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ANNUAL GROUND-WATER MONITORING REPORT FOR HAZARDOUS WASTE SURFACE IMPOUNDMENT NAS PENSACOLA, FLORIDA

ANNUAL
GROUND WATER MONITORING REPORT
FOR:

HAZARDOUS WASTE SURFACE IMPOUNDMENT
NAVAL AIR STATION, PENSACOLA, FLORIDA

FDER, GMS #1017-F-00625
FEB 84

3250002

February, 1984

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MISSIMER AND ASSOCIATES, INC.

Consulting Hydrologists . Geologists · Environmental Scientists

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THOMAS H O'DONNELL

February 27, 1984

Mr. Bill Kellinberger
Department of Environmental Regulation
160 Governmental Center
Pensacola, Florida 32501

Re: Hazardous Waste Surface Impoundment, Naval Air Station, Pensacola, Florida: Semi-Annual Ground Water Monitoring Program

Dear Mr. Kellinberger:

Please find enclosed the following documents related to subject monitoring program:

a) May, 1983, indicator parameter and associated student-t tests.
b) May, 1983, ground water levels.
c) July, 1983, laboratory verification of suspected contaminants from (a) above.
d) November, 1983, indicator parameter and associated student-t tests.
e) November, 1983, tests of parameters to characterize ground water quality.
f) November, 1983, ground water levels.

A brief discussion of these data is also provided. Collectively, this should satisfy the reporting requirements for the first years semi-annual monitoring program. Please feel free to call with any questions.

Sincerely,

MISSIMER AND ASSOCIATES, INC.

Thomas O'Donnell

Thomas H. O'Donnell
Senior Hydrologist

THO:sm

Enclosures

cc: Mr. Dick Bozung
SOUTHDIVNAVFACENGCOM

TABLE OF CONTENTS

	Page
LETTER OF TRANSMITTAL	i
TABLE OF CONTENTS	ii
DER FORM 17-1.216(2)	1
INTRODUCTION	2
FIGURE 1. MONITOR WELL LOCATIONS FOR THE HWSI	3
TABLE 1. LABORATORY ANALYTICAL METHODS	4
TABLE 2. WATER SAMPLE CONTAINERS AND PRESERVATION	5
MAY, 1983 MONITORING Water Quality Water Levels	6
NOVEMBER, 1983 MONITORING Water Quality Water Levels	7
TABLE 3. MONITORING RESULTS MAY, 1983 SAMPLING PERIOD	8
Monitor Well #UG-1	9
Monitor Well #DG-1	10
Monitor Well #DG-2	11
Monitor Well #DG-3	12
TABLE 4. MONITORING RESULTS, RECHECK OF SIGNIFICANTLY'DIFFERNT PARAMETERS DURING MAY, 1983 SAMPLING	13
Monitor Well #DG-1	14
Monitor Well #DG-2	15
TABLE 5. MONITORING RESULTS NOVEMBER, 1983 SAMPLING PERIOD	16
Monitor Well #UG-1	17
Monitor Well #DG-1	18
Monitor Well #DG-4	19
Monitor Well #DG-5	20
Monitor Well #DG-6	21
TABLE 6. MONITORING RESULTS, RECHECK OF SIGNIFICANTLY DIFFERENT PARAMETERS DURING NOVEMBER, 1983 SAMPLING	22
Monitor Well #DG-1	23
Monitor Well #DG-4	24
Monitor Well #DG-5	25
Monitor Well #DG-6	26

3250003

TABLE OF CONTENTS - Continued:

