

SECOND SEMI-ANNUAL REPORT
CORRECTIVE-ACTION AND
COMPLIANCE-MONITORING PROGRAMS
SURGE POND OPERATION PERMIT
NO. H017-127026
WASTEWATER TREATMENT FACILITY
NAVAL AIR STATION, PENSACOLA, FLORIDA

FDER Identification No. 1017F00625
EPA Identification No. FL9170024567

Prepared For:

NAVAL FACILITIES ENGINEERING COMMAND
Southern Division
Charleston, South Carolina

December 1988

GCM Project No. TF0290PN11

Prepared By:

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December 14, 1988

Mr. Mike Green
Environmental Engineer
Southern Division - Code 11433
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, SC 29411

RE: RCRA Surge Pond Operation Permit, NAS Pensacola
Wastewater Treatment Plant, Pensacola, Florida

Dear Mr. Green:

Enclosed are two copies each of the following documents.

- o Fourth quarterly report on ground-water monitoring of the point-of-compliance (POC) wells, DER Form 17-1.216(2)
- o Second Semiannual Report, Corrective-Action and Compliance-Monitoring Programs (draft)

Seven copies of the quarterly monitoring report and two copies of the draft semiannual report also have been sent to Mr. Ed Pike.

The fourth quarter samples from the POC wells were collected on November 8, 1988. In addition to the DER forms, the quarterly monitoring report includes laboratory data, quality assurance/quality control documentation, and a data validation summary.

To avoid confusion, the fourth quarter POC monitoring report and the second semiannual report should be submitted together to the Florida Department of Environmental Regulation (FDER). It is understood, however, that the second semiannual report is currently in draft form and must be reviewed by the Navy and revised if necessary prior to submittal to the FDER. If the review process is anticipated to require several weeks, you may choose to submit the quarterly report in advance of the semiannual report. In any case, please remember that the DER Form 17-1.216(2) must be signed by an authorized representative prior to submittal.

GERAGHTY & MILLER, INC.

Mr. Mike Green
December 14, 1988
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Upon your review of the draft semiannual report, and upon receipt of any comments or changes, Geraghty & Hiller, Inc. will complete a final report. Please contact us if you have any questions.

Sincerely,

GERAGHTY & MILLER, INC.

Julie Mattick

Julie L. Mattick
Staff Scientist

William Bocskosky, Jr.

William P. Bocskosky
Associate

JLM:WPB/jf
525/30
Enclosure
cc: Ed Pike

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INTRODUCTION

On September 29, 1987, the State of Florida Department of Environmental Regulation (FDER) issued Permit No. H017-127026 to the U.S. Navy Public Works Center at the Naval Air Station (NAS), Pensacola, Florida (Appendix A). The permit was issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule 17-30 to operate a Hazardous Waste Storage Surface Impoundment (commonly referred to as the surge pond). The surge pond is located at the NAS Pensacola Wastewater Treatment Plant (WWTP) (Figure 1). The operating permit expired November 1, 1988.

The Specific Conditions 32 and 34 of the operation permit required that the permittee conduct ground-water monitoring related to a corrective-action program in accordance with 40 Code of Federal Regulations (CFR) 264.100, and a compliance-monitoring program in accordance with 40 CFR 264.99.

In compliance with 40 CFR 264.100(g), this semi-annual report has been prepared to assess the effectiveness of the corrective-action program from May through November 1988. A summary of the water-quality data from the compliance-monitoring program also is included. Corrective-action and compliance monitoring after November 1, 1988 will be conducted according to the surge pond closure permit issued November 2, 1988 (personal communication with Mr. Ed Pike, NAS Public Works Center).

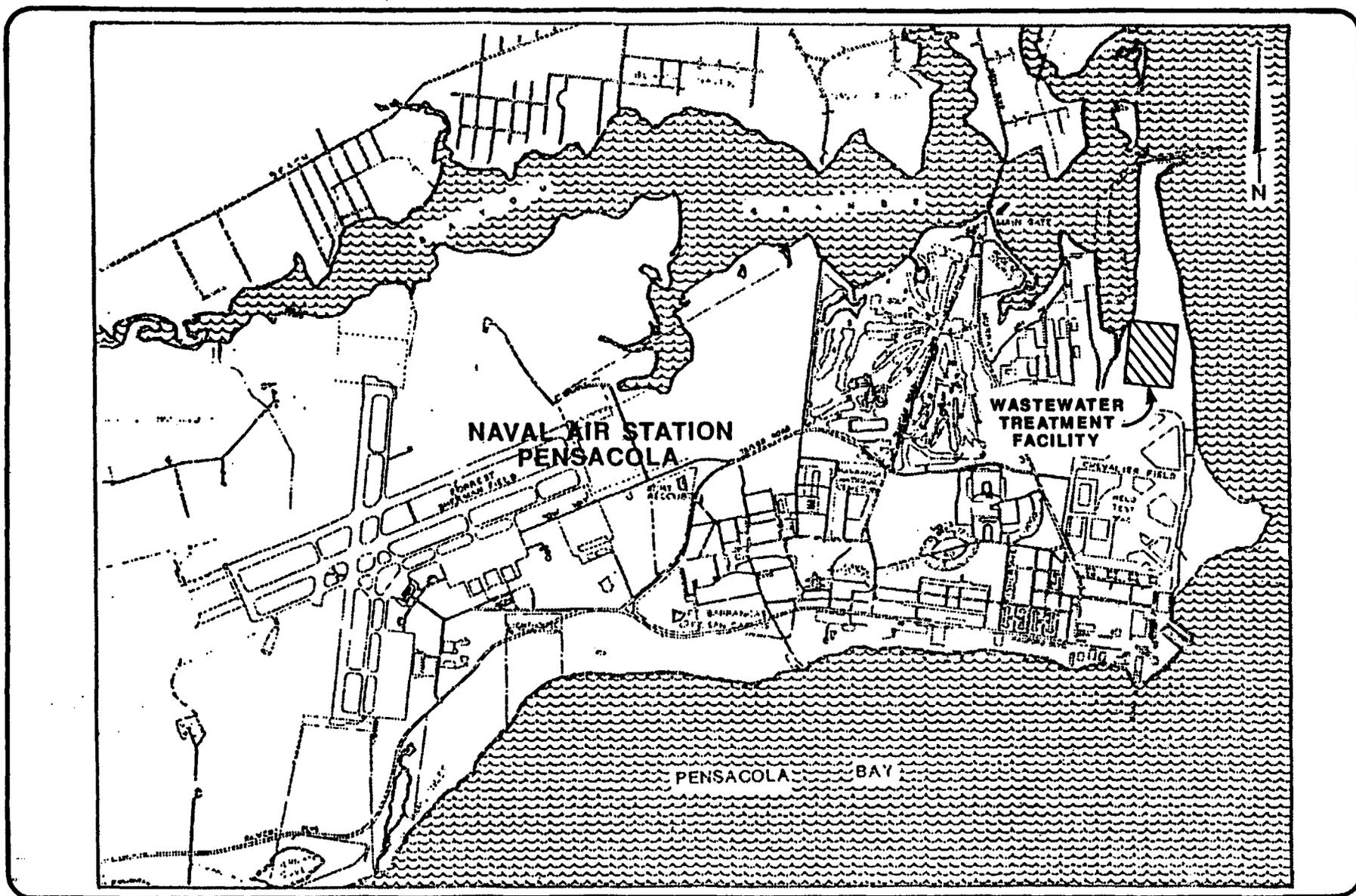


Figure 1. Location of Wastewater Treatment Plant, NAS Pensacola, Florida.

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CORRECTIVE-ACTION PROGRAM

Description of Recovery-Well System

The corrective-action program includes seven recovery wells located primarily downgradient from the surge pond (Figure 2) and within the contaminant plume identified in previous studies (Geraghty & Miller, Inc., (G&M), January 1985; December 1985; April 1987). The recovery wells and the associated plumbing and centrifugal pumps were installed from October 1986 through February 1987 to fulfill the requirements of the preceding Temporary Operation Permit. The recovery-well system is designed to recover contaminated ground water from the shallow aquifer, which is comprised of the uppermost 40 feet (ft) of sand underlying the site (Figure 3). Since February 1987, the recovered water has been pumped and sprayed into the surge pond for additional treatment.

Table B-1 (Appendix B) lists the depths and screen settings of the recovery wells, and Figures B-1 and B-2 show schematic diagrams of the typical recovery wells. Recovery wells RW-4 through RW-7 were completed below grade, and recovery wells RW-1 through RW-3 were completed above grade due to periodic flooding in that area. The wells are pumped from four pumping stations or pumphouses: pumphouse A services wells RW-1, RW-2, and RW-3; pumphouse B services wells RW-4 and RW-6; pumphouse C services RW-7; and pumphouse D services well RW-5.

The recovery system is inspected weekly by a subcontractor to monitor its performance and record operational data including vacuum and discharge pressures, flow rates, and total ground-water withdrawals. Preventive maintenance, repairs, and adjustments are performed on an as-needed basis. A dual-pump system (primary and backup) is

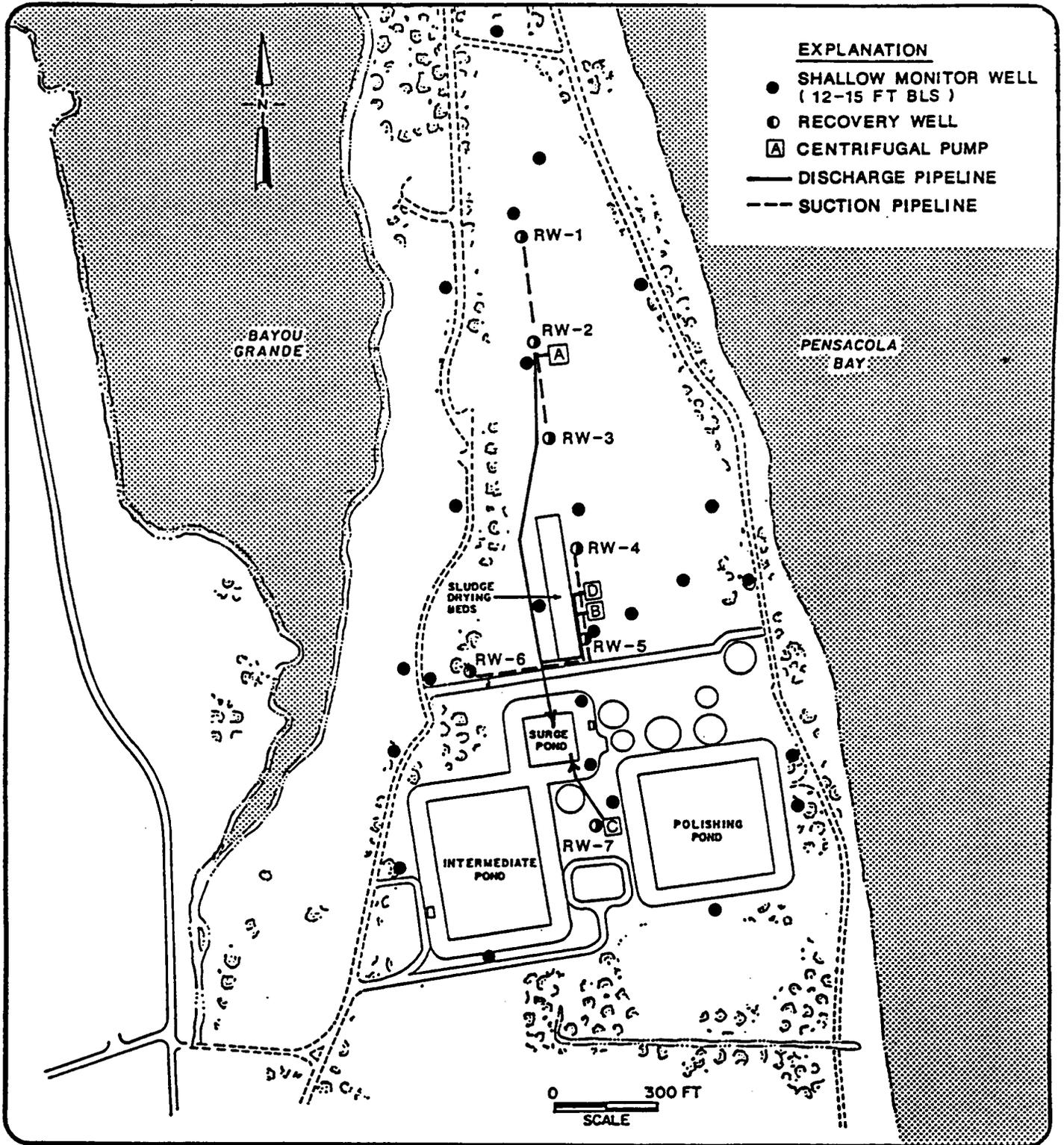


Figure 2. Locations of Recovery Wells and Surface Impoundments.

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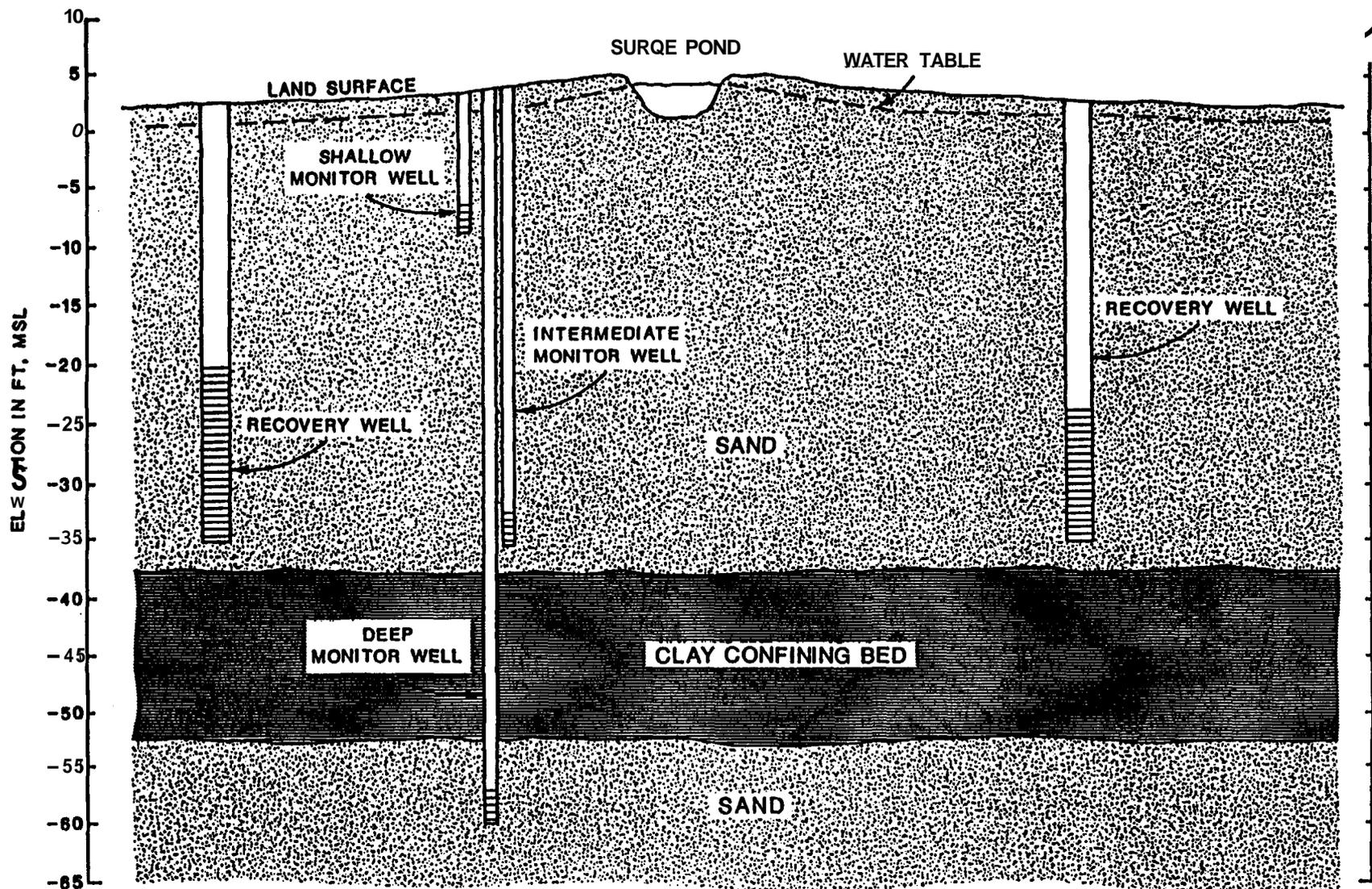


Figure 3. Generalized Cross Section Showing Relative Depths of Monitor Wells and Recovery Wells.

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employed at pumphouses A through C. To maximize pump life and to assist in continuous operation of the recovery system, the operation of the pumps at each house is alternated on a regular basis. In October 1988, the 1/2-horsepower pumps in pumphouse D were replaced with new 1-horsepower pumps. The existing pumphouse and concrete pad is large enough to accommodate only one of the new pumps, consequently, the back-up pump is stored for use should the primary pump fail.

Corrective-Action Monitoring

As stipulated by the permit, the wells shown in Figure 4 constitute the "core ground-water monitoring system." At four locations, there were three clustered wells designated as shallow (about 15 ft below land surface [bls] or -10 ft mean sea level [msl]), intermediate (about 40 ft bls or -35 ft msl), and deep (about 65 ft bls or -60 ft msl). The well clusters allow ground-water monitoring at two zones above the uppermost confining layer, which is about 40 to 55 ft bls (-35 to -50 ft msl), and in a zone immediately underlying the confining layer (Figure 3). Construction details of the monitor wells installed during the various phases of investigations at the WWTP are listed in Table B-2 (Appendix B).

Upon completion of the second quarterly sampling event, corrective-action monitor wells DG-2, GM-74, and GM-75 and compliance monitor wells DG-1, DG-6, and GM-75 (dual purpose) were properly plugged and abandoned to facilitate the construction of a new surge tank. The wells were abandoned on February 23, 1988, in accordance with the regulations of the Northwest Florida Water Management District.

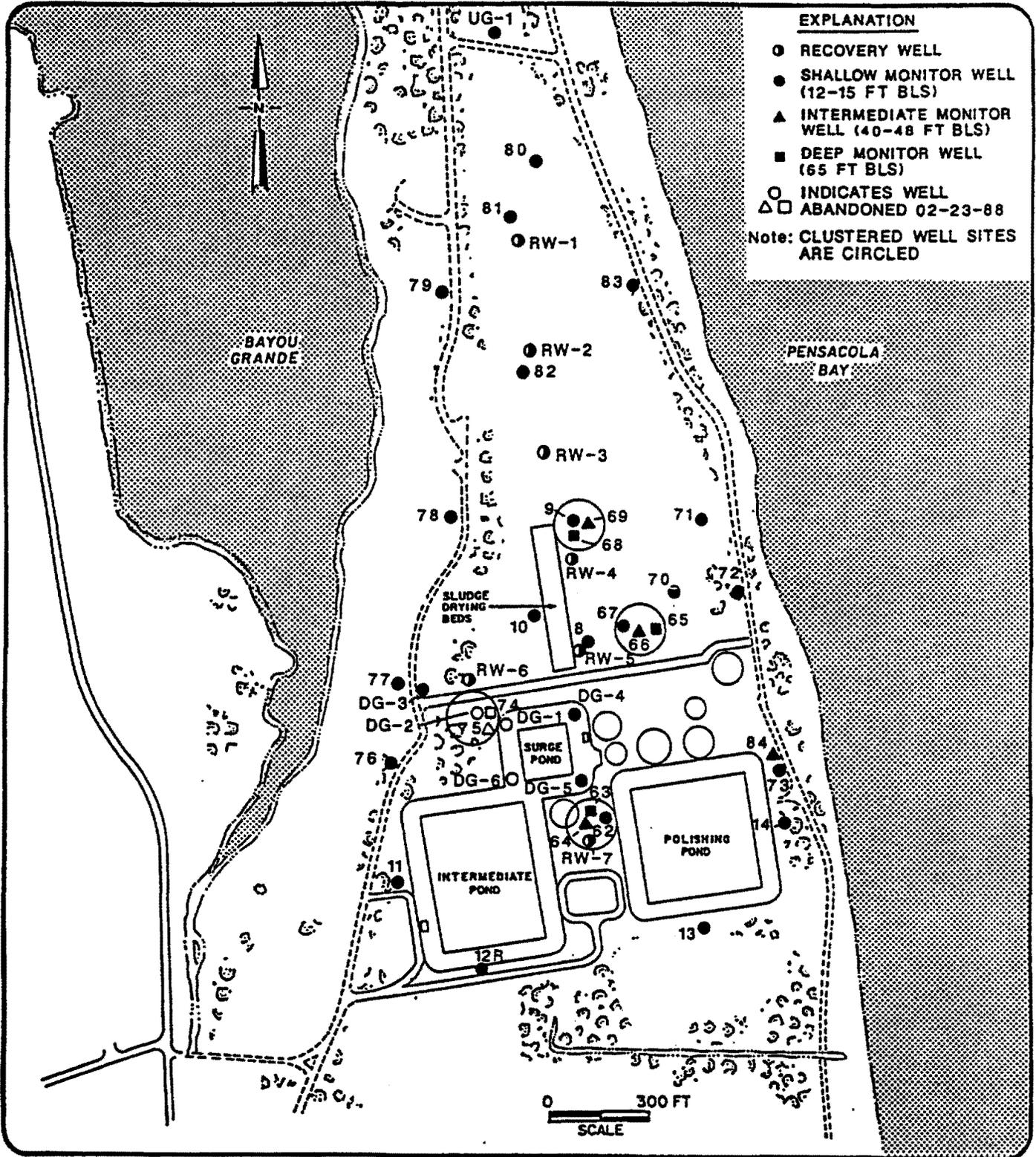


 Figure 4. Locations of Monitor Wells and Recovery Wells.

