proper shipping name)
    - "Cargo Aircraft Only" (if applicable as identified in 49 CFR 172.101)

11. Arrow symbols indicating "This Way Up" should be placed on the cooler in addition to the marking and labels described above.

12. Restricted-article/Dangerous Goods airbills are used for shipment indicating the following:

- Number of packages or number of coolers.
- Proper shipping name and packaging group. If unknown, use FLAMMABLE SOLID, N.O.S. or FLAMMABLE LIQUID, N.O.S.
- Hazard Class; if unknown, use flammable solid or flammable liquid.
- Words "Limited Quantity" if inner containers meet the volume limits for limited quantities under 49CFR173.
- Identification number; if unknown, use UN1325 (for flammable solids) or UN1993 (for flammable liquids).
- Net quantity per package or amount of substance in each cooler.
- Radioactive materials section (leave blank).
- Passenger or cargo aircraft (cross off the nonapplicable). Up to 25 pounds of flammable solid per cooler can be shipped on a passenger or cargo aircraft. Up to 1 quart of flammable liquid per cooler can be shipped on a passenger aircraft, and up to 10 gallons of flammable liquids per cooler can be shipped on a cargo aircraft). Use Hazardous Materials Table (49CFR172.101) column (9) to verify quantity restrictions for other Proper Shipping Names.
- Name and title of shipper (printed).
- An emergency telephone number at which the shipper can be reached within 24-48 hours.
- Emergency Response Guide Number
- Shipper's signature.

NOTE: The penalties for improper shipment of hazardous materials are severe. A fine of $25,000 and five years imprisonment can be imposed for each violation.

4.3.4 Sample Documentation

The following documentation is associated with sample collection and transfer:

- Field Logbooks
- Site Logbooks
- Master Sample Log
- Sample Label
- Chain-of-Custody Form
- Custody Seals
- Shipping Airbill.

5.0 FIELD INVESTIGATION ACTIVITIES

5.1 STANDARD OPERATING PROCEDURES (SOPs)

Technical guidelines used in preparing this SAP were obtained primarily from the following sources:

- June 1988 Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NESSA 20.2-047B

- The USEPA REM III/ARCS II Program Field Technical Guidelines, prepared for the USEPA by FWENC under Contract Number 68-01-7250 (Field Technical Guidelines)

- The New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual (May 1992)

- The New Jersey Department of Environmental Protection (NJDEP) Guidance Document for the Remediation of Contaminated Soils (June 1996)

All of the aforementioned guidance documents were consulted in preparation of this SAP to ensure that the procedures presented in this SAP are consistent with each document.

5.2 FIELD INVESTIGATION PROGRAM

The following sections detail the field investigation program. Primary tasks of the program include Mobilization/Demobilization (Section 5.2.1), Soil Sampling Prior to Excavation (Section 5.2.2), and Post Excavation Confirmation Sampling (Section 5.2.3).

5.2.1 Mobilization and Demobilization

Mobilization shall consist of contacting appropriate Navy personnel at NWS-Earle to arrange for contractor passes and to coordinate support requirements for the soil excavation and removal and the operation of the recovery system.

FWENC shall contact the NWS-Earle Public Works Department to obtain a dig permit and have all utilities marked out prior to the excavation activities.

5.2.2 Soil Sampling Prior to Excavation

Objectives

The objective of soil sampling prior to excavation is to obtain waste characterization information to determine the appropriate transportation and off-site disposal facility for the excavated materials. Based on previous field screening results, the soil may contain elevated concentrations of TAL metals (cadmium, chromium, lead), and some volatile and semi-volatile organic compounds.

Sampling Locations, Equipment and Procedures

Sample locations at Site 19 will be selected for every 20 cubic yards of excavated material for the first 100 cubic yards then for every 100 cubic yards of material thereafter. Since waste characterization sampling will take place before the actual excavation, the number of samples will be based upon estimates of the quantity of material to be excavated. Sample locations will be selected based upon the results of previous investigations and the surface area of the areas to be excavated. Once the locations have been selected, a laborer in level D protection and clean, dedicated sampling gloves will collect the waste characterization samples from 0-2 feet with a decontaminated steel hand auger in the former settling pond. A sample from 3 to 5 feet shall be collected in southern portion of the site, in the vicinity of former soil sample 19SB03.

Procedures for sampling are as follows:

1. Using a clean steel hand auger, core down from 0-2 feet at sample location. Transfer soil, with as few rocks and vegetative material as possible, from auger head into the sample bottle.
2. Cap the sample bottle immediately. Wipe excess residue from the sides of the bottleware.
3. Affix labels to the sample jar(s), and complete chain-of-custody and other required sample data forms. Protect samples against extreme temperature changes and breakage by placing them in sample coolers stored in a protected area.

Sample Analysis

Each sediment/soil sample will be collected and analyzed for waste characteristics as described in Table 4-1. Each sample shall be collected from a previously chosen location and laboratory analyzed for TPH, TOX, PCBs, ignitability, corrosivity, reactivity, moisture content, RCRA metals (including Cu, Ni, Zn), and full TCLP. The laboratory analyses are dictated by the analytical requirements of the recycling and disposal facilities. Based on previous analytical data of soil samples, the soils will probably be classified as non-hazardous, therefore the excavated soils shall be sent to a soil recycling facility, but the laboratory analyses must verify the non-hazardous classification of the soils.

5.2.3 Post Excavation Confirmation Sampling

Objectives

The objective of confirmation sampling after the excavation activity is to determine if all of the contaminated material has been removed from the site before backfilling takes place.

Sampling Locations, Equipment and Procedures

Based on NJDEP Final Regulations, one confirmatory sample will be taken from the top of each sidewall for every 30 linear feet of sidewall and one sample will be taken from the excavation bottom for every 900 square feet of bottom area.. If possible, these samples should be taken from areas of visible staining or with a strong odor. The samples will be collected by a laborer in level D modified protection, with tyvek coveralls and dedicated clean sampling gloves, using a clean steel trowel and bowl. Wide-mouthed sample bottles will be used.

Procedures for sampling are as follows:

1. Using a clean steel trowel and bowl, dig into sidewall (or excavation floor) at sample location. Transfer soil, with as few rocks and organic material as possible, into the sample bottle.
2. Cap the sample bottle immediately. Wipe excess residue from the sides of the bottleware.
3. Affix labels to the sample jar(s), and complete chain-of-custody and other required sample data forms. Protect samples against extreme temperature changes and breakage by placing them in sample coolers stored in a protected area.

Sample Analysis

Each sediment/soil sample will be collected and analyzed for TCL volatile and semi-volatile organics and TAL Metals as described in Table 4-1.

5.2.4 Decon Water Sampling

Objectives

The objective of decon water sampling is to obtain waste characterization information to determine the appropriate disposal.

Sampling Locations, Equipment and Procedures

One water sample shall be obtained from the decon water contained in the 55 gallon drums.

Procedures for sampling are as follows:

1. Using a clean disposable glass drum thief to obtain a water sample from the drum. Transfer the water immediately in the appropriate sample containers
2. Cap the sample bottle immediately. Wipe excess residue from the sides of the bottleware. Break the glass drum thief off into the sample drum and reseal the drum.
3. Affix labels to the sample jar(s), and complete chain-of-custody and other required sample data forms. Protect samples against extreme temperature changes and breakage by placing them in sample coolers stored in a protected area.

Sample Analysis

Each water sample will be collected and analyzed for TCL volatiles and semi-volatiles and TAL metals as described in Table 4-1. Based on the analytical data of the decon water, permission for on-site disposal shall be sought from the NJDEP, or the water will be transported off-site. Analytical results obtained from the waste characterization samples can be used to complete the remaining analytical parameters required in the waste profile sheet if off-site disposal is warranted.

5.2.5 Field Blank Sampling

Objectives

The objective of field blank sampling is to ensure that the proper quality assurance and quality control procedures were used during the collection of the confirmatory soil samples.

Sampling Locations, Equipment and Procedures

One water sample shall be collected for the field blank..

Procedures for sampling are as follows:

1. Deionized water shall be poured over the decontaminated soil collection device, such as a hand auger, with the water being collected in a decontaminated stainless steel bowl under the sampling device. The water should be transferred from the stainless steel bowl to the appropriate sample container.
2. Cap the sample bottle immediately. Wipe excess residue from the sides of the bottleware.
3. Affix labels to the sample jar(s), and complete chain-of-custody and other required sample data forms. Protect samples against extreme temperature changes and breakage by placing them in sample coolers stored in a protected area.

Sample Analysis

Each water sample will be collected and analyzed for TCL volatiles and semi-volatiles and TAL metals as described in Table 4-1. A waste profile sheet shall be completed for the decon water if off-site disposal is required. Analytical results obtained from the waste characterization samples can be used to complete the remaining analytical parameters required in the waste profile sheet.

5.3 DECONTAMINATION

The objective of this section is to provide the methodology for the proper decontamination procedures to be used on chemical sampling and field analytical equipment.

In order to assure that chemical analysis results are reflective of the actual concentrations present at sampling locations, chemical sampling and field analysis equipment must be properly decontaminated prior to the field effort, during the sampling program (i.e. between sample points), and at the conclusion of the sampling program. This will minimize the potential for cross-contamination between sample points and the transfer of contamination off-site.

Prior to sampling, equipment will be decontaminated using the following procedures:

1. Potable water rinse.

2. Alconox or Liquinox detergent wash.

3. Scrubbing with a scrub brush may be required if the equipment is heavily contaminated with heavy or extremely viscous compounds (not anticipated).

4. Potable water rinse.

5. Rinse with 10% nitric acid solution

6. Distilled, deionized water rinse.

7. Methanol rinse.

8. Distilled, deionized water rinse.

9. Air dry.

10. Wrap sampling equipment in aluminum foil (shiny side out).

Decontamination fluids containing nitric acid and methanol rinse solutions should be containerized separately from rinse water consisting of water and soap only.

6.0 QA/QC VERIFICATION OF FIELD SAMPLING AND PROCEDURES FOR FIELD CHANGES AND CORRECTIVE ACTION

6.1 QA/QC FIELD AUDITS

Quality assurance and quality control during the sampling program will be performed by the Foster Wheeler Environmental Project Superintendent (PS). The PS will supervise all sampling and documentation and subcontractor operations to ensure that all activities are being performed in accordance with the SAP. The PS will report all findings to the SPEM. A submittal sheet documenting the quality assurance submittals is located in Appendix E.

6.2 FIELD CHANGES AND CORRECTIVE ACTIONS

The SPEM, or his designee, is responsible for all site activities. In this role, the SPEM is required at times to adjust the field program to accommodate site-specific needs. If it becomes necessary to modify a program, the responsible sampling personnel will notify the SPEM of the anticipated changes prior to implementation. Changes will only be acted upon with the SPEM's concurrence. The SPEM will consult with the Navy Technical Representative (NTR) ahead of time for major changes, and receive his/her approval before proceeding. If changes are implemented that are subsequently determined to be unacceptable, the actions taken during the period of deviation will be evaluated to determine the significance of any departure from established program practices.

The changes in the program will be documented on a Change Request Form (CRF), which will be signed by the PS and the SPEM. A typical CRF Form used to document field changes is provided as Figure 5-1. The CRFs for each change will be numbered sequentially starting with the number "01." A copy of the CRF will be attached to the

Foster Wheeler Environmental Corporation
Change Request Form

Section 1 through 4 to be filled out by Foster Wheeler, Section 5 to be filled out by Navy

PROJECT: **Navy RAC D.O.**	OFS.No. **1284-00**	Change Request Form: **CRF-** **Rev.**

To: _____ Dept. _____ Location: _____ Date: _____

Re: ☐ Drawing No. _____ Title _____

☐ Spec. No. _____ Title _____

☐ Other _____

1. DESCRIPTION (*Items involved, submit sketch if applicable*) _____

2. REASONS FOR CHANGE (*If from disposition of nonconformance report, list report number)* _____

3. RECOMMENDED DISPOSITION

☐ Technical Clarification [NTR approval required]

☐ Out of Scope [CO/COTR approval required]

☐ Cost Growth

☐ ROM Estimate (If Applicable) $ _____

☐ Schedule Impact _____

FWENC Initiator (Signature/Title):

4. FWENC Project Manager (Signature)	Date	Project Superintendent Concurrence (Signature)	Date

5. NAVY DISPOSITION

☐ Approved per recommended disposition

☐ Not approved (give reason)

☐ Approved with modification(s) [describe below]

NTR Concurrence (*Signature*)	Date	ROICC Concurrence (*Signature)*	Date
Contracting Officer Technical Representative Approval (*Signature*)		Contracting Officer Approval (*Signature*)	Date

Engineer signs and transmits to Resident Engineer with copies to:

_____	Project Manager	Others as Required	_____
_____	Project Superintendent	File:	_____
_____	Quality Control		_____

FORM: CD97#5/97201CRF

file copy of the SAP. The SPEM is responsible for controlling, tracking, and implementing the identified changes.