		Page
APPENDIX A.	SUMMARY-OF MONITORING RESULTS MAY AND JULY, 1983	27
TABLE 1.	RESULTS OF LABOMTORY ANALYSES: INDICATOR PARAMETERS	28
TABLE 2.	STUDENT-t VALUES FOR INDICATOR PARAMETERS	28
TABLE 3.	WATER TABLE ELEVATIONS IN MONITOR WELLS	29
TABLE 4.	RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS SHOWING SIGNIFICANTLY GREATER CONCENTRATION	29
TABLE 5.	STUDENT-t VALUES FOR INDICATOR PARAMETERS	29
APPENDIX B.	SUMMARY OF MONITORING RESULTS NOVEMBER, 1983 AND FEBRUARY, 1984	30
TABLE 1.	RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS AND PARAMETERS THAT ESTABLISH GROUND WATER QUALITY	31
TABLE 2.	STUDENT-t VALUES FOR INDICATOR PARAMETERS	32
TABLE 3.	WATER TABLE ELEVATIONS IN MONITOR WELLS	32
TABLE 4.	RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS SHOWING SIGNIFICANTLY GREATER CONCENTRATION	33
TABLE 5.	STUDENT-t VALUES FOR INDICATOR PARAMETERS	33

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

'HWEST DISTRICT
GOVERNMENTAL CENTER
NSACOLA, FLORIDA 32501

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

ROBERT V. KRIEGEL
DISTRICT MANAGER

QUARTERLY REPORT ON GROUND WATER MONITORING
Rule 17-4.245(6)(k)2.

GHS # 1017-F-00625

DATE February 29, 1984

DER PERMIT # N/A

Naval Air Station, Pensacola
Installation Name

PWC Utilities | Pensacola | Florida 32508 | Escambia
Address | City | State Zip | County

Thomas H. O'Donnell, Missimer and Assoc., Inc. | Senior Hydrologist
Authorized Representative's Name | Title

Method of Discharge Lined surface impoundment

Type of Industry Industrial/Domestic Wastewater Treatment

Report for Period January, 1983 (date) to December, 1983 (date)

Attach monitoring data as approved in monitoring plan using parameter monitoring report forms. When applicable, attach additional sheets describing any changes in the brckground water quality and the discharge plume since the last reported description. Include any changes in size, direction of movement, rate of movement, rnd concentration changes of plume constituents in violation of the applicable standards.

NOTE: Pursurnt to Rule 17-4.245(6)(k)3., at any time there is a change in the permitted volume, location or chemical, physical or microbiological composition of the discharge plume, the permittee shall notify the department rnd, if required by the department, submit a new report stating the volume and chemical, physical rnd microbiological compositions of the discharge at the point of release or contact with the ground water at the site boundary.

CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this docuacnt and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Thomas H. O'Donnell — February 29, 1984
Owner or Authorized Representative's Signature — Date

3751084

INTRODUCTION

The ground water monitoring program for the Pensacola Naval Air Station, HWSI consists of 7 water-table aquifer wells (Figure 1). Numbers DG-1, 2, 3 and UG-1 were utilized for sampling through July, 1983. Numbers DG-1, 4, 5, 6 and UG-1 were used thereafter. Details of monitoring activities are described in a report entitled "Semi-Annual Ground Water Monitoring Program" (Missimer and Associates, Inc., 1983). Two tabular excerpts (Tables 1 and 2) from this document are provided herein to define sample preservation and analytical techniques.

In reference to DER Form 17-1.216(2), downgradient wells have been identified according to location. To date, the applicable State permit which would specify well types has not been issued. The well development methodology has consisted of discharging 5 to 10 times the casing volume prior to sample collection.

