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ACTION MEMORANDUM FOR THE TIME - CRITICAL REMOVAL OF DIOXIN -
CONTAMINATED SEDIMENT NCBC GULFPORT MS

5/1/2002

TETRA TECH

**Action Memorandum
For The
Time - Critical Removal of
Dioxin - Contaminated Sediment**

**Naval Construction Battalion Center
Gulfport, Mississippi**



**Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order CTO 187**

MAY 2002



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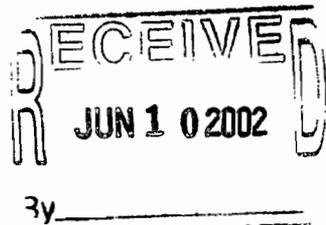
24 March, 2002

Project Number 2860

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Art Conrad (Code ES32)
Remedial Project Manager
2155 Eagle Drive
North Charleston, South Carolina 29419-9010

Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0187

Subject: Action Memorandum For The Time -Critical
Removal Of Dioxin -Contaminated Sediment



Dear Mr. Conrad:

Tetra Tech NUS, Inc. is pleased to submit the enclosed Final Action Memorandum For The Time-Critical Removal Of Dioxin-Contaminated Sediment for Site 8. In addition electronic files for the subject documents are also provided on the enclosed compact disk (CD). The enclosed CD as been scanned using the anti-virus software Norton Anti-Virus 2000™ and Trend Anti-Virus™ and is free of detectable viruses.

If you have any questions regarding this submittal or require further information, please contact me at (850) 385-9899.

Sincerely,

Robert Fisher, P.G.
Task Order Manager

/bh

Enclosure

c: Gordon Crane, NCBC
Don Ficklen, AFCEE
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Debbie Wroblewski (Cover Letter Only)
Mark Perry(Unbound) .

COMMENT RESPONSE TABLE
Draft Action Memorandum for the
Time Critical Removal of Dioxin Contaminated Sediment
Former Herbicide Orange Storage Area
Site 8 Areas B and C
at NCBC, Gulfport, Mississippi

Item	General Comments	Response
1	The removal of contaminated sediment from the Area B and C ditch systems is described as time-critical in accordance with CERCLA and NCP guidance. Supposedly the decision for removal was based on two studies, of which the latest (Groundwater Monitoring Report, HLA) was final in December 1999. If this action is time-critical, the six-month response window expired in June of 2000. The time-critical designation also seems incongruous considering the contamination has probably been in the ditch system for at least 24 years.	According to Removal Action Guidance, the time-critical designation is based on the length of time between the decision to take action and the initiation of that action. In this case, the decision to take action within six months of the completion of the Action Memo qualifies this action for Time-Critical status.
2	This proposed remedial action seems to be jumping the gun on the proposed remedy that will be advocated in the Proposed Plan and agreed to in the Record of Decision. Although unlikely, a scenario might develop that would lead to a remedy other than landfilling/capping at Area 8A	This action will supplement any future action at Site 8 included in the Feasibility Study.
3	Drainage ditch cleanup levels. Has a decision been made whether or not to clean the contaminated ditch systems to a level that will allow for unrestricted use and maintenance by NCBC? Also, is soil stabilization with accompanying restricted (industrial) use acceptable for Areas B and C?	The goal for ditch cleanup will be for the restricted levels for residential development. However, the procedures used to clean ditches will most likely result in confirmation numbers that will allow for unrestricted maintenance and disposal of ditch sediments.
4	Soil stabilization. On page 3 (Section II.A.1, Dioxin Delineation Studies) the first bullet states that surface soil dioxin levels "were generally below 15 ppt" at Areas B and C and decreased with soil depth. Is this consistent with the statement on page 10, paragraph V.A.2, Surface Soil, that says the current 95%UCL for dioxins in surface soil at Areas B and C is 43 ppt. This report does not make a sufficient case	Soil stabilization at Areas B and C is not necessary to achieve a clean-up goal, but is necessary to return the site to pre-remedial conditions. Therefore, it is agreed that soil stabilization should take place as funding allows, and not as a critical component of the Action Memorandum.

Comment Responses on Action Memorandum for Site 8, Areas B and C

Item	General Comments	Response
	for soil stabilization at Areas B and C.	
5	The Action Memorandum lacks substance. The facts that led the Navy, as lead agent, to select a removal vs. a remedial response needs to be clearly established in the document. Then the need to address the removal as a time-critical action rather than a non time-critical action should be established.	Have added additional text to describe, more fully, the need to take this action within the near term; specifically as related to the deterioration of the sediment traps and the resulting increased potential for off site releases of dioxin during precipitation events. Please see (1) Purpose, (2) Section II.A.3, (3) Section III.A.1, and (4) Section IV for additional text that clearly outlines the need for a removal action and the determination of time critical status.
6	There appears to be enough evidence available (though it is not clearly stated in the current draft of this document) to make a decision to proceed with a removal action. However, there is no indication that it should be time-critical. What is anticipated to happen in the next six months that has not already occurred?	See response above.

Item	Specific Comment	Response
7	Both "TIME CRITICAL" AND " DIOXIN CONTAMINATED" should be hyphenated.	Agreed.
8	Place a comma after 'HEALTH.'	Done.
9	Change the title of the paragraph to "DELAY CONTINGENCIES."	Done.
10	Delete "NUMBER" and right justify "PAGE".	Done.
11	Include AR, OEHL, ppt, ppq and TC (if used). Delete AFESC since the abbreviation was never used in this report.	Done.
12	Why capitalize time-critical? Also do not use the abbreviation TC since it is not subsequently used in this report.	Agreed.
13	Hyphenate time-critical here and throughout the rest of the report.	Agreed.
14	Delete "a time-critical action" at the end of the sentence since it is redundant.	Agreed.
15	Delete the "the" before "Harrison."	Done.
16	Place commas after "8" and "C" (e.g. "Site 8, Areas B and C,") and make similar changes through this document.	Agreed.
17	Replace "this program" with "Site 8." Also delete the comma after "(HO)."	Done

Comment Responses on Action Memorandum for Site 8, Areas B and C

Item	Specific Comment	Response
18	Delete "Office of."	Done
19	Insert "(OEHL)" after "Laboratory."	Done
20	Change the last line to read, "...at sea, these investigations..."	Done
21	Bullet 4. Add "of contaminants" after "migration."	Done
22	Begin the first sentence, "Personnel from the OEHL collected..."	Done
23	Bullets 1 and 4. Change "Site 8A" to "Area 8A."	Done
24	Change to read, "Conducted by EG&G Idaho, Inc and the Air Force Engineering and Services Center, these studies delineated the horizontal and vertical extent of HO and dioxin at Site 8 and provided an estimate of contaminated soil potentially requiring remediation."	Done
25	This work is described as being done at Site 8. This report covers Areas B and C of Site 8. Does the information in the next paragraph (w/5 bullets) apply to B and/or C?	Clarified to indicate the specific areas described by this action memo.
26	Bullet 4. Change "ppt" to "part per trillion (ppt)" and add ppt to Glossary list. Also, change "was" to "were."	Done
27	Bullet 5. State what the detection limits were for dioxins and furans during the 1984-1988 timeframe.	Done.
28	The lead-in sentence identifies the period 1995-2000 while the first sentence begins with, "From 1995 through 1999...". Resolve this apparent inconsistency.	Resolved to state 1999.
29	Bullet 1, line 4. State what the detection limits were for dioxins and furans during the 1995-2000 timeframe.	Done
30	Bullet 4, line 1. Change "wells" to "well" and hyphenate as "monitoring-well."	Restated
31	Change to read, "Site 8, Areas B and C, occupies a combined area of..."	Done
32	The acreage agreed on in the FFS was as follows: 8A = 12 acres, 8B = 17 acres and 8C = 1 acre. Explain the use of 21.5 acres for the combined areas B and C.	Explanation was added to clarify the difference between the area of the "Sites" compared to the size of the area actually contaminated.
33	Change the first sentence to read, " From 1968 through 1977 a portion of the base, now known collectively as Site 8, was used...in 55-gallon drums."	Done
34	Change "has" to "had."	Done

