WORK PLAN

REMEDIAL INVESTIGATION

Stratford Army Engine Plant
Stratford, Connecticut

Contract Number DACW41-96D-8014
Task Order 0011

Prepared for
U.S. Department of the Army
Corps of Engineers, New York District
26 Federal Plaza
New York, New York 10278-0090

October 26, 1998

Prepared by
Woodward-Clyde Federal Services
P.O. Box 290
201 Willowbrook Boulevard
Wayne, New Jersey 07470

K9716-6.1

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

Figures

Appendices

1.1 PROJECT INTRODUCTION

The Stratford Army Engine Plant (SAEP or the Site) is a government-owned, contractor-operated facility located in Stratford, Connecticut. The United States Department of the Army (U.S. Army) owns the land (about 124 acres), the buildings, and some of the production equipment at SAEP. Responsibility for the jurisdiction, control, and accountability of SAEP was transferred from the U.S. Army Aviation and Troop Command (ATCOM) to the U.S. Army Tank-Automotive and Armament Command (TACOM) on September 9, 1995.

Allied-Signal operated SAEP under a facilities contract with TACOM. Allied-Signal manufactured and tested turbine engines, primarily for the U.S. Army. Allied-Signal also produced turbine engines at SAEP for the United States Department of the Navy (U.S. Navy), for foreign military sale and for commercial use. Prior to October 28, 1994 Textron Lycoming operated the facility.

In October 1995, SAEP was placed on the Base Realignment and Closure (BRAC) list, known as BRAC 95. Pursuant to the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510), the BRAC Environmental Restoration Program mandates that environmental contamination on U.S. Army BRAC properties be investigated and remediated, as necessary, prior to disposal and reuse.

1.2 AUTHORITY

For BRAC 95, the Environmental Restoration Program begins by conducting an Environmental Baseline Survey (EBS), which describes the environmental condition of the property. The survey is used to determine the suitability to lease or transfer excess BRAC property. The U.S. Army Environmental Center (USAEC) contracted the EBS to ABB Environmental Services, Inc. (ABB-ES). The EBS was completed in December 1996.

The next step in the Environmental Restoration Program is preparation and implementation of a Remedial Investigation Work Plan (RIWP) for SAEP. Although previous environmental investigations have been conducted at SAEP, additional data are required to complete the assessment of environmental conditions at the Site. The U.S. Army Corps of Engineers (USACE) contracted the preparation of this RIWP to Woodward-Clyde Federal Services (W-C) under Contract Number DACW41-96D-8014, Task Order 0011.

1.3 PURPOSE AND SCOPE OF WORK PLAN

Data from environmental investigations at SAEP were evaluated and summarized in the Phase II Remedial Investigation Report (Phase II Report) dated April 1996 (W-C, 1996). The U.S. Environmental Protection Agency (USEPA) and Connecticut Department of Environmental Protection (CDEP) provided comments on the Phase II Report. To fill the data gaps identified in the USEPA and CDEP comments and provide other information needed to bring the SAEP to closure, a Remedial Investigation (RI) and Feasibility Study (FS) are required.

Preparation of the RIWP for SAEP is the primary objective of Task Order 0011, Contract No. DACW41-96-D-8014, dated September 29, 1997. Revisions to the Draft RIWP submitted

March 30, 1998, in accordance with response to comments from USEPA/CDEP/USACE and subsequent discussions have been incorporated into this document. The revised Scope of Work for Task Order 0011 includes the following tasks:

TASK 1 Quality Control Plan for this Delivery Order;

TASK 2 Resolution of USEPA/CDEP Comments;

TASK 3 Pre-Work Plan Data Assessment/Information Gathering Activities;

TASK 4 Draft RI Work Plan;

TASK 5 Response to Comments on Draft RI Work Plan; and,

TASK 6 Final RI Work Plan.

This RIWP was prepared in accordance with CDEP, Comprehensive Response Compensation and Liability Act (CERCLA), and BRAC requirements, and it utilized the Data Quality Objective (DQO) approach in evaluating USEPA/CDEP comments and in developing the RIWP to address the comments. DQOs were developed based on overall data requirements of the following:

- Remedial Alternatives Analysis;
- Regulatory Guidance;
- Risk Assessments;
- Evaluation of the Nature and Extent of Contamination;
- Proposed Future Land Use; and,
- Evaluation of On- and Off-Site Sources.

Deviations from this work plan will be approved by USACE prior to implementation.

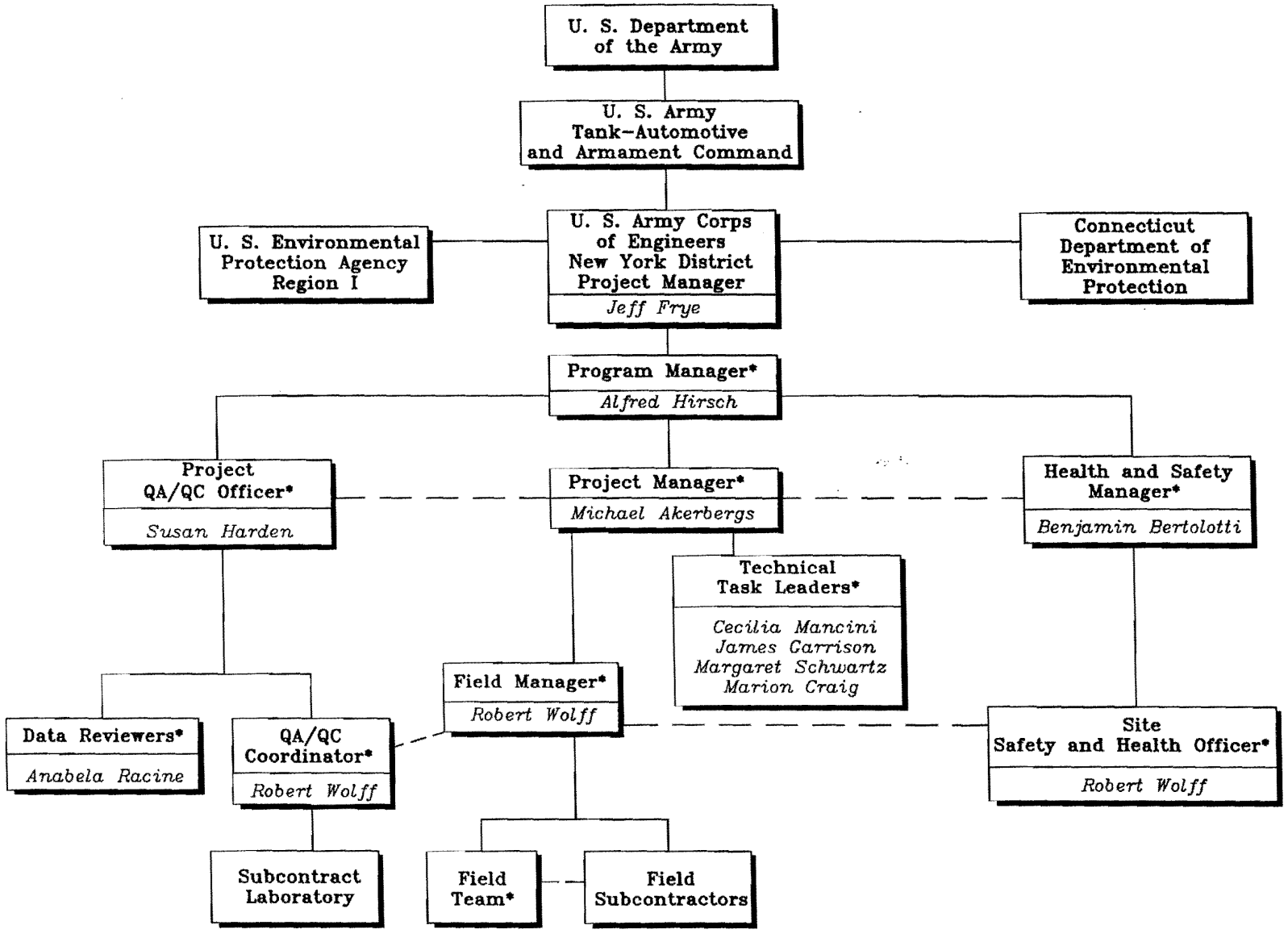


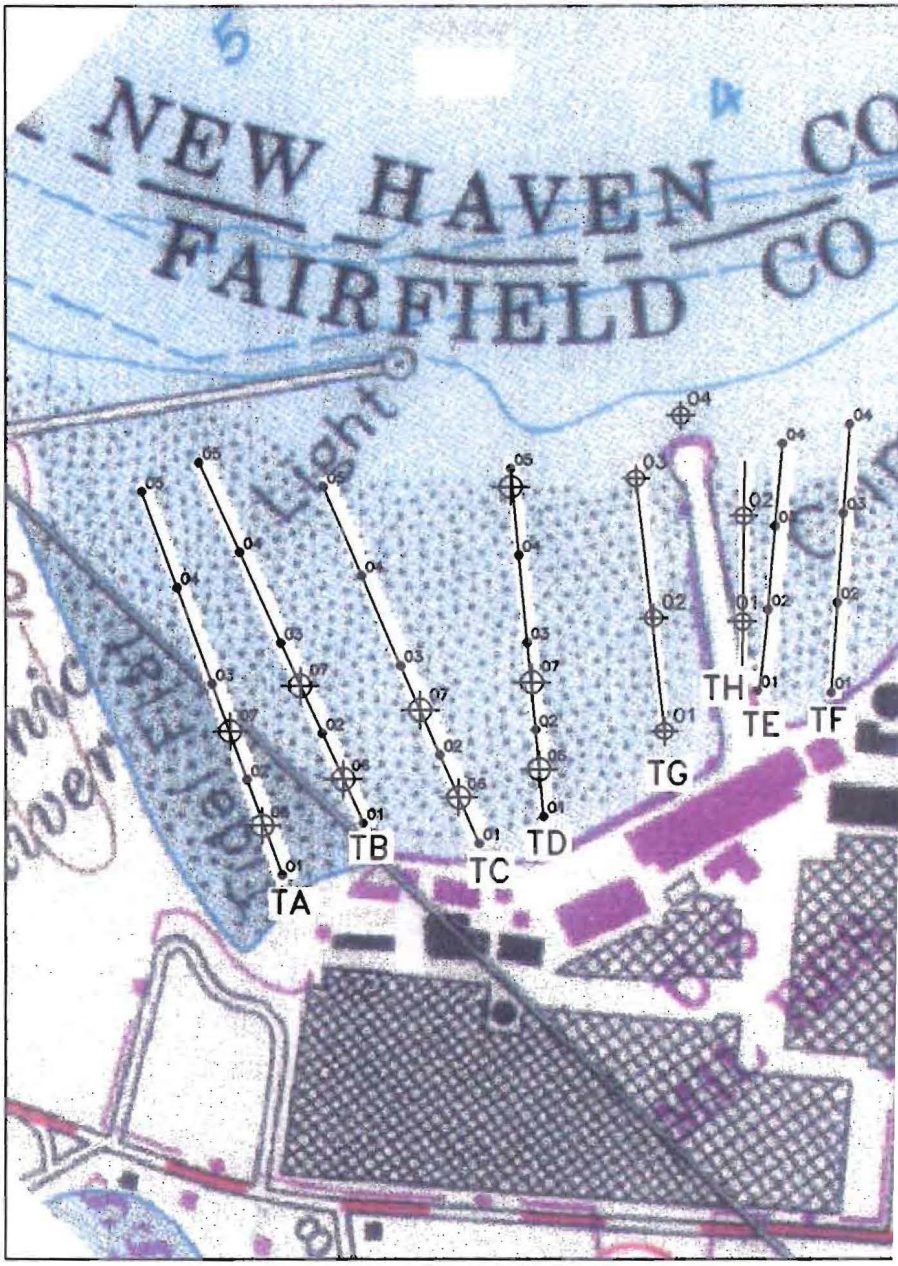
Figure 1

PROJECT ORGANIZATION CHART
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

Key:

* Woodward-Clyde Personnel

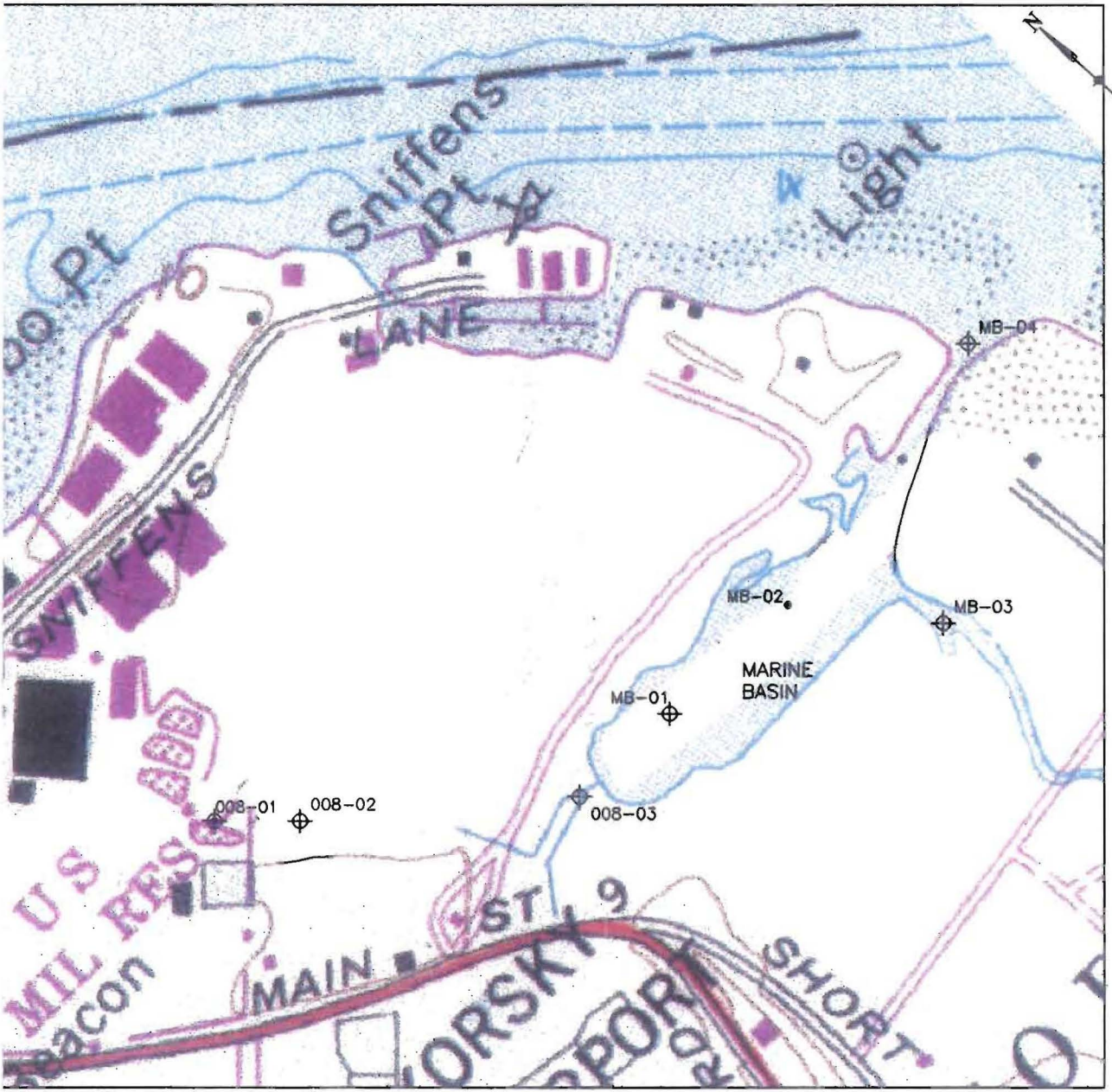
File name: K:\CADD\K9716\K9716001.DWG DWG Last edited: 98/03/26 @ 17:13



SCALE IN FEET

0 500'

K9716.dwg



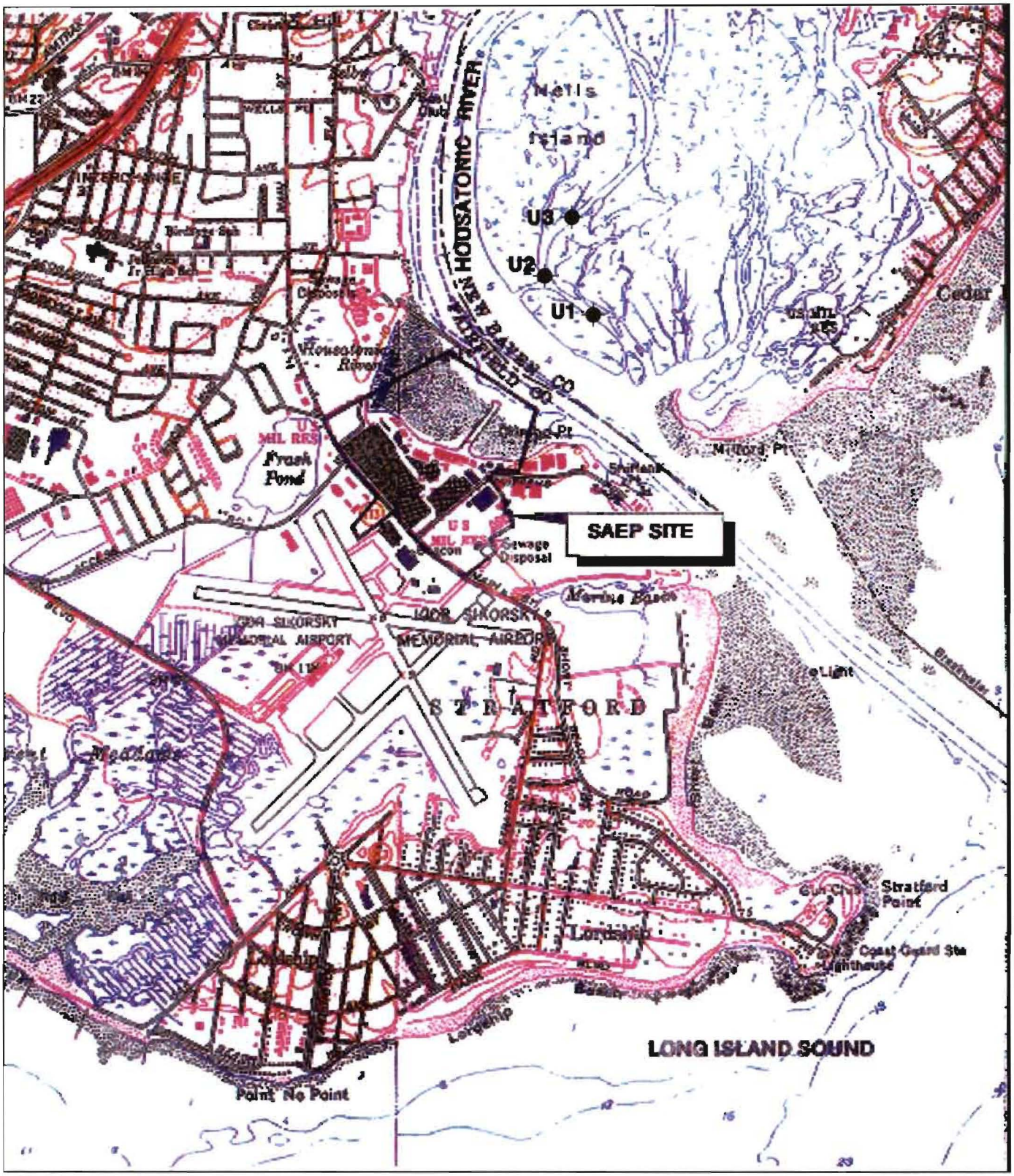
GEND:

01 PREVIOUS SAMPLING STATION

01 PROPOSED SAMPLING LOCATION

TE: STATION LOCATIONS APPROXIMATE.