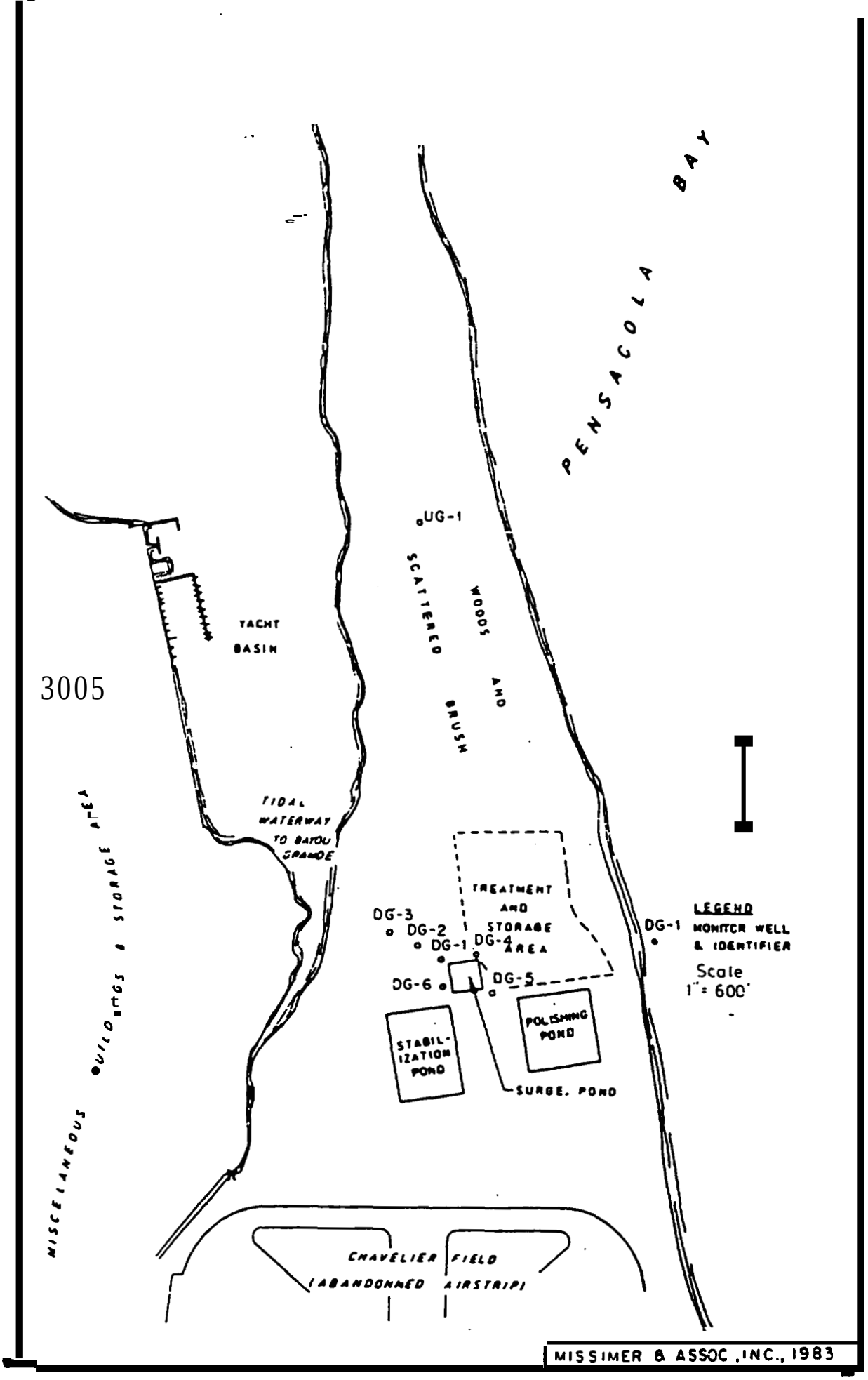

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FIGURE 1. MONITOR WELL LOCATIONS FOR THE HWSI.

TABLE 1. LABORATORY ANALYTICAL METHODS

Indicators of Contamination

Parameter	Method
Total Organic Carbon	TC Analyzer
Total Organic Halogen	GC
pH	Potentiometric
Specific Ccnductance	Conductivity Meter

Ground Water Quality

Parameter	Method
Iron	Atomic Absorption
Manganese	Atomic Absorption
Ch1oride	Titrimetric, Mercuric
Sodium	Atomic Absorption
Sulfate	Turbidometric
Phenols	Distillation/Colormetric, 4-AAP

TABLE 2. WATER SAMPLE CONTAINERS AND PRESERVATION

Indicators of Contamination

Parameter	Container	Preservation
Total Organic Carbon	G, Brown	H_2SO_4 to pH <2, Cool 4°C
Total Organic Halogen	P,G	Cool, 4°C
pH	P,G	Cool, 4°C
Specific Conductance	P,G	Cool, 4°C

Ground Water Quality

Parameter	Container	Preservation
Iron	P,G	HNO_3 to pH <2
Manganese	P,G	HNO_3 to pH <2
Chloride	P,G	None
Sodium	P,G	HNO_3 to pH <2
Sulfate	P,G	Cool, 4oc
Phenols	G	H_3PO_4 to pH 4, 1.0g $CuSO_4$/L, Cool, 4°C

3250006

P = plastic
G = glass

MAY, 1983 MONITORING

Water Quality

Indicator parameter test results are shown in Table 3 on the appropriate DER forms. They are also summarized in Appendix A, which includes Student-t computations.

