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NCBC GULFPORT
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LETTER REGARDING REGULATORY REVIEW AND COMMENTS ON DRAFT FINAL
REMEDIAL INVESTIGATION FEASIBILITY STUDY WORK PLAN NCBC GULFPORT MS
3/15/1993
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY



STATE OF MISSISSIPPI
DEPARTMENT OF ENVIRONMENTAL QUALITY
JAMES I. PALMER, JR.
EXECUTIVE DIRECTOR

March 15, 1993

Mr. Ken Barnes, Engineer-in-charge
Dept. of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, S.C. 29411-0068

Re: Draft Final RI/FS Work Plan
Naval Construction Battalion Center
Gulfport, MS

Dear Mr. Barnes:

Enclosed are comments regarding the referenced work plan. This office is available for a meeting or teleconference to discuss these comments in more detail. The major concern is that the Verification Study didn't provide convincing evidence that the clay encountered at each site is continuous and confining over the entire facility. Therefore, the remedial investigation needs to address the potential for downward migration of contaminants in the groundwater.

Additionally, in a technical review committee meeting at CBC Gulfport in August 1989, I provided written comments on the Final Verification Report and asked that they be addressed in the next phase of work. Since I'm not sure that you currently have those comments, I'm hereby enclosing a copy. These comments should also be reviewed before finalizing the RI/FS work plan.

This office is also concerned with the delay in implementing the remedial investigation. Although we recognize the Navy's need to fund projects in accordance with regional priorities, it has been five years since the last IRP investigation was completed on the waste disposal sites (excluding the Herbicide Orange site). Accordingly, this office is considering enforcement action but would like to get feedback from the Navy first.

Mr. Ken Barnes

Page -2-

If you have any questions or comments, please contact Phillip Weathersby at (601) 961-5302 or me at extension 5065. Also, please let us know your time frame for responding to this letter.

Sincerely,



Jim Hardage, Chief
CERCLA Section

JH:PW_mes17

Enclosure

cc Gordon Crane (w/enclosure)

Mississippi DEQ Comments
RI/FS Work Plan
Naval Construction Battalion Center
Gulfport, MS

- (1) Pg. 2-10, second paragraph, states that all borings conducted during the Verification Study encountered a clay layer which was from 13-30 feet below land surface. Figure 2-6 does not show this clay layer in Boring 2-1. It is imperative that all borings that are intended to show continuity of the confining clay actually reach the clay.
- (2) Pg. 2-21, Section 2.3.5.1, 3rd sentence. Please provide well logs showing the 28 to 197 feet of clay below the surficial aquifer.
- (3) Pg. 2-21, Section 2.3.5, 1st sentence. Please clarify this sentence. May I suggest placing the word "sources" behind groundwater?
- (4) Pg. 2-21, Section 2.3.5.2, 1st sentence. Is this sentence saying that the entire Citronelle Formation is 0 to 300 feet thick or that the lenses and layers of clay in the Citronelle are from 0 to 300 feet thick?
- (5) Page 4-6. Why are the three background soil samples not being analyzed for volatile organic compounds and total petroleum hydrocarbons? These parameters should be included unless you can provide a rationale for not including them.
- (6) Page 4-6. What is the rationale for not analyzing the background groundwater samples for TCL constituents?
- (7) Pg. 4-8, 2nd paragraph. The paragraph is ambiguous concerning which parameters the surface water samples will be analyzed for. Will background and on-site surface water samples be analyzed for TCL VOCs, TCL semivolatile organics, TCL pesticides and PCBs, and total petroleum hydrocarbons? If not, why not?

- (8) Pg. 4-6, 1st paragraph, 1st sentence. All split spoon samples should be field described in full engineering and geologic detail.
- (9) Pg. 4-9, Section 4.2.1. Clarify the entire paragraph. See above comments 2, 3, and 4.
- (10) Pg. 4-24, last paragraph, 2nd and 3rd sentences. Clarify analytical parameters for surface water samples for all sites.
- (11) Site 3 - An additional pair of monitor wells should be installed north or northwest of the burn pit. These wells could help better define groundwater flow of the area.
- (12) Develop cross-sections using all available data to show the subsurface lithology at NCBC. Any cross-sections based on extrapolation of data should be so noted.

Additional Comments on the RI/FS Sampling and Analysis Plan

- (13) Pg. 2-32, 3rd paragraph. The sandpack and bentonite pellet seal should be tremied into place in any well exceeding 25 feet.
- (14) What kind of bailer will be used to collect groundwater samples immediately above the confining clay layer?
- (15) Sampling the on-site potable wells should be included in the RI. HRS scoring yielded a high facility score based on possible contamination of these wells.



Phase II
COMMENTS FOR THE FINAL VERIFICATION REPORT
NAVAL CONSTRUCTION BATTALION CENTER (NCBC)
GULFPORT, MISSISSIPPI

July, 1989

Author: David C. Pentecost



INTRODUCTION

We have recently reviewed the Final Verification Report for the Naval Construction Battalion Center (NCBC) located at Gulfport, Mississippi. The purpose of this review is to evaluate the analytical data and recommend additional work that will satisfy the requirements under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Six sites are included in this study and include a fire fighting training area, a disaster recovery disposal area, and four other landfill/disposal areas. Figure 1 shows the location of these sites and table 1 lists the chemical parameters identified for analysis of sediment, soil, and water samples at NCBC for this study.

HYDROGEOLOGICAL SETTING

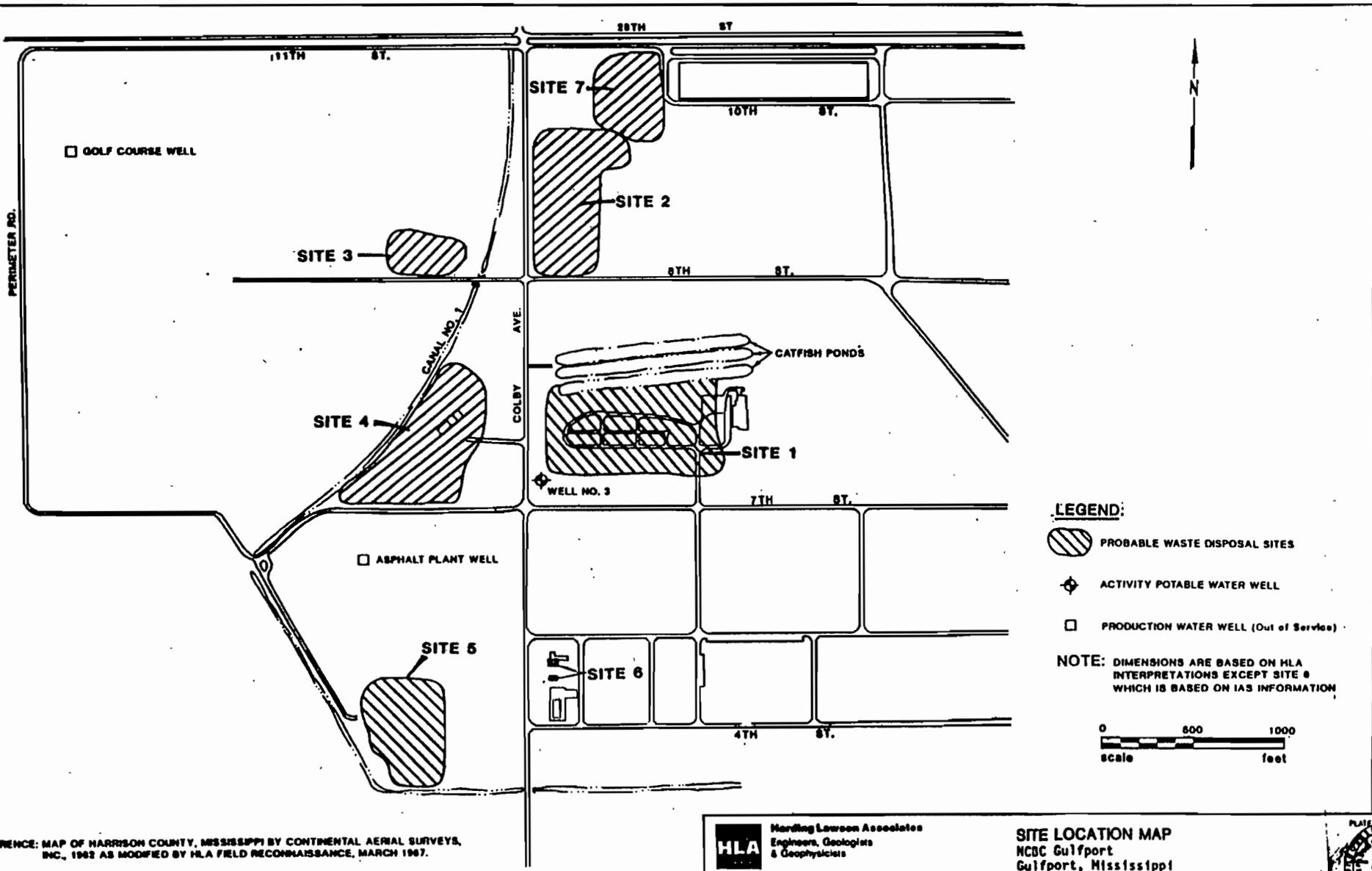
The stratigraphy beneath the NCBC facility consists of, in descending order, a thin topsoil layer, the surficial aquifer, which consists of up to 27 feet of unconsolidated sand with varying amounts of clay and silt, and a lower confining clay layer. Below this confining clay are deeper groundwater aquifers that are divided into two major systems: 1) the Citronelle Formation and 2) the Miocene aquifer system. These two deeper aquifers are the primary sources of water for individuals and municipalities in the Gulf Coast area. While the Citronelle aquifer is the source of water for some individual and municipal water supplies, higher yields can be obtained from the Miocene aquifer system. As a result, the majority of wells in this area are completed in the Miocene aquifers.

