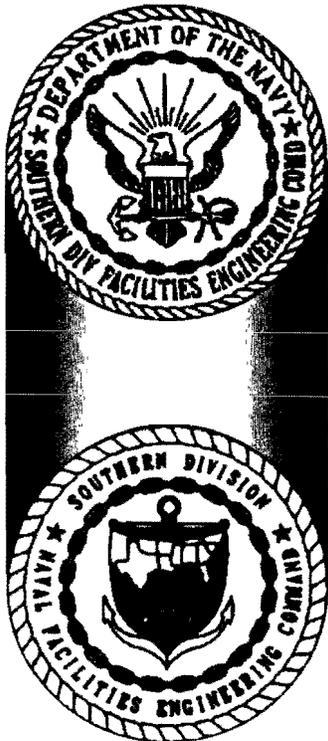


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CORRECTIVE MEASURES STUDY WORK PLAN RATIONALE FOR NO FURTHER ACTION
SOLID WASTE MANAGEMENT UNIT 43 (SWMU 43) ZONE A WITH TRANSMITTAL CNC
CHARLESTON SC
11/27/2000
CH2M HILL

CORRECTIVE MEASURES STUDY WORK PLAN

Rationale for No Further Action **Solid Waste Management Unit 43, Zone A**



Charleston Naval Complex
North Charleston, South Carolina

SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

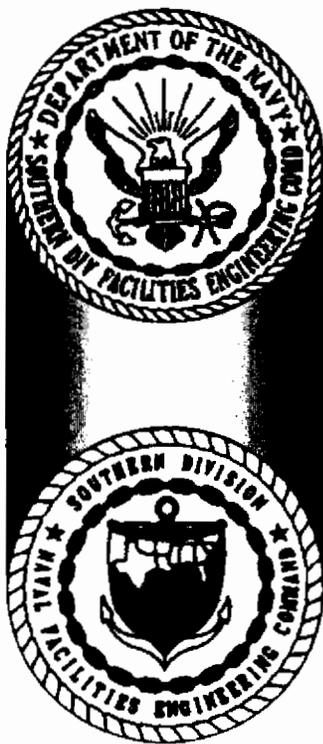
PREPARED BY
CH2M-Jones

November 2000

Revision 1
Contract N62467-99-C-0960

CORRECTIVE MEASURES STUDY WORK PLAN

Rationale for No Further Action Solid Waste Management Unit 43, Zone A



**Charleston Naval Complex
North Charleston, South Carolina**

SUBMITTED TO
**U.S. Navy Southern Division
Naval Facilities Engineering Command**



Scan Date 5-21-09
Operator AL
Location Code BINSEL 1188

PREPARED BY
CH2M-Jones

November 2000

Revision 1
Contract N62467-99-C-0960



CH2MHILL

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November 27, 2000

John Litton, P.E.
Director
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Litton:

Enclosed please find four copies of Revision 1 to the Corrective Measures Study (CMS) Work Plan – Rationale for No Further Action for SWMU 43, at the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson, P.E.

xc:


Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL



DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

P.O. BOX 190010

2155 EAGLE DRIVE

NORTH CHARLESTON, S.C. 29419-9010

5090/11

Code 18B1

28 November, 2000

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF CORRECTIVE MEASURES STUDY WORK PLAN FOR SOLID
WASTE MANAGEMENT UNIT 43, REVISION 1

Dear Mr. Litton,

The purpose of this letter is to submit the Corrective Measures Study Work Plan for Solid Waste Management Unit (SMWU) 43 located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

This document and the proposed rationale for no further action were discussed at the September Project Team meeting. The document has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

A handwritten signature in black ink that reads "Matthew A. Hunt".

Matthew A. Hunt, P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4),
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

CORRECTIVE MEASURES STUDY WORK PLAN

Rationale for No Further Action **Solid Waste Management Unit 43, Zone A**



Charleston Naval Complex
North Charleston, South Carolina



SUBMITTED TO
U.S. Navy Southern Division
Naval Facilities Engineering Command

PREPARED BY
CH2M-Jones

E11300021RGNV

November 2000
158814.ZA.PR.01

Revision 1
Contract N62467-99-C-0960

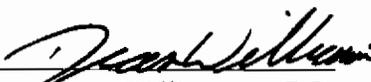
Certification Page for Corrective Measures Study Work Plan for SWMU 43, Zone A

Rationale for No Further Action

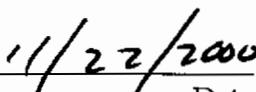
I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct; and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

Temporary Permit No. T2000342



Dean Williamson, P.E.



Date

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1 **Acronyms and Abbreviations**

2	AOC	Area of Concern
3	BCT	BRAC Clean-Up Team
4	BRAC	Base Realignment and Closure Act
5	CA	Corrective Action
6	CMS	Corrective Measures Study
7	CMS WP	CMS Work Plan
8	CNC	Charleston Naval Complex
9	COC	chemical of concern
10	DPT	Direct-Push Technology
11	EnSafe	EnSafe Inc.
12	MCL	maximum contaminant level
13	µg/L	microgram per liter
14	NAVBASE	Naval Base
15	NFA	No Further Action
16	OWS	oil/water separator
17	RBC	risk-based concentration
18	RCRA	Resource Conservation and Recovery Act
19	RFA	RCRA Facility Assessment
20	RFI	RCRA Facility Investigation
21	SCDHEC	South Carolina Department of Health and Environmental Control
22	SVOC	semi-volatile organic compound
23	SWMU	Solid Waste Management Unit

SECTION 1.0

Introduction

1 1.0 Introduction

2 In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for
3 closure as part of the Defense Base Realignment and Closure Act (BRAC), which
4 regulates closure and transition of property to the community. The Charleston Naval
5 Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval
6 Shipyard and NAVBASE on April 1, 1996.

7 CNC Corrective Action (CA) activities are being conducted under the Resource
8 Conservation and Recovery Act (RCRA); the South Carolina Department of Health and
9 Environmental Control (SCDHEC) is the lead agency for CA activities at the site. All
10 RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0
11 170 022 560).

12 In April 2000, CH2M-Jones was awarded a contract to provide environmental
13 investigation and remediation services at CNC. This submittal has been prepared by
14 CH2M-Jones to document the basis for changing the permit status of one Solid Waste
15 Management Unit (SWMU) at CNC to No Further Action (NFA).

16 This submittal is a revision to the September 2000 (Revision 0) submittal, which has
17 been updated to incorporate responses to SCDHEC comments and agreements made at
18 the October 2000 BRAC Cleanup Team (BCT) meeting. Responses to SCDHEC
19 comments are presented in Appendix A.

20 1.1 Background for Corrective Measures Study Work Plan

21 As part of RCRA CA activities, a RCRA Facility Investigation (RFI) report was finalized
22 for Zone A (EnSafe Inc. [EnSafe], 1998a). Zone A is located in the northernmost portion
23 of CNC on the west side of the Cooper River. It is bounded by the base boundary to the
24 north and west; the Cooper River to the east; and Noisette Creek to the south. Data for
25 SWMU 43 (Publications and Printing Plant, Building 1628) in Zone A is adequate to
26 support an NFA recommendation.

27 Figure 1-1 shows the location of Zone A with respect to the CNC. Detailed figures
28 depicting SWMU 43 are presented in Section 2.0 of this Corrective Measures Study
29 Work Plan (CMS WP).

1 Prior to changing the status of any site to NFA in the CNC RCRA CA permit, the BCT
2 agrees that the following issues should be considered:

- 3 • Status of the RFI
- 4 • Presence of metals (inorganics) in groundwater
- 5 • Potential linkage of SWMU/Area of Concern (AOC) to SWMU 37 (investigated
6 sanitary sewers)
- 7 • Potential linkage of SWMU/AOC to AOC 699 (investigated stormwater sewers)
- 8 • Potential linkage of SWMU/AOC to AOC 504 (investigated railroad lines)
- 9 • Potential migration pathways to surface water bodies (Zone J)
- 10 • Potential contamination associated with oil-water separators (OWSs)
- 11 • Relevance or need for land-use controls at the site

12 **1.2 Brief Description of Zone L SWMUs and AOCs,** 13 **and Zone J**

14 With respect to the linkage of individual sites to sanitary sewers, stormwater sewers,
15 and railroad lines, reference is made to the *Final Zone L RFI Work Plan* (EnSafe, 1995).