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Water Levels

Monthly water-level elevations measured in all monitor wells and recovery wells are compiled in Appendix C. Based on water levels measured in the shallow monitor wells February 3 and 4, 1987, Figure 5 illustrates the configuration of the water-table surface under static (non-pumping) conditions. As determined in previous investigations, a ground-water divide extends along the longitudinal axis of the peninsula and ground water flows north, east, and west toward Pensacola Bay and Bayou Grande.

Figure 6 shows the configuration of the water-table surface on October 19, 1988 while pumping the recovery-well system. During this period, the combined flow from the seven wells averaged about 64 gallons per minute (gpm). The effects of pumping are shown by the altered water-table elevation contours, particularly in the vicinity of recovery wells RW-1 through RW-5.

Monitor Well GM-70 was reportedly damaged and the casing filled with sand in October 1988. Water levels were not measured in GM-70 after that time.

Ground-Water Sampling and Analysis Program

In accordance with the operation permit, Table 1 is the quarterly monitoring schedule for selected wells. The four quarterly sampling events were conducted in December 1987, and February, June and August 1988. Ground-water samples were collected from selected monitor wells (Table 1) and the combined discharge from recovery wells RW-1 through RW-6 for analyses of sodium, chloride, volatile organic compounds (VOCs) according to EPA Method 624, and base/neutral extractable organics (BNEs) according to EPA Method 625. In addition to the quarterly samples, Quality Assurance/Quality

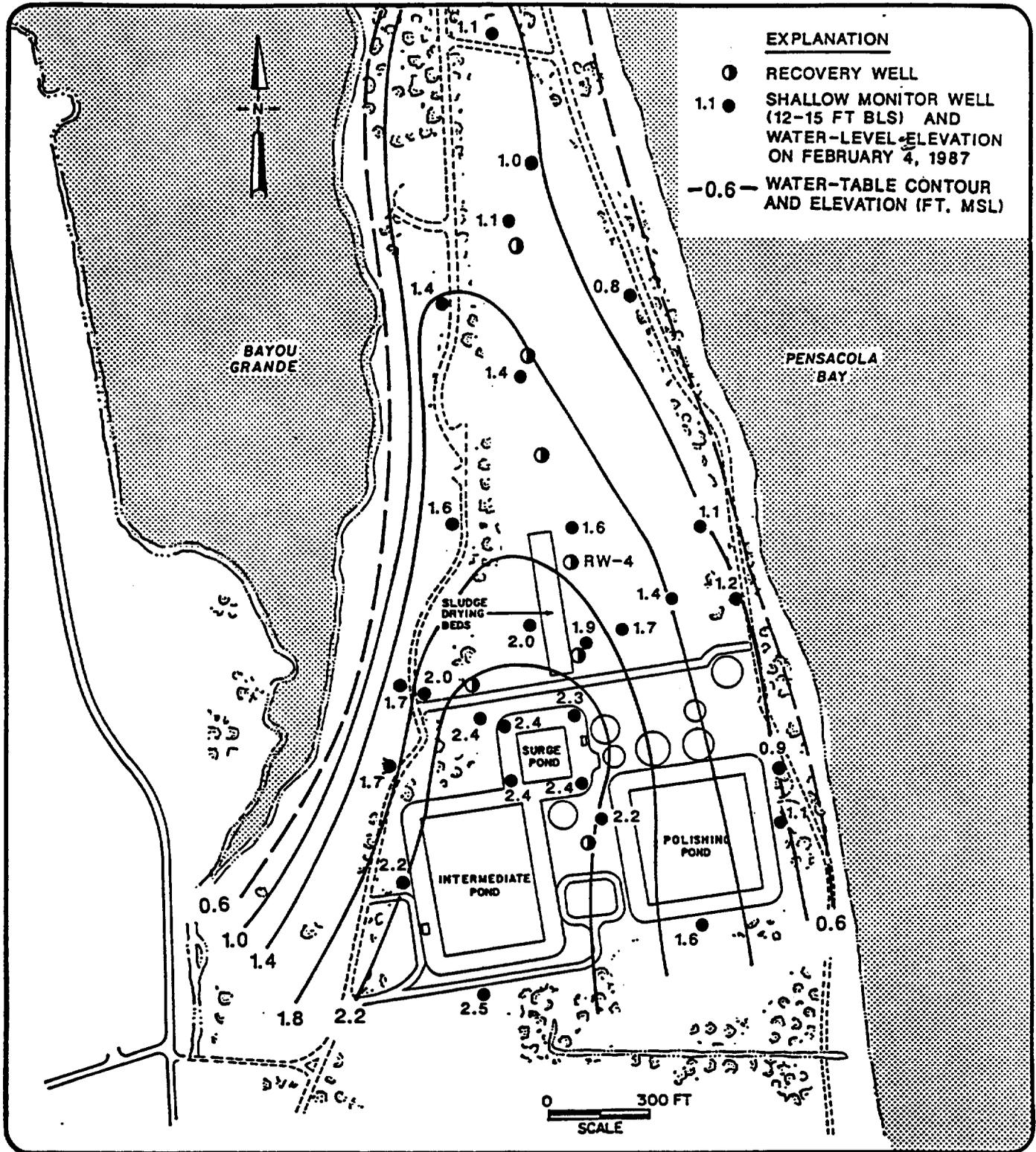


Figure 5. Water-Table Contour Map, February 1987 (Non-Pumping Condition).

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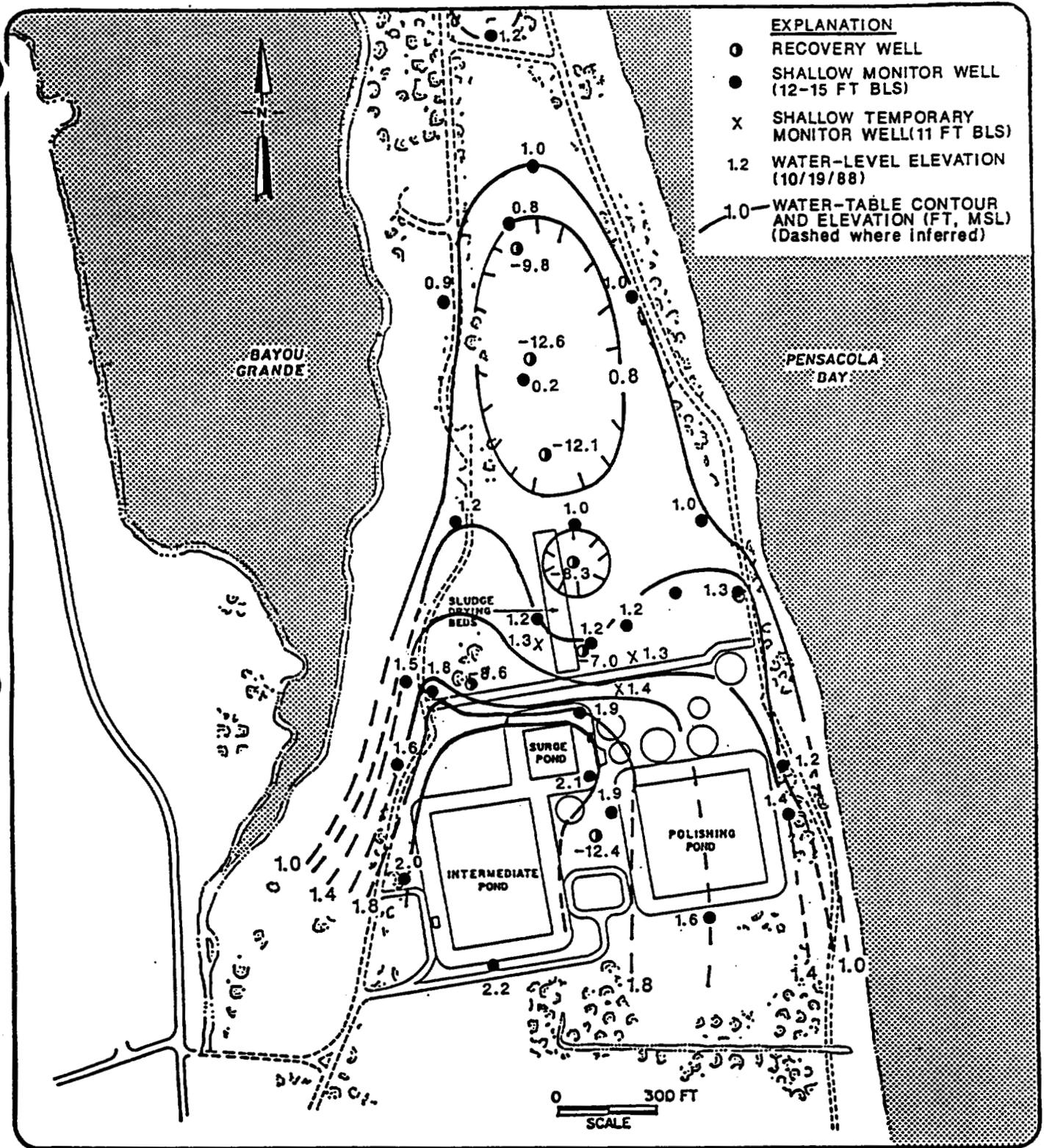


Figure 6. Water-Table Contour Map, October 1988 (Pumping Condition).

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Table 1. NAS Pensacola WWTP Sampling and Analysis Schedule.

PARAMETER	WELL I.D.	11/87 a/	12/87	01/88	02/88 b/	03/88	04/88	05/88 c/	06/88	07/88	08/88 d/	09/88	10/88	11/88 e/
CORRECTIVE ACTION MONITORING 40 CFR, 264.100														
pH, SPECIFIC CONDUCTANCE, SODIUM, CHLORIDE	UG-1 (S)	X			X			X			X			
	UG-9 (S)	X			X			X			X			
	GM-63 (D)	X			X			X			X			
	GM-64 (I)	X			X			X			X			
	GM-65 (D)	X			X			X			X			
	GM-66 (I)	X			X			X			X			
	GM-67 (S)	X			X			X			X			
	GM-68 (D)	X			X			X			X			
	GM-69 (I)	X			X			X			X			
	GM-71 (S)	X			X			X			X			
	GM-72 (S)	X			X			X			X			
	CU-74 (D)	X			X			[X]			[X]			
	MI-76 (S)	X			X			X			X			
	GM-77 (S)	X			X			X			X			
	GM-78 (S)	X			X			X			X			
GM-79 (S)	X			X			X			X				
GM-83 (S)	X			X			X			X				
COMBINED DISCHARGE RW-1 THROUGH RW-6		X			X			X			X			
VOCs (EPA 624) & ELASE NEUTRAL EXTRACTABLES (EPA 625)	DO-2 (S)	X			X			[X]			[X]			
	CM-9 (S)	X			X			X			X			
	OM-62 (S)	X			X			X			X			
	CU-63 (D)	X			X			X			X			
	CU-64 (I)	X			X			X			X			
	GM-65 (D)	X			X			X			X			
	GM-66 (I)	X			X			X			X			
	GM-67 (S)	X			X			X			X			
	GM-68 (D)	X			X			X			X			
	GM-69 (I)	X			X			X			X			
GM-74 (D)	X			X			[X]			[X]				
GM-75 (I)	X			X			[X]			[X]				
GM-84 (I)	X			X			X			X				
WATER-LEVEL MEASUREMENTS	ALL WELLS	X	X	X	X	X	X	X	X	X	X	X	X	X
TOTAL DEPTH	ALL WELLS	X												
COMPLIANCE MONITORING 40 CFR, 264.99														
APPENDIX IX	DC-4 (S)	X					X							
pH, SPECIFIC CONDUCTANCE, AND SPECIFIED CONSTITUENTS IN SECTION 34C OF RCRA PERMIT	UG-1 (S)				X			X			X			X
	UG-1 (S)				X			[X]			[X]			[X]
	DC-4 (S)				X			X			X			X
	DC-5 (S)				X			X			X			X
	DC-6 (S)				X			[X]			[X]			[X]
GM-75 (I)				S			[X]			[X]			[X]	

- (S) = SHALLOW MONITOR WELL, ABOUT 13 FT DEEP
- (I) = INTERMEDIATE MONITOR WELL, ABOUT 40 FT DEEP
- (D) = DEEP MONITOR WELL, ABOUT 65 FT DEEP
- (X) = NOT SAMPLED, WELL ABANDONED 23-FEB-88 DUE TO CONSTRUCTION OF NEW SURGE TANK
- a/ = 30-NOV-87 THROUGH 03-DEC-87
- b/ = 22-FEB-86 THROUGH 24-DEC-88
- c/ = 01-JUN-88 THROUGH 03-JUN-88 AND 20-JUN-88
- d/ = 15-AUG-88 THROUGH 17-AUG-88
- e/ = 08-NOV-88

Control (QA/QC) samples were collected which included field replicates, sampler rinsates, field blanks, and trip blanks. The first two quarterly analyses were performed by Martin Marietta Analytical Chemistry Laboratory, Oak Ridge, Tennessee; the final two quarterly analyses were performed by Pioneer Laboratory, Inc., Pensacola, Florida.

On November 30, 1987, total depths of the wells were measured to allow accurate calculation of the well volumes to be evacuated from each well before sampling. Water levels were measured and approximately four well volumes of water were removed from each monitor well before sample collection. Ground water was evacuated using a peristaltic pump with a Teflon hose except for well GM-84, where it was necessary to use a Teflon bailer to purge the well.

The ground-water samples were collected with a Teflon bailer with a Teflon drop line for analyses of organic compounds and with a peristaltic pump with Teflon suction hose for inorganic compounds. The pH, temperature, and specific conductance were determined in the field at the time of sample collection. Sample preservation included storage on ice for VOCs, BNEs, and chloride; and nitric acid and storage on ice for sodium. Before sampling each well, the sampling equipment was thoroughly decontaminated with isopropyl alcohol, MICRO laboratory cleaning soap, and several rinses with deionized water. Proper chain-of-custody procedures were followed. All laboratory analytical results were subjected to data validation procedures by G&M's Quality Assurance officer (Appendix D).

Water-Quality Results

Ground-water-quality data collected during the four quarterly sampling events are summarized in Appendix E, which includes pH, specific conductance, and the results of

inorganic and organic compound analyses. For comparison, results of organic compound analyses and pH and specific conductance measurements obtained under previous investigations also are presented.

Specific Conductance, Sodium, Chloride, and pH

Measuring specific conductance and the concentrations of sodium and chloride in the ground water helps monitor any significant movement of sea water into the shallow ground water due to operation of the recovery-well system. This is important because water with a high concentration of dissolved solids would be harmful to the biological treatment processes that are used at the treatment plant. Since the start up of the recovery system in February 1987, specific conductance values in most of the corrective-action wells have decreased or remained about the same, indicating that operation of the recovery system has not induced salt-water intrusion.

During the final two quarters, and similar to the first two quarters of sampling, the following specific conductance values were measured in ground-water samples:

- o shallow monitor wells were generally less than 500 micromhos per centimeter (umhos/cm);
- o intermediate monitor wells ranged from about 1,000 to 7,000 umhos/cm, with the exception of GM-84 (located adjacent to the bay) which was higher;
- o deep monitor wells were generally less than 1000 umhos/cm, except for well GM-63 which was higher.

The higher values of specific conductance in the intermediate depth zone are the natural water chemistry and likely due to minor residual sea water, whereas the lower values measured in the shallow zone are due to recharge from

rainfall. Correspondingly, concentrations of sodium and chloride also are generally higher in the intermediate zone than in the shallow depth zone of the aquifer (Figure 7).

Generally, ground water in all the various depth wells is naturally slightly acidic, with pH values of 5 to 6. Exceptions have been observed in recovery well RW-5 and intermediate depth well GM-66 with the most recent pH values at about 3.7. These anomalously low pH values are attributed to residual sulfuric acid which accidentally spilled in October 1983. In the past, the pH in recovery well RW-5 has been as low as 1.5. The pH has increased and since September 1988 has maintained a value of about 3.9.

Organic Compounds

With regard to the final two quarterly analyses for VOCs and BNEs, the following observations are noted:

- o With one exception, no VOCs or BNEs were detected in the three deep monitor wells (GM-63, GM-65, and GM-68). In June 1988, well GM-63 was reported to contain 64 micrograms per liter (ug/L) of dichlorobenzenes and 2 ug/L chlorobenzene. However, no VOCs were detected in GM-63 in August 1988. (Figures 8 and 9)
- o No BNEs were detected in the three shallow monitor wells (GM-9, GM-62, and GM-67). The concentrations of total VOCs in samples from well GM-62 were 161 ug/L and 346 ug/L in June and August 1988, respectively. No VOCs were detected in GM-9 and only minor concentrations (4 ug/L) in GM-67 during the June sampling event. (Figures 8 and 9)
- o The highest concentrations of VOCs and BNEs occurred in the intermediate monitor wells GM-66 and GM-69. The predominant compounds included trichloroethene, dichlorobenzenes, chlorobenzenes, and 1,2-dichloroethene. (Figures 8 and 9)

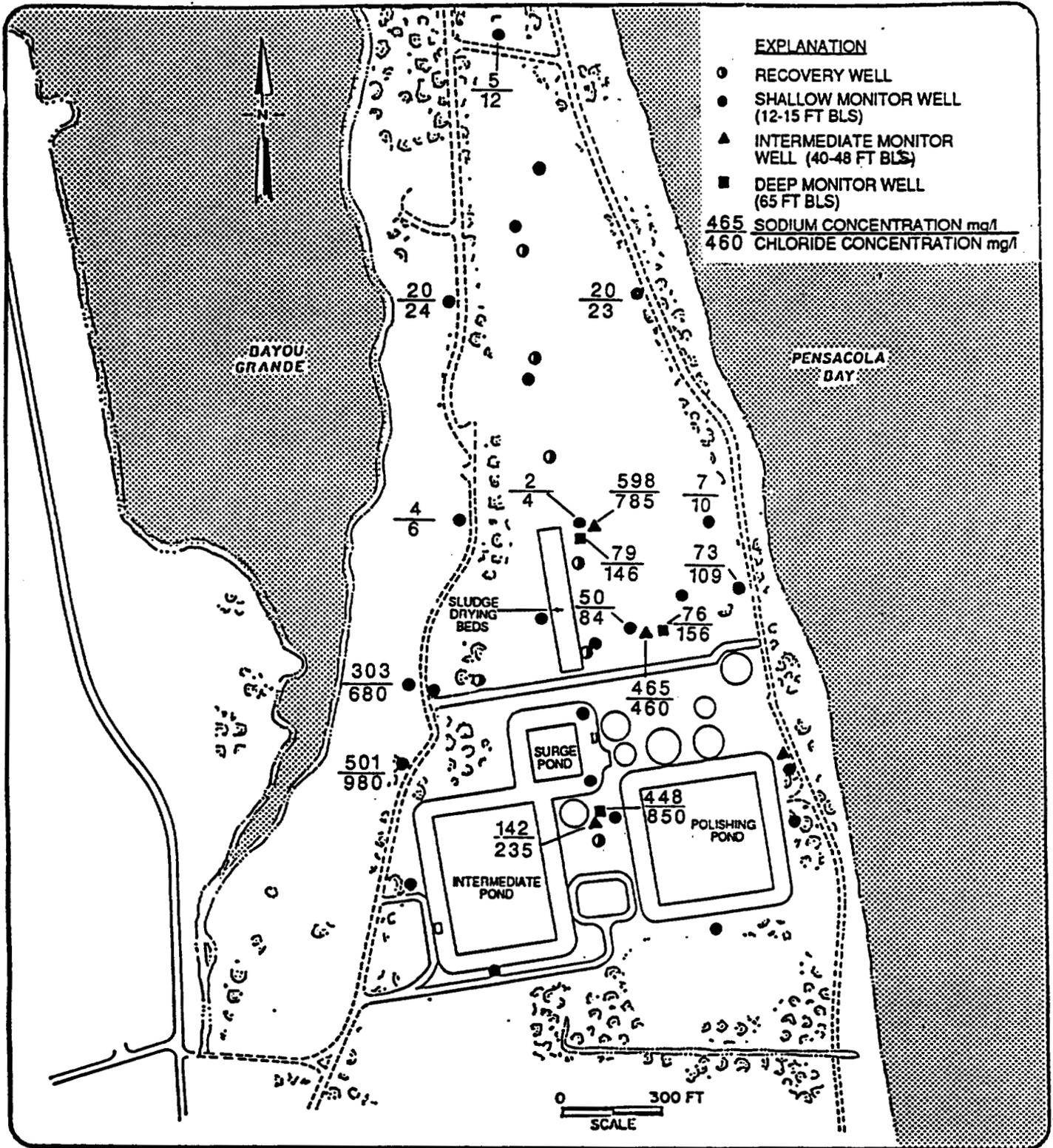


Figure 7. Concentrations of Sodium and Chloride in Corrective-Action Monitor Wells, August 1988.