Comment Responses on Action Memorandum for Site 8, Areas B and C

Item	Specific Comment	Response
35	Change "trillion" to "billion" and "ppt" to "ppb."	Done
36	Change "Site 8A" to "Area 8A."	Done
37	Change the first sentence to, "However, the 1985-1987 investigations and remedial activities did not..."	Done
38	Change "Site 8A" to "Area 8A."	Done
39	Place commas after "8" and "C" (e.g. "Site 8, Areas B and C,").	Done
40	Hyphenate "HO-related."	Done
41	Delete "the" before "Agreed."	Done
42	Don't capitalize the "c" in "city."	Done
43	Place a comma after "HEALTH" in the paragraph title.	Done
44	The second sentence is awkward. Suggest, "The following factors were considered applicable to Areas B and C in determining..."	Modified
45	Bullets 1 and 2. The Risk Assessment determined that there were no COPECs for Site 8. What are the threats to the ecosystem, animals and the food chain?	Not true. The COPC are identified by the comparison of highest levels of contamination against published Tier 1 Risk or MCL tables. In this case, the COPCs exceeded both the Region III RBCV and the MDEQ Tier 1 Tables.
46	Replace "appropriate" in the first line with "...applicable to Areas B and C..."	Done
47	Change "poses" to "posed."	Done
48	Reword as, "Most of the contaminated surface soil at Areas B and C was removed..."	Done
49	Place a comma after "systems."	Done
50	Change "Site 8" to "Areas B and C."	Done
51	Place "the" before "Air Force" on line 2 and capitalize "Areas" on line 3.	Done
52	If the proposed removal of sediment from the ditches draining Areas B and C really fit the EPA definition of "time-critical", then the actual date that the removal action determination was made must be given in order to identify the 6-month window of action. See general comments concerning this being a "time-critical" removal action.	The specific date will be recorded when MDEQ provides acceptance of the memo.
53	Do not capitalize "time-critical."	Done
54	Bullet 3. Add an "s" to "ARAR."	Done
55	Do not capitalize "time-critical."	Done
56	Add an "s" to "system."	Done
57	Bullet 2. Insert "contaminated" after "all."	Done

Comment Responses on Action Memorandum for Site 8, Area B and C

Item	Specific Comment	Response
58	Bullet 3. Rewrite as, "Transportation of the excavated material to Area A for isolation within the containment berm."	Modified
59	Number the sub-paragraphs a., b., c., etc. to be consistent with paragraph V.A.1.	The second level letters are lower case. Table of contents were updated.
60	Explain that the berm will not require rain protection (liner or cover) because the material is contained and water is a highly inefficient transport mechanism for dioxin.	Modified
61	Delete the "of" immediately before "contaminated."	Done
62	The part of the first sentence that follows "is to achieve" sounds garbled. Reword.	Reworded
63	Hyphenate "post-excavation."	Done
64	One of the objectives of NCBC is to be able to perform unrestricted maintenance on the ditches. It must be determined if this is still a firm objective of NCBC and if sediment removal from the ditch system will result in residual contamination that is too high to allow unrestricted use or maintenance.	The remedial goal is based on residential standards (scenario 1). The risk scenario associated with ditch maintenance is described as Scenario 2 in the Risk Assessment report with a much higher threshold of 833 ppt. The question that will remain, post excavation, is how will ditch maintenance spoils be handled/disposed. Based on the success of previous removals, this maintenance material should be below residential standards and be available for stockpiling anywhere on base.
65	This paragraph references "light and durable barriers...as shown on Figure 4." The barriers are not evident on Figure 4. Also, how are these barriers used? Please clarify.	Clarified
66	Will post-removal sediment recovery traps (SRTs) be installed? If post-removal residual contamination in the ditch system is at or below 4.3 ppt (15 ppt?), and if SPLP landfill sampling shows no leaching, why commit to SRTs? Determine if this issue has been settled before committing to SRTs in this Memo.	The base has requested post removal SRTs. However, these structures will differ significantly from existing gravel and gabion filter to eliminate future maintenance. Our current conceptual design calls for a low concrete barrier (similar to a weir) with a steep upstream face and a self-cleaning sloping downstream face.
67	Why include the ditches north of Area 8A - has a time-critical determination been made for the Area A ditch system?	This area includes highly contaminated sediment not within area A and not properly stabilized by SRTs.
68	Delete the extra spaces in "Pilot-Scale."	Done
69	Does this paragraph mean that contaminated soil will be removed only from this one spot for all of Areas B and C?	Yes, removal of contaminated soil in that portion of area B was required to meet future use requirements of areas B and C without the placement of a permanent cap.
70	Is the 20x20 "hot spot" area L8026 on Figure 4? How can the area be identified on site - is it marked or is there a way to measure the location?	The oversight team will mark this area with the help of a local land surveyor.
71	Specify the level of acceptability of the confirmation sampling.	Done. The confirmation level for the soil removal will need to be 15 ppt.

Comment Responses on Action Memorandum for Site 8, Areas B and C

Item	Specific Comment	Response
72	Land-use restrictions are considered a form of Post-Removal Site Controls. Delete "Land use restrictions" and begin the third sentence in this paragraph with. "Post-removal site controls..."	Done
73	Insert "is" after "source that..."	Done
74	The first sentence leads the reader to think that the FFS only explored remedial actions at Area A of Site 8. Clarify.	Done
75	The first two words in all three bullets should be hyphenated - e.g. Chemical-Specific.	Done
76	3 rd column, 3 rd row. Complete the sentence, "...been requested by the..." The what?	Done
77	2 nd column, 4 th row and 3 rd column, 4 th row. Can we use Post-Removal Site Controls here or do the ARARs specifically say LUCs?	Based on discussions with the state, I think the use of LUCs will be acceptable for this document.
78	8 th row. Delete this row since it is an exact repeat of column 7.	Done
79	10 th row. Left justify "State."	Done
80	3 rd column, 12 th row. Spell out TBC.	Done
81	Place commas after "8" and "C" (e.g. "Site 8, Areas B and C,").	Done
82	Re, "...within the next six months..." If this is determined to be a time-critical remedial action, then shouldn't the start/stop dates be keyed to the date of determination that this action is time-critical?	The key dates are tied to (1) state acceptance of the Action Memo, and (2) the initiation of field activities. However, the Removal Action guidance does state that the 6 month planning period is not a "hard deadline" and that if a longer planning period results due to unseen circumstances, the action does not need to be changed to a non-critical action.
83	The phrase "take longer" is too vague. Estimate the amount of time needed to complete soil stabilization assuming good weather.	Changed based on conversation with the RAC
84	Bullet 3. Insert "(AR)" after "administrative record." Put "AR" in the Glossary list.	Done
85	Header line. Change the title of the paragraph to "DELAY CONTINGENCIES."	Done
86	Change "was located" to "were."	Done
87	Last line. The Risk Assessment came up with no COPECs. What is the potential exposure to ecological receptors?	Site conceptual exposure models were developed along with an evaluation of potential receptors to develop exposure scenarios and associated remedial goals.
88	Delete "the" before "surface" and insert "at Areas B and C" after "stabilization."	Done
89	Place a comma after "C".	Done
90	There is a tab for attachments, but none is included. Are there any attachments?	Added.

**ACTION MEMORANDUM
FOR THE
TIME CRITICAL REMOVAL OF DIOXIN CONTAMINATED SEDIMENT**

**FORMER HERBICIDE ORANGE STORAGE AREA
SITE 8 AREAS B AND C**

AT THE

**NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI**

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

**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406**

**Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
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**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0187**

MAY 2002

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
I. PURPOSE	1
II. SITE CONDITIONS AND BACKGROUND	2
A. Site Description	2
1. Removal Site Evaluation	4
2. Physical Location	4
3. Site Characteristics	4
4. Release into the Environment of a Hazardous Substance	5
5. NPL Status	5
B. Other Actions to Date	5
1. Previous Actions	5
2. Current Actions	6
C. State and Local Authorities' Roles	6
1. State and Local Actions to Date	6
2. Potential for Continued State/Local Action	6
III. THREATS TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT	6
A. Threats to Public Health or Welfare	6
1. Actual or Potential Exposure to Hazardous Substances or Contaminants by Nearby Populations	6
2. High contaminant concentration levels largely at or near the surface that may migrate	7
3. Weather conditions that may cause migration or releases	7
B. Threats to the Environment and Food Chain	7
1. Actual or Potential Exposure to Hazardous Substances or Contaminants By Nearby Populations	7
2. Actual or Potential Contamination of Sensitive Ecosystems	8
3. High contaminant concentration levels largely at or near the surface that may migrate	8
4. Weather conditions that may cause migration or releases	8
IV. ENDANGERMENT DETERMINATION	8
V. PROPOSED ACTIONS	9
A. Proposed Actions	9
1. Proposed Action Description	9
a. Objective and Scope	9
b. Types of Responses to Meet Objective	10
2. Detailed Description of Responses	10
3. Contribution to Remedial Performance	12
4. Description of Alternative Technologies	12
5. Engineering Evaluation and Cost Analysis	13
6. Applicable or Relevant and Appropriate Requirements	13
7. Project Schedule	15
8. Community Relations Requirements	15
B. Estimated Costs	15