7.0 HEALTH AND SAFETY REQUIREMENTS

The site-specific Health and Safety Plan (HASP) is provided as a separate submittal. As required by paragraph 1.2.1, Pre- and Post-Construction documentation, the HASP includes organizational information, a potential hazards assessment, protective equipment requirements, air monitoring, site controls and protective zones, medical surveillance procedures, emergency response and spill control measures, and training requirements.

8.0 WASTE REMOVAL/REGULATORY COMPLIANCE

This section addresses how the soil excavated from the Site 19 settling pond and drainage ditch will be handled

8.1 SOIL

The contaminated soil will be sampled and analyzed for waste characterization prior to the excavation activities. Ten to twelve samples shall be collected and analyzed for Full TCLP and other waste characteristics as described in Table 4-1. Based upon analytical results, the soil will be classified as RCRA hazardous or non-hazardous.

8.2 INVESTIGATION DERIVED WASTES

As part of the Site 19 contaminated soil excavation, several investigation derived waste streams will be generated. These include decontamination fluids, PPE, and other miscellaneous debris. These wastes shall be collected, stored separately and tested to determine waste characteristics for purposes of waste classification and disposal facility selection. Depending upon classification, investigation derived wastes will be disposed of in accordance with NJDEP Solid Waste and/or Hazardous Waste Regulations.

8.3 MANIFESTS/SHIPPING PAPERS

Foster Wheeler Environmental shall provide completed hazardous waste manifests and/or bills of lading and transport documentation to the Navy for review and signature. All manifests and shipping papers shall be typed.

8.4 WASTE TRANSPORT AND DISPOSAL

Foster Wheeler Environmental shall subcontract for waste transport and disposal (T&D) services. The T&D subcontractor shall be competitively procured. All disposal facilities transporters both hazardous and solid waste, to be used for disposal of the Navy's wastes, will be evaluated for regulatory compliance and approved for use in accordance with

Foster Wheeler Corporation Regulatory Compliance Procedures (RC-2). Approved facilities and transporters will be submitted to the Navy for final approval.

8.5 HAZARDOUS WASTE MANAGEMENT

RCRA regulated hazardous wastes, if present, will be placed into appropriate DOT approved containers for disposal. Soils shall be directly loaded into dump trailers, other wastes shall be placed in DOT approved containers Foster Wheeler Environmental will prepare Waste Profiles, Hazardous Waste Manifests, LDR Notification Forms and other shipping documentation for Navy review and signature prior to off-site disposal. D. Blazak (Ext. 2982) or G. Goepfert (Ext. 2515) of NWS - Earle shall be notified of all waste handling operations. Copies of certified weight tickets, TSDF signed manifests and all disposal documentation documents will be forwarded to the Navy.

Foster Wheeler Environmental shall notify the Environmental and Safety Division of NWS - Earle of all hazardous materials brought on to station and provide monthly usage information. If on-site storage of hazardous waste containers is required, the proposed hazardous waste storage area will meet generator requirements for less than 90 day storage of hazardous waste, as per 40 CFR 262.34:

- All stored hazardous wastes will be removed from the project site for off-site disposal within 90 days of first being accumulated.

- Each container will be marked with the date on which the accumulation period begins.

- All hazardous waste storage areas will be marked with signs stating "Hazardous Waste."

- For waste containers containing free liquids, the container storage areas will have a containment system capable of collecting and holding spills, leaks and precipitation. The containment system shall have an impervious base underlying the containers which is free of leaks, gaps or cracks. The capacity will be sufficient to contain the entire volume of the largest container or 10% of the entire volume of all of the containers whichever is largest. Run on into the containment system will be prevented. Spilled or leaked waste and accumulated precipitation will be removed from the containment system in as timely a manner as necessary to prevent overflow of the containment system.

- For waste containers which do not contain free liquids, a secondary containment system will not be provided, however the storage area will be designed and operated to drain and remove liquid resulting from precipitation or the containers will be elevated and removed from contact with accumulated precipitation.

- Containers holding reactive or ignitable waste will be stored at least 50 feet (15 meters) from the property line.

- Each container of hazardous waste will be marked and labeled in accordance with US DOT requirements under 49 CFR 172.

- Hazardous Waste Containers will meet US DOT requirements under 49 CFR Parts 173, 178, and 179.

- Each container of hazardous waste of 110 gallons or less will be marked in accordance with US DOT requirements under 49 CFR 172.304 with the following:

  HAZARDOUS WASTE-FEDERAL LAW PROHIBITS IMPROPER DISPOSAL. If found contact the nearest police or public safety authority or the Environmental Protection Agency.
  Generator name and Address_____
  Manifest Document Number_____

- Waste will be placed in containers in good condition. If container begins to leak, the contents will be transferred from the defective container into a good container.

- The containers used will be made of or lined with a material that does not react with and is compatible with the waste.

- The containers shall remain closed during storage except when waste is added or removed from the container.

- The containers will not be opened, stored, or handled in a manner which will cause the container to leak.

- The containers will be labeled to accurately identify their contents.

- The storage area and containers will be inspected at least weekly to identify leaks and/or deterioration. Inspection reports will be documented in writing.

- Incompatible wastes will not be placed within the same container or in an unwashed container that previously held an incompatible waste or material.

- A container holding a waste that is incompatible with other wastes or materials will be segregated from the other materials or protected by means of an impermeable dike, wall, berm or other device.

- Upon project closure, all hazardous waste and hazardous waste residues will be removed from the containment system. The containment system will be decontaminated and all wastes will be disposed off-site at a permitted disposal facility.

- Appropriate hazardous training will be provided to site personnel as per 40 CFR 265.16 and 29 CFR 1910.120.

- A Contingency Plan will be developed to handle any fire, spill, or emergency and appropriate emergency response equipment (spill cleanup materials, fire protection equipment, communication devices and alarms to notify workers of an emergency are) and will be present as required under 40 CFR 265 Subparts C & D.

8.6 SOLID WASTES

All non-hazardous solid wastes generated on-site will be disposed or recycled in accordance with NJ Solid Waste Regulations. All solid wastes will be recycled or disposed at state permitted recycling facilities. Due to the recent invalidation of the NJ Solid Waste Flow Laws by the U.S. Supreme Court on 11/10/97, solid wastes may be disposed at in-state or out of state facilities. Solid wastes will be competitively procured. Disposal facilities will be evaluated and approved in accordance with Foster Wheeler Environmental Corporate Procedure (RG-2) to ensure facility compliance. Solid wastes to be encountered include soils, PPE, and decon waters.

9.0 PROJECT MANAGEMENT

The project management team shall be responsible for all technical and administrative aspects of the remediation project.

9.1 PROJECT SCHEDULE

The project schedule is provided as Figure 9-1.

9.2 PROJECT STAFFING PLAN

The organization chart for this project is provided in Figure 9-2. The resumes for the primary project staff are included in the Quality Control Plan.

9.3 MEETINGS

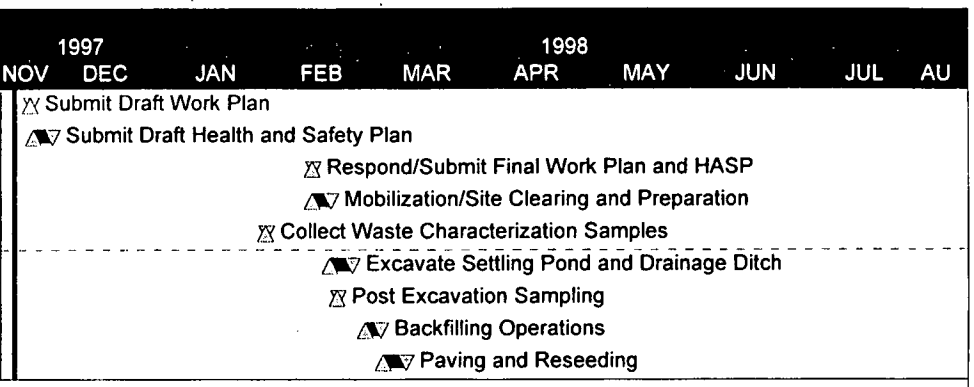
9.3.1 Pre-Construction Meeting

Prior to mobilization, the Project Superintendent shall conduct a pre-construction meeting in the ROICC office. The date and time of the pre-construction meeting shall be approved by the ROICC NTR.

9.3.2 Daily Safety Meetings

Prior to the starting work, a daily safety meeting will be conducted by the Foster Wheeler Environmental Health and Safety Officer. All of the day's planned activities will be reviewed with particular attention focused on PPE and risk. All personnel are required to attend the meeting. Excavation of the sanitary sewer system should not require more than two days.

Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish
1000	Submit Draft Work Plan	1d	0	25NOV97 A	25NOV97 A
1010	Submit Draft Health and Safety Plan	1d	0	26NOV97 A	01DEC97 A
1030	Respond/Submit Final Work Plan and HASP	1d	0	12FEB98 A	12FEB98 A
1040	Mobilization/Site Clearing and Preparation	1d	0	12FEB98 A	17FEB98 A
1050	Collect Waste Characterization Samples	1d	0	30JAN98 A	30JAN98 A
1070	Excavate Settling Pond and Drainage Ditch	1d	0	17FEB98 A	23FEB98 A
1080	Post Excavation Sampling	1d	0	19FEB98 A	19FEB98 A
1090	Backfilling Operations	1d	0	27FEB98 A	03MAR98 A
1100	Paving and Reseeding	1d	0	04MAR98 A	10MAR98 A

