USACE CONTRACT NO. DACW33-94-D-0002
TASK ORDER NO. 020
TOTAL ENVIRONMENTAL RESTORATION CONTRACT

SUPPLEMENTAL WORK PLAN
NON-TIME CRITICAL REMOVAL ACTION FOR THE CAUSEWAY AND DIKE
STRATFORD ARMY ENGINE PLANT
Stratford, Connecticut
April 2000

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

Prepared by

Foster Wheeler Environmental Corporation
Boston, MA

and

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Portland, Maine

Revision Affected	Date	Prepared By	Approved By	Pages
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1.0 INTRODUCTION

Foster Wheeler Environmental Corporation (Foster Wheeler) and Harding Lawson Associates (HLA) have been contracted through the U.S. Army Corps of Engineers – New England District (USACE) to complete a Non-time Critical Removal Action (NCRA) for the Causeway and Dike Area at the Stratford Army Engine Plant (SAEP) under Task Order No. 020 of Contract No. DACW33-94-D-0002. The objectives of this Task Order are to: 1) complete additional field activities necessary to characterize physical and chemical subsurface conditions on the Causeway and Dike, 2) summarize the results of field activities in a report, and 3) document the decision process for selection of a removal action for the Causeway and Dike area in an Engineering Evaluation/Cost Analysis (EE/CA) and a Removal Action Memorandum (RAM).

This supplemental work plan addresses the need for additional SPLP analyses of subsurface soils on the Causeway to support a removal action alternative of capping with a permeable barrier.

2.0 SCOPE

Results of field investigation activities intended to address items 1 and 2 in Section 1, conducted by Foster Wheeler and HLA during the summer and fall of 1999, are presented in the Causeway and Dike NCRA Pre-Design Investigation Report (Foster Wheeler/HLA, 2000). Specific to the Causeway, a number of subsurface soil samples collected and analyzed during that field investigation show that there are exceedances above the Connecticut Remediation Standard Regulation (CT RSR) GB Pollution Mobility Criteria (PMC) and CTRSR Direct Exposure Criteria (DEC). Discussions with regulatory agencies have identified data needs that, if answered, may allow for a specific clean-up scenario. This Supplemental Work Plan has been prepared to address those additional data needs. Specifically, if it can be demonstrated that areas with PMC exceedances, for subsurface soils from above the water table (vadose zone), can pass the Synthetic Precipitate Leaching Procedure (SPLP) test, then a permeable barrier cap may be installed on the Causeway rather than installing an engineered barrier to prevent infiltration.

Two locations, which previously contained SPLP PMC exceedances for vanadium, will also be resampled. These locations are in areas where Honeywell removed radiologically contaminated soil in March 2000. These areas will be resampled to assess whether vanadium levels in soils still exceed the PMC after the excavation was completed.

In the Pre-Design Investigation Report (Foster Wheeler/HLA, 2000), groundwater elevations on the Causeway are known from measurements in the two shallow wells MWCD-99-01A and MWCD-99-02A. Based on groundwater elevations in these two wells, the average depth to water below ground surface (bgs) for the Causeway is 4.5-feet bgs (4.27-feet bgs at MWCD-99-01A and 4.65-feet bgs at MWCD-99-02A). For contaminated soils in a GB area, all soils at or above the seasonal high water table are to be considered for remediation based upon results of the SPLP analysis. Therefore, only those contaminated soils on the Causeway at or above 4.5-feet bgs will be considered capable of leaching into the groundwater. This follows the guidance of the State of Connecticut Department of Environmental Protection Remedial Standard Regulations (RSRs).

Results of sampling conducted during the Pre-Design Investigation Report (Foster Wheeler/HLA, 2000) show that a number of samples exceed the GB PMC. Of these, only the soils at or above 4.5-feet bgs will be resampled and analyzed using SPLP methods, and only for those parameters already found to exceed the CTDEP criteria established in the RSRs.

3.0 FIELD PROGRAM

Sampling

Ten (10) previously sampled exploration locations will be resampled on the Causeway to collect subsurface soil samples. At these explorations, SPLP analyses will be requested for those parameters that were previously detected as being above the GB PMC, and at the depths previously detected if they were from depths at or above 4.5-feet bgs. Exploration locations are listed on Table 1 and are shown on Figure 1. These new explorations will be completed using test-pitting techniques.

Soil samples will be collected at the depths and for the SPLP parameters as shown on Table 1. A backhoe will be used to complete test pit explorations. The backhoe will excavate the test pits to the required depths, and analytical samples will be collected for off-site analysis. Soil samples will be collected using stainless steel spatulas and spoons. VOC samples will be collected in a way that minimizes the sample exposure to air. The sample will be transferred to a soil jar with airtight silicon septa. The soil jar will be completely filled to minimize headspace in the jar. The SPLP extraction will be conducted within 48 hours of sample collection.