The aquifer of concern in this verification study is the surficial aquifer, which, according to this report, is closely interrelated with surface water bodies at NCBC Gulfport. The main focus of the verification study is the surficial aquifer and its related surface water bodies. However, samples were also collected from the Miocene aquifer water supply wells for analyses.

REVIEW OF ANALYTICAL RESULTS FOR WATER SUPPLY WELLS AT NCBC

Five wells supply potable water from the Miocene aquifer system to the NCBC facility. The report indicates that the Miocene aquifer system underlies the clay interval that serves as the surficial aquifer's lower confining unit. As a result, the Miocene aquifers are presumed to be protected from potential contamination that may occur in the surficial aquifer. However, groundwater samples were taken from each of the potable water wells on the base in order to determine if chemical contamination of the Miocene aquifer has occurred.

Analytical data (table 2) for groundwater samples collected from the NCBC water supply wells indicate that only one groundwater sample had a concentration of chromium above detection limits. The sample



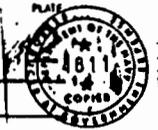
REFERENCE: MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., 1962 AS MODIFIED BY HLA FIELD RECONNAISSANCE, MARCH 1967.

HLA Harding Lawson Associates
 Engineers, Geologists
 & Geophysicists

DATE: *EL* JOB NUMBER: 2176,093.12

SITE LOCATION MAP
 NCBC Gulfport
 Gulfport, Mississippi

APPROVED: *MKB* DATE: *11/1/77* REVISION: DATE:



- LEGEND:**
- PROBABLE WASTE DISPOSAL SITES
 - ACTIVITY POTABLE WATER WELL
 - PRODUCTION WATER WELL (Out of Service)

NOTE: DIMENSIONS ARE BASED ON HLA INTERPRETATIONS EXCEPT SITE 6 WHICH IS BASED ON IAS INFORMATION

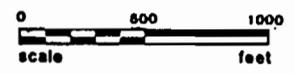


Figure 1



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TABLE 1

~~TABLE 2~~

CHEMICAL PARAMETERS IDENTIFIED FOR ANALYSIS OF SEDIMENT, SOIL, AND WATER SAMPLES

Parameter	Surface and Groundwater Samples		Sediment and Soil Samples	
	Analytical Method Number	Method Detection Limit	Analytical Method Number	Method Detection Limit
pH	150.1(1)	0.1 su	3-51(2)	0.01 su
Specific Conductance	120.1(1)	1 μ hos	Not Applicable	
Total Organic Carbon (TOC)	415.2(1)	1 mg/l	DC-80(3)	100 mg/kg
Total Organic Halogen (TOX)	9020(4)	5 μ g/l	DX-20(5)	200 mg/kg
Chemical Oxygen Demand (COD)	Hach(6)	5 mg/l	3-393(2)	50 mg/kg
Oil and Grease (O and G)	413.2(1)	1.0 mg/l	3-284(2)	100 mg/kg
Cadmium (Cd)	213.2(1)	5 μ g/l	213.2(1)	3 mg/kg
Chromium (Cr)	218.2(1)	10 μ g/l	218.2(1)	5 mg/kg
Lead (Pb)	239.2(1)	5 μ g/l	239.2(1)	3 mg/kg
<u>Volatile Organics</u>	624(7)		Not Applicable	
Acrolein		20 μ g/l(8)		
Acrylonitrile		10		
Benzene		5		
Bromoform		5		
Bromomethane		10		
Carbon Tetrachloride		5		
Chlorobenzene		5		
Chlorodibromomethane		5		
Chloroethane		10		
Chloromethane		10		
2-Chloroethyl Vinyl Ether		10		
Chloroform		5		
Dichlorobromomethane		5		
1,1-Dichloroethane		5		
1,2-Dichloroethane		5		
1,1-Dichloroethylene		5		
1,2-Dichloropropane		5		
trans-1,3-Dichloropropene		5		
Ethyl Benzene		5		
Methylene Chloride		5		
1,1,2,2-Tetrachloroethane		5		
Tetrachloroethylene		5		
Toluene		5		
1,2-trans-Dichloroethylene		5		
1,1,1-Trichloroethane		5		
1,1,2-Trichloroethane		5		
Trichloroethylene		5		
Trichlorofluoromethane		10		
Vinyl Chloride		10		
cis-1,3-Dichloropropene		10		



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TABLE I
~~TABLE 2~~ (con't.)

CHEMICAL PARAMETERS IDENTIFIED FOR
ANALYSIS OF SEDIMENT, SOIL, AND WATER SAMPLES

Parameter	Surface and Groundwater Samples		Sediment and Soil Samples	
	Analytical Method Number	Method Detection Limit	Analytical Method Number	Method Detection Limit
Base-Neutral Extractable Organics (con't.)	625(7)		Not Applicable	
Di-n-butylphthalate		10 ug/l (8)		
1,2-Diphenylhydrazine		10		
2,4-Dinitrotoluene		10		
2,6-Dinitrotoluene		10		
Di-n-octyl Phthalate		10		
Fluoranthene		10		
Fluorene		10		
Hexachlorobenzene		10		
Hexachlorobutadiene		10		
Hexachlorocyclopentadiene		10		
Hexachloroethane		10		
Indeno(1,2,3-cd)pyrene		10		
Isophorone		10		
Naphthalene		10		
Nitrobenzene		10		
N-nitrosodi-n-propylamine		10		
N-nitrosodiphenylamine		10		
Phenanthrene		10		
Pyrene		10		
1,2,4-Trichlorobenzene		10		
Pesticides/PCB's	608(7)		Not Applicable	
Aldrin		0.1 ug/l (8)		
alpha-BHC		0.1		
beta-BHC		0.1		
gamma-BHC		0.1		
delta-BHC		0.1		
alpha Chlordane		0.5		
gamma Chlordane		0.5		
4,4'-DDT		0.1		
4,4'-DDE		0.1		
4,4'-DDD		0.1		
Dieldrin		0.1		
alpha-Endosulfan		0.1		
beta-Endosulfan		0.1		
Endosulfan Sulfate		0.1		
Endrin		0.1		
Endrin Ketone		0.1		
Heptachlor		0.1		



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TABLE 1

TABLE 2 (con't.)

