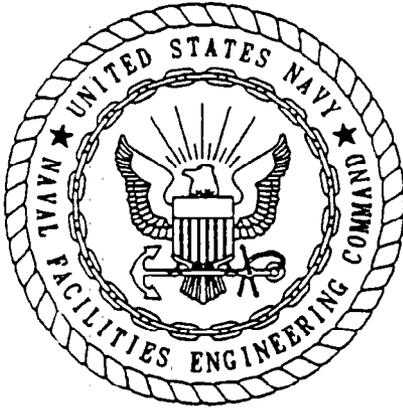


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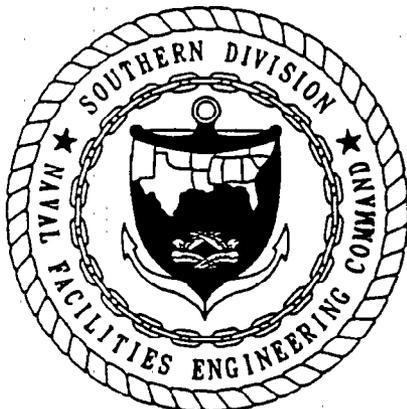


BASEWIDE ECOLOGICAL ASSESSMENT WORKPLAN

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

**UNIT IDENTIFICATION CODE: N60200
CONTRACT NO. N62467-89-D-0317/090**

JUNE 1995



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010**

BASEWIDE ECOLOGICAL ASSESSMENT WORKPLAN

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Unit Identification Code (UIC): N60200

Contract No. N62467-89-D-0317/090

Prepared by:

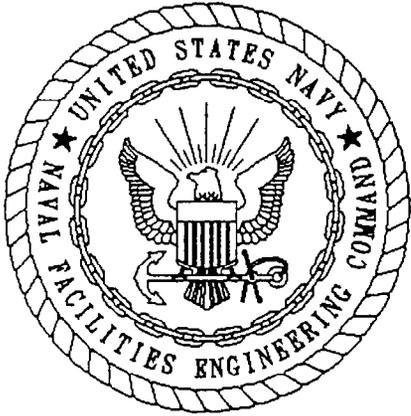
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Prepared for:

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Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

Alan Shoultz, Code 1827

June 1995



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

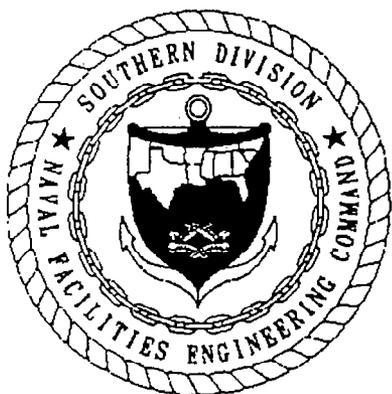
The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/090 are complete and accurate and comply with all requirements of this contract.

DATE: June 8, 1995

NAME AND TITLE OF CERTIFYING OFFICIAL: James A. Denier
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Janet Burris
Project Technical Lead

(DFAR 252.227-7036)



FOREWORD

The Department of the Navy developed the Installation Restoration (IR) program to locate, identify, and remediate environmental contamination from the past disposal of hazardous materials at Navy and Marine Corps installations. The Navy IR program follows the Department of Defense Environmental Restoration Program mandated by the Superfund Amendments and Reauthorization Act of 1986 to address waste sites that may pose a threat to human health or the environment.

The IR program consists of Preliminary Assessment and Site Inspection, Remedial Investigation and Feasibility Study (RI/FS), and Remedial Design and Remedial Action at sites where disposal of chemicals allegedly occurred. The Preliminary Assessment and Site Inspection identifies the presence of pollutants. The RI/FS analyzes the nature and extent of contamination and determines the optimum remedial solution. The Remedial Design and Remedial Action complete the implementation of the solution.

Previous investigations have determined that Naval Air Station (NAS) Cecil Field has 18 waste sites that may pose a threat to human health or the environment. Therefore, an RI/FS will be performed to address the extent, magnitude, and impact of possible contamination at these waste sites.

