

**QUALITY ASSURANCE
PROJECT PLAN**
for
**AREA B HYDROGEOLOGIC
INVESTIGATION**
NAWC Warminster, Pennsylvania



**Northern Division
Naval Facilities Engineering Command**

Contract No. N62472-90-D-1298
Contract Task Order 0134

November 1993

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**QUALITY ASSURANCE PROJECT PLAN
AREA B HYDROGEOLOGIC INVESTIGATION
NAWC WARMINSTER, PENNSYLVANIA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

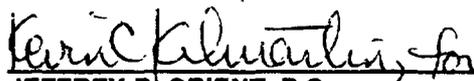
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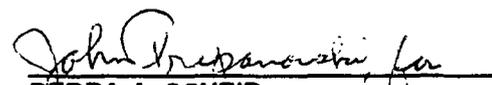

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1.0 PROJECT DESCRIPTION

The Area B hydrogeologic investigation is part of continuing environmental investigations conducted at NAWC Warminster by Halliburton NUS Corporation (HNUS). This project is a continuation of the Phase II remedial investigation (RI) conducted between May 1992 and April 1993. As a result, this Quality Assurance Project Plan (QAPP) is presented as an addendum to the RI QAPP prepared by HNUS for the Phase II RI in May 1992 (HNUS, 1992b). Additional detail is provided in that document as well as the Area B Hydrogeologic Investigation Work Plan Addendum.

2.0 SCOPE OF WORK

A detailed description of the Area B hydrogeologic investigation scope of work is included in Section 3.0 of the Area B Hydrogeologic Investigation Work Plan Addendum.

3.0 SAMPLE MATRICES, PARAMETERS, AND FREQUENCY COLLECTION

Environmental samples will be collected from the soil and from groundwater. A listing of the sample matrices, parameters, frequency of collection, and associated field quality control samples is found in Table 3-1. Sampling procedures to be used are addressed in Section 6.0 of this QAPP. A sampling rationale is included in Section 4.0 of the Area B Hydrogeologic Investigation Work Plan Addendum.

4.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

4.1 PROJECT ORGANIZATION

The key personnel involved in the Area B hydrogeologic investigation are as follows:

NORTHDIV Remedial Project Manager	Lonnie Monaco
Halliburton NUS Program Manager	John Trepanowski
Halliburton NUS Project Manager	Jeffrey Orient
Halliburton NUS QA/QC Manager	Debra Scheib
Halliburton NUS Field Operations Leader	Don Whalen
Health and Safety Manager	Matthew Soltis

TABLE 3-1
SUMMARY OF SAMPLING and QA/QC ACTIVITIES
AREA B HYDROGEOLOGIC INVESTIGATION
NAWC WARMINSTER, PENNSYLVANIA

MEDIUM	PARAMETER	ANALYTICAL METHOD	FIELD SAMPLES	DUPLICATES	FIELD BLANKS	TRIP BLANKS	MS/MSD	RINSATE BLANKS ^(a)	TOTAL
Groundwater and Soil (aqueous QA/QC)	Low-concentration volatile organics	CLP SOW OLCO2.0 ^(b)	36	4	3	8	2	4	57
	TCL volatile organics	CLP SOW OLMO1.8				3		3	6
	TCL semivolatile organics	CLP SOW OLMO1.8	9	1	3		1	4	18
	TCL pesticides/ PCBs	CLP SOW OLMO1.8	9	1	3		1	4	18
	TAL metals (total)	CLP SOW ILMO2.1	18	2	3		1	7	31
	TAL metals (filtered)	CLP SOW ILMO2.1	18	2	3		1	4	28
	COD	E 410.1	3	1					4
	BOD(5)	SM 5210B	3	1					4
	TOC	E 415.1	3	1					4
	TDS	E 160.2	3	1					4
	TSS	E 160.1	3	1					4
	pH	E 150.1	3	1					4
	Alkalinity	E 310.1	3	1					4
	Hardness	E 130.2	3	1					4
SOIL	TCL volatile organics	CLP SOW OLMO1.8	10	1			1		12
	TAL metals	CLP SOW ILMO2.1	10	1			1		12

**TABLE 3-1 (C ntinued)
SUMMARY OF SAMPLING ACTIVITIES**

- (a) Rinsate samples are collected every day during sampling events. Samples from every other day are analyzed. If equipment contamination problems are indicated, intervening samples may be analyzed. The number depicted is the total number of rinsate samples to be obtained.
- (b) October 1992

Note: Groundwater volatiles sampling assumes two coolers per day over four days equals eight trip blanks.