16 The investigated segments of Zone L encompass:

- 17 • Specific sections of the sanitary sewer system that may have been exposed to
18 hazardous materials (SWMU 37)
- 19 • Sections of the stormwater collection system likely exposed to hazardous materials
20 (AOC 699)
- 21 • Sections of the railroad line system where known or suspected releases of solid or
22 hazardous waste contaminants have occurred (AOC 504)

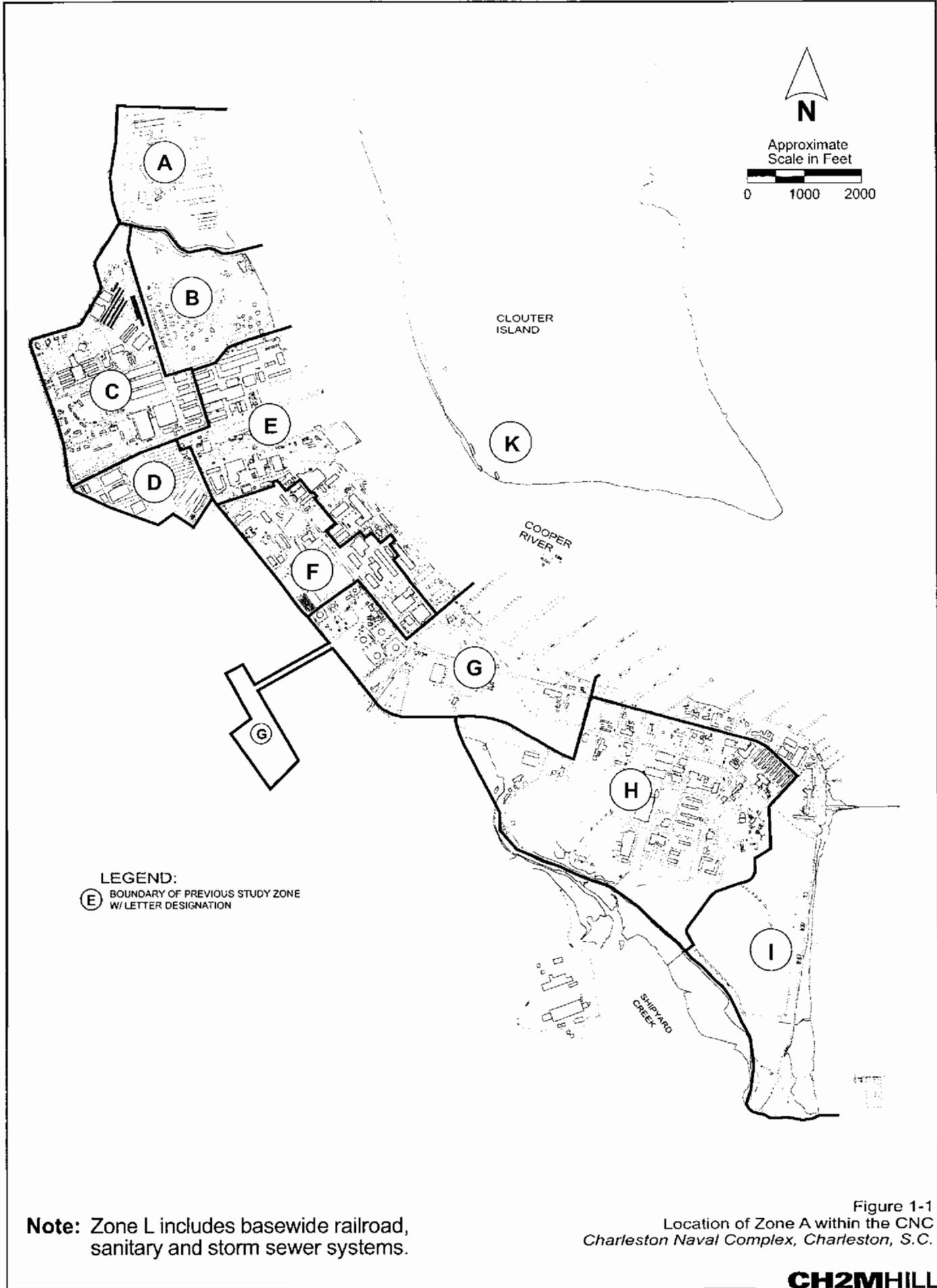
23 The *Zone J Draft RCRA Facility Investigation Report* (EnSafe, 2000) is also referenced in
24 this CMS WP. Zone J encompasses investigated surface water bodies in the CNC.

25 **1.3 Document Purpose**

26 The purpose of this CMS WP is to provide additional information to support the
27 decision for NFA at SWMU 43. This CMS WP provides supplemental information for
28 SWMU 43 and is organized in the following manner:

29 **1.0 Introduction** – Presents the organization of this CMS WP and background
30 information pertaining to the site.

- 1 **2.0 Supplemental Information for NFA – SWMU 43 in Zone A** – Provides
- 2 supplemental information for NFA – SWMU 43 in Zone A, Publications and Printing
- 3 Plant, Building 1628.
- 4 **3.0 References** – Lists the references used in this document.
- 5 **Appendix A** presents responses to SCDHEC comments.
- 6 **Appendix B** presents the figure (Davis and Floyd, 1998) depicting drainage
- 7 improvements in the study area.
- 8 **Appendix C** presents excerpts from the Final Zone A RFI Report.



SECTION 2.0

**Supplemental Information for NFA –
SWMU 43 in Zone A**

2.0 Supplemental Information for NFA – SWMU 43 in Zone A

Building 1628, SWMU 43, is a former publications and printing plant that was in operation from 1979 through 1996. A dark room and a hazardous materials locker were located on the ground floor of the building. Prior to installing the lockers, hazardous materials were stored in two areas outside of the main building. SWMU 43 is described further in the following paragraphs.

2.1 Brief Overview of Potential Site Contaminants

As a result of the operations at SWMU 43, potential contaminants (whose presence was assessed in the RFI) include silver-containing developing solutions, lead, chromium, acetic acid, ferric chloride, and potassium hydroxide. An aerial view of SWMU 43 and the local area around the SWMU is presented in Figure 2-1. Figure 2-2 presents the location of SWMU 43 with respect to the sanitary sewer segment assessed as part of the Zone L investigation.

2.2 RFI Status

The status of the *Zone A RCRA Facility Investigation Report* (EnSafe, 1998a) is final. Results of the contamination investigation performed at this site are addressed in Section 10.6 of the RFI report. The results of the soil and groundwater sampling and analysis did not identify chemicals of concern (COCs); therefore, no corrective measures were recommended.

2.3 Presence of Inorganics in Groundwater

For the purpose of site closeout documentation, the inorganics in groundwater issue refers to the occasional or intermittent detection of several metals (primarily arsenic, thallium, and antimony) in groundwater at concentrations above the applicable maximum contaminant level (MCL). They typically are preceded or followed by detections of these same metals below the MCL or below the practicable quantitation limit.

1 This was not found to be an issue of concern at SWMU 43 during the RFI. As noted in
2 Section 10.6.6.2 of the Zone A approved RFI report (April 14, 1998), the Navy analyzed
3 for metals at the single downgradient shallow well at SWMU 43. No inorganics
4 exceeded their respective MCLs. The arsenic results in three rounds of sampling (18.3,
5 21.2, and 25.2 micrograms per liter [$\mu\text{g}/\text{L}$]) exceeded the risk-based concentration (RBC)
6 value of 0.045 $\mu\text{g}/\text{L}$ but did not exceed the MCL of 50 $\mu\text{g}/\text{L}$. A copy of Table 10.6.7 from
7 the Final RFI (Ensafe, 1998a), showing the range of detections versus screening criteria,
8 is presented in Appendix C. Consequently, no further evaluation of inorganics in
9 groundwater is necessary at SWMU 43.

10 **2.4 Potential Linkage to Sanitary Sewers (SWMU 37)**

11 The nearest investigated sanitary sewer to SWMU 43 is adjacent to the site (see
12 Figure 2-2).

13 As part of the SWMU 37 and Zone L investigation, soil (borings and Direct-Push
14 Technology [DPT]) and groundwater (monitor wells and DPT) samples were collected
15 (EnSafe, 1998b). One DPT soil sample location (037SP010) and one DPT groundwater
16 sample location (037GP018) are adjacent to the sanitary sewer line of SWMU 43. These
17 samples were used to assess the linkage of the sanitary sewer to SWMU 43 and are
18 presented in Figure 2-3.