Soil sample descriptions will be provided on test pit logs in accordance with the Unified Soil Classification System (USCS), ASTM D-2488. Procedures for obtaining soil samples while test pitting are described in standard operating procedure (SOP) No. 11 contained in Attachment A of the SAEP QAPjP (Foster Wheeler/HLA, 1999a). Decontamination between explorations will be performed as described in SOP No. 7.

Results

Soil sample descriptions will be provided on soil boring logs in accordance with the USCS method, ASTM D-2488. Information required by this method includes sample color, composition, and moisture content. Careful notes will be kept regarding visual, olfactory, and field screening instrument observations to provide the basis for selection of a sample for submittal to the analytical laboratory. Any floating product at the water table or free product in the soil samples that appears to be potential source material will be noted.

Analytical parameters will include SPLP analysis for VOCs, SVOCs, and vanadium, as listed on Table 1. The method numbers for the laboratory analyses are also shown on Table 1.

A location and elevation survey will not be performed for the resampled explorations, since the planned explorations will be placed as near as possible to the existing locations that have been previously surveyed.

Results of soil sampling and chemical analysis will be presented in the revised Pre-Design Investigation Report (Foster Wheeler/HLA, 2000). This report is currently being modified to include regulatory comments.

4.0 SAMPLE HANDLING

Sections 5.0 and 6.0 of the URSGWCFS RI Field Sampling Plan detail the documentation, packaging, and shipping procedures to be used during field activities and sample collection (URSGWCFS, 1998).

As stated in those sections, each sample will receive a unique sample identification number, which will be recorded on the sample label, the laboratory Chain of Custody, and the field logbook. Field data sheets will be used to record observations and details regarding field activities and general observations. Sample handling requirements, including holding times are presented in Table 2.

Samples to be sent off-site for analysis will be appropriately packaged to prevent damage to the sample containers, and maintain required temperatures and adequate custody. SOP No. 6, contained in Attachment A of the SAEP QAPjP (Foster Wheeler/HLA, 1999), contains information on sample handling.

Approximately 10% of all samples submitted to the off-site laboratory will be collected as split samples. The splits will be submitted to a quality assurance (QA) laboratory designated by the USACE to provide data on the comparability of data generated at an independent laboratory. Samples will be shipped directly to the QA Laboratory from the HLA field office.

5.0 INVESTIGATION-DERIVED WASTES

Section 7.0 of the Causeway and Dike NCRA Work Plan (Foster Wheeler/HLA, 1996b) identifies handling and disposal of Investigation-Derived Wastes (IDW) anticipated to be generated during this field investigation.

bgs	below ground surface
EE/CA	Engineering Evaluation/Cost Analysis
Foster Wheeler	Foster Wheeler Environmental Corporation
HLA	Harding Lawson Associates
IDW	investigation-derived waste
NCRA	Non-time Critical Removal Action
PID	photoionization detector
PMC	Pollutant Mobility Criteria
QA	Quality Assurance
RAM	Removal Action Memorandum
RSR	Remediation Standard Regulation
SAEP	Stratford Army Engine Plant
SOP	Standard Operating Procedure
SPLP	Synthetic Precipitate Leaching Procedure
URSGWCFS	URS Greiner-Woodward Clyde Federal Services
USACE	U.S. Army Corps of Engineers – New England District
USCS	Unified Soil Classification System
VOC	volatile organic compound

Foster Wheeler Environmental Corporation/Harding Lawson Associates (Foster Wheeler/HLA), Draft Pre-Design Investigation Report, Causeway and Dike NCRA. Prepared for the U.S. Army Corps of Engineers, February, 2000.

Foster Wheeler Environmental Corporation/Harding Lawson Associates (Foster Wheeler/HLA), 1999a. Draft Quality Assurance Project Plan for the Non-Time Critical Removal Action for the Causeway and Dike, Stratford Army Engine Plant. Prepared for the U.S. Army Corps of Engineers, July 12, 1999.

Foster Wheeler Environmental Corporation/Harding Lawson Associates (Foster Wheeler/HLA), 1999b. Draft Work Plan Non-Time Critical Removal Action for the Causeway and Dike, Stratford Army Engine Plant. Prepared for the U.S. Army Corps of Engineers, July, 1999.

URS Greiner-Woodward Clyde Federal Services (URSGWCFS), 1998. Remedial Investigation Work Plan for the Stratford Army Engine Plant. Prepared for the U.S. Department of the Army, October 26, 1998.