Job No. K9716	AQUATIC SAMPLING LOCATIONS REMEDIAL INVESTIGATION STRATFORD ARMY ENGINE PLANT STRATFORD, CONNECTICUT
Prepared by: TFP	
Date: 03/17/1998	FIGURE 2



0 2000 4000

SCALE (FEET)

N

MAP SOURCE:
FROM BRIDGEPORT & MILFORD CT. U.S.G.S. QUADRANGLE MAP DATED 1960 & 1970, PHOTOREVISED 1984.

NOTE:
STATION LOCATIONS APPROXIMATE

AQUATIC REFERENCE SAMPLING STATIONS
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

WOODWARD-CLYDE FEDERAL SERVICES
ENGINEERING & SCIENCES APPLIED TO THE EARTH & ITS ENVIRONMENT
WAYNE, NEW JERSEY

DR. BY	JL	SCALE	AS SHOWN	DWG. NO. 98104003	PROJ. NO. R98104
CK'D. BY	RW	DATE	OCT 21, 1998	FIG. NO.	2A

File name: K:\CADD\R98104\98104003.DWG Last edited: 98/10/22 @ 09:47

FIGURE 4

DAILY QUALITY CONTROL REPORT

REPORT NUMBER: _____

PROJECT NAME:	Remedial Investigation Stratford Army Engine Plant Stratford, CN	DATE: _____ Page 1 of 2
CONTRACT NUMBER:	DACW41-96D-8014	
DELIVERY ORDER NUMBER:	0011	
PROJECT NUMBER:	K9716	

WEATHER:

WORK PERFORMED / ACTIVITIES CONDUCTED:

GENERAL:

SPECIFIC:

PERSONNEL:

EQUIPMENT USED ON SITE:

QUALITY CONTROL ACTIVITIES:

FIGURE 4

DAILY QUALITY CONTROL REPORT

REPORT NUMBER: _____

DATE: _____

PROJECT NAME: Remedial Investigation
Stratford Army Engine Plant
Stratford, CN

CONTRACT NUMBER: DACW41-96D-8014

DELIVERY ORDER NUMBER: 0011

PROJECT NUMBER: K9716

SAFETY AND HEALTH LEVELS AND ACTIVITIES:

PROBLEMS ENCOUNTERED / CORRECTIVE ACTION TAKEN:

SPECIAL NOTES:

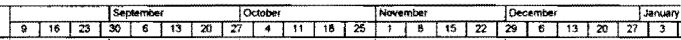
ACTIVITIES SCHEDULED FOR _____ :

Prepared by: _____

Name: _____

Title: _____

Task Name	Duration	Start	Finish	Predecessors
Authorization to Proceed - Task 1	0 days	Wed 8/12/98	Wed 8/12/98	
Authorization to Proceed - Tasks 3, 7, 8, 9, 10, 11, 13, 14	0 days	Fri 10/23/98	Fri 10/23/98	
TASK 1 -Pre-Mobilization Activities	**39 days**	**Wed 8/12/98**	**Mon 10/5/98**	
1.1 - Permits	39 days	Wed 8/12/98	Mon 10/5/98	1
Subcontractor bid procurement	15 days	Wed 8/12/98	Tue 9/1/98	4SS
- Pre-mobilization site inspection and kickoff meeting	10 days	Wed 9/2/98	Tue 9/15/98	5
1.4 - Prepare Soil Sampling Plan addendum	10 days	Wed 9/16/98	Tue 9/29/98	6
1.5 - Submit Soil Sampling Plan adddendum to TACOM/ACOE/CDEP/USEPA	0 days	Mon 10/5/98	Mon 10/5/98	15S+39 days
TASK 2 - GMS/GIS Model - Initial Development(with NED COE)	**313 days**	**Wed 10/21/98**	**Fri 12/31/99**	**1**
2.1 - Develop GIS/GMS (with NED ACOE)	313 days	Wed 10/21/98	Fri 12/31/99	1,101FF
TASK 3 - Infrastructure Evaluation	**179 days**	**Mon 11/2/98**	**Thu 7/8/99**	
3.1 - Evaluate existing infrastructure information for soil borings	10 days	Mon 11/2/98	Fri 11/13/98	2FS+6 days
3.2 - Coordinate with Plant Close-out of Infrastructure	169 days	Mon 11/16/98	Thu 7/8/99	47SS
3.3 - Evaluate existing infrastructure and soil sampling information for residue sampling	20 days	Mon 1/11/99	Fri 2/5/99	47
3.4 - Develop Infrastructure Sampling Plan Addendum	5 days	Mon 2/8/99	Fri 2/12/99	14
3.5 - Submit Infrastructure Sampling Plan Addendum to TACOM/ACOE/CDEP/USEPA	0 days	Fri 2/12/99	Fri 2/12/99	15
3.6 - Review by ACOE and others/Evaluation of comments by W-C	10 days	Mon 2/15/99	Fri 2/26/99	16
3.7 - Meeting/telecon to discuss Infrastructure Sampling Plan addendum	0 days	Fri 2/26/99	Fri 2/26/99	17
3.8 - Sampling	21 days	Mon 3/1/99	Mon 3/29/99	18
3.9 - Analytical Laboratory Analysis	34 days	Mon 3/1/99	Thu 4/15/99	19SS
3.10 - Data Validation	30 days	Mon 3/29/99	Fri 5/7/99	20SS+20 days
3.11 - Update GIS to include observations and analytical data	55 days	Mon 3/1/99	Fri 5/14/99	19SS
TASK 4 - Surface Water Sampling	**77 days**	**Mon 3/29/99**	**Tue 7/13/99**	
4.1 - Mobilization	10 days	Mon 3/29/99	Fri 4/9/99	
4.2 - Sampling	30 days	Mon 4/12/99	Fri 5/21/99	24
4.3 - Analytical Laboratory Analysis	46 days	Mon 4/12/99	Mon 6/14/99	25SS
4.4 - Data Validation	44 days	Mon 5/10/99	Thu 7/8/99	26SS+20 days
4.5 - Update GIS to include observations and analytical data	67 days	Mon 4/12/99	Tue 7/13/99	25SS
4.6 - Surveying	30 days	Mon 4/12/99	Fri 5/21/99	25SS
TASK 5 - Sediment Sampling	**77 days**	**Mon 3/29/99**	**Tue 7/13/99**	
5.1 - Mobilization	10 days	Mon 3/29/99	Fri 4/9/99	24SS
5.2 - Sampling	30 days	Mon 4/12/99	Fri 5/21/99	31
5.3 - Analytical Laboratory Analysis	46 days	Mon 4/12/99	Mon 6/14/99	32SS
5.4 - Data Validation	44 days	Mon 5/10/99	Thu 7/8/99	33SS+20 days
5.5 - Update GIS to include observations and analytical data	67 days	Mon 4/12/99	Tue 7/13/99	32SS
5.6 - Surveying	30 days	Mon 4/12/99	Fri 5/21/99	32SS
- Biota Sampling	**77 days**	**Mon 3/29/99**	**Tue 7/13/99**	
6.1 - Mobilization	10 days	Mon 3/29/99	Fri 4/9/99	24SS
6.2 - Sampling	30 days	Mon 4/12/99	Fri 5/21/99	38
6.3 - Analytical Laboratory Analysis	46 days	Mon 4/12/99	Mon 6/14/99	39SS
6.4 - Data Validation	44 days	Mon 5/10/99	Thu 7/8/99	40SS+20 days
6.5 - Update GIS to include observations and analytical data	67 days	Mon 4/12/99	Tue 7/13/99	39SS
6.6 - Surveying	30 days	Mon 4/12/99	Fri 5/21/99	39SS
TASK 7 -Soil Sampling	**91 days**	**Mon 10/26/98**	**Mon 3/1/99**	
7.1 - Mobilize soil sampling subcontractor	10 days	Mon 10/26/98	Fri 11/6/98	8FS+5 days
7.2 - Utility Clearance	40 days	Mon 11/9/98	Fri 1/1/99	45
7.3 - Collect soil samples - initial characterization	40 days	Mon 11/16/98	Fri 1/8/99	12,46SS
7.4 - Laboratory analyses of initial characterization soil samples	56 days	Mon 11/16/98	Mon 2/1/99	47SS
7.5 - Data Validation -initial characterization soil samples	51 days	Mon 12/14/98	Mon 2/22/99	48SS+20 days
7.6 - Update GIS/GMS to incorporate soil observations and results	76 days	Mon 11/16/98	Mon 3/1/99	47SS
7.13 - Surveying	7 days	Mon 1/11/99	Tue 1/19/99	47
TASK8 - Soil Gas Survey	**82 days**	**Tue 2/2/99**	**Wed 4/14/99**	
8.1 - Evaluate soil sampling data and develop soil gas sampling plan addendum	10 days	Tue 2/2/99	Mon 2/15/99	48
8.2 - Submit soil gas sampling plan addendum to TACOM/ACOE/CDEP/USEPA	0 days	Mon 2/15/99	Mon 2/15/99	53
8.3 - Review by ACOE and others/Evaluation of comments by W-C	10 days	Tue 2/16/99	Mon 3/1/99	54
8.4 - Meeting/telecon to discuss Soil Gas Sampling Plan Addendum	0 days	Mon 3/1/99	Mon 3/1/99	55
8.5 - Sampling	10 days	Tue 3/2/99	Mon 3/15/99	56
8.6 - Analytical Laboratory Analysis	25 days	Tue 3/2/99	Mon 4/5/99	57SS
8.7 - Update GIS to incorporate soil gas survey observations and results	32 days	Tue 3/2/99	Wed 4/14/99	57SS
TASK 9 - Groundwater	**120 days**	**Mon 12/14/98**	**Fri 5/28/99**	
9.1 - Develop Groundwater Sampling Plan addendum based on updated GMS/GIS	10 days	Mon 12/14/98	Fri 12/25/98	47FS-20 days
9.2 - Submit Updated GMS/GIS and Groundwater sampling plan addendum	0 days	Fri 12/25/98	Fri 12/25/98	61
9.3 - Review by ACOE,TACOM,CDEP,USEPA/Evaluation of Comments by W-C	10 days	Mon 12/28/98	Fri 1/8/99	62
9.4 - Meeting/telecon to discuss groundwater sampling plan addendum	0 days	Fri 1/8/99	Fri 1/8/99	63
9.5 - Mobilize for monitoring well installation	1 day	Fri 1/8/99	Fri 1/8/99	66SS
9.6 - Utility clearance	40 days	Fri 1/8/99	Thu 3/4/99	67SS-1 day
9.7 - Installation/Development of Mon. Wells	40 days	Mon 1/11/99	Fri 3/5/99	47
9 - Surveying	6 days	Mon 3/8/99	Mon 3/15/99	67
- Monitoring well sampling - round 1	10 days	Tue 3/9/99	Mon 3/22/99	68FS-5 days



Project: SAEP RIWP
Date: Sun 10/25/98

Task | Split | Progress | Milestone | Summary | Rolled Up Task

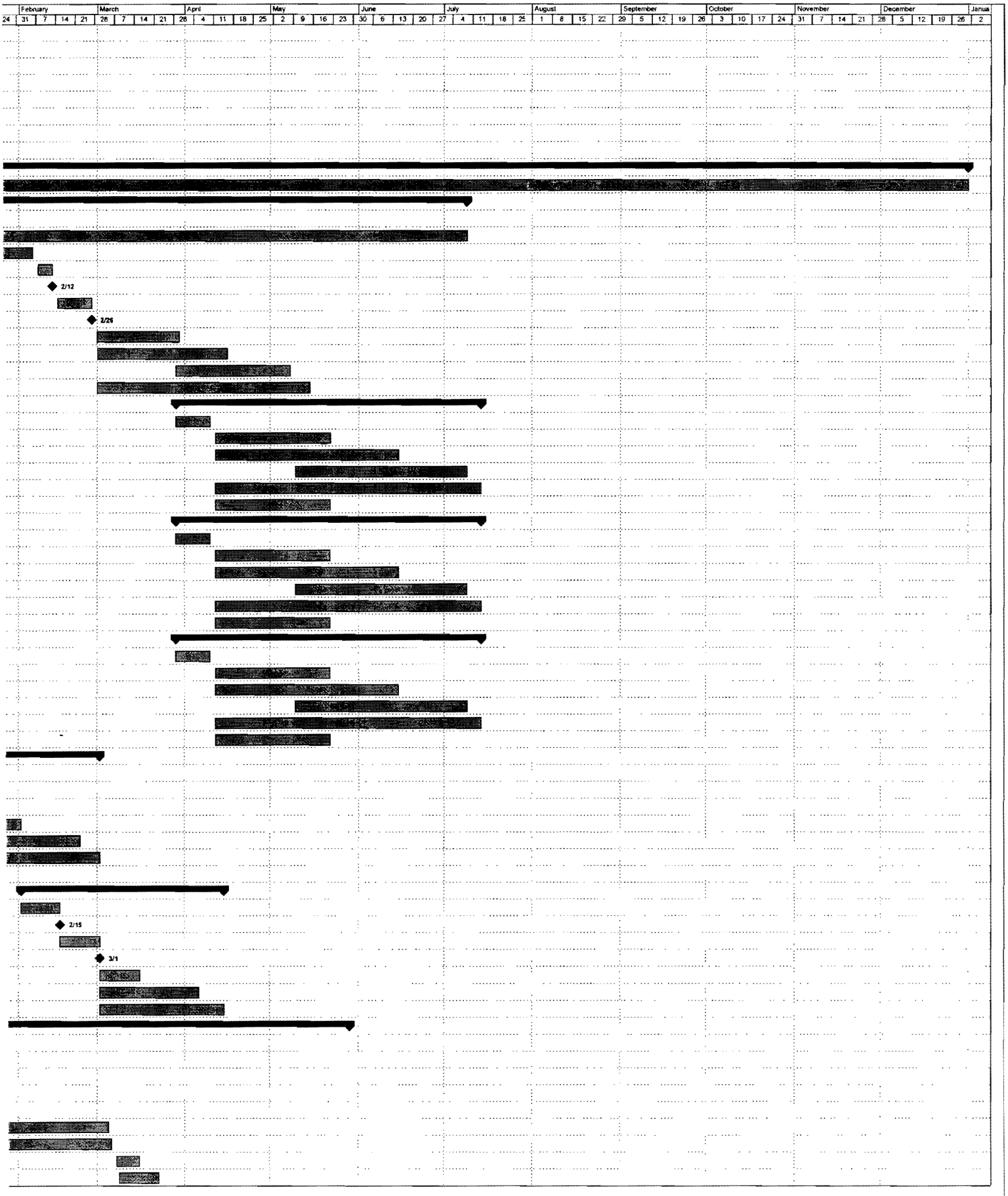
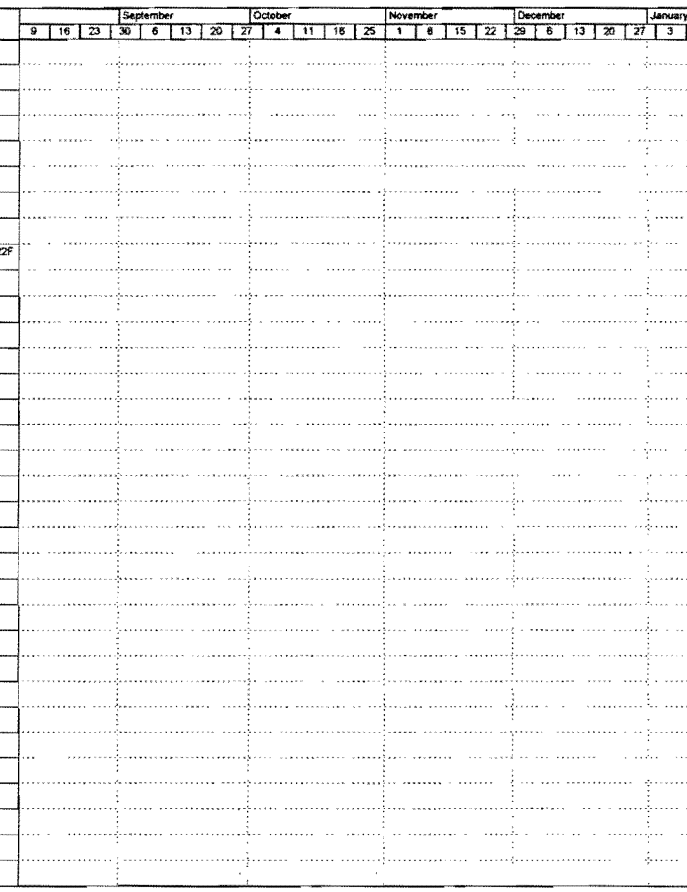