CHEMICAL PARAMETERS IDENTIFIED FOR ANALYSIS OF SEDIMENT, SOIL, AND WATER SAMPLES

Parameter	Surface and Groundwater Samples		Sediment and Soil Samples	
	Analytical Method Number	Method Detection Limit	Analytical Method Number	Method Detection Limit
<u>Acid Extractable Organics</u>	625(7)		Not Applicable	
2-Chlorophenol		10 $\mu\text{g/l}$ (8)		
2,4-Dichlorophenol		10		
2,4-Dimethylphenol		10		
4,6-Dinitro-o-cresol		50		
2,4-Dinitrophenol		50		
2-Nitrophenol		10		
4-Nitrophenol		50		
p-chloro-m-cresol		10		
Pentachlorophenol		50		
Phenol		10		
2,4,5-Trichlorophenol		50		
2,4,6-Trichlorophenol		10		
<u>Base-Neutral Extractable Organics</u>	625(7)		Not Applicable	
Acenaphthene		10 $\mu\text{g/l}$ (8)		
Acenaphthylene		10		
Anthracene		10		
Benzidine		50		
Benzo(a)anthracene		10		
Benzo(a)pyrene		10		
Benzo(b)fluoranthene		10		
Benzo(ghi)perylene		10		
Benzo(k)fluoranthene		10		
bis(2-chloroethoxy)methane		10		
bis(2-chloroethyl)ether		10		
bis(2-chloroisopropyl)ether		10		
bis(2-ethylhexyl)phthalate		10		
4-Bromophenylphenyl ether		10		
Butyl Benzyl Phthalate		10		
2-Chloronaphthalene		10		
4-Chlorophenyl Phenyl ether		10		
Chrysene		10		
Dibenzo(a,h)anthracene		10		
1,2-Dichlorobenzene		10		
1,3-Dichlorobenzene		10		
1,4-Dichlorobenzene		10		
3,3'-Dichlorobenzidine		20		
Diethylphthalate		10		
Dimethyl Phthalate		10		



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TABLE I

TABLE 2 (con't.)

**CHEMICAL PARAMETERS IDENTIFIED FOR
ANALYSIS OF SEDIMENT, SOIL, AND WATER SAMPLES**

Parameter	Surface and Groundwater Samples		Sediment and Soil Samples	
	Analytical Method Number	Method Detection Limit	Analytical Method Number	Method Detection Limit
Pesticides/PCB's	608(7)		Not Applicable	
Heptachlor Epoxide		0.1 µg/l (8)		
Methoxychlor		0.5		
PCB-1242		1.0		
PCB-1254		1.0		
PCB-1221		1.0		
PCB-1232		1.0		
PCB-1248		1.0		
PCB-1260		1.0		
PCB-1016		1.0		
Toxaphene		1.0		

Notes: (1) "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1979.

(2) Plumb, R.H., Jr., 1981, Procedures for Handling Sediment and Water Samples, Technical Report EPA/CE-81-1.

(3) Dohrmann DC-80 Analysis Specifications.

(4) U. S. EPA Test Methods for Evaluating Solid Waste-Physical/Chemical Methods, SW-846, 2nd Edition, U. S. EPA, 1985.

(5) Dohrmann DX-20 Analysis Specification.

(6) HACH COD Specifications.

(7) U.S. EPA Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, July 1982.

(8) All method detection limits for volatile and acid, base-neutral extractable organics and pesticides/PCB's are in µg/l.



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TABLE 2
~~TABLE 8~~

SUMMARY OF CHEMICAL ANALYSIS RESULTS,
ACTIVITY POTABLE WELLS

Location	Well No. 1	Well No. 2	Well No. 3	Well No. 4	Well No. 5
Sampling Date	3/27/87	3/27/87	3/27/87	3/27/87	3/27/87
Temperature	26	25	24	28	24
pH (field)	9.02	8.73	7.57	8.36	7.49
Specific Conductance (field)	740	400	310	320	310
pH (laboratory)	8.69	9.03	8.30	8.88	8.00
Specific Conductance (laboratory)	500 (500)	220	190	190	190
Cd	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7
Cr	< 7.8	< 7.8	< 7.8	< 7.8	9.0
Pb	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Volatile Organics	(1)	(1)	(1)	(1)	(1)
Toluene	7	7	11	10	6
Acid/Base/Neutrals	(1)	(1)	(1)	(1)	(1)
Phenol	12				
Bis (2-Ethylhexyl) Phthalate	24		277(2)		

- Note: 1. All analysis results are reported in $\mu\text{g/l}$ except temperature, pH, and specific conductance which are in $^{\circ}\text{C}$, units and $\mu\text{mhos/cm}$ at 25°C , respectively.
2. Results presented in parentheses are for duplicate analyses.
3. Temperature, pH (field) and Specific Conductance (field) data for groundwater samples are an average of three separate measurements.
- (1) All chemical parameters not specifically reported were below their analytical detection limit (Table 3).
- (2) Laboratory analysis and associated calculations were repeated to verify accuracy of reported value.
- Sample not analyzed or measured for these parameters.
- * Found below detection limit for analytical method.



from well No. 5 had a concentration of 9 ppb chromium, significantly below the MCL of 50 ppb. The other metals analyzed for in this study, cadmium and lead, were below detection limits.