The concentration of total organic carbon and the specific conductance in the background well showed a significant decrease from initial levels. This fact requires mention but not resampling. The concentration of total organic carbon in DG-1 and total organic halogen in DG-2 showed a significant increase over initial background levels. These apparent changes were not verified when DC-1 and DG-2 were retested in July, 1983 (Table 4); hence, are attributable to laboratory inconsistency.

Water Levels

All of the downgradient wells had been disturbed by construction activities at the time of sampling. Water table elevations listed on Table 3 are, therefore, suspect particularly in the case of DG-2. Regardless, there was no reason to question the continued functioning of UG-1 as a suitable background site. Well repairs were ordered and completed prior to the next required sampling period.

NOVEMBER. 1983 MONITORING

Water Quality

Indicator and ground water quality test parameter results are listed in Table 5. They are also summarized in Appendix B, which includes the Student-t computations.

The concentration of total organic carbon in the background well showed a significant decrease over initial levels. This fact requires mention but not resampling. The concentration of total organic carbon in DG-4, DG-6 and specific conductance in all downgradient wells showed significantly higher values than initial background; hence, they were retested. The value of pH was also significantly higher in the downgradient wells.

Table 6 lists the results of retesting total organic carbon and specific conductance in the required downgradient wells. Student-t computations using these data appear in Appendix B. All of the values except for total organic carbon in DG-4 were verified to be significantly higher than background levels.

Water Levels

Water table elevations are also listed in Table 5. These are the first set of measurements for wells DG-4, 5 and 6. UG-1 is still functioning as a suitable background site.

TABLE 3: MONITORING RESULTS
MAY, 1983 SAMPLING PERIOD

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

5 # _____

nitoring Well # UG-1

11 Name _____

assification of Groundwater _____

11 Developed* Prior to
mple Collection (Yes/No) Yes

Sample Date May 18, 1983

Well Type: [x] Background
[ ] Site Boundary
[ ] Intermediate
[ ] Compliance

Ground Water Elevation
(above MSL) 1.28 ft

IRE T ode	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltere	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosec	4.1	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		38.5	ppb		
	pH			6.47	Unit		
	Sp. Cond.			194.	umhos/		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

ell development is the process of pumping the well prior to sampling in order to obtain p entativc ground water sample.

R For8 17-1.216(2)
fectivb January 1, 1983

PARAMETER MONITORING REPORT
!Rule 17-3.402, 17-3.404 - 17-3.406)

'S # _____

Sample Date May 18, 1983

nitoring Well # DG-1

Well Type: [ ] Background
[x] Site Boundary
[ ] Intermediate
[ ] Compliance

:1 Name _____

essification of Groundwater _____

.1 Developed. Prior to
ole Collection (Yes/No) Yes

Ground Water Elevation
(above MSL) 2.21 ft

'ORET 'ode	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	42.1	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		17.	ppb		
	pH			6.77	Unit		
	Sp. Cond.			344.	umhos/cm		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

'ell development is the proceea of pumping the well prior to sampling in order to obtain :r ntative ground water aample.

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'fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.406 - 17-3.406)

S # _____

Sample Date May 18, 1983

nitoring Well # DG-2

Well Type: [ ] Background
[ ] Site Boundary
[x] Intermediate
[ ] Compliance

ll Name _____

assification of Groundwater _____

ll Developed* Prior to ple Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 3.02 ft

DRET ode	Parameter Honitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed)	14.7	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		124.	ppb		
	pH			6.42	Unit		
	Sp. Cond.			111.	mmhos/c		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

3250009

ell development is the process of pumping the well prior to sampling in order to obtain p entative ground water sample.