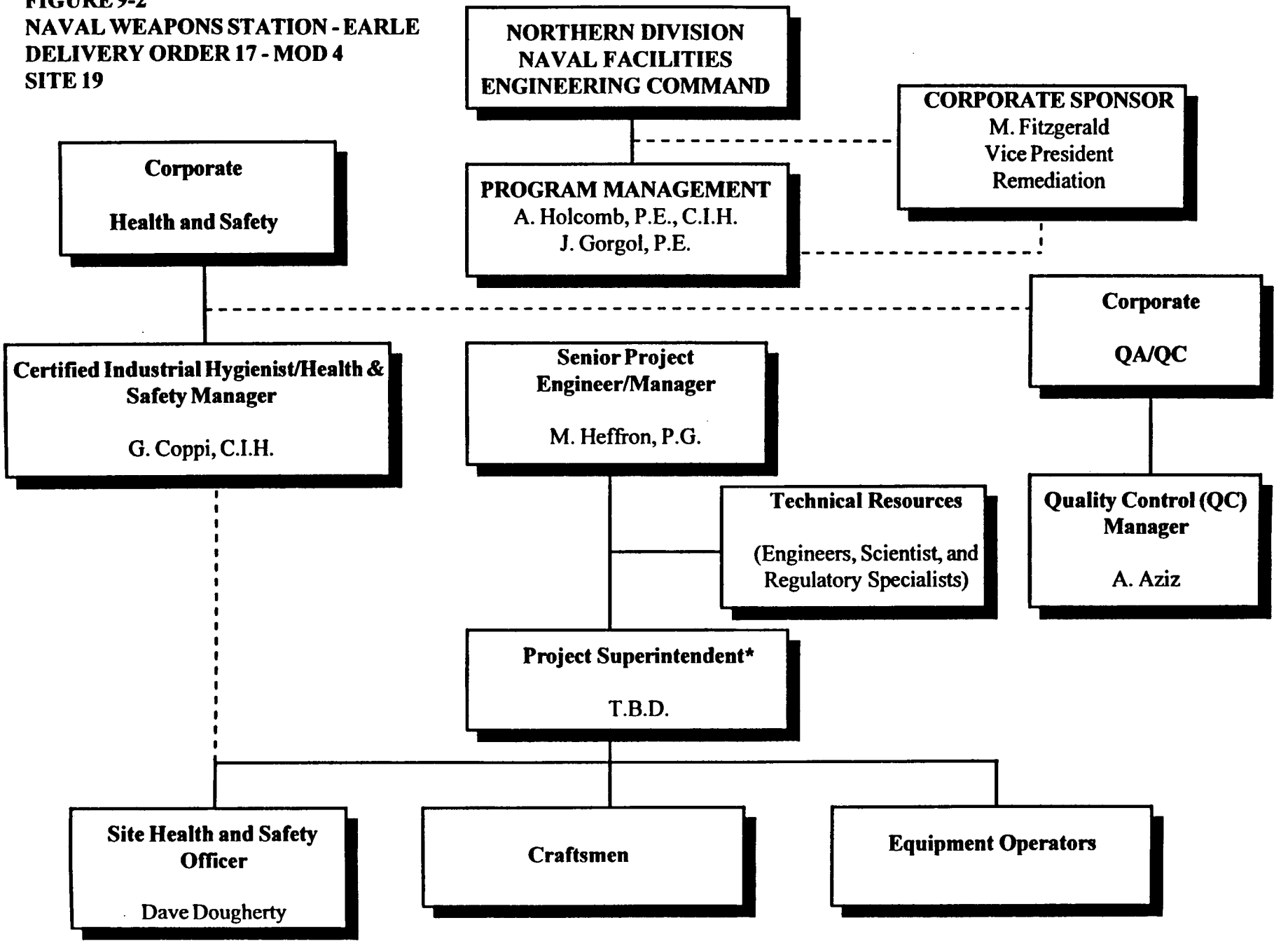


- Early start point
- Early finish point
- Early bar
- Late finish point
- Total float bar
- Progress bar
- Critical bar
- Summary bar
- Progress point
- Critical point
- Summary point
- Start milestone point
- Finish milestone point

FIGURE 9-1
NWS-EARLE
SITE 19 SCEHDEDULE OF ACTIVITIES

Date	Revision	Checked	Approved

FIGURE 9-2
NAVAL WEAPONS STATION - EARLE
DELIVERY ORDER 17 - MOD 4
SITE 19



10.0 QUALITY ASSURANCE/QUALITY CONTROL

This Quality Assurance/Quality Control (QA/QC) section describes the organization, inspections, tests, procedures, and documentation necessary to produce a completed project which complies with the governing regulations and the technical statement of work.

10.1 ORGANIZATION AND RESPONSIBILITIES

QA/QC duties are the responsibility of the Senior Project Engineer/Manager (SPEM). He will employ physical inspections, direct measurement, and confirmatory laboratory testing to verify that work is being performed in accordance with the project plans. All subcontractors will conform to and participate in the program described herein as part of a unified team.

Foster Wheeler Environmental will direct and maintain responsibility for the overall QA/QC program and will manage subcontractors in a manner to maintain project requirements. Subcontractors shall be used for drilling, laboratory analysis, and waste disposal.

10.2 PROBLEM OR WORK DEFICIENCY MEETINGS

If a major problem or deficiency occurs or is likely to occur, a special meeting to address related issues will be held. The meeting may be attended by the SPEM, Navy Representative(s) and others, as required. Meetings may be conducted at NWS Earle, NORDIV, or by teleconference. The purpose of the meeting will be to define and resolve potential problems or work deficiencies in the following manner:

- Define and discuss the problem or deficiency
- Review alternative solutions, including their effects on schedule and budget
- Implement plan to resolve the problem or deficiency

10.3 SUBMITTALS

The Submittal Register is located in Appendix E.

The Quality Control Manager is responsible for maintaining the submittal register and reviewing and certifying that submittals are in compliance with the contract requirements. All submittals will be accompanied by a transmittal form which will identify the submittal and provide a unique tracking number.

10.4 TESTS AND INSPECTIONS

Foster Wheeler Environmental will perform preparatory, initial, and follow-up inspections.

10.5 CHANGES

If circumstances develop during the project that make it necessary or advisable to revise the Work Plan in order to accomplish project objectives, a Change Request Form (CRF) will be forwarded to the Navy for approval. Events such as a change in the site conditions or system performance may result in a CRF. Changes may be discussed with the Navy Design Manager telephonically and followed up with a CRF to avoid negative impacts on the project budget.

10.6 DOCUMENTATION

Documentation of operations, record keeping, photographic evidence of work performed, and as analytical results will be provided to the Navy in the Closure Report.

10.6.1 Operations Record keeping

All field inspection and testing activities will be documented in a project logbook. The project logbook will be maintained in accordance with the relevant Foster Wheeler Environmental Field Technical Guidelines. The Project Manager will maintain records of quality control operations and activities for subcontractors and suppliers.

10.6.2 Photographic Documentation

Still, 35mm color photographs will be taken as needed to record work progress. At a minimum, photographs will be taken of the existing conditions before work begins, during the excavation activities, and following backfill and regrading/reseeding. Photograph location, date and description of the activity recorded will be entered in a photo documentation log. The photographs and log will be submitted with the Closure Report

TABLE 20-4a

COMPARISON OF SUBSURFACE SOIL ANALYTICAL DATA TO ARARS - SITE 19

NWS EARLE, COLTS NECK, NEW JERSEY

SAMPLE NUMBER:	19SB03-03	19SB04-00	19SB04-03	19SB05-02	---	---	SELECTED ARARS		
LOCATION:	19SB03	19SB04	19SB04	19SB05	---	---	NJDEP Soil Residential Direct Contact Cleanup Criteria	NJDEP Soil Non-Residential Direct Contact Cleanup Criteria	NJDEP Soil Impact to Groundwater Cleanup Criteria
DATA SOURCE:	1995 RI	1995 RI	1995 RI	1995 RI					
INOR ANICS	mg/kg	mg/kg	mg/kg	mg/kg			mg/kg	mg/kg	mg/kg
aluminum	3610	1470	1690	1220			-	-	-
antimony				0.70			14.0	340	-
arsenic	2.8 J	1.1 J	1.0 J	1.1 J			20.0	20.0	-
barium	8.2 J	5.0 J	241 J	3.3 J			700	47000	-
beryllium	0.19	0.12	0.15	0.17			1.00	1.00	-
cadmium	0.11	0.052	0.074	0.10			1.00	100	-
calcium	129	524	380	68.6			-	-	-
chromium, hexavalent	7.0 J						-	10.0	-
chromium, total	34.0	6.8	6.4	13.7			-	500	-
cobalt	0.16	0.15	0.17				-	-	-
copper	4.6	1.8	3.7	1.2			600	600	-
iron	2900 J	2750 J	1730 J	1890 J			-	-	-
lead	27.4 J	6.9 J	5.8 J	2.9 J			400	600	-
magnesium	158	186	184	61.3			-	-	-
manganese	1.6 J	3.7 R	3.4 R	2.7 J			-	-	-
mercury	0.049 J	0.023 J	0.027 J	0.014 J			14.0	270	-
nickel	0.58	0.68	0.69	0.42			250	2400	-
potassium	495	98.6	320	179			-	-	-
silver			0.14				110	4100	-
sodium	162	154	144	138			-	-	-
thallium	0.80 J		0.77 J				2.00	2.00	-
vanadium	8.2	6.1	7.2	4.4			370	7100	-
zinc	89.1 J	2.2 J	100 J	24.4 J			1500	1500	-
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg			ug/kg	ug/kg	ug/kg
tetrachloroethene		4.0 J					4000	6000	1000

TABLE 20-4a
COMPARISON OF SUBSURFACE SOIL DATA TO ARARS - SITE 19
NWS EARLE, COLTS NECK, NEW JERSEY

Footnotes to sample results:

No value - No positive result occurred for this parameter. (Refer to the complete analytical database appendix for detection limits.)

J - Value is estimated because concentration is below the quantitation limit or because of exceedance of data validation quality control criteria.

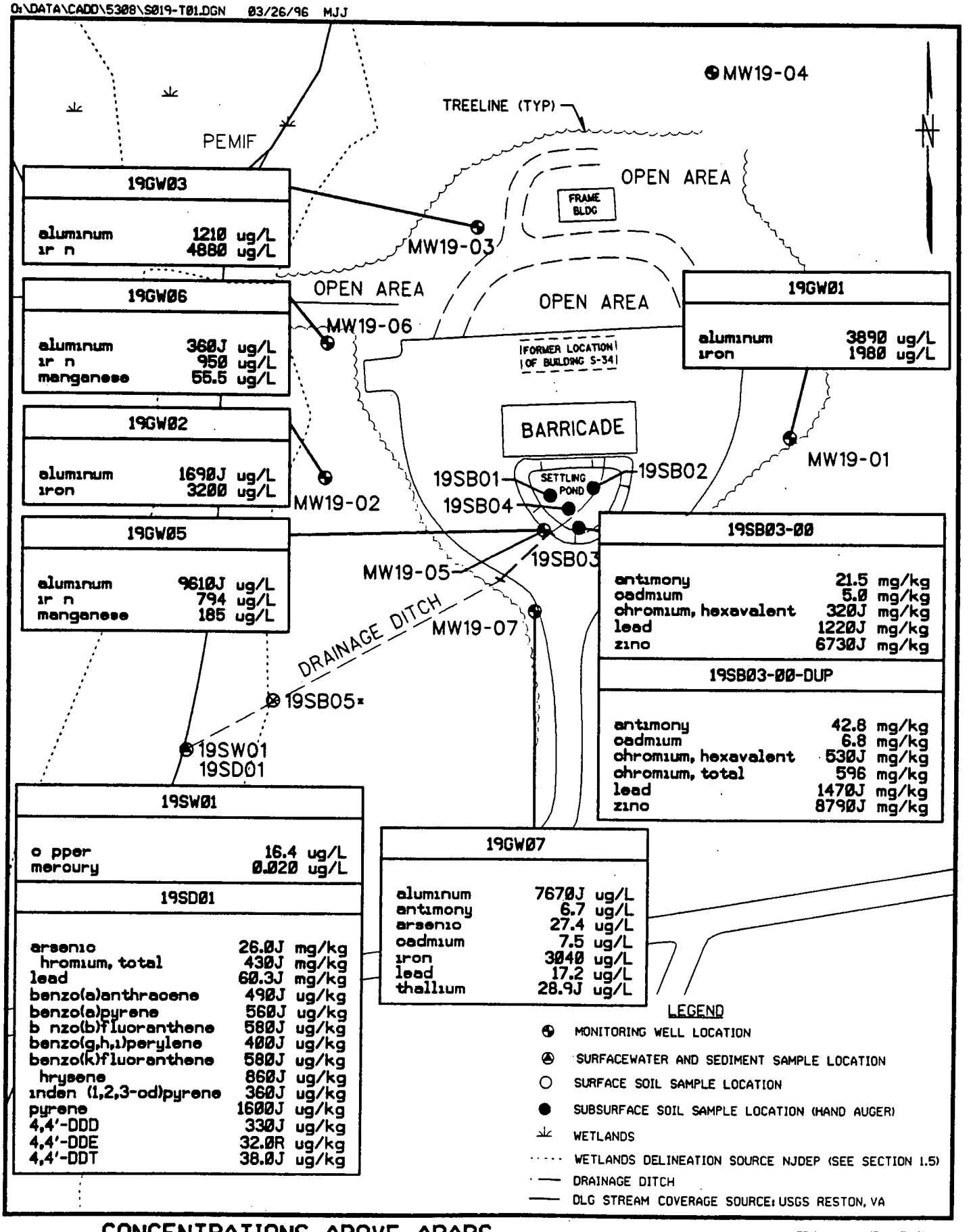
R - Positive result is considered rejected based on exceedance of data validation quality control criteria.

E - Result exceeds one or more of the selected ARARs.

Footnotes to soil criteria:

- - No standard is available for this chemical in this classification.