TABLE OF CONTENTS (Continued)

	<u>PAGE</u>
VI. DELAY CONTINGENCIES	15
VII. OUTSTANDING POLICY ISSUES.....	15
VIII. ENFORCEMENT	15
IX. RECOMMENDATION.....	16
REFERENCES	R1

TABLES

	<u>PAGE</u>
FEDERAL AND STATE ARAR	14

FIGURES

1	Vicinity Map
2	Site Map
3	Dioxin Delineation Map
4	Sediment Removal Map
5	Soil Stabilization Map

I. PURPOSE

This Action Memorandum has been developed by Tetra Tech NUS (TtNUS) under contract to the U. S. Navy to guide the time-critical removal action of dioxin contaminated sediment at Site 8, Areas B and C, at the Naval Construction Battalion Center (NCBC), Gulfport, Mississippi. An Action Memorandum provides a concise, written record of the decision to select an appropriate removal action. As the primary decision document, this report substantiates the need for a removal action, identifies the proposed action, and explains the rationale for the removal action selection. In this respect, the Action Memorandum for removal actions parallels the function of the Record of Decision (ROD), which documents the final action plan for a remedial response; however, the Action Memorandum is not as elaborate as the ROD.

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (USEPA, 1990) authorize two types of responses to releases of hazardous substances into the environment - remedial and removal actions. Remedial actions involve the study, design, and construction of long-term actions directed toward permanent remedy. CERCLA and the NCP define a removal action as any one or all of the following: 1) the cleanup or removal of released hazardous substances; 2) actions to mitigate a threat or release of hazardous substances; 3) actions to monitor and evaluate release conditions; 4) disposal of removed material; and 5) actions to mitigate or prevent damage to public health, welfare, or the environment. Specific topics addressed in this Action Memorandum demonstrate that the release of dioxins at Site 8, Areas B and C, meet statutory and NCP requirements for a removal action.

This Action Memorandum addresses all five required components of a removal action, they are:

1. Removal Site Evaluation.
2. Assessing NCP Removal Factors.
3. Determining the urgency.
4. Planning and documenting the Decision.
5. Taking Removal Action and documenting the Completion.

The primary need to conduct a time-critical removal action at this time is the presence of dioxin-contaminated sediment in the ditches at Site 8, Areas B and C at the surface and subject to erosion and transportation during significant rain events. Additionally, the dioxin levels in the sediment at Area B represent the highest level of contamination observed during the Surface Water and Sediment Dioxin Delineation Study (ABB, 1999). While sediment traps were installed in all ditches that convey surface water off of Site 8, these structures were designed as a

temporary barrier to prevent downstream migration of baseload sediment. These sediment traps are now nearing four years in age and visible signs of siltation and higher water levels indicate that their effectiveness may be gradually diminishing. Given this set of circumstances, the Navy and Air Force are at risk for significant cost increases in both resampling and higher remediation volumes should action be delayed. Further, the potential exists that these dioxin-contaminated sediments may recontaminate previously cleaned locations in or near residential property.

II. SITE CONDITIONS AND BACKGROUND

NCBC Gulfport is located in the western part of Gulfport, Mississippi, in Harrison County, in the southeastern corner of the state, approximately 2 miles north of the Gulf of Mexico (Attachment B, Figure 1). The base occupies approximately 1,100 acres and has an elevation averaging 30 feet above sea level with the only significant exception being the linear piles of bauxite stored on the surface.

The NCP states that a removal action may be conducted at a site where a threat to human health and welfare or to the environment is established. An appropriate removal action is taken to abate, minimize, stabilize, mitigate, or eliminate the release at a site. The following paragraphs describe the conditions at Site 8, Areas B and C, that support the need for a removal.

A. Site Description

1. Removal Site Evaluation

The purpose of the Removal Site Evaluation is to determine the nature and extent of contamination and the potential for the contamination to migrate and adversely affect human health or the environment. For Site 8, the nature and extent of herbicide orange (HO) and related dioxins and furans have been extensively studied and documented in the Onsite and Offsite Dioxin Delineation Report (HLA,1997), the Swamp Delineation Reports (HLA,2000), and in the Groundwater Monitoring Report (HLA,1999). Therefore, a formal Site Removal Evaluation Report will not be generated. The following paragraphs describe the actions and results of the previous investigations at all areas on Site 8.

Initial HO Monitoring Programs (1977-1984) – Conducted by the USAF Occupational and Environmental Health Laboratory (OEHL), as part of the plan to incinerate all remaining HO stockpiles at sea, these investigations focused on the following issues:

- Offsite migration of dioxin.

- Migration levels of 2,4-D, 2,4,5-T (the two primary components of HO) and dioxins at Site 8.
- Long-term degradation potential of 2,4-D, 2,4,5-T and dioxins.
- Potential vertical migration of contaminants.

Personnel from the OEHL collected soil, surface water, sediment, and biota samples for analysis using the best method available at that time (what we would now refer to as a low-resolution method). The findings were:

- Confirmation that Area 8A was contaminated with HO and primarily 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD).
- Soil levels of 2,4-D and 2,4,5-T were rapidly decreasing (a reported 60% drop over a six-month period in 1981-1982).
- TCDD levels were consistent suggesting significant persistence in the environment.
- TCDD was never detected in the surface water.
- Low levels [less than 50 parts per trillion] (ppt) of TCDD were discovered in sediment and biota samples downstream of Area 8A (which was near the method detection limit at that time).
- Movement of dioxin from Site 8, occurs primarily through soil erosion.

Comprehensive Soil Characterization and Confirmation Studies (1984-1988) – Conducted by EG&G Idaho, Inc and the Air Force Engineering and Services Center, these studies delineated the horizontal and vertical extent of HO and dioxin at Site 8 and provided an estimate of contaminated soil potentially requiring remediation.

In total nearly 2,500 samples were collected and analyzed using a grid sampling approach with a 20-foot node spacing. The major findings of these investigations were:

- High concentrations of TCDD were restricted to 2 feet in depth.
- Soil samples contained a maximum level of 310 parts per billion (ppb), TCDD.
- Soil cement contained up to 1,000 ppb TCDD.
- Assuming an action level of 1 part per trillion (ppt) TCDD, nearly 27,000 cubic yards of soil were above action levels at Site 8 in 1987.
- Confirmation samples of the excavated areas and of the resulting ash were below the detection limits for dioxins and furans.

Dioxin Delineation Studies (1995-1999) – From 1995 through 1999, ABB-ES, and later Harding Lawson Associates, conducted a series of delineation studies, post-removal and incineration, to delineate the remaining dioxin contaminated soil and sediment. It should be noted that during

this timeframe the detection limit for dioxins in soil and sediment was reduced to the low parts per trillion. These studies at 8B and 8C determined the following:

- Surface soil sample results for dioxin analysis at B and C were generally below 15 ppt toxicity equivalents (TEQ) of TCDD – with the largest contributing congener consisting of TCDD. Deeper soil samples indicated that dioxin levels decreased dramatically with depth and were below detection limits at 4 feet below land surface.
- Sediment sample results on B were as high as 4 ppb. Sediment samples on C were as high as 120 ppt (See dioxin delineation map, figure 3).
- Vertical delineation studies and previous removal actions have demonstrated that the extent of contaminated sediment is generally observable in the field, and is typically 2 feet or less.
- Thirteen direct-push groundwater and four monitoring - well samples from Areas B and C were all well below the 30 parts per quadrillion (ppq) MDEQ Tier 1 screening level.

2. Physical Location

Site 8, Areas B and C, occupies a combined area of approximately 18 acres of the north-central portion of the base north of 7th Street between Goodier Avenue and Lee Avenue (Figure 2). However, the area included in the proposed removal would extend beyond the accepted boundaries to include nearly 21.5 acres as shown on Figure 2. The additional acreage is included because the Navy and Air Force propose excavating the ditches up to the existing sediment traps (located outside of the Site boundaries).

3. Site Characteristics

From 1968 through 1977, a portion of the base, now known collectively as Site 8, was used in 55 gallon drums. Site 8 was divided into three areas (A, B, and C), based on the level of storage and handling of HO; B and C, were periodically used as overflow storage areas while A was continually in use.