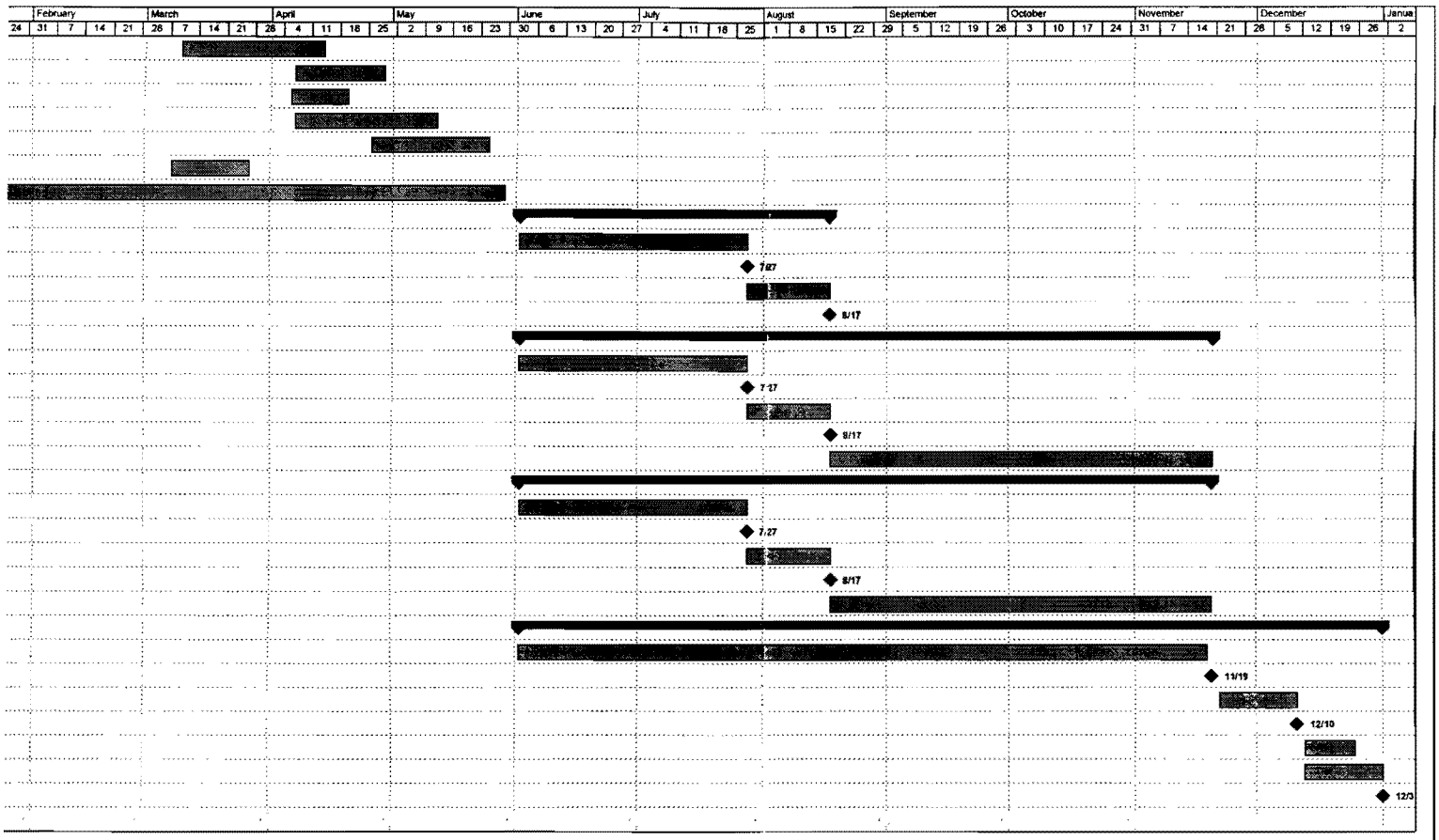
FIGURE 5 - ESTIMATED PROJECT SCHEDULE
STRATFORD ARMY ENGINE PLANT
REMEDIAL INVESTIGATION (Revised 10/25/98)

Task Name	Duration	Start	Finish	Predecessors
9.10 - Analytical Laboratory Analysis	25 days	Wed 3/10/99	Tue 4/13/99	69FS-9 days
9.11 - Data Validation	16 days	Wed 4/7/99	Wed 4/28/99	70SS+20 days
9.12 - Monitoring well sampling - round 2	10 days	Tue 4/6/99	Mon 4/19/99	69FS+10 days
9.13 - Analytical Laboratory Analysis	25 days	Wed 4/7/99	Tue 5/11/99	72FS-9 days
9.14 - Data Validation	21 days	Mon 4/26/99	Mon 5/24/99	73FS-12 days
9.15 - Aquifer testing	15 days	Mon 3/8/99	Fri 3/26/99	67
9.16 - Update GIS/GMS to include Groundwater sampling results	100 days	Mon 1/11/99	Fri 5/28/99	67SS
TASK 10 - Interim Data Report	**65 days**	**Wed 6/2/99**	**Tue 8/17/99**	
10.1 - Prepare Interim Data Report	40 days	Wed 6/2/99	Tue 7/27/99	76FS-30 days,22F
10.2 - Submit Interim Data Report	0 days	Tue 7/27/99	Tue 7/27/99	78
10.3 - Review by ACOE,TACOM,CDEP,USEPA/Evaluation of Comments by W-C	15 days	Wed 7/28/99	Tue 8/17/99	79
10.4 - Meeting/telecon to discuss Interim Data Report	0 days	Tue 8/17/99	Tue 8/17/99	80
TASK 11 - Human Health Risk Assessment	**123 days**	**Wed 6/2/99**	**Fri 11/19/99**	
11.1 - Problem Formulation	40 days	Wed 6/2/99	Tue 7/27/99	78SS
11.2 - Submit Human Health Risk Assessment Interim Memorandum	0 days	Tue 7/27/99	Tue 7/27/99	83
11.3 - Review by ACOE,TACOM,CDEP,USEPA,CHPPM/Evaluation of Comments by W-C	15 days	Wed 7/28/99	Tue 8/17/99	84
11.4 - Meeting/telecon to discuss Problem Formulation	0 days	Tue 8/17/99	Tue 8/17/99	85
11.5 - Additional Components of the Human Health Risk Assessment	68 days	Wed 8/18/99	Fri 11/19/99	86
TASK 12 - Ecological Risk Assessment	**123 days**	**Wed 6/2/99**	**Fri 11/19/99**	
12.1 - Problem Formulation	40 days	Wed 6/2/99	Tue 7/27/99	78SS
12.2 - Submit Problem Formulation Interim Deliverable	0 days	Tue 7/27/99	Tue 7/27/99	89
12.3 - Review by ACOE,TACOM,CDEP,USEPA,CHPPM/Evaluation of Comments by W-C	15 days	Wed 7/28/99	Tue 8/17/99	90
12.4 - Meeting/telecon to discuss Problem Formulation	0 days	Tue 8/17/99	Tue 8/17/99	91
12.5 - Ecological Exposure and Effects and Risk Characterization	68 days	Wed 8/18/99	Fri 11/19/99	92
TASK 13 - RI Report	**183 days**	**Wed 6/2/99**	**Fri 12/31/99**	
13.1 - RI Report	122 days	Wed 6/2/99	Thu 11/18/99	78SS
13.2 - Submit First Draft Report to ACOE/TACOM/USEPA/CDEP	0 days	Fri 11/19/99	Fri 11/19/99	95,87,93
13.3 - ACOE/TACOM/USEPA/CDEP review	15 days	Mon 11/22/99	Fri 12/10/99	96
13.4 - Meeting/telecon to discuss comments on First Draft Report	0 days	Fri 12/10/99	Fri 12/10/99	97
13.5 - Address comments	10 days	Mon 12/13/99	Fri 12/24/99	98
13.6 - Revise First Draft Report	15 days	Mon 12/13/99	Fri 12/31/99	98
13.7 - Submit Final Draft Report to ACOE/TACOM/USEPA/CDEP	0 days	Fri 12/31/99	Fri 12/31/99	100
TASK 14 - Monthly Progress Reports	**304 days**	**Thu 10/1/98**	**Wed 12/1/99**	



Project: SAEP RIWP
Date: Sun 10/25/98

Task | Split | Progress | Milestone | Summary | Rolled Up Task



d Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

FIGURE 5 - ESTIMATED PROJECT SCHEDULE
STRATFORD ARMY ENGINE PLANT
REMEDIAL INVESTIGATION (Revised 10/25/98)

FIELD SAMPLING PLAN

REMEDIAL INVESTIGATION

Stratford Army Engine Plant
Stratford, Connecticut

Contract Number DACW41-96D-8014
Task Order 0011

Prepared for
U.S. Department of the Army
Corps of Engineers, New York District
26 Federal Plaza
New York, New York 10278-0090

October 26, 1998

Prepared by
Woodward-Clyde Federal Services
P.O. Box 290
201 Willowbrook Boulevard
Wayne, New Jersey 07470

K9716-6.1

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Figures

1.1 SITE HISTORY AND CONTAMINANTS

A description of the Stratford Army Engine Plant (SAEP) site history is provided in Section 2.4 of the Remedial Investigation Work Plan (RIWP).

Contaminants detected at SAEP are summarized in Section 3 - Previous Investigations of the RIWP.

1.2 SUMMARY OF EXISTING SITE DATA

A land use assessment, the physical setting, and ecological setting at SAEP are presented in Sections 2.1, 2.2 and 2.3, respectively, of the RIWP.

Results of previous environmental investigations at SAEP are summarized in Section 3 of the RIWP.

1.3 SITE-SPECIFIC SAMPLING AND ANALYSIS PROBLEMS

During previous investigations, the following sampling and analysis problems were encountered:

1.3.1 Sampling

- Deep sediment not available at a downstream location (DS). The matrix (rock and gravel) was not representative of the sediment background sample. A shallow sediment sample was collected instead.
- During well installation, the drilling crew had problems with running sand. The augers and hole were cleaned before sampling resumed.
- Groundwater sampling occurred at a monitoring well (WC-20D2) located downwind of a major intersection with a lot of truck traffic. This may have impacted volatile organic compound (VOC) sample results.
- Groundwater sampling occurred at a monitoring well (LW-5D) located downwind of an airport. Aircraft exhaust fumes were noted during well development and sampling. This may have impacted VOC sample results.

1.3.2 Analysis

Independent review of data quality resulted in some chemical analysis results being qualified or rejected based on blank contamination, outlying internal standard areas, accuracy parameters, precision parameters, holding time exceedances, and matrix interference.

The project organization identifies the responsibilities of individuals involved in this remedial investigation (RI) project. The project organizational structure and personnel responsibilities are designed to provide adequate project coordination and control and proper quality assurance for the RI activities at SAEP. The responsibilities of key personnel are described below. The organizational structure is shown on Figure 1. Individual personnel assignments to the project organization may be changed at the discretion of the Woodward-Clyde (W-C) Program Manager and W-C Project Manager. Upon request, resumes of key personnel will be submitted to United States Army Corps of Engineers (USACE) for review and approval. The analytical laboratory internal organizational structure is presented in the laboratory Quality Assurance/Quality Control (QA/QC) Manual which is available upon request.

2.1 RESPONSIBILITIES OF KEY PERSONNEL

The responsibilities of key W-C personnel are described in the following sections.

2.1.1 Program Manager

The Program Manager has overall responsibility for all activities on the project and reporting of project status and progress to the USACE. The Program Manager monitors progress of the project work and provides supervision and support to the Project Manager. The Program Manager has overall responsibility for the development of the RIWP, for monitoring the quality of the technical and managerial aspects of the project, and, where necessary, for implementing corrective measures.

2.1.2 Project Manager

The Project Manager has primary responsibility for the coordination, implementation, and completion of the scope of work and all activities on the project. The Project Manager is responsible to the Program Manager and the USACE for day-to-day control of planning, scheduling, cost control, and implementation of the project. The Project Manager also supervises the timely development and delivery of the technical reports, and other project documents. The Project Manager assigns and monitors all project personnel in planning, coordinating, and controlling all technical aspects of the tasks, and is responsible for maintaining the quality of the work product, schedule and budget control, and communications with the USACE Project Manager and other key staff personnel.

2.1.3 Project QA/QC Officer

The Project QA/QC Officer reports to the Program Manager and works directly with the Project Manager and other project personnel. Overall responsibility of the Project QA/QC Officer is to implement the quality assurance program, and monitor and verify that the work is done in accordance with the Sampling and Analysis Plan (SAP) [including the Field Sampling Plan (FSP), the Quality Assurance Project Plan (QAPP), and the Standard Operating Procedures (SOPs)] and other applicable procedures. The Project QA/QC Officer also has the following responsibilities: to assess the effectiveness of the QA/QC program; to recommend modifications

to the program when applicable; for verifying that personnel assigned to the project are trained and indoctrinated relative to the requirements of the QA/QC program; for reviewing and verifying the disposition of nonconformance and corrective action reports; and for periodic quality assurance audits.

The Project QA/QC Officer advises the Project Manager on implementation of the QA/QC program, but the QA/QC functions of the Project QA/QC Officer are independent of the Project Manager. The Project QA/QC Officer is responsible for coordination of quality assurance (QA) sample collection and delivery and data submittal to the Government Quality Assurance Laboratory (USACE Missouri River Division Laboratory). The QA/AC Officer will also designate and oversee the activities of the QA/QC Coordinator.

2.1.4 Health and Safety Manager

The Health and Safety Manager (HSM) reports to the Program Manager and works directly with the Project Manager and other project personnel. The HSM has the responsibility to monitor and verify, by conducting periodic audits and reports from the Site Safety and Health Officer (SSHO), that the field activities are conducted in accordance with the Site Safety and Health Plan (SSHP) written for this RI. The HSM will advise the Project Manager regarding health and safety issues, but will function independently of the Project Manager. The HSM will also designate and oversee the activities of the SSHO.

2.1.5 QA/QC Coordinator

A QA/QC Coordinator will be appointed by the Project QA/QC Officer, with approval by the Program Manager, to review, monitor, and report on the conformance to QA/QC program requirements for specific project activities or tasks. A QA/QC Coordinator will audit activities and will report audit findings to the Project QA/QC Officer. As QA/QC Coordinator, the designated staff member may also do project-related work, but may not do quality-monitoring on his or her own work. As a QA/QC Coordinator, the designated staff member may also advise field personnel on QA/QC methods and practices, and conduct field audits of project activities. The QA/QC Coordinator will maintain a record of quality-monitoring activities and will inform the Project QA/QC Officer of these monitoring activities.

2.1.6 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) monitors all site activities and is responsible for the implementation of the site-specific SSHP. The SSHO reports directly to the HSM, and works with the Project Manager and Task Leaders to ensure overall compliance with the SSHP. A detailed description of the HSM and SSHO responsibilities is presented in the SSHP.

2.1.7 Technical Task Leaders

Technical Task Leaders will be chosen by the Project Manager with approval by the Program Manager and will be assigned to work on various tasks as deemed necessary by the Project Manager. Each Task Leader is responsible to the Project Manager for planning, scheduling, cost

control, and completion of assigned project tasks. The Task Leader is responsible for implementing the QA/QC program as it relates to assigned tasks for the project.

2.1.8 Field Manager

The Field Manager will be appointed by the Project Manager with approval by the Program Manager, and will be responsible for coordinating all field activities. The Field Manager will work with the Technical Task Leaders, and will schedule field activities with the project staff assigned by the Project Manager. The Field Manager will also work with the SSHO and the QA/QC Coordinator to accomplish the objectives of all aspects of the work plan, including the QAPP, as they pertain to field activities.