This Basewide Ecological Assessment Report (BEAR) workplan describes how a Basewide Ecological Assessment will be completed for NAS Cecil Field. The Basewide Ecological Assessment will evaluate potential adverse ecological effects associated with exposures to contamination from all potential sources of contamination (PSCs). The Basewide Ecological Assessment will contain information on the ecological setting of NAS Cecil Field, the general methodology for ecological risk assessments (ERAs) for individual PSCs, summaries of the ERA results for each of the PSCs, and an evaluation of risks for watersheds associated with all PSCs. The workplan describes how the BEAR will be written, distributed, and updated.

Questions regarding this report should be addressed to the Commanding Officer, Code OOB, P.O. Box 111, NAS Cecil Field, Jacksonville, Florida 32215-0111.

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Naval Air Station Cecil Field
Jacksonville, Florida

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1.0 INTRODUCTION

1.1 PURPOSE. The Basewide Ecological Assessment Workplan describes the approach and format for the Basewide Ecological Assessment Report (BEAR) for Naval Air Station (NAS) Cecil Field. The BEAR will assess potential ecological risks for aquatic and terrestrial receptors resulting from the release of contaminants from the Installation Restoration (IR) program waste sites and potential sources of contamination (PSCs) (ABB Environmental Services, Inc., [ABB-ES], 1993).

This workplan serves as an annotated outline of the BEAR report and is intended to relate the scope and structure of the BEAR. Sites and PSCs at NAS Cecil Field are described in the Site Management Plan (SMP) (ABB-ES, 1993). Operable units (OUs) are used to define investigative sets of PSCs at NAS Cecil based on types of waste disposed of and the suspected contaminants of concern. Currently there are 8 OUs at NAS Cecil Field and 35 PSCs. Figure 1-1 in the BEAR will be a map that shows the general location of NAS Cecil Field. Figure 1-2 in the BEAR will show the location of each of the PSCs at NAS Cecil Field.

Completion of the BEAR will address four primary objectives:

- description of the ecological setting of NAS Cecil Field,
- description of the methodology used to complete individual Ecological Risk Assessments (ERAs) for each of the PSCs,
- synopsis of the ERA results for each PSC, and
- assessment of the total ecological risk represented by multiple PSCs at NAS Cecil.

The assessment of "total" risk will be based on the results of the respective ERAs completed for each of the OUs and PSCs as part of the Remedial Investigation (RI) and Feasibility Study (FS) process. Additional analyses of the total risk represented by the release of contamination from multiple PSCs will be completed and included as the last chapter of the BEAR. Risk associated with contamination not associated with PSCs may be evaluated if it has a bearing on the interpretation and assignment of risk from the PSCs.

1.2 SCOPE. The workplan is organized according to the proposed structure of the BEAR and serves as an annotated outline. The BEAR will be a "living" document that will be updated on a periodic basis (see Chapter 9.0). Based on the results of the ERA for each PSC, portions of the BEAR will be updated and reissued. The entire BEAR will not be rewritten. Considering the dynamic nature of the document, the structure of the BEAR is proposed to facilitate quick and easy changes. Special references are made to indicate the portions of the BEAR that will be subject to change and those that will remain unchanged.

Chapter 1.0 of the BEAR will describe the purpose, scope, organization, and intended uses of the BEAR. Other introductory information pertaining to the status of the facility under Base Realignment and Closure (BRAC), site management, and remediation may be included.

Chapter 2.0 of the BEAR will provide ecological setting information for NAS Cecil Field and for each of the PSCs or other sites. Chapter 3.0 will describe the

2.0 ECOLOGICAL SETTING

The ecological setting at NAS Cecil Field will be described in Chapter 2.0 of the BEAR. Aquatic habitats, upland habitats, and wetlands will be described in separate subsections. A subsection discussing the possible presence of rare, endangered, and threatened species will be included.

2.1 AQUATIC HABITATS. This section of the BEAR will describe the general surface hydrology at NAS Cecil Field. The habitat provided by the surface water at NAS Cecil Field will be described according to the watershed. Habitats will be described based on previous biological sampling events at NAS Cecil Field (ABB-ES, 1993; CDM Federal Program [CDM], 1994; EA Engineering, Science, and Technology, 1993) and previous reports (Envirodyne Engineers, 1985). Aquatic habitats will be described for each of the three watersheds present at NAS Cecil, including Rowell Creek, Sal Taylor Creek, and Yellow Water Creek. Figure 2-1 will show the locations of the surface drainage features at NAS Cecil Field.