19 The arsenic concentration reported in 037SP010 exceeded the RBC, but was less than
20 background. Iron was reported at a concentration greater than the RBC but is within the
21 range typical for background. No MCL or tap water RBC exceedances were reported for
22 the organic compounds analyzed in the groundwater sample. Neither soil nor
23 groundwater contamination exist at SWMU 43. Copies of Tables 10.6.3, 10.6.4, 10.6.6,
24 and 10.6.7 from the Final RFI (Ensafe, 1998a), which present the range of detections
25 versus the screening criteria, are presented in Appendix C.

26 Since no contamination exists, further evaluation of this issue is not warranted.

27 **2.5 Potential Linkage to Storm Sewers (AOC 699)**

28 The nearest investigated stormwater sewer to SWMU 43 is located a significant distance
29 away, approximately 2,700 feet to the south, across Noisette Creek (see Figure 2-2). The
30 results of soil samples collected at SWMU 43 exceeded RBCs but were less than
31 background. No soil contamination exists at SWMU 43. Copies of Tables 10.6.3 and

1 10.6.4 (Ensafe, 1998a) from the Final RFI, which present a range of detections versus the
2 screening criteria, are presented in Appendix C.

3 Representatives of the BCT conducted a walk-through of SWMU 43 in October 2000. A
4 stormwater drop inlet was observed on the east side of Building 1628 and a floor drain,
5 located in the northwest corner of Building 1628, was identified. Representatives of
6 SCDHEC questioned as to whether the drop inlet was connected to Building 1628, and
7 whether the floor drain was connected to the storm sewer. To answer these questions,
8 CH2M-Jones evaluated engineering drawings for the Building 1628 area.

9 Appendix B contains a figure (Davis and Floyd, 1998) depicting drainage improvements
10 in the study area, which clearly demonstrates that the drop inlet of concern (located east
11 of Building 1628 and north of Building 191) is not connected to Building 1628. To
12 answer the question regarding the floor drain in the northwest corner of Building 1628,
13 engineering drawings on file at the RDA were reviewed. One plan (Drawing Number
14 1628-25) clearly demonstrates that the floor drains in the building are connected to the
15 sanitary sewer line, thus leading to the conclusion that the floor drains are not
16 connected to the stormwater lines. The figure box for the referenced drawing is
17 presented in Appendix B. As no contamination has been reported at SWMU 43, and
18 concerns regarding connections of the drop inlet and floor drain have been eliminated,
19 further evaluation of linkage between AOC 699 and the subject site is not warranted.

20 **2.6 Potential Linkage to Railroad Lines (AOC 504)**

21 The nearest investigated railroad line to SWMU 43 is approximately 350 feet to the west
22 and 350 feet to the northeast (see Figure 2-2). The results of soil samples collected at
23 SWMU 43 exceeded RBCs but were less than background. No soil contamination exists
24 at SWMU 43. Copies of Table 10.6.3 and 10.6.4 from the Final RFI (Ensafe, 1998a) that
25 present the range of detections versus the screening criteria are provided in Appendix
26 C. Based on this information, further evaluation of linkage between AOC 504 and the
27 subject site is not warranted.

28 **2.7 Potential Migration Pathways to Surface Water Bodies**

29 Surface water was studied separately as part of the *Zone J Draft RCRA Facility*
30 *Investigation Report* (EnSafe, 2000). The *Zone J Draft RCRA Facility Investigation Report*
31 includes the investigated surface water bodies. The nearest investigated surface water

1 bodies to SWMU 43 are Noisette Creek, approximately 360 feet to the south, and Cooper
2 River, approximately 1,200 feet to the east.

3 There are two possible migration pathways for contaminants to affect surface water;
4 overland flow via stormwater runoff, and subsurface flow via groundwater. Figure 2-1
5 shows SWMU 43 in relation to Noisette Creek, which is approximately 360 feet to the
6 south of the subject SWMU. The fact that source area contamination was not identified
7 at SWMU 43, and the nearest water receiving body is 360 feet to the south (and across a
8 road), indicates that surface water runoff from SWMU 43 would not be an ecological
9 concern at Noisette Creek. Therefore, further evaluation of a potential pathway for
10 contaminant migration via stormwater runoff is not warranted.

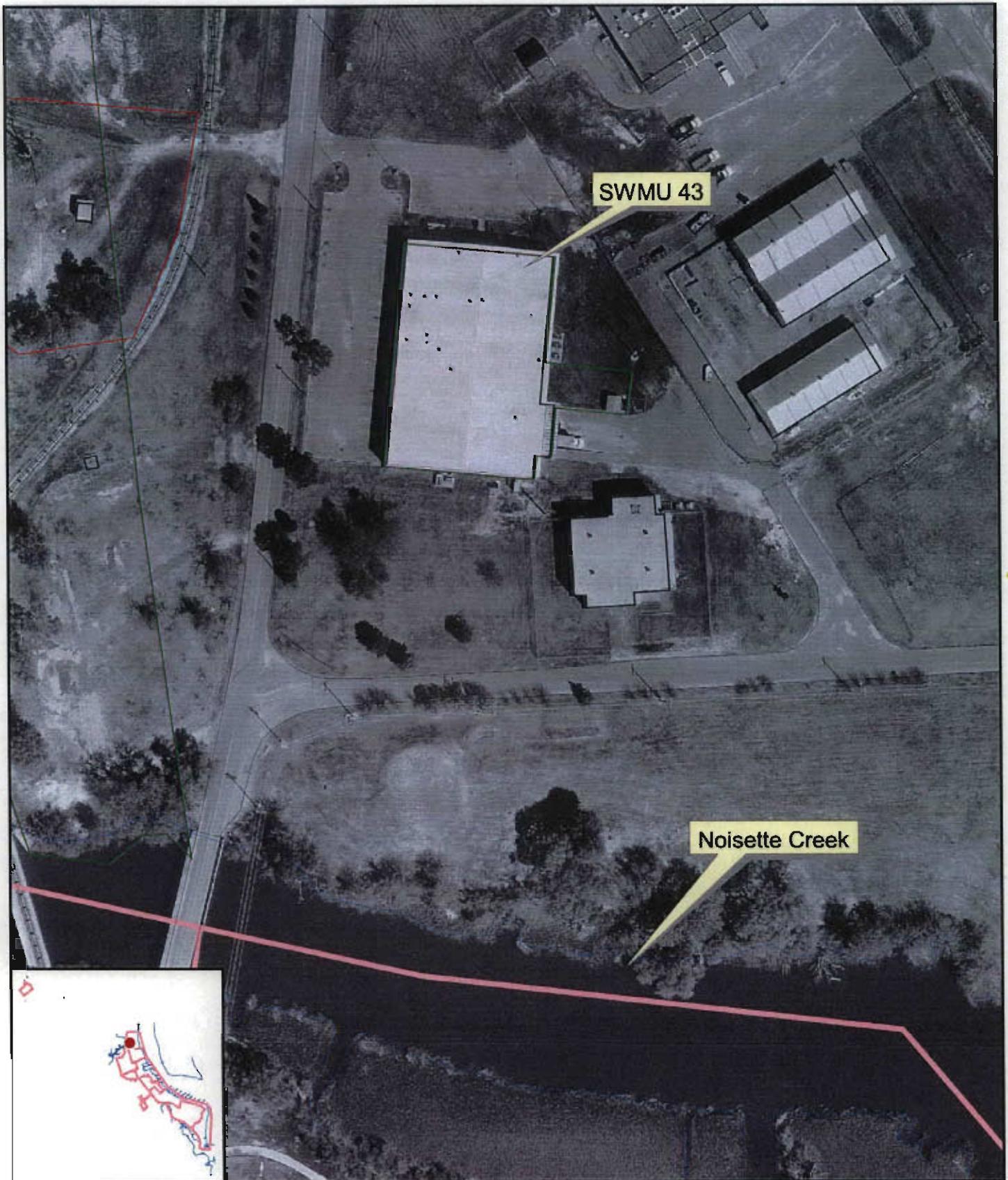
11 A groundwater contaminant plume was not identified at SWMU 43. Furthermore,
12 because no COCs have been identified at SWMU 43, there is no connection between
13 SWMU 43 and hits of semi-volatile organic compounds (SVOCs) detected in Noisette
14 Creek. Therefore, further evaluation of a potential contaminant migration via
15 groundwater migration is not warranted.