R Form 17-1.216(2)
fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

MS # _____

Sample Date May 18, 1983

:nitoring Well # DG-3

Well Type: [ ] Background
[ ] Site Boundary
[ ] Intermediate
[x] Compliance

ell Name _____

:assification of Groundwater _____

ell Developed* Prior to ample Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 2.02 ft

TORET Code	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	1.3	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		52.5	ppb		
	pH			6.55	Unit		
	Sp. Cond.			6.02	mmhos/c		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

Well development is the process of pumping the well prior to sampling in order to obtain a representative ground water sample.

Form 17-1.216(2)
Effective January 1, 1983

TABLE 4: MONITORING RESULTS, RECHECK OF SIGNIFICANTLY DIFFERENT PARAMETERS DURING MAY, 1983 SAMPLING

3250010

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.006)

MS # _____

Sample Date July 27. 1983

cnitoring Well # DG-1

Well Type: [ ] Background
[x] Site Boundary
[ ] Intermediate
[ ] Compliance

'ell Name _____

lassification of Groundwater _____

ell Developed* Prior to ample Collection (Yes/No) Yes

. Ground Water Elevation (above MSL) _____ ft

TORET Code	Parameter Honitored	Sampling Method	Analysis Hethod	Analysis Result	Units	Sample Filtered/Unfiltere	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	L3.6, 14.5	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer			ppb		
	pH				Unit		
	Sp. Cond.				umhos/cm		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

Well development is the process of pumping the well prior to sampling in order to obtain ...entative ground water sample.

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PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

S # _____

Sample Date July 27. 1983

nitoring Well # DG-2

Well Type: [ ] Background
[ ] Site Boundary
[X] Intermediate
[ ] Compliance

11 Name _____

assification of Groundwater _____

11 Developed* Prior to mple Collection (Yes/No) Yes

Ground Water Elevation (above MSL) _____ ft

ORET ode	Parameter Honitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfilterec	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed		ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		25.6, 27.5	ppb		
	pH				Unit		
	Sp. Cond.				mhos/c		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

3250011

/ell development is the process of pumping the well prior to sampling in order to obtain :presentative ground water sample.

:R /orm 17-1.216(2)
'fective January 1, 1983

TABLE 5: **MONITORING RESULTS**
NOVEMBER, 1983 SAMPLING PERIOD

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

S # _____

Sample Date November 16, 198_

nitoring Well # UG-1

Well Type: [X] Background
[ ] Site Boundary
[ ] Intermediate
[ ] Compliance

11 Name _____

assification of Groundwater _____

11 Developed* Prior to mple Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 1.00 ft

ORET ode	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	4.6	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		7.5	ppb		
	pH			6.81	Unit		
	Sp. Cond.		?	260.	umhos/cm		
	Iron			2.03	ppm		
	Manganese			0.02	ppm		
	Chloride			45.	ppm		
	Sodium			24.	ppm		
	Sulfate			1.2	ppm		
	Phenol			0.01	ppm		

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'ell development is the process of pumping the well prior to sampling in order to obtain presentative ground water sample.

R Form 17-1.216(2)
'fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

GMS # _____

Sample Date November 16, 1983

Monitoring Well # DG-1

Well Type: [ ] Background
[x] Site Boundary
[ ] Intermediate
[ ] Compliance

Well Name _____

Classification of Groundwater _____

Well Developed* Prior to Sample Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 1.97 ft

STORET Code	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preservatives Added
	TOC	Teflon	See Table 1 (enclosed)	27.0	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		16.0	ppb		
	pH			7.70	Unit		
	Sp. Cond.			750.	umhos/cm		
	Iron			1.03	ppm		
	Manganese			0.11	ppm		
	Chloride			50.	ppm		
	Sodium			93.	ppm		
	Sulfate			<1.	ppm		
	Phenol			0.60	ppm		

*Well development is the process of pumping the well prior to sampling in order to obtain representative ground water sample.