A list of resident aquatic species will be generated for each watershed and will be included in Appendix A, Ecological Receptor Species at NAS Cecil Field. The list will be based on those aquatic species collected from the aquatic habitats as well as species that are suspected to be resident but were not collected and identified. Appendix A will include lists of mammals, birds, reptiles, amphibians, and plants associated with the aquatic habitats.

2.1.1 Rowell Creek Rowell Creek will be subdivided into at least four separate segments for the purposes of discussing habitat and risk. The tentative subsections are Rowell Creek upstream (upstream of Lake Fretwell), Lake Fretwell, Lake Newman, and Rowell Creek downstream (downstream of Lake Fretwell). Tributaries to Rowell Creek will also be discussed separately.

2.1.2 Sal Taylor Creek The aquatic habitat provided by Sal Taylor Creek will be discussed in this section. Sal Taylor Creek may be subdivided with separate discussions of the upstream (altered and channelized on the eastern side of the flightline) and downstream sections.

2.1.3 Yellow Water Creek Because Rowell Creek drains to Sal Taylor Creek and Sal Taylor Creek drains into Yellow Water Creek south of NAS Cecil Field, Yellow Water Creek ultimately receives flow from all of NAS Cecil Field. It also may receive runoff from PSGs located on the northern part of the facility.

2.2 UPLAND WILDLIFE HABITATS. Habitat provided for terrestrial wildlife species at NAS Cecil Field will be described. The term "upland" refers to land not considered to be a jurisdictional wetland by the State of Florida. In general, upland habitat will be described for the facility based on a review of information gathered from biological sampling events (ABB-ES, 1993; EA, 1993) and previous reports (CDM, 1994). The system for description and classification of upland habitats will be according to the Florida Natural Areas Inventory (FNAI) and Department of Natural Resources, 1990. The location of habitats at NAS Cecil Field will be shown on Figure 2-3.

**Table 2-1
Rare, Endangered, and Threatened Flora and Fauna at or in the Vicinity of
Naval Air Station (NAS) Cecil Field**

Basewide Ecological Assessment Workplan
Naval Air Station Cecil Field
Jacksonville, Florida

Common Name	FGFWFC ¹	USFWS ²	FDA ³	Comments
Florida gopher frog (<i>Rana capito</i>)	SSC	C2		Possible resident at NAS Cecil Field. (Envirodyne Engineers, 1985).
American alligator (<i>Alligator mississippiensis</i>)	SSC	T(S/A)		Confirmed resident in Lake Fretwell (Envirodyne Engineers, 1985).
Eastern indigo snake (<i>Drymarchon corais couperi</i>)	T	T		Confirmed resident at NAS Cecil Field. (Envirodyne Engineers, 1985).
Gopher tortoise (<i>Gopherus polyphemus</i>)	SSC	C2		Confirmed resident at NAS Cecil Field. (Envirodyne Engineers, 1985).
Wood stork (<i>Mycteria americana</i>)	E	E		Suitable habitat for feeding may be present in shallow water areas at NAS Cecil Field (Envirodyne Engineers, 1985).
Southeastern kestrel (<i>Falco sparverius paulus</i>)	T	C2		Confirmed migrant (Envirodyne Engineers, 1985).
Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>)	E	T		Confirmed migrant (Envirodyne Engineers, 1985).
Bald eagle (<i>Haliaeetus leucocephalus</i>)	T	E		Confirmed migrant (Envirodyne Engineers, 1985).
Sherman's fox squirrel (<i>Sciurus niger shermani</i>)	SSC	C2		Possible resident of pine woods. Confirmed resident of similar habitat at NAS Jacksonville. Not known to be a resident species at NAS Cecil Field (Envirodyne Engineers, 1985).
Florida black bear (<i>Ursus americanus floridanus</i>)	T	C2		Evidence of black bears reported in outlying areas in 1982 (Envirodyne Engineers, 1985).
Florida mouse (<i>Peromyscus floridanus</i>)	SSC	C2		Known from Clay County, may range into habitats (sand pine scrub and longleaf pine-turkey oak communities) present at NAS Cecil. Not known to be a resident at NAS Cecil Field (Envirodyne Engineers, 1985).
Hooded pitcher plant (<i>Sarracenia minor</i>)			T	Found in wetlands at Site 17.
Spoon-leaved sundew (<i>Drosera intermedia</i>)			T	Found at one location at Yellow Water Weapons Area in drainage ditch (Environmental Services & Permitting [ESP], 1990).
See notes at end of table.				