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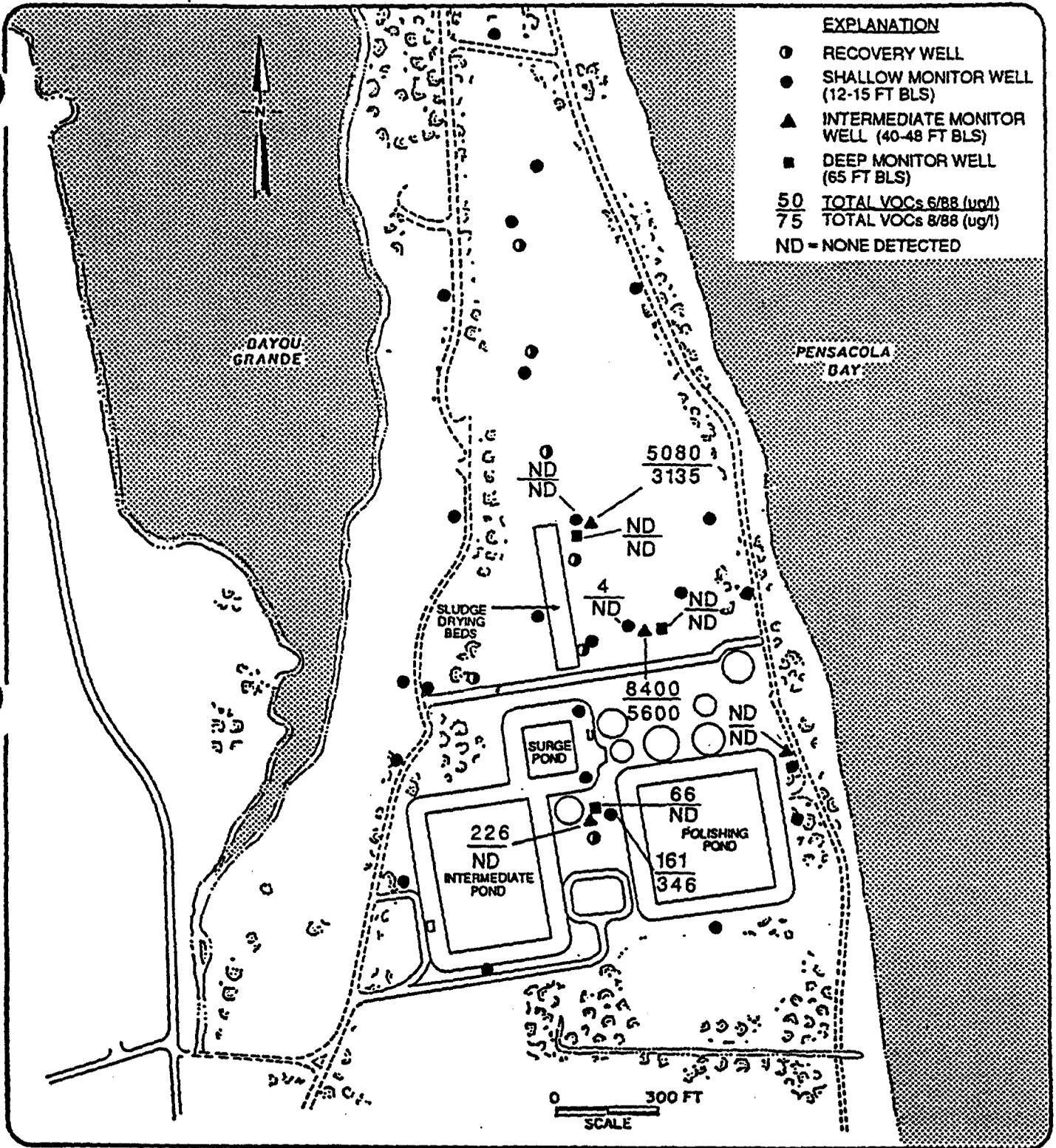


Figure 8. Concentrations of Total VOCs in Corrective-Action Monitor Wells, June and August 1988.

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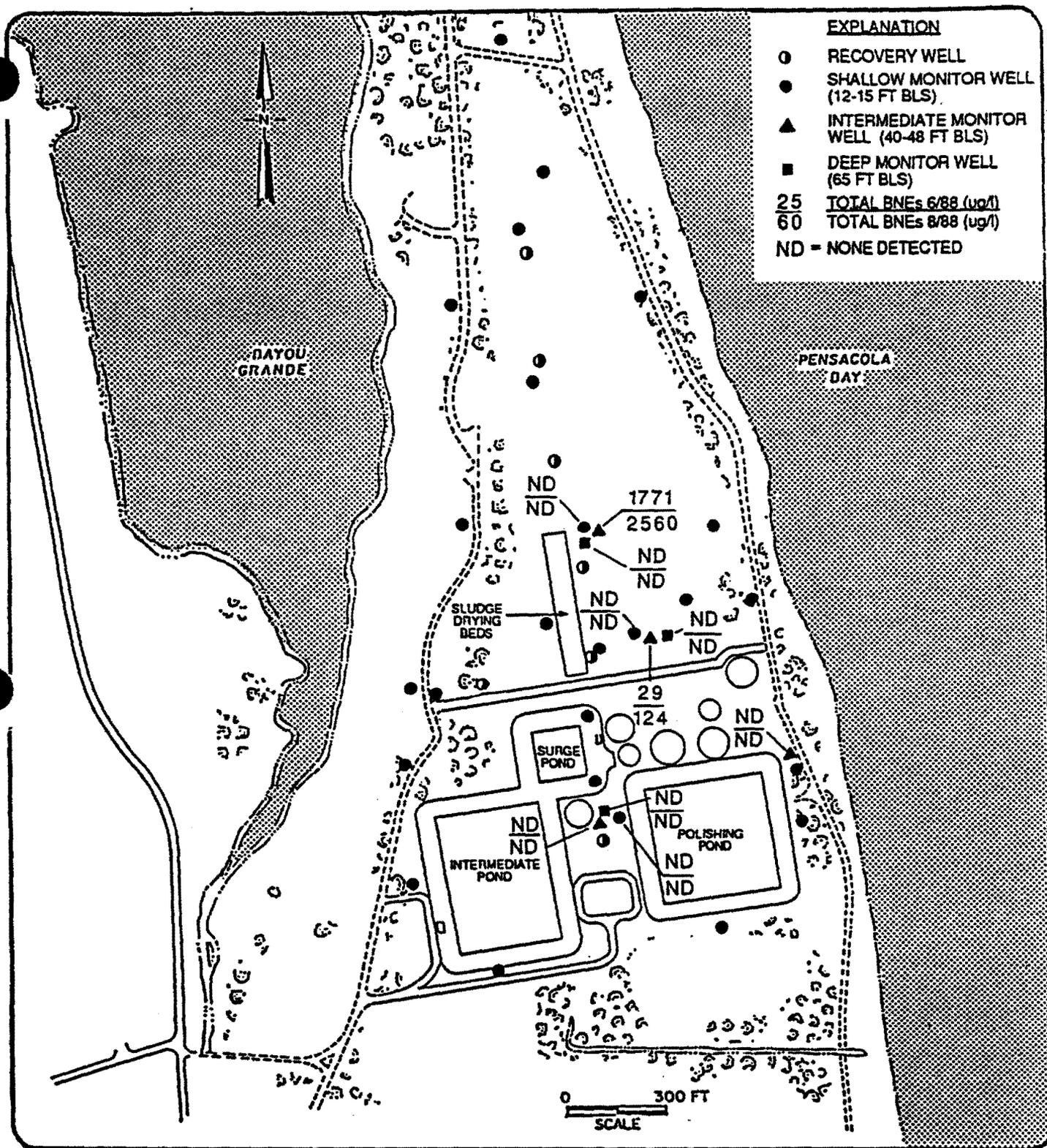


Figure 9. Concentrations of BNEs in Corrective-Action Monitor Wells, June and August 1988.

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Effectiveness of the Recovery-Well System

To date, the recovery-well system has pumped and treated approximately 43 million gallons of contaminated ground water (Table 2 and Figure 10). The combined discharge from the seven recovery wells is currently averaging about 64 gpm. Recovery wells RW-1 through RW-3 are pumped at a combined rate of about 30 gpm while RW-4 and RW-6, together, average about 19 gpm. Recovery wells RW-5 and RW-7 pump at rates of about 9 gpm and 6 gpm, respectively.

The graphs in Figures 11 through 13 illustrate the concentrations of total VOCs over time in the shallow and intermediate zones at the clustered well sites, above the confining unit. Careful consideration should be given to the log scales on the vertical concentration axes of the graphs. As shown (Figure 11), the total concentration of VOCs in shallow well GM-9 decreased from about 29,000 ug/L in 1984 to below detection limits in 1987 and 1988. However., the VOC concentrations in intermediate well GM-69 are still similar to those measured in September 1985 (about 3,000 ug/l).

Concentrations of total VOCs in shallow monitor well GM-62 (Figure 12) increased from below detection levels in December 1987 to 346 ug/L in August 1988. Concentrations in intermediate well GM-64 (Figure 12) fluctuated during the four quarters of sampling but, most recently, no VOCs were detected. The increase of VOCs in GM-62 and the erratic Concentration levels in GM-64 might be due to the .proximity of these wells to the ponds (source) and recovery well RW-7. Variable recharge from rainfall or the ponds might result in the flushing of residual contaminants from the partially saturated zone above the water table or from stagnant pore spaces when microscopic changes in the ground-water flow direction occur. This might result in variable water quality intercepted by recovery well RW-7 and in the wells adjacent

Table 2. Summary of Ground-Water Withdrawals
from Recovery-Well System.

MONTH/YEAR	GALLONS PUMPED FROM PUMPHOUSE				TOTAL GALLONS PUMPED	CUMULATIVE PUMPAGE (GALS)
	A	B	C	D		
FEB 87	1,159,200	861,120	331,200		2,351,520	2,351,520
MAR 87	1,447,900	367,580	309,250		2,124,730	4,476,250
APR 87	984,500	571,000	294,050		1,849,550	6,325,800
MAY 87	1,187,700	509,700	285,090		1,982,490	8,308,290
JUN 87	1,339,500	428,600	305,150		2,073,250	10,381,540
JUL 87	1,005,800	289,000	223,380		1,518,180	11,899,720
AUG 87	1,313,700	635,000	304,750		2,253,450	14,153,170
SEP 87	979,760	495,300	226,922		1,701,982	15,855,152
OCT 87	872,020	501,800	90,118	75,170	1,539,108	17,394,260
NOV 87	965,320	532,800	289,320	26,860	1,814,300	19,208,560
DEC 87	1,092,400	756,660	306,930	10,790	2,166,780	21,375,340
JAN 88	1,162,080	751,860	176,340	111,850	2,202,130	23,577,470
FEB 88	884,700	655,020	194,050	109,350	1,843,120	25,420,590
MAR 88	1,162,920	709,060	72,530	224,830	2,169,340	27,589,930
APR 88	889,500	503,600	130,780	163,950	1,687,830	29,277,760
MAY 88	955,300	309,900	135,940	112,870	1,514,010	30,791,770
JUN 88	961,100	132,000	173,720	176,410	1,443,230	32,235,000
JUL 88	895,000	355,000	177,120	77,360	1,504,480	33,739,480
AUG 88	1,074,600	783,600	173,490	20,410	2,052,100	35,791,580
SEP 88	1,135,400	800,700	99,970	300	2,036,370	37,827,950
OCT 88	1,213,000	795,000	272,280	326,080	2,606,360	40,434,310
NOV 88	1,004,200	903,300	204,170	330,260	2,441,930	42,876,240

- A = Combined discharge from Recovery Wells RW-1, RW-2, and RW-3
 B = Combined discharge from Recovery Wells RW-4, RW-5, and RW-6;
 beginning October 1987 combined discharge from RW-4 and RW-6
 C = Discharge from Recovery Well RW-7
 D = Discharge from Recovery Well RW-5

a.

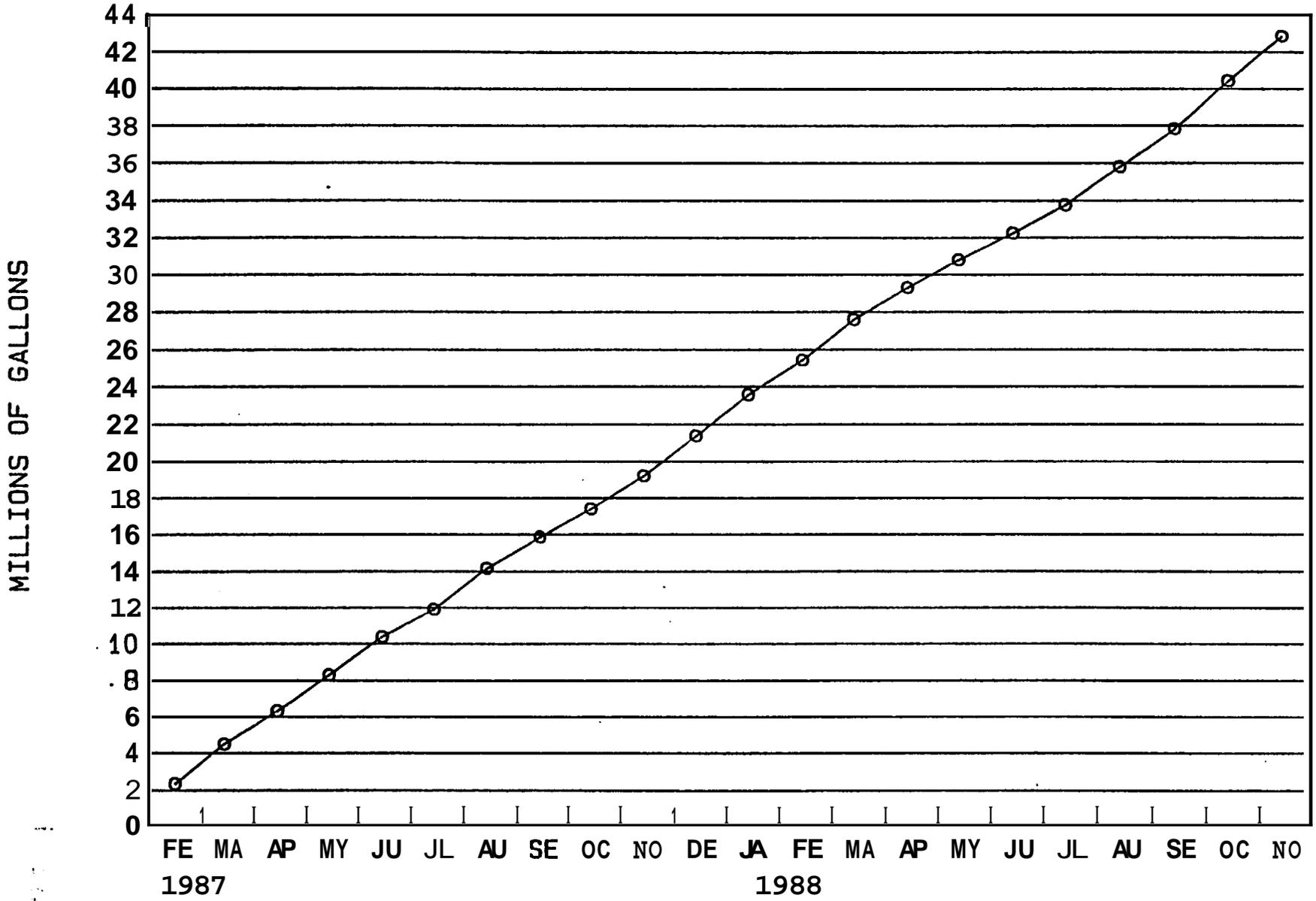


Figure 10. Cumulative Monthly Ground-Water Withdrawals from Recovery Well System.

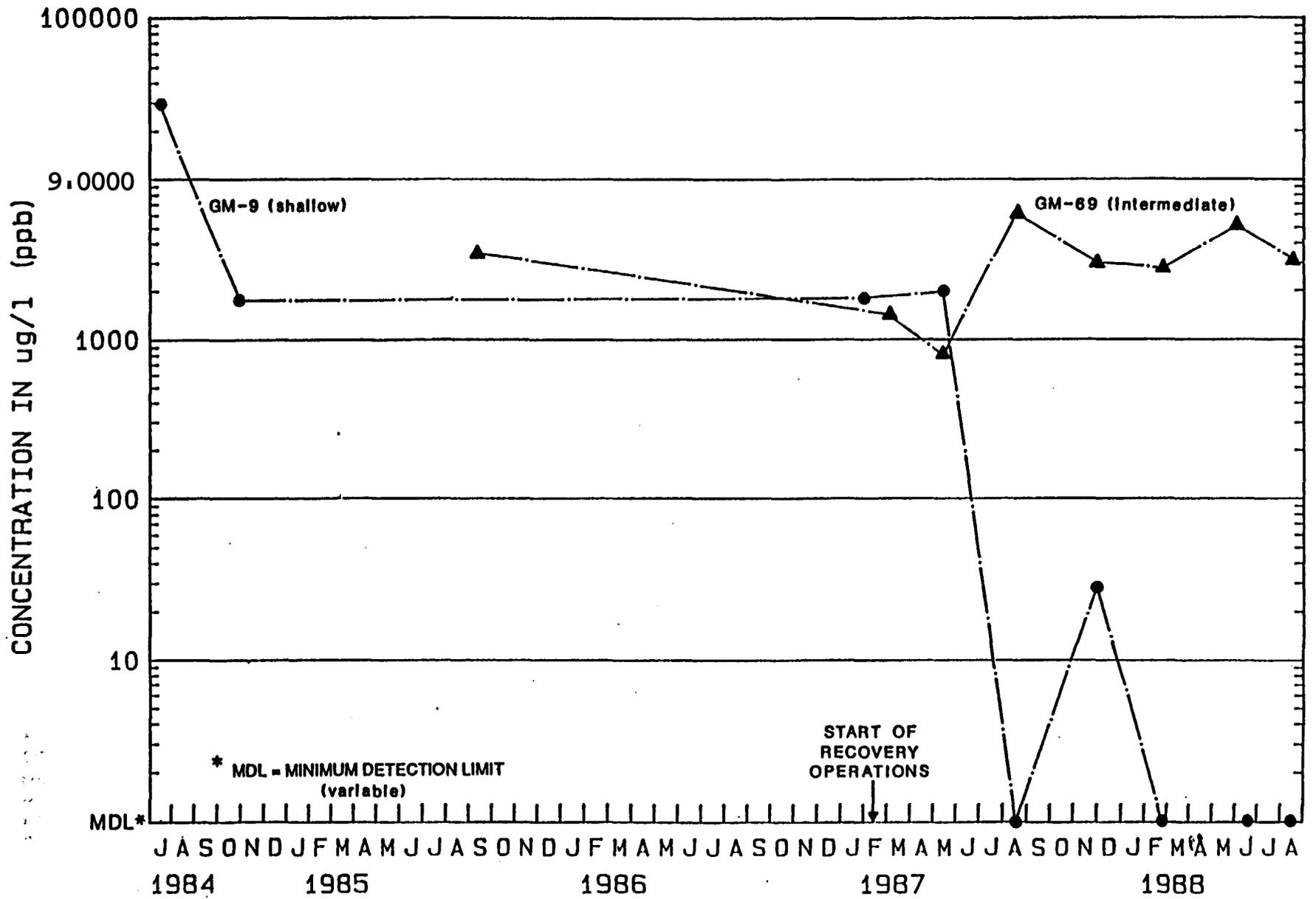


Figure 11. Concentrations of Total VOCs in Monitor Wells GM-9 and GM-69.