2.1.9 Project Staff

Project staff members are chosen by the Project Manager. Each member of the project staff is responsible to the Field Manager or Project Manager for completion of assigned project activities. Members of the project staff are responsible for understanding and implementing the QA/QC program as it applies to their project activities.

2.1.10 Data Reviewers

Data Reviewers are chosen by the Project Manager and the Project QA/QC Officer and report directly to the Project QA/QC Officer. Responsibilities of the Data Reviewers include, but are not necessarily limited to:

- Verifying measurement system calibration;
- Auditing quality control activities;
- Screening data sets for outliers;
- Auditing field sample data records and chain-of-custody forms; and,
- Checking calculations.

The primary task of the Data Reviewers is to quantitatively and qualitatively assess chemical data reported by the laboratory.

Data quality review of non-laboratory data will be accomplished by a professional qualified for that task (e.g., geologic data will be reviewed by a geologist; field calibration logs will be reviewed by the Site Manager while the field activities are being performed). The appropriate Data Reviewer will review the data results and data collection procedures for compliance with established quality control criteria. Data Reviewers will report to the Project Manager and Project QA/QC Officer.

2.2 SUBCONTRACTORS

Implementation of the RIWP and the RI activities will require subcontractors for providing additional project support for services such as:

- Drilling borings and monitoring well installation/development;
- Laboratory chemical analysis of surface water, sediment/residue, biota, soil, indoor air, and groundwater samples; and,
- Surveying of sample and monitoring well locations and elevations.

Training and qualifications of subcontractor personnel is assumed through certifications and licenses which are issued by regulatory agencies. Equipment, including related health and safety items, required for field activities performed by subcontractors, will be supplied by the subcontractors. The subcontractors identified for this project are listed below along with a point of contact for each subcontractor.

The QA/QC Coordinator and Field Manager will be responsible for compliance to the RIWP, the QAPP, and QA/QC requirements by the field subcontractors. The Project QA/QC Officer will be responsible for verifying laboratory compliance to the QA/QC program for this project. Laboratory personnel, which have primary responsibility of ensuring adherence to the QA/QC of the project and the laboratory QA/QC program, are identified in the laboratory QA/QC Manual.

2.2.1 Analytical Laboratories

Sediment/Surface Water/Biota

- EA Laboratories (M.M. Uhfelder)

  19 Loveton Circle

  Sparks, Maryland 21152

  410-771-4920

  410-771-4407 (fax)

- Frontier Geosciences (Beverly Heaphey)

  414 Pontius Avenue North

  Seattle, Washington 98109

  206-622-6960

  206-622-6870 (fax)

Soil and Groundwater

- EMAX Laboratory (Phillip Toy)

  630 Maple Avenue

  Torrance, California, 90503

  1-310-618-2229

  1-310-618-0818 (fax)

- Brooks Rand (Rebecca Wood)
  3950 6th Avenue NW
  Seattle, Washington, 98107
  1-206-632-6206
  1-206-632-6017 (fax)
- Severn-Trent Laboratory (Jeff Curran)
  200 Monroe Turnpike
  Monroe, Connecticut, 06468
  203-261-4458
  203-268-5346 (fax)

2.2.2 Drilling

- Connecticut Test Borings (Chris DeAngelis)
  28 Rimmondale Street
  P.O. Box 69
  Seymour, Connecticut 06483
  800-782-8085
  203-889-0635 (fax)

2.2.3 Utility Markout

- Hager-Richter Geosciences (Gene Simmons)
  8 Industrial Way, D-10
  Salem, New Hampshire 03079
  603-893-9944
  603-893-8313 fax

2.2.4 Soil Gas

- Vironex (Mark Kluger)
  512 Interchange Boulevard
  Newark, Delaware 19711
  800-VIRONEX
  302-453-0701 fax

2.3 QUALIFICATIONS OF PERSONNEL

All personnel assigned to the project, including subcontractors, will be qualified for the task(s) to which they are assigned. Appraisal of the qualification of technical personnel assigned to the project will be made by the Project Manager. The appraisal will include comparison of the requirements of the task assignment with the relevant experience and training of the prospective personnel. All documents concerning qualification appraisal will be stored in the project administrative files.

The identification of data gaps and the development of data quality objectives (DQOs) involve gathering and evaluating information to ensure that data collection activities are focused on obtaining the information needed to make decisions on remedial actions or answer the relevant questions leading up to such decisions. The data gaps/DQO process ensures that all future work at the site -- from field investigations, to interim remedial actions, to selection, design and implementation of final remedial actions -- is based on the most appropriate set of information obtained in the most cost-effective way, and that time and effort are not wasted on loosely defined objectives.

As part of the RIWP planning process, a comprehensive assessment of data gaps in the existing site data was performed. This assessment was based on a conceptual understanding of site conditions, which are summarized in Section 2 (Site Description and History) and Section 3 (Previous Investigations) of the RIWP.

These data gaps, translated into "data requirements" needed to fulfill the objectives of the RI, are summarized in Table 1 of the SAEP RIWP. This table, which is organized by environmental media of concern and site areas needing sampling, provides brief statements of how the data obtained will be used, i.e., how the data will fill data gaps to achieve project objectives.

Also during the RIWP planning process, DQO Statements (typically in the form of questions) are developed that, in turn, guide the development of a site-specific data collection and analysis program. DQO Statements can be either qualitative or quantitative. The DQO Statements identify the type and/or quality of data required to characterize a site to the extent needed to: 1) select the most appropriate remedial action that will be protective of human health and the environment; and, 2) satisfy all applicable regulatory requirements.

Qualitative DQOs for the SAEP RI are presented in Table 2 of the SAEP RIWP. These DQOs are the basis for the data collection program contained in Section 6 (Work Plan Approach) of the RIWP, the field sampling program contained in this FSP, the QA/QC program described in the QAPP presented as the second part of the SAEP SAP, and the SOPs contained in Attachment A of the SAP.

Quantitative DQOs such as detection limits and the data quality parameters of accuracy and precision are discussed in the QAPP presented as the second part of the SAEP SAP.

The field activities to be conducted as part of this RI have been grouped based on the six types of media to be investigated: surface water, sediment/residue, biota, soil, indoor air, and groundwater. The rationale, field procedures, and laboratory analysis for each of these categories is discussed below.

4.1 SURFACE WATER

4.1.1 Rationale

Surface water samples will be collected in the Outfall 008/Marine Basin area to characterize the surface water chemistry in this area. Surface water will also be collected from a minimum of three reference stations from a reference location across the Housatonic River adjacent to Nell's Island (Figure 2a) to serve as a basis for comparison. Samples collected at high tide will provide input into regional surface water quality; those collected at low tide will likely represent local contributions, including potential site-related inputs. Results will be used to determine if concentrations of site-related constituents are higher relative to the remainder of the system, and whether they are present at concentrations that could pose a threat to human health or ecological receptors based on a comparison to literature-based benchmarks.

The specific scope of the surface water sampling component is summarized in Tables 1 and 2. Approximate locations of sampling stations are shown in Figure 2 and 2a.

4.1.2 Field Procedures

Seven surface water samples will be collected in Marine Basin and downgradient of Outfall 008 at the same locations where sediments will be collected. Three additional samples will be collected at a suitable reference location in the wetland drainage across the Housatonic River (Figure 2a). Sufficient surface water will be collected to perform the selected chemical analyses.

Surface water samples will be collected using the procedures described in SOP No. 12. Decontamination between stations will be performed as described in SOP No. 7. These Standard Operating Procedures (SOPs) are contained in Attachment A.

Surface water samples will be taken prior to sediment samples to minimize potential for turbidity. Surface water samples will be collected one time each during high (within two hours) and low (within two hours) tides at mid-depth. A Kemmerer or similar water sampling device will be used where bottles can not be filled directly. Pertinent field observations, such as sample time, color and odor, will be recorded in the field logbook. In situ field measurements including temperature, conductivity, pH, dissolved oxygen and turbidity or total suspended solids will also be collected using a properly calibrated water quality meter at each location during each sampling event.

For metals, analyses will be performed on both field-filtered (dissolved) and nonfiltered (total) samples. That portion of the sample to be filtered will be emptied onto the filtering vessel directly from the sampling equipment. Samples will be filtered according to United States Environmental Protection Agency (USEPA) QAD009.

Samples will be sealed in moisture proof packaging and stored at 4 degrees Celsius (°C) as soon after collection as practical. All samples will be shipped on ice to the analytical laboratory within 24 hours of collection. Containers and holding time requirements are specified in Table 2.

QA/QC surface water samples, rinsate blanks, matrix spike and matrix spike duplicates will be collected each at a frequency of one per 20 investigative samples.

4.1.3 Laboratory Analyses

All surface water samples will be analyzed for Target Compound List (TCL) VOCs, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and total and dissolved Target Analyte List (TAL) metals. Analyses for arsenic, mercury, and chromium will include trivalent arsenic, methyl mercury, and hexavalent chromium. Samples in Marine Basin will also be analyzed for cyanide.

4.2 SEDIMENT

The sediment sampling program involves the collection and analysis of aquatic sediment from on and near the Site and residue from plant infrastructure (e.g., catchbasins, pumping stations). Both types of sampling are described below.

4.2.1 Rationale

Aquatic sediment will be sampled at various locations in the Intertidal Mudflats and Outfall 008/Marine Basin area to collect data needed to fill gaps identified in the Phase II investigation and requested by USEPA and Connecticut Department of Environmental Protection (CDEP) (see Figures 2 and 2a; Appendix C). In addition, general bathymetric observations will be recorded at several locations to characterize these areas.

In general, intertidal mudflat sediment stations are oriented along the original Transects A through F sampled in the Phase II investigation. Two more transects have been added as part of this effort, Transect G and H, oriented north and south of the Causeway, respectively. Stations located along these transects will address USEPA's concern with respect to whether potential site-related chemicals deposited on the Causeway have migrated to the intertidal mudflats.

Stations located in the Outfall 008/Marine Basin area will be located on a gradient from the original Station 008, located at the outfall discharge point, along the drainageway and in Marine Basin.

The rationale behind the aquatic sediment data collection effort is described in the following bullets:

- Sediment data collected in the vicinity of the outfalls will be used to better delineate the vertical and horizontal extent of constituent distribution in this area;
- Sediment data collected in the vicinity of the Causeway will be used to identify the potential for elevated site-related constituents and potential human and ecological threats in this area;

- Sediment data collected in the 008/Marine Basin area will be used to delineate the extent to which site-related constituents have migrated from the Site, and to characterize the potential for human and ecological threats in this area; and,
- Sediment data collected in the reference area will be used as a basis to characterize regional sediment chemistry and as a basis for comparison with data collected on and in the vicinity of the Site.

Specific data sets to be collected (chemistry, Acid Volatile Sulfides/Simultaneously Extracted Metals [AVS/SEM], toxicity and bioaccumulation testing, benthic community analyses) represent measurement endpoints which will be used to answer specific questions relating to the potential ecological threat posed by the Site (Section 6.12). In addition, some of these data will also be used to support human health exposure assessment.

The specific scope of the aquatic sediment sampling effort is summarized in Tables 1 and 2 and discussed below. Proposed aquatic sampling locations are shown in Figures 2 and 2a.

The initial residue sampling of plant infrastructure will focus on those locations most likely to represent potential sources to the environment (e.g., catch basins, pumping stations) and those likely to contain material representative of site operations (e.g., downgradient locations) before proceeding with other infrastructure sampling, if needed, based on the initial sampling. Details of the process in which infrastructure residue sampling locations will be selected are provided in Section 6.3 of the RIWP.

Following a thorough review of existing infrastructure information, an Infrastructure Sampling Plan Addendum will be prepared. The Infrastructure Sampling Plan Addendum will provide details on sampling locations, rationale, parameters, and methods. Based on current information, an estimated 20 samples will be collected. If contaminated residue is found, then, on the basis of an evaluation of detailed drawings and as assessment of areas evidencing contaminated soil and groundwater, the need to further sample the infrastructure system will be evaluated.

4.2.2 Field Procedures

4.2.2.1 Lithology/Bathymetry

Lithologic and bathymetric observations will be recorded as part of the characterization of the Intertidal Mudflat area and Outfall 008/Marine Basin area, prior to sediment sampling. Data will be collected within two hours of high tide at three stations on each of three transects (A, D and E) in the Mudflat area and south of the Causeway, and at three stations along a transect in Outfall 008/Marine Basin area. Observations will include surface water depth, depth of mud or noncohesive sediments (where possible), general description of grain size and color, and stratigraphy where appropriate.

4.2.2.2 Sediment

Sediment/residue samples will be collected using the procedures described in SOP No. 9. Decontamination between stations will be performed as described in SOP No. 7. These SOPs are contained in Attachment A.

Aquatic sediment samples will be collected using a properly decontaminated, hand-held coring device from the surface (0 to 6 inches) and at depth at a total of eight stations located in the Intertidal Mudflats adjacent to the outfalls. The depth to which sediment samples will be collected in this area will be every 6 inches to a maximum depth of 24 inches, or point of refusal, which ever comes first. Surficial sediments (0 to 6 inches) will reflect conditions in the biologically active zone, while sediments below this depth reflect historical deposition. Locations will be along the same transects sampled in the Phase II Investigation. Global position system (GPS) will be used to identify stations in the field.

For the remainder of the aquatic sediment stations adjacent to the Causeway (six stations), Outfall 008/Marine Basin area (seven stations), and the reference location (three station), sediments will be collected only from the biologically active zone at a depth of 0 to 6 inches. All sediments will be analyzed for chemistry and physicochemical parameters. In addition, some surficial sediments (0 to 6 inches) will also be analyzed for AVS/SEM, toxicity and bioaccumulation testing, and benthic community analyses as shown in Table 1.

Reference stations for collection of aquatic sediment chemistry data will be field located. Existing sediment background data collected as part of the Raymark Superfund Site will also be used.

Infrastructure residue samples will be collected using the same general procedures as those used for the aquatic sediment samples, with the following exceptions/additions. First, procedures specific to boat handling activities will not be necessary as infrastructure residue sampling will be conducted from the land surface. Second, GPS will not be used to identify sampling locations. Third, sampling personnel will remain on the land surface and sampling equipment will be lowered down through the access port (e.g., into the catch basin, manhole), i.e., under no circumstances will sampling personnel enter the plant infrastructure to obtain a residue sample.

For aquatic samples collected from adjacent to the Causeway, the Outfall 008/Marine Basin, and the reference location and for the infrastructure samples, residue will be collected with a stainless steel hand held corer, Eckman Dredge, Petite Ponar Grab sampler, shovel, or similar suitable sampling device which has undergone appropriate decontamination procedures. Sufficient sediment/residue will be collected from each location and homogenized to perform all tests except VOCs and benthic analyses. Aliquots for each of the tests will be placed in appropriately labeled vessels and prepared for shipment to the laboratory.

Samples will be sealed in moisture proof packaging and stored at 4°C as soon after collection as practical. All samples will be shipped on ice to the analytical laboratory under proper chain of custody within 24 hours of collection. Containers and holding time requirements are specified in Table 2.

QA/QC sediment/residue samples, rinsate blanks, matrix spike and matrix spike duplicates will be collected each at a frequency of one per 20 investigative samples.

4.2.2.3 Benthos

All benthic samples will be collected using a sampler of known surface area (e.g., petite Ponar bottom grab, sampling area 36 square inches). Three replicates will be collected at each station.

Each sample will be washed through a 500-micron mesh, stainless steel sieve to remove fine sediments. Large rocks and twigs will be rinsed free of organisms into the sieve, and discarded. Washed samples will be back-washed into appropriately-labeled sample jars and fixed using a 10 percent buffered, formalin/rose bengal solution.

Pertinent field observations, such as sample time, sediment texture, color and odor, will be recorded in the field logbook.

4.2.3 Laboratory Analyses

4.2.3.1 Sediment/Residue Chemistry

All aquatic sediment samples will have chemical analysis performed for TCL VOCs, PAHs, PCBs, TAL metals, cyanide and physicochemical parameters. AVS/SEM will be analyzed for the samples shown in Table 1. Analytical methods are described in the QAPP.

All infrastructure residue samples will be submitted to the analytical laboratory for analysis of TCL VOCs, semi-volatile organic compounds (SVOCs), PCBs, TAL Metals, and cyanides or as modified by the Infrastructure Sampling Plan Addendum.

4.2.3.2 Physicochemical Parameters

All aquatic sediment samples will be analyzed for physicochemical parameters including total organic carbon (TOC), grain size, percent moisture and solids. Protocols are specified in the QAPP. These samples will be used to further characterize the sediments.

4.2.3.3 Sediment Toxicity Testing

The test organisms for the toxicity testing were selected based on their specific presence, or the presence of closely related organisms, in the study area. Both chronic and acute endpoints will be measured. Protocols will follow appropriate American Society for Testing and Materials (ASTM) guidelines where available.

- 20-day Neanthes arenaceodentata. Endpoints: mortality, growth

  Toxicity tests will follow ASTM 1611-94 protocol for 20-day Neanthes arenaceodentata chronic endpoints. The test is conducted in 1-L jars, 5 replicates per location, 5 worms per replicate. It is a static renewal test, where 50 percent of the water volume is exchanged every 3 days. Worms are fed a controlled diet of Tetramin and alfalfa during the test. At termination, the survivors are counted, and final biomass measured. Final biomass is then compared to initial (pre-test) biomass to establish growth.