3.0 ECOLOGICAL RISK ASSESSMENT METHODOLOGY

An ERA is the process that evaluates actual or potential adverse effects to the ecosystem or ecosystem components associated with exposure(s) to contamination from a hazardous waste site. The ERAs for each of the OUs and PSCs at NAS Cecil Field will be completed in accordance with current U.S. Environmental Protection Agency (USEPA) guidance for ecological assessment at Superfund sites (USEPA, 1989a; 1989b; 1991a; 1991b; 1991c). Each ERA examines the potential or actual adverse effects associated with exposure to contamination in surface soil, surface water, sediment, and groundwater to ecological receptors. The general methodology used for completing the ERAs will be described in this chapter of the BEAR including regulatory requirements.

The approach for ERA at NAS Cecil Field integrates both predictive and field measurement methodologies to assess risk. Decisions regarding overall risk for ecological receptors are based on the weight of evidence from the results of all components of the assessment methodology. The components are designed to provide measures of risk for various ecological receptors, exposure pathways, and potential adverse effects.

Chapter 3.0 of the BEAR will describe the following components of the ERA presented as the following subsections.

- 3.1.1 Problem Formulation
 - 3.1.1.1 Identification of Receptors
 - 3.1.1.2 Identification of Exposure Pathways
 - 3.1.1.3 Identification of Endpoints
- 3.1.2 Selection of Ecological Contaminants of Potential Concern
- 3.1.3 Exposure Assessment
- 3.1.4 Ecological Effects Assessment
- 3.1.5 Risk Characterization
- 3.1.6 Uncertainty Analyses

4.0 SUMMARY OF ECOLOGICAL CONTAMINANTS OF CONCERN

Ecological Contaminants of Concern (ECCs) are the analytes associated with an ecological risk. The ECCs identified for each of the PSCs for surface soil, groundwater, surface water, and sediment will be summarized in Chapter 4.0 of the BEAR. The purpose of the summaries is to identify any trends in contamination among the PSCs to identify contaminants that may be of concern basewide. This portion of the BEAR is critical to the assessment of total risk for the aquatic habitats at NAS Cecil Field because it provides for examination of the extent of contamination within the entire watershed.

The method for selection of ECCs will be included in the individual ERAs for each OU and PSC and will not be specified in the BEAR except to note any differences in the selection process among the PSC-specific ERAs. The process for selection may change over time and could be different for each of the PSCs.

4.1 SURFACE SOIL. The ECCs selected for each PSC will be presented and summarized in tabular format to provide for quick updating of the BEAR. A prototype of the table (Table 4-1) is provided.

4.2 GROUNDWATER. The ECCs for each PSC will be presented and summarized in tabular format to provide for quick updating of the BEAR. A prototype of the table (Table 4-2) is provided.

4.3 SURFACE WATER AND SEDIMENT. The distribution of ECCs in surface water and sediment will be presented in both tabular and geographic format. Figure 4-1 will indicate the surface water and sediment sampling locations for Rowell Creek. Figure 4-2 will show the surface water and sediment sampling locations and distribution of contamination in Sal Taylor Creek. Figure 4-3 will show the sampling stations and results for Yellow Water Creek. Figure 4-4 will show the sampling stations and results for Lake Fretwell. Surface water and sediment data will be included as Appendix B of the BEAR. Table 4-3 will provide a summary of the ECPCs for surface water and sediment.

**Table 4-3
 Prototype of Table for Summary of Ecological Contaminants of Concern
 for Surface Water and Sediment**

Basewide Ecological Assessment Workplan
 Naval Air Station Cecil Field
 Jacksonville, Florida

Contaminant of Potential Concern	Rowell Creek OU 1	Rowell Creek Upstream of OU 1	Lake Fretwell	PSC 5 Tributary	PSC 2 Tributary	Sal Taylor Creek	Yellow Water Creek
1,4-Dichlorobenzene	SW/SD						
4,4-DDT		SD					
Aroclor-1254		SD					
Aroclor-1260		SD				SD	
Arsenic		SW					
Notes: OU = operable unit. PSC = potential source of contamination. SW = surface water. SD = sediment. DDT = dichlorodiphenyltrichloroethane.							

