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Supplemental Biomonitoring Plan

for

Site 8 - Nitroglycerin Plant Office
Indian Head Division
Naval Surface Warfare Center

Indian Head, Maryland

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command
Northern Division Contract Number N62472-90-D-1298
Contract Task Order 0117

October 1992
Revision 2 (July 1995)

Halliburton NUS
CORPORATION

079505/P

SUPPLEMENTAL BIOMONITORING PLAN
FOR
SITE 8 - NITROGLYCERIN PLANT OFFICE

INDIAN HEAD DIVISION, NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity Chesapeake
Environmental Branch Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121

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CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0117

OCTOBER 1992
REVISION 2 (JULY 1995)

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1.0 INTRODUCTION

The Northern Division of the Naval Facilities Engineering Command issued three Contract Task Orders (CTOs 64, 99 and 117) to Halliburton NUS Corporation under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62472-90-D-1298 for environmental work at the Navy Installation Restoration (IR) Program Site 8 - Nitroglycerin Plant Office (Site 8), at the Indian Head Division, Naval Surface Warfare Center (NSWC) at Indian Head, Maryland. Site 8 consists of a stream and a pond which historically received water from the floor drains in Building 766 which contained elevated levels of mercury. As a result, the sediment/soil of Site 8 contained elevated levels of mercury. Halliburton NUS performed biomonitoring work at Site 8 on a quarterly basis from October 1992 through January 1995. The original objective of the biomonitoring work at Site 8 was to investigate the elevated levels of mercury in the stream and pond at Site 8. The original objective of biomonitoring for mercury was achieved and sufficient information has been obtained to draw conclusions about the impact of mercury at Site 8. Biomonitoring was performed in accordance with two earlier versions of this Biomonitoring Plan (Halliburton NUS, 1992, and Halliburton NUS, 1993).

In 1994 elevated levels of lead were detected in the Site 8 pond. As a result, lead was added to the Site 8 biomonitoring program during the April and October 1994 biomonitoring rounds. However, although biomonitoring for mercury is complete, insufficient data exists to assess lead levels in the pond at Site 8; therefore, Halliburton NUS will perform two additional rounds of biomonitoring for elevated levels of lead at the Site 8 pond.

Halliburton NUS has developed this Supplemental Biomonitoring Plan to present the procedures that will be used to perform the two additional rounds of biomonitoring for lead at the Site 8 pond.

1.1 PROJECT BACKGROUND

Elevated levels of lead were detected during routine sampling and analysis at NPDES Discharge Point IW87 which discharges into the Site 8 stream above the pond. Subsequent sampling and analysis indicated that lead levels in the sediment of the Site 8 pond ranged from 163 mg/kg to 811 mg/kg (Halliburton NUS, 1994). In addition, samples were collected and analyzed for TCLP (Toxicity Characteristic Leaching Procedure) and determined to leach lead at concentrations above the RCRA hazardous waste level of 5 mg/L (NSWC, 1994).

The source of lead in the Site 8 stream and pond is believed to be the result of discharge from the Biazzi Nitration Plant (Building 790) and Building 279. The floors in these buildings were lined with lead. Acid used in the buildings generated fumes. These acidic fumes, in combination with periodic washdown of the walls and floor, caused lead to go into solution in the washdown water and be transported through the floor drain to IW87 (NSWC, 1994). It is also possible that particulate lead was washed to IW87 via the floor drain (NSWC, 1994). Lead is no longer used for this purpose.

The lead contaminated site has been identified as IR-Site 56. Site 56 is located on and within Site 8.

1.2 ECOLOGICAL IMPACT OF LEAD

The ultimate fate and form of lead in the environment has been the subject of numerous scientific investigations. Elevated levels of lead can have detrimental health effects. Although lead (unlike mercury) does not bioaccumulate in the classical sense, it does show a tendency to accumulate in the brain, bones, and viscera of individual animals. In a population of fish or wildlife exposed to high levels of lead, the oldest animals will typically contain the highest lead levels, and these levels will be highest in brain, bone, and liver/kidney tissue.