- 28-day Leptocheirus plumulosus. Endpoints: mortality, growth, reproduction

  Toxicity tests will follow protocol for 28-day Leptocheirus plumulosus chronic endpoints. The test is conducted in 1-L jars, 5 replicates per location, 20 organisms per replicate. It is a static renewal test, where 50 percent of the water volume is exchanged every 3 days. Worms are fed a controlled diet of Tetramin and alfalfa

during the test. At termination, the survivors and offspring are counted, and final biomass measured.

4.2.3.4 Bioaccumulation Testing

As with toxicity test organisms, test organisms for bioaccumulation testing were selected based on their known occurrence in the study area. The specific laboratory protocol has been selected based upon its reliability in the scientific community.

- 28-day Nereis virens.

  The bioaccumulation tests will follow ASTM 1688-96 protocol for 28-day Nereis virens. The test is conducted in 10 gallon aquaria, 5 replicates per location, 40 worms per replicate. The worms are depurated 24 hours in clean seawater (to void gut contents) after the sediment exposure and before chemical analysis. Tissue will be analyzed for PCBs and TAL Metals.

4.2.4 Benthic Community Analyses

In the laboratory, samples will be washed in fresh water and preserved in a solution of 70 percent ethanol within 72 hours of collection. Samples will be sorted under dissecting microscopes in the laboratory, separating benthic fauna from any sediment and detritus. Every tenth tray will be resorted as a quality control measure. Organisms recovered will be identified to the lowest practical taxon and enumerated.

4.3 BIOTA

Three types of biota collections will be performed as part of the SAEP investigation. These include the following:

- benthic macroinvertebrates;
- oysters or consumable shellfish; and,
- fish.

The rationale for collection and analysis of benthic macroinvertebrates has been included in Section 4.2, Sediment. The rationale for fish and shellfish will be discussed in this section.

4.3.1 Rationale

Oyster tissues, or those of a similar shellfish consumed by humans, will be collected from the Marine Basin area and analyzed for PCBs and TAL metals, to estimate potential risk to the human receptors from ingestion of the shellfish tissue.

Qualitative fish community surveys will be performed in the Intertidal Mudflat area and the Outfall 008/Marine Basin area to identify species that use the area. Depending upon the species and quantity available in these areas, whole body tissues of a prey/forage species, and fillets of a recreationally or commercially important species will be analyzed for PCBs and TAL metals. These parameters were selected based on their bioaccumulation potential, apparent relation to

previous site activities, and detection in sediment samples during previous investigations. Whole body tissues will include offal; data generated from these analyses will be used in the assessment of potential risk to wading and shore birds. Data from analyses of edible fish fillets will be used in the assessment of potential risk to human receptors.

The specific scope of the biota sampling effort is summarized in Tables 1 and 2 and is discussed in greater detail in the following sections below.

4.3.2 Field Procedures

Biological tissue collection will be performed using the procedures described in SOP No. 8. Decontamination between stations will be performed as described in SOP No. 7. These SOPs are contained in Attachment A.

4.3.2.1 Shellfish

Oysters or consumable bivalves will be collected from three locations in Marine Basin and one reference location in the wetland area across the Housatonic River. A sufficient number will be collected to obtain three replicate samples at each station. Samples will be collected manually, or using hand tools such as a decontaminated shovel, rake or other suitable collection device. Station locations will correspond as nearly as possible to the stations used for sediment and surface water sampling but will be dictated by the presence of the bivalves.

The amount of tissue needed for analyses is approximately 50 to 150 grams per replicate. This will require that each sample likely be composed of a composite of about five to ten large bivalves, depending upon the species.

Shellfish will be frozen and transported whole to the analytical laboratory. They will be shucked in the laboratory to limit the risk of cross contamination between stations. Containers and holding time requirements are specified in Table 2.

At each location where shellfish are collected, water quality parameters including temperature, pH, dissolved oxygen, alkalinity and hardness will be recorded. Additional field observations will also be recorded such as substrate type, odors, presence of other biota, etc.

4.3.2.2 Finfish

Fish sampling will be performed by seining or gill netting to qualitatively characterize fish populations occurring on the Intertidal Mudflats, adjacent to the SAEP site and the Marine Basin. Fish will also be collected from a suitable reference location. Sampling at all locations will occur during a preliminary one-day site reconnaissance. Subsequent sampling procedures will be determined following this preliminary effort.

Samples will be collected by either seine and/or gill net and/or trap nets. Seines will be pulled along the mudflat perpendicular to the shoreline during high tide, or deployed in a semicircle using a suitable vessel. Gill nets will be placed parallel to the shoreline (as close to the breakwater as possible) as a means to reduce potential complications resulting from the current.

Where it is determined that suitable species occur in adequate numbers, attempts will be made to collect a minimum of six replicate fish samples each of a prey species and an edible species. Whole body fish samples will be collected of prey species, and data used as input into the Ecological Risk Assessment (ERA). Whole body samples will include all gut contents. Edible fillet samples will also be collected and provide input into the Human Health Risk Assessment (HHRA). The fillet samples will be taken from an important local commercial and recreational species (e.g., American shad, Atlantic herring, or tautog). Samples will be filleted in the laboratory to prevent cross contamination.

Approximately 45 grams (wet weight) of tissue are needed to perform the analyses (i.e., 30g for PCBs, 10g for metals, 3g for lipids) for each replicate of each species (QA/QC samples will require approximately 100 grams wet weight). For the prey fish, a composite sample of whole fish will be prepared with an adequate number of specimens to achieve the required sample quantity. For larger fish, every attempt will be made to collect a specimen large enough to represent one replicate. If a specimen of sufficient size cannot be collected, similar-sized specimens' fillets will be composited until sufficient tissue is available.

All fish and shellfish specimens will be individually wrapped in solvent-rinsed aluminum foil, labeled, and packed on ice for shipment to the laboratory. Large specimens will be placed in individual packages and composite samples of small specimens will be placed in one package per composite sample.

After sufficient quantities of fish and shellfish have been captured for all analyses at all stations, samples will be prepared for overnight shipment to the laboratory using proper chain-of-custody procedures.

4.3.3 Laboratory Analysis

Shellfish and fish tissues will be analyzed for PCBs, TAL metals, percent lipids, and percent moisture using methods described in the QAPP.

4.4 SOIL

4.4.1 Rationale

Using information in previous investigation reports and provided by SAEP, correspondence and meetings with USEPA and CDEP regarding the Phase I and II Investigations, and the initial site reconnaissance, the need for sampling the subsurface at the various areas of concern identified in reports of these investigations was evaluated. The potential for sampling these areas was evaluated on the basis of:

- Potential for presence of hazardous materials,(e.g., activities likely to have required the use of fuels, solvents, etc.);
- Evidence of actual or potential release, (e.g., analytical laboratory data, reports of spills, visible stains); and,

- Potential migration pathway to the subsurface (e.g., cracked flooring, drains, sumps, pits, pipes).

Because all areas were not vacant at the time of the initial site reconnaissance, the precise locations of a number of areas referred to in information reviewed could not be determined at the time of the initial site reconnaissance. These locations will be confirmed during Task 1, Subtask 1.3 – Pre-Mobilization Activities; any proposed changes to the soil sampling will be documented in the Soil Sampling Plan Addendum (Task 1, Subtask 1.5), which will summarize and document additional information on sampling locations obtained as a result of the pre-mobilization site inspection and the kickoff meeting. Any additions or deletions to the RIWP locations will be indicated. Rationale for any additions, deletions, or other changes will be provided in the Soil Sampling Plan Addendum.

The soil sampling will be conducted in an iterative manner with soil borings in potential areas of concern will first be sampled across the entire Site. The soil data will be evaluated by the on-site RI team members as well as other investigation team members on an on-going basis so that decisions regarding additional borings or other characterization or delineation (both horizontal and vertical) sampling can be implemented during the same field mobilization. Initial characterization boring data will be compared to CDEP Remediation Standard Regulations (RSRs) to determine if further soil sampling is required to delineate potential source areas.

4.4.2 Field Procedures

Table 3 lists the areas to be sampled with initial characterization borings on the basis of the above criteria, arranged according to Community Environmental Response Facilitation Act (CERFA) assessment parcel to correspond to the format of the Environmental Baseline Survey (EBS). Figure 3 shows the approximate extent of these areas with the total number of initial characterization soil borings indicated for each CERFA assessment parcel. The initial characterization sampling program is summarized in Table 4 which includes estimated number of samples submitted for analysis, analytical parameters, sample intervals, sample containers, and QA/QC samples.

All soil borings will extend to the water table (estimated at 4 to 11 feet below ground surface, depending on location). Deeper vertical profiling below the water table may be conducted in areas in which contamination extends below the water table based on field judgment. Soil samples will be obtained using the hollow-stem auger (HSA) and split-spoon advancement method.

Procedures for obtaining soil samples using split spoon samplers and hollow stem augers to advance the boreholes are described in SOP No. 1 (Soil Sampling Using Split-Spoon Samplers) also provided in Attachment A. Floor slabs in borehole locations in buildings will first be cored or jackhammered to provide access to the sub-slab soil. Decontamination between boring locations will be performed as described in SOP No. 7.

All boreholes will be sampled continuously. One soil sample will be submitted for analytical laboratory analysis from the zero to six inch interval below grade or any paved surface (i.e., first split spoon) or within one foot below the depth of the potential release source, if known (e.g., the depth of the bottom of a sump). A second sample will be submitted from the interval

immediately above the water table. Additional samples may be collected based on visual, olfactory, or field screening evidence of contamination. Provisions will be made to provide samples to other government contractors on-site, subject to available sample volumes.

Careful notes will be kept regarding visual, olfactory, and field screening instrument observations because, in addition to providing the basis for biasing a sample for submittal to the analytical laboratory, this will provide important information needed to define potential source areas. Any floating product at the water table or free product in the soil samples will be noted. If material is encountered that, based on field observations, appears to be potential source material, selected samples may be selected for analysis using the Synthetic Precipitation Leaching Procedure (SPLP) for comparison with CDEP pollutant mobility criteria. In addition, potential source material that appears to be of sufficiently limited extent to potentially be excavated as part of an Interim Removal Action may be selected for analysis using TCLP methods.

All boring locations will be clearly marked with brightly colored paint and labeled with the appropriate identification number. All boring locations will be surveyed in Connecticut State Plane coordinates for tie-in to the existing Site survey. Horizontal locations will be surveyed to the nearest 0.01 foot. Surface elevations will be vertically surveyed in elevation above mean sea level to the nearest 0.01 foot to a consistent National Geodetic Vertical Datum (NGVD) for comparison to previous Site surveys.

4.4.3 Laboratory Analysis

Analytical parameters will cover a wide range of potential contaminants (TCL VOCs and SVOCS, PCBs (shallow samples only), TAL metals, and cyanide). Selected samples will be analyzed for remedial design-related parameters (e.g., TOC, grain size distribution, and total petroleum hydrocarbons (TPH)).

All soil samples will be extracted for possible analysis using SPLP methodology for semivolatiles, PCBs, and metals only if, after reviewing the data, the contaminant mass concentrations based upon the results of the semivolatiles, PCBs, and metals analyses exceed the appropriate SPLP-based CDEP pollutant mobility criteria in the RSRs multiplied by 20 (i.e., the SPLP dilution factor).

If material is encountered that, based on field observations, appears to be source material (i.e., visual and olfactory evidence of contamination) of sufficiently limited extent to potentially be excavated as part of an Interim Remedial Measure, selected samples may be selected for analysis by TCLP methods, for potential disposal. Attachment B identifies the analytical methods, target analytes, method detection limits, and reporting limits for the project.

4.5 SOIL GAS

4.5.1 Rationale

An estimated 40 samples will be collected from locations in buildings across the Site. Ten samples are estimated for Building B-2, five each in Buildings B-16, B-3, and B-6, and the

remaining 15 samples distributed among the other buildings on-site. The proposed parameter list and sampling locations will be submitted in the Soil Gas Sampling Plan Addendum.

4.5.2 Field Procedures

The soil gas sampling procedures are described in SOP No. 10 (Soil Gas Sampling) provided in Attachment A.

4.5.3 Laboratory Analysis

The subcontractor will analyze the samples using protocols to speciate compounds found on pages 48 and 49 in Appendix F to Sections 22a-133k-1 through 22a-133k-3 of the Connecticut State Agencies Industrial/Commercial Volatilization Criteria for Soil Vapor. Samples will be collected in either an evacuated/purged syringe or tedlar bag depending on the volume required to be able to achieve results lower than the Industrial/Commercial Volatilization Criteria.

4.6 GROUNDWATER

4.6.1 Rationale

The Site has been divided into seven on- and off-site areas critical to the determination of exposure pathways in which collection of additional groundwater information will be necessary for a complete understanding of groundwater flow and contaminant transport. These areas are depicted on Figure 4 of the RIWP, and corresponding critical issues are summarized in Table 3 of the RIWP. The expected locations and rationale for the monitoring wells in the seven areas are given in Table 5 and described below.

Based on currently available information, it is estimated that a total of 25 monitoring wells will be installed at 14 locations on the plant Site [13 shallow (water table) wells with 10-foot screened sections intersecting the water table which is generally found at 4 to 11 feet below ground surface depending on the location on the Site, 9 intermediate (mid-depth) wells with a 10-foot screen at depths of approximately 30- to 50-foot depths, and 3 deep (bedrock surface) wells screened with 10 feet of screen at the bedrock surface, expected to be at up to 150 feet below ground surface). Monitoring wells will be installed at four locations in the intertidal flats with a shallow (less than 5 feet deep) and intermediate (15 to 25 feet deep) monitoring well at each location and shorter screen lengths (less than five feet for the shallow and 5 feet for the deeper wells). Actual screened intervals will be determined in the field by the field geologist.

The precise location, number, and design details (e.g., screen length and position) of monitoring wells will be determined during implementation of the RI after all existing Phase I and Phase II data, and newly obtained soil sample data are entered into the Groundwater Modeling System (GMS) and an updated comprehensive conceptual model is evaluated. In addition, the use of diffusion samplers, e.g., "peepers" or some other type of passive accumulator-type detector, may be used to assess the groundwater/surface water interaction in the intertidal flat area and assist in identifying optimal locations for monitoring well placement.

Details on the groundwater investigation will be provided in a Groundwater Sampling Plan Addendum prepared after the assessment of data using the GMS. This addendum will provide information on monitoring well location; monitoring well installation details; well development; well survey; in situ permeability testing; logs and well installation diagrams; water level measurement; determination of free product and sampling; aquifer testing; field measurement procedures and criteria; sampling methods; sample containers and preservation techniques; field quality control sampling procedures; laboratory analysis; upgradient, QA/QC, and blank samples and frequency; and decontamination procedures.

4.6.2 Field Procedures

All newly installed wells and existing wells installed during previous investigations and sampled during the Phase II investigations (see Table 6) will be sampled using low flow rate purging and sampling techniques. (NOTE: Existing monitoring wells may need to be re-developed.) Two rounds of sampling will be conducted separated by at least 30 days.

The groundwater investigation will also include the performance of slug-type permeability tests on all newly installed monitoring wells to evaluate permeability of the water-bearing formation. The need for pumping tests will be evaluated. A surface water elevation gage will be installed in the mudflats adjacent to the Site. A 72-hour tidal study, in which the variation in water levels are evaluated in relation to the tidal cycle, will be conducted.

General procedures that are expected to be used for the groundwater investigation are provided in Attachment A, including:

- SOP No. 2 - Monitoring Well Installation;
- SOP No. 3 - Groundwater Sampling Using Low Flow Rate Purging and Sampling Technique;
- SOP No. 4 - Slug Testing; and,
- SOP No. 5 - Water Level Measurement.

Modifications to these SOPs, if necessary, will be provided in the Groundwater Sampling Plan Addendum.

4.6.3 Laboratory Analysis

It is currently expected that groundwater samples will be analyzed for TCL VOCs and SVOCs, PCBs, TAL Metals, and total cyanide. Useful design-related parameters will also be analyzed for in selected wells (e.g., pH, conductivity, salinity, manganese, iron, total organic carbon, chemical oxygen demand, chlorides, phosphates). Details on the analysis of groundwater samples will be provided in the Groundwater Sampling Plan Addendum.

This section is divided into six topics concerning sample chain of custody and documentation: field logbook, photographs, sample numbering system, sample documentation, documentation procedures, and corrections to documentation.

5.1 FIELD LOGBOOK

Details of field documentation are provided in SOP No. 6. Field notebooks contain the documentary evidence for procedures as performed by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability and secure page binding. The pages of the notebook will be numbered consecutively and will not be removed.

Entries will be made in waterproof, indelible blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change.

Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

Entries into the field logbook will include, but are not necessarily limited to, the following information:

- Project name and number;
- Reasons for being on site or taking the sample such as quarterly sampling, resampling to confirm previous analysis, initial site assessment, etc.;
- Date and time of activity;
- Sample identification number;
- Geographical location of the sampling point with reference to site (or other) facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate;
- Physical location of the sampling point such as depth below ground surface or water surface;
- Description of the method of sampling including procedures followed, equipment used, and any departure from the specified procedures. Volume of water purged and water levels will be included for ground water samples;
- Description of the sample such as physical characteristics, odor, etc.;
- Results of field measurements such as temperature, specific conductivity, pH, dissolved oxygen, organic vapors, etc.;
- Readings obtained from health and safety equipment;
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample;

- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture, and the number of the negative on the roll;
- Reference numbers from all serialized forms on which the sample is listed or labels which are attached to the sample, i.e., chain of custody forms, airbill numbers, etc.;
- Other pertinent observations such as the presence of other persons on the site (those associated with the job or members of the press, special interest groups, or passers-by), actions by others that may affect performance of site tasks, etc.; and,
- Names of sampling personnel and signature of persons making entries.