DER Form 17-1.216(2)
Effective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

ıS # _____

onitoring Well # DG-4

ell Name _____

lassification of Groundwater _____

ell Developed, Prior to ample Collection (Yes/No) Yes

Sample Date November 16, 1983

Well Type: [ ] Background
[X] Site Boundary
[ ] Intermediate
[ ] compliance

Ground Water Elevation (above MSL) 1.96 f

FORET Code	Parameter Honitored	Sampling Hethod	Analysis Hethod	Analysis Result	Units	Sample Filtered/Unfiltere	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosec	66.2	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		12.5	ppb		
	pH			7.60	Unit		
	Sp Cond.			770.	umhos/c	1	
	Iron			6.13	ppm		
	Manganese			0.11	ppm		
	Chloride			65.	ppm		
	Sodium			91.	ppm		
	Sulfate			<1.	ppm		
	Phenol			0.42	ppm		

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ell development is the process of pumping the well prior to sampling in order to obtain p `sentative ground water sample.

R Form 17-1.216(2)
'fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

Sample Date November 16, 1983

Monitoring Well # DG-5

Well Type: [ ] Background
[x] Site Boundary
[ ] Intermediate
[ ] Compliance

Well Name

Classification of Groundwater

Well Developed* Prior to Sample Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 2.01 ft

STORET Code	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preservatives Added
	TOC	Teflon	See Table 1 (enclosed)	12.8	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		11.5	ppb		
	pH			7.50	Unit		
	Sp. Cond.			800.	umhos/cm		
	Iron			0.98	ppm		
	Manganese			0.07	ppm		
	Chloride			75.	ppm		
	Sodium			93.	ppm		
	Sulfate			<1.	ppm		
	Phenol			0.75	ppm		

*Well development is the process of pumping the well prior to sampling in order to obtain representative ground water sample.

DER Form 17-1.216(2)
Effective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

: # _____

Sample Date November 16, 1983

itoring Well # DG-6

Well Type: [ ] Background
[X] Site Boundary
[ ] Intermediate
[ ] Compliance

1 Name _____

ssification of Groundwater _____

1 Developed' Prior to
ple Collection (Yes/No) Yes

Ground Water Elevation (above MSL) 2.10 ft

RET de	Paraoetcr Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	39.8	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer		23.0	ppb		
	pH			8.29	Unit		
	Sp. Cond.			9.81	mhos/c		
	Iron			0.36	ppm		
	Manganese			0.11	ppm		
	Chloride			120.	ppm		
	Sodium			132.	ppm		
	Sulfate			<l.	ppm		
	Phenol			0.84	ppm		

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ll development is the process of pumping the well prior to sampling in order to obtain resentative ground water sample.

orm 17-1.216(2)
active January 1, 1983

TABLE 6: MONITORING RESULTS, RECHECK OF SIGNIFICANTLY DIFFERENT PARAMETERS DURING NOVEMBER, 1983 SAMPLING

PARAMETER MONITORING REPORT
(Rule 17-3.602, 17-3.404 - 17-3.406)

S # _____

Sample Date February 8, 1984

nitoring Well # DG-1

Well Type: [ ] Background
[X] Site Boundary
[ ] Intermediate
[ ] Compliance

11 Name _____

assification of Groundwater _____

11 Developed* Prior to mple Collection (Yes/No) Yes

Ground Water Elevation (above MSL) _____ t!

ORET ode	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed)		ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer			ppb		
	pH				Unit		
	Sp. Cond.			810.,850.	umhos/cm		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

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Well development is the process of pumping the well prior to sampling in order to obtain representative ground water sample.

:K form 17-1.216(2)
'fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

;MS • _____

Sample Date February 8, 1984

icnitoring Well # DG-4

Well Type: [ ] Background
[X] Site Boundary
[ ] Intermediate
[ ] Compliance

Well Name _____

Classification of Groundwater _____

Well Developed* Prior to Sample Collection (Yes/No) Yes

Ground Water Elevation (above MSL) _____ ft

STORET Code	Parameter Honitored	Sampling Hethod	Analysis Method	Analysis Rcsu1t	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed	24., 25.	ppm	Unfi1tered	See Table 2 (enclosed)
	TOX	Bailer			ppb		
	pH				Unit		
	Sp. Cond.			80. ,800.	mmhos/c		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

*Well development is the process of pumping the well prior to sampling in order to obtain a representative ground water sample.