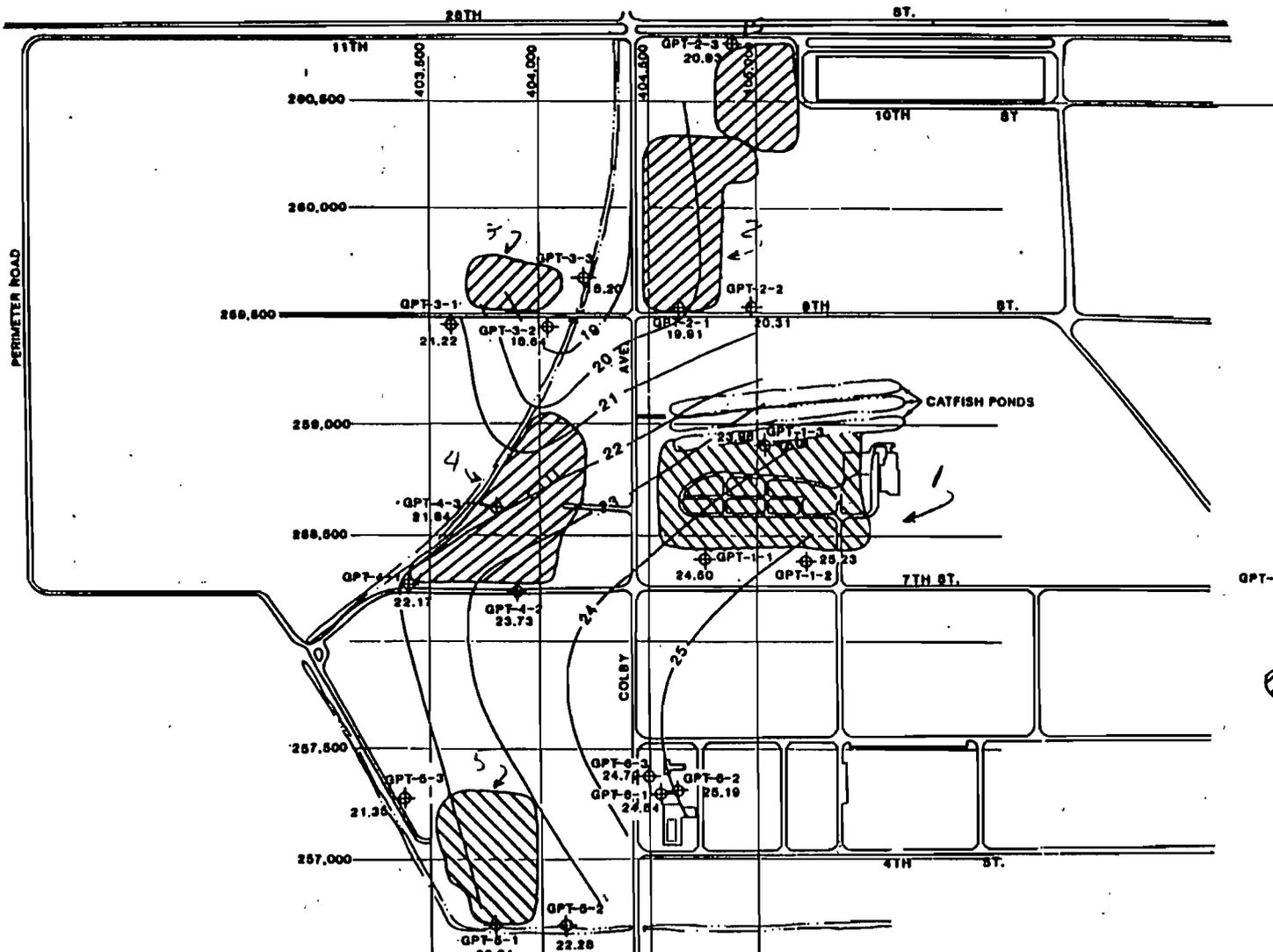
Traces of toluene were detected in groundwater samples from all five water supply wells, and ranged in concentration from 6 ppb to 11 ppb. Phenol was detected in well No. 1 at 12 ppb, and Bis (2-Ethylhexyl) phthalate was found at 24 ppb and 227 ppb in well Numbers 1 and 3, respectively. The concentrations of toluene, phenol, and Bis (2-Ethylhexyl) phthalate were all below RFI health based criteria. The report states that the presence of toluene and phenol at such low concentrations may be attributable to the presence of phase separated hydrocarbons associated with oils used in well pumping equipment. The Bis (2-Ethylhexyl) phthalate is presumed to be associated with the use of PVC piping.

The report recommends resampling the potable wells for confirmation of analytical results. Such sampling and analysis could also be used to verify the sources of contamination. If the presumed sources are verified, remediation could be achieved by removing phase separated hydrocarbons at the groundwater surface in the wells, improving maintenance procedures, and replacing equipment where necessary. The report also recommends that additional geotechnical and/or hydrogeological investigations be conducted to fully characterize the confining clay that separates the surficial aquifer from the deeper aquifers. This course of action should be adequate with respect to the base water supply wells.

GENERAL CONCERNS AND RECOMMENDATIONS

Only one round of water level measurements were taken in the surficial aquifer at the NCBC facility. These measurements indicate that the hydraulic gradient slopes in a direction different than originally presumed (figure 2). This has resulted in the placement of an inadequate number of downgradient monitoring wells at Sites 1 through 5, and possibly at Site 6. The Final Verification Report recommends that before additional monitoring wells are installed at these locations, further rounds of water level measurements should be collected. It was noted in the report that several inches of precipitation had occurred at the facility in the weeks that preceded the water level measurements. This rainfall had the effect of raising water levels to above normal and may have also affected the slope of the potentiometric surface. Quarterly water level measurements would determine if seasonal and/or local effects cause significant variations in the hydraulic gradient and the direction in which it slopes. This information is necessary to determine if future monitoring wells are correctly placed and that an adequate number are installed.

The screened intervals of all monitoring wells at the NCBC facility extend entirely through the surficial aquifer. During future sampling events, groundwater samples should be collected from discrete intervals in the wells in order to minimize the effects of dilution. Some wells at the facility (discussed in detail later in



LEGEND:

- GPT-1-1 GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- 22.17 GROUNDWATER ELEVATION (NGVD)
- 25 - GROUNDWATER ELEVATION CONTOUR
- PROBABLE WASTE DISPOSAL SITES
- MISSISSIPPI STATE PLANE COORDINATES (See Appendix C for exact monitoring well locations)

NOTE: Groundwater elevations measured on March 30, 1987.

0 500 1000
scale feet
Contour Interval = 1 Foot

REFERENCE: MAP OF HANCOCK COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., FORWARDED BY HLA FIELD RECONNAISSANCE, MARCH 1987.

HLA
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

MAP OF POTENTIOMETRIC SURFACE OF SURFICIAL AQUIFER
NCBC Gulfport
Gulfport, Mississippi

DATE: 4/1/87
APPROVED: [Signature]

JOB NUMBER: 2176.093.12



these comments) detected relatively low concentrations of TCE, a denser than water compound. Concentrations of contaminants in such cases would likely have been greater if well screens had been shorter in length and if they had been placed at the bottom of the aquifer. Dilution of other contaminants is also a possibility when aquifers are screened over large intervals. In the future, well screens at the NCBC facility should be constructed in such a way as to optimize the possibility of collecting samples from intervals having the greatest potential contaminant levels.

The report states that methyl ethyl ketone (MEK) was disposed of at sites 4, 5, and 6. However, this compound is not listed as one of the chemical parameters analyzed for in this report. It is recommended that MEK be added to the list of constituents to be analyzed for in future sampling events.

Additional surface water and sediment sampling is recommended. The report states that the surficial aquifer is probably interconnected with surface water bodies at NCBC Gulfport. If it is found that the slope of the potentiometric surface of the shallow aquifer changes seasonally, or is affected by local conditions, then further surface water and sediment sampling will be needed.

⑤ No hydraulic data has been included with the Final Verification Report. Parameters such as hydraulic conductivity, transmissivity, or average linear velocity have not been determined. Slug tests, single well pump tests, multiple well pump tests, or other appropriate tests should be conducted to determine hydraulic characteristics of the surficial aquifer and the confining nature of the confining clay before a final risk assessment can be made.

If contaminant levels are confirmed to be above health base levels, it will be necessary to perform additional work to define contaminant plumes and levels of contamination.