1.3 OBJECTIVE AND SAMPLING STRATEGY

The objective of the supplemental biomonitoring by Halliburton NUS is to obtain additional data to assess the impact of lead on the fish communities at the Site 8 pond. These data may be used to determine whether further action is necessary or, in the event that a Removal Action is warranted, to characterize changes in the ecological community that may result from such an action.

The overall sampling strategy is to collect fish from the Site 8 pond during two additional quarterly rounds of biomonitoring and analyze them for total lead. The two additional rounds will be performed in the summer (July/August) and fall (October/November) of 1995.

1.4 PLAN FORMAT

Section 1.0 of this Supplemental Biomonitoring Plan contains general background information which was used to design the subject biomonitoring program. Section 2.0 contains field operation procedures. Section 3.0 discusses analytical and reporting procedures. Section 4.0 is the Project Management Plan.

2.0 FIELD OPERATIONS

Fieldwork will consist of collecting fish from the Site 8 pond during two rounds of Biomonitoring in the summer and fall of 1995 as described herein.

2.1 MOBILIZATION/DEMOBILIZATION

Following Navy approval of this Supplemental Biomonitoring Plan, Halliburton NUS will begin mobilization activities. The field team will consist of a Halliburton NUS Project Biologist and two field technicians. A subcontractor will also provide field technicians and equipment. All field team members will review this Biomonitoring Plan and the site-specific Halliburton NUS Health and Safety Plan (HASP) prior to initiation of biomonitoring activities. In addition, a field team orientation meeting will be held to familiarize personnel with the scope of the field activities.

The Project Biologist will coordinate mobilization activities with the subcontractor and will oversee all sampling activities during field operations.

2.2 FIELD SAMPLING

During field sampling, a complete sample log will be maintained by the Subcontractor. At a minimum, the sample log will contain the following information:

- Date and time of sampling
- Locations sampled
- Sample type (e.g., gambusia)
- Weather conditions (e.g., overcast or rainy)
- Name of field team members.

The overall goal of fish sampling will be to collect 5 to 10 fish of the same species from each of the following four trophic groups.

- Insectivore/surface feeder: *Gambusia*, mummichog, *Notropid* shiner, golden shiner, creek chub.
- Omnivore/sunfish: bluegill, warmouth, pumpkinseed.

- Bottom feeder: brown bullhead, common carp, creek chubsucker.
- Top carnivore: Largemouth bass, white crappie, redfin pickerel, chain pickerel.

Each of these trophic levels will provide useful information to evaluate the impacts of lead because each has a different feeding strategy/behavior. Small *Gambusia* are eaten by sunfish (e.g., bluegill and large-mouth bass) as well as larger *Gambusia* (see Meffe, 1987, for a discussion of cannibalistic behavior in *Gambusia*). *Gambusia* of all size are eaten by large-mouth bass and wading birds, such as the great blue heron, which is common in the study area. Brown bullhead are for the most part bottom feeders, ingesting a variety of insect larvae, fish eggs, molluscs, and plants (Pfieger, 1975; Lee, 1980). Large-mouth bass, which are top-of-the-food-chain predators, are known to bioaccumulate toxicants. Also, each species has a different life span, with *Gambusia* typically living 0 to 2 years, brown bullhead 0 to 5 years, and large-mouth bass 0 to 10 years (Carlander, 1969; Pflieger, 1975; Lee, 1980). Older fish typically accumulate higher levels of contaminants, than younger fish because of longer exposure times (Sorensen, 1991). Species of different feeding strategies and positions in the food chain should provide insight into the trophic dynamics of lead in the Site 8 pond ecosystem.

Table 2-1 summarizes the preferred size (total length) and preferred sample size (quantity of fish) for each target species.

Based on availability of equipment and actual site conditions, the following procedures/equipment will be used to collect fish: hoop/trap/fyke nets, gill nets, baited minnow traps, seining and electrofishing. Methods that appear to be most effective (and least damaging to fish that are captured) will be employed. No quantitative abundance measures will be performed.

All fish collected will be identified to species, measured (total length in millimeters), weighed (to nearest 1.0 gram), and examined cursorily for gross pathology (e.g., lesions, ectoparasites, fungal/bacterial infections). Fish with conspicuous lesions or bacterial/fungal infections will not be used. The preceding data along with capture location, time of day, and weather conditions will be recorded on field data sheets.