Areas B and C are relatively flat with little vegetation. The surface soils consist of a fine to medium sand with approximately one-third of these areas stabilized with cement. Areas B and C are also located at the head of local drainage basins; surface water from 8B flows north and exits the base at Outfall 4, and surface water from 8C drains to the southeast exiting the base at Outfall 2 (south) into Brickyard Creek (Figure 3).

Surface water and sediment that leaves Site 8 passes through a series of sediment traps installed to prevent the migration of dioxin. These sediment traps are temporary structures designed to

both filter surface water and act as a barrier to slow surface water velocities during storm events, which prevent sediment erosion and transportation beyond site boundaries. However, these sediment traps require regular removal and reinstallation, which has not been performed since 1998.

4. Release into the Environment of a Hazardous Substance

The area now known as Site 8 had been used as an equipment storage and staging area prior to 1968. Between 1968 and 1977, the area was used by the U.S Air Force as a storage and handling area for HO in support of the defoliation program in Vietnam known as Operation Ranchhand. Spills and leaks of HO occurred at all three areas of Site 8 contaminating the surface soil and sediment with the mixture components, 2,4,5-T and 2,4-D; as well as the byproduct contaminants (dioxins and furans) – primarily (TCDD).

The HO drums were removed from Site 8 in 1977 and placed on an incinerator ship for destruction in the South Pacific. The confirmation that dioxins were released during storage activities was established in 1977; the site was fenced and left inactive until 1985.

5. NPL Status

NCBC Gulfport is not listed on the NPL under CERCLA as amended by SARA.

B. Other Actions to Date

1. Previous Actions

Between 1985 and 1987 Site 8 was remediated to the standards that existed at that time (1 part per billion – ppb). The excavated soil and sediment above that level was incinerated and placed on Site 8, Area A. However, the 1985-1987 investigations and remedial activities did not include the drainage systems carrying surface water and sediment from the site into lower reaches of the local drainage basins. Between 1987 and January 2001, access has been restricted and no base operations have been conducted within site boundaries. Since January 2001, a new rail loading ramp has been constructed on the south side of Area 8A in anticipation of future site activities as a storage and staging facility.

2. Current Actions

There are no current actions taking place on Areas B and C.

C. State and Local Authorities' Roles

1. State and Local Actions to Date

The Navy is undertaking this removal action for Site 8, Areas B and C, on behalf of NCBC Gulfport. While no emergency response action has been requested by MDEQ, the investigation and long-term remediation of HO - related chemicals has been mandated by MDEQ through administrative actions resulting in the Agreed Order No. 3466-97.

2. Potential for Continued State/Local Action

Agreed Order signed by the Navy and Air Force will continue to serve as the authority for future dioxin studies and remedial/removal actions. In addition, city and county ordinances for the protection of trees and drainage system modifications will be adhered to as appropriate.

III. THREATS TO PUBLIC HEALTH, WELFARE OR THE ENVIRONMENT

Section 300.415 of the NCP outlines factors to be considered in establishing the appropriateness of a removal action. The following factors were considered applicable to Areas B and C in determining whether the removal action was appropriate:

1. Actual or potential exposure to humans, animals, or the food chain.
2. Actual or potential contamination of sensitive ecosystems.
3. High contaminant concentration levels in soils/sediments largely at or near the surface that may migrate.
4. Weather conditions that may cause migration or releases.

The following factors were not considered applicable to Areas B and C in determining whether the removal action was appropriate:

- Drums, barrels, tanks, or other bulk containers that may pose a threat of release.
- Threat of fire or explosion.

A. Threats to Public Health or Welfare

1. Actual or Potential Exposure to Hazardous Substances or Contaminants by Nearby Populations

The Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (HLA 2001), was performed to determine whether contamination in surface water, sediment, soil, and groundwater associated with HO and dioxins at Site 8 posed potential health risks to individuals under current or foreseeable future site conditions. The results indicated that 2,3,7,8-substituted dioxins/furans exceeded screening levels for soil and sediment at Site 8 and related drainage systems. None of the surface water samples exceeded screening levels.

2. High contaminant concentration levels largely at or near the surface that may migrate

Most of the contaminated surface soil at Areas B and C was removed and remediated in the mid 1980s. However, elevated (up to 4 ppb) levels of dioxin in the drainage systems, at and near Areas B and C were not addressed and remain in a layer up to 2 feet thick. Erosion, transportation and deposition of these sediments onto surrounding surface soil and downstream areas are possible if the aging sediment traps fail due to siltation and/or erosion.

3. Weather conditions that may cause migration or releases

Periods of intense rainfall, such as those associated with tropical systems have a high likelihood of eroding the contaminated sediments in the drainage systems in and adjacent to Areas B and C. Both Areas B and C are at the head of local drainage basins, so future contamination from upstream locations is not likely.

The temporary sediment traps installed in the ditch system around Site 8 are stressed most severely during intense rain events, which are a common occurrence in the Gulfport area. During these rain events, surface water velocities easily exceed the threshold to erode and transport dioxin contaminated sediment off of the Site. As the upstream pools, created by the sediment traps, gradually fill with sediment, dioxin contaminated sediment will likely be deposited outside the banks of the ditch or over the top of the trap. In either case, unless action is taken shortly, dioxin contamination will be migrating beyond the lines of delineation established in the Surface Water and Sediment Delineation Report (ABB, 1999), at a cost of nearly two million dollars.

B. Threats to the Environment and Food Chain

1. Actual or Potential Exposure to Hazardous Substances or Contaminants by Nearby Populations

As stated in Subsection III.A.1, dioxins/furans exceeded screening levels for soil and sediment at Areas B and C and related drainage systems.

2. Actual or Potential Contamination of Sensitive Ecosystems

The results of the Swamp Delineation Studies (HLA 2000) have shown that dioxin contaminated sediment has migrated from Site 8 into a swamp north of the base. Sediment traps have been placed into all drainage systems that are hydraulically downgradient of Site 8 as a temporary solution.

3. High contaminant concentration levels largely at or near the surface that may migrate

As discussed in Subsection III.A.2, sediment contamination at Areas B and C exceeds human health screening levels.

4. Weather conditions that may cause migration or releases

As discussed in Subsection III.A.3, significant rainfall events could result in the erosion, transportation and deposition of contaminated sediment to downstream locations.

Based upon the information contained in the Onsite and Offsite Delineation Reports (HLA 1997) and in the Groundwater Monitoring Report (HLA 1999), Southern Division and the Air Force have determined that a removal action is appropriate for Areas B and C at Site 8.

IV. ENDANGERMENT DETERMINATION

The primary factor used to determine the type of removal action to take is the urgency of the situation. The NCP describes two different types of removal situations: (1) those situations that require action within 6 months of determining that a removal response is appropriate; and (2) those situations for which a planning period of 6 months or greater is appropriate. For areas B and C, removal and mitigation of contaminated surface soil and sediment is considered a time-critical activity due to the factors discussed in Section II.

In particular, the sediment traps, installed as a temporary measure, are gradually causing a buildup of sediment on the upstream side; which diminishes the ability to prevent downstream migration through filtration and velocity reduction. The effects of downstream or overbank deposition of dioxin contaminated sediment include;

- the potential for increased levels of dioxin contamination in or near residential areas,
- the increased costs of the project due to additional delineation sampling, and
- significantly higher remediation costs due to higher volumes and increased time to complete field activities.

While no quantitative analysis exists to determine the moment at which sediment traps become ineffective, recent field observations indicate that the pools upstream of the traps are filling with sediment and the baseline water levels on the traps are generally higher now than when they were installed nearly four years ago.

V. PROPOSED ACTIONS

This section describes the objectives and scope of the time-critical removal action, including the types of responses that will meet the objective. This Action Memorandum will not develop costs as part of an engineering evaluation/cost analysis (EE/CA) for the time-critical removal action. If this action were proposed as a non time-critical action, an EE/CA would be required.

A. Proposed Actions

The time-critical planning process requires the following to be documented:

- the objective and scope of the action;
- the types of responses that will meet the objective; and
- that federal and state applicable or relevant and appropriate requirements (ARARs) were evaluated and which ARARs were considered practicable to meet.