O:\DATA\CADD\5308\S019-T01.DGN 03/26/96 MJJ



CONCENTRATIONS ABOVE ARARS
SITE 19

0 100 200
SCALE IN FEET

FIGURE 20-4

Brown & Root Environmental

TABLE 20-4a

COMPARISON OF SUBSURFACE SOIL ANALYTICAL DATA TO ARARS - SITE 19

NWS EARLE, COLTS NECK, NEW JERSEY

SAMPLE NUMBER:	19SB01-01	19SB01-03	19SB02-00	19SB02-03	19SB03-00	19SB03-00-DUP	SELECTED ARARS		
LOCATION:	19SB01	19SB01	19SB02	19SB02	19SB03	19SB03	NJDEP Soil Residential Direct Contact Cleanup Criteria	NJDEP Soil Non-Residential Direct Contact Cleanup Criteria	NJDEP Soil Impact to Groundwater Cleanup Criteria
DATA SOURCE:	1995 RI	1995 RI	1995 RI	1995 RI	1995 RI	1995 RI			
INORGANICS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
aluminum	1430	980	562	790	3000	1430	-	-	-
antimony					21.5 E	42.8 E	14.0	340	-
arsenic	1.1 J		0.66 J		4.9 J	5.2 J	20.0	20.0	-
barium	151 J	104 J	157 J	129 J	283 J	323 J	700	47000	-
beryllium	0.14	0.16	0.13	0.12	0.29	0.20	1.00	1.00	-
cadmium	0.069	0.063	0.12	0.090	5.0 E	6.8 E	1.00	100	-
calcium	385	178	453	321	412	652	-	-	-
chromium, hexavalent			10.0 J	0.90 J	320 E J	530 E J	-	10.0	-
chromium, total	7.4	8.6	45.3	9.4	460	596 E	-	500	-
cobalt			0.18		5.6	6.8	-	-	-
copper	4.7	4.8	5.6 J	2.4	11.1 J	18.4 J	600	600	-
iron	2500 J	3110 J	1450 J	874 J	6090 J	3120 J	-	-	-
lead	3.1 J	2.7 J	7.4 J	3.4 J	1220 E J	1470 E J	400	600	-
magnesium	222	107	147	95.0	387	485	-	-	-
manganese	3.7 R	1.7 J	2.9 J	1.4 J	16.5 R	19.8 R	-	-	-
mercury	0.015 J		0.018 J		0.20 J	0.18 J	14.0	270	-
nickel	0.56	0.36	0.64	0.32	1.7	2.2	250	2400	-
potassium	147	194	58.0	174	377	302	-	-	-
selenium					0.71 J		63.0	3100	-
silver					0.17	0.29	110	4100	-
sodium	153	66.3	145	153	192	193	-	-	-
thallium					1.1 J		2.00	2.00	-
vanadium	6.2	6.1	3.9	4.2	12.0	10.3	370	7100	-
zinc	101 J	83.2 J	138 J	76.9 J	6730 E J	8790 E J	1500	1500	-
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
tetrachloroethene	4.0 J		4.0 J		4.0 J		4000	6000	1000

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 7/11/96)

This listing represents the combination of Tables 3-2 and 7-1 from the Department of Environmental Protection and Energy's February 3, 1992 proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26, with noted correction based upon errors identified by the Department during or subsequent to the comment period as well as new toxicological information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This along with other site-specific factors including background conditions may result in site specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the Department's opinion that a site requires remediation.

SURF SOILS (0-2' BGS)

Note: Material bracketed [thus] is deleted and material underlined thus is added

SUBSURFACE SOILS 2-7' BGS

Contaminant	Chemical Abstract Registry Number (CASRN)	Residential Direct Contact Soil Cleanup Criteria(a)(b) (RDCSCC)	Non-Residential Direct Contact Soil Cleanup Criteria(a)(b) (NRDCSCC)	Impact to Ground Water Soil Cleanup Criteria(b) (IGWSCC)
Acenaphthene	83-32-9	3400	10000(c)	100
Acetone	67-64-1	1000(d)	1000(d)	[50] 100 (i)
Acrylonitrile	107-13-1	1	5	[100] 1 (i)
Aldrin	309-00-2	0.040	0.17	50
Anthracene	120-12-7	10000(c)	10000(c)	[500] 100 (i)
Antimony	7440-36-0	14	340	(h)
Arsenic	7440-38-2	[2 (f)] 20 (e)	[2 (f)] 20 (e)	(h)
Barium	7440-39-3	700	47000(n)	(h)
Benzene	71-43-2	3	13	1
Benzo(b)fluoranthene (3,4-Benzofluoranthene)	205-99-2	0.9	4	[500] 50 (i)
Benzo(a)anthracene	56-55-3	0.9	4	500
Benzo(a)pyrene (BaP)	50-32-8	0.66(f)	0.66(f)	100
Benzo(k)fluoranthene	207-08-9	0.9	4	500
Benzyl Alcohol	100-51-6	10000(c)	10000(c)	50
Beryllium	7440-41-7	1(f)	1(f)	(h)
Bis(2-chloroethyl) ether	111-44-4	0.66(f)	3	[1] 10 (j)
Bis(2-chloroisopropyl) ether	39638-32-9	2300	10000(c)	10
Bis(2-ethylhexyl) phthalate	117-81-7	49	210	100

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 7/11/96)

Contaminant	(CASRN)	(RDCSCC)	(NRDCSCC)	(IGWSCC)
Bromodichloromethane (Dichlorobromomethane)	75-27-4	[5] 11 (g)	[22] 46 (g)	1
Bromoform	75-25-2	86	370	1
Bromomethane	74-83-9	79	1000 (d)	1
2-Butanone (MEK)	78-93-3	1000 (d)	1000 (d)	50
Butylbenzyl phthalate	85-68-7	1100	10000 (c)	100
Cadmium	7440-43-9	1	100	(h)
Carbon tetrachloride	56-23-5	2 (k)	4 (k)	1
4-Chloroaniline	106-47-8	230	4200	(r)
Chl robenzene	108-90-7	37	680	1
Chloroform	67-66-3	19 (k)	28 (k)	1
4-Chloro-3-methyl phenol	59-50-7	10000 (c)	10000 (c)	100
Chloromethane	74-87-3	520	1000 (d)	10
2-Chlorophenol	95-57-8	280	5200	[50] 10 (j)
Chrysene	218-01-9	9	40	500
Copper	7440-50-8	600 (m)	600 (m)	(h)
Cyanide	57-12-5	1100	21000 (o)	(h)
4,4'-DDD (p,p'-TDE)	72-54-8	3	12	[100] 50 (i)
4,4'-DDE	72-55-9	2	9	[100] 50 (i)
4,4'-DDT	50-29-3	2	9	[100] 500 (i)
Dibenz(a,h) anthracene	53-70-3	0.66 (f)	0.66 (f)	[500] 100 (j)
Dibromochloromethane (Chlorodibromomethane)	124-48-1	110	1000 (d)	1
Di-n-butyl phthalate	84-74-2	5700	10000 (c)	100
Di-n-octyl phthalate	117-84-0	1100	10000 (c)	100
1,2-Dichlorobenzene	95-50-1	5100	10000 (c)	50
1,3-Dichlorobenzene	541-73-1	5100	10000 (c)	100
1,4-Dichlorobenzene	106-46-7	570	10000 (c)	100
3,3'-Dichlorobenzidine	91-94-1	2	6	100
1,1-Dichloroethane	75-34-3	570	1000 (d)	[1] 10 (i)
1,2-Dichloroethane	107-06-2	6	24	1
1,1-Dichloroethene	75-35-4	8	150	10

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 7/11/96)

Contaminant	(CASRN)	(RDCSCC)	(NRDCSCC)	(IGWSCC)
1,2-Dichloroethene (trans)	156-60-5	1000 (d)	1000 (d)	50
1,2-Dichl roethene (cis)	156-59-2	79	1000 (d)	[50] 1 (i)
2,4-Dichl rophenol	120-83-2	170	3100	10
1,2-Dichloropropane	78-87-5	10	43	(r)
1,3-Dichloropropene (cis and trans)	542-75-6	4	5 (k)	1
Dieldrin	60-57-1	0.042	0.18	50
Diethyl phthalate	84-66-2	10000 (c)	10000 (c)	50
2,4-Dimethyl phenol	105-67-9	1100	10000 (c)	10
Dimethyl phthalate	131-11-3	10000 (c)	10000 (c)	50
2,4-Dinitrophenol	51-28-5	110	2100	10
Dinitrotoluene (2,4-/2,6-mixture)	25321-14-6	1 (l)	4 (l)	10 (l)
Endosulfan	115-29-7	[3] 340 (g)	[52] 6200 (g)	50
Endrin	72-20-8	17	310	50
Ethylbenzene	100-41-4	1000 (d)	1000 (d)	100
Fluoranthene	206-44-0	2300	10000 (c)	[500] 100 (i)
Fluorene	86-73-7	2300	10000 (c)	100
Heptachlor	76-44-8	0.15	0.65	[500] 50 (j)
Hexachlorobenzene	118-74-1	0.66 (f)	2	[50] 100 (i)
Hexachlorobutadiene	87-68-3	[11] 1 (g)	[210] 21 (g)	[50] 100 (g)
Hexachlorocyclopentadiene	77-47-4	400	7300	100
Hexachloroethane	67-72-1	6	100	100
Indeno (1,2,3-cd) pyrene	193-39-5	0.9	4	500
Isophorone	78-59-1	1100	10000 (c)	[10] 50 (j)
Lead	7439-92-1	[100] 400 (p)	600 (q)	(h)
Lindane	58-89-9	0.52	2.2	[1] 50 (j)
2-Methylphenol	95-48-7	2800	10000 (c)	(r)
4-Methylphenol	106-44-5	2800	10000 (c)	(r)
Methoxychlor	72-43-5	280	5200	[500] 50 (i)
Mercury	7439-97-6	14	270	(h)
4-Methyl-2-pentanone (MIBK)	108-10-1	1000 (d)	1000 (d)	50

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 7/11/96)

Contaminant	(CASRN)	(RDCSCC)	(NRDCSCC)	(IGWSCC)
Methylene chloride	75-09-2	49	210	[10] 1 (j)
Naphthalene	91-20-3	230	4200	100
Nickel	7440-02-0	250	2400 (k) (n)	(h)
Nitrobenzene	98-95-3	28	520	[50] 10 (i)
N-Nitrosodiphenylamine	86-30-6	140	600	100
N-Nitrosodi-n-propylamine	621-64-7	0.66 (f)	0.66 (f)	[1] 10 (j)
PCBs (Polychlorinated biphenyls)	1336-36-3	0.49	2	[100] 50 (i)
Pentachlorophenol	87-86-5	6	24	100
Phenol	103-95-2	10000 (c)	10000 (c)	50
Pyrene	129-00-0	1700	10000 (c)	[500] 100 (j)
Selenium	7782-49-2	63	3100 (n)	(h)
Silver	7440-22-4	110	4100 (n)	(h)
Styrene	100-42-5	23	97	100
1,1,1,2-Tetrachloroethane	630-20-6	170	310	1
1,1,2,2-Tetrachloroethane	79-34-5	34	70 (k)	1
Tetrachloroethylene	127-18-4	4 (k)	6 (k)	1
Thallium	7440-28-0	2 (f)	2 (f)	(h)
Toluene	108-88-3	1000 (d)	1000 (d)	500
Toxaphene	8001-35-2	0.10 (k)	0.2 (k)	[100] 50 (i)
1,2,4-Trichlorobenzene	120-82-1	68	1200	100
1,1,1-Trichloroethane	71-53-6	210	1000 (d)	50
1,1,2-Trichloroethane	79-00-5	22	420	1
Trichloroethene (TCE)	79-01-6	23	54 (k)	1
2,4,5-Trichlorophenol	95-95-4	5600	10000 (c)	50
2,4,6-Trichlorophenol	88-06-2	62	270	[50] 10 (i)
Vanadium	7440-62-2	370	7100 (n)	(h)
Vinyl chloride	75-01-4	2	7	[1] 10 (i)
Xylenes (Total)	1330-29-7	410	1000 (d)	10
Zinc	7440-66-6	1500 (m)	1500 (m)	(h)

SOIL CLEANUP CRITERIA (mg/kg)
(LAST REVISED - 7/11/96)

F otnotes:

(a) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(b) Criteria are subject to change based on site-specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.).
(c) Health based criterion exceeds the 10,000 mg/kg maximum for total organic contaminants.
(d) Health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants.
(e) Cleanup standard proposal was based on natural background.
(f) Health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level.
(g) Criterion has been recalculated based on new toxicological data.
(h) The impact to ground water values for inorganic constituents will be developed based upon site specific chemical and physical parameters.
(i) Original criterion was incorrectly calculated and has been recalculated.
(j) Typographical error.
(k) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(l) New criterion derived using methodology in the basis and background document.
(m) Criterion based on ecological (phytotoxicity) effects.
(n) Level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended.
(o) Level of the criterion is such that evaluation for potential acute exposure hazard is recommended.
(p) Criterion based on the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) model utilizing the default parameters. The concentration is considered to protect 95% of target population (children) at a blood lead level of 10 ■g/dl.
(q) Criteria were derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and were designed to be protective for adults in the workplace.
(r) Insufficient information available to calculate impact to ground water criteria.