16 **2.8 Potential Contamination in OWSs**

17 Neither the RCRA Facility Assessment (RFA) nor RFI refer to the presence of oil/water
18 separators (OWSs) at SWMU 43. Additionally, the Navy completed a comprehensive
19 review of its records and facilities to identify the presence of OWSs throughout the
20 complex (Summer and Fall, 2000). No OWS was identified at SWMU 43 as part of this
21 comprehensive investigation. On this basis, further evaluation of this issue is not
22 warranted.

23 **2.9 Land-Use Control Management Plan**

24 No unacceptable risks to human health and the environment were identified in the risk
25 assessment in Section 10.6.6 of the *Zone A RCRA Facility Investigation Report* (EnSafe,
26 1998a). Therefore, land-use controls will not be necessary at SWMU 43.



-  Railroads
-  Shoreline
-  AOC Boundary
-  SWMU Boundary
-  Buildings
-  Zone Boundary

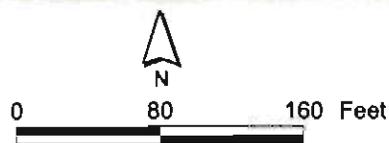


Figure 2-1

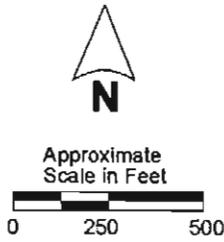
Aerial View of SWMU 43 and the Surrounding Area

CH2MHILL

LEGEND:

-  SANITARY SEWER LINE INVESTIGATED FOR SWMU 037
-  SEWER MANHOLE
-  FENCELINE
-  RAILROAD TRACKS
-  ZONE W/ LETTER DESIGNATION

Note: Zone L includes basewide railroad, sanitary and storm sewer systems.



SWMU 43
Former Publication
and Printing Plant

COOPER RIVER

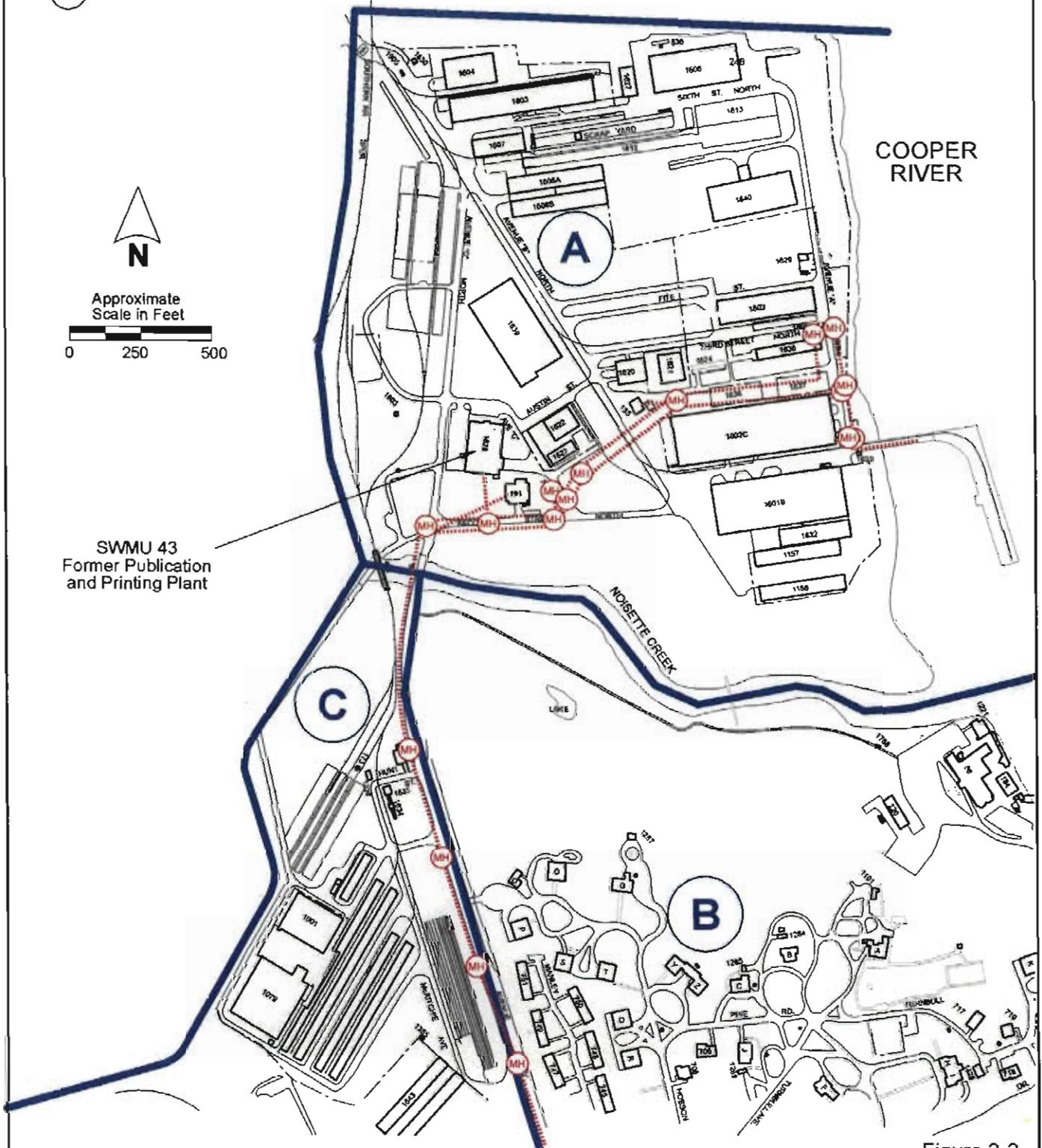
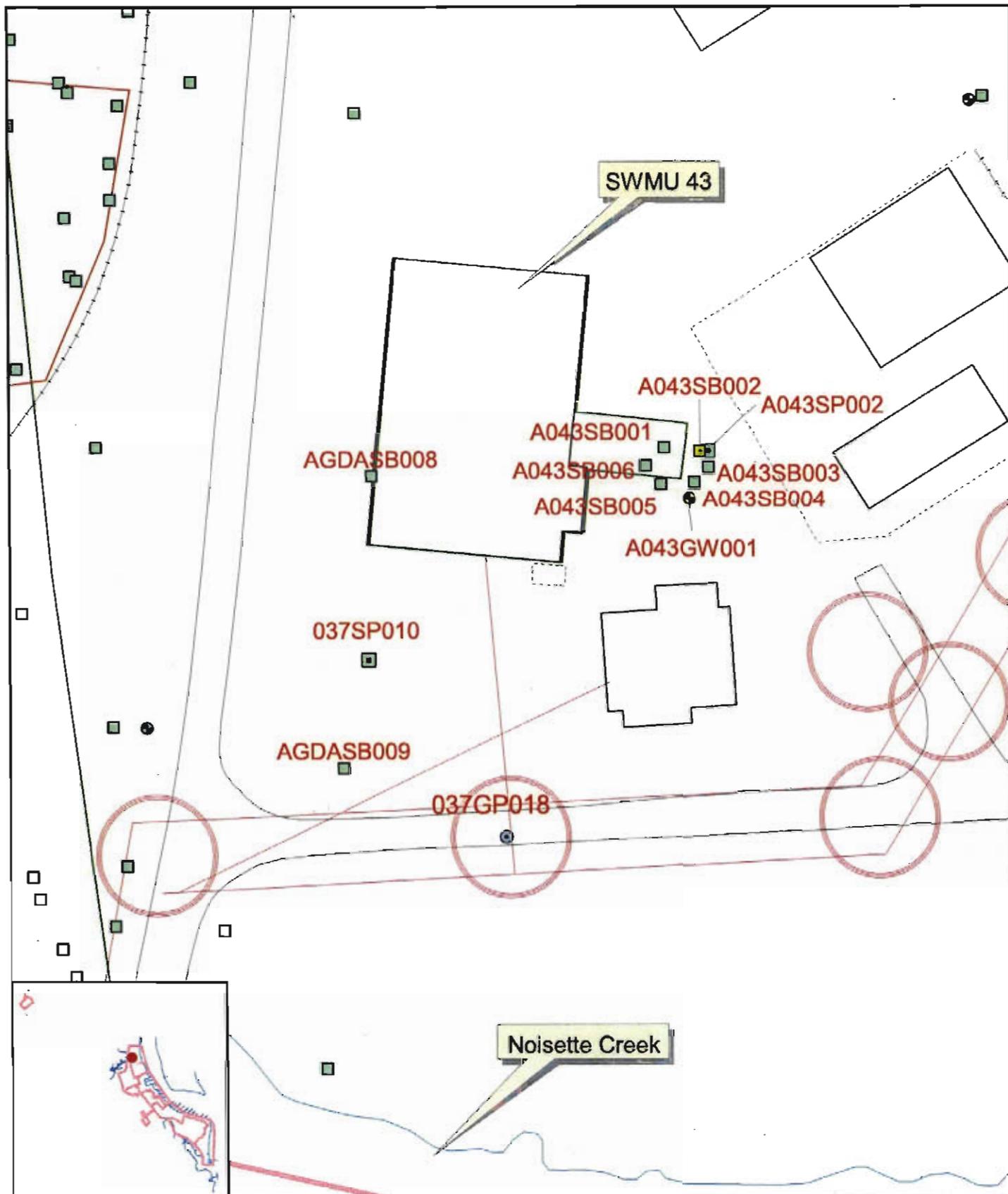