1. Proposed Action Description

a. Objective and Scope The objective of this time - critical removal action is to remove contaminated sediment (above the MDEQ Tier 1 Screening level – non residential) from the drainage systems at Areas B and C that are currently subject to migration from erosion and deposition patterns caused by the weather. These sediments will be placed back on Area A within a containment berm, to await final disposal. The objective also includes the soil-cement stabilization of the surface soils at Areas B and C to prevent future migration of low-level (below MDEQ Tier 1 Screening) contaminated soil and to provide for future military (non-residential) use of these areas.

The scope of these actions includes Areas B and C (as shown on Figure 2) and the immediately adjacent drainage ditches. Area A is not included in this action, and is being addressed under the Remedial Action Process.

b. Types of Responses to Meet Objective The following five responses are proposed to meet the objectives stated above:

1. Construction of a containment berm at Area A
2. Mechanical dewatering and excavation of all contaminated ditch segments within and adjacent to Areas B and C.
3. Transportation of the excavated material to Area A for isolation within the containment berm.
4. Collection of confirmation samples from each of the ditch segments and from a statistically significant number of surface soil locations at Areas B and C.
5. Construction of a cement-stabilized soil surface within the boundaries of Areas B and C.

Each of the five responses outlined above are described in more detail in the following subsection.

2. Detailed Description of Responses

Containment Berm at Area A All contaminated soil and sediment removed from Areas B and C will be consolidated at Area A until a permanent landfill cap is constructed. The berm and cover will be constructed to prevent offsite migration of contaminated material. The berm will not require an impermeable liner because water is a highly inefficient transport mechanism for dioxin.

Dewatering and Excavation The goal of excavating contaminated material from Areas B and C is to achieve an resulting 95% UCL of Tier 1 Restricted TRG of 38 ppt. The 95% UCL for the surface soil at Areas B and C is currently 43 ppt based on the data set of 27 samples collected in 1997 to reconfirm the post - excavation sampling of 1985 and 1986. The surface soil excavation activities described in this subsection are designed to meet the Tier 1, goal of 38 ppt.

The approach to excavating sediment is different than the approach for soils due to the dynamic hydraulic conditions in ditches and the need to conduct ditch maintenance in the future. Therefore, all associated ditch segments at Areas B and C will have the contaminated sediment throughout the extent of the drainage systems removed, with the resulting 95% UCL expected to be significantly below 38 ppt.

Sediment The ditches at Areas B and C are uniformly shallow, less than 4 feet deep, and contain runoff only during periods of precipitation. The ditch segments that are

shown on Figure 4 will require excavation to remove contaminated sediment and associated surface soil.

If standing water is present, dewatering is best accomplished by installing sections of corrugated 8-foot PVC seawall pilings. These light and durable barriers should be placed across adjacent ditches: upstream and downstream of the culverts. Surface water can then be easily pumped downstream from an excavated sump. Care should be taken to work from the top (upstream) of the basin to downstream segments. The series of downstream sediment traps now in place will prevent dioxin contamination from migrating beyond the boundaries of Site 8.

Excavating the dioxin contaminated sediment from the ditches at Areas B and C is a relatively simple matter. The dioxins are entirely bound to the dark, organic deposits in the bottom and sides of the ditches, which cover the fine-grained white sand below. The thickness of this organic layer at B and C varies from a few inches to 3 feet. TtNUS will provide oversight to assist in determining depth and extent of contamination during excavation.

Volume estimates of contaminated sediment for the ditch segments shown on Figure 4 are - Area 8B: 1,700 cubic yards, Area 8C: 200 cubic yards, and the ditches north of 8A: 250 cubic yards. These estimates are based on field observations of contaminant thickness and extent during Pilot - Scale activities (TtNUS 2001) at Site 8.

Surface Soil One area of elevated dioxin levels (up to 181 ppt) in the surface soil at Area B was reported in the 1997 Onbase Dioxin Delineation Report (HLA 1999). The removal of surface soils in this small area (20 feet by 20 feet) to a total depth of 1.0 foot will lower the overall 95% UCL for Areas B and C to 33 from 43. The location of this "hot spot" is shown on Figure 4. While the source of this contaminated surface soil is not known for certain, it is more likely due to overbank deposits of contaminated sediment than a "missed" location during the 1985 excavation and incineration of surface soil.

Transportation Excavated material will be transported to a designated location within Area A (Figure 4). The transportation vehicles (dumptrucks or rollofs) should be watertight to prevent the spilling of potentially contaminated fluids on NCBC roads.

Confirmation Sampling To confirm the removal of contaminated sediment from the ditches at Areas B and C, samples will be collected and analyzed for dioxins and furans using the high

resolution USEPA 8290 method (USEPA 1992). To determine the total number of ditch samples to confirm that the removal meets the Tier 1 TRG, the process outlined for large sites in the *Verification of Soil Remediation Guidance* (Michigan Department of Environmental Quality, April 1994) was followed. The resulting grid node spacing requires the collection of 62 sediment samples. Two additional surface soil samples will be collected to confirm the removal of contamination in the area of sample L8026 (Figure 4). The results of all additional sampling will be presented in the Closeout Report.

Soil Stabilization To return Areas B and C to useful benefit for the Navy, it is proposed that the surface of these areas be stabilized with a cement-soil mixture capable of supporting AASHTO H20 loads within the area shown on Figure 5. This action will provide two benefits: (1) the soil cement will entrain all remaining (below 38 ppt) dioxin and prevent future offsite migration, and (2) the areas could be used for non-residential purposes. Land-use restrictions and post removal site controls will be discussed in detail in the Closeout Report. The precise thickness, extent and percent cement for the soil cementing will be determined in conjunction with the final decisions for future activities at Areas B and C.

3. Contribution to Remedial Performance

The removal of contaminated surface soil and sediment at Areas B and C significantly reduces potential future and/or existing risks to human and ecological receptors through the elimination of a contaminant source that at or very near the surface. Additionally, this action will be taken as part of the overall strategy to remediate dioxins related to the storage of HO at Site 8, as required by the Agreed Order.

Any future considerations such as land use restrictions, post removal site controls, or future activities on these areas will be coordinated with the ongoing remedial activities at Site 8 Area A and associated ditch systems.

4. Description of Alternative Technologies

Alternative technologies for removal and treatment of dioxins were recently completed as part of the Focused Feasibility Study (TtNUS, 2001). These alternatives included: (1) excavation and offbase incineration, (2) excavation, stabilization, and capping, (3) off site disposal and (4) a variety in situ treatments. Following the screening and detailed analysis, excavation (ex situ) methods, either stabilization or offbase disposal, were considered the best options.

5. Engineering Evaluation and Cost Analysis

Since this is a time-critical removal action, an EE/CA is not required.

6. Applicable or Relevant and Appropriate Requirements

Under the description of ARARs set forth in the NCP and SARA, state and Federal ARARs are categorized as:

- **Chemical - Specific:** Controlling the extent of the site removal action with regard to specific contaminants and pollutants.
- **Location - Specific:** Governing site features such as wetland, floodplains, and sensitive ecosystems (including features of historical significance).
- **Action - Specific:** Pertaining to the proposed site removal action.

The chemical, location, and action specific ARARs are presented in the following table.

Federal and State ARARS

Name and Regulatory Citation	Description	Consideration in the Removal Action Process	Type
Federal			
USEPA Region III Risk-Based Concentration Table	Provides risk-based concentrations for screening of soil.	Relevant and Appropriate. These guidelines aid in the screening of chemicals in soil.	Chemical-specific
CERCLA and the NCP Regulations (40 CFR, Section 300.430)	Discusses the types of LUCs to be established at CERCLA sites.	Applicable. These requirements may be used as guidance in establishing appropriate LUCs at Site 8.	Action-specific
Occupational Safety and Health Act (29 CFR Part 1910)	Requires establishment of programs to ensure worker health and safety at hazardous waste sites.	Applicable. These requirements apply to response activities conducted in accordance with the NCP. During the implementation of any remedial alternative for Site 8, these regulations must be followed.	Action-specific
Hazardous Materials Transportation Act Regulations (49 CFR 171-179)	Provides requirements for packaging, labeling, manifesting and transporting hazardous materials.	Applicable: If soil is excavated and transported and is found to be hazardous, the soil would need to be handled, manifested, and transported as a hazardous waste.	Action-specific
National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61)	Standards promulgated under the Clean Air Act for significant sources of hazardous air pollutants.	Relevant and Appropriate: Remedial Action (e.g., soil excavation) may result in release of hazardous air pollutants.	Action-specific
Resource Conservation and Recovery Act (RCRA) Treatment Storage, and Disposal of Hazardous Waste (40 CFR 262-266)	Regulates the treatment, storage, and disposal of hazardous waste.	Relevant and Appropriate: Hazardous waste generated by site remediation must meet RCRA generator and treatment, storage, or disposal requirements.	Action-specific
Land Disposal Restrictions (40 CFR 268)	Restricts certain listed or characteristic hazardous waste from placement or disposal on land without treatment.	Excavated soils or treatment residuals (such as spent activated carbon) may require disposal in a land fill.	Action-specific
State			
Mississippi Target Risk Goals (MS Code Section 49-35-21)	Default Screening Levels. Human Health risk-based cleanup goals for soil.	Applicable. These regulations apply to all remedial actions in the State of Mississippi.	Chemical Specific
MDEQ Risk Evaluation Procedures for Voluntary Cleanup and Redevelopment	Risk-based procedures and rationale for Site evaluation and remediation.	To be considered criteria (TBC). These regulations apply to all Voluntary Cleanup and Brownfield actions in the State of Mississippi	Guidance
MDEQ Office of Pollution Control Hazardous Waste Management Regulations	Adopts by reference, specific sections of the Federal Hazardous Waste regulations	Relevant and Appropriate. These regulations may apply if material is removed from the Base	Action Specific