All fish will be ground and analyzed on a whole body basis. Depending upon the quantity and size of fish collected, they will either be composited or analyzed separately. The fish will be packed in ice and sent to a fixed based lab for analysis.

TABLE 2-1

FISH SAMPLING GOALS
NSWC, INDIAN HEAD, MARYLAND

Trophic Level	Species	Preferred Size (Total Length)	Preferred Sample Size
Insectivore/surface feeder	*Gambusia* (mosquitofish)	N/A	10
	mummichog	N/A	10
	Notropts/shiner	N/A	10
	golden shiner	N/A	10
	creek chub	N/A	10
Omnivore/sunfish	bluegill	>75 mm	10
	warmouth	>75 mm	10
	pumpkinseed	>75 mm	10
Bottom feeder	brown bullhead	>75 mm	5
	common carp	>300 mm	5
	creek chubsucker	>75 mm	5
Top carnivore	largemouth bass	>200 mm	5
	white crappie	>150 mm	5
	redfin pickerel	>150 mm	5
	chain pickerel	>150 mm	5

2.3 RECORDKEEPING

In addition to chain-of-custody records, standard forms will be completed for sample description and documentation. These shall include both sample log sheets (for biota) and a field notebook.

A bound/weatherproof field notebook shall be maintained by the Subcontractor. All information related to field activities will be recorded in the field notebook. This information will include, but is not limited to, sampling time, weather conditions, unusual events, field measurements, descriptions of photographs, etc. This book will also contain a summary of the day's activities.

At the completion of the project, the Subcontractor shall submit all field records, data sheets, field notebooks, chain-of-custody receipts, daily logs, etc., to the Halliburton NUS Project Manager.

2.4 HEALTH AND SAFETY

All field activities will be performed in accordance with the Site-Specific Health and Safety Plan for this project (as contained in Appendix C of the Final Abbreviated Field Sampling Plan, AFSP; Site 8 - Nitroglycerin Plant Office, Indian Head, Maryland, August 1992 Contract No. N62472-90-D-1298 Contract Task Order Number 0064).

3.0 ANALYSIS AND REPORTING PROCEDURES

3.1 ANALYTICAL PROCEDURES

A fixed based lab will be utilized to perform whole body total lead analysis on the samples collected at Site 8. Samples will be analyzed via SW-846 Method 7421. The detection limit shall be 0.2 mg/kg.

3.2 REPORTING PROCEDURES

Summary Reports will be provided to the Navy approximately 6 weeks after the results of the lead analysis are available. The results will be presented in two Quarterly Biomonitoring Reports. These reports will (1) briefly describe the field sampling activities, (2) present analytical results, and (3) provide a brief interpretation of those results.

4.0 PROJECT MANAGEMENT PLAN

Halliburton NUS will perform this project with support from the Navy. This section describes the project organization, Navy contacts and support, and a project contingency plan.

4.1 PROJECT ORGANIZATION

The proposed Halliburton NUS project organization is shown on Figure 4-1. As shown on that figure, Halliburton NUS will utilize a subcontractor to perform the field work and analysis.

Mr. Anthony P. Klimek, P.E. will be the project manager for these activities and will be the primary point of contact. He will manage the day-to-day aspects of this project and will be responsible for cost and schedule control as well as technical performance. Mr. Klimek is a registered professional engineer in the state of Maryland and has more than 15 years of experience on civil and environmental engineering projects. He was the Project Manager for the previous work performed by Halliburton NUS at Site 8.

Field oversight and preparation of the project reports will be performed by Mr. Philip Moore, Project Biologist. He will provide technical assistance and continuity through the development of the Biomonitoring Plan, field work, and preparation of reports.