Figure 2-2
SWMU 43 in Relation to Zone L
Charleston Naval Complex, Charleston, S.C.



- Soil Boring
- Groundwater Well
- Soil Probe
- ~ Sewer System 1998
- ▭ AOC Boundary
- ▭ SWMU Boundary



Figure 2-3
SWMU 43
 Sample Locations and Zone L Features

SECTION 3.0

References

1 **3.0 References**

- 2 EnSafe Inc. *Final Zone L RFI Work Plan, NAVBASE Charleston*. October 15, 1995.
- 3 EnSafe Inc. *Zone A RCRA Facility Investigation Report, NAVBASE Charleston*. Revision 0.
- 4 August 7, 1998a.
- 5 EnSafe Inc. *Zone J Draft RCRA Facility Investigation Report, NAVBASE Charleston*.
- 6 April 24, 2000.
- 7 EnSafe Inc. *Zone L RCRA Facility Investigation Report, NAVBASE Charleston*.
- 8 December 18, 1998b.
- 9 Davis and Floyd. *Evaluation of Drainage System Serving Charleston Naval Complex*.
- 10 September 1998.

APPENDIX A

Responses to SCDHEC Comments

Response to SCDHEC Comments Dated September 19, 2000 from Mr. Mansour Malik,
Division of Hydrogeology and Dated September 20, 2000 from Ms. Susan Peterson,
Corrective Action Engineering Section on the
CMS Work Plan; Rationale For No Further Action; SWMU 43, Charleston Naval Complex

Comments from Mansour N. Malik

General Comments:

- 1. This CMS-WP, submitted as a stand-alone document, is very generalized. The Department would like to see a comprehensive document with detailed substantiated evidence to support an NFA.**

Response: The BCT has agreed that documentation for these CMS work plans can be very brief where only a brief discussion is appropriate. Also, where existing documentation has previously been created and approved, for example, where an RFI has already been approved, re-creation and re-presentation of the RFI in these CMS WPs is not required. The RFI will serve in most cases as an adequate reference for information already presented and approved. For the CMS work plans to address the site close out issues, only the appropriate amount of new documentation needs to be created.

- 2. The Zone A RFI Report shows SWMU 43 as building 1628, the Publication and Printing Plant. The sampling conducted seems to encompass only the small shed storage area behind Building 1628. The Navy should properly delineate the SWMU boundaries.**

Response: The SWMU boundaries have been properly delineated. During the RFA, the building was assumed to be the SWMU footprint. During the development of the RFI sampling plan, the SWMU footprint was expanded to include the storage shed. The sampling that was conducted was based on a sampling and analysis plan which the DHEC approved. No further delineation is required.

Specific Comments:

- 3. Section 1.3, line 23+, the text claims provision of additional information to support the decision for a NFA. The Department was unable to identify any additional information in this document other than those included in the referenced Zone A RFI Report. This CMS-WP does not suggest any additional work to support an NFA. The Navy should submit a plan for additional, work or otherwise a proper use of the available information as in support of an NFA.**

Response: Information included in the CMS work plan that was not previously included in the Zone A RFI report includes, but is not limited to, an aerial photograph of the site, a site plan that presents the layout of the sanitary and storm sewers in the vicinity of SWMU 43, information on the location of SWMU 43 with respect to the nearest railroad segment

investigated as part of the AOC 504 investigation, information on the location of SWMU 43 with respect to the nearest storm sewer investigated as part of the Zone L investigation for AOC 699, and information on the results of groundwater sampling conducted as part of the Zone L investigation for SWMU 37.

The BCT agreed at the October 2000 meeting that no additional investigative work is needed at this SWMU for site close-out.

- 4. Section 2.2, line 16: This document referred to the Section 10.6 Zone A RFI (April 14, 1999) report. Fig 10.6.2 (in the RFI Report) doesn't link the geoprobe locations and that of the shallow monitoring well to the stormwater and sanitary sewer system and Noisette Creek. Please be advised to incorporate pertinent information on the figures in this CMS-WP Report.**

Response: Figure 2-3 of the CMS work plan for SWMU 43 presents the location of shallow monitor well MW A034GW001 and Geoprobe boring locations installed as part of the SWMU 37 investigation at SWMU 43 with respect to the storm sewer, sanitary sewer, and Noisette Creek.

- 5. Section 2.3: As referenced in the CNC Meeting's minutes (06/10/1997), the team was in favor of an NFA pending resolution of the Thallium issue in the groundwater. The issue of inorganics has yet to be addressed.**

Arsenic was not detected in any groundwater samples from MW A034GW001 above its MCL. Thallium was not detected in any groundwater samples from MW A034GW001. Therefore, there is no "inorganics in groundwater" issue at SWMU 43.

- 6. Figure 2.3 (in this CMS-WP) lacks the surface runoff and the groundwater flow directions. Please revise and include information.**

Response: Because there is no groundwater contamination at this site, groundwater flow direction is immaterial. Because there is no surface soil contamination at this site, surface water runoff direction is immaterial. Neither of these features need to be added to the figure.

- 7. Section 2.4: Potential linkages to Sanitary Sewers (SWMU 37): The text, lines 8+, pointed out the usage of groundwater samples to assess the potential linkage of the sanitary sewer to SWMU 43. The text failed to present what kind of data and how does it establish a linkage. Please clarify and submit relevant data and correlation.**

Response to SCDHEC Comments Dated September 19, 2000 from Mr. Mansour Malik,
Division of Hydrogeology and Dated September 20, 2000 from Ms. Susan Peterson,
Corrective Action Engineering Section on the
CMS Work Plan; Rationale For No Further Action; SWMU 43, Charleston Naval Complex

Response: The BCT agreed at the October 2000 meeting that no additional data regarding the potential linkage of SWMU 43 to the sanitary sewer is needed for site close-out. The team agreed that, in accordance with the memorandum from the Executive Sponsor group, dated August 30, 2000, that additional sampling along the sanitary sewer is necessary only "where there are priorities (sources identified)" and that "the team should pick only those areas that they think may be a problem; but not to look at additional sampling that has no justification." Additionally, the sponsors indicated that "Before requiring more sampling, the question must be asked "what significant questions will be answered by taking this additional sample(s)" and "is it reasonable to suspect something".

The BCT also agreed at the October 2000 meeting that trying to use Geoprobes to establish whether a release may have occurred from connecting lines from a SWMU to the sanitary sewer main would be ineffective because groundwater elevations are above the sewers lines such that water tends to migrate into, not out of, the sanitary sewer.

For these reasons, the team agreed that further evaluation of potential releases from SWMU 43 associated with its sanitary sewer line connection is not required for site close-out.

8. Section 2.4: The stormwater and sanitary sewer systems are not adequately represented. The Navy should develop a pattern of sampling around those systems that takes into consideration a reasonable sample distance and depth from the sewer lines. This task is essential to rule out any potential leak and build up a proper connection to the SWMU.

The BCT agreed at the October 2000 meeting that because there is no known connection of Building 1628 to the stormwater sewer, no further investigative evaluation of the storm sewer in this area is required for site close-out.