DER Form 17-1.216(2)
Effective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

S # _____

Sample Date February 8, 1984

nitoring Well # DG-5

Well Type: [ ] Background
[X] Site Boundary
[ ] Intermediate
[ ] Compliance

11 Name _____

assification of Groundwater _____

11 Developed* Prior to mple Collection (Yes/No) Ye's .

Ground Water Elevation (above MSL) _____ f!

ORET ode	Parameter Monitored	Sampling Hethod	Analysis Hethod	Ana1ysis Result	Units	Sample Filtered/Unfilterec	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed		ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer			ppb		
	pH				Unit		
	Sp. Cond.			50.,560.	mmhos/c		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

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'ell development is the process of pumping the well prior to sampling in order to obtain :presentative ground water sample.

:R rorm 17-1.216(2)
'fective January 1, 1983

PARAMETER MONITORING REPORT
(Rule 17-3.402, 17-3.404 - 17-3.406)

:Mo # _____

Sample Date February 8, 1984

:onitoring Well # DG-6

well Type: [ ] Background
[x] Site Boundary
[ ] Intermediate
[ ] Compliance

'ell Name _____

'lassification of Groundwater _____

:ell Developed* Prior to :ample Collection (Yes/No) Yes

Ground Water Elevation (above MSL) _____ ft

:ORET Code	Parameter Monitored	Sampling Method	Analysis Method	Analysis Result	Units	Sample Filtered/Unfiltered	Preser-vatives Added
	TOC	Teflon	See Table 1 (enclosed)	44., 55.	ppm	Unfiltered	See Table 2 (enclosed)
	TOX	Bailer			ppb		
	pH				Unit		
	Sp. Cond.			1200.,1200	umhos/cm		
	Iron				ppm		
	Manganese				ppm		
	Chloride				ppm		
	Sodium				ppm		
	Sulfate				ppm		
	Phenol				ppm		

*Well development is the process of pumping the well prior to sampling in order to obtain :ep' sentative ground water saaple.

)E Form 17-1.216(2)
:ffective January 1, 1983

APPENDIX A: SUMMARY OF MONITORING RESULTS MAY AND JULY, 1983

- WATER QUALITY
- WATER LEVELS
- STUDENT-t CALCULATIONS

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HAZARDOUS WASTE SURFACE IMPOUNDMENT
SEMI-ANNUAL GROUND WATER MONITORING PROGRAM

MAY, 1983 SAMPLING

TABLE 1. RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS (mean of four replicate measurements)

Parameter	Unit	Well Numbers DG-1	DG-2	DG-3	UG-1
Total Organic Carbon	ppm	42.1	14.7	1.3	4.1
Total Organic Halogen	ppb	17.	124.	52.5	38.5
pH	-	6.77	6.42	6.55	6.47
Specific Conductance	umhos/cm	344.	111.	602.	194.

TABLE 2. STUDENT-t VALUES FOR INDICATOR PARAMETERS (monitor wells compared to initial background)

Parameter	Well Numbers DG-1	DG-2	DG-3	UG-1
Total Organic Carbon	+11.04*	-9.23*	-19.31*	-17.21*
Total Organic Halogen	0.71	+6.78*	2.39	1.17
pH	1.68	0.45	0.91	0.63
Specific Conductance	0.35	-4.91*	- 4.71*	- 3.29*

*Indicates significant difference;
negative sign shows parameter concentrations below background,
plus sign shows parameter concentrations above background.

ABLE 3. WATER TABLE ELEVATIONS IN MONITOR WELLS (feet above NGVD)

Well Number	Elevation
DG-1	2.21*
DG-2	3.02*
DG-3	2.02*
UG-1	1.28

*Wells distrubed by construction crews, elevation of measuring points suspected to have been altered.