5.0 SUMMARY OF BIOLOGICAL SAMPLING

Chapter 5.0 of the BEAR will summarize biological studies that have been completed at NAS Cecil Field. The biological studies include (1) toxicity tests, (2) aquatic studies, (3) terrestrial studies, (4) wetland studies, and (5) chemical analyses of plant and animal tissue. The biological sampling studies will be described according to the OU and PSC for which the information was collected. This structure will facilitate the addition of other information as further biological sampling at NAS Cecil Field is completed. The biological sampling events will be described in chronological order in Appendix C of the BEAR. Appendix C will serve as a record of biological sampling activities completed at NAS Cecil Field. Included in Appendix C will be a base map which records where all biological samples have been collected.

5.1 TOXICITY TESTING. An important part of the approach for the ERA at NAS Cecil Field is toxicity testing of media samples collected from the PSCs (soil, water, and sediment). This provides direct measurement of any adverse effects associated with the mixture of contaminants present in the medium. Toxicity testing of surface soil, sediment, and groundwater has been completed. Section 4.1 of the BEAR will summarize for each PSC the toxicity testing methods, results, uncertainties, and conclusions.

5.1.1 Operable Units Subsection 5.1.1 will describe the toxicity testing completed for each of the eight OUs at NAS Cecil Field. If additional OUs are added to the SMP, additional sections will be added.

5.1.2 Other Sites and PSCs Subsection 5.1.2 will describe the toxicity testing results for PSCs that are not part of OUs.

5.1.3 Sediment Toxicity Testing Subsection 5.1.3 of the BEAR will address sediment toxicity testing that is not associated with a particular OU or PSC. The results of PSC and OU-specific sediment toxicity testing described in Subsections 5.1.1 and 5.1.2 will also be summarized in this section. The inclusion of all sediment toxicity testing results will provide easy reference for the reader and will facilitate summarization of sediment toxicity within the watersheds at NAS Cecil Field.

5.2 AQUATIC STUDIES. Aquatic studies include examination or sampling of aquatic resources or habitat at NAS Cecil Field. Aquatic resources include fish, invertebrates, and aquatic plants. The timing and scope of aquatic studies will be reported in Appendix C. Study results will be summarized in this section according to OUs and PSCs. Any studies not completed for a specific PSC or OU will be summarized in Subsection 5.2.3.

The information will be presented as follows.

- 5.2.1 Operable Units
- 5.2.2 Other Sites and PSCs
- 5.2.3 Other Studies

7.0 ANALYSES OF OVERALL ECOLOGICAL RISKS

The BEAR will discuss potential risk to the environment associated with contamination from all of the OUs and PSCs. The analyses of overall risk will pertain to the aquatic environments at NAS Cecil Field.

Examination of total risks for terrestrial wildlife associated with contamination in surface soil is expected to be unnecessary. The ERA completed for each OU or PSC at NAS Cecil Field includes examination of worst-case exposure conditions where species are assumed to be resident and exposed over a lifetime to contamination within the area of the particular OU or PSC. Risks for a wildlife species exposed to contamination in surface soil from a variety of PSCs would be expected to result in lower contaminant exposures than the worst-case scenario. If, upon examination of the ECC data in Chapter 4.0, persistent and potentially bioaccumulative contaminants are identified across several OUs and PSCs that are located in close proximity (close enough for a species to forage in both areas), a risk evaluation for multiple exposures will be completed.

The watersheds at NAS Cecil Field may receive contamination from more than one PSC. If so, it becomes important to assess risks associated with multiple exposures. Risks for the watersheds will be discussed in the following subsections. Risk assessment will be based on the ERA results reported in Chapter 6.0, the extent of contamination of the watershed reported in Chapter 4.0, and the status of the aquatic communities reported in Chapter 5.0. Where permitted, based on the available results from the PSC-specific ERAs, risks for the watershed will be discussed quantitatively. The goals of the risk analyses include:

- identification of contamination in watersheds that has migrated from PSCs,
- assessment of risks associated with particular contaminants with the intent of identifying the necessity for source controls, and
- identification of any areas within the watershed that are at risk associated with contamination present in surface water or sediment regardless of contaminant source.