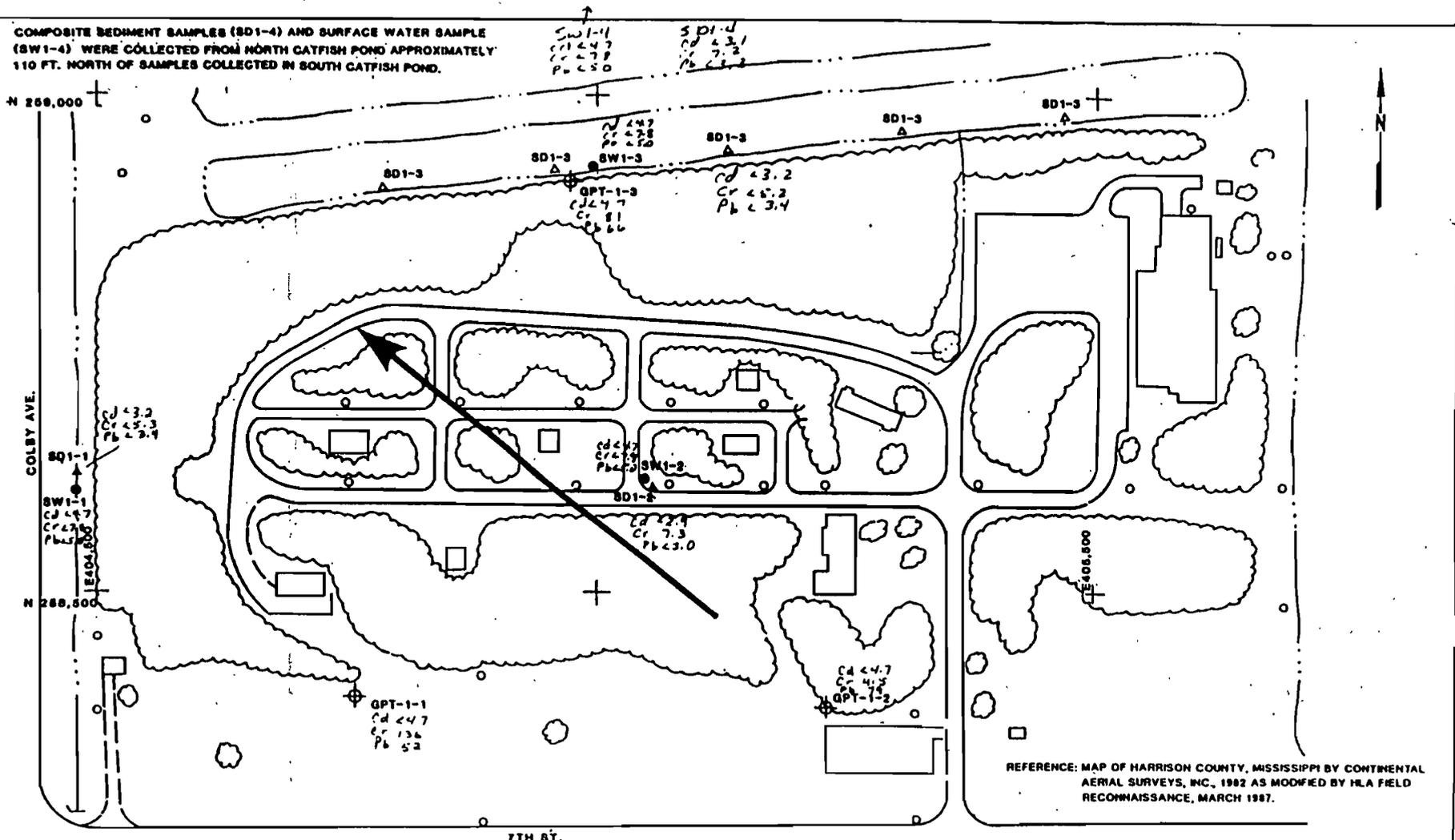
SITE SPECIFIC CONCERNS AND RECOMMENDATIONS

Site 1

Site 1 is currently used as a disaster recovery training area. From 1942 to 1948, before being used as a training area, chemical wastes were disposed of at this site primarily by trench burial of containerized materials, reportedly 55 gallon drums. The principal wastes disposed of include paints, oils, solvents, paint strippers and cleaning compounds. Excavation in this area in 1984 revealed several drums containing xylene, toluene, and 1,2 dichloroethane.

Analytical results for groundwater samples taken from all three monitoring wells at site 1 indicate that levels of chromium and lead are above the Maximum Concentration Levels (MCLs) as specified in the Safe Drinking Water Act (figure 3). The highest concentrations of chromium and lead were encountered in well GPT-1-2. As stated previously, the report recommends that the wells be resampled to verify contaminant concentrations. The installation of additional

COMPOSITE SEDIMENT SAMPLES (SD1-4) AND SURFACE WATER SAMPLE (SW1-4) WERE COLLECTED FROM NORTH CATFISH POND APPROXIMATELY 110 FT. NORTH OF SAMPLES COLLECTED IN SOUTH CATFISH POND.



REFERENCE: MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., 1982 AS MODIFIED BY HLA FIELD RECONNAISSANCE, MARCH 1987.

LEGEND:

- GPT-1-1 ⊕ GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- SD1-1 ▲ SEDIMENT SAMPLE NUMBER AND LOCATION
- SD1-3 ▲ COMPOSITE SEDIMENT SAMPLE NUMBER AND LOCATION
- SW1-1 ● SURFACE WATER SAMPLE NUMBER AND LOCATION

APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (Based on Plate 3)



HLA Harding Lawson Associates
Engineers, Geologists
& Geophysicists

GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITE 1
NCBC Gulfport
Gulfport, Mississippi



DATE: 4/1/87
JOB NUMBER: 2176,093,12
APPROVED: [Signature]



downgradient well are necessary pending confirmation of the potentiometric surface configuration.

Site 2

Site 2 was originally defined as two separate areas (Sites 2 and 7). These sites were combined after reconnaissance indicated that Site 7 was larger than originally anticipated and actually overlapped Site 2.

Site 2 was used for the burning and burial of chemical wastes from 1948 to 1966. The principal wastes disposed of include ash from combustible solid waste and noncombustible solid waste and liquid waste (paints, paint thinners, solvents, oils, and fuels).

Site 7 is currently used for rubble disposal and has been in operation since 1978. Disposal of chemical wastes have not been reported at this site.

Analytical results for groundwater samples at Site 2 indicate an elevated concentration of chromium in well GPT-2-2 (figure 4). The value obtained was 73 ppb, which is in excess of the MCL of 50 ppb. Lower concentrations of chromium and lead were detected in wells GPT-2-1 and GPT-2-3, but did not exceed the MCL.

Trichloroethylene (TCE) was detected at a concentration of 5 ppb (equal to the MCL) in a sample from well GPT-2-3. This well is screened at the shallowest interval of any well at the facility and was presumed in the report to encounter the lower confining clay at a depth of 13 feet. Most wells at the facility encounter the lower confining clay at depths in excess of 20-25 feet. The possibility exists that well GPT-2-3 encountered a discrete clay lense above the lower confining clay unit. Because TCE is denser than water, and if there is additional sand below a shallow clay layer, there is a possibility that TCE may be contaminating groundwater at a deeper interval at this site. Further characterization of the clay unit in this area will be necessary to determine if such contamination has occurred.

In addition, 1,2-trans-Dichloroethylene was detected in well GPT-2-3 at a concentration of 37 ppb, as was a trace of toluene and chloroform. The Bureau concurs with the report which recommends additional sampling in order to evaluate the significance of the contamination in these wells.

Low levels of lead and chromium were detected in the sediment sample at the site. The level of chromium detected in this sample is below the RFI health-based criteria for systemic toxicants. There is no RFI level for lead.

None of the monitoring wells at Site 2 were in the downgradient direction. Pending further water level measurements, additional monitoring wells will be necessary to fully assess this site.

Cd 4.29
Cr 4.9
Pb 4.7

E 404,800
SD2-1 ●
SW2-1 ▶
4.7
27.8
25.8

8TH ST.

N 259,800
E 405,000

GPT-2-1 Cd 4.7
Cr 26
Pb 20

GPT-2-2 Cd 4.7
Cr 73
Pb 41

COLBY AVE.



[Handwritten signature]

GPT-2-3
Cd 4.1
Cr 21
Pb 13
1/2 Trms -
Dichloroethylene 37
TCE 5
Toluene 1
bis(2-Furyl)HD 21
Phthalate

N 260,500



GPT-2-1
● GROUNDWATER MONITORING WELL NUMBER AND LOCATION
SD2-1 ▲ SEDIMENT SAMPLE NUMBER AND LOCATION

LEGEND:
SW2-1 ● SURFACE WATER SAMPLE NUMBER AND LOCATION
↑ APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (based on Plate 3)

REF MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS INC., 1982
AS BY HLA FIELD RECONNAISSANCE, MARCH 1987.