Tabl 1. Sediment Quality Criteria for selected organic compounds (FW=fresh water, SW=salt water, NA=not available).

Compound	Sediment Criterion (ug/g Carbon) (top # is FW criterion, bottom # SW critierion).		
		95% Confidence Interval	
	Mean	Lower	Upper
Acenaphthene	730 NA	180 NA	3030 NA
Anilene	0.0662 0.248	0.0169 0.0635	0.262 0.984
Chlorpyrifos	3.22 0.44	0.831 0.114	12.7 1.73
DDT	0.828 0.828	0.183 0.183	3.80 3.80
Dieldrin	0.130 0.130	0.00976 0.00976	1.79 1.79
Endrin	0.0532 0.0532	0.00654 0.00654	0.443 0.443
Ethyl Parathion	0.0810 NA	0.0160 NA	0.416 NA
Heptachlor	0.110 0.104	0.0148 0.014	0.840 0.796
Lindane	0.157 NA	0.0394 NA	0.636 NA
Phenanthrene	139 102	32.6 23.8	605 442
PCB (1245)*	19.5 41.8	3.87 8.29	99.9 214

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* should be used as a surrogate for PCBs in general

The sediment quality criteria are reference numbers used to identify the presence of contamination exceeding levels potentially harmful to aquatic lif . Specific cleanup objectives are to be developed on a case-by-case basis.

Table 2. Summary of ER-L and ER-M, concentrations for selected chemicals in sediment (dry weight).

Chemical Analyte	ER-L Concentration	ER-M Concentration	Subjective Degree of Confidence In ER-L/ER-M Values
Trace Elements (ppm)			
Antimony	2	25	Moderate/moderate
Arsenic	33	85	Low/moderate
Cadmium	5	9	High/high
Chromium	80	145	Moderate/moderate
Copper	70	390	High/high
Lead	35	110	Moderate/high
Mercury	0.15	1.3	Moderate/high
Nickel	30	50	Moderate/moderate
Silver	1	2.2	Moderate/moderate
Zinc	120	270	High/high
Pesticides (ppb)			
Chlordane	0.5	6	Low/low
Polynuclear Aromatic Hydrocarbons (ppb)			
Ac napthene	150	650	Low/low
Anthracene	85	960	Low/moderate
Benzo(a) anthracene	230	1600	Low/moderate
Benzo(a) pyrene	400	2500	Moderate/moderate
Chrysene	400	2800	Moderate/moderate
Dibenz(a,h) anthracene	60	260	Moderate/moderate
Fluoranthene	600	3600	High/high
2-methylnaphthalene	65	670	Low/moderate
Napthalene	340	2100	Moderate/high
Phenanthrene	225	1380	Moderate/moderate
Pyrene	350	2200	Moderate/moderate
Total PAH	4000	35000	Low/low

Source: NOAA 1990

The ER-L and ER-M are reference numbers used to identify the presence of contamination exceeding levels potentially harmful to aquatic life. Specific cleanup objectives are to be developed on a case-by-case basis.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

METHODOLOGY FOR THE FIELD EXTRACTION/PRESERVATION OF SOIL SAMPLES WITH METHANOL FOR VOLATILE ORGANIC COMPOUNDS DECEMBER 1996

1.0 Scope and Application

1.1 This method describes the container preparation, field sampling and field extraction/preservation procedure to be used in conjunction with the analysis of soil samples for volatile organics. The applicable analytical methods are SW-846 methods 8010B, 8015A, 8020A, 8021A, 8240B and 8260A found in the most recently promulgated edition of USEPA's Test Methods For Evaluating Solid Waste and the most current version of the Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, USEPA Contract Laboratory Program.

1.2 It is the labboratory's responsibility when analyzing samples obtained by this method to demonstrate internally that all cleanup criteria have been achieved. Should a laboratory know or suspect it has inadequate analytical sensitivity to meet any of the cleanup criteria, the laboratory shall not accept any samples unless the Department is notified in advance and the laboratory obtains approval.

2.0 Method Summary

2.1 Soil samples collected for volatile organic analysis must be handled in a manner which will minimize the loss of contaminants due to volatilization and biodegradation. Department experience and open literature indicate that, for the analysis of volatile organic compounds in soil, field extraction/preservation with methanol must be conducted to ensure that contaminants do not degrade or volatilize during sample handling and transport.

2.2 A small diameter soil core sampling device is used to collect a 10 gram (g) soil sample. The sample is extruded into a tared sample container, supplied by the laboratory performing the analysis, containing purge and trap grade methanol and surrogate compounds. The ratio of volume of methanol to weight of soil is 2.5:1. A portion of the methanol extract is combined with organic free reagent water and analyzed by purge and trap GC or GC/MS.

3.0 Sample Containers

3.1 The recommended sample containers are 60 ml (2 oz.) amber wide mouth packer bottle with a Teflon[R] lined screw cap, a 60 ml straight sided round bottle with a Teflon[R] lined screw cap, a 40 ml VOA vial with an open-top screw cap and a silicone rubber coated with Teflon[R] septa or other similar sample container. The use of larger volume containers will cause the layer of methanol over the sample to be minimized, making it difficult to extract an aliquot of methanol for analysis.

3.2 The standard 40ml VOA vial can be used, but the small mouth may not accommodate some core samplers. The VOA vial is also unstable and susceptible to spillage.

4.0 Sample Container Preparation

4.1 Label each sample container with a unique numerical designation.

4.2 Fill the sample container with 25 mls of demonstrated analyte free purge and trap grade methanol.

4.3 An actual analysis should be traceable to the methanol used in the sample containers on the day the sample containers were prepared.

4.4 Record the lot number of the methanol used in the preparation of the sample containers. This information can be used for future reference in the event of suspected contamination of the methanol.

4.5 Employing a syringe, add the appropriate surrogate compounds to the methanol based on the analytical method. For methods 8010B, 8015A, 8020A, and 8021A, add each surrogate compound to the methanol yielding a concentration of approximately 1500 ug/l in each sample container. For methods 8240B, 8260A and the Medium Level Soil/Sediment Sample procedure of the Contract Laboratory Program Statement of Work, add each surrogate compound to the methanol yielding a concentration of approximately 2500 ug/l in each sample container.

4.6 Immediately cap the container tightly and gently swirl.

4.7 Variations of the surrogate compounds may be used depending upon expected sample matrix interferences and contaminants.

4.8 Weigh each labeled sample container with the 25 mls of methanol and surrogate compounds to the nearest one tenth (0.1g) of a gram.

4.9 Record the weight in a bound logbook and on the chain of custody record with its corresponding numerical designation.

4.10 All sample containers must be supplied by the laboratory performing the analysis.

4.11 The prepared sample containers must be stored at 4° ±2°C before shipment. The sample containers should be prepared no more than fourteen (14) days prior to shipment. It will be the responsibility of the laboratory to ensure the integrity of the sample containers remain contaminant free.

5.0 Sample Collection Methodology

5.1 Soil sample collection for volatile organic analysis must be performed with the use of a decontaminated small diameter coring device. A modified 10-30 ml disposable syringe or commercially available small diameter tube/plunger sampler is acceptable. The small diameter coring device must be capable of collecting the required amount of sample from larger diameter core samplers (split spoons, etc.) or from freshly exposed soils.

5.2 Selection of the sample location for volatile organics must be based on the methods in the NJDEPE Field Sampling Procedures Manual, May, 1992 and the site specific sampling plan.

5.3 If a modified disposable syringe is used it can be prepared in-house by cutting off the injection tip. Depending upon the construction of the syringe, small air vents must be cut into the plunger or the rubber tip and retaining post must be removed. These alterations to the plunger will prevent air from being forced through or around the soil plug during subcoring and sample extrusion.

5.4 The small diameter core sampler must be capable of delivering the sample directly into the sample container. The outer diameter of the core sampler must be smaller than the inner diameter of the sample container to avoid loss of sample and ease the soil transfer process. The sample from the small diameter core cannot be transferred to a secondary container such as another sample bottle, zip lock bag, aluminum foil, etc. prior to placement into the sample container with the methanol preservative.

5.5 Use a small electronic balance or manual scale for measuring the weight of the soil in the syringe.

5.6 Tare weigh the small diameter core sampler.

5.7 Using a decontaminated coring device, collect 10g ±2g (8-12grams) of sample (wet weight). Wipe the outside of the subcoring device to remove any adherent soil. The plunger of the coring device can be pulled back or completely removed allowing the open barrel of the subcore to be inserted into the soil. Depending upon the soil texture, depth or moisture content, the subcore can be inserted straight into the soil, on an angle or multiple insertions can be performed to obtain the required sample weight.

5.8 Quickly weigh the sample while contained in the small diameter core sampler. Excess soil sample can be removed from the coring device by extruding a small portion of the core and cleaning away with a decontaminated trowel or spatula. If soil weight is below the weight limit, obtain additional sample. Reweigh after each addition or removal of sample to the subcore until the target weight is attained (8-12g). Analytical results from a sample exceeding the weight maximums and minimums may be rejected and thus require resampling.

5.9 When sampling soils consisting of similar textures and water content, sample weight can be estimated based on volume of previously weighed samples from sampling or practice core sampling to determine sample weights.

5.10 Immediately open the sample container and slowly extrude the soil core into the preweighed and prenumbered sample container supplied by the laboratory performing the analysis. Avoid splashing methanol out of the sample container. Do not immerse the small diameter soil coring device into the methanol.

5.11 Ensure the threads on the sample container and cap are free of soil particles. Use a clean brush or paper towel to remove the particles off the threads. The presence of soil particles compromises the seal of the container resulting in loss of methanol which may invalidate the sample.

5.12 Secure the lid of the sample container. Gently swirl the sample to mix and break up the soil aggregate until soil is covered with methanol. Do not shake.

5.13 Do not attach any additional adhesive backed labels or tape to the sample containers. Record sample numbers on container avoiding covering laboratory identification number. Labels with wire or rubber band attachments may be used provided they can be removed easily for sample weighing. Record laboratory and field

identification numbers on chain of custody and field notes.

5.14 The actual weight of soil will be determined by the laboratory performing the analysis.

5.15 Do not use or submit samples for analysis if any methanol has spilled from a sample container during shipment to the site or during sampling. Extra sample containers can be made available by the laboratory in case of accidental spillage of methanol in the field. The sample containers must be prepared in accordance with Section 4.0.

5.16 After sample collection, immediately return the containers to an iced cooler in an upright position. Sample containers can be placed in separate ziplock bags to protect other containers in case of leakage during transport. The laboratory sample number or field sample identification number may be placed on the bag and crossed referenced on the Chain of Custody. Do not place additional adhesive backed labels or tape on the sample containers. If any methanol is lost from a sample container upon arrival at the laboratory, the sample is invalid and resampling must be performed.

6.0 Moisture Determination

6.1 To report the sample results on a dry weight basis, collect one duplicate sample not preserved with methanol from each sample location for moisture determination. Tightly seal the container to prevent the loss of soil moisture. This sample does not require to be weighed or preserved with methanol. A small volume sample container (15 mls or less) may be used for this sample to avoid possible sample shortages.