7. Project Schedule

The removal action for Site 8, Areas B and C is scheduled to begin within the next six months, following a short period of planning and procurement. The removal action is scheduled to be completed within four 10-day shifts.

8. Community Relations Requirements

The community relations requirements for a time-critical removal action include the following:

1. Designation of a spokesperson.
2. Conducting community interviews.
3. Publish notice of availability of administrative record (AR) file within 60 days of initiation of on-site removal activities, and place AR file in a central location near the site.
4. Provide a public comment period of not less than 30 days.
5. Prepare a written response to significant public comments.

B. ESTIMATED COSTS

The removal action described herein is being funded entirely by the Navy and the Air Force.

VI. DELAY CONTINGENCIES

Should a removal action for the dioxin-contaminated sediment at Areas B and C not be undertaken, it is likely that the migration of contaminated (now slowed by sediment traps) will continue to impact downstream locations and areas prone to flooding and overbank deposition. Further, it should be noted that the highest levels of dioxin contamination reported anywhere on the base were located within Area B, which strengthens the case to conduct the removal action within these areas to eliminate the potential exposure to ecological receptors. Downstream and/or overbank deposition of dioxin will result in significantly higher study and remediation costs and also could potentially recontaminate ditches in or near residential property.

VII. OUTSTANDING POLICY ISSUES

None are currently identified.

VIII. ENFORCEMENT

The Navy and Air Force will undertake the described action within the framework of the ongoing Agreed Order to address dioxin and furan contamination related to the storage and handling of herbicide orange at NCBC Gulfport.

IX. RECOMMENDATION

This document presents a site description and the proposed removal action to consolidate dioxin-contaminated surface soil and sediment within Site 8, former Herbicide Orange Storage Area. In addition, the surface soil stabilization is intended to prevent any future erosion and migration of dioxins. This document was prepared in accordance with CERCLA, as amended, and is not inconsistent with the NCP.

Conditions at Site 8, Areas B and C meet the NCP Section 300.416(b)(2) criteria for a removal action. Completion of this removal action and the incorporation of this document into the Administrative Record is recommended.

Installation Commander

Date

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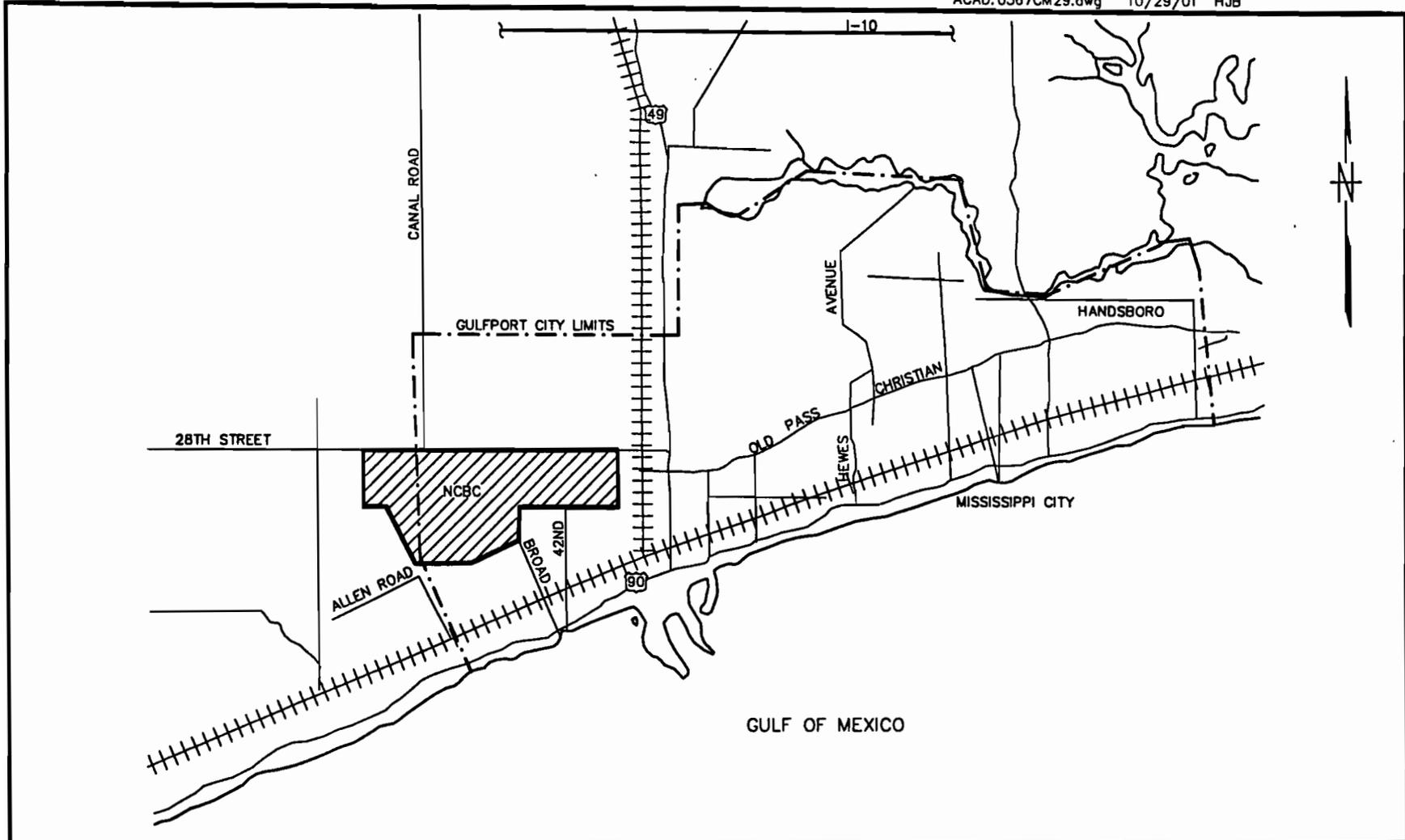
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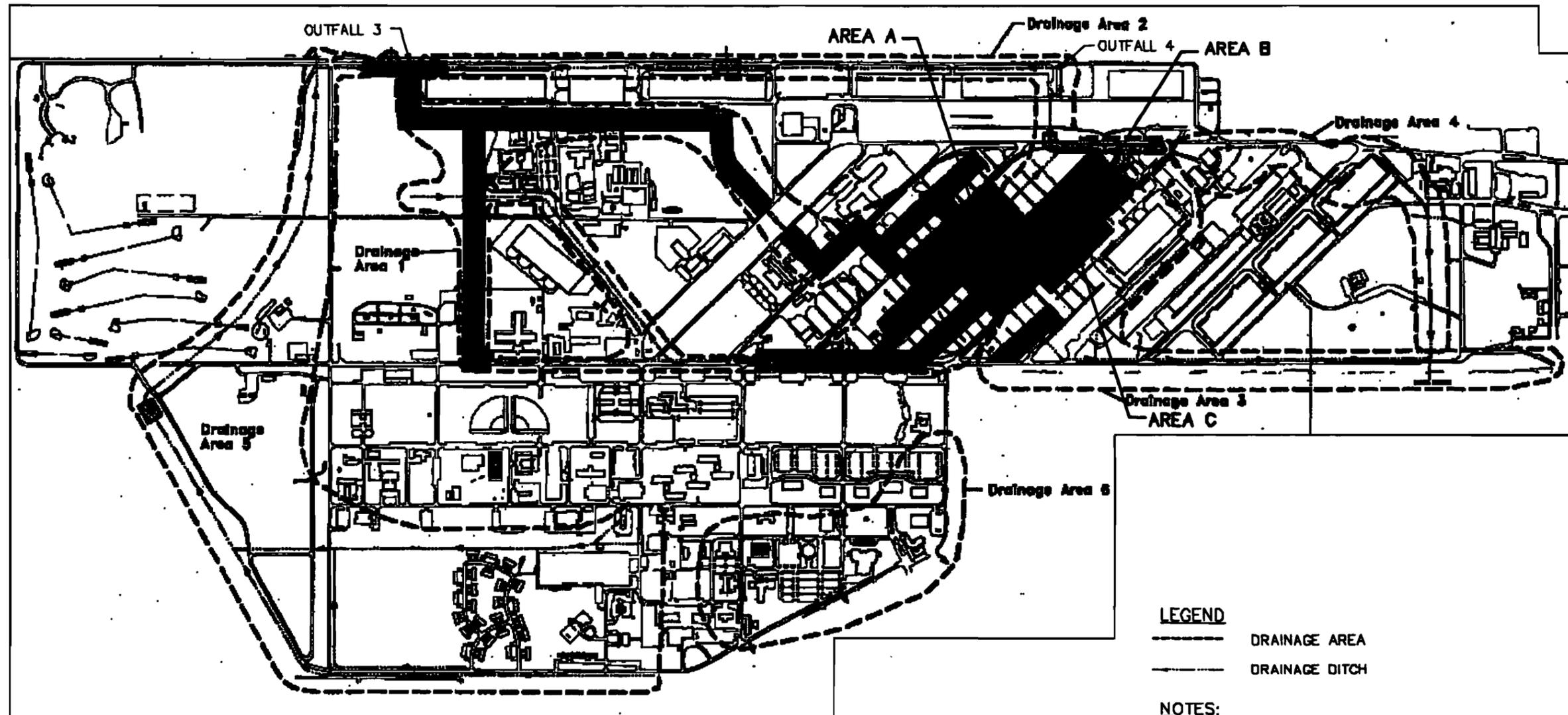