HLA Harding Lawson Associates
Engineers, Geologists
& Geophysicists

GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITES 2 AND 3
NCBC Gulfport
Gulfport, Mississippi

Drawn by *[Signature]*
JOB NUMBER 2176,093.12

APPROVED *[Signature]* DATE *4/6/87*





Site 3

Site 3 is currently a training area for Navy Reserve personnel. From 1948 to 1966, prior to use as a training area, chemical wastes were disposed of at this site by burning and burial. The principal wastes disposed of included substantial amounts of solid wastes and liquid wastes (fuels, oils, solvents, paints, and paint thinners).

Metals were the only contaminants detected in the groundwater samples from Site 3 (figure 5), and all metals levels were below the MCL. Resampling to verify contaminant concentrations is recommended, as is installation of additional downgradient monitoring wells after confirmation of the configuration of the potentiometric surface.

Analytical results for surface water and sediment samples indicated no volatile organic, acid-extractable, or base-neutral constituents above the detection limits. All metals concentrations were found to be well within any health based criteria listed in the RFI guidance document.

Site 4

Site 4 is located on the base golf course and driving range. From 1966 to 1972, prior to construction of the golf course, chemical wastes were disposed of at this site by burning and burial. Some containerized chemical wastes were also buried. The principal wastes disposed of included solid wastes and liquid wastes (fuel, oils, solvents (toluene, xylene, MEK), paints, and paint thinners). Combustion by products were also disposed of at Site 4.

There were no volatile organic, acid-extractable, or base-neutral contaminants above detection limits for all monitoring wells at Site 4 (figure 6). Chromium concentrations for samples taken from wells GPT-4-1 and GPT-4-3, however, were above the MCL of 50 ppb at concentrations of 72 ppb and 155 ppb, respectively. Lead concentrations for the same two wells were 50 ppb and 124 ppb (MCL = 50 ppb). Levels of chromium and lead below the MCL were detected at well GPT-4-2 and levels below the RFI health based criteria were found in sediment sample SD4-1. Resampling of all wells is recommended to confirm these contaminant levels. Additional downgradient wells are needed, but as always should be installed only after further groundwater measurements confirm slope of the potentiometric surface at this site.

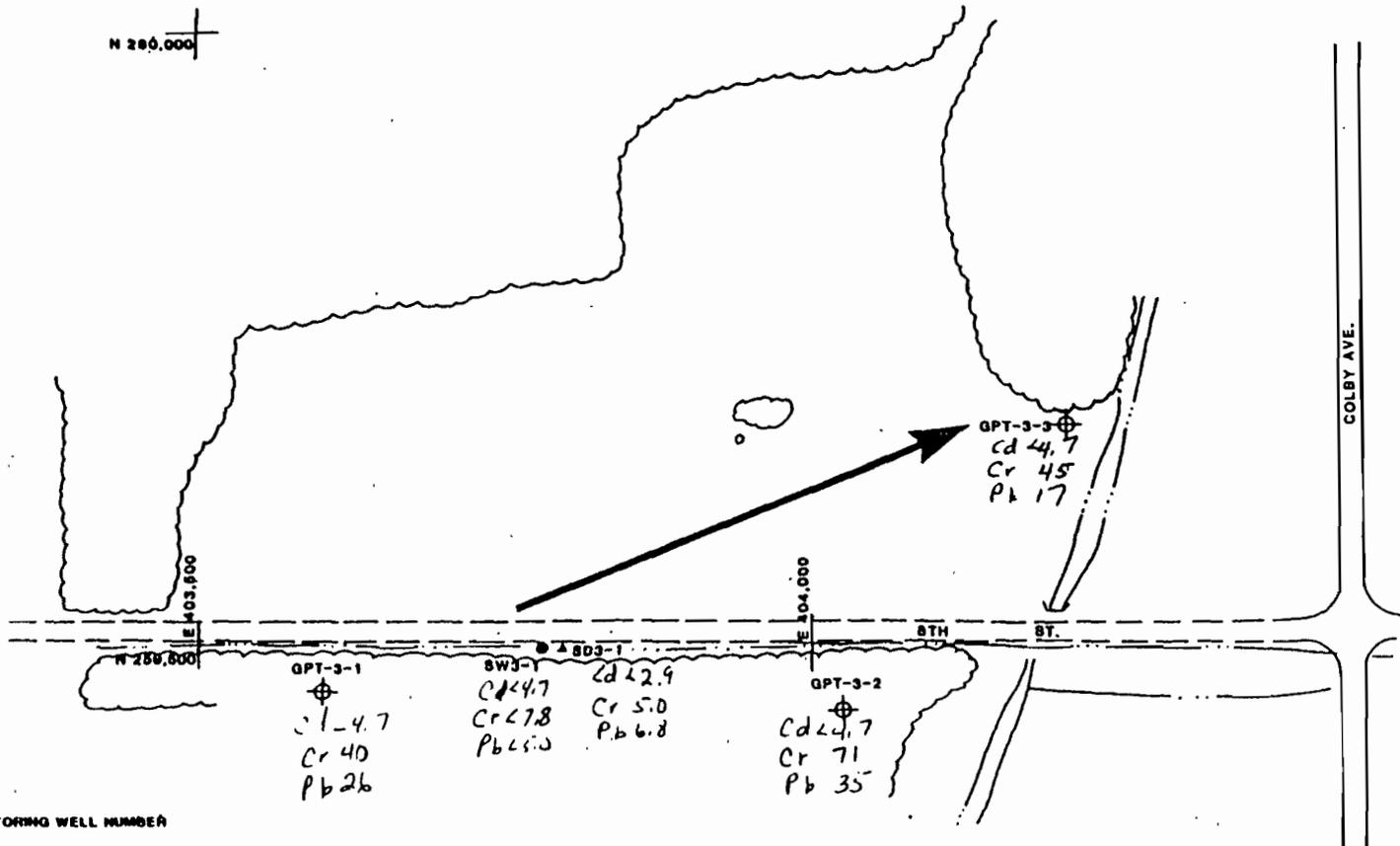
Another area of concern involves the past practice of disposing of MEK at Site 4. This compound was not included in the list of chemical parameters analyzed for at this facility. MEK should be added to this list and analyzed for in any future sampling events.

Site 5

Site 5 is currently used as a training area for operating heavy equipment. From 1972 to 1976, before its use as a training area,



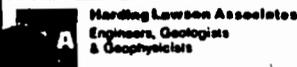
N 280,000



LEGEND:

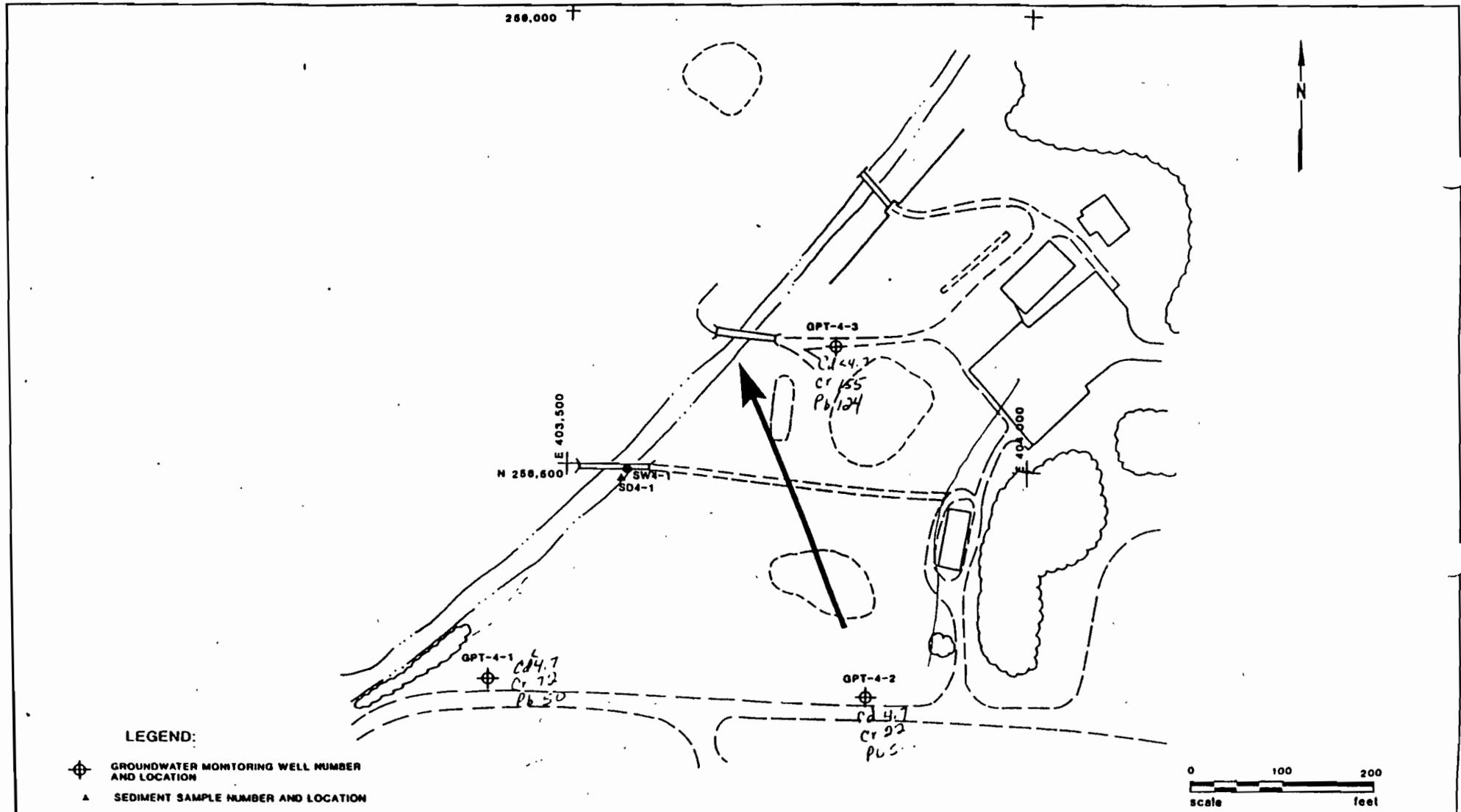
- OPT-3-1 GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- SDS-1 SEDIMENT SAMPLE NUMBER AND LOCATION
- SW3-1 SURFACE WATER SAMPLE NUMBER AND LOCATION
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (based on Plate 3)

REFERENCE: MAP OF HANCOCK COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., 1967. REVISED BY HLA FIELD RECONNAISSANCE, MARCH 1987.


GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITE 3
 NCBC Gulfport
 Gulfport, Mississippi

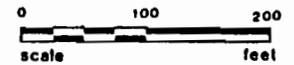
APPROVED:  DATE: 11/1/87
 2176,093.12


 COPIES



LEGEND:

- ⊕ GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- ▲ SEDIMENT SAMPLE NUMBER AND LOCATION
- SURFACE WATER SAMPLE NUMBER AND LOCATION
- ↖ APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (based on Plate 3)



REFERENCE: MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS INC., 1982 AS MODIFIED BY HLA FIELD RECONNAISSANCE, MARCH 1987.

	Harding Lawson Associates	GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITE 4 NCBC Gulfport Gulfport, Mississippi		
	Engineers, Geologists & Geophysicists			
DRAWN BY 	JOB NUMBER 2176,093.12	APPROVED 	DATE 4/1/87	REVISIONS



Site 5 was used as a landfill for the burial of containerized and noncontainerized chemical wastes. The principal wastes disposed of included liquid wastes (fuels, oils, solvents {MEK, toluene, xylene}, paints, and paint thinners), some solid wastes, and liquid dichlorodiphenyl-trichlorethane (DDT).

Elevated levels of chromium were detected at Site 5 (figure 7). Analytical results for groundwater samples from GPT-5-1, GPT-5-2 and GPT-5-3 indicate chromium concentrations of 79 ppb, 104 ppb, and 91 ppb, respectively. Lead levels were all below the MCL, but are high enough (38 to 48 ppb) to be of concern. As for the other sampling sites, resampling as recommended in the report should be done, but in a manner that reduces the dilution of groundwater samples. Additional downgradient wells are needed.

As at Site 4, the disposal of MEK is of concern and should be added to the list of chemical parameters analyzed for in future sampling events.

Site 6

Site 6 is currently a training area for electricians. From 1966 to 1975, prior to its current use, chemical wastes were disposed of at Site 6 by burning in unlined earth pits during fire fighting training. The principal wastes disposed of were free liquid wastes (fuels, oils, solvents (xylene, toluene, {MEK}, paints and paint thinners). Also, combustion by-products were present.

The concerns at Site 6 are much the same as those at Sites 4 and 5 (figure 8). Concentrations of chromium and lead in GPT-6-1 are 72 ppb and 70 ppb, respectively. Levels of these two metals are below the MCL of 50 ppb in each of the other two monitoring wells, but they are high enough to be of concern. As stated previously, sampling of discrete intervals is recommended to confirm the level of contamination and to determine if there is vertical variations in their concentrations.

The disposal of MEK at this site makes it necessary that it be included in the list of chemical constituents analyzed for in future sampling events.

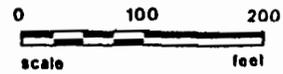
CONCLUSIONS

The findings summarized in the Final Verification Report reveal that levels of some contaminants are higher than health based limits. Until the slope of the potentiometric surface is determined by additional rounds of water level measurements, it will be impossible to determine which contaminant levels detected, if any, represent background values, or if the contaminants detected represent releases from the sites. The recommendations included in these comments should be addressed as well as those in the Final Verification Report in order to fully assess the level and extent of contamination and to characterize the hydrogeology at the NCBC facility.