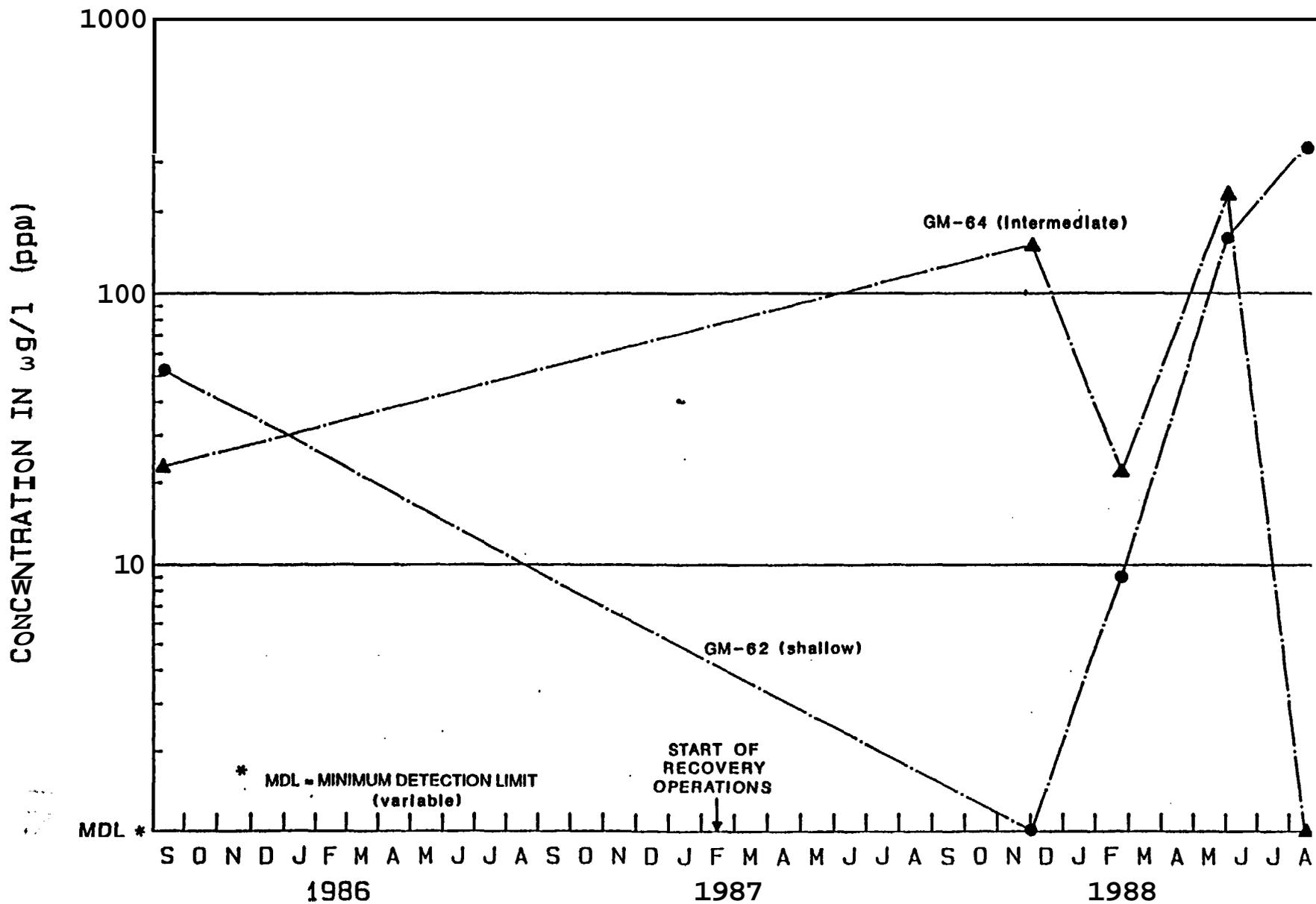


Figure 12. Concentrations of Total VOCs in Monitor Wells GM-62 and GM-64.

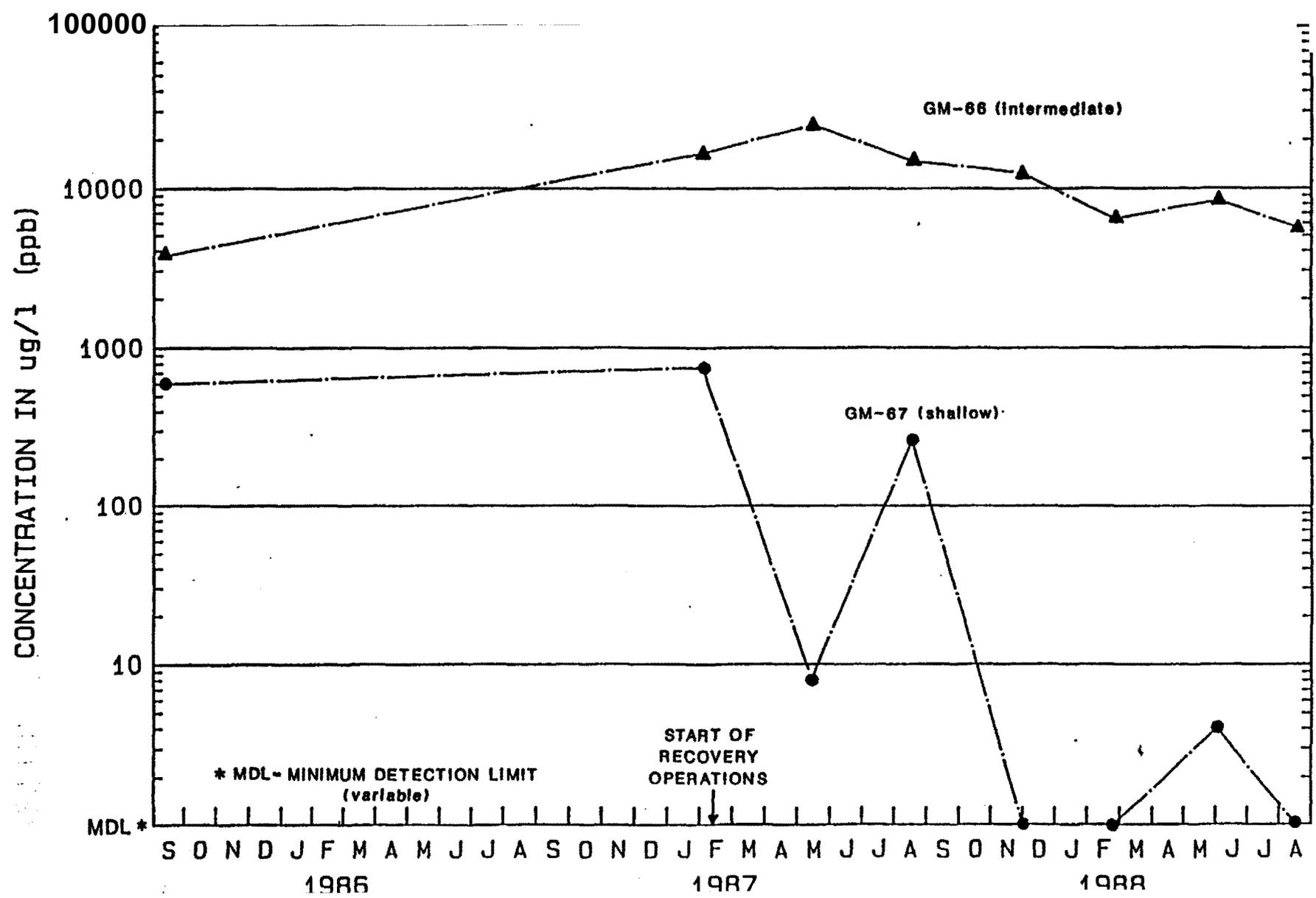


Figure 13. Concentrations of Total VOCs in Monitor Wells GM-66 and GM-67.

to RW-7. Also, during May and June 1988, a dewatering system was operating just north of the surge pond. The withdrawn water was discharged to the polishing pond and might have effected the water quality in the vicinity of GM-62 and GM-64.

Concentrations of total VOCs in shallow well GM-67 (Figure 13) have decreased from about 700 ug/L to below detection levels. Concentrations also have decreased in intermediate well GM-66 (Figure 13) from a maximum of almost 25,000 ug/L in 1987 to 5,600 ug/L in August 1988.

The downward trend of VOC concentrations, the large volume of recovered water, and the water table maps indicate that the system is capturing and recovering contaminated ground water and abating further migration from the source. Continued operation of the system and the ultimate closure of the surge pond will enhance the clean-up efforts in the future. However, additional action can be taken to increase the capture zone of the recovery-well system. This is discussed in a later section of this report.

COMPLIANCE MONITORINGGround-Water Sampling and Analysis Program

According to permit condition 34.b monitor wells UG-1, DG-1, DG-4, DG-5, DG-6, and GM-75 constituted the point-of-compliance (POC) wells (Figure 4). Permit condition 34.d mandated sampling POC well DG-4 for Appendix IX constituents (or FDER approved equivalent). The results of these analyses were to establish those constituents to be analyzed during the quarterly sampling events. On December 3, 1987, water samples were collected from well DG-4 for analyses of an abbreviated list of Appendix IX constituents. The results of the abbreviated Appendix IX analyses were submitted to the FDER on February 8, 1988. Based on the results of these analyses, the first quarterly samples were collected from the POC wells on February 22, 1988 and analyzed for VOCs, Base/Neutral and Acid extractables (BNAs) and manganese. During the sampling of the POC monitor wells in February, the FDER notified the Navy of their disapproval of the abbreviated Appendix IX analysis. Consequently, well DG-4 was re-sampled on April 29, 1988 for a complete list of Appendix IX constituents. The results of the analyses were similar to those from the previous analyses and reported the presence of VOCs, BNAs, and one inorganic parameter (manganese) that exceeded the ground-water protection standard listed in Specific Condition 34.C of the operation permit. The results of these analyses were reported verbally to the FDER in May 1988 and were accepted and used to determine the list of constituents to be analyzed for during the remaining three quarterly sampling events. Written results were submitted to the FDER on July 19, 1988.

The final three quarterly sampling events were conducted in June, August and November 1988 (Table 1). Ground-water samples were collected for analyses of VOCs (SW-846 Method

Geraghty & Miller, Inc.

8240), BNAs (Sw-846 Method 8270) and manganese (EPA Method 6010). In addition to the quarterly samples, QA/QC samples were collected and included field replicates, sampler rinsates, field blanks and trip blanks. All POC sampling procedures followed those described on page 12 of this document. As previously mentioned, POC wells DG-1, DG-6 and GM-75 were abandoned February 23, 1988 and therefore were not sampled after that time. In addition, well DG-4 was dry during the June 1988 sampling event due to the operation of a dewatering system for construction of the new surge tank. Consequently this well was not sampled in June.

Water-Quality Results

Ground-water-quality data collected during the four quarterly sampling events are summarized in Appendix F, which includes pH, specific conductance, and the results of inorganic and organic compound analyses. For comparison, analytical results obtained during previous investigations also are included.

The following observations concerning the chemical data from June through November 1988 are provided:

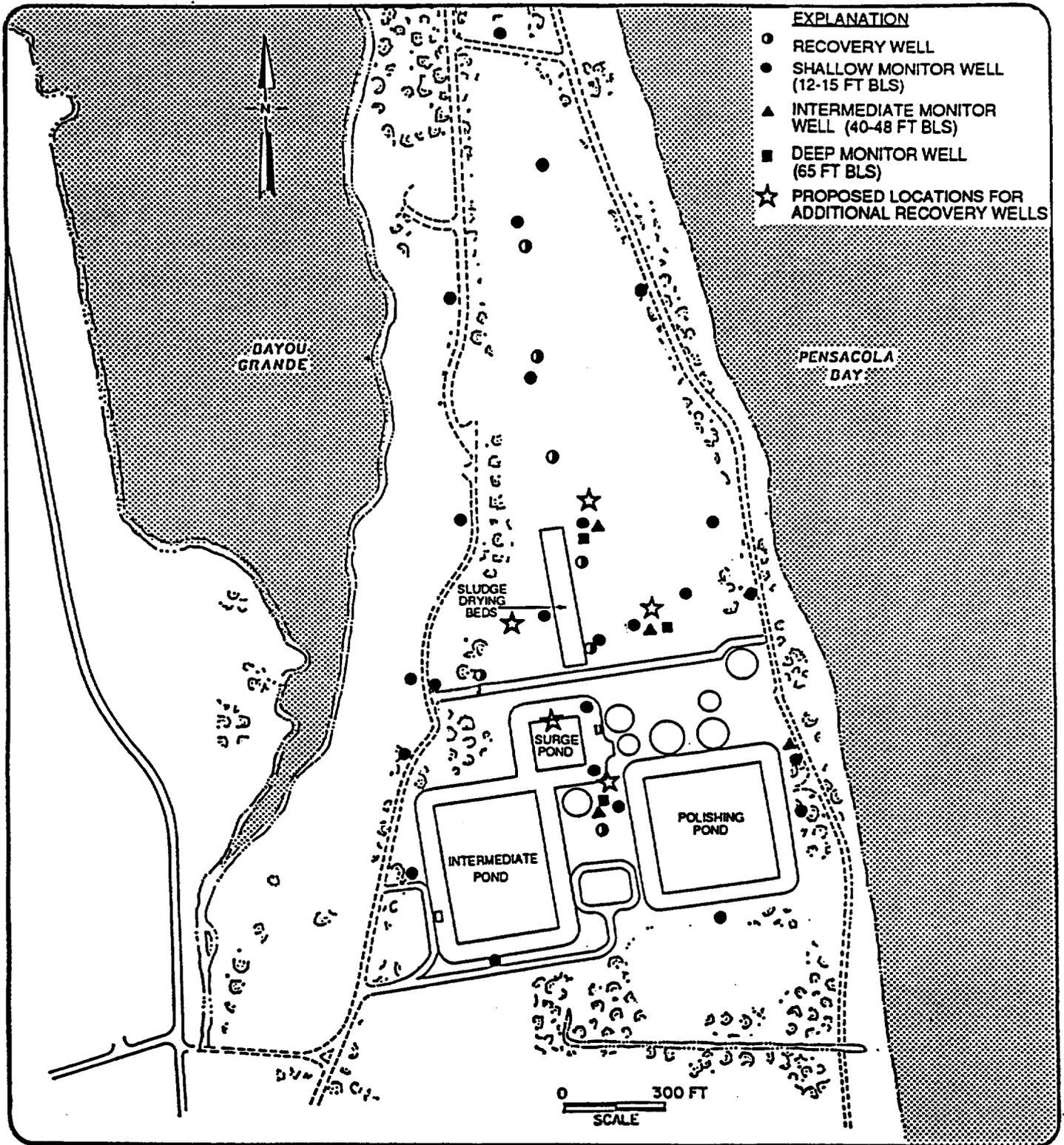
- o Of the three wells sampled (UG-1, DG-4, and DG-5), DG-4 and DG-5 contained manganese at concentrations greater than the ground-water protection standard of 0.05 milligrams per liter during at least one sampling event. No manganese was detected in well UG-1.
- o Samples from wells UG-1, DG-4 and DG-5 contained VOCs at concentrations exceeding the analytical detection limits (ground-water protection standard) during only one of the three sampling events. Well UG-1 reportedly contained 40 ug/L acetone (suspected laboratory contamination) in November; DG-4 contained 7 ug/L 1,1-dichloroethane in November; and DG-5 contained 22 ug/L dichlorobenzenes and 2 ug/L toluene. No other VOCs were detected during the final three sampling events.
- o No BNAs were detected during the final three sampling events.

RECOMMENDATIONS

Data collected during operation of the existing ground-water recovery system have demonstrated that recovery wells are an effective way to remediate the site. However, based on the high concentrations of VOCs and BNEs in the vicinity of monitor wells GM-66 and GM-69 (Figures 8 and 9), additional recovery wells are recommended in these areas to more effectively and expeditiously clean up the contaminated ground water (Figure 14).

Additional recovery wells are also recommended north of RW-6 and near the surge pond, when the pond has been removed (Figure 14). This will effect a capture zone in the water table surface in the identified source area.

Sampling of selected monitor wells and recovery wells in the north part of the peninsula is also recommended to determine what level of clean up has occurred in that area.



 **Figure 14. Proposed Locations for Additional Recovery Wells.**

Naval Facilities Engineering Command,
Southern Division

REFERENCES

Geraghty & Miller, Inc., January 1985, Water-Quality Assessment Program at the Wastewater-Treatment Plant, NAS Pensacola, Florida (Phase I).

Geraghty & Miller, Inc., December 1985, Water-Quality Assessment Program at the Wastewater-Treatment Plant, NAS Pensacola, Florida (Phase II).

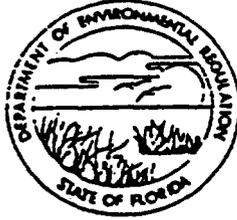
Geraghty & Miller, Inc. April 1987, Quarterly Report, Corrective Action Program, Wastewater Treatment Plant, NAS Pensacola, Florida.

APPENDIX A

Operation Permit No. H017-127026[~]
I.D. No. 1017F00625 (FL9170024567)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
180 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501-5794



BOB MARTINEZ
GOVERNOR
DALE TWACHTMANN
SECRETARY
ROBERT V. KRIEDEL
DISTRICT MANAGER

PERMITTEE:

U.S. Navy Public Works
Center

I.D. Number: 1017300625 (FL9170024567)
Permit/Certification Number: 8017-127026
Date of Issue: **SEP 26 1987**

Expiration Date: November 1, 1988
County: Escambia
Latitude/Longitude: 30°21'050"/087°15'52"
Project: Storage Surface Impoundment

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule 17-30. The above named applicant, hereinafter called Permittee, is hereby authorized to perform the work or operate the facility shown of the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

To operate a Hazardous Waste Storage Surface Impoundment hereinafter referred to as the Surge Pond having a capacity of 1,154,725 gallons.

The following facility submittals were used in the preparation of this document and are considered part hereof:

The State of Florida Hazardous Waste Permit application DEB FORM 17-1.201(3) for a Temporary Operation Permit dated April 1, 1983.

Temporary Operation Permit HP7-68087 issued on January 7, 1985.

The State of Florida Hazardous Waste Operation Permit application (DEB FORM 17-1.201(3) received November 7, 1986.

The additional information received from the Permittee on March 23, 1987.

PERMITTEE:

US. Navy Public Works

I.D. Number: 1017P00625 (FL9170024567)

Permit/Certification Number: H017-127026

Date of Issue: SEP 2 1987

Expiration Date: November 1, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions", and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review *this* permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid **only** for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of **this** permit may constitute grounds for revocation and enforcement action by the Department.
3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of **this** permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. **This** permit does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and *the* necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.
5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefor caused by the construction or operation of **this** permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of **this** permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of *the* permit and when required by Department rules.

PERMITTEE:

US Navy Public Works

I.D. Number: 1017F00625 (FL9170024567)
Permit/Certification Number: H017-127026
Date of Issue:

Expiration Date: November 1, 1988

GENERAL CONDITIONS:

7. The permittee, by accepting *this* permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

- a. Having access to and copying any records that must be kept under the conditions of this permit;
- b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; end,
- c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the Department with the following information:

- a. A description of and cause of non-compliance; and
- b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes.

PERMITTEE:

U.S. Navy Public Works

X.D. Number: 1017F00625 (FL9170024567)

Permit/Certification Number: B017-127026

Date of Issue: 5.7.88

Expiration Date: November 1, 1988

GENERAL CONDITIONS:

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. The permittee shall comply with the following monitoring and record keeping requirements:

- a. Upon request, the permittee shall furnish all records and plans under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.
- b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.
- c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurement;
 - the person responsible for performing the sampling or measurement;
 - the date(s) analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and
 - the results of such analyses,

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F00625 (FL9170024567)
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Date of Issue: **SEP 1 1988**
Expiration Date: November 1, 1988

GENERAL CONDITIONS:

14. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be submitted or corrected promptly.