TABLE 4. RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS SHOWING SIGNIFICANTLY GREATER CONCENTRATION (duplicate tests performed July, 1983)

Parameter	Unit	Well Numbers			
		DG-la	DG- b	DG-2a	DG-2b
Total Organic Carbon	ppm	13.6	14.5	--	--
Total Organic Halogen	ppb	--	--	25.6	27.5

TABLE 5. STUDENT-t VALUES FOR INDICATOR PARAMETERS (monitor wells compared to initial background)

Parameter	Well Numbers	
	DG-	DG-2
Total Organic Carbon	-9.72	--
Total Organic Halogen	--	0.14

3250018

APPENDIX B: SUMMARY OF MONITORING RESULTS NOVEMBER, 1983 AND FEBRUARY, 1984

-WATER QUALITY

-WATER LEVELS

-STUDENT-t CALCULATIONS

HAZARDOUS WASTE SURFACE IMPOUNDMENT
SEMI-ANNUAL GROUND WATER MONITORING PROGRAM

NOVEMBER, 1983 SAMPLING

TABLE 1. RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS AND PARAMETERS THAT ESTABLISH GROUND WATER QUALITY (former reported as mean of four replicate measurements)

		Well Numbers				
ameter	Unit	DG-1	DG-4	DG-5	DG-6	UG-1
al Organic Carbon	ppm	27.0	66.2	12.8	39.8	4.6
al Organic ogen	ppb	16.0	12.5	11.5	23.0	7.5
	--	7.70	7.60	7.50	8.29	6.81
cific Conductance	umbos/cm	750.	770.	800.	981.	260.
n	ppm	1.03	6.13	0.98	0.36	2.03
ganese	ppm	0.11	0.11	0.07	0.11	0.02
oride	ppm	50.	65.	75.	120.	45.
lium	ppm	93.	91.	93.	132.	24.
-fate	ppm	<1.	<1.	<1.	<1.	1.2
eno1	ppm	0.60	0.42	0.75	0.84	0.01

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TABLE 2. STUDENT-t VALUES FOR INDICATOR PARAMETERS (monitor wells compared to initial background)

	Well Numbers				
arameter	DG-1	DG-4	DG-5	DG-6	UG-1
otal Organic Carbon	0.00	+21.84*	-10.46*	+9.22*	-16.91*
otal Organic Halogen	0.80	1.10	1.19	0.18	1.55
H	+4.93*	+ 4.58*	+ 4.23*	+6.99*	1.82
pecific Conductance	+7.60*	+ 7.99*	+ 8.58*	+12.13*	2.00

'Indicates significant difference;
negative sign shows parameter concentrations below background,
plus sign shows parameter concentrations above background.

TABLE 3. WATER TABLE ELEVATIONS IN MONITOR WELLS (feet above NGVD)

Well Number	Elevation*
DG-1	1.97
DG-4	1.96
DG-5	2.01
DG-6	2.10
UG-1	1.00

*Damaged wells reported May, 1983 have been repaired, elevations accurate.

TABLE 4. RESULTS OF LABORATORY ANALYSES: INDICATOR PARAMETERS SHOWING SIGNIFICANTLY GREATER CONCENTRATION (duplicate tests performed February, 1984)

Parameter	Unit	Well Numbers DG-la	DG-lb	DG-4a	DG-4b
Total Organic Carbon	ppm	--	--	24.	25.
Specific Conductance	umhos/cm	810.	850.	780.	800.

Parameter	Unit	Well Numbers DG-5a	DG-5b	DG-6a	DG-6b
Total Organic Carbon	ppm	--	--	44.	55.
Specific Conductance	umhos/cm	550.	560.	1200.	1200.

TABLE 5. STUDENT-t VALUES FOR INDICATOR PARAMETERS (monitor wells compared to initial background)

Parameter	Well Numbers DG-1	DG-4	DG-5	DG-6
Total Organic Carbon	--	-1.32	--	+10.46*
Specific Conductance	+6.43*	+5.90*	+2.66*	+11.54*

*Indicates verified significant difference:
negative sign shows parameter concentrations below background
plus sign shows parameter concentrations'above background.

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