6.2 Weigh a 5-10g portion of the sample in a tared crucible.

6.3 Dry the sample overnight at 103-105 °C. Allow to cool in a desiccator before reweighing.

6.4 Determine percent dry weight by the following formula:

$$\% \text{ dry weight} = \frac{\text{g of dry sample}}{\text{g of sample}} \times 100$$

6.5 Calculate sample concentration on a dry weight basis.

7.0 Quality Assurance/Quality Control Sample and Decontamination Requirements

7.1 Ambient Blank

7.1.1 An Ambient Blank is a QA/QC sample which will determine the potential contamination from ambient air during sampling procedures. This sample will provide a means to evaluate non-sample related contamination.

7.1.2 The Ambient Blank is prepared in the same manner as the sample containers described in Section 4.0. During sample collection, it is opened at the same time and next to the sample container and remains open during sample collection. It is closed at the same time as the sample container. It is performed at only one sample location in an area suspected of having the highest ambient contamination.

7.1.3 The collection of an Ambient Blank is not required when sampling is performed using the methanol extraction/preservation technique. It will be optional at the discretion of the site investigation team, or will be required on a site specific basis if previous elevated analytical results are suspected due to contamination from the sampling environment.

7.1.4 The minimum frequency of collection for Ambient Blanks must be at a rate of 10% the total number of samples collected throughout an event or one per sample shipment, whichever is less. The frequency of collection may be at a higher rate at the discretion of the investigation team based on site conditions.

7.1.5 Results of the Ambient Blank must be reported using a sample weight of 10g.

7.2 Field Blank

7.2.1 A Field Blank is a QA/QC sample which will determine potential contamination from sampling equipment used to collect and transfer samples from the point of collection to the sample container.

7.2.2 A Field Blank is performed by pouring demonstrated analyte free water from one sample container, over each piece of sampling equipment required for sample collection and into a separate set of identical sample containers. Additional information on Field Blanks can be found in the NJDEPE Field Sampling Procedures Manual, May 1992.

7.2.3 A Field Blank is not required when sampling with the methanol extraction/preservation technique. It is

optional, or will be required on a site specific basis if previous elevated analytical results are suspected due to cross contamination from sampling equipment.

7.3 Trip Blanks

7.3.1 A Trip Blank is a QA/QC sample which will determine additional sources of contamination that may potentially influence the samples. The sources of the contamination may be from the lab, sample bottles or during shipment.

7.3.2 A Trip Blank is prepared at the same time and in the same manner as the sample containers as described in Section 4.0. The Trip Blank must accompany the sample containers to the field and back to the laboratory along with the collected samples for analysis. It must remain sealed at all times until it is analyzed at the laboratory.

7.3.3 A Trip Blank is required when sampling with the methanol extraction/preservation technique. It will be required on a site specific basis if previous elevated analytical results are suspected due to cross contamination from sample shipment.

7.3.4 The frequency of collection for the Trip Blank must be at a rate of one (1) per sample shipment.

7.3.5 Results of the Trip Blank must be reported using a sample weight of 10g.

7.4 Duplicate Samples

7.4.1 Perform duplicate samples at a rate of five (5) percent (1 per 20 samples).

7.4.2 Duplicate samples must be obtained from the same location and soil type to minimize location as a potential source of variation in the analytical results. Separate core samples should be obtained for the sample and duplicate sample.

7.5 Sample and Sample Container Handling Time

7.5.1 Sample handling time is to control the length of time bottles are shipped to the site and held on site. The standard four (4) day handling time for sample containers and samples remains the same. Obtain additional information on handling times from Chapter 2 in the NJDEPE Field Sampling Procedures Manual, May 1992.

7.5.2 As stated in N.J.A.C. 7:26E-2.1(a)15, samples must be delivered to the laboratory no later than 48 hours

after sample collection.

7.6 Decontamination of Sampling Equipment

7.6.1 All equipment used for sampling must be decontaminated prior to use.

7.6.2 Decontamination of sampling equipment must follow the procedures in the NJDEPE Field Sampling Procedures Manual, May 1992 for soil sampling equipment. If modified disposable syringes are utilized, they should be discarded if the three step cleaning procedure will not remove the contamination since exposure to acetone may damage the sampling tool.

7.7 General Quality Assurance

7.7.1 Quality assurance requirements have been established to maintain sample integrity. Their primary objectives are to maintain the physical form and chemical composition of the sample and to prevent contamination from other sources or cause changes in contaminant concentrations. Chapter 2 in the NJDEPE Field Sampling Procedures Manual, May 1992 may be consulted for further details on other sampling QA/QC criteria and procedures.

8.0 Field Analysis

8.1 Field analytical methods may be employed during an investigation to aid in the selection or elimination of samples for laboratory analysis. When collecting samples for field analysis, collect a duplicate sample for laboratory analysis. This prevents returning to a sample location and resampling at a later time. Any methanol preserved samples not submitted for laboratory analysis are a hazardous waste and must be disposed of according to State and Federal regulations. To avoid this problem, the following procedure can be used:

8.1.1 Use the sampling method in section 5.0, use an EnCore® core sampler to obtain a duplicate sample for laboratory analysis. Store the soil for laboratory analysis in the core sampler by sealing the end(s) of the core with the end caps supplied with the EnCore sampler. Eliminate headspace in the sampler.

8.1.2 Label the core for lab analysis and immediately cool the sample. The core sample may be stored at 4°C on ice for a maximum of six (6) hours prior to preserving with methanol. This intermediate storage method can only be used if samples are field analyzed.

8.1.3 Perform the selected field analytical procedure

on the duplicate sample and document the field analysis in accordance with the NJDEP Field Analysis Manual, July 1994.

8.1.4 If soil from a sample location is selected for laboratory analysis, preserve the iced core sample with methanol. Samples must be preserved with methanol within the six (6) hour field holding time.

8.1.5 Use this procedure only when performing field analysis of the samples (ie. Field GC, Immunoassay, etc.).

9.0 Laboratory Analysis

9.1 Upon arrival of the sample at the laboratory, weigh the sample container to the nearest one tenth (0.1g) of a gram to determine the weight of soil placed in the sample container.

9.2 Subtract the weight of the container, methanol and surrogates from the total weight of the sample container with the soil sample. This gives the wet weight of the soil sample.

9.3 Proceed with the analysis of the sample using the "high concentration" methodology of the requested SW 846 analytical method or the "Medium Level Soil/Sediment Samples" procedure of the USEPA Contract Laboratory Program Statement of Work. In both instances, start the analytical procedure at the point where approximately 1ml of methanol extract is to be transferred to storage.

9.4 Using the non-methanol preserved duplicate sample, determine the dry weight of the sample.

10.0 Shipping Procedures

10.1 Methanol is considered a hazardous material therefore shipping of the sample containers is regulated by the U.S. Department of Transportation and the International Air Transport Association (IATA). The rules of shipment set in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179) and the current edition of the IATA Dangerous Goods Regulation must be followed when shipping methanol between the laboratory and the field. Consult the above documents or the shipping company for additional information.

10.2 The shipment of the quantity of methanol used for the sample preservation falls under the exemption for small quantities. A summary of the requirements for

shipping samples follows. Refer to the code for a complete review of the requirements.

10.2.1 The maximum volume of methanol in a sample container is limited to thirty (30) mls.

10.2.2 The sample container must not be full of methanol.

10.2.3 The sample container must be stored upright and have the lid held securely in place. The mechanism used to hold the cap in place must be able to be completely removed so weight is not added to the sample container.

10.2.4 Sample containers must be packed in a sorbent material capable of absorbing spills from leaks or breakage of the sample containers.

10.2.5 The maximum sample shuttle weight does not exceed 64 pounds.

10.2.6 The maximum volume of methanol per shipping container is 500mls.

10.2.7 The shipper must mark the sample shuttle in accordance with shipping dangerous goods in acceptable quantities.

10.2.8 The package must not be opened or altered until no longer in commerce.

11.0 Safety

11.1 Methanol is a toxic and flammable liquid. Therefore, methanol must be handled with all safety precautions related to toxic and flammable liquids. Inhalation of methanol vapors must be avoided. Vials should be opened and closed quickly during the sample preservation procedure. Methanol must be handled in a ventilated area. Use protective gloves when handling the methanol vials. Store methanol away from sources of ignition such as extreme heat or open flames. The vials of methanol should always be stored in a cooler with ice at all times.

12.0 References

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SPECIFICATION SHEETS

02231: CLEARING AND GRUBBING

02722: GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT

02741: BITUMINOUS CONCRETE PAVEMENT

SECTION 02231

CLEARING AND GRUBBING
03/96

PART 1 GENERAL

1.1 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

1.1.1 SD-14, Samples

a. Tree wound paint

b. Herbicide

Submit samples in cans with manufacturer's label.

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to, store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Bituminous based paint of standard manufacture specially formulated for tree wounds.

2.2 HERBICIDE

[_____]. Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on contractor's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Protection shall be in accordance with Section 01575, "Temporary Environmental Controls."

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage.

Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01310, "Administrative Requirements," and Section 01575, "Temporary Environmental Controls," for additional utility protection.

3.2 CLEARING

Shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except for trees and vegetation indicated or directed to be left standing. ~~Apply herbicide [at the rate of [_____]] [in accordance with the manufacturer's label] to the top surface of stumps designated not to be removed.~~

3.3 TREE REMOVAL

[Where indicated, remove designated trees and stumps from areas outside those areas specified for clearing [and grubbing].]

[Where indicated, remove designated trees and stumps and grub roots.]

~~3.4 PRUNING~~

~~[Prune individual trees as indicated.] Trim trees designated to be left standing within the cleared areas of dead branches 38 mm 1 1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 32 mm 1 1/4 inches in diameter with an approved tree wound paint.~~

3.5 GRUBBING

Remove and dispose of roots larger than 75 mm 3 inches in diameter, matted roots, and designated stumps from the indicated grubbing areas. [Excavate this material together with logs, organic and metallic debris, brush, and refuse and remove to a depth of not less than 450 mm 18 inches below the original soil surface in areas indicated to be grubbed and in areas indicated as construction areas under this contract.] ~~Fill depressions made by grubbing with suitable material and compact in accordance with the requirements specified in Section [02301, "Earthwork for Structures and Pavements,"] [[_____], ["_____"]] to make the new surface conform with the existing adjacent surface of the ground.~~

3.6 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

~~3.6.1 Saleable Timber~~

~~Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuelwood can be produced as saleable timber. Trim limbs and tops, and saw into saleable lengths [of [_____] meters [_____] feet for saw logs,~~

~~[_____] meters [_____] feet for pulpwood, [_____] meters [_____] feet for poles, [_____] meters [_____] feet for ties, and [_____] meters [_____] feet for fuelwood], and stockpile adjacent to the site. The stockpile timber will remain the property of the Government.~~

3.6.2 Nonsaleable Materials

[Remove from the project site and dispose of off station] [Deposit in and cover with earth in spoil areas as indicated,] [Burn at the site] [Dispose of by a combination of burning, burying, or removal] timber, scrub, vegetation, and debris considered as nonsaleable. [Burning will not be permitted.]

-- End of Section --

SECTION 02722

GRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVEMENT
03/96

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29/C 29M	(1991; Rev. A) Unit Weight and Voids in Aggregate
ASTM C 117	(1995) Materials Finer than 75-Micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1995; Rev. A) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 1883	(1994) CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D 2217	(1985; R 1993) Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1995) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

1.2.1 ~~SD-11, Factory Test Reports~~

~~a. Gradation~~

b. Bearing ratio

c. Liquid limit

d. Plasticity index

e. Percentage of wear

[f. Dry weight of slag]

g. Density

1.2.2 SD-12, Field Test Reports

a. Gradation

b. Smoothness

c. Density

d. Thickness

1.3 DELIVERY AND STORAGE

Inspect materials delivered to site for damage and store as to prevent segregation and contamination.

1.4 WEATHER LIMITATIONS

Do not construct base course when atmospheric temperature is below 2 degrees C 35 degrees F or when rainfall or other weather conditions detrimentally affect the quality of the finished course.