TAL	-	target analyte list
COD	-	chemical oxygen demand
BOD(5)	-	biological oxygen demand (five day)
TOC	-	total organic carbons
TDS	-	total dissolved solids
TSS	-	total suspended solids
TCL	-	Target Compound List
MS/MSD	-	matrix spike/matrix spike duplicate
CLP	-	Contract Laboratory Program

4.2 FIELD ORGANIZATION

The field organization will be as presented in Section 2.4.2 of the Phase II RI/FS QAPP (HNUS, 1992b).

4.3 LABORATORY OPERATIONS

Analyses of environmental samples will be performed by CEIMIC Corporation. CEIMIC is a Navy Energy and Environmental Support Activity (NEESA)-approved laboratory. The analytical work will be performed at DQO Level D, which requires CLP methods and CLP deliverables.

5.0 QUALITY ASSURANCE OBJECTIVES

The quality assurance objectives are presented in the Phase II RI QAPP (HNUS, 1992b). The specific elements addressed in the QAPP are as follows:

- Data quality objectives
- Quantitation limits
- Detection limits
- PARCC parameters
 - precision
 - accuracy
 - representativeness
 - comparability
 - completeness
- Field blanks
- Trip blanks
- Rinsate blanks
- Bottleneck

6.0 SAMPLING PROCEDURES

6.1 SITE BACKGROUND

The site background information is included in the Phase II RI/FS Work Plan (HNUS, 1992a).

6.2 SAMPLING OBJECTIVES

The sampling objectives are included in the Area B Hydrogeologic Investigation Work Plan Addendum.

6.3 SAMPLE LOCATION AND FREQUENCY

The sample location and frequency are included in the Area B Hydrogeologic Investigation Work Plan Addendum.

6.4 SAMPLE DESIGNATION

The sample designation will be as presented in Section 1.4 of the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b).

6.5 SAMPLE EQUIPMENT AND PROTOCOLS

The sample equipment and protocols are the HNUS standard operating procedures (SOPs) that are presented in Appendix A, as applicable, in the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b).

6.6 SAMPLE HANDLING AND ANALYSIS

Groundwater samples will be obtained in accordance with HNUS SOP SA-1.1, which appears in Appendix A of the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b).

Soil samples will be obtained in accordance with HNUS SOP GH-1.3, Section 5.1.2, which appears in Appendix A of the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b).

A summary of sampling and analysis requirements for the Area B hydrogeologic investigation is presented in Table 6-1.

6.7 EQUIPMENT DECONTAMINATION AND WASTE DISPOSAL

Equipment decontamination and waste disposal will be in accordance with HNUS SOPs SF-2.2 and SF-2.3, which appear in Appendix A of the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b).

As discussed further in the Area B Hydrogeologic Investigation Work Plan Addendum, drill cuttings will be spread around the borehole and the area will be reseeded. Cuttings that are determined to be significantly contaminated based on visual observation or instrument (HNu) detection will be staged on site until their ultimate fate is determined. Purged groundwater, well development water, and decontamination water will be disposed by discharging it onto the ground surface. All field-generated expendable equipment will be double bagged and disposed in on-site disposal facilities.

7.0 SAMPLE CUSTODY

The sample custody will be as presented in Section 1.8 of the Phase II RI/FS Sampling Plan Addendum (HNUS, 1992b). The specific elements addressed in the addendum are as follows:

- Field custody
- Transfer of custody and shipment
- Sample shipment procedures
- Field documentation responsibilities