15. In the case of a hazardous waste facility permit, the following permit conditions shall also apply.

a. The permittee will submit the following reports to the department:

- (1) Manifest discrepancy report: If a significant discrepancy in a manifest is discovered, the permittee must attempt to reconcile the discrepancy. If not resolved within 15 days after receiving waste, the permittee shall immediately submit a letter report including a copy of the manifest to the Department.
- (2) Unmanifested waste report: Permittee shall submit an unmanifested waste report to the Department within 15 days of receipt of unmanifested waste.
- (3) Annual report: An annual report covering facility activities during the previous calendar year must be submitted in accordance with Florida Administrative Code Rule 17-30.

b. Notification of any non-compliance which may endanger health or the environment, including the release of any hazardous waste that may endanger public drinking water supplies, or the occurrence of a fire or explosion from the facility which could threaten the environment or human health outside the facility, shall be verbally submitted to the Department within 24 hours and a written submission provided within 5 days. The verbal submission provided within 24 hours shall contain the name, address, I.D. number and telephone number of the facility owner or operator, the name and quantity of materials involved, the extent of injuries (if any), an assessment of actual or potential hazards, and the estimated quantity and disposition of recovered material. The written submission shall contain the following:

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F00625 (PL9170024567)
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Expiration Date: November 1, 1988

GENERAL CONDITIONS:

- (1) a description of and cause of noncompliance; and,
 - (2) if not corrected, the anticipated **time** the noncompliance is expected to continue and step being taken to reduce, eliminate, and prevent recurrence of the noncompliance.
- c. Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
 - d. All reports or information required to be submitted to the Department by a hazardous waste permittee shall be signed by a person authorized to sign a permit application.
16. This permit also constitutes:
- () Determination of Best Available Control Technology (BACT)
 - () Determination of Prevention of Significant Deterioration (PSD)
 - () Certification of Compliance with State Water Quality Standards Section 401, (PL 92-500)
 - () Compliance with New Source Performance Standards

SPECIFIC CONDITIONS:

17. This permit authorizes the storage of the wastes in the surge pond specified in Section C of the application which are F006, F019, F007, and D002 for the operating conditions specified in Section B of the application. *type-error D007*
18. The permittee shall operate and maintain the surface impoundment to prevent overtopping resulting from normal and abnormal operating conditions and the requirements of 40 CFR 264.221(f)
19. The permittee shall inspect the surface impoundment, dikes, liners, and other associated structural and monitoring equipment in accordance with the schedule approved in Section D and Appendix D-1, and Section F of the application. Dikes shall be inspected within 24 hours after a major storm (ten year storm event). Corrective action shall be taken if malfunction or deterioration of the unit is noted. 40 CFR 264.226

PERMITTEE:

U.S. Navy Public Works

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Date of Issue: SEP 21 1987

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

20. If the surface impoundment must be removed from service to comply with the requirements of 40 CFR 264.227(a), the permittee must notify the Department in writing within seven days after detection of the problem. The permittee must recertify the structural stability of the impoundment in accordance with 40 CFR 264.226(c). The permittee shall not restore the surface impoundment to service without the Department's written approval. If the surface impoundment is not repaired to the Department's satisfaction, the permittee shall apply for a closure permit. 40 CFR 264.226(b) and 40 CFR 264.227.

21. Prior to acceptance of new hazardous wastes, the permittee shall submit to the Department, for approval, an analysis of the proposed new waste stream and a request for a permit modification. This analysis must also be incorporated in the general waste analysis plan and retained on-site. If any hazardous wastes are to be accepted from off-site, the facility must comply with the manifest requirements of 40 CFR 264.70, as well as the waste analysis requirements of 40 CFR 264.13 prior to treatment or storage of such wastes in the regulated unit. 40 CFR 264.13

22. The permittee shall inspect the facility operating, emergency and safety equipment in accordance with the schedule approved in Section F of the above application. The permittee shall remedy any deterioration or malfunction discovered by an inspection in accordance with the requirements of 40 CFR 264.15(c). Changes, additions, or deletions to the schedule must be approved in writing by the Department. The schedule must be maintained as part of the operating record at the facility. 40 CFR 264.15

23. Facility personnel must successfully complete the approved training program indicated in Section H of the application within six months after the date of their employment. Verification of this training must be kept with the personnel training records and maintained on-site. Personnel shall not work unsupervised until training has been completed. The permittee shall ensure that facility personnel take part in an annual review of training. 40 CFR 264.16.

24. The permittee shall follow the emergency procedures specified in 264.56 and approved in Section G of the application. The permittee shall give proper notification if an emergency situation arises and within 15 days must submit to the Department a written report which includes all information required in 40 CFR 264.56(j). 40 CFR 264.56.

25. The permittee shall maintain and operate the facility to minimize the possibility of fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or constituents to air, soil, or surface water which could threaten human health or the environment.

PERMITTEE:

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SPECIFIC CONDITIONS:

26. The permittee shall follow the procedures described in the waste analysis plan described in Section C of the permit application. (40 CFR 264.13).

27. The permittee shall comply with the security provisions of 40 CFR 264.14(b) and (c), as described in Section F of the application. The facility shall either maintain a 24-hour surveillance at the unit, or ensure that access to the site is denied during periods when surveillance is not maintained.

28. The permittee shall comply with the following conditions concerning preparedness and prevention:

- a. At a minimum, the permittee shall equip the facility with the equipment described in the contingency plan, Section G, of the permit application, as required by 40 CFR 264.32.
- b. The permittee shall test and maintain the equipment specified in the contingency plan as necessary to assure its proper operation in time of emergency as required by 40 CFR 264.33.
- c. The permittee shall maintain access to the communications or alarm system as required by 40 CFR 264.34.
- d. The permittee shall maintain arrangements with state and local authorities as required by 40 CFR 264.37. If state or local officials refuse to enter into preparedness and prevention arrangements with the permittee, the permittee must document this refusal in the operating record.

29. The permittee shall comply with the following conditions concerning the contingency plan:

- a. The permittee shall immediately carry out the provisions of the contingency plan, Section G of the permit application and follow the emergency procedures described by 40 CFR 264.56, whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which threatens or could threaten human health or the environment. The permittee shall give proper notification if an emergency situation arises and within 15 days must submit to the Department a written report which includes all information required in 40 CFR 264.56(j).

PERMITTEE:

U.S. Navy Public Works

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SPECIFIC CONDITIONS:

- b. The permittee shall comply with the requirements of 40 CFR 264.53.
- c. The contingency plan shown in Section G of the application must be amended and distributed to the appropriate agencies if any criteria in 40 CFR 264.54 are met. Amendments to the plan must be approved in writing by the Department. 40 CFR 264.54.
- d. The permittee shall comply with the requirements of 40 CFR 264.55, concerning the emergency coordinator.

30. The permittee shall maintain a written operating record at the facility which includes:

- the description and quantity of each hazardous waste received
- the results of the waste analyses
- a summary report and details of incidents that require implementation of the contingency plan
- manifest numbers
- the results of inspections (for 3 years)
- annual certification of waste minimization
- the closure plan

These records must be maintained at the facility until completion and certification of closure. 40 CFR 264.73.

31. The permittee shall continue to operate the corrective action system described in Section E of the Operation Permit Application dated November 4, 1986 as amended, modified, and approved by the Department in accordance with Subpart 264.100 to remove any hazardous constituents under Subpart 264.93 exceeding concentration limits under Subpart 264.94 in groundwater between the compliance point under Subpart 264.95 and the downgradient facility property boundary.

PERMITTEE:

US. Navy Public Works

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Permit/Certification Number: H017-127026
Date of Issue: **SEP 1 1988**
Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

32. The permittee shall conduct the Corrective-Action Program in accordance with the following:

- a. The wells delineated on Figure E-14 in the Part B application shall constitute the core groundwater monitoring system (GWMS) to comply with §264.100(d) for the purpose of assessing the effectiveness of the corrective action at the facility. In addition, intermediate well GM-84, and the wells installed as part of the recovery system for corrective action shall also be considered GWMS wells. Any additional wells installed to assess the extent of the contaminant plume, or as part of the corrective action system shall be included in the GWMS.
- b. The permittee shall continue corrective action per §264.100(f) to remove hazardous constituents identified in Condition 34c exceeding the groundwater protection standard limits between the Point of Compliance (POC) and the downgradient facility property boundary. The compliance period as defined under 5264.96 will continue until the groundwater protection standards at all POC wells have not been exceeded for three consecutive years. The owner or operator shall ensure that the corrective action program will function as designed and planned in the corrective action plan, or subsequent plan modification proposed by the permittee and approved by the Department. If the permittee or Department determines that the corrective action plan no longer satisfies the requirements of 40 CFR 264.100, the permittee must, within 90 days, submit an application to the Department for a permit modification to make any appropriate change to the program. [40 CFR 264.100(1)] Any measures taken to meet these conditions will be reported in the semi-annual report.
- c. The following wells, delineated on Figure E-14 in the Part B application as groundwater monitoring system (GWMS) wells, shall be monitored for the indicator parameters of pH, specific conductance, sodium, and chloride on a quarterly basis:

Shallow Wells

GM-9, GM-67, GM-71, GM-72, GM-76, GM-77, GM-78, GM-79, GM-83, DG-1.

Intermediate Wells

GM-66, GM-69, GM-64

Deep Wells

GM-65, GM-68, GM-63, GM-74

Recovery Wells

Combined discharge RW1 through RW6

PERMITTEE:
US Navy Public Works

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Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

- d. In addition to the monitoring required in Condition 32c. above, the following wells shall be monitored quarterly for volatile organic compounds (EPA Method 624) and base neutral extractables (EPA Method 625):

Shallow Wells

GM-9, GM-62, GM-67, DG-2

Intermediate Wells

GM-64, GM-66, GM-69, GM-75, GM-84

Deep Wells

GM-63, GM-65, GM-68, GM-74

- e. Should hazardous constituents be detected in POC deep wells GM-63 and GM-74 above the groundwater protection standards established in Condition 34c below, the permittee shall submit to the Department within 90 days a corrective action plan to address the groundwater contamination in this lower zone. The corrective action plan shall meet the requirements of 40 CFR 264.100 and DER Form 17-1.207(3) Part III A.8.
- f. Within 30-days of permit issuance the permittee shall begin conducting monthly water level measurements in all GWS wells specified in Condition 32c for 1 year to assess the hydraulic effectiveness of corrective action. All water levels must be determined within a 24 hour period. Should it be determined that there is any tidal effect on any monitoring well, the permittee shall document the affected well and extent of tidal influence. Subsequent water level measurements in tidally affected wells shall be made during the same tidal stage, and the stage reported along with the water level data.

33. This permit is not renewable. The permittee shall cease adding hazardous waste to the Surge Pond on or before November 1, 1988.

34. The permittee shall conduct groundwater monitoring in accordance with the following:

- a. The Waste Management Area shall, for the purpose of this permit, encompass the active RCRA Surge Pond as defined under §264.95(b). The Point of Compliance (POC) for the purpose of this permit shall be an imaginary vertical surface at the boundary of the Waste Management Area as defined under §264.95(a), and shall extend down into the uppermost and interconnected aquifers (see attached figure).

PERMITTEE:

U.S. Navy Public Works

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SPECIFIC CONDITIONS:

- b. The following wells, as shown in Figure E-14 in the Part B application, shall constitute the POC wells to which the groundwater protection standards shall apply:

Shallow Wells: E-5, DG-4, DG-1, E-6.
 Intermediate Well: GM-75.

The background monitoring well shall be well UG-1. The facility may designate or install another well that is more representative of unaffected background to ensure completion of corrective action. The facility may apply for alternate concentration limits (ACL) in accordance With. 40 CFR 264.94 for the groundwater protection standard as a permit modification in accordance with PAC Rule 17-30.290.

- c. The groundwater protection standard (40 CFR 264.92) as established under 40 CFR 264.94 shall be:

<u>Parameter</u>	<u>Standard</u>
Arsenic	0.05 mg/l*
Barium	1.0 mg/l*
Cadmium	0.01 mg/l*
Chromium (total)	0.05 mg/l*
Lead	0.05 mg/l*
Mercury	0.002 mg/l*
Selenium	0.01 mg/l*
Silver	0.05 mg/l*
Copper	1.00 mg/l**
Zinc	5.00 mg/l**
Iron	0.3 mg/l**
Manganese	0.05 mg/l**
Antimony	minimum detection limit
Thallium	minimum detection limit
Nickel	minimum detection limit
Chloride	250 mg/l**
Sulfate	250 mg/l**
Sodium	160 mg/l**

*Federal primary drinking water standard (40 CFR 264.94 Table 1)

**Florida secondary drinking water standards (FAC 17-22.104(2))

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F 00625 (FL9170024567)
Permit/Certification Number: H017-127026
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Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

ACID EXTRACTABLES

2-Chlorophenol	minimum detection limit
2,4-Dichlorophenol	minimum detection limit
2,4-Dimethylphenol	minimum detection limit
4,6-Dinitro-o-Cresol	minimum detection limit
2,4-Dinitrophenol	minimum detection limit
2-Nitrophenol	minimum detection limit
4-Nitrophenol	minimum detection limit
p-Chloro-m-Cresol	minimum detection limit
Pentachlorophenol	minimum detection limit
Phenol	minimum detection limit
2,4,6-Trichlorophenol	minimum detection limit
2-methyl phenol	minimum detection limit
o-methyl phenol	minimum detection limit
methyl ethyl phenol	minimum detection limit
dimethyl ethyl phenol	minimum detection limit
tetramethyl butyl phenol	minimum detection limit

VOLATILES

Acrolein	minimum detection limit
Acrylonitrile	minimum detection limit
Benzene	minimum detection limit
Bis(chloromethyl) ether	minimum detection limit
Bromofom	minimum detection limit
Carbon Tetrachloride	minimum detection limit
Chlorobenzene	minimum detection limit
Chlorodibromomethane	minimum detection limit
Chloroethane	minimum detection limit
2-Chloroethyl vinyl Ether	minimum detection limit
Chloroform	minimum detection limit
Dichlorobromomethane	minimum detection limit
Dichlorodifluoromethane	minimum detection limit
1,1-Dichloroethane	minimum detection limit
1,2-Dichloroethane	minimum detection limit
1,1-Dichloroethylene	minimum detection limit

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F 00625 (FL9170024567)
Permit/Certification Number: H017-127026
Date of Issue: 270 8 5 88

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS :

1,2-Dichloropropane	minimum detection limit
1,2-Dichloropropylene	minimum detection limit
Ethylbenzene	minimum detection limit
Methyl Bromide	minimum detection limit
Methyl Chloride	minimum detection limit
Hethyl Ethyl Ketone	minimum detection limit
Methylene Chloride	minimum detection limit
1,1,2,2-Tetrachloroethane	minimum detection limit
Tetrachloroethylene	minimum detection limit
Toluene	minimum detection limit
1,2-trans-Dichloroethylene	minimum detection limit
1,1,1-Trichloroethane	minimum detection limit
1,1,2-Trichloroethane	minimum detection limit
Trichloroethylene	minimum detection limit
Trichlorofluoromethane	minimum detection limit
Vinyl Chloride	minimum detection Unit

BASE NEUTRAL EXTRACTABLES

Acenaphthene	minimum detection limit
Acenaphthylene	minimum detection limit
Anthracene	minimum detection limit
Benzidine	minimum detection limit
Benzo(a)anthracene	minimum detection Unit
Benzo(a)pyrene	minimum detection limit
3,4-Benzofluoranthene	minimum detection limit
Benzo(ghi)perylene	minimum detection limit
Bis(2-chloroethoxy)methane	minimum detection limit
Bis(2-chloroethyl)ether	minimum detection limit
Bis(2-chloroisopropyl)ether	minimum detection limit
Bis(2-ethylhexyl)phthalate	minimum detection limit
4-Bromophenyl Phenyl Ether	minimum detection limit
Butylbenzyl Phthalate	minimum detection limit
2-Chloronaphthalene	minimum detection limit
4-Chlorophenyl Phenyl Ether	minimum detection limit
Chrysene	minimum detection limit
Dibenzo(a,h)anthracene	minimum detection limit
1,2-Dichlorobenzene	minimum detection limit
1,3-Dichlorobenzene	minimum detection limit
1,4-Dichlorobenzene	minimum detection limit
3,3-Dichlorobenzidine	minimum detection limit

PERMITTEE:

U.S. Navy Public Works.

I.D. Number: 1017F00625 (FL9170024567)
Permit/Certification Number: E017-127026
Date of Issue: **SEP 20 1987**

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

Diethylphthalate	minimum detection limit
Dimethylphthalate	minimum detection limit
Di-n-Butyl Phthalate	minimum detection limit
2,4-Dinitrotoluene	minimum detection limit
Di-n-Octyl-Phthalate	minimum detection limit
1,2-Diphenylhydrazine	minimum detection limit
Fluoranthene	minimum detection limit
Fluorene	minimum detection limit
Hexachlorobenzene	minimum detection limit
Hexachlorobutadiene	minimum detection limit
Hexachlorocyclopentadiene	minimum detection limit
Hexachloroethane	minimum detection limit
Indeno(1,2,3-cd)pyrene	minimum detection limit
Isophorone	minimum detection limit
Methyl naphthalene	minimum detection limit
2-Methyl naphthalene	minimum detection limit
Naphthalene	minimum detection limit
Nitrobenzene	minimum detection limit
N-Nitrosodimethylamine	minimum detection limit
N-Nitrosodi-n-propylamine	minimum detection Unit
N-Nitrosodiphenylamide	minimum detection limit
Phenanthrene	minimum detection Unit
Pyrene	minimum detection limit
1,2,4-Trichlorobenzene	minimum detection limit

ADDITIONAL CONSTITUENTS

Benzyl Alcohol	minimum detection limit
Methyl Dihydro Indene	minimum detection limit
Tetramethylbenzene	minimum detection limit
"alkylated" benzene	minimum detection limit
2-hexanone	minimum detection limit
Trimethyl Benzene	minimum detection limit
Hydroxymethyl Pentanone	minimum detection limit
Cyanide (complexed)	minimum detection limit

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F 00625 (FL9170024567)
Permit/Certification Number: H017-127026
Date of Issue: SEP 26 1987

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

- d. The permittee shall, within 90 days of permit issuance, submit an Appendix VIII (or Department approved equivalent) analysis on the POC monitoring well DW-4 [40 CFR 264.99(f)]. Any additional hazardous constituents detected in this analysis shall be sampled for in all compliance point monitoring wells in future sampling events. If new hazardous constituents are detected, the Department will establish groundwater protection standards for those constituents in accordance with 40 CFR 264.94 and FAC Rule 17-30.290.
- e. The permittee shall conduct annual sampling and analyses in November for all 40 CFR Part 261 Appendix VIII (or Department approved equivalent) parameters at a Department approved well or wells to meet 50264.100 and 264.99 requirements.
- f. The point of compliance wells specified in Specific Condition 34b above and the background well shall be sampled in May, August, November and February each year. Each well will be sampled for pH, specific conductance, and all hazardous waste constituents and hazardous constituents specified in Specific Condition 34c above.
- g. Water level elevations must be determined each time a well is sampled. [40 CFR 264.97(f)]. In addition, total depth of all wells must be determined by physical measurement on at least an annual basis to determine whether siltation of any well is a problem, and to recalculate the casing volume to be purged prior to sampling. If Willing or siltation interferes with sampling in any well, this fact shall be reported to the Department within 15 days of discovery.
- h. The permittee shall determine groundwater flow rate and direction in the uppermost interconnected aquifers at least annually in accordance with 40 CFR 264.99(e).
- i. Sampling and analytical methods shall conform to those specified in EPA Manual 600/2-80-018, "Samplers and Sampling Procedures for Hazardous Waste Streams"; EPA Manual 600/S4-84-076, "Characterization of Hazardous Waste Sites: A Methods Manual-Volume II"; EPA Manual SW 846, "Test Methods for Evaluating Solid Wastes" (latest edition); EPA Manual 600/4-82-057, "EPA Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater" or Department approved equivalent analytical methods.

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F 00625 (FL9170024567)
Permit/Certification Number: .H017-127026
Date of Issue: SEP 20 1988

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS:

- j. All analyses for metals must be conducted on unfiltered samples. Analyses done on filtered samples may be conducted and reported, but are not required.

35. The permittee shall apply for a closure and post closure permit as applicable pursuant to F.A.C. Rule 17-30.260 at least 180 days prior to beginning closure at the facility and not later than May 1, 1988, F.A.C. Rule 17-30.16 0.

36. All analyses and reports on the monitoring of water quality required by this permit shall be submitted to the Northwest District Office, Department of Environmental Regulation, 160 Governmental Center, Pensacola, Florida 32501-5794. Laboratory analyses must be submitted within 30 days of the end of the sampling period; however, if for any reason the permittee is unable to submit analyses within that time, it shall submit a letter stating the cause of the delay- DEB will review any such reason for delay and may grant an extension of time for submission of the data. The attached Form 17-1.216(2) shall be reproduced by the permittee and used for future submittals. A separate Page 2 is required for each monitoring well, with a single Page 1 certification.

37. The permittee shall certify no later than March 1 annually that the permittee has a program in place to reduce the volume and toxicity of hazardous waste that he generates to the degree determined by the permittee to be economically practicable and the proposed method of treatment, storage or disposal is that practicable method currently available to the permittee which minimizes the present and future threat to human health and the environment. 40 CFR 264.73.

38. The Department may modify the conditions of this permit in accordance with the provisions of F.A.C. Rule 17-30.290.

39. The permanent Department identification number (GMS No.) for this facility is 1017F00625. Please cite this number on all reports and correspondence concerning this facility. In addition, the EPA ID# FL9170024567 should also be cited.