TABLE 1
SUMMARY OF PROPOSED OFF-SITE ANALYTICAL SAMPLING

SUPPLEMENTAL WORK PLAN
CAUSEWAY AND DIKE NON-TIME CRITICAL REMOVAL ACTION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

EXPLORATION LOCATION	SAMPLE DEPTH (feet bgs)	ANALYTICAL PARAMETER AND METHOD
CB-99-01	0' – 2'	SPLP for VOCs by 1312/8260B
CB-99-03	2' – 4'	SPLP for VOCs by 1312/8260B
CB-99-04	0' – 2'	SPLP for VOCs by 1312/8260B
CB-99-08	1' – 3'	SPLP for VOCs by 1312/8260B
CB-99-11	0' – 2'	SPLP for VOCs by 1312/8260B
		SPLP for SVOCs by 1312/Modified 8270 SIM
CB-99-14	1' – 3'	SPLP for SVOCs by 1312/Modified 8270 SIM
CB-99-15	1' – 3'	SPLP for SVOCs by 1312/Modified8270 SIM
TP-99-10	3' – 4.5'	SPLP for VOCs by 1312/8260B
		SPLP for SVOCs by 1312/Modified 8270 SIM
TP-DEP-11	0' – 1'	SPLP for VOCs by 1312/8260B
		SPLP for SVOCs by 1312/Modified 8270 SIM
		SPLP for Vanadium by 1312/6010B
TP-DEP-12	1' – 3'	SPLP for VOCs by 1312/8260B
		SPLP for Vanadium by 1312/6010B

Notes:

SIM = Selective Ion Monitoring
SPLP = Synthetic Precipitation Leaching Procedure
SVOC = Semivolatile Organic Compounds
VOC = Volatile Organic Compounds

Analytical methods are from USEPA SW0846 "Test Methods for Evaluating Solid Waste Chemical/Physical Methods", SW-846, Final Update III, revised 1993, or more recent edition unless otherwise indicated.

TABLE 2
SAMPLE HANDLING REQUIREMENTS

SUPPLEMENTAL WORK PLAN
CAUSEWAY AND DIKE NON-TIME CRITICAL REMOVAL ACTION
STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

ANALYTICAL PARAMETER	CONTAINER TYPE AND SIZE	HOLDING TIME	PRESERVATION/ STORAGE
VOC	Pre-weighed, septum-sealed, screw-cap, 40 ml glass vial	14 days	Methanol, 4°C
SVOC	One 8 oz. Wide-mouth glass jar will be used for SVOCs and Vanadium	14 days to extraction 40 days to analysis.	4°C

Notes:

SVOC = Semivolatile Organic Compounds
VOC = Volatile Organic Compounds

LEGEND

MWCD-99-01A — EXISTING HLA CAUSEWAY/DIKE MONITORING WELLS

TP-99-22 — EXISTING HLA TEST PIT LOCATIONS

CB-99-01 — EXISTING HLA CAUSEWAY BORING

B–53 — BUILDING DESIGNATIONS

CHAINLINK FENCE

LIMITS OF PRE–DESIGN INVESTIGATION

CB-99-15 / 1'–3'/SVOCs — EXPLORATION LOCATION TO BE RESAMPLED; COMPOUNDS TO BE ANALYZED BY SYNTHETIC PRECIPITATE LEACHING PROCEEDURE; PROPOSED DEPTH OF SAMPLE COLLECTION

NOTES:

1. MAP IS IN CONNECTICUT STATE PLANE COORDINATES.
2. BASE MAP SOURCE: ALLIEDSIGNAL, INC.
3. ALL ELEVATION CONTOURS ARE INTERPRETIVE AND APPROXIMATE. CONTOUR INTERVAL IS 1 FOOT.

N

CONCRETE PAD & CHAIN LINK FENCE

CONCRETE RAMP (BADLY DETERIORATED)

MWCD-99-02B

MWCD-99-02A

TP-DEP-17

SIGN

CB-99-17

CB-99-15
1'–3'/SVOCs

CB-99-14
1'–3'/SVOCs

CB-99-13

CB-99-16

TP-DEP-15

CB-99-12

CB-99-11
0'–2'/VOCs,SVOCs

FENCE

TP-99-10
3'–4.5'/VOCs,SVOCs

SIGN

TP-DEP-12
1'–3'/VOCs,VANADIUM

TP-99-26

CB-99-08
1'–3'/VOCs

TP-DEP-11
0'–1'/VOCs,SVOCs,VANADIUM

TIDAL FLATS

CAUSEWAY

TP-99-06

CB-99-07

FILL AREA

SIGN

TP-99-24

CB-99-05

CB-99-04
0'–2'/VOCs

CB-99-03
2'–4'/VOCs

CB-99-02

MWCD-99-01A
MWCD-99-01B

CB-99-09

TP-99-23

TP-99-22

TP-99-25

END OF DIKE RIPRAP

B–59

BLACKTOP PATHWAY

CB-99-01
0'–2'/VOCs

TIDAL FLATS

DIKE RIPRAP

BLACKTOP PATHWAY

B–40

B–16

B–34

B–33

B–19

B–4

B–69

0 40 80 160 FEET

SCALE: 1"=80'

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FIGURE 1
CAUSEWAY EXPLORATION LOCATIONS
SUPPLEMENTAL WORK PLAN
CAUSEWAY AND DIKE
NON-TIME-CRITICAL REMOVAL ACTION
STRATFORD ARMY ENGINE PLANT
Harding Lawson Associates