**TABLE 6-1
SUMMARY OF SAMPLING AND ANALYSIS REQUIREMENTS
NAWC WARMINSTER, PENNSYLVANIA**

MEDIUM	ANALYSIS	NO. OF SAMPLES ^(c)	NUMBER AND TYPE OF CONTAINERS	PRESERVATION REQUIREMENTS	HOLDING TIME ^(b)	METHOD	
Groundwater and	Low-concentration volatile organics	55	G, teflon-lined septum; three 40-ml vials	Cool to 4° C; HCl to pH < 2	14 days	CLP SOW OLCO2.0 ^(b)	
	TCL volatile organics	6	G, teflon-lined septum; three 40-ml vials	Cool to 4° C; HCl to pH < 2	14 days	CLP SOW OLMO1.8	
	TCL semivolatile organics	17	G, one 1-l amber, teflon-lined lid	Cool to 4° C	7 days extract; 40 days analysis	CLP SOW OLMO1.8	
	TCL pesticides/PCBs	17	G, one 1-l amber, teflon-lined lid	Cool to 4° C	7 days extract; 40 days analysis	CLP SOW OLMO1.8	
Soil (aqueous QA/QC)	TAL metals (total)	30	P, one 1-l bottle	Cool to 4° C; HNO ₃ to pH < 2	180 days except mercury (28 days)	CLP SOW ILMO2.1	
	TAL metals (filtered)	27	P, one 1-l bottle	Cool to 4° C; HNO ₃ to pH < 2	180 days except mercury (28 days)	CLP SOW ILMO2.1	
	COD	4	P, one 1-l bottle	Cool to 4° C	28 days	E 410.1	
	BOD(5)	4	P, one 1-l bottle	Cool to 4° C	48 hours	SM 5210B	
	TOC	4	P, one 1-l bottle	Cool to 4° C	28 days	E 415.1	
	TDS, TSS, pH	4	P, one 1-l bottle	Cool to 4° C	7 days	E 160.2, E 160.1, E 150.1	
	Alkalinity	4	P, one 1-l bottle	Cool to 4° C	14 days	E 310.1	
	Hardness	4	P, one 1-l bottle	Cool to 4° C; HNO ₃ to pH < 2	180 days	E 130.2	
	SOIL	TCL volatile organics	11	G, teflon-lined septum; three 60-ml wide-mouth vials	Cool to 4° C	7 days	CLP SOW OLMO1.8
		TAL metals	11	G, one 8-oz. jar	Cool to 4° C	180 days except mercury (28 days)	CLP SOW ILMO2.1

- (a) NEESA policy states that holding times are measured from the date of collection.
- (b) October 1992
- (c) Excluding MS/MSD Samples

8.0 CALIBRATION PROCEDURES

Calibration procedures will be as presented in Section 2.8 of the Phase II RI/FS QAPP (HNUS, 1992b).

9.0 ANALYTICAL PROCEDURES

Environmental samples collected during the field investigation for chemical analyses will be analyzed using the appropriate analytical procedures as outlined in Section 4 of the Area B Hydrogeologic Investigation Work Plan Addendum and listed in Table 3-1 of this QAPP.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

The data reduction, validation, and reporting will be as presented in Section 2.10 of the Phase II RI/FS QAPP (HNUS, 1992b).

11.0 INTERNAL QUALITY CONTROL CHECKS

The internal quality control checks will be as presented in Section 2.11 of the Phase II RI/FS QAPP (HNUS, 1992b).

12.0 PERFORMANCE AND SYSTEM AUDITS

The performance and system audits will be as presented in Section 2.12 of the Phase II RI/FS QAPP (HNUS, 1992b).

13.0 PREVENTIVE MAINTENANCE

Preventive maintenance will be conducted as presented in Section 2.13 of the Phase II RI/FS QAPP (HNUS, 1992b).

14.0 DATA ASSESSMENT PROCEDURES

Data assessment procedures will be as presented in Section 2.14 of the Phase II RI/FS QAPP (HNUS, 1992b). Specific elements addressed by this section include

- Representativeness, accuracy, and precision
- Validation
- Data Evaluation

15.0 CORRECTIVE ACTION

Corrective action procedures will be as presented in Section 2.15 of the Phase II RI/FS QAPP (HNUS, 1992b).

16.0 QUALITY ASSURANCE REPORTS

Quality assurance reports will be as presented in Section 2.16 of the Phase II RI/FS QAPP (HNUS, 1992b).

17.0 REFERENCES

Halliburton NUS Corporation, 1992a. Remedial Investigation/Feasibility Study Final Phase II Work Plan; Part I - Work Plan. Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract, Naval Air Warfare Center, Warminster, Pennsylvania. Contract N62472-90-D-1298, CTO 0022, May 1992.

Halliburton NUS Corporation, 1992b. Remedial Investigation/Feasibility Study Final Phase II Work Plan; Part II - Sampling Plan Addendum. Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract, Naval Air Warfare Center, Warminster, Pennsylvania. Contract N62472-90-D-1298, CTO 0022, May 1992.