1.5 CONSTRUCTION EQUIPMENT

Equipment shall be dependable and adequate for the purpose intended. Maintain equipment in satisfactory and safe operating condition. Subject to approval, special equipment dictated by local conditions may be used. Calibrated equipment, such as scales, batching equipment, spreaders, and similar items, shall have been recalibrated by [an approved calibration laboratory] ~~[a State calibration laboratory]~~ within [12] [_____] months of commencing work.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Aggregates

Consist of durable and sound crushed gravel, crushed stone, or crushed slag, free of lumps or balls of clay or other objectionable matter. Crushed stone and gravel shall be free from flat, elongated, soft, or disintegrated pieces. Crushed gravel retained on a 4.75 mm No. 4 sieve shall have at least 90 percent by weight with at least two fractured faces and 100 percent by weight with at least one fractured face. Base course materials samples shall have a bearing ratio of at least 100 as determined by laboratory tests on a 4-day soaked specimen in accordance with ASTM D 1883; compact specimen in accordance with ASTM D 1557, Method D. Determine grain size in accordance with ASTM C 136 and amount of material finer than 75 micrometers 200 mesh sieve in accordance with ASTM C 117. Aggregate, other than slag, shall have a percentage of wear not exceeding ~~[40]~~ [45] when tested in accordance with ASTM C 131, Grading A. Slag shall be an air-cooled, blast furnace product having a dry weight of not less than ~~[1120] [1041] kilograms per cubic meters [70]~~ [65] pounds per cubic foot when tested in accordance with ASTM C 29/C 29M and shall consist of angular

fragments uniform in density and quality, reasonably free from thin, elongated pieces, dirt, or other objectionable material. Soil binder material, that portion of material passing the 425 micrometers No. 40 sieve, shall be of such composition that the composite material conforms to the requirements specified herein. The base course shall be of such nature that it can be compacted readily with watering and rolling to a firm, stable base and shall conform to one of the following sizes:

~~Percentage by Weight Passing~~

~~Square Mesh Laboratory Sieves~~

	Size Numbers		
Sieves	1	2	3
50.0 mm	100	-	-
37.5 mm	70-100	100	-
25.0 mm	45-80	60-100	100
12.5 mm	30-60	30-65	40-70
4.75 mm	20-50	20-50	20-50
2.0 mm	15-40	15-40	15-40
425 micrometers	5-25	5-25	5-25
75 micrometers	0-10	0-10	0-10

Percentage by Weight Passing

Square Mesh Laboratory Sieves

	Size Numbers		
Sieves	1	2	3
2 inch	100	-	-
1 1/2 inch	70-100	100	-
1 inch	45-80	60-100	100
1/2 inch	30-60	30-65	40-70
No. 4	20-50	20-50	20-50
No. 10	15-40	15-40	15-40
No. 40	5-25	5-25	5-25
No. 200	0-10	0-10	0-10

That portion of the material passing the 425 micrometers No. 40sieve shall have a liquid limit of not more than 25 and a plasticity index of not more than 5 as determined by ASTM D 4318. Prepare samples in accordance with ASTM D 2217, Procedure A.

PART 3 EXECUTION

3.1 BASE COURSE

Construct the graded aggregate base course on a ~~[prepared subgrade~~] [previously constructed subbase course], as indicated. Provide line and grade stakes for control. Place grade stakes in lanes parallel to the centerline of areas to be paved and space for string lining or other control methods. The base course shall consist of aggregate processed,

deposited, spread, and compacted on a prepared surface. The Contractor shall be responsible for protection of completed areas against detrimental effects. Recondition, reshape, and recompact areas damaged by freezing, rainfall, or other weather conditions.

3.2 [OPENING AND OPERATION OF PITS

Perform stripping, clearing, processing, and blending in the opening of new pits and operation of existing pits as necessary to obtain acceptable material. Open pits in a manner to expose the vertical faces of the deposits for suitable working depths, following which the material shall be obtained in successive vertical cuts extending through the exposed strata. Waste strata and pockets of unsuitable materials overlaying or occurring in the deposit. Change or modify the method of operating the pits, and the processing and blending of the material when necessary to obtain material conforming to the specified requirements. Upon completion of the work, condition pits to drain readily and leave in a satisfactory condition.]

3.3 MIXING OF MATERIALS

Mix aggregates in a stationary or traveling plant. Proportion aggregates by weight or volume in such quantities that specified gradation, liquid limit, and plasticity index requirements are met after the base course has been placed and compacted. Incorporate, during the mixing operation, water in quantities sufficient to provide the necessary moisture content for the specified compaction. Mixing operations shall produce satisfactory uniform blending and the method of discharging into trucks shall not produce segregation.

3.4 PLACING

Do not dump mixed materials in piles, but place on prepared subgrade or subbase in layers of uniform thickness with a spreader. When a compacted course 150 mm 6 inches in thickness is required, place material in a single layer. When a compacted course in excess of 150 mm 6 inches is required, place material in layers of equal thickness. Do not exceed 150 mm 6 inches or have less than 75 mm 3 inches in thickness for any compacted layer. Place layers so that when compacted, they will be true to grades or levels required with the least possible surface disturbance. Where the base course is constructed in more than one layer, clean previously constructed layers of loose and foreign matter. Maintain material water content during the placing period to obtain the compaction specified. Make adjustments in placing procedures or equipment to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to insure a satisfactory base course.

3.4.1 Stationary-Plant Method

Mix aggregates, binder material and water until a uniform homogeneous mixture is obtained. Do not dump materials in piles; place in layers of essentially uniform thickness, not to exceed 150 mm 6 inches after compaction, by an approved spreader. Tail gate spreading will be acceptable only with permission, under conditions such as where space limitations prohibit use of the spreader.

3.4.2 Windrow Traveling-Plant Method

Place aggregates and binder materials in windrows of such cross section and proportions that, when picked up, mixed, and redeposited in windrows, the finished mixture shall conform to the specified requirements. Do not exceed the rated capacity of the traveling plant with the size of the windrow of the combined materials. Add water, in quantity sufficient to provide the necessary moisture content for compacting, to the aggregates at the time of mixing. Mix materials uniformly by the traveling plant, deposit in windrows of uniform cross section, and spread in a layer of

uniform thickness to the required contour and grades.

3.5 COMPACTING AND FINISHING

Immediately following the placing, spread the finished mixture uniformly in a layer and bring to optimum moisture content. The loose thickness and the surface of the layer shall be such that the specified density and the required thickness shall be obtained after compaction. Compact the layer with steel-faced, vibrating or pneumatic-tired rollers, or other suitable compacting equipment or combinations thereof. Continue compacting until the layer is compacted through the full depth~~, to a field density of at least 100 percent of the maximum density at optimum moisture content tested in accordance with ASTM D 1556 [ASTM D 2922 and ASTM D 3017.]~~ In areas not accessible to rollers or compactors, compact the mixture with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate by blade graders, or other suitable equipment. Aerate until the moisture content of the material is that needed to obtain the required density. Finish the surface of the layer by a combination of rolling and blading. Final surface shall be smooth and free from waves, irregularities, and ruts or soft yielding spots.

3.6 [PROOF ROLLING

On the center 7.50 m 25 feet of taxiways and on the center 30 m 100 feet of runways, in addition to compacting the base course to the required density, proof roll the top surface of the completed base course by making eight coverages with a heavy rubber-tired roller having four tires with each tire loaded to 13,600 kg 30,000 pounds or more and inflated to at least 1034 kPa 150 psi. Make four coverages over other areas to be paved, excluding the runway over-runs, blast protection areas, and shoulders. A coverage is defined as one application of one tire print over each point in the surface of the designated area. When under the action of the proof rolling, the base course yields, pumps, or otherwise fails, remove, replace with suitable materials, and recompact materials in the base course or in the underlying layers indicated to be unsatisfactory. The speed of the roller shall not exceed 8 kph 5 miles per hour. Obtain approval upon completion of the proof rolling of the base course.]

3.7 FINISHING AT EDGES OF BASE COURSE

Place earth or other approved materials along the edges of the base course in such quantity that it will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, place material to the thickness of each layer. In each operation, allow at least a 300 mm one foot width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer.

3.8 FIELD QUALITY CONTROL

Approve materials and material sources in advance of the use of such materials in the work. ~~Replace base where samples are removed. [Provide duplicate samples to the Contracting Officer on an average of [____] samples a [week] [month]. Take duplicate samples at the same time and in the same manner as the original.]~~

3.8.1 Sampling

3.8.1.1 Aggregates at the Source

Prior to production and delivery of aggregates, take at least one initial sample in accordance with ASTM D 75. Collect each sample by taking three incremental samples at random from the source material to make a composite sample of not less than 23 kg 50 pounds. Repeat above sampling when source of material is changed or when unacceptable deficiencies or variations from specified grading of materials are found in testing.

3.8.1.2 During Construction

Take one random sample from each [1000] [_____] metric tons [1000] [_____] tons of completed course material, but not less than one random sample per day's run. Take samples in accordance with ASTM D 75.

3.8.1.3 Sample Identification

Place each sample in a clean container, securely fastened to prevent loss of material. Tag each sample for identification and with the following information:

Contract No._____
Sample No._____ Quality _____
Date of Sample_____
Sampler_____
Source_____
Intended Use_____
For Testing_____

3.8.2 Testing

3.8.2.1 Aggregates

Test each sample of base course material without delay. Make gradation tests from each sample in accordance with ASTM C 136. Make sieve analysis on material passing the 75 micrometers No. 200 sieve in accordance with ASTM C 117.

3.8.2.2 Smoothness Tests

Test with a 3 m 10 foot straightedge, applied parallel with and at right angles to the center line of the paved area. Correct deviations in the surface in excess of [10] [13] mm [3/8] [1/2] inch by loosening, adding or removing material, reshaping, watering, and compacting. The smoothness requirements specified herein apply only to the top layer when base course is constructed in more than one layer.

3.8.2.3 Field Density Tests

ASTM D 1556 or [ASTM D 2922 and ASTM D 3017]. Take one test for each [420] [_____] square meters [500] [_____] square yards of each layer of base course.

3.8.2.4 Laboratory Density Tests

In accordance with ASTM D 1557, Method D.

3.8.2.5 Thickness Tests

Measure thickness of base course at intervals such that there will be a depth measurement for at least each [420] [_____] square meters [500] [_____] square yards of complete base course. Make depth measurements by test holes, at least 75 mm 3 inches in diameter, through the base course. Where base course deficiency is more than 13 mm 1/2 inch, correct by scarifying, adding mixture of proper gradation, reblading, and recompacting. Where the measured thickness is more than 13 mm 1/2 inch thicker than indicated, consider it as the indicated thickness plus 13 mm 1/2 inch for determining the average. The average thickness is the average of the depth measurements and shall not underrun the thickness indicated.

3.9 MAINTENANCE

After construction is completed, maintain the base course throughout, except where portion of the succeeding course is under construction

thereon. Maintenance includes drainage, rolling, shaping, and watering, as necessary, to maintain the course in proper condition. Correct deficiencies in thickness, composition, construction, smoothness, and density, which develop during the maintenance, to conform to the requirements specified herein. Maintain sufficient moisture by light sprinkling with water at the surface to prevent a dusty condition.

-- End of Section --

SECTION 02741

BITUMINOUS CONCRETE PAVEMENT
12/95

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T30	(1993) Mechanical Analysis of Extracted of Aggregate
AASHTO T230	(1968; R 1993) Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1559	(1989) Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D 2172	(1993) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2950	(1991) Density of Bituminous Concrete in Place by Nuclear Methods

FEDERAL SPECIFICATIONS (FS)

FS TT-P-115	(Rev. F) Paint, Traffic (Highway, White and Yellow)

STATE HIGHWAY SPECIFICATION (SHS)

SHS [New Jersey] [~~____~~]

1.2 SUBMITTALS

Submit the following in accordance with section entitled "Submittal Procedures."

1.2.1 ~~SD-02, Manufacturer's Catalog Data~~

~~a. Precast car stops~~

1.2.2 SD-08, Statements

a. Asphalt mix delivery record

b. Asphalt concrete and material sources

1.2.2.1 ~~Mix Delivery Record Data~~

~~Record and submit the following information to each load of mix delivered to the job site. Submit within one day after delivery on Government-furnished forms:~~

a. Truck No:

b. Time In:

c. Time Out:

d. Tonnage and Discharge Temperature:

e. Mix Type:

f. Location:

g. Stations Placed:

1.2.2.2 Materials

Obtain approval of the Contracting Officer for materials and material sources 2 days prior to the use of such material in the work.