The only remaining question at this SWMU with regard to stormwater releases was in regard to a stormwater drop inlet in the paved area in back of the building. The BCT agreed at the October 2000 meeting that provided this drop inlet was shown to not have a direct connection to the building, this site could be closed out.

Attached with this response is a figure from an engineering evaluation of the CNC stormwater system, conducted by Davis and Floyd Engineers for the

CNCRDA. The figure shows that there are no pipes from Building 1628 that connect to the storm sewer system or the drop inlet behind the building.

9. **Section 2.4 lines 15+:** The text refers to the impracticability of comparing the metals results from all the DPT groundwater samples collected from Zone L to the RBCS and MCLs as due to the high suspended solids contents in the samples. A different sampling technique might serve a better result. The Navy should support the claim of impracticability or conduct additional sampling.

See response to comment 5 and 7. There is no "inorganics in groundwater" issue at this site and no reason to suspect there has been a release from the sanitary sewer in this area. Thus additional sampling is not required.

10. **Section 2.7, lines 6&7:** Ensafe Zone A RFI report April 14, 1998 (Section 10.6 2nd paragraph). SVOCs hits were recorded in the creek water directly south of SWMU 43. The Navy should thoroughly investigate whether the stormwater and sewer systems passing through SWMU 43, have any role as potential contaminant migration pathways to the creek.

Response: The BCT agreed at the October 2000 meeting that the Navy, with Ensafe as its lead contractor as part of the Zone J RFI work, would be evaluating whether the presence of contamination in surface waters and sediments in water bodies near the CNC may have originated at CNC SWMUs or AOCs. The executive sponsors also indicated that contamination in Zone J could be delinked from SWMUs and AOCs to allow for decision making about remediation or site close-out about particular sites. At SWMU 43, because no COCs have been identified for surface soil, the BCT agreed that this SWMU should be delinked from hits of SVOCs in creek water or in water body sediments and that the SWMU can be closed-out without further evaluation of this issue.

Comments from Susan Peterson

1. **SWMU 43 boundary**

As per the RFA, the boundary of SWMU 43 included Building 1628 and the outside storage area. The RFI investigation for SWMU 43 focused on the eastern portion of the SWMU (outside storage area). This portion is where a corrugated metal shed formerly stored hazardous wastes and materials that accumulated as the result of SWMU 43 operations. Since the entire area around SWMU 43 was not investigated as part of this RFI, the Department would like to discuss and agree upon an appropriate path forward with respect to the proposed NFA.

Response: During the RFA, the boundary of the SWMU was assumed to be the footprint of Building 1628. During development of the RFI work plan, the SWMU boundary was expanded to include the metal shed outside the building. The BCT agreed at the October 2000 meeting that no further investigation at this SWMU was required.

2. Need for additional information, Section 2.3.

The Navy provides a well-written statement on lines 22 through 26 on page 2-1 that describes the inorganics in groundwater issue for the purpose of site close-out documentation. However, this section lacks information to support the Navy's recommendation of no further evaluation. The Navy should provide a summary of the inorganics in groundwater in order to support their recommendation. This may include, but is not limited to a) a figure (such as Figure 2-1) that shows the location of the monitoring wells b) statements describing the frequency of monitoring and c) a summary of the analytical results (that may support the general statement of intermittent detections, no exceedences, trends etc.).

Response: Results of groundwater analyses were previously provided in the approved Zone C RFI. As noted in response to General Comment 1 from Mansour Malik, an approved RFI will serve as adequate documentation and reference for many of the site close-out issues. Because no inorganics in groundwater were detected above their respective MCLs, there is no "inorganics in groundwater" issue at this site.

3. Justification for recommendation needed, Section 2.5

The Navy states that the nearest investigated stormwater sewer is located a significant distance away, and bases its recommendation of no further evaluation of linkage on that statement. The Navy should revise this section to support that recommendation. The Navy should justify that the distance would prevent contamination at SWMU 43 from impacting the stormwater sewer. The justification may include, but is not exclusive of information on groundwater flow direction, topography, migration pathways etc.

Response: See response to Specific Comment 8, from Mansour Malik. The BCT has agreed that no further evaluation of the stormwater sewer issue is required for site close-out, since there is no groundwater or soil contamination at this site.

4. Types of lines

Please revise Figure 2-3 to differentiate the sanitary sewer system and the stormwater system lines. In addition, more lines exist that are not included on this figure. Please revise figure 2-3 to include all lines.

Figure 2-3 only shows sanitary sewer lines. The BCT has agreed at the October 2000 meeting that the issue of potential linkage to the sanitary sewer does not require additional investigation. Therefore, no revisions to this figure are necessary.

5. Samples collected to support linkage to sewer and stormwater lines

It appears that too great a distance exists between samples collected (037SP010) to establish or refute a linkage between SWMU 43 and the sewer/storm lines. The Department would like to discuss the issue of horizontal distance and vertical depth of these samples with the BCT prior to concurring on an NFA recommendation.

Response: See response to specific comments 7 and 8 from Mansour Malik. The BCT has agreed that further evaluation of the sanitary sewer is not required for close-out of this SWMU.

6. Justification for recommendation needed, Section 2.6

The Navy states that the nearest investigated railroad line to SWMU 43 is approximately 350 feet to the west and 350 feet to the northeast, and bases its recommendation of no further evaluation of linkage to that statement. The Navy should revise this section to support that recommendation. The Navy should justify that the distance would prevent contamination at SWMU 43 from impacting the railroad line. This justification may include, but is not exclusive of information on groundwater flow direction, topography, migration pathways, etc.

Response: The BCT agreed at the October 2000 meeting that potential railroad linkages potentially apply only at sites at which an investigated section of AOC 504 (railroad) overlies or is adjacent to a SWMU or AOC. Because no investigated segment of AOC 504 overlies or is adjacent to SWMU 43, there is no need to evaluate this issue further.

7. Issues to be addressed in Section 2.7

The Navy should state whether or not a sewer or stormwater line connecting the source (SWMU 43) to a surface water body exists. The Navy also needs to state the existence or absence of hits in the surface water body near the connection. If such hits exist, the Navy needs to prove that the hits are related or not related to the source (SWMU 43).

Response: See response to specific comment 9 and 10 from Mansour Malik. There are no records indicating that a direct discharge route from Building 1628 to Noisette Creek exists.

8. Need for additional information, Section 2.8

Please revise this section to support the statement "No OWSs were identified near SWMU 43." This may include providing information regarding the following: a) the date the Navy conducted a site walk-through b) the fact (or approximate dates) that the Navy reviewed site maps, drawings, and records for the presence of OWS and c) whether the site walk-through and records search indicated the presence of any OWS near or within the boundary of SWMU 43.

Response to SCDHEC Comments Dated September 19, 2000 from Mr. Mansour Malik,
Division of Hydrogeology and Dated September 20, 2000 from Ms. Susan Peterson,
Corrective Action Engineering Section on the
CMS Work Plan; Rationale For No Further Action; SWMU 43, Charleston Naval Complex

Response: Neither the RFA nor the RFI refers to the presence or possible presence of an OWS at SWMU 43. Additionally, as part of a sitewide evaluation of the presence of oil water separators (OWSs), the Navy completed (during year 2000) a comprehensive review of its records and facilities to identify the presence of OWSs. A list of 27 known OWSs were provided to the BCT members, including DHEC staff, at the BCT meeting in September 2000. This lists is currently the best available data source about the presence of OWSs at the CNC. No OWS was identified at SWMU 43. On this basis, further evaluation of this issue for SWMU 43 is not warranted.

9. Recommendation for additional information, Section 2.9

The Navy should state that they have addressed all site close-out issues. In addition to negating the need for land-use controls, the Navy may add a sentence that summarizes that the apparent path forward would be for unrestricted use of property at the portion of SWMU 43 that has been investigated.

Response: The information suggested above could be provided in a cover letter from the Navy to DHEC, without requiring a revision to this CMS WP. In future CMS work plans for site close-out, the suggested language can be incorporated into the work plan.