During the RI, field logbooks will be stored in the field project files when not in use. At the completion of field activities, the logbooks will be stored in the permanent project file.

5.2 PHOTOGRAPHS

Photographs of site characteristics or field investigation activities provide pictorial documentation of conditions encountered during the RI. Whenever possible, identifying features such as sample location number will be included in the photograph.

The film roll number will be identified by taking a photograph on an information sign as the first frame of the roll. The project and film roll numbers will be shown on this sign. As stated above, photographic information (including a brief description of what was photographed, the date and time, the compass direction of the picture, and the number of the negative on the roll of film) will be recorded at the time the photograph is taken.

Once the film has been developed, each slide or photographic print will be serialized corresponding to its notebook entry and labeled with the project name and number, signature of the photographer, the time and date of the photograph, and site location. All photographs will be stored in the project file.

Videotape recording cameras may also be used during some field activities to provide additional documentation. Videotapes will be labeled with pertinent project information and stored in the project file.

5.3 SAMPLE NUMBERING SYSTEM

A sample numbering system will provide a tracking mechanism to allow retrieval of each sample, and information concerning the sample location and description. A unique sample identification number will be assigned to each sample, and this number will be recorded on the sample label and all documentation associated with the sample. Procedures for this sample numbering system are provided in SOP No. 6.

5.4 SAMPLE DOCUMENTATION

The unique sample identification number will be recorded on the sample label and/or tags and on all documentation associated with the sample including the field logbook, Chain-of-Custody (COC) forms, and receipt of sample records at the laboratory.

COC procedures are particularly important to ensure sample integrity and proper sample identification. The primary purpose of COC procedures is to document the possession of the samples from collection by the field sampling team through shipping, storage, and analysis. COC forms become permanent records of all sample handling and shipment. The Field Manager or his/her designee is responsible to the Project Manager for monitoring compliance with COC procedures. These procedures are described in detail in SOP No. 6.

5.5 DOCUMENTATION PROCEDURES

In addition to the information recorded in the field logbook and provided on the COC forms, field data sheets may be used to record field-related information. Field data sheets may include boring logs, monitoring well construction logs, well development logs, and water level data sheets.

- Boring logs will be completed for each boring by qualified personnel. An example boring log and the information to be included on each log is located in SOP No. 1 (Soil Sampling Using Split-Spoon Samplers) and SOP No. 11 (Soil Sampling Using Direct Push Sampling Methods).
- A monitoring well construction log will be completed for each monitoring well installed as part of the RI. An example log and the information to be included on each log is located in SOP No. 2.
- A well development log will be completed to document the well development procedures followed for each monitoring well installed as part of the RI. An example log and the information to be included on each log is located in SOP No. 2.
- All water level measurements will be recorded on a water level data sheet. These sheets will include all pertinent information concerning water levels, field measurements, and monitoring wells. An example data sheet is located in SOP No. 5.

5.6 CORRECTIONS TO DOCUMENTATION

If an incorrect entry is made on project documentation (including the field logbook or COC forms), the incorrect information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Correct information will then be written adjacent to the crossed-out entry.

If information on a COC form must be changed after the COC form and associated samples have been submitted to the analytical laboratory, the laboratory will be informed verbally of the

change and a revised hard copy of the COC form (with corrections made as described in the preceding paragraph) forwarded to the laboratory as soon as possible.

Appropriate procedures and safeguards will be used for all sample packaging and shipping activities. These procedures, described in SOP No. 6, will be followed to ensure the integrity of all samples shipped for laboratory analyses.

Investigation-derived waste (IDW) will include drill cuttings generated during boring installation, groundwater generated during well development and purging, and decontamination water generated during field decontamination of equipment.

Solid and liquid IDW will be stored separately in appropriate drums or other containment on the Site. The disposition of the materials will be determined based on analytical results. Composite samples will be collected of like materials (i.e., soil or water). These samples will be analyzed for waste classification using the Toxicity Characteristic Leaching Procedure (SPLP) and other analytical requirements as requested by the treatment/disposal facility. Alternatively, IDW may be disposed of based on generator knowledge. Another alternative for liquid IDW may be to treat it on-site at the SAEP wastewater treatment plant and/or discharge to the sanitary sewer after the proper permits have been obtained.

W-C will handle all aspects of the disposal of IDW, except for selecting the disposal company and signing manifests. All IDW storage containers (i.e., 55-gallon drums) will be labeled to include the following information:

- date of generation;
- type of material; and
- location from which IDW were obtained (including depth, if appropriate).

Contractor Chemical Quality Control (CCQC) is the contractor's system to manage, control and document compliance with contract requirements and provisions of the RIWP, FSP, and QAPP in regard to the quality of RI data. The contractor's responsibility includes ensuring adequate quality control services are provided for work accomplished on- and off-site by contractor personnel, suppliers, subcontractors, technical laboratories, and consultants. The work activities include safety, submittal management, and all other functions relating to requirements for chemical data quality.

Components of W-C's CCQC program are contained within the SAEP RIWP, SAP (including FSP, QAPP, and SOPs), and Quality Control Work Plan. Highlights of this program include:

- Establishment of DQOs (see Section 5 of the RIWP);
- Standard Operating Procedures (SOPs) for sample collection and associated activities (see SOPs in Attachment A of the SAP);
- Field oversight of subcontractors (as described in SOPs in Attachment A of the SAP);
- Collection and analysis of QA/QC samples (see Section 4 of the FSP and Section 8 of the QAPP);
- Preparation and submittal of Daily Quality Control Reports (see Section 9 of FSP);
- Independent validation of laboratory data using appropriate guidelines (see Section 11.3 of the QAPP); and,
- Technical document review (see Quality Control Work Plan dated November 1997).

The efficacy of W-C's CCQC program for this project will be summarized in a Quality Control Summary Report (QCSR). This report will be prepared after a review of information contained in the Daily Quality Control Reports, laboratory data, and results of the independent data validation. The purpose of the QCSR is to determine how well the field and analytical portions of the project were executed and to what extent the chemical data achieved the project-specific DQOs.

The QCSR will contain, but not necessarily be limited to, the following information:

- Project Description (including project organization and site description);
- Field Quality Control (QC) Activities (including a summary of field QC activities, a summary of any deviations from planned activities, and a summary of the evaluation of the quality of the sampling);
- Laboratory QC Activities (including a summary of laboratory QC activities, a summary of any deviations from planned activities, and a summary of the evaluation of the data quality for each analysis and matrix);
- Data Presentation and Evaluation (including an assessment of sampling and analysis techniques, an evaluation of data quality of each matrix and parameter, and an evaluation of the usability of the data);

- Lessons Learned (including any suggested changes to field or analytical procedures that could be made to better characterize chemical contamination in future work efforts);
- DQCR Consolidation (in which all DQCRs are summarized); and,
- Conclusions and Recommendations (including an assessment of the chemical data quality in regards to the site-specific DQOs).

The QCSR will be prepared and submitted concurrent with the RI report.

During the field investigation, the Field Manager will prepare Daily Quality Control Reports (DQCRs) for the USACE. The purpose of these reports is to inform USACE personnel of RI activities as they progress and to document adherence to provision of the FSP and QAPP.

DQCRs will include the following information:

- Project Name;
- Contract Number;
- Delivery Order Number;
- W-C Project Number;
- Report Number;
- Date;
- Weather conditions;
- Work Performed/Activities Conducted (including general and specific activities and personnel);
- Equipment used on site;
- Quality Control Activities;
- Safety and Health Levels and Activities;
- Problems Encountered/Corrective Actions Taken;
- Special Notes;
- Activities Scheduled for next day;
- Name of person preparing DQCR;
- Signature of person preparing DQCR; and,
- Title of person preparing DQCR.

A sample DQCR is provided in Figure 4.

DQCRs will be compiled and sent to the USACE Project Manager once every week in the event that no significant problems or deviations arise. Should problems arise, the Field Manager or Project Manager will notify the USACE Project Manager immediately and send the DQCR by express mail or fax. USACE will prepare the Quality Control Summary Report (QCSR).

A nonconformance is an unauthorized deviation from documented procedures, practices or standards, or a defect in an item that is sufficient to render the quality of the item unacceptable or indeterminate, or any event which is beyond the expected conditions and limits such as those presented in this FSP. Field nonconformances may include, but are not limited to, the following:

- Failure of a field instrument to work properly;
- Improper field instrument calibration;
- Improper sample collection method;
- Improper sample preservation method; and,
- Sample documentation not correct.

Any identified nonconformances with established quality control procedures will be expeditiously corrected or controlled. Additional work which is dependent on the nonconforming activity will not be performed until the identified nonconformance is corrected.

A corrective action is an appropriate measure applied to correct a nonconformance and minimize the possibility of recurrence. Corrective action may be necessary in the event that data are determined to be suspect following performance or system audits or when existing or potential conditions are identified which may have an adverse impact on data quality.

During field implementation of this FSP, the Project Manager will periodically review the procedures being implemented in the field and audit findings for verifying consistency with the established procedures and protocols. Documentation will be checked for completeness. Where procedures are not strictly in compliance with the established protocol, deviations will be documented and reported. Deviations will be assessed and corrective actions defined by the Project Manager and Project QA/QC Officer and documented as appropriate. Upon implementation of the corrective action, the Project Manager will provide the Project QA/QC Officer with a written memorandum documenting field implementation. The memorandum will become part of the project file.

Figure 5 presents an estimated project schedule for RI activities at SAEP.

General descriptions of sampling equipment and procedures for collecting samples are described in Section 4 of this FSP. Details of the same are provided in the SOPs in Attachment A to this SAP.

All field instrumentation, equipment, and accessories will be maintained in accordance with the manufacturer's recommendations/specifications and established field practice.

The calibration and general maintenance of field instrumentation will be the responsibility of the field team member using the equipment and under the direction of the Field Manager and Site Safety and Health Officer. All documentation pertinent to the calibration and/or maintenance of field equipment will be maintained in a field logbook. Entries made into the logbook regarding the status of any field equipment will contain, but are not necessarily limited to, the following information:

- data and time of calibration/maintenance;
- name of person performing calibration/maintenance;
- type of equipment being calibrated/serviced and identification number (such as serial number);
- calibration and/or maintenance procedure(s) used;
- reference standard used for calibration (such as pH of buffer solution); and,
- other pertinent information.

Equipment that fails calibration and/or becomes otherwise inoperable during the field investigation will be removed from service and segregated to prevent use. Such equipment will be properly tagged to indicate that it should not be used until the nature of the problem can be determined. Failed equipment will be repaired or recalibrated and may be used after approved for use by the Field Manager or Site Safety and Health Officer prior to placement back into service. Equipment that cannot be repaired or recalibrated with minimum delay will be replaced.

TABLE 1
SUMMARY SCOPE OF WORK
FOR AQUATIC HABITATS
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

	INTERTIDAL MUDFLATS																	CAUSEWAY						OUTFALL 008/MARINE BASIN							REF.		
DATA SET[1]	TA01	TA03	TA05	TA06	TA07	TB06	TB07	TC06	TC07	TD01	TD03	TD05	TD06	TD07	TE01	TE03	TE05	TG01	TG02	TG03	TG04	TH01	TH02	008-01	008-02	008-03	MB01	MB02	MB03	MB04	U1	U2	U3
Surface Water Chemistry																								X	X	X	X	X	X	X	X	X	X
Surficial Sediment Chemistry 0 - 6"				X	X	X	X	X	X				X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sediment Chemistry at Depth				X	X	X	X	X	X				X	X																			
Bathymetry / Lithology	X	X	X							X	X	X			X	X	X								X		X	X			X	X	X
Physicochemical Parameters				X	X	X	X	X	X				X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sediment Toxicity Testing				X	X	X	X	X	X				X	X					X			X		X	X	X	X	X	X	X	X	X	X
Bioaccumulation Testing				X	X	X	X	X	X				X	X					X			X									X	X	X
Benthic Community Analyses																			X			X		X	X	X	X	X	X	X	X	X	X
Finfish Tissue Analyses	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→										→	→	→	→	X	X	X
Shellfish Tissue Analyses																											→	→	→	→	X	X	X

Note: Arrows indicate samples to be collected throughout area at stations to be field identified.

(1) Parameters and associated sample containers, holding times, special handling, and preservation /storage requirements are specified in Table 2.

TABLE 2
SAMPLE HANDLING REQUIREMENTS FOR AQUATIC MEDIA
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

MATRIX	PARAMETER	CONTAINER TYPE AND SIZE	HOLDING TIME	SPECIAL HANDLING	PRESERVATION/ STORAGE
Surface Water	VOCs	2 x 40 ml glass vial, teflon lined-septum	14 days	No Head Space	HCl to pH < 2; 4° C
	PAHs	1-L organics-cleaned, amber glass	7 days to extraction 40 days to analysis	Need additional jars for each QC (dup,MS,MSD)	4° C
	PCBs	1-L organics-cleaned, amber glass	7 days to extraction 40 days to analysis	Need additional jars for each QC (dup,MS,MSD)	4° C
	Cyanide	1 L poly/glass	14 days	pH > 12	4° C
	Total Metals	250 mL Precleaned Teflon Jar	Hg 28 days; all others 6 months	Need additional jars for each QC (dup,MS,MSD)	Nitric acid to pH <2; 4° C
	As & Hg Speciation	500 mL Precleaned Teflon Jar	28 days	none	As, Hg - No preservatives 5 days
Sediment	VOCs	5 grams in pre-weighed, septum-sealed, screw-cap 40 ml glass vial	14 days	Preservative added to vial prior to shipment to field; need to fill second, unpreserved vial for percent moisture analysis	Methanol or sodium bisulfate as per USEPA Method 5035; 4° C
	PAHs & PCBs	16-oz precleaned glass, teflon-lined lid	14 days to extraction 40 days to analysis	3/4 full	4° C
	Cyanide	500 mL glass container	14 days	None	4° C
	Total Metals, As & Hg Speciation	4-oz precleaned, tared Spex	Hg 28 days; all others 6 months	No more than 1/3 full	4° C
	Cr Speciation	4-oz precleaned glass, teflon-lined lid	7 days	3/4 full	4° C
	AVS/SEM	4-oz precleaned glass, teflon-lined lid	14 days	No Head Space	4° C or 3/4 full and freeze immediately
	Grain Size	4-oz plastic or glass	6 months	1/2 to 3/4 full	4° C
	TOC	4-oz precleaned glass, teflon-lined lid	30 days	1/2 to 3/4 full	4° C
	Chronic Toxicity (Neanthes or Leptocheirus)	2-L widemouth precleaned glass, teflon-lined lid	6 weeks	3/4 full	4° C
	Bioaccumulation (Nereis)	2 3-gal HDPE pails	6 weeks	full as possible; need 5+ gal	4° C
Tissue (Nereis virens from bioaccumulation test)	PAHs & PCBs	8-oz precleaned glass, teflon-lined lid	14 days to extraction 40 days to analysis	none	4° C (or up to 6 months if frozen immediately)
	Lipids	4-oz precleaned glass, teflon-lined lid	14 days to extraction 40 days to analysis	none	4° C (or up to 6 months if frozen immediately)
	Total Metals	4-oz precleaned, tared Spex	Hg 28 days; all others 6 months	No more than 1/3 full	4° C

TABLE 2 (continued)
SAMPLE HANDLING REQUIREMENTS FOR AQUATIC MEDIA
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

Abbreviations:

ASTM = American Society for Testing and Materials
AVS/SEM = Acid Volatile Sulfides/Simultaneously Extracted Metals
CEC = Cation Exchange Capacity
CN = Total Cyanides
PAHs = Polynuclear Aromatic Hydrocarbons
PCBs = Polychlorinated Biphenyls
SVOCs = Semi-Volatile Organic Compounds
TAL = Target Analyte List
TCL = Target Compound List
TOC = Total Organic Carbon
TPH = Total Petroleum Hydrocarbons
USEPA = United States Environmental Protection Agency
VOCs = Volatile Organic Compounds

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
1	North parking lot		Total: 2	
		1-A		
		1-A-1 – lagoons or pits	2	Confirm presence of potential contamination associated with lagoons or pits observed in historical aerial photographs
		1-B		
		1-B-1 Remainder of North Parking Lot	0	Contingency samples for Phase II or to document conditions in areas within Site but removed from manufacturing areas
2	Outlying tidal flats		Total: 0	
		None	--	Sediment sampling to be conducted
3	Northern portion of B-2 (shipping/receiving, manufacturing, and offices)		Total: 2	
		3-A		
		3-A-1 - Northeast corner of B-2 adjacent to B-65	1	Confirm presence of contaminated soil in area in which contaminated soil was encountered during construction (paint and zinc/chromate)
		3-B		
		3-B-1 – Soil boring WC-9S	1	Confirm presence of exceedances of RSRs
		3-C		
		3-C-1 – Remainder of parcel outside of above potential areas of concern.	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
4	B-65 (storage facility)		Total: 0	
		Included in area 3-A; parcel is within hydraulic fill area.		--