1.2.3 SD-11, Factory Test Reports

a. Trial batch reports

b. Mix design

1.2.3.1 Trial Batch

Submit current bituminous design reports for all mix types proposed for use on the project.

1.2.3.2 Mix Design

Submit results of laboratory tests performed on each mix design. Testing shall have been accomplished not more than one year prior to date of material placement.

1.2.4 SD-12, Field Test Reports

a. Asphalt concrete

b. Density

c. Thickness

d. Straightedge test

Submit reports for testing specified under paragraph entitled "Field Quality Control."

1.2.5 SD-13, Certificates

a. Asphalt concrete

b. Curbs

c. Guard (Guide) rails

d. Median barriers

e. Traffic signs

Submit certificates, signed by the producer, that paving materials and incidental construction items conform to specification requirements.

1.2.6 SD-14, Samples

a. Uncompacted mix

b. Pavement cores

1.2.6.1 Uncompacted Mix

Submit [2] [_____] per day of each mix type. When two tests on uncompacted mix fail submit new trial batch for approval.

1.2.6.2 Pavement Cores

Submit [2] [_____] pavement cores when using the in-place nuclear density method.

1.3 QUALITY ASSURANCE

1.3.1 Regulatory Requirements

Provide work and materials in accordance with applicable requirements ~~of SHS [_____]. [Divisions and Sections] [Sections and Paragraphs] [[_____] and [_____]]~~ mentioned herein refer to those specifications. ~~Paragraphs in SHS [_____] entitled ["Quantity and Payment"] ["Method of Measurement" and "Basis of Payment"] ["_____"] shall not apply.~~ SHS New Je

1.3.2 Modification of References

Where term "Engineer" is used in SHS [101.03] it shall be construed to mean ~~[Contracting Officer]~~ [Contractor's Quality Control representative]. [Where term "state" is used, it shall mean "Federal Government"].

PART 2 PRODUCTS

2.1 ASPHALT CONCRETE

Provide asphalt concrete in accordance with the applicable requirements of the SHS [903], except where specified otherwise. [Recycled asphalt pavement material may be used as permitted by SHS [900].]

2.2 SUBBASE

~~SHS [_____],~~ materials for construction of the subbase shall be in accordance with ~~[Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].~~ Specification 2302

2.3 BASE COURSE

SHS [New Jersey], materials for construction of the base course shall be in accordance with [Division [~~300~~ 901], Section [08]] ~~[Section [_____], paragraph [_____]] [[_____], [_____]], [Type [_____]] [Class [_____]]~~.

2.4 SURFACE COURSE

SHS [New Jersey], materials for construction of the surface course shall be in accordance with [Division [900], Section [903]] ~~[Section [_____], paragraph [_____]] [Type [_____]] [Class [_____]]~~.

2.5 ~~STRIPING~~

~~SHS [New Jersey], materials for paint striping shall be in accordance with [Division [900], Section [912]] [Section [_____], paragraph [_____]], [[_____], [_____]].]~~

~~[Paint shall conform to FS TT-P-115, Types I, or II.]~~

~~2.6 CURBS [AND GUTTERS]~~

SHS [_____], materials for construction of curbs [and gutters] shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____]], [_____]].]

[Concrete is specified in Section 03300, "Cast-In-Place Concrete."]

2.7 GUARD (GUIDE) RAILS

SHS [_____], materials for construction of the guard (guide) rails shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

2.8 MEDIAN BARRIERS

SHS [_____], materials for construction of the median barriers shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

2.9 TRAFFIC SIGNS

SHS [_____], provide traffic signs in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

2.10 PRECAST CAR STOPS

Provide car stops to the profile and size indicated. Manufacture with air entrained concrete having a minimum compressive strength of 25 MPa 3,000 psi at 28 days, with two No. 4 reinforcing rods located at mid-point of its cross section and with two galvanized sleeves for anchoring.

2.11 COMPOSITION OF MIXTURE REQUIREMENTS

2.11.1 Mixture Properties

Gradation of mineral aggregate shall be as specified. Percentage of bituminous material provided in the bituminous mixtures shall be within the limits specified. Mixtures shall have the following physical properties:

Test Property	Values
Stability (50 Blows)	Not less than 454 kg
Flow (0.25 mm)	Not more than 20 nor less than 8
Percent Air Voids	Not less than 3 nor more than 8 for binder course; not less than 3 nor more than 5 for wearing course
Percent Voids in Mineral Aggregates	See Table I

Test Property	Values
Stability (50 Blows)	Not less than 1000 pounds
Flow (0.01 inch)	Not more than 20 nor less than 8
Percent Air Voids	Not less than 3 nor more than 8 for binder course; not less than 3 nor more than 5 for wearing course
Percent Voids in Mineral Aggregates	See Table I

TABLE I

MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)

TABLE I

MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)

U.S.A. Standard Sieve Designation	Nominal Maximum Particle Size, mm	Minimum VMA Percent
4.75 mm	4.75	18
9.5 mm	9.5	16
12.5 mm	12.5	15
19.0 mm	19.0	14
25.0 mm	25.0	13

TABLE I

MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)

U.S.A. Standard Sieve Designation	Nominal Maximum Particle Size, Inch	Minimum VMA Percent
No. 4	0.187	18
3/8 inch	0.375	16
1/2 inch	0.500	15
3/4 inch	0.750	14
1 inch	1.000	13

2.11.2 Quantity of Bituminous Material

Mix asphalt cement with aggregates of corresponding mixes in the following proportions:

ASPHALT CEMENT PERCENT BY WEIGHT OF TOTAL MIX

Binder Course	Wearing Course
4 to 8	5 to 9

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Excavation and Filling

Excavation and filling to establish elevation of subgrade is specified in Section ~~02301~~ 02302, "Earthwork for Structures and Pavements."

3.2 CONSTRUCTION

Provide construction in accordance with the applicable requirements of the SHS [New Jersey], except where indicated or specified otherwise.

3.2.1 Subgrade

~~SHS [_____]~~, preparation of subgrade shall be in accordance with ~~[Division [_____], Section [_____]], [Section [_____], paragraph [_____]] [[_____], [_____]] [Section 02301, "Earthwork for Structures and Pavements."]~~ Specification 2302

3.2.2 Subbase

~~SHS [_____]~~, methods of construction of the subbase shall be in accordance with ~~[Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]]~~. with Specification 2302

3.2.3 Base Course

SHS [NJ], methods of construction of the base course shall be in accordance with [Division [301], ~~Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]]~~.

3.2.4 Surface Course

SHS [NJ], methods of construction of the surface course shall be in accordance with [Division [401], ~~Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]]~~. Placement will not be permitted unless the Contractor has a working asphalt thermometer on site.

3.2.5 Striping

SHS [_____], provide paint striping in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].] Allow bituminous pavement to cure for at least 21 days before paint is applied. Pavement shall be thoroughly clean and entirely free of loose sand, stones, dust, oil, grease, water, and other substances that will be deleterious to the paint or will adversely affect the adhesion of the paint. Do not apply paint during high wind (over 24 km/h) (over 15 miles per hour) or high humidity (over 70 percent). Apply paint only when ambient temperature is 5 degrees C 40 degrees F or above and rising but not more than 35 degrees C 95 degrees F. Dimensions and arrangement of striping shall be as indicated. Apply paint to a wet film thickness of 0.38 mm 0.015 inch by means of conventional traffic line striping equipment. Traffic shall not be permitted to use the painted areas for a minimum of 30 minutes after painting of lines has been completed.

3.2.6 Curbs [and Gutters]

SHS [_____], methods of construction of curbs [and gutters] shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].]

[Provide curbs [and gutters] as indicated. Provide concrete construction as specified in Section 03300, "Cast-In-Place Concrete."]

3.2.7 Guard (Guide) Rails

SHS [_____], methods of construction of the guard (guide) rails shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

3.2.8 Median Barrier

SHS [_____], methods of construction of the median barriers shall be in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

3.2.9 Traffic Signs

SHS [_____], install traffic signs in accordance with [Division [_____], Section [_____]] [Section [_____], paragraph [_____]] [[_____], [_____]].

3.2.10 Precast Car Stops

Provide car stops where indicated. Install with an anchor rod driven through each sleeve.

3.3 FIELD QUALITY CONTROL

Sample shall be taken by Contractor as specified herein. Contractor shall replace pavement where sample cores have been removed.

3.3.1 Sample and Core Identification

Place each sample and core in a container and securely seal to prevent loss of material. Tag each sample for identification. Tag shall contain the following information:

a. Contract No.

b. Sample No.

c. Quantity

d. Date of Sample

e. Sample Description

f. Source/Location/Stations Placed/depth below the finish grade

g. Intended Use

h. Thicknesses of various lifts placed

3.3.2 Testing

3.3.2.1 Bituminous Mix Testing

Take two samples per day per mix type at plant or from truck. Test uncompacted mix for extraction in accordance with ASTM D 2172 and sieve analysis in accordance with AASHTO T30. Test samples for stability and flow in accordance with ASTM D 1559. When two consecutive tests fail to meet requirements of specifications, cease placement operations and test a new trial batch prior to resumption of placement operations.

3.3.2.2 Testing of Pavement Course

a. Density: Determine density of pavement by testing cores obtained from the binder and wearing course in accordance with AASHTO T230. Take three cores at location designated by Contracting Officer for each [18 metric tons] [200 tons] [_____], or fraction thereof, of asphalt placed. Deliver cores undisturbed and undamaged to laboratory and provide test results within [48] [_____] hours of each day placement of paving materials.

b. Thickness: Determine thickness of the binder and wearing course from cores taken for density test.

c. Straightedge Test: Test compacted surface of binder course and wearing course with a straightedge as work progresses. Apply straightedge parallel with and at right angles to center line after final rolling. Variations in the binder course surface shall not be more than 6 [13] [3] mm 1/4 [1/2] [1/8] inches from the lower edge of the 3.0 m 10 foot straightedge; variations in wearing course surface shall not be more than 6 [13] [3] mm 1/4 [1/2] [1/8] from the lower edge of the 3.0 m 10 foot straightedge. Pavement showing irregularities greater than that

SUBMITTAL REGISTER

Contract Number: N62472-94-D-0398 D.O. # 0017, Mod. 4

Project Title: Site 19 Paint Chip and Sludge Disposal Area

LOCATION: Naval Weapons Station - Earle

CONTRACTOR: Foster Wheeler Environmental Corporation

							CONTRACTOR ACTION		APPROVING AUTHORITY ACTION					CONTR	
SPEC SECTION NO.	SD NO. & TYPE OF SUBMITTAL-MATL OR PRODUCT	SPEC PARA NO.	CLASSIF/ APPR BY CO *	GOVT OR A/E REVR	TRANS CONTL NO.	PLANNED SUBMITTAL DATE	ACT. CODE	DATE OF ACTION	DATE FWD TO APPR AUTH / DATE RECD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RECD FROM OTHER REVIEWER	ACT. CODE	DATE OF ACTION	MAILED TO CONTR / RECD FROM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(I)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
	SD-18, Records														
	Draft Health and Safety Plan	N/A	"G"		1	11/26/97			11/26/97			AN			
	SD-18, Records														
	EECA/Action Memorandum	N/A	"G"		2	11/26/97			11/26/97			A			
	SD-18, Records														
	Draft Work Plan	N/A	"G"		3	11/25/97			11/25/97			AN			
	SD-18, Records														
	Final Work Plan	N/A	"G"		3B	2/12/98			2/12/98			A			
	SD-18, Records														
	Final Health and Safety Plan	N/A	"G"		1B	2/3/98			2/3/98			A			
	SD-18, Records														
	Waste Profile Sheets					2/18/98									
	Certifications for Clean Soils					2/20/98									
	Analytical of Confirmatory Soil Samples					2/25/98									
	Seed Mix Fertilizer					2/25/98									
	Close-out Report					3/18/98									

* Navy Notes:
Approved by:
G: Contracting Officer
Blank: CQC Manager

* NASA Notes:
Approved by:
Blank: Contracting Officer

*Army Notes:
Classification:
GA: Gov't Approval
FIO: For Infor ONLY

ACTION CODES: NR: Not Reviewed AN: Approved as Noted A: Approved
RR: Disapproved; Revise and Resubmit (Others may be prescribed by the Transmittal Form