N 257,500

N 257,000
E 403,000

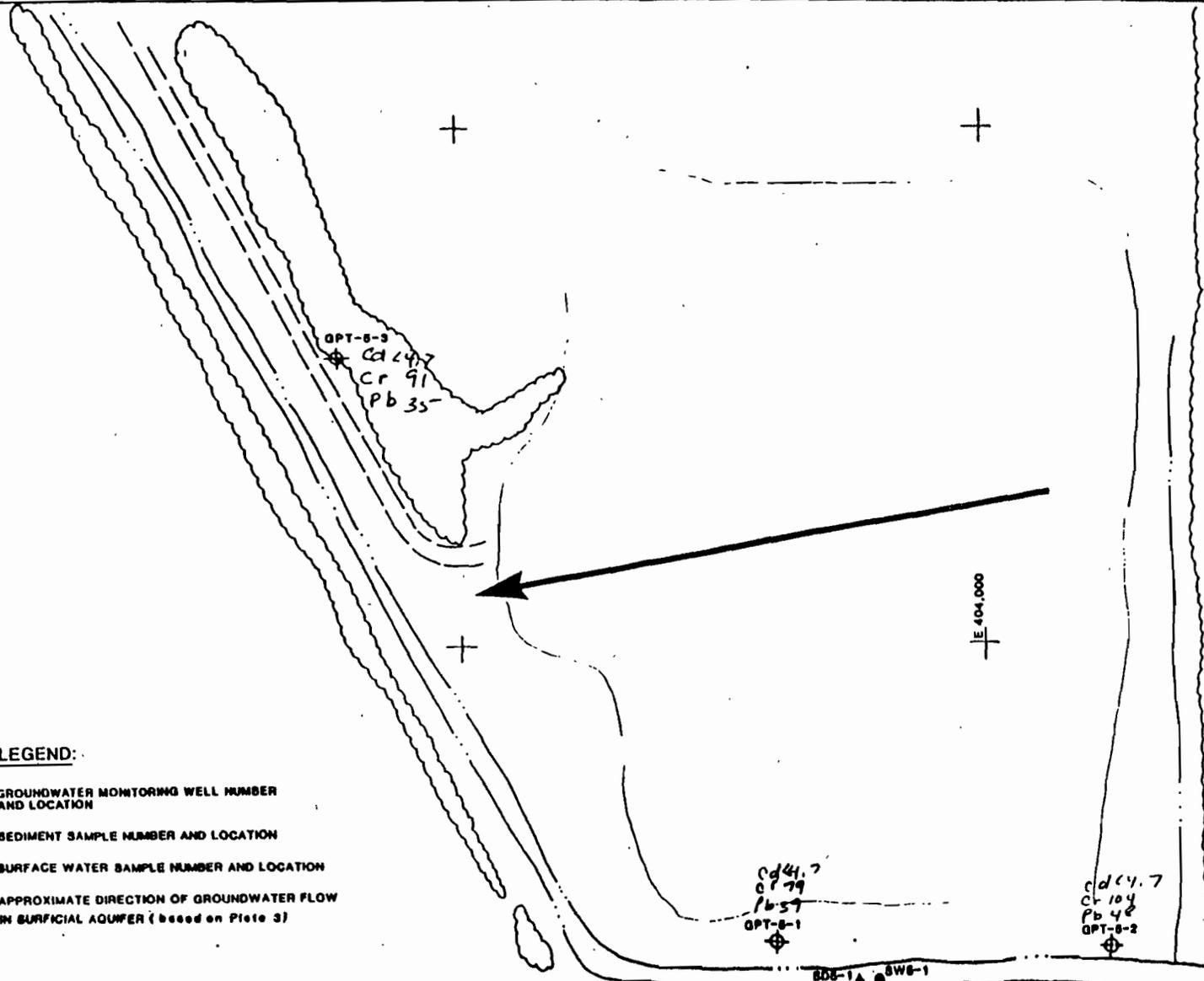
E 404,000



LEGEND:

-  GPT-S-1 GROUNDWATER MONITORING WELL NUMBER AND LOCATION
-  SDS-1 SEDIMENT SAMPLE NUMBER AND LOCATION
-  SWS-1 SURFACE WATER SAMPLE NUMBER AND LOCATION
-  APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (based on Plate 3)

REFERENCE: MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., 1982 AS MODIFIED BY HLA FIELD RECONNAISSANCE, MARCH, 1987.




HARDING LAWSON ASSOCIATES
 Engineers, Geologists
 & Geophysicists
 2111 N. 993.12
 Gulfport, Mississippi
 DATE: 11/1/87
 DRAWN BY: MRS

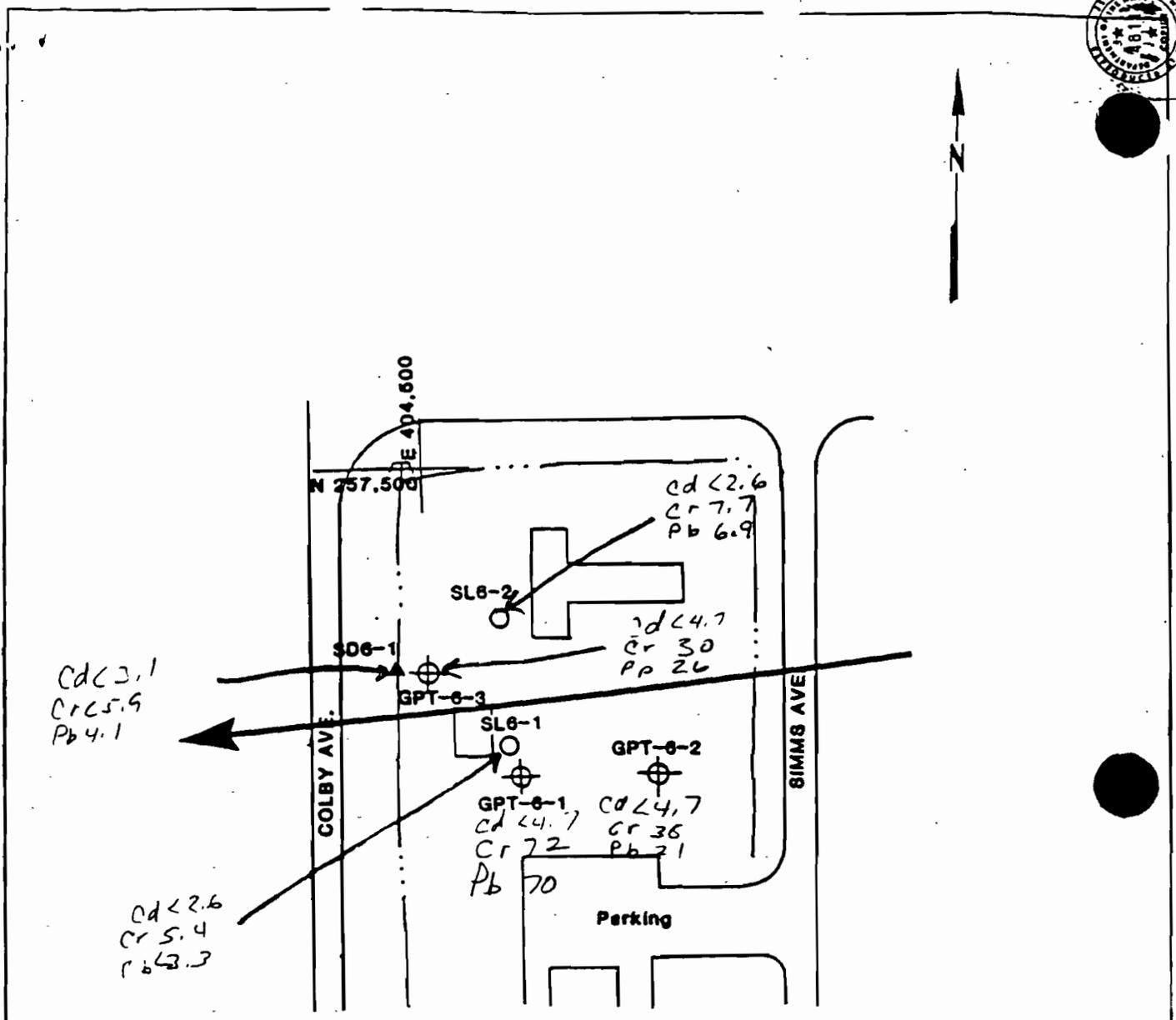
PLATE 13

GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITE 5

NCBC Gulfport
Gulfport, Mississippi

JOB NUMBER
2111-093.12





LEGEND:

- GPT-6-1 GROUNDWATER MONITORING WELL NUMBER AND LOCATION
- SD6-1 SEDIMENT SAMPLE NUMBER AND LOCATION
- SL6-1 SOIL SAMPLE NUMBER AND LOCATION
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW IN SURFICIAL AQUIFER (based on Plate 3)

REFERENCE: MAP OF HARRISON COUNTY, MISSISSIPPI BY CONTINENTAL AERIAL SURVEYS, INC., 1982 AS MODIFIED BY HLA FIELD RECONNAISSANCE, MARCH, 1987.



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

GROUNDWATER MONITORING WELL AND SAMPLING LOCATIONS - SITE 6
NCBC Gulfport
Gulfport, Mississippi

DRAWN
Ed.

JOB NUMBER
2176,093.12

APPROVED
HLA

DATE
11/11/87

REVISED

DATE

Figure 8