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
5	B-36 (pumphouse) B-73 (storage shed)		Total: 2	
		5-A		
		5-A-1 - Soil borings WC-7S and BR-8	1	Confirm presence of exceedances of RSRs. Soil contamination associated with radiological storage being investigated by others.
		5-A-2 Pump station B-36 and upgradient drainage lines (WWSS1)	1	Potential for stormwater drainage system as a source of contamination. Subject to review of Allied Signal Records. WWSS1 runs through a leased section of B65 so no borings are located there.
		5-B		
		5-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area.	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources
6	B-58 (missile assembly/standards lab)		Total: 5	
		6-A		
		6-A-1 – Soil borings WC-6S, BR-6, and BR-7.	1	Confirm presence of exceedances of RSRs.
		6-A-2 – Building B-58; B-58 satellite waste accumulation area. See Note 2.	3	Evaluate presence and extent of oil encountered during construction of B-58. Subject to confirmation by Allied Signal.
		6-A-3 - Inactive septic tank	1	Evaluate septic tank as a potential source; zinc chromate paint sludge reportedly deposited in abandoned septic. Subject to confirmation by Allied Signal.
		6-B		
		6-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area.	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
7	Western portion of B-2 (cafeteria, mailroom, medical, and guard headquarters)		Total: 1	
		7-A		
		7-A-1 - Soil boring WC-11S	1	Confirm presence of exceedances of RSRs
		7-B		
		7-B-1 Remainder of parcel outside of above potential areas of concern	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
8	Central portion of B-2 (manufacturing area)		Total: 26	
		8-A		
		8-A-1; 8-A-2; 8-A-3 - Final assembly area sunken drip pans; Inactive septic tank east of Final Assembly air lock	3	Potential leakage from sumps; inspect first to evaluate potential; Potential for hazardous materials deposited in septic tanks. See Note 1 for inactive septic tank.
		8-B		
		8-B-1 - Old septic tank near B-42	0 (covered by 12A1 & 8L1)	Potential for hazardous materials deposited in septic tanks; zinc chromate paint sludge reportedly deposited in abandoned septic.
		8-C		
		8-C-1; 8-C-2; 8-C-3; 8-C-4 - Mobile degreasers	4	Evaluate area of mobile degreasers and sample at potential route of migration (e.g.,sump, cracked floor)
		8-D		
		8-D-1 - Paint spray, HAE and Anodizing areas	2	Evaluate area and sample at potential route of migration (sump, cracked floor); also, lines to CWTP

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
8	(Continued)	**8-E**		
		8-E-1 - Punch press sumps	2	Evaluate condition of sumps and sample at representative points with evidence of potential to impact soil below Building B-2. See Note 1.
		8-F		
		8-F-1 - Milling machines	2	Evaluate condition of sumps below milling machines and sample at representative points with evidence of potential route to impact soil below B-2. See Note 1.
		8-G		
		8-G-1 - Former septic system	1	Potential for hazardous materials deposited in septic tanks; zinc chromate paint sludge reportedly deposited in abandoned septic. See Note 1
		8-H		
		8-H-1 - Shaft line area (stains, drip pans, spills)	2	Potential sources of contamination. Evaluate condition of sumps and sample at representative points with evidence of potential route to impact soil below B-2. See Note 1.
		8-I		
		8-I-1 - "Robotics" area pits; mobile degreasers	2	Potential for releases from pits; mobile degreasers a potential source of contamination. Evaluate condition of sumps and sample at representative points with evidence of potential route to the soil below Building B-2; Evaluate area of mobile degreasers and sample at potential route of migration (sump, cracked floor). See Note 1.
		8-J		
		8-J-1 - Former UST in B-52	1	Document post-closure conditions.
		8-K		
		8-K-1; 8-K-2 - Pit degreasers	5	Potential sources of soil contamination. Inspect for leakage potential. Sample if potential exists.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
8	(Continued)	**8-L**		
		8-L-1 Remainder of parcel outside of above potential areas of concern; B-2 satellite waste accumulation areas. See Note 2.	2	Potential for stormwater drainage systems (WWSS3 & WWSS5) as a source of contamination
		B-2 PCB transformers (includes other buildings; 17 total).	0	Potential PCB release. See Note 2
		Sampling along major storm system lines within building B-2 (WWSS1, WWSS2, WWSS3, WWSS5)	0 (Covered by other borings in various parcels)	Potential for stormwater drainage system as a source of contamination. See Note 3.
9	B-13 (scrap metal) B-15 (oil/acid/alkali stores) B-37 (pumphouse) B-38 (pumphouse) B-44 (stores) B-48 (stores) B-68 (emergency generator) B-74 (hazardous waste stores) B-81		**Total: 18**	
		9-A		
		9-A-1 – Edge of dike between B-64 and B-37	4	Potential for contaminated runoff and spills from storage and scrap areas east of B-13 to migrate from paved surface to soil along dike.
		9-A-2 – Pump station B-38 and upgradient drainage lines. (WWSS3)	1	Potential for stormwater drainage system as a source of contamination

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
9	(Continued)	**9-B**		
		9-B-1 – Soil borings BR-2,BR-3, BR-4, WC-5S	0 (covered by 9B-6, , 9C-2, 9B-8, 9B-10 and 13A1.)	Evaluate extent of exceedances of RSRs.
		9-B-2 – southwest corner of B-13	1	Potential contamination associated with cuttings and oils in dumpsters
		9-B-3 – B-13 (raw chemicals formerly stored in B-13) and surrounding area (areas adjacent formerly used for various storage)	1	Area used extensively for storage; Potential releases of hazardous substances.
		9-B-4 – Scrapyard east of B-13	1	Potential releases from long-term storage area.
		9-B-5 - Former chip pit west of B-13	0 (see 9B11 & 13A1)	Potential leakage from pit and lines. See Note 1.
		9-B-6 – B-15 (chemical storage area – stained areas and spills)	1	Evaluate presence and extent of soil contamination attributable to spills
		9-B-7 – B-15 three waste oil pits – northwest corner	1	Potential leakage from pit and lines
		9-B-8 – B-15 waste accumulation area – southeast corner near boring BR-4	1	Potential leakage from pit and lines
		9-B-9 – Hazardous waste transfer system from B-13 to B-15	1	Potential leakage from pit and lines
		9-B-10 – Four waste oil pits that collected waste oils until 1990 – north of B-13	1	Potential leakage from pit and lines. See Note 1.
		9-B-11 – Steel lined concrete pit west of B-13 where wastes were discharged until 1993 (removed in 1993)	1	Potential leakage from pit and lines. See Note 1.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
9	(Continued)	**9-C**		
		9-C-1 – B-15 three waste oil pits and hazardous waste storage area (dike area and drum storage; reported spills)	1	Potential leakage from pit and lines. Hazardous Waste Storage Area.
		9-C-2 – Pump station B-37 and upgradient drainage lines (WWSS2)	1 (See also 9B6 and 9B10)	Potential for stormwater drainage system as a source of contamination
		9-D		
		9-D-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area; B-48 and B-15 satellite waste accumulation areas. See Note 2.	2	Potential for stormwater drainage systems (WWSS2 & WWSS3) as a source of contamination
10	West parking lot		**Total: 3**	
		10-A		
		10-A-1 West Parking Lot	3	Document conditions in areas within Site but removed from manufacturing areas; potential off-site sources of contamination
11	B-1 (administrative and government offices)		**Total: 0**	
		None	--	--

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
12	B-2 (plating area) B-3 (former plating area) B-63 (CWTP pumping station) B-70 (CDF) B-77 (offices)		Total: 17	
		12-A		
		12-A-1 – Soil boring WC-10S	1	Evaluate extent of exceedances of RSRs
		12-B		
		12-B-1 – Vicinity of monitoring well ECD-4.	1	Elevated concentrations of metals in ECD-4 groundwater sample. Review HLA sample locations and results.
		12-B-2 – B-2 heat plating shop; mobile degreasers	0 (see 8D-2 and 12B-1)	Likely source of metals in area groundwater. Document presence and extent of soil contamination. Review HLA sample locations and results.
		12-B-3 – B-2 heat treat area	3	Potential for release of contaminants to soil from pits.
		12-B-4 – B-63 chemical waste collection and pumping station and piping	1	Potential for releases at collection points (e.g. pumping stations) and along piping.
		12-B-5 former septic tank between B-2 and B-3 (1940s).	1	Paint and solvents piped to septic tank. Potential source of contamination. See Note 1.
		12-B-6 – B-70 CWTP pump station –	2	Evaluate contamination found during construction of foundation (green water observed during construction).
		12-B-7 – Concrete vault east of B-70	0 (see 12B6)	Paint wastes reportedly piped to vault. Potential source of contamination. See Note 1.
		12-C		
		12-C-1 – B-2 oil wrap area; barrel finishing; roto-tumble area	2	Drains to CWTP

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
12	(Continued)	**12-D**		
		12-D-1 – Areas with stained and cracked concrete flooring; B-3 red floor lab area (former plating area)	3	Potential route of migration of contamination to soil below B-3. See Note 1.
		12-E		
		12-E-1 – Vicinity of monitoring well WC-12S	1	Evaluate potential source of elevated concentrations of contaminants in WC-12S
		12-E-2 – Former septic and fuel oil tanks near B—2	1	Potential sources of contamination. Shown on 1940s site plans.
		12-F		
		12-F-1 Remainder of parcel outside of above potential areas of concern	1	Potential for stormwater drainage system (WWSS3) as a source of contamination.
		Chemical Waste Lines WWTP-1	0	Potential leakage from major lines to CWTP
13	B-7 (engine fuel system testing) B-7A (engine fuel system testing) B-8 (paint/solvent storage) B-9 (garage) B-10 (stores/recuperator manufacture) B-11 (stores/recuperator manufacture)		**Total: 13**	
		13-A		
		13-A-1 – B-12 north end – shed with cuttings and dumpster	1	Potential sources of contamination – cutting fluids.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
13	(Continued)	**13-B**		
		13-B-1 – B-8 and north side of B-8	1	Exceedances of RSRs in WC-8S, north of B-8; paint storage area a potential source of contamination.
		13-C		
		13-C-1 – Area between B-7 and B-8 – drum storage, unknown contents	1	Potential source of contamination
		13-D		
		13-D-1 – B-7/7A drains along perimeter	3	Drains a potential collection point and potential route for soil contamination. Evaluate condition of drains and sample at representative points with evidence of potential route to the soil below.
		13-E		
		13-E-1 – B-9 – hydraulic cylinder lift and floor drains that lead to OATP	1	Drains a potential collection point and potential route for soil contamination. Evaluate condition of drains and sample at representative points with evidence of potential route to the soil below.
		13-F		
		13-F-1 – B-10 center of building – milling equipment trenches	1	Potential leakage from pit and lines. See Note 1.
		13-G		
		13-G-1 – B-10 north end – equipment pits	1	Potential leakage from pit and lines. See Note 1.
		13-H		
		13-H-1 – B-10 east wall – drains	1	Drains a potential collection point and potential route for soil contamination. Evaluate condition of drains and sample at representative points with evidence of potential route to the soil below.
		13-I		
		13-I-1 – Former gasoline USTs	1	Former tanks on 1940s site plans.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
13	(Continued)	**13-J**		
		13-J-1 Remainder of parcel outside of above potential areas of concern; eastern part of parcel is within hydraulic fill area.	3	Potential for stormwater drainage system (WWSS4 & WWSS5) as a source of contamination. Fill data gaps; evaluate soil conditions in other areas; potential for historical sources. Evaluate contamination found during construction of foundation (green water observed during construction).
14	B-64-2 (oil abatement treatment) B-64-1 (pumphouse)		**Total: 2**	
		14-A		
		14-A-1 – Soil boring WC-4S	0 (See 17A3-4)	Evaluate extent of exceedances of RSRs
		14-A-2 – OATP pumphouse and upgradient drainage lines (WWSS4)	2	Oily soil Noted during previous RCRA inspection. See Note 1. Two borings located; remainder will be located review of inspection records.
		14-B		
		14-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area; B-12 and B-7 satellite waste accumulation areas. See Note 2.	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources. See Note 2.
15	Parking lot south of B-2		**Total: 1**	
		15-A		
		15-A-1 – Potential soil contamination	1	Fill data gaps; evaluate potential for soil contamination from historical sources. See Note 2.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
16	B-3 (engineering and development) B-67 (general stores)		Total: 12	
		16-A		
		16-A-1 – B-3 southeast corner; mobile degreasers	4	Potential for releases through settling and cracks in floor – Evaluate area of mobile degreasers and sample at potential route of migration (sump, cracked floor). See Note 1.
		16-B		
		16-B-1 – Mobile degreasers	2	Evaluate area of mobile degreasers and sample at potential route of migration (sump, cracked floor). See Note 1.
		16-C		
		16-C – Engine overhaul area	2	Source of process waste from B-3. Potential source of contamination. See Note 1.
		16-D		
		16-D-1 – ECM line; East side of B3.	3	Potential source of historical contamination. See Note 1.
		16-D-2 - Remainder of parcel outside of above potential areas of concern; storm drain lines (predominantly in southern portion of B-3)	1	Potential for stormwater drainage system (WWSS5) as a source of contamination. Fill data gaps; evaluate soil conditions in other areas; potential for historical sources
		B-3 PCB transformers	See 8L	See Note 2
17	B-16 (prod. And develop. Test cells)		Total: 20	
		17-A		
		17-A-1 – Soil boring WC-3S	1	Evaluate extent of exceedances of RSRs
		17-A-2 – B-16 drains/sumps in test cell areas. Mobile degreasers.	6	Oil observed in B-16 test cell drains. Drains in B-16 reported to have been in poor condition before being

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
				sealed.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
17	(Continued)	17-A-3 – East of B-16 in area of possible mercury spills	8	Reported potential mercury spills and disposal of mercury and other wastes.
		17-A- 4 – Scrap metal yard north of B-16	1	Potential source of contamination. See Note 1.
		17-A-5 – Pump station B-40 and upgradient drainage lines (WWSS5)	1 (covered by 13I, 17B, 33A)	Potential for stormwater drainage system as a source of contamination
		B-16 PCB transformers		See Note 2
		17-B		
		17-B-1 – Old oil-water separator west of B-16	1	Potential historical source of contamination
		17-C		
		17-C-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area; B-16 satellite waste accumulation areas. See Note 2.	2	Potential for stormwater drainage system (WWSS5) as a source of contamination
18	B-59 (engineering/missile storage) Causeway		**Total: 0**	
		18-A		
		18-A-1 – Causeway	0	Reportedly off-site fill; reported dumping/burning (fire training) on north side of causeway.
19	Southern parking lot		**Total: 6**	
		19-A		
		19-A-1 South Parking Lot	3	Document conditions in areas within Site but removed from manufacturing areas
		Chemical Waste Lines WWTP-2	3	Potential leakage from major lines to CWTP

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
20	B-18 (CWTP) B-71 (CWTP solids handling) B-75 (hazardous waste storage) B-76 (hazardous waste storage)		**Total: 5**	
		20-A		
		20-A-1 – CWTP	3	Potential leakage from CWTP lines
		20-A-2 – B-75 (hazardous waste storage)	1	Evaluate presence and extent of potential contamination from dike area to surrounding soil. Review existing lab data.
		20-A-2 – B-76 (hazardous waste storage)	1	Evaluate presence and extent of potential contamination from dike area to surrounding soil. Review existing lab data.
		20-B		
		20-B-1 Remainder of parcel outside of above potential areas of concern	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources
21	CWTP lagoons		**Total: 0**	
		21-A		
		21-A-1 – CWTP lagoons	0	Document soil conditions in area under RCRA closure
22	Southern parking lot		**Total: 3**	
		22-A		
		22-A-1 – Area where fill was placed in accordance with CDEP requirements.	3	Document soil conditions in area where fill was placed in accordance with CDEP requirements
23	B-72 (fuel pumping station)		**Total: 3**	
		23-A		
		23-A-1 – Soil exceedances in boring BR-9 and BR-10	3	Confirm presence of exceedances of RSRs and of contaminated soils encountered during excavation for

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
				lagoons south of B-72

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
23	(Continued)	**23-B**		
		23-B-1 Remainder of parcel outside of above potential areas of concern	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
24	B-6 (experimental hangar, R&D)		**Total: 14**	
		24-A		
		24-A-1 – B-6 metrology room; room to north of metrology room	2	Potential for release through cracked floor; lines to CWTP, and gold plating area.
		24-A-2; 24-A-3;24-A-4 – Building B-6 Storm drain system (primarily in eastern and western portion of B-6)	7	Variety of test cells throughout. Potential for release in pits and areas of floor in poor condition; Potential for release through cracked floor; stains; potential for mercury spills.
		B-6 PCB transformers		See Note 2
		24-B		
		24-B-1 – B-6A four test cells	2	Gratings and drains – potential for migration to subsurface
		24-C		
		24-C-1 - B-17 drain in center of room	1	Drains are a potential collection point and potential route for soil contamination.
		24-D		
		24-D-1 – Chemical waste treatment collection structure north of B-6	1	Potential for leaks at collection points and along piping.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
24	(Continued)	**24-E**		
		24-E-1 Remainder of parcel outside of above potential areas of concern; B-6 and B-6A satellite waste accumulation areas. See Note 2.	1	Potential for chemical waste drainage system (WWTP2) as a source of contamination
25	B-53 (surplus equipment stores) B-60 (natural gas pump station) B-61 (refrigeration plant)		**Total: 1**	
		25-A		
		25-A-1 - B-61 drains/sumps	1	Drains and pits potential collection point and potential route for soil contamination. Evaluate integrity.
		25-B		
		25-B-1 - Remainder of parcel outside of above potential areas of concern	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
26	B-69 (USACE resident engineer) B-79 (SSE building) B-82 (guard shack)		**Total: 0**	
		26-A		
		26-A-1 - Fuel storage area near B-69	0 (See 27E2)	Historical area with potential for spills. See Note 1.
		26-B		
		26-B-1 Remainder of parcel outside of above potential areas of concern	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
27	B-3A (engineering lab) B-4 (recuperator repair and stores) B-5 (fire headquarters) And component test) B-41 (pump station)		Total: 19	
		27-A		
		27-A-1 - B-3A Pilot plating line and lab area	1	Potential source of contamination to subsurface.
		27-B		
		27-B-1 - B-3A eastern edge – heat treat room – sump in center	1	Potential source of contamination. Sump a potential collection point and potential route for soil contamination.
		27-C		
		27-C-1 - B-3A northwest corner	1	Stains and cracked floor; plating drains; coating lab Source of process waste to CWTP
		27-D		
		27-D-1 - Spill of liquid cleaning solvents north of B-3A	1	Potential historical source of contamination. PCE exceedance at existing well.
		27-E		
		27-E-1 - Tank farm southwest of B-34	4	Evaluate post-remediation soil conditions in area of former fuel and chemical waste UST and petroleum-contaminated soils in vicinity of B-34. Review existing groundwater data.
		27-E-2 - Former drum storage in southeast corner of B-4	1	Stains and cracked floors. Potential source of contamination.
		27-E-3 - B-4 sump in southeast corner	1	Drains and pits potential collection point and potential route for soil contamination. Evaluate integrity.
		27-E-4 - B-4 north-central area drains	1	Drains and pits potential collection point and potential route for soil contamination. Evaluate integrity.