PERMITTEE:

U.S. Navy Public Works

I.D. Number: 1017F00625 (PL9170024567)
Permit/Certification Number: H017-127026
Date of Issue: SEP 23 1987

Expiration Date: November 1, 1988

SPECIFIC CONDITIONS :

Expiration date:

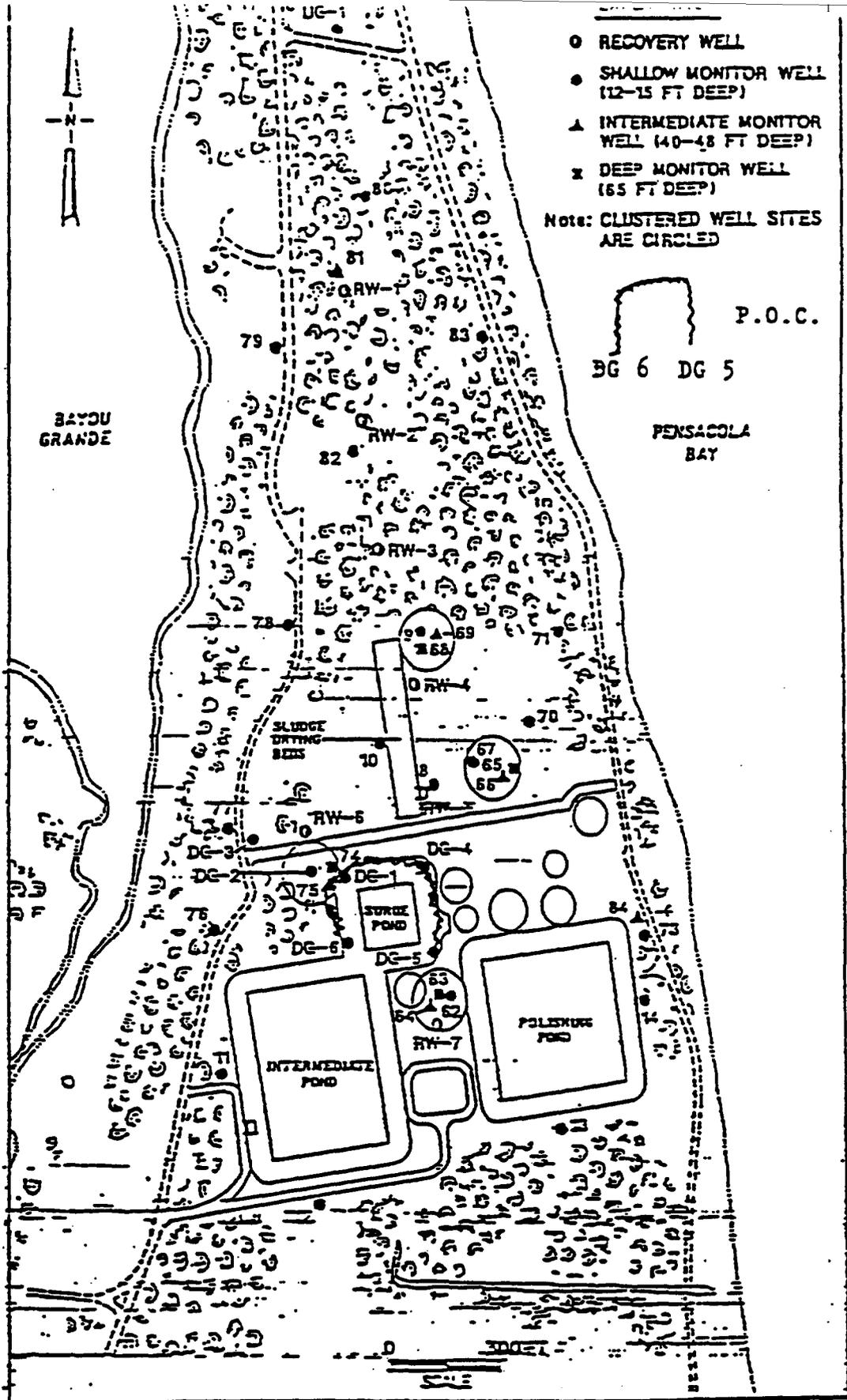
November 1, 1988

Issued this 23rd day of Sept,
1987.

STATE OF FLORIDA DEPARTMENT
OF ~~ENVIRONMENTAL~~ *REGULATION



ROBERT V. KRIEGEL
District Manager



APPENDIX B

Construction Details and Schematic Diagrams
of Monitor Wells and Recovery Wells

Table B-1. Depths and Screen Settings of Recovery Wells

Well Designation	Total Depth (ft bls) ^{1/}	Screen Setting (ft msl) ^{3/}	Measuring Point Elevation ^{2/} (ft msl)	Land Surface Elevation (ft msl)
RW-1	30	- 12.6 to - 27.6	4.91	2.4
RW-2	37	- 18.7 to - 33.7	5.88	3.3
RW-3	37	- 19.2 to - 34.2	5.64	2.8
RW-4	39	- 19.0 to - 34.0	3.44	5.0
RW-5	39	- 18.8 to - 33.8	4.22	5.2
RW-6	39.5	- 20.8 to - 35.8	2.66	3.7
RW-7	39	- 19.3 to - 34.3	3.35	4.7

Notes :

- 1/ feet below land surface
 2/ measuring point is the edge of well's access hole
 3/ feet referenced to mean sea level; U.S.C.&G. vertical control

Table B-2. Construction Details of
the Monitor Wells Installed at the WWTP

Well Designation	Total Depth (ft bls) ^{1/}	Screened Interval (ft msl) ^{2/}	Top of Well Casing Elevation (ft msl)
		<u>RCRA</u>	
UG-1	10.4	2.2 to -2.8	8.48
DG-1 ^{3/}	10.0	-0.5 to -5.5	5.71
DG-2 ^{3/}	10.0	-1.4 to -6.4	4.89
DG-3	10.2	-0.9 to -5.9	5.30
DG-4	9.5	1.3 to -3.7	8.03
DG-5	10.3	2.2 to -2.8	8.61
DG-6 ³	10.0	0.9 to -4.1	7.10
		<u>Phase I</u>	
GM-8	12.0	=4.0 to -6.5	6.12
GM-9	12.0	-4.6 to -7.1	5.65
GM-10	12.0	-4.4 to -6.9	5.83
GM-11	12.0	-4.2 to -6.7	6.00
GM-12	12.0	-4.0 to -6.5	5.73
GM-12R ⁴	15.0	-3.3 to -7.3	9.83
GM-13	12.0	-5.3 to -7.8	5.09
GM-14	12.0	-5.7 to -8.2	4.56
		<u>Phase II</u>	
GM-62	15.0	-7.7 to -10.2	7.11
GM-63	63.5	-56.1 to -58.6	6.97
GM-64	40.0	-32.7 to -35.2	6.26
GM-65	66.5	-58.7 to -61.2	6.67
GM-66	40.5	-32.7 to -35.2	7.48
GM-67	16.7	-8.9 to -11.4	6.38
GM-68	65.5	-58.0 to -60.5	7.00
GM-69	40.0	-32.7 to -35.2	7.85
GM-70	15.0	-7.5 to -10.0	7.15
GM-71	11.0	-3.8 to -6.3	6.76
GM-72	11.0	-2.7 to -5.2	7.61
GM-73	15.5	-2.8 to -5.3	12.36
GM-74	65.0	-58.8 to -61.3	6.68
GM-75 ^{3/}	40.0	-33.9 to -36.4	6.17
GM-76	12.0	-2.4 to -4.9	7.88
GM-77	12.0	-5.3 to -7.8	4.71
GM-78	11.5	-3.0 to -5.5	7.02
GM-79	11.1	-5.5 to -8.0	4.65
GM-80	12.0	-5.6 to -8.1	4.63
GM-81	12.0	-6.4 to -8.9	4.33
GM-82	12.5	-6.9 to -9.4	4.45
GM-83	11.7	-5.3 to -7.8	4.84
GM-84	48.0	-33.0 to -38.0	11.84

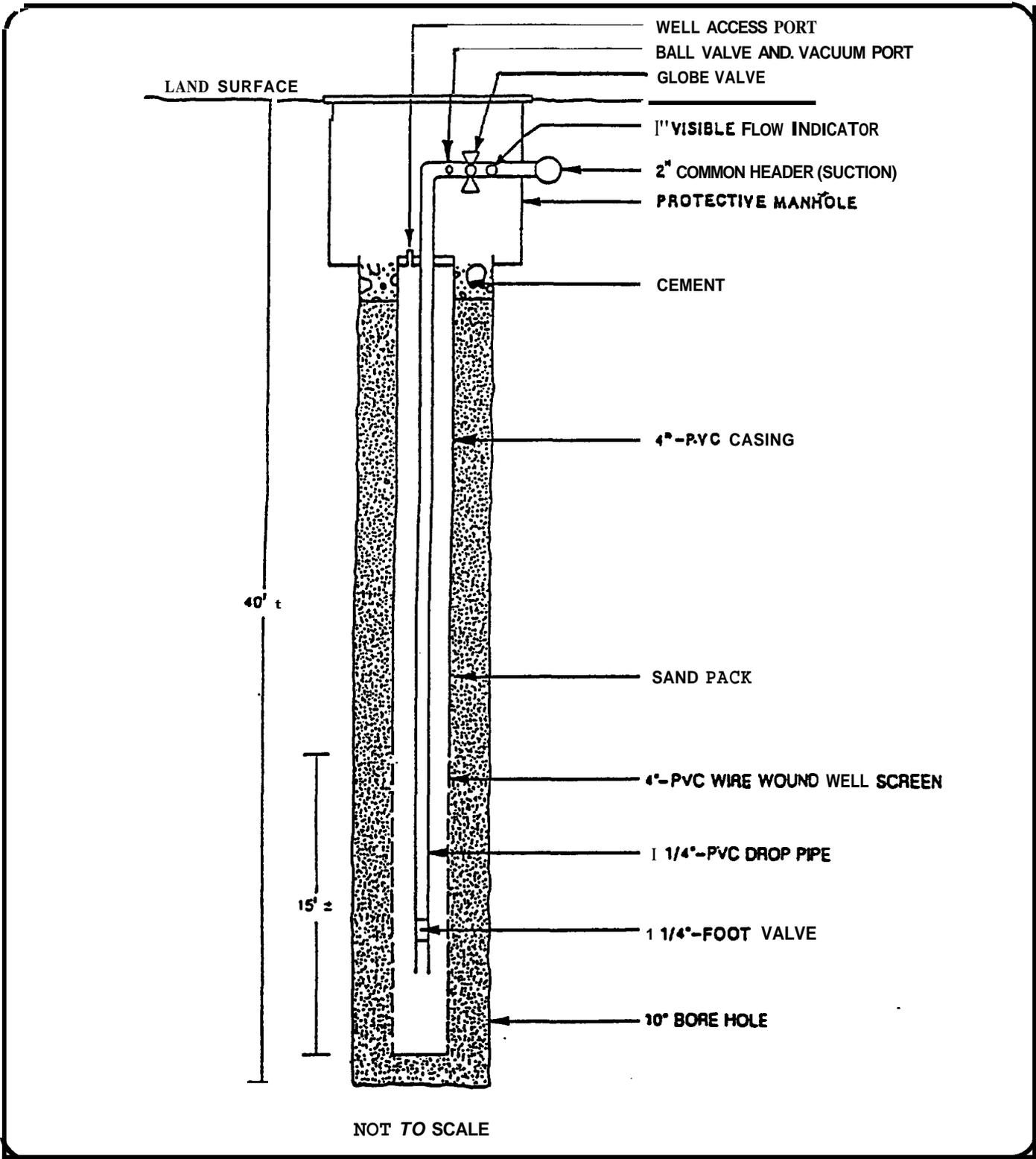
1/ feet below land surface

2/ feet referenced to mean sea level; U.S.C.&G.
vertical control

3/ well abandoned 23-Feb-88 due to construction of new surge tank

4/ replacement well installed 4/26/88; well GM-12 was destroyed during construction activities

Note: All wells are 2-inch diameter.



 **Figure B-1.**
Schematic Diagram of Typical
Below-Grade Recovery Well.

CLIENT NAME
Naval Facilities
Engineering Command,
Southern Division

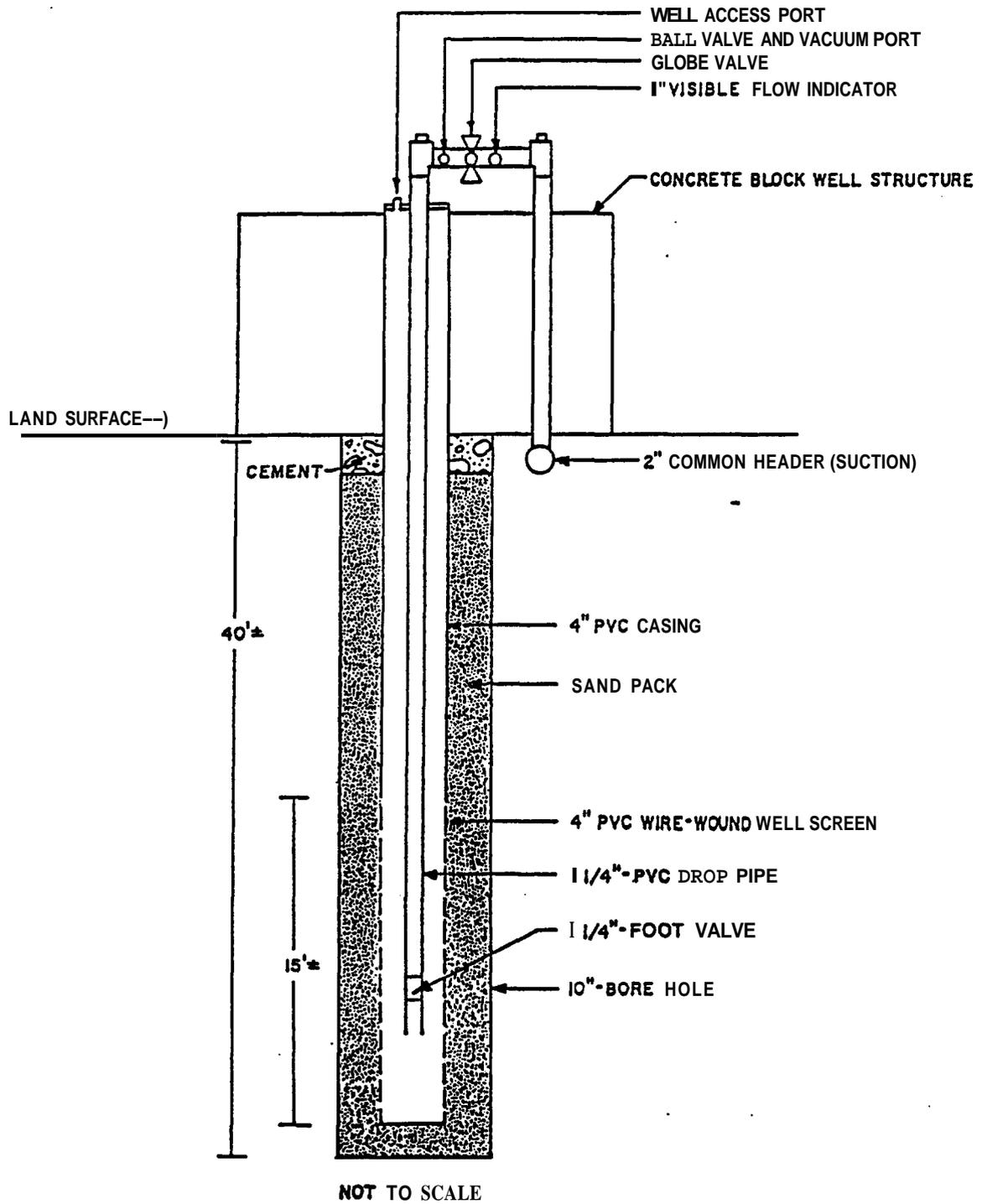


Figure B-2.

Schematic Diagram of Typical Above-Grade Recovery Well.

CLIENT NAME:

Naval Facilities
 Engineering Command
 Southern Division

APPENDIX C

Water-Level Elevations in
Monitor Wells and Recovery Wells

MONITOR WELL WATER ELEVATIONS IN FT. MSL

MONITOR WELL UC-1 (S)*

Measuring Point: Top of era 4
 Elevation of measuring point: 8.48 ft. mal

Date	Time	Water Level Elevation
04-Feb-87	1442	1.12
05-Feb-87	1440	1.09
06-Feb-87	1410	1.16
10-Mar-87	1700	1.3L
16-Apr-87	0812	0.81
29-May-87	1200	1.33
26-Jun-87	1002	1.43
21-Jul-87	0650	1.11
17-Aug-87	0715	2.52
21-Sep-87	0642	1.24
21-Oct-87	0702	0.70
30-Nov-87	0710	1.24
21-Dec-87	1045	0.93
05-Jan-88	1125	1.35
22-Feb-88	---	2.42
24-Mar-88	1134	0.52
25-Apr-88	1234	0.81
23-May-88	1101	0.51
01-Jun-88	1401	0.59
20-Jul-88	1117	0.78
15-Aug-88	0830	1.77
19-Sep-88	1025	2.69
19-Oct-88	1041	1.21
08-Nov-88	---	1.07

MONITOR WELL DG-1 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 5.71 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1035	2.39
05-Feb-87	0901	2.37
06-Feb-87	1044	2.27
10-Mar-87	1745	2.32
16-Apr-87	1237	1.40
29-May-87	1230	1.80
26-Jun-87	0845	2.16
21-Jul-87	0742	1.77
17-Aug-87	0824	3.47
21-Sep-87	0727	1.82
21-Oct-87	0750	1.01
30-Nov-87	0815	1.53
21-Dec-87	1130	1.35
05-Jan-88	1157	1.97
22-Feb-88	---	3.16
23-Feb-88	Well abandoned	

MONITOR WELL DG-2 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.89 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1016	2.37
05-Feb-87	0848	2.43
06-Feb-87	1050	2.22
16-Apr-87	1244	1.36
26-Jun-87	0830	2.13
21-Jul-87	0732	1.97
17-Aug-87	0820	3.65
21-Sep-87	0725	1.87
21-Oct-87	0755	1.00
30-Nov-87	1400	1.55
21-Dec-87	1139	1.33
05-Jan-88	1159	1.93
22-Feb-88	---	3.17
23-Feb-88	Well abandoned	

MONITOR WELL DG-3 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 5.30 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	0945	2.03
05-Feb-87	1409	1.05
06-Feb-87	1335	1.99
10-Mar-87	1435	2.06
16-Apr-87	1400	1.24
29-May-87	1227	1.54
26-Jun-87	0944	1.90
21-Jul-87	0729	1.68
17-Aug-87	0815	2.86
21-Sep-87	0722	1.70
21-Oct-87	0748	0.84
30-Nov-87	1420	1.47
21-Dec-87	1124	1.37
05-Jan-88	1153	1.89
22-Feb-88	---	2.64
24-Mar-88	1202	1.45
25-Apr-88	1315	0.94
23-May-88	1216	0.30
01-Jun-88	1344	0.09
20-Jul-88	1210	-0.09
15-Aug-88	1054	2.06
19-Sep-88	1104	2.60
19-Oct-88	1135	1.78
08-Nov-88	---	1.54

MONITOR WELL DG-4 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 8.03 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1018	2.33
05-Feb-87	0920	3.24
06-Feb-87	1128	2.19
10-Mar-87	1742	2.24
16-Apr-87	1232	1.33
29-May-87	1249	1.83
26-Jun-87	0854	2.11
21-Jul-87	0933	1.54
17-Aug-87	1041	3.33
21-Sep-87	0805	1.85
21-Oct-87	1134	1.01
30-Nov-87	0950	1.49
21-Dec-87	1242	1.28
05-Jan-88	1205	1.91
22-Feb-88	0830	3.03
24-Mar-88	1210	1.35
25-Apr-88	1324	1.17
29-Apr-88	1224	1.16
23-May-88	1320	-3.17
01-Jun-88	1245	-3.16
20-Jul-88	1220	-2.19
15-Aug-88	1140	1.73
19-Sep-88	1109	3.19
19-Oct-88	1146	1.87
08-Nov-88	1146	1.68

MONITOR WELL DG-5 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 8.61 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1127	2.38
05-Feb-87	0928	2.28
06-Feb-87	0917	2.20
10-Mar-87	1731	2.25
16-Apr-87	1131	1.45
26-Jun-87	0857	2.18
21-Jul-87	0830	1.59
17-Aut-87	0955	3.49
21-Sep-87	0800	1.86
21-Oct-87	1244	1.17
30-Nov-87	1450	1.59
21-Dec-87	1306	1.42
05-Jan-88	1356	2.02
22-Feb-88	0832	3.21
2b-Mar-88	1340	1.48
25-Apr-88	1511	1.44
23-May-88	1445	-0.11
01-Jun-88	1324	-0.38
20-Jul-88	1421	-0.79
15-Aug-88	1030	2.45
19-Sep-88	1237	3.32
19-Oct-88	1308	2.06
08-Nov-88	---	1.81

MONITOR WELL DG-6 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.10 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1101	2.45
05-Feb-87	0912	2.42
06-Feb-87	1101	2.32
10-Mar-87	1735	2.38
16-Apr-87	1246	1.56
29-May-87	1241	1.98
26-Jun-87	0847	2.26
21-Jul-87	0745	1.74
17-Aug-87	0835	3.52
21-Sep-87	0735	1.94
21-Oct-87	0753	1.20
30-Nov-87	0830	1.65
21-Dec-87	1137	1.48
05-Jan-88	1203	2.00
22-Feb-88	---	3.29
Well abandoned		