4.2 NAVY SUPPORT

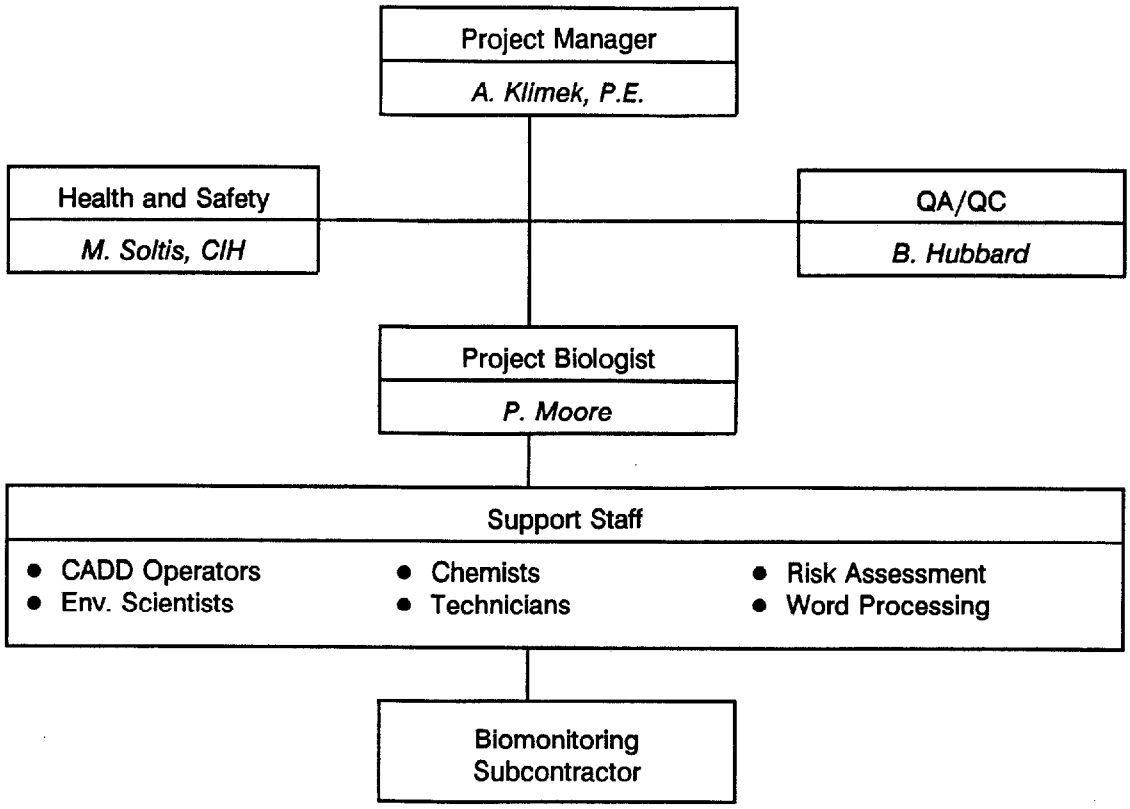
Mr. Shawn Philips P.E. will be the Remedial Project Manager (RPM) for EFACHES. He will be the primary Navy point of contact for the project. All project activities, including reporting and field activities, will be coordinated through Mr. Philips. Any changes in scope will be approved through Mr. Philips prior to implementation.

Mr. Philips may be contacted at the following address:

Mr. Shawn Philips, P.E., Code 1812
Engineering Field Activity Chesapeake
Naval Facilities Engineering Command
Washington Naval Yard, Building 212
Washington, DC 20374-2121
(202) 685-3274

FIGURE 4-1

PROJECT ORGANIZATION CHART



Mr. Shawn Jorgensen will be the primary point of contact at NSWC. All field work will be coordinated through Mr. Jorgensen; he will notify appropriate NSWC personnel (security, etc.) and make arrangements for support that will be provided by the Navy. Mr. Jorgensen may be contacted at the following address:

Mr. Shawn Jorgensen, Code 0965
Indian Head Division
Naval Surface Warfare Center
Building D28
Indian Head, Maryland 20640-5035
(301) 743-6745

Throughout this project, Navy will provide the following support:

- Authorization to access Site 8.
- Make available existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of the site.
- Make available all historical data, background geological and hydrogeological information, and previous investigation documents.

4.3 CONTINGENCY PLAN

In the event major problems are encountered during field activities, the Halliburton NUS Project Manager will be notified immediately, followed by the NSWC Point of Contact and the EFACHES RPM. Halliburton NUS will then develop an alternate course of action and discuss it with the Navy. All alternate courses of action that impact the project schedule and budget will be approved through the NSWC Point of Contact and the EFACHES RPM before being enacted.

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