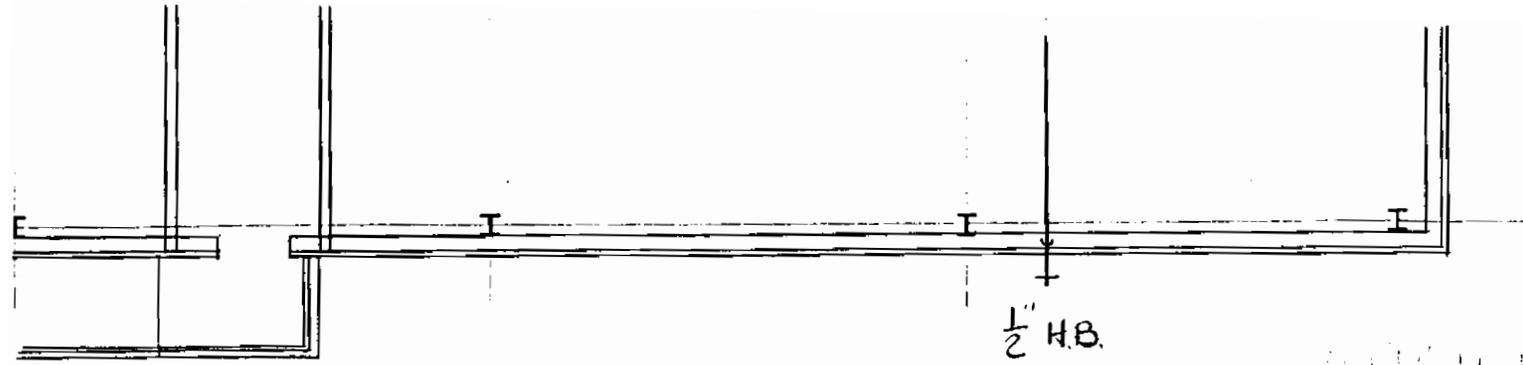
10. Inclusion of a an additional section

The Navy may use this section to recommend a modification to the existing Permit. The Navy should note their intention to submit appropriate Public Noticing paperwork (such as Fact Sheet, Statement of Basis) in the future.

Response: The information suggested above could be provided in a cover letter from the Navy to DHEC, without requiring a revision to this CMS WP. In future CMS work plans for site close-out, the suggested language can be incorporated into the work plan.

APPENDIX B

Drainage Improvements Figure, CNC



1/2" HB.

REVISIONS
DATE 11/14/77

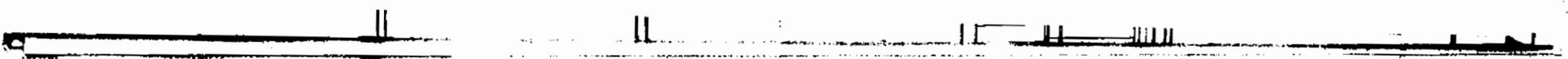
PIEDMONT ENGINEERS, ARCHITECTS & PLANNERS 420 PARK AVENUE GREENVILLE, SOUTH CAROLINA		DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND SOUTHERN DIVISION CHARLESTON, S. C.		
DSGN DIXON DR BROWN CHK DIXON SUPV A. WILLS CH ENGR MILLER		NAVAL SHIPYARD		CHARLESTON, S.C.
SUBMITTED BY <i>G.W. McDaniel</i> EX-V.P. DATE <i>10-20-77</i> FIRM MEMBER (TITLE)		WELDING SHOP PRINT SHOP (NPPSO) PLUMBING PLANS		
SOUTHERN DIV — DESIGN DIVISION PDE <i>A.J. Moody</i> DIR		APPROVED _____ DATE _____	SIZE F	NAVFAC DRAWING NO. 5047934
OFFICER IN CHARGE _____		CODE IDENT NO. 80091	CONSTR CONTR NO. N62467-76-C-0439	
APPROVED <i>E. J. Miller</i> PE DATE <i>11/4/77</i> EFD FOR COMMANDER, NAVFAC		SCALE GRAPHIC	SPEC 06-76-0439 SHEET 50 OF 78	

30' 35'



H1628-25

25



APPENDIX C

Excerpts from Final Zone A RFI

Table 10.6.3
SWMU 43
Organic Compounds Detected in Soil

Compound	Sampling Interval	Frequency of Detection	Range of Detection ($\mu\text{g}/\text{kg}$)	Mean of Detections ($\mu\text{g}/\text{kg}$)	RBC ($\mu\text{g}/\text{kg}$)	Number of Samples Exceeding RBC
Volatile Organic Compounds						
(13 samples collected: 6 upper interval, 4 lower interval, and 3 Geoprobe^a interval, 1 sample duplicated)						
Acetone	Upper	3/6	9.0 - 63.0	34.0	7,800,000	0
	Lower	3/4	50.0 - 1,600	647	NA	NA
	Geoprobe	1/3	12.0	NA	NA	NA
Bromomethane	Upper	0/6	NA	NA	110,000	0
	Lower	1/4	3.4	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
2-Butanone	Upper	0/6	NA	NA	47,000,000	0
	Lower	3/4	8.8 - 190	70	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
Carbon disulfide	Upper	0/6	NA	NA	7,800,000	0
	Lower	1/4	5.9	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
cis-1,2-dichloroethene	Upper	0/6	NA	NA	780,000	0
	Lower	2/4	2.6 - 79.0	40.8	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
Methylene chloride	Upper	1/6	15.0	NA	85,000	0
	Lower	1/6	100	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
4-methyl-2-pentanone (MIBK)	Upper	0/6	NA	NA	6,300,000	0
	Lower	1/4	6.8	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA

Table 10.6.3
SWMU 43
Organic Compounds Detected in Soil

Compound	Sampling Interval	Frequency of Detection	Range of Detection ($\mu\text{g}/\text{kg}$)	Mean of Detections ($\mu\text{g}/\text{kg}$)	RBC ($\mu\text{g}/\text{kg}$)	Number of Samples Exceeding RBC
Volatile Organic Compounds (13 samples collected: 6 upper interval, 4 lower interval, and 3 Geoprobe ^a interval, 1 sample duplicated)						
Tetrachloroethene	Upper	1/6	1.7	NA	12,000	0
	Lower	1/4	11.0	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
Toluene	Upper	0/6	NA	NA	16,000,000	0
	Lower	2/4	2.3 - 3.3	2.8	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
trans-1,2-dichloroethene	Upper	0/6	NA	NA	1,600,000	0
	Lower	1/4	6.3	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
Trichloroethene	Upper	0/6	NA	NA	58,000	0
	Lower	2/4	2.9 - 14.0	8.5	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA
Trichlorofluoromethane	Upper	0/6	NA	NA	23,000,000	0
	Lower	1/4	25.0	NA	NA	NA
	Geoprobe	0/3	NA	NA	NA	NA

Notes:

- a = Third-interval samples from Geoprobe investigation were collected from 2' to 4' bgs.
 NA = Not applicable

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 NAVBASE Charleston
 Section 10 — Site-Specific Evaluations
 Revision: 0

Table 10.6.4
 SWMU 43
 Inorganics Detected in Soil

Element	Sample Interval	Frequency of Detections	Range of Detections (mg/kg)	Mean of Detections (mg/kg)	Reference Conc. (mg/kg)	RBC (mg/kg)	Number of Samples Exceeding ^a
Inorganics							
(10 samples collected: 6 upper interval and 4 lower interval, 1 sample duplicated for Appendix IX analysis)							
Aluminum	Upper	6/6	3,700 - 7,890	5,570	12,800	78,000	0
	Lower	4/4	8,740 - 11,300	9,990	28,240	NA	0
Arsenic	Upper	6/6	1.7 - 3.7	2.8	9.4	0.43	0
	Lower	4/4	4.1 - 6.6	5.1	9.8	NA	0
Barium	Upper	6/6	4.3 - 17.3	11.7	53.0	5,500	0
	Lower	4/4	12.7 - 21.4	16.6	40.0	NA	0
Calcium	Upper	6/6	3,370 - 36,300	14,900	NA	NA	NA
	Lower	4/4	2,230 - 36,800	16,200	NA	NA	NA
Chromium	Upper	6/6	7.0 - 13.0	10.2	50.4	390	0
	Lower	4/4	13.7 - 27.0	17.8	63.4	NA	0
Cobalt	Upper	2/6	1.8 - 2.9	2.4	4.4	4,700	0
	Lower	0/4	NA	NA	1.7	NA	0
Copper	Upper	6/6	1.6 - 10.8	6.0	165	3,100	0
	Lower	4/4	3.0 - 12.2	8.0	33.7	NA	0
Iron	Upper	6/6	3,540 - 8,900	6,040	NA	NA	NA
	Lower	4/4	7,600 - 12,200	9,170	NA	NA	NA
Lead	Upper	6/6	1.8 - 55.4	20.0	140	400 ^b	0
	Lower	4/4	7.1 - 27.0	18.6	22.0	400 ^b	0
Magnesium	Upper	6/6	354 - 894	495	NA	NA	NA
	Lower	4/4	393 - 2,650	1,470	NA	NA	NA
Manganese	Upper	6/6	13.0 - 63.8	25.5	98.1	1,800	0
	Lower	4/4	10.5 - 41.7	31.0	85.5	NA	0
Nickel	Upper	5/6	3.6 - 8.3	5.2	13.6	1,600	0
	Lower	4/4	4.9 - 11.5	8.5	35.0	NA	0
Potassium	Upper	4/6	189 - 243	208	NA	NA	NA
	Lower	4/4	285 - 727	477	NA	NA	NA