MONITOR WELL GM-8 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.12 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1730	1.91
05-Feb-87	1146	1.67
06-Feb-87	1120	1.63
10-Mar-87	1807	1.79
16-Apr-87	1549	0.82
29-May-87	1355	1.29
26-Jun-87	1156	1.64
21-Jul-87	0925	1.16
17-Aug-87	1017	2.72
21-Sep-87	0852	1.36
21-Oct-87	0956	0.51
30-Nov-87	1005	1.06
21-Dec-87	1230	0.84
05-Jan-88	1212	1.43
22-Feb-88	---	2.43
24-Mar-88	1219	0.70
25-Apr-88	1330	0.64
29-Apr-88	1232	0.60
23-May-88	1245	-1.24
01-Jun-88	1435	-1.83
20-Jul-88	1300	-1.56
15-Aug-88	0954	1.72
19-Sep-88	1122	2.59
19-Oct-88	1235	1.24
08-Nov-88	---	1.08

MONITOR WELL GM-9 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 5.65 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1830	1.62
05-Feb-87	1113	1.58 ¹
06-Feb-87	1022	1.40
10-Mar-87	1505	1.56
16-Apr-87	1645	0.45
29-May-87	1254	0.84
26-Jun-87	1202	1.56
21-Jul-87	0914	0.89
17-Aug-87	1030	2.67
21-Sep-87	0841	1.09
21-Oct-87	0949	0.21
30-Nov-87	1021	0.75
21-Dec-87	1212	0.54
05-Jan-88	1329	1.20
22-Feb-88	---	2.41
24-Mar-88	1235	0.50
25-Apr-88	1408	0.47
29-Apr-88	1254	0.40
23-May-88	1240	-0.24
01-Jun-88	1316	-0.50
20-Jul-88	1245	-0.70
15-Aug-88	1005	1.54
19-Sep-88	1134	2.55
19-Oct-88	1202	0.95
08-Nov-88	---	0.89

MONITOR WELL GM-10 (S)*

Date	Time	Water Level Elevation
04-Feb-87	0729	1.99
05-Feb-87	1132	1.83
06-Feb-87	1114	1.78
10-Mar-87	1802	1.86
16-Apr-87	1555	0.71
29-May-87	1245	1.20
26-Jun-87	1259	1.67
21-Jul-87	0930	1.05
17-Aug-87	1044	2.81
21-Sep-87	0807	1.31
21-Oct-87	1138	0.39
30-Nov-87	1000	0.93
21-Dec-87	1240	0.73
05-Jan-88	1210	1.44
22-Feb-88	---	2.57
24-Mar-88	1208	0.79
25-Apr-88	1321	0.57
29-Apr-88	1236	0.53
23-May-88	1232	-0.63
01-Jun-88	1318	-1.06
20-Jul-88	1235	-1.26
15-Aug-88	0945	1.71
19-Sep-88	1120	2.63
19-Oct-88	1154	1.22
08-Nov-88	---	1.03

MONITOR WELL GM-11 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.00 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1616	2.20
05-Feb-87	1229	2.15
06-Feb-87	1229	2.15
10-br-87	1749	2.25
16-Apr-87	1045	1.63
29-by-87	1314	1.87
26-Jun-87	0813	2.11
	1802	1.72
17-Aug-87	0925	3.14
21-Sep-87	0743	1.92
21-Oct-87	0805	1.34
30-Nov-87	1445	1.74
21-Dec-87	1253	1.60
05-Jan-88	1340	2.06
22-Feb-88	---	2.90
24-Mar-88	1310	1.74
25-Apr-88	1457	1.61
23-May-88	1412	0.94
01-Jun-88	1341	0.82
20-Jul-88	1400	0.69
15-Aug-88	1105	2.30
19-Sep-88	1224	2.90
19-Oct-88	1345	2.04
08-Nov-88	---	1.82

MONITOR WELL GM-12 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 5.73 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1609	2.53
05-Feb-87	1223	2.52
06-Feb-87	1217	2.51
10-Mar-87	1753	2.66
16-Apr-87	1048	1.93
29-May-87	1317	2.22
26-Jun-87	0811	2.73
21-Jul-87	0805	2.19
17-Aug-87	0930	3.63
Well Destroyed September 1987		

MONITOR WELL GM-12R (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 9.83 ft. msl

Date	Time	Water Level Elevation
23-May-88	1416	1.23
01-Jun-88	1336	1.05
20-Jul-88	1404	0.81
15-Aug-88	1110	2.57
19-Sep-88	1227	3.36
19-Oct-88	1347	2.17
08-Nov-88	---	2.01

MONITOR WELL GM-13 (S)*

Date	Time	Water Level Elevation
04-Feb-87	1600	1.59
05-Feb-87	1215	1.57
06-Feb-87	1205	1.64
10-Mar-87	1756	1.83
16-Apr-87	1051	1.26
29-May-87	1330	1.64
26-Jun-87	0809	2.08
21-Jul-87	0810	1.69
17-Aug-87	0936	2.51
21-Sep-87	0750	1.49
21-Oct-87	1701	0.99
30-Nov-87	1247	1.44
23-Dec-87	1314	1.26
05-Jan-88	1355	1.73
22-Feb-88	---	2.52
25-Mar-88	1315	1.11
25-Apr-88	1500	1.27
23-May-88	1420	0.79
01-Jun-88	1339	0.79
20-Jul-88	1407	0.56
15-Aug-88	1115	1.84
19-Sep-88	1230	2.56
19-Oct-88	1351	1.63
08-Nov-88	---	1.73

MONITOR WELL GM-14 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.56 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1543	1.10
05-Feb-87	1207	1.03
06-Feb-87	1154	1.13
10-Mar-87	1812	1.18
16-Apr-87	1206	0.86
29-May-87	1338	1.13
21-Jul-87	0802	1.28
21-Jul-87	0900	1.52
17-Aug-87	1115	1.76
21-Sep-87	0831	1.16
21-Oct-87	1111	0.73
30-Nov-87	1112	1.01
21-Dec-87	1157	0.91
05-Jan-88	1316	0.86
24-Mar-88	1259	0.52
25-Apr-88	1457	0.91
23-May-88	1400	0.69
01-Jun-88	1506	0.90
20-Jul-88	1350	0.56
15-Aug-88	1135	1.25
19-Sep-88	1215	2.10
19-Oct-88	1300	1.38
08-Nov-88	---	0.95

MONITOR WELL GM-62 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.11 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1204	2.16
05-Feb-87	0946	1.93
06-Feb-87	0858	1.84
10-Mar-87	1730	1.96
16-Apr-87	1113	1.17
29-May-87	1320	0.98
26-Jun-87	0904	1.97
21-Jul-87	0817	1.39
17-Aug-87	0942	3.17
21-Sep-87	0752	1.62
21-Oct-87	1300	0.97
30-Nov-87	1455	1.35
21-Dec-87	1303	1.18
05-Jan-88	1349	1.82
22-Feb-88	---	2.93
24-Mar-88	1330	1.31
25-Apr-88	1506	1.23
23-May-88	1435	0.11
01-Jun-88	1326	-0.04
20-Jul-88	1411	-0.55
15-Aug-88	1042	2.26
19-Sep-88	1240	3.06
19-Oct-88	1336	1.86
08-Nov-88	---	1.61

MONITOR WELL GM-63 (D)*

Measuring Point: Top of casing
Elevation of measuring point: 6.97 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1135	2.16
05-Feb-87	0935	2.19
06-Feb-87	0850	2.25
10-Mar-87	1725	2.64
16-Apr-87	1115	2.32
29-May-87	1321	2.32
26-Jun-87	0906	1.97
21-Jul-87	0817	0.68
17-Aug-87	0944	2.32
21-Sep-87	0754	2.37
21-Oct-87	1258	0.27
30-Nov-87	1500	2.39
21-Dec-87	1302	1.79
05-Jan-88	1350	1.49
22-Feb-88	---	1.92
24-Mar-88	1331	1.55
25-Apr-88	1507	2.03
23-May-88	1437	-0.65
01-Jun-88	1330	-0.07
20-Jul-88	1413	0.88
15-Aug-88	1038	1.63
19-Sep-88	1241	2.63
19-Oct-88	1335	2.10
08-Nov-88	---	2.23

MONITOR WELL CM-64 (I)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.26 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1216	2.59
05-Feb-87	0945	1.24
06-Feb-87	0905	0.99
10-Mar-87	1722	1.10
16-Apr-87	1117	0.09
29-May-87	1322	0.27
26-Jun-87	0900	0.77
21-Jul-87	0821	-0.41
17-Aug-87	0946	2.18
21-Sep-87	0755	0.74
30-Nov-87	1502	-0.08
21-Dec-87	1301	-0.39
05-Jan-88	1351	0.44
22-Feb-88	---	1.07
24-Mar-88	1332	-0.06
25-Apr-88	1508	-0.27
23-May-88	1440	-1.50
01-Jun-88	1333	-1.57
20-Jul-88	1415	-1.82
15-Aug-88	1034	0.99
19-Sep-88	1242	1.96
19-Oct-88	1334	0.53
08-Nov-88	---	0.43

MONITOR WELL GM-65 (D)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.67 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1633	2.28
05-Feb-87	1005	2.35
06-Feb-87	0945	2.31
10-Mar-87	1811	2.70
16-Apr-87	1720	2.13
29-Hap87	1304	2.21
26-Jun-87	1113	2.13
21-Jul-87	0922	0.88
17-has-87	100s	2.31
21-Sep-87	0851	2.43
21-Oct-87	1003	0.35
30-Nov-87	1043	2.23
21-Dec-87	1336	1.78
05-Jan-88	1217	1.35
22-Feb-88	---	2.02
24-Mar-88	1228	1.51
25-Apr-88	1420	1.96
29-Apr-88	1240	0.43
23-Hap88	1257	-0.62
01-Jun-88	1256	0.07
20-Jul-88	1255	0.88
15-Aug-88	1027	1.66
19-Sep-88	1150	2.68
19-et-88	1217	2.28
08-Nov-88	---	2.30

MONITOR WELL GM-66 (I)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.48 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1530	1.48
05-Feb-87	1017	1.29
06-Feb-87	0950	1.24
10-Mar-87	1545	1.43
16-Apr-87	1734	0.55
29-May-87	1305	0.83
26-Jun-87	1110	1.29
21-Jul-87	0920	0.91
17-Aug-87	1010	2.38
21-Sep-87	0849	1.02
21-Oct-87	1001	0.28
30-Nov-87	1042	0.77
21-Dec-87	1335	0.54
05-Jan-88	1216	1.06
22-Feb-88	---	2.09
24-Mar-88	1229	0.26
25-Apr-88	1422	0.42
29-Apr-88	1244	0.33
23-May-88	1259	-1.01
01-Jun-88	1258	-1.39
20-Jul-88	1257	-1.32
15-Aug-88	1026	1.33
19-Sep-88	1151	2.24
19-Oct-88	1218	0.88
08-Nov-88	---	0.73

Measuring Point: Top of casing
 Elevation of measuring point: 6.38 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1533	1.68
05-Feb-87	1011	2.28
06-Feb-87	0945	1.52
10-Mar-87	1555	1.63
16-Apr-87	1722	0.78
29-May-87	1306	1.09
26-Jun-87	1108	1.53
21-Jul-87	0919	1.12
17-Aug-87	1015	2.64
21-Sep-87	0847	1.30
21-Oct-87	0959	0.53
30-Nov-87	1041	1.01
21-Dec-87	1331	0.82
05-Jan-88	1215	1.30
22-Feb-88	---	2.31
25-Apr-88	1423	0.71
29-Apr-88	1248	0.64
23-May-88	1302	-0.76
01-Jun-88	1300	-1.16
20-Jul-88	1259	-1.14
15-Aug-88	1025	1.62
19-Sep-88	1152	2.55
19-Oct-88	1219	1.24
08-Nov-88	---	1.08

MONITOR WELL GM-68 (D)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.00 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1845	2.22
05-Feb-87	1107	2.35
06-Feb-87	1012	2.39
10-Mar-87	1818	2.77
16-Apr-87	1622	2.22
29-May-87	1255	2.26
26-Jun-87	1204	2.04
21-Jul-87	0915	0.90
17-Aug-87	1035	2.30
21-Sep-87	0843	2.46
21-Oct-87	0950	0.46
30-Nov-87	1022	2.23
21-Dec-87	1213	1.72
05-Jan-88	1330	1.40
22-Feb-88	---	2.01
24-Mar-88	1236	1.58
25-Apr-88	1409	1.95
29-Apr-88	1258	0.30
23-May-88	1238	-0.64
01-Jun-88	1314	0.07
20-Jul-88	1247	0.90
15-Aug-88	0957	1.64
19-Sep-88	1135	2.74
19-Oct-88	1203	2.32
08-Nov-88	---	2.34

MONITOR WELL GM-69 (I)*

Measuring Point: top of casing
 Elevation of measuring point: 7.85 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1812	1.73
05-Feb-87	1119	1.53
06-Feb-87	1025	1.28
10-Mar-87	1500	1.50
16-Apr-87	1655	0.37
29-May-87	1253	0.82
26-Jun-87	1206	1.13
21-Jul-87	0911	0.82
17-Aug-87	1040	2.51
21-Sep-87	0845	0.74
21-Oct-87	0951	0.21
30-Nov-87	1025	0.69
21-Dec-87	1214	0.65
08-Jan-88	1331	1.06
22-Feb-88	---	2.25
24-Mar-88	1237	0.37
25-Apr-88	1410	0.41
29-Apr-88	1300	0.32
23-May-88	1237	-0.27
01-Jun-88	1312	-0.52
20-Jul-88	1250	-0.73
15-Aug-88	1000	1.40
19-Sep-88	1137	2.38
19-Oct-88	1204	0.90
08-Nov-88	---	0.79

MONITOR WELL GM-70 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.15 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1710	1.41
05-Feb-87	1050	1.34
06-Feb-87	1000	1.31
10-Mar-87	1815	1.40
16-Apr-87	1630	0.66
29-May-87	1259	0.98
26-Jun-87	1058	1.38
21-Jul-87	0906	1.05
17-Aug-87	1055	2.33
21-Sep-87	0835	1.15
21-Oct-87	0945	0.47
30-Nov-87	1036	0.93
21-Dec-87	1205	0.75
05-Jan-88	1324	1.11
22-Feb-88	---	2.07
24-Mar-88	1242	0.46
25-Apr-88	1416	0.63
29-Apr-88	1252	0.59
23-May-88	1345	-0.24
01-Jun-88	1305	-0.37
20-Jul-88	1253	-0.50
15-Aug-88	1029	1.44
19-Sep-88	1144	2.42
19-Oct-88	Well damaged, casing filled with sand	

MONITOR WELL GM-71 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.76 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1729	1.11
05-Feb-87	1058	1.15
06-Feb-87	1005	1.07
10-Mar-87	1825	1.04
16-Apr-87	1626	0.55
29-May-87	1257	1.02
26-Jun-87	1101	1.14
21-Jul-87	0908	1.18
17-Aug-87	1057	2.00
21-Sep-87	0837	0.96
21-Oct-87	0946	0.40
30-Nov-87	1034	0.76
21-Dec-87	1207	0.60
05-Jan-88	1327	0.74
22-Feb-88	---	1.70
24-Mar-88	1239	0.28
25-Apr-88	1414	0.51
23-May-88	1340	0.04
01-Jun-88	1310	0.15
20-Jul-88	1252	0.02
15-Aug-88	1010	1.16
19-Sep-88	1140	2.15
19-Oct-88	1210	1.00
08-Nov-88	---	0.73

MONITOR WELL GM-72 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.61 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1741	1.21
05-Feb-87	1152	1.13
06-Feb-87	1136	1.18
10-Mar-87	1800	1.17
16-Apr-87	1137	0.87
26-Jan-87	0720	1.21
21-Jul-87	0845	1.57
17-Aug-87	1103	1.79
21-Sep-87	0821	1.11
21-Oct-87	1122	0.65
30-Nov-87	1100	0.99
21-Dec-87	1145	0.83
05-Jan-88	1306	0.73
22-Feb-88	---	1.36
24-Mar-88	1248	0.53
25-Apr-88	1426	0.89
23-May-88	1350	0.43
01-Jun-88	1515	0.77
20-Jul-88	1345	0.37
15-Aug-88	1120	1.21
19-Sep-88	1208	2.08
19-Oct-88	1250	1.31
08-Nov-88	---	0.92

MONITOR WELL GM-73 (S)*

Measuring Point: top of casing
 Elevation of measuring point: 12.36 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1534	0.91
05-Feb-87	1200	0.79
06-Feb-87	1148	0.93
10-Mar-87	1807	0.93
16-Apr-87	1154	0.75
29-May-87	1344	1.10
26-Jun-87	0728	1.00
21-Jul-87	0853	1.42
17-Aug-87	1108	1.48
21-Sep-87	0829	1.04
21-Oct-87	1109	0.52
30-Nov-87	1102	0.80
21-Dec-87	1154	0.64
05-Jan-88	1311	0.46
24-Feb-88	1255	0.48
25-Apr-88	1445	0.82
23-May-88	1354	0.70
01-Jun-88	1500	0.89
20-Jul-88	1346	0.51
15-Aug-88	1130	1.01
19-Sep-88	1212	1.91
19-Oct-88	1255	1.20
08-Nov-88	---	0.68

MONITOR WELL GM-74 (D)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.68 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1020	2.18
05-Feb-87	0846	2.21
06-Feb-87	1018	2.54
10-Mar-87	1710	2.85
16-Apr-87	1239	2.54
29-May-87	1234	2.35
26-Jun-87	0841	1.96
21-Jul-87	0736	0.86
17-Aug-87	0826	2.58
21-Sep-87	0730	2.42
21-Oct-87	0751	0.50
30-Nov-87	0817	1.88
21-Dec-87	1132	1.83
05-Jan-88	1200	1.52
22-Feb-88	---	1.98
23-Feb-88	Well abandoned	

MONITOR WELL GM-75 (I)*

Measuring Point: Top of casing
 Elevation of measuring point: 6.17 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1039	2.16
05-Feb-87	0829	1.96
06-Feb-87	1032	1.84
10-Mar-87	1752	2.01
16-Apr-87	1241	1.07
29-May-87	1237	1.31
26-Jun-87	0843	1.80
21-Jul-87	0738	1.24
17-Aug-87	0830	3.01
21-Sep-87	0732	1.51
21-Oct-87	0752	0.92
30-Nov-87	0820	1.29
21-Dec-87	1135	1.03
05-Jan-88	1201	1.57
22-Feb-88	---	2.62
23-Feb-88	Well abandoned	-

MONITOR WELL GM-76 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 7.88 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1620	1.69
05-Feb-87	1352	1.69
06-Feb-87	1242	1.64
10-Mar-87	1746	1.69
16-Apr-87	1041	1.24
29-May-87	1311	1.32
26-Jun-87	0816	1.61
21-Jul-87	0759	1.54
17-Aug-87	0920	2.22
21-Sep-87	0740	1.50
21-Oct-87	0800	0.92
30-Nov-87	1440	1.38
21-Dec-87	1250	1.31
05-Jan-88	1337	1.61
22-Feb-88	---	2.08
24-Mar-88	1307	1.33
25-Apr-88	1455	1.09
23-May-88	1410	0.42
01-Jun-88	1343	0.49
20-Jul-88	1358	0.82
15-Aug-88	1100	1.72
19-Sep-88	1220	2.04
19-Oct-88	1343	1.55
08-Nov-88	---	1.43

MONITOR WELL GM-77 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.71 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1634	1.72
05-Feb-87	1416	1.74
06-Feb-87	1342	1.67
10-Mar-87	1742	1-73
16-Apr-87	1037	0.97
29-Mar-87	1225	1.17
26-Jun-87	1220	1.89
21-Jul-87	0727	1.51
17-Aug-87	0812	2.1s
21-Sep-87	0721	1.43
21-Oct-87	0746	0.67
30-Nov-87	0755	1.29
21-Dec-87	1120	1.16
05-Jan-88	1151	1.71
22-Feb-88	---	2.05
24-Mar-88	1201	1.12
25-Apr-88	1312	0.65
23-May-88	1214	0.07
01-Jun-88	1345	0.13
20-Jul-88	1205	-0.19
15-Aug-88	1058	1.70
19-Sep-88	1101	2.01
19-Oct-88	1111	1.49
08-nw-88	---	1.24

MONITOR WELL GM-78 (S)*

Measuring Point: Top Of casing
 Elevation of measuring point: 7.02 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1646	1.60
05-Feb-87	1423	1.58
06-Feb-87	1351	1.50
10-Mar-87	1740	1.46
16-Apr-87	1030	0.54
29-May-87	1223	1.09
26-Jun-87	0950	1.54
21-Jul-87	0724	1.04
17-Aug-87	0810	2.56
21-Sep-87	0718	1.27
21-Oct-87	0746	0.37
30-Nov-87	0750	1.00
21-Dec-87	1116	0.80
05-Jan-88	1149	1.44
22-Feb-88	---	2.34
24-Mar-88	1159	0.74
25-Apr-88	1310	0.62
23-May-88	1211	-0.01
01-Jun-88	1348	-0.14
20-Jul-88	1200	-0.24
15-Aug-88	1059	1.60
19-Sep-88	1059	2.41
19-Oct-88	1129	1.17
08-Nov-88	---	1.03