TABLE 3

AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
27	(Continued)	27-E-5 - B-4 outside of northeast corner – former drum storage area	0 (see 27E2)	Potential historical source of contamination
		27-E-6 - B-4 north wall – brine tanks – former ECM area	1	Potential historical source of contamination
		27-E-7 - B-4 northeast corner – Clean room	1	Potential historical source of contamination – recently excavated
		27-E-8 - B-4 drain/pit south of clean room	1	Drains and pits potential collection point and potential route for soil contamination. Evaluate integrity.
		27-E-9 - B-5 old degreasers near drain along east wall and catch basins and adjacent area	1	Drains and pits potential collection point and potential route for soil contamination. Evaluate integrity. Evaluate extent of contaminated soil related to Fuel storage tanks that have apparently leaked in area of B-5.
		27-E-10 - Marine diesel tanks south of B-33	1	Potential source of contamination. Recently excavated. See Note 1.
		27-E-11 Pump Station B-41 and upgradient drainage lines (WWSS6)	3	Potential for stormwater drainage system as a source of contamination
		27-F		
		27-F-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area; B-3A and B-5 satellite waste accumulation areas. See Note 2.	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
		B-3A PCB transformers		See Note 2.
28	B-19 (component test) B-43 (pump station)		**Total: 4**	
		28-A		
		28-A-1 – B-19 pits with grating (central portion of building)	2	Pits a potential collection point and potential route for soil contamination.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
28	(Continued)	28-A-2 – B-19 pits west central portion of building	2	Pits a potential collection point and potential route for soil contamination. pits (excavated at time of reconnaissance - radiological)
		28-B		
		28-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area; B-19 satellite waste accumulation area. See Note 2.	0	Contingency samples for Phase II or to fill data gaps; evaluate soil conditions in other areas; potential for historical sources
		B-19 PCB transformers		See Note 2
29	Northeast corner of B-2 B-52 (plasma spray and stores)		**Total: 4**	
		29-A		
		29-A-1 – Former USTs;Plasma spray	3	Drains and lines to CWTP. See Note 1.
		29-B		
		29-B-1 Remainder of parcel outside of above potential areas of concern	1	Fill data gaps, evaluate soil conditions in other areas; potential for historical sources
30	Building B-34 tank farm		**Total: 0**	
		30-A		
		30-A-1 - Areas included in 27-E:Former fuel and chemical waste UST and petroleum-contaminated soils in vicinity of B-34; parcel is within hydraulic fill area; B-34 satellite waste accumulation area. See Note 2.		

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
31	East of Building B-19		Total: 7	
		31-A		
		31-A-1 – TCA-contaminated soil cleanup east of B-19	3	Evaluate post-remediation conditions; fuel storage tanks occasionally overfilled. Review existing data.
		31-A-2 – Soil exceedances in boring WC-1S)	2	Evaluate extent of exceedances of RSRs
		31-A-3 – Former UST locations	2	Evaluate post-remediation conditions. See Note 1.
		31-B		
		31-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area.	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources
32	Near shore intertidal flats		Total: 0	
		None		Sediment sampling to be conducted.
33	South of Building B-9		Total: 1	
		33-A		
		33-A-1 – South of B-9 – former USTs	1	Post-remediation information not available
		33-B		
		33-B-1 Remainder of parcel outside of above potential areas of concern; parcel is within hydraulic fill area.	0	Fill data gaps; evaluate soil conditions in other areas; potential for historical sources

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale
--	Drainage and wastewater infrastructure			
		Sampling adjacent to pumping stations (B-36:included in area 5-A,B-37: included in area 9-C; B-38: included in area 9-A; B-40: included in area 17-A; B-41: included in area 27-E; and B-63: included in area 12-B)	--	Potential for stormwater drainage system as a source of contamination
		Sampling near catch basins of major storm line leading into pumping stations; included in sampling for pumping station areas, above.	--	Potential for stormwater drainage system as a source of contamination. See Note 3.
		WWSS-1,WWSS-2.WWSS-3, WWSS-5		
		Sampling along major storm system lines within building B-2; included in sampling for parcel 8, above	--	Potential for stormwater drainage system as a source of contamination. See Note 3.
		WWPT-1, WWTP-2		
		Sampling along Chemical Wastewater System – CWTP line from B-2, B-6, and B-3A to CWTP and main lines east of B-2 in roadway; included in sampling for parcels 12, 19, and 24, above	--	Potential leakage from major lines to CWTP.

TABLE 3
AREAS OF CONCERN TO BE INVESTIGATED WITH SOIL SAMPLING
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

No.	CERFA Assessment Parcel Description	Potential Area of Concern	Initial Characterization Borings	Rationale

NOTES:

(1) Locations uncertain - will confirm with Allied Signal personnel.

(2) Plant personnel are closing out PCB transformers and satellite waste accumulation areas. W-C will confirm the "no release" status of PCB transformer and satellite waste accumulation areas with Allied Signal personnel; any areas requiring further sampling will be investigated further as part of the RI. UST areas that are likely to require further investigation have been identified in previous investigations and will be investigated as part of the RI. W-C will confirm the closure of USTs with facility personnel; any USTs requiring further sampling as part of information obtained will be investigated further as part of the RI.

(3) Locations to be determined as part of further infrastructure evaluation during RI.

TABLE

INITIAL SUBSURFACE SOIL SAMPLING PROGRAM
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	NUMBER OF SOIL BORINGS	SAMPLING METHOD	SAMPLE INTERVAL	ESTIMATED NUMBER OF SAMPLES SUBMITTED FOR ANALYSIS						DUPLICATE SAMPLES
				VOC	SVOC[8]	PCBs[8]	Metals[8]	CN	REMED	
1	2	Hollow stem Auger	See Note 1	4	4	2	4	4	TBD	1
2	0	--	--	0	0	0	0	0	0	0
3	2	Hollow stem Auger	See Note 1	4	4	2	4	4	TBD	(7) (included in Area 1)
4	0	--	--	0	0	0	0	0	0	0
5	2	Hollow stem Auger	See Note 1	4	4	2	4	4	TBD	1
6	5	Hollow stem Auger	See Note 1	10	10	5	10	10	TBD	(7) (included in Area 5)
7	1	Hollow stem Auger	See Note 1	2	2	1	2	2	TBD	1
8	26	Hollow stem Auger	See Note 1	52	52	26	52	52	TBD	(7) (included in Area 7)
9	18	Hollow stem Auger	See Note 1	36	36	18	36	36	TBD	1
10	3	Hollow stem Auger	See Note 1	6	6	3	6	6	TBD	1
11	0	--	--	0	0	0	0	0	0	0
12	17	Hollow stem Auger	See Note 1	34	34	17	34	34	TBD	1
13	14	Hollow stem	See Note 1	28	28	14	28	28	TBD	1

TABLE
INITIAL SUBSURFACE SOIL SAMPLING PROGRAM
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	NUMBER OF SOIL BORINGS	SAMPLING METHOD	SAMPLE INTERVAL	ESTIMATED NUMBER OF SAMPLES SUBMITTED FOR ANALYSIS						DUPLICATE SAMPLES
				VOC	SVOC[8]	PCBs[8]	Metals[8]	CN	REMED	
		Auger								
14	2	Hollow stem Auger	See Note 1	4	4	2	4	4	TBD	1
15	1	Hollow stem Auger	See Note 1	2	2	1	2	2	TBD	(7) (included in Area 18)
16	12	Hollow stem Auger	See Note 1	24	24	12	24	24	TBD	1
17	20	Hollow stem Auger	See Note 1	40	40	20	40	40	TBD	1
18	0	Hollow stem Auger	See Note 1	0	0	0	0	0	TBD	0
19	6	Hollow stem Auger	See Note 1	12	12	6	12	12	TBD	1
20	5	Hollow stem Auger	See Note 1	10	10	5	10	10	TBD	(7) (included in Area 19)
21	0	Hollow stem Auger	See Note 1	0	0	0	0	0	TBD	0
22	3	Hollow stem Auger	See Note 1	6	6	3	6	6	TBD	1
23	3	Hollow stem Auger	See Note 1	6	6	3	6	6	TBD	1

TABLE
INITIAL SUBSURFACE SOIL SAMPLING PROGRAM
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	NUMBER OF SOIL BORINGS	SAMPLING METHOD	SAMPLE INTERVAL	ESTIMATED NUMBER OF SAMPLES SUBMITTED FOR ANALYSIS						DUPLICATE SAMPLES
				VOC	SVOC[6]	PCBs[6]	Metals[6]	CN	REMED	
24	14	Hollow stem Auger	See Note 1	28	28	14	28	28	TBD	1
25	1	Hollow stem Auger	See Note 1	2	2	1	2	2	TBD	1
26	0	Hollow stem Auger	See Note 1	0	0	0	0	0	TBD	0
27	19	Hollow stem Auger	See Note 1	38	38	19	38	38	TBD	1
28	4	Hollow stem Auger	See Note 1	8	8	4	8	8	TBD	1
29	4	Hollow stem Auger	See Note 1	8	8	4	8	8	TBD	1
30	0	--	--	0	0	0	0	0	0	0
31	7	Hollow Stem Auger	See Note 1	14	14	7	14	14	TBD	1
32	0	--	--	0	0	0	0	0	0	0
33	1	Hollow Stem Auger	See Note 1	2	2	1	2	2	TBD	1
TOTAL	**192**		**TOTAL**	**384**	**384**	**192**	**384**	**384**	TBD	**20**

TABLE
INITIAL SUBSURFACE SOIL SAMPLING PROGRAM
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	NUMBER OF SOIL BORINGS	SAMPLING METHOD	SAMPLE INTERVAL	ESTIMATED NUMBER OF SAMPLES SUBMITTED FOR ANALYSIS						DUPLICATE SAMPLES
				VOC	SVOC[8]	PCBs[8]	Metals[8]	CN	REMED	

bgs = below ground surface
CEC = Cation Exchange Capacity
CN = Total Cyanides
Hg = Mercury
NA = Not Applicable
Metals = Metals (including Hg)
PCBs = Polychlorinated Biphenyls
REMED = Remediation parameters including grain size distribution, TOC, TPH and CEC
SVOC = Semi-Volatile Organic Compounds
TBD = To Be Determined
TOC = Total Organic Carbon
TPH = Total Petroleum Hydrocarbons
VOC = Volatile Organic Compounds
SPLP = Synthetic Precipitation Leaching Procedure

NOTES:

1. Shallow sample: 0 to 6 inches below grade or any paved surface or within one foot below potential release (e.g. bottom of sump, pipe or tank).
   Deeper sample: interval directly above water table.
   Additional sample may be collected on the basis of visual, olfactory, or field screening instrument evidence of potential contamination
   PCB analyses from shallow samples only.
2. Representative soil types will be analyzed for REMED parameters. The sampling locations will be determined in the field based on conditions encountered.
3. Field (sampler) blank samples will be collected and submitted at a rate of 5 percent of soil boring samples (maximum of 1 field blank per day).
   These field blank samples will be analyzed for the same parameters as the associated environmental samples.
4. Batch matrix spike/matrix spike duplicate samples will be analyzed for each case of field samples, each 20 field samples within a case, each 14 calendar day period during which field samples in a case are received, or whichever comes first.
5. All soil samples will be preserved by cooling to 4 degrees C. In addition, soil samples for VOC analysis will be preserved in the field using methanol or sodium bisulfate as per USEPA Method 5035. (Separate, non-preserved container required for percent moisture)

TABLE

INITIAL SUBSURFACE SOIL SAMPLING PROGRAM
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	NUMBER OF SOIL BORINGS	SAMPLING METHOD	SAMPLE INTERVAL	ESTIMATED NUMBER OF SAMPLES SUBMITTED FOR ANALYSIS						DUPLICATE SAMPLES
				VOC	SVOC[8]	PCBs[8]	Metals[8]	CN	REMED	

6. Container requirements and holding times for soil samples are as follows:

Parameter	Container Requirements	Holding Times*
VOC	Pre-weighed, septum-sealed, screw cap 40 ml glass vial	14 days
SVOC**	8 oz. wide-mouth glass	14 days to extraction/analyze within 40 days of extraction
PCBs**	8 oz. wide mouth glass	14 days to extraction/analyze within 40 days of extraction
Metals***	8 oz. wide mouth glass	6 months
CN***	8 oz. wide mouth glass	14 days
Hg	8 oz. wide mouth glass	28 days
grain size distrib.	4 oz. wide mouth glass	NA
TOC	4 oz. wide mouth glass	28 days
TPH	4 oz. wide mouth glass	28 days
CEC	4 oz. wide mouth glass	NA
SPLP	4 oz. wide mouth glass	14 days to extraction/analyze within 40 days of extraction

* Holding time begins at time of sample collection
** SVOC and PCBs may be collected in the same container
*** Metals and CN may be collected in the same container

7. Duplicate samples will be collected at a rate of 5 percent of total soil boring samples with one per adjacent areas and submitted for the same analyses as the associated samples.
8. SPLP analysis depnding on mass concentrations. All samples extracted for potential SPLP analysis.

TABLE 5
GROUNDWATER INVESTIGATION AREAS
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

AREA	SHALLOW WELLS		INTERMEDIATE WELLS		DEEP WELLS		RATIONALE
	Existing	New	Existing	New	Existing	New	
1	1	1	2	0	0	0	Evaluate groundwater chemistry and flow relationship of intertidal flats to Frash Pond.
2-land	14	5	3	3	0	1	Evaluate groundwater chemistry and flow relationship of on-site groundwater to the intertidal flats; although shallow wells exist in the area, there is considerable potential for as yet unidentified potential sources of groundwater contamination; purpose of shallow wells is to delineate known areas of groundwater contamination (e.g., ECD-4 and WC-12S) and potential new sources identified by soil sampling; intermediate wells to delineate vertical extent of groundwater contamination in areas of contaminated shallow groundwater;deep well to provide deeper stratigraphy in the eastern portion of the Site and evaluate groundwater quality at bedrock surface.
2-mudflats	0	4	0	4	0	0	Evaluate the groundwater quality at the zone of discharge from the Site into the intertidal flats.
3	1	1	1	1	0	0	Evaluate groundwater chemistry and flow relationship of on-site groundwater to off-site groundwater at the airport; one well cluster to better define 1) the existence of an off-site contaminant source south and west of the SAEP and 2) potential contaminanant migration from off-site sources onto the SAEP

TABLE 6
EXISTING MONITORING WELLS TO BE SAMPLED
REMEDIAL INVESTIGATION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

WELL IDENTIFICATION NUMBER	SCREENED INTERVAL (ft)
WC-1S	4-14
WC-2D	24.5-34.5
WC-3S	3-13
WC-4S	3-13
WC-5S	3-13
WC-6S	3-13
WC-7S	3-13
WC-8S	3-13
WC-9S	3-13
WC-10S	3-13
WC-11S	3-13
WC-12S	3-13
WC-13S	3-13
WC-14S	3-13
WC-15S	3-13
PZ-9D	24-34
PZ-11D	24-34
PZ-16D	21-31
PZ-17D	29-39
MW-1	2-15
MW-2	2-15
MW-3	2-15
MW-4	2-15
ECD-4	8-18
WC-9D2	145-155
WC-18S	3.5-13.5
WC-18D1	35-45
WC-19S	3-13
WC-19D1	30-40
LW-1S	0-10