Final Zone A RCRA Facility Investigation Report
 NAVBASE Charleston
 Section 10 — Site-Specific Evaluations
 Revision: 0

Table 10.6.4
 SWMU 43
 Inorganics Detected in Soil

Element	Sample Interval	Frequency of Detections	Range of Detections (mg/kg)	Mean of Detections (mg/kg)	Reference Conc. (mg/kg)	RBC (mg/kg)	Number of Samples Exceeding ^a
Inorganics (10 samples collected: 6 upper interval and 4 lower interval, 1 sample duplicated for Appendix IX analysis)							
Selenium	Upper	1/6	0.76	NA	1.2	350	0
	Lower	0/4	NA	NA	1.7	NA	0
Sodium	Upper	6/6	210 - 284	253	NA	NA	NA
	Lower	4/4	265 - 631	442	NA	NA	NA
Tin	Upper	5/6	9.4 - 15.0	10.9	**	47,000	0
	Lower	1/4	28.1	NA	**	NA	NA
Vanadium	Upper	6/6	7.2 - 15.5	11.6	29.2	550	0
	Lower	4/4	16.1 - 23.0	19.2	77.3	NA	0
Zinc	Upper	6/6	7.4 - 47.3	23.8	208	23,000	0
	Lower	4/4	9.3 - 32.1	24.1	163	NA	0

Notes:

- ^a = Number of samples exceeding both RBC and RC in upper interval or number of samples exceeding the RC in the lower interval.
- ^b = RBC not available for lead. USEPA residential soil cleanup level used for comparison (OSWER Directive 9355.4-12).
- ** = Number of nondetects prevented determination of UTL.
- NA = Not applicable

including those collected at SWMU 43.

Table 10.6.6
SWMU 43
Organic Compounds Detected in Groundwater

Compound	Sampling Event	Sampling Interval	Frequency of Detection	Range of Detections ($\mu\text{g/L}$)	Mean of Detections ($\mu\text{g/L}$)	RBC ($\mu\text{g/L}$)	Number of Samples Exceeding RBC
Volatile Organic Compounds (3 shallow groundwater samples collected during Geoprobe event; 1 during other events)							
Acetone	Geoprobe	Shallow	1/3	8.2	NA	3,700	0
	Feb. 97	Shallow	0/1	NA	NA	3,700	0
	Mar. 97	Shallow	0/1	NA	NA	3,700	0
	July 97	Shallow	0/1	NA	NA	3,700	0
	Oct. 97	Shallow	0/1	NA	NA	3,700	0
Toluene	Geoprobe	Shallow	1/3	4.0	NA	750	0
	Feb. 97	Shallow	0/1	NA	NA	750	0
	Mar. 97	Shallow	0/1	NA	NA	750	0
	July 97	Shallow	0/1	NA	NA	750	0
	Oct. 97	Shallow	0/1	NA	NA	750	0
Semivolatile Organic Compounds (1 shallow groundwater sample collected during well sampling events)							
Fluorene	Feb. 97	Shallow	0/1	NA	NA	1,500	0
	Mar. 97	Shallow	0/1	NA	NA	1,500	0
	July 97	Shallow	0/1	NA	NA	1,500	0
	Oct. 97	Shallow	1/1	6	NA	1,500	0

Note:

NA = Not applicable

Table 10.6.7
SWMU 43
Inorganics Detected in Groundwater

Compound	Sampling Event	Sampling Interval	Freq. of Detection	Range of Detections (µg/L)	Reference Conc. (µg/L)	RBC (µg/L)	Number of Samples Exceeding both RC and RBC
Inorganics (1 shallow groundwater sample collected during three of the events)							
Aluminum	Feb. 97	Shallow	1/1	1,380	3,210	37,000	0
	Mar. 97	Shallow	0/1	NA	3,210	37,000	0
	Oct. 97	Shallow	1/1	760	3,210	37,000	0
Arsenic	Feb. 97	Shallow	1/1	18.3	7.4	0.045	1
	Mar. 97	Shallow	1/1	21.2	7.4	0.045	1
	Oct. 97	Shallow	1/1	25.2	7.4	0.045	1
Barium	Feb. 97	Shallow	1/1	64.7	104	2,600	0
	Mar. 97	Shallow	1/1	62.5	104	2,600	0
	Oct. 97	Shallow	1/1	73.0	104	2,600	0
Cadmium	Feb. 97	Shallow	0/1	NA	**	18	0
	Mar. 97	Shallow	0/1	NA	**	18	0
	Oct. 97	Shallow	1/1	0.66	**	18	0
Calcium	Feb. 97	Shallow	1/1	112,000	NA	NA	NA
	Mar. 97	Shallow	1/1	107,000	NA	NA	NA
	Oct. 97	Shallow	1/1	110,000	NA	NA	NA
Chromium	Feb. 97	Shallow	1/1	1.2	8.7	180	0
	Mar. 97	Shallow	0/1	NA	8.7	180	0
	Oct. 97	Shallow	0/1	NA	8.7	180	0
Copper	Feb. 97	Shallow	0/1	NA	15.7	1,500	0
	Mar. 97	Shallow	1/1	3.9	15.7	1,500	0
	Oct. 97	Shallow	1/1	10	15.7	1,500	0
Iron	Feb. 97	Shallow	1/1	21,600	NA	NA	NA
	Mar. 97	Shallow	1/1	18,200	NA	NA	NA
	Oct. 97	Shallow	1/1	18,200	NA	NA	NA

Table 10.6.7
 SWMU 43
 Inorganics Detected in Groundwater

Compound	Sampling Event	Sampling Interval	Freq. of Detection	Range of Detections ($\mu\text{g/L}$)	Reference Conc. ($\mu\text{g/L}$)	RBC ($\mu\text{g/L}$)	Number of Samples Exceeding both RC and RBC
Inorganics							
(1 shallow groundwater sample collected during three of the events)							
Magnesium	Feb. 97	Shallow	1/1	35,800	NA	NA	NA
	Mar. 97	Shallow	1/1	28,200	NA	NA	NA
	Oct. 97	Shallow	1/1	24,400	NA	NA	NA
Manganese	Feb. 97	Shallow	1/1	80.0	577	840	0
	Mar. 97	Shallow	1/1	66.1	577	840	0
	Oct. 97	Shallow	1/1	160	577	840	0
Nickel	Feb. 97	Shallow	0/1	NA	**	730	0
	Mar. 97	Shallow	0/1	NA	**	730	0
	Oct. 97	Shallow	1/1	1	**	730	0
Potassium	Feb. 97	Shallow	1/1	15,800	NA	NA	NA
	Mar. 97	Shallow	1/1	18,800	NA	NA	NA
	Oct. 97	Shallow	1/1	13,600	NA	NA	NA
Selenium	Feb. 97	Shallow	1/1	3.1	**	180	0
	Mar. 97	Shallow	1/1	3.2	**	180	0
	Oct. 97	Shallow	0/1	NA	**	180	0
Sodium	Feb. 97	Shallow	1/1	54,400	NA	NA	NA
	Mar. 97	Shallow	1/1	48,600	NA	NA	NA
	Oct. 97	Shallow	1/1	41,400	NA	NA	NA
Vanadium	Feb. 97	Shallow	1/1	2.8	5.4	260	0
	Mar. 97	Shallow	1/1	1.4	5.4	260	0
	Oct. 97	Shallow	1/1	1.5	5.4	260	0

Notes:

NA = Not Applicable.

** = Number of nondetects prevented determination of UTL.