Potential ecological risk will be evaluated for Rowell Creek in Section 7.1, Sal Taylor Creek in Section 7.2, Yellow Water Creek in Section 7.3, and wetlands in Section 7.4.

7.1 ROWELL CREEK. For ease of evaluation, Rowell Creek will be subdivided into three segments. Tributaries to Rowell Creek will be discussed separately. Further subdivision of the segments may be necessary in the future and can be ladded as subsections easily. The proposed subsections of the BEAR include:

- 7.1.1 Rowell Creek Upstream of Lake Fretwell
- 7.1.2 Lake Fretwell
- 7.1.3 Rowell Creek Downstream of Lake Fretwell
- 7.1.4 Tributaries to Rowell Creek

6.0 ECOLOGICAL RISK ASSESSMENT RESULTS

The results and conclusions of the ERAs for each of the PSCs will be summarized in Chapter 6.0 of the BEAR. The results will be reported according to OUs and PSCs and will also be presented in tabular format. The results for OUs 1 and 2 are currently available and will be included in the first draft of the BEAR. Subsequent ERA results will be added as additional sections according to the following structure as they become available:

- 6.1 OPERABLE UNITS
 - 6.1.1 Operable Unit 1
 - 6.1.1.1 Site 1
 - 6.1.1.2 Site 2
 - 6.1.2 Operable Unit 2
- 6.2 OTHER SITES AND PSCS

Each section will include available information on remedial goals, remedial response objectives, and records of decision (RODs).

8.0 RECOMMENDATIONS

This section of the BEAR will provide for discussion of recommendations for further action based on the risk results in Chapter 7.0. Further action may include further sampling and analyses and possibly remediation. The Section will be organized according to watersheds in the same manner as Chapter 7.0.

8.1 ROWELL CREEK

8.2 SAL TAYLOR CREEK

8.3 YELLOW WATER CREEK

8.4 WETLAND HABITATS

9.0 DISTRIBUTION OF DOCUMENT AND UPDATING

9.1 DOCUMENT REVIEW AND DISTRIBUTION. After Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) review, the workplan for the BEAR will be distributed to the following parties for review and comment:

- Florida Department of Environmental Protection (FDEP),
- USEPA Region IV,
- NAS Cecil Field,
- U.S. Fish and Wildlife Service, and
- National Oceanic and Atmospheric Administration (NOAA).

9.2 DRAFT BEAR. After workplan approval, the first BEAR will be issued to SOUTHNAVFACENGCOM. The BEAR will be referred to as interim until the last (final) BEAR is issued. The interim BEAR will be distributed according to the direction of SOUTHNAVFACENGCOM.

9.3 UPDATING. The BEAR will be updated after each OU RI/FS has been finalized or once a year, whichever is greater, as long as new ERAs are completed for OUs and PSCs at NAS Cecil Field. The updates will be completed by providing revised pages or additional pages with instructions to insert in place of obsolete pages.

REFERENCES

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- Springborn Laboratories, 1994, Personal communication between Janet Burris of ABB Environmental Services, Inc., and Krzysztof Jop: January.
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APPENDIX A

ECOLOGICAL RECEPTOR SPECIES AT NAS CECIL FIELD

Appendix A will contain separate lists of potential ecological receptors of contamination from the PSCs including terrestrial plants, mammals, birds, reptiles, amphibians, aquatic invertebrates, and fish.

APPENDIX B

SURFACE WATER AND SEDIMENT ANALYTICAL DATA

Appendix B will contain a summary of the chemical analyses of surface water and sediment samples from NAS Cecil Field. The results, sorted according to chemical, will include only detected concentrations of analytes in the respective samples.

APPENDIX C

BIOLOGICAL STUDIES AT NAS CECIL FIELD

Appendix C will contain a chronological summary of the biological studies completed for NAS Cecil Field. Biological studies include aquatic studies, terrestrial studies, toxicity testing, and wetlands studies. The appendix is intended to be a quick reference for the reader to determine the history of biological sampling activities for the facility.

APPENDIX D
DISTRIBUTION LIST

This appendix will record the updates and a list of parties to whom the BEAR is distributed.