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COST/SCHED-AREA	
SCALE	
NOT TO SCALE	



VICINITY MAP
 ACTION MEMORANDUM FOR THE TIME CRITICAL
 REMOVAL OF DIOXIN CONTAMINATED SEDIMENT
 NAVAL CONSTRUCTION BATTALION CENTER
 GULFPORT, MISSISSIPPI

CONTRACT NO. 0567	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV. 0



LEGEND

- DRAINAGE AREA
- DRAINAGE DITCH

NOTES:

- 1) BOUNDARIES FOR SITE 8B AND SITE 8C ARE APPROXIMATE.
- 2) WIDTHS ACROSS DRAINAGE DITCHES ARE NOT TO SCALE.

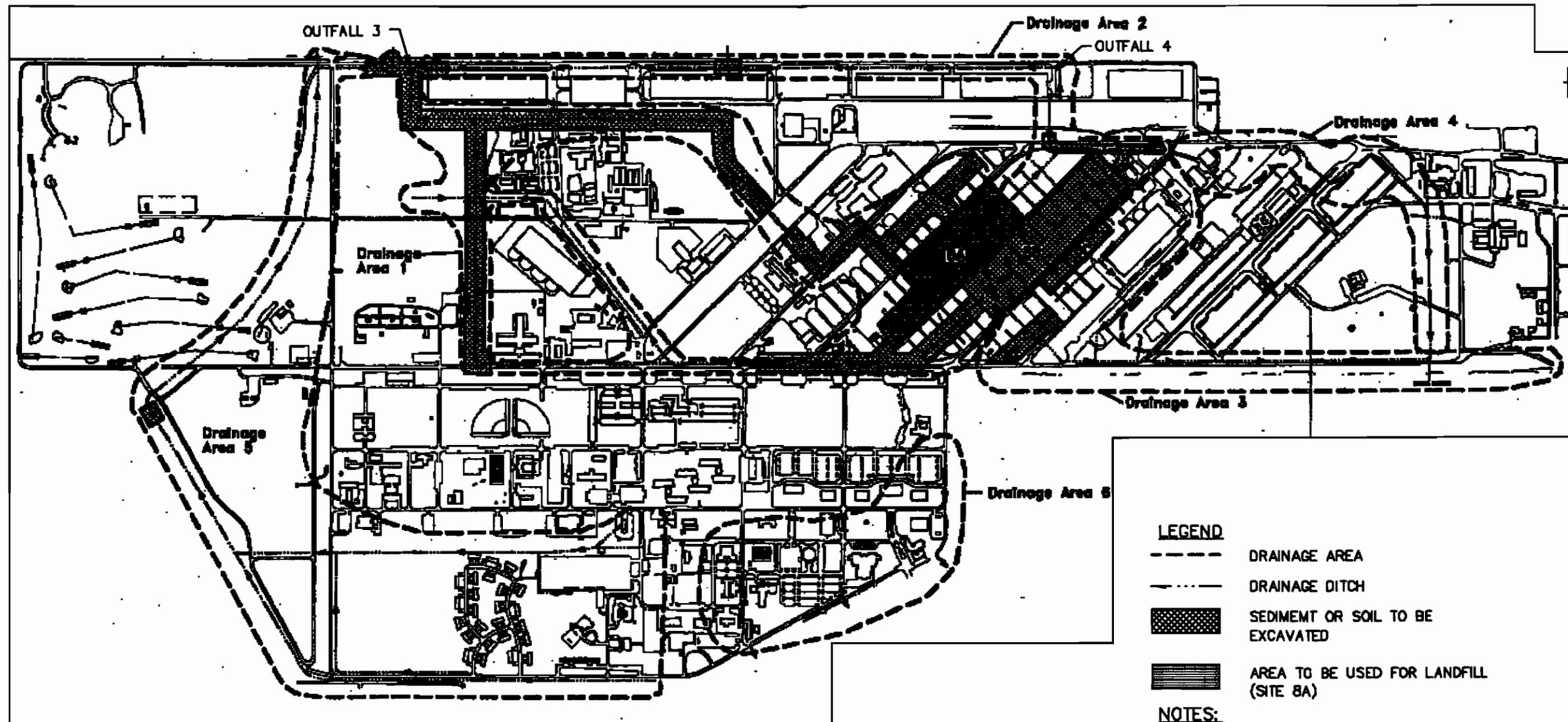


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE
							HJP	10/29/01
							CHECKED BY	DATE
							COST/SCHED-AREA	
							SCALE	
							AS NOTED	



LOCATION OF FORMER HERBICIDE ORANGE STORAGE AREAS
 ACTION MEMORANDUM FOR THE TIME CRITICAL REMOVAL OF DIOXIN CONTAMINATED SEDIMENT
 NAVAL CONSTRUCTION BATTALION CENTER
 GULFPORT, MISSISSIPPI

CONTRACT NO. 0567	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2	REV. 0

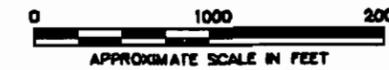


LEGEND

- DRAINAGE AREA
- - - DRAINAGE DITCH
- ▨ SEDIMENT OR SOIL TO BE EXCAVATED
- ▨ AREA TO BE USED FOR LANDFILL (SITE 8A)

NOTES:

- 1) BOUNDARIES FOR SITE 8B AND SITE 8C ARE APPROXIMATE.
- 2) WIDTHS ACROSS DRAINAGE DITCHES ARE NOT TO SCALE.

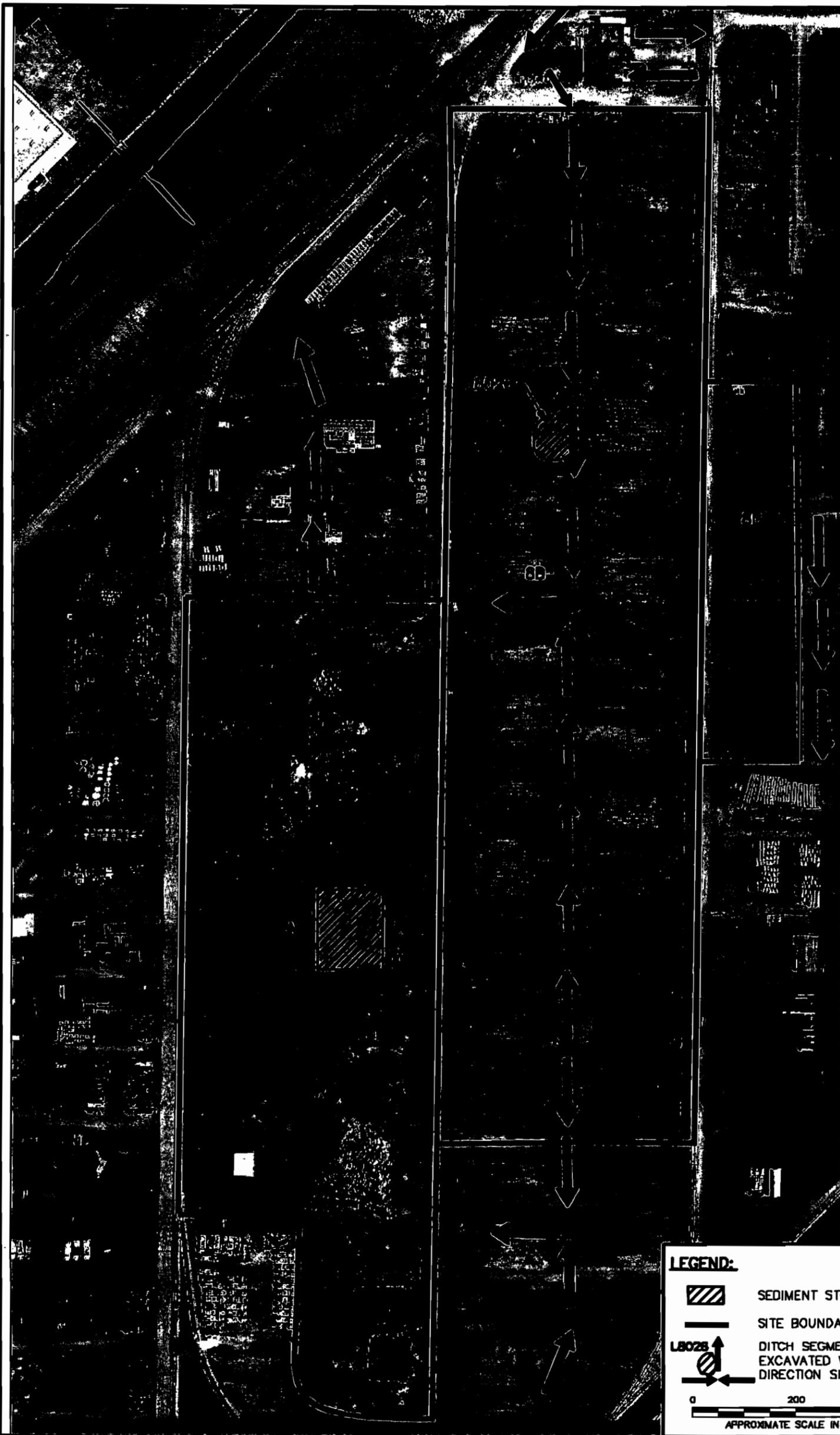


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COST/SCHED-AREA	
SCALE	
AS NOTED	

AREAL EXTENT OF ON-BASE
CONTAMINATED MEDIA
ACTION MEMORANDUM FOR THE TIME CRITICAL
REMOVAL OF DIOXIN CONTAMINATED SEDIMENT
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

CONTRACT NO. 0567	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV. 1

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LEGEND:

-  SEDIMENT STORAGE AREA
-  SITE BOUNDARIES
-  DITCH SEGMENTS TO BE EXCAVATED WITH FLOW DIRECTION SHOWN

0 200 400
APPROXIMATE SCALE IN FEET

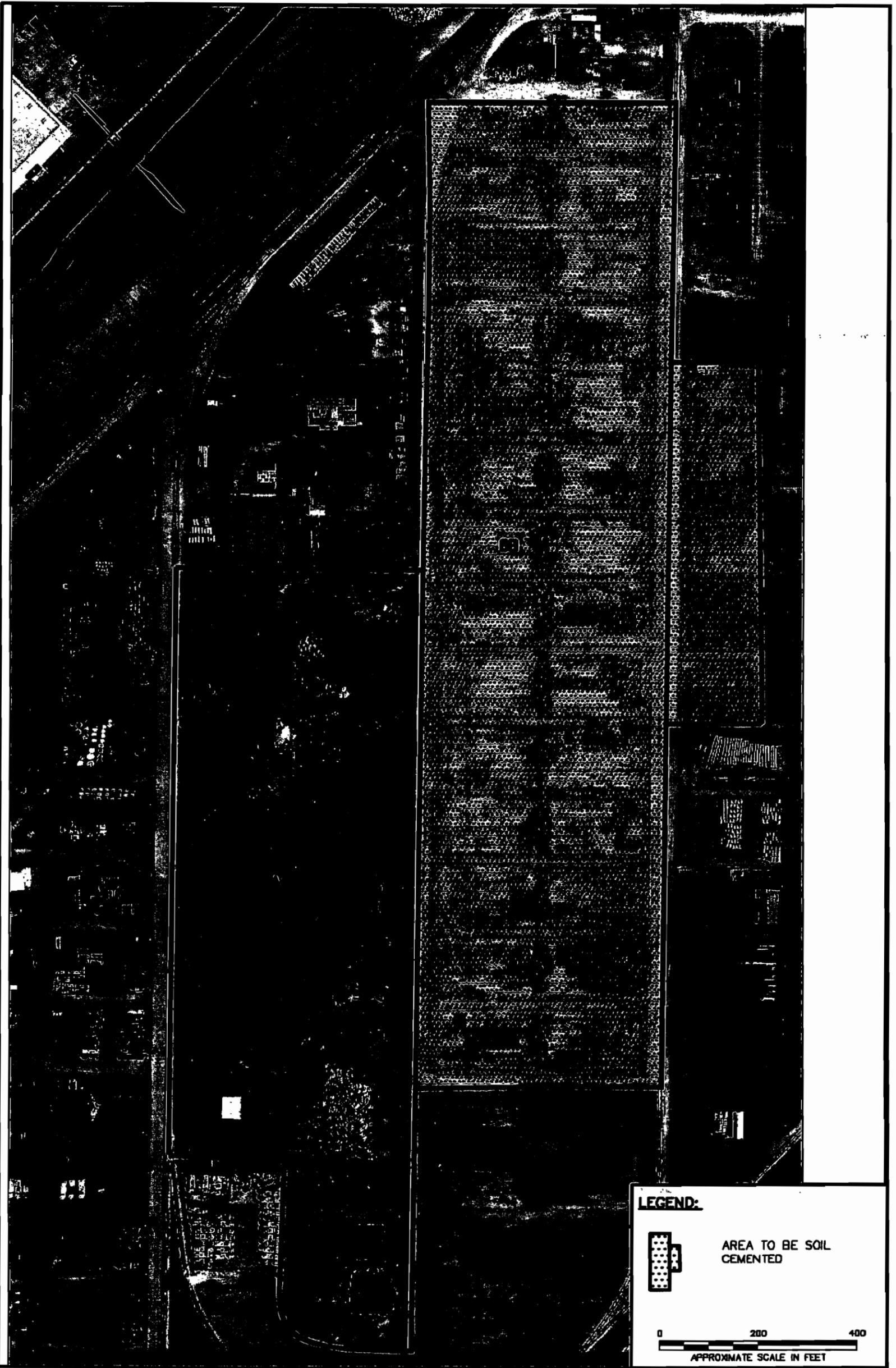
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COST/SCHED-AREA	
SCALE AS NOTED	



SEDIMENT EXCAVATION MAP
AREAS B AND C
ACTION MEMORANDUM FOR THE
TIME CRITICAL REMOVAL OF DIOXIN CONTAMINATED SEDIMENT
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

CONTRACT NO. 0567	
APPROVED BY	DATE
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DRAWING NO.	FIGURE 4
REV.	0

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LEGEND:



AREA TO BE SOIL CEMENTED

0 200 400

APPROXIMATE SCALE IN FEET

DRAWN BY	DATE
HJB	10/30/01
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
AS NOTED	

**PROPOSED AREA OF SOIL CEMENT STABILIZATION
ACTION MEMORANDUM FOR THE
TIME CRITICAL REMOVAL OF DIOXIN CONTAMINATED SEDIMENT
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI**

CONTRACT NO. 0567	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	FIGURE 5
REV.	0