MONITOR WELL GM-79 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.65 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1514	1.38
06-Feb-87	1350	1.61
10-Mar-87	1713	1.04
16-Apr-87	0850	0.27
29-May-87	1220	0.71
26-Jun-87	0958	1.09
21-Jul-87	0711	0.76
17-Aug-87	0805	2.35
21-Sep-87	0705	0.91
21-Oct-87	0728	0.11
30-Nov-87	0735	0.85
21-Dec-87	1103	0.63
05-Jan-88	1140	1.17
22-Feb-88	---	2.03
24-Mar-88	1150	0.31
23-Mar-88	1130	-0.05
01-Jun-88	1351	0.04
15-Aug-88	0940	1.36
19-Sep-88	1045	2.22
19-Oct-88	1110	0.93
08-Nov-88	---	0.77

MONITOR WELL GM-80 (5)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.63 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1502	1.01
05-Feb-87	1456	0.97
06-Feb-87	1424	0.97
10-Mar-87	1655	1.06
16-Apr-87	0803	0.39
29-May-87	1208	0.75
26-Jun-87	1009	1.08
21-Jul-87	0659	0.79
17-Aug-87	0725	2.29
21-Sep-87	0650	0.94
21-Oct-87	0712	0.35
30-Nov-87	0717	0.93
21-Dec-87	1050	0.68
05-Jan-88	1129	1.10
22-Feb-88	---	2.08
24-Mar-88	1136	0.31
25-Apr-88	1239	0.50
23-May-88	1106	0.19
01-Jun-88	1407	0.26
20-Jul-88	1121	0.48
15-Aug-88	0915	1.29
19-Sep-88	1031	2.38
19-Oct-88	1046	0.97
08-Nov-88	---	0.84

MONITOR WELL GM-81 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.33 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	0753	1.13
05-Feb-87	1517	0.98
06-Feb-87	1442	0.71
10-Mar-87	1325	0.85
16-Apr-87	0715	-0.16
29-May-87	1211	0.30
26-Jun-87	1020	0.72
21-Jul-87	0653	0.34
17-Aug-87	0737	2.57
21-Sep-87	0659	0.74
21-Oct-87	0720	0.00
30-Nov-87	0729	0.75
21-Dec-87	1057	0.44
05-Jan-88	1135	0.99
22-Feb-88	---	2.05
24-Mar-88	1144	0.14
25-Apr-88	1246	0.25
23-May-88	1117	-0.04
01-Jun-88	1354	-0.09
20-Jul-88	1130	0.23
15-Aug-88	0920	1.32
19-Sep-88	1038	2.40
19-Oct-88	1056	0.82
08-Nov-88	---	0.78

MONITOR WELL GM-82 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.45 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	0821	1.35
05-Feb-87	1527	1.14
06-Feb-87	1452	0.85
10-Mar-87	1200	0.45
16-Apr-87	0902	-0.33
29-May-87	1215	0.21
26-Jun-87	1012	0.51
21-Jul-87	0715	-0.13
17-Aug-87	0753	2.79
21-Sep-87	0710	0.53
21-Oct-87	0732	-0.40
30-Nov-87	0742	0.27
21-Dec-87	1110	-0.10
05-Jan-88	1144	0.57
22-Feb-88	---	2.11
24-Mar-88	1153	-0.20
25-Apr-88	1258	-0.17
23-May-88	1202	-0.44
01-Jun-88	1410	-0.67
20-Jul-88	1150	-0.45
15-Aug-88	0855	0.92
19-Sep-88	1049	2.41
19-Oct-88	1116	0.19
08-Nov-88	---	0.37

MONITOR WELL CM-83 (S)*

Measuring Point: Top of casing
 Elevation of measuring point: 4.84 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1705	0.77
05-Feb-87	1505	0.89
06-Feb-87	1433	0.94
10-Mar-87	1702	0.70
16-Apr-87	0807	0.33
29-May-87	1205	0.89
26-Jun-87	1230	0.90
21-Jul-87	0701	1.20
17-Aug-87	0732	1.35
21-Sep-87	0652	0.87
21-Oct-87	0716	0.44
30-Nov-87	0725	0.69
21-kc-87	1052	0.53
05-Jan-88	1132	0.43
22-Feb-88	---	0.89
24-Mar-88	1139	0.14
25-Apr-88	1242	0.49
23-May-88	1110	0.30
01-Jun-88	1404	0.80
20-Jul-88	1125	0.56
15-Aug-88	0910	0.68
19-Sep-88	1035	1.76
19-Oct-88	1051	1.04
08-Nov-88	---	1.52

MONITOR WELL GM-84 (I)*

Measuring Point: Top of casing
 Elevation of measuring point: 11.84 ft. msl

Date	Time	Water Level Elevation
10-Mar-87	1814	0.96
16-Apr-87	1144	0.75
29-May-87	1346	1.23
26-Jun-87	0724	0.95
21-Jul-87	0850	1.40
17-Aug-87	1105	1.34
21-Sep-87	0827	0.96
21-Oct-87	1107	0.40
30-Nov-87	1103	0.70
21-Dec-87	1152	0.46
05-Jan-88	1312	0.21
22-Feb-88	---	0.94
24-Mar-88	1251	0.40
25-Apr-88	1444	0.72
23-May-88	1357	0.61
01-Jun-88	1459	-0.94
20-Jul-88	1348	0.39
15-Aug-88	1125	0.95
19-Sep-88	1210	1.74
19-Oct-88	1256	1.09
08-Nov-88	---	0.61

DATE REVISED: November 16, 1988
 (NAVY.MWL)

RECOVERY WELL WATER ELEVATIONS IN FT. MSL

RECOVERY WELL RU-1

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 4.91 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	0905	1.12
06-Feb-87	1552	-3.99
10-Mar-87	1330	-5.74
16-Apr-87	0805	-13.51
26-Jun-87	1559	-13.43
21-Jul-87	0705	-13.38
17-Aug-87	0741	-12.21
21-Sep-87	0700	-10.29
21-Oct-87	0722	-13.29
30-Nov-87	0730	-13.17
21-Dec-87	1100	-14.03
05-Jan-88	1136	-12.89
22-Feb-88	---	-13.54
24-Mar-88	1145	-14.28
25-Apr-88	1247	-13.99
23-May-88	1205	-13.99
01-Jun-88	1357	-14.12
20-Jul-88	1135	-11.19
15-Aug-88	0930	-13.31
19-Sep-88	1040	-12.60
19-Oct-88	1104	-9.84
08-Nov-88	---	-0.90

RECOVERY WELL RU-2

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 8.88 ft. msl

Date	Time	Water Level Elevation
06-Feb-87	1530	-7.39
10-Mar-87	1255	-11.79
16-Apr-87	0855	-8.65
26-Jun-87	1530	-11.97
21-Jul-87	0717	-13.04
17-Aug-87	0750	-11.04
21-Sep-87	0708	-6.02
21-Oct-87	0731	-12.42
30-Nov-87	0740	-12.16
21-Dec-87	1107	-13.12
05-Jan-88	1143	-12.68
22-Feb-88	---	-13.49
24-Mar-88	1152	-12.94
25-Apr-88	1255	-12.69
23-May-88	1200	-12.62
01-Jun-88	1412	-12.98
20-Jul-88	1147	-12.82
15-Aug-88	0900	-11.67
19-Sep-88	1048	-11.54
19-Oct-88	1111	-12.59
08-Nov-88	---	-10.12

RECOVERY WELL RW-3

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 5.64 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	359	1.34
06-Feb-87	1513	-5.76
10-fir-87	1045	-6.86
16-Apr-87	1008	-5.53
26-Juri-87	1550	-6.77
21-Jul-87	0720	-7.26
17-Aug-87	0756	-3.86
21-Sep-87	0714	-6.34
21-Oct-87	0735	-13.56
30-Nov-87	0746	-12.56
21-Dec-87	1112	-13.26
05-Jan-88	1146	-13.16
22-Feb-88	---	-12.06
24-Mar-88	1155	-12.96
25-Apr-88	1300	-12.92
23-May-88	1155	-12.76
01-Jun-88	1415	-13.34
20-Jul-88	1155	-13.36
15-Aug-88	0905	-12.06
19-Sep-88	1052	-11.06
19-Oct-88	1120	-12.06
08-Nov-88	---	-3.09

RECOVERY WELL RW-4

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 3.44 ft. msl

Date	Time	Water Level Elevation
03-Feb-87	1806	1.73
06-Feb-87	0802	-11.21
10-fir-87	0920	-2.38
16-Apr-87	1600	-12.78
26-Jan-87	1510	-8.05
21-Jul-87	1030	-8.98
17-Aug-87	1025	-10.12
21-Sep-87	1120	-10.36
21-Oct-87	1055	-5.76
30-Nov-87	1020	-9.26
21-Dec-87	1220	-9.46
05-Jan-88	1333	-13.06
22-Feb-88	---	-9.31
24-Mar-88	1233	-9.20
25-Apr-88	1405	-6.46
23-May-88	1243	-0.48
01-Jun-88	1425	-0.76
20-Jul-88	1240	-12.20
15-Aug-88	1012	-10.77
19-Sep-88	1205	-6.20
19-Oct-88	1159	-8.26

RECOVERY WELL RU-5

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 4.22 ft. msl

Date	Time	Water Level Elevation
06-Feb-87	0735	-10.38
10-Mar-87	0815	-2.66
16-Apr-87	2045	0.85
26-Jun-87	1445	-4.18
21-Jul-87	1140	1.12
17-Aug-87	1016	2.68
21-Sep-87	1030	-8.82
21-Oct-87	---	0.57
30-Nov-87	1130	-11.78
21-Dec-87	1225	0.84
05-Jan-88	1255	0.12
22-Feb-88	---	2.50
24-Mar-88	1217	-9.74
25-Apr-88	1328	-11.23
23-May-88	1250	-1.42
01-Jun-88	1455	-9.68
20-Jul-88	1305	-1.58
15-Aug-88	1015	1.67
19-Sep-88	1130	2.57
19-Oct-88	1231	-7.03

RECOVERY WELL RW-6

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 2.66 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1307	1.96
05-Feb-87		-4.90
06-Feb-87	0719	-12.85
10-Mar-87	1125	-2.27
16-Apr-87	1420	-14.26
26-Jun-87	1520	-3.33
21-Jul-87	0755	-14.44
17-Aug-87	0842	-4.54
21-Sep-87	1306	-5.64
21-Oct-87	1440	-7.84
30-Nov-87	1135	-5.14
21-Dec-87	1126	-13.64
05-Jan-88	1155	-10.94
22-Feb-88	---	-14.44
24-Mar-88	1204	-11.04
23-May-88	1220	-1.26
20-Jul-88	1215	-11.34
15-Aug-88	1050	-12.58
19-Sep-88	1111	-8.38

RECOVERY WELL RW-7

Measuring Point: Edge of well's access hole
 Elevation of measuring point: 3.35 ft. msl

Date	Time	Water Level Elevation
04-Feb-87	1233	2.12
05-Feb-87	---	-2.31
06-Feb-87	0819	-12.06
10-Mar-87	1005	-6.13
16-Apr-87	1055	-14.68
26-Jun-87	1410	-19.73
21-Jul-87	0825	-16.49
17-Aug-87	0950	-11.55
21-Sep-87	1345	-13.55
21-Oct-87	1252	-10.35
30-Nov-87	1505	-16.55
21-Dec-87	---	-15.15
05-Jan-88	1353	-11.45
22-Feb-88	---	-16.25
24-Mar-88	1320	-16.38
25-Apr-88	1515	-12.25
23-May-88	1443	-16.45
01-Jun-88	1445	-15.88
20-Jul-88	1417	-14.93
15-Aug-88	1046	-13.30
19-Sep-88	1245	-10.90
19-Oct-88	1332	-12.45

DATE REVISED: NOVEMBER 16, 1988

(NAVY.RWL)

APPENDIX D

Quality Assurance Summaries
and Data Validation for
Quarterly Sampling Events

MEMORANDUM

TO: William P. Bocskosky, Project Manager
FROM: Charles W. Ankerberg, Quality Assurance Officer
Date: February 1, 1988
Re: NAS-Pensacola Analytical Program - T0290PN08
Quality Assurance Summary for Well DG-4 and
Corrective Action Wells Sampling and Analysis

I. CORRECTIVE ACTION WELLS

- A. Field Data Package
1. Documentation: no deficiencies
 2. Field Performance: no deficiencies
 3. Conclusion: samples are valid
- B. Analytical Data Package
1. Inorganic Analyses Data: Sodium, Chloride
 - a. Sodium:
 - Replicates (field): acceptable
 - Laboratory Duplicates: acceptable
 - Matrix Spikes: acceptable (note 1)
 - Blanks:
 - Method blanks: acceptable (note 1)
 - Instrument blanks: acceptable (note 1)
 - b. Chloride:
 - Replicates (field): acceptable
 - Laboratory Duplicates: acceptable
 - Matrix Spikes: acceptable
 - Blanks:
 - Method blanks: acceptable
 - Instrument blanks: acceptable
 2. Organic Analyses Data: VOA and BNA
 - a. VOA (Volatile Organic Compound Analyses):
 - Field Blanks:
 - FB-1: Only the methylene chloride in ~~FB-1~~, compromised the results in sample GM-74; methylene chloride value is flagged "J" as an estimated value by the laboratory. G&M concurs. Other contaminants had no effect on sample results.

Note 1: Laboratory blanks and matrix spikes for sodium were not submitted with the original report as required by the terms of the contract. However, this information was provided by the laboratory in the revised report and is acceptable.

- **FB-2:** Two contaminants were detected in this blank. These had no effect on any sample.
 - **Trip Blanks:** Chloroform was present in both trip blanks. No samples were affected; probable cause of contamination: Trihalomethanes in tap water from the laboratory.
 - **Rinsate Blank:** No sample effects observed
 - **Surrogate Spikes:** acceptable
 - **Matrix Spikes:** acceptable
 - **Matrix Spike Duplicates:** acceptable
 - **RPD:** acceptable
 - **Holding times:** acceptable
 - **Replicates:** acceptable
- b. **BNA (Base/Neutral and Acid Extractable Organic Compounds Analyses):**
- **Field Blanks:** acceptable (note 2)
 - **Rinsate Blank:** No sample effects observed
 - **Surrogate Spikes:** acceptable
 - **Matrix Spikes:** acceptable
 - **Matrix Spike Duplicates:** acceptable
 - **RPD:** acceptable
 - **Holding times:** acceptable
 - **Replicates (field):** acceptable
 - **Reported Compounds:** (notes 3 and 4)

Note 2: Original report indicated extraction times were outside of holding times and not acceptable. However, the laboratory revealed the indicated extraction time was a computer error and the samples were in fact extracted within the allowable holding time. The laboratory has submitted a revised report showing the actual holding times. All are acceptable.

Note 3: **Base/Neutral** Extractable compounds were actually ordered as indicated by the chain of custody but both **Base/Neutrals** and **Acid Extractables** were reported. This does not, however, invalidate the data.

Note 4: The compounds **1,2-diphenylhydrazine** and **2,3,7,8-tetrachlorodibenzo p-dioxin** were not reported. The dioxin is not usually analyzed unless requested because it requires a separate analysis. The **1,2-diphenylhydrazine**, however, should have been reported. Tentatively identified compounds (TIC) will be checked for this compound and will be reported if detected.

Conclusion for All Corrective Action Well Water-Quality Data

All data are acceptable and validated to level B. Data may be used for quantitative purposes. All data were consistent with a priority pollutant scan and met the deliverables and QA requirements of the contract and methods of analysis.

M E M O R A N D U M

May 4, 1988

TO: Mr. William P. Bocskocsky, Project Manager and
Ms. Julie Mattick, Field Manager

FROM: Debra E. Brown O.B.

RE: NAS-Pensacola Analytical Program-TF0290PN08, Quality
Assurance Summary-POC and Corrective Action Wells,
Sampling and Analysis, Revised Report

POC Wells

I) Field Data Package

- Documentation: no deficiencies
- Field Performance: no deficiencies
- Conclusion: samples are valid

II) Analytical Data Package

A) General

- o Case Narrative: Acceptable
- o Master Tracking List: Acceptable
- o Chain-of-Custody: Acceptable

B) Metal Analyses Data: Manganese

- o Replicate (Field): Acceptable
- o Sampler Rinsate: Acceptable
- o Lab Duplicate: Acceptable
- o Matrix Spike: Acceptable
- o Blanks:
 - o Field Blank: Acceptable
 - o Method Blank: Acceptable
 - o Trip Blank: Acceptable
- o Initial and Continuing Calibration Blank: Acceptable
- o Initial and Continuing Calibration Verification: Acceptable
- o ICP Interference Check Samples: Acceptable
- o Laboratory Control Samples: Acceptable
- o ICP Serial Dilutions: Acceptable
- o Instrument Detection Limits: Acceptable
- o ICP Interelement Correction Factors: Acceptable
- o ICP Linear Ranges: Acceptable

C) Organic Analyses Data

- 1) Volatiles

- o Holding time: Acceptable except for toluene in DG-4. This value is estimated because the holding time of 7 days was exceeded.
- o Quantitation Limits: CLP Acceptable
- o Tentatively Identified Compounds: Acceptable
- o Blanks:
 - Trip Blank: Chloroform was present in the trip blank. No samples were affected. Probable cause of contamination; trihalomethanes in tap water from lab.
 - Field Blank: Shows a high level of acetone (150 ug/L) which compromises the results in all samples. These results should be flagged as estimated. The blank also had a low level of toluene (below CLP quantitation limit) and does not affect the samples.
 - Sampler Rinsate: Shows low levels of both acetone and toluene (below CLP detection limits). Results do not affect samples.
- Method blanks (2): Show several compounds below CLP detection limits. Blank 1 (#880301-036) also shows 1,1,2,2-tetrachloroethane above the CLP quantitation limit and blank 2 (#880302-042) shows 1,1,2-trichloroethane, bromoform and 1,1,2,2-tetrachloroethane above quantitation limits. Acetone was detected above the quantitation limit but below the 5x the quantitation limit as allowed by CLP protocol. No sample results are compromised.
- o Surrogate Spikes: Acceptable
- o Matrix Spikes, Matrix Spike Duplicates, %R, and %RPD: Acceptable
- o Field Replicate: Unacceptable, however this alone cannot invalidate the data.
- o Sample Results: Acceptable except for DG-4. Vinyl chloride and trans-1,2-dichloroethene are noted as estimated by the laboratory because it exceeded the linear range of the instrument. The sample was not diluted and re-analyzed; therefore, the results are qualitative only.

- 2) Semi-Volatiles
- o Extraction and Analysis Times: Acceptable
 - o Quantitation Limits: CLP Acceptable
 - o Tentatively Identified Compounds: Acceptable
 - o Blanks :
 - Trip: Acceptable
 - Field: Acceptable
 - Method: Acceptable
 - o Surrogate Spikes: Acceptable
 - o Matrix Spikes, Matrix Spike Duplicates, %R, and %RPD: Acceptable
 - o Field Replicate: Acceptable
 - o Sample Results: Acceptable
- D) Conclusions: Metal analysis for manganese is consistent with the CLP Protocol required. The data is acceptable for all quantitative purposes.

Volatiles and semi-volatiles data are acceptable and can be validated to level B-quantitative use except for the following results. Acetone in all samples; and vinyl chloride and trans-1,2-dichloroethene in DG-4 are qualitative only.

Correction Action Wells

- I) Field Data Package
- o Documentation: No deficiencies
 - o Field Performance: No deficiencies
 - o Conclusions: Samples are valid
- II) Analytical Data Package
- A) General
- o Case Narrative: Acceptable
 - o Master Tracking List: Acceptable
 - o Chain-of-Custody: Acceptable
- B) Inorganics Data: Sodium and Chloride
- o Replicate (Field): Acceptable
 - o Lab Duplicates: Acceptable
 - o Matrix Spikes: Acceptable
 - o Method Blanks: Acceptable
- C) Organics Data: VOCs and BNs
- 1) VOCs
- o Holding Times: Acceptable
 - o Tentatively Identified Compounds: Acceptable

- ° Blanks:
- Trip: Chloroform was detected above the quantitation limit in both trip blanks. No samples were affected. Probable cause of contamination is trihalomethanes in the laboratory water. Acetone and trichloroethene were found in trip blank (2/24/88) above the quantitation limit. Acetone was less than 5x the quantitation limit.
 - Field: Acetone was found above the CLP quantitation limit but was less than 5x the quantitation limit and is therefore acceptable.
 - Method: Several compounds were detected above the quantitation limit. Acetone, results for GM-9, GM-65, GM-84, Replicate 1, Field Blank 1, and 2/24 Trip Blank should be flagged as estimated because results were not 10 times above the level of associated blanks. In addition, acetone results should be considered suspect for GM-74 and the sampler rinsate because the laboratory blank designated by the laboratory as associated with these samples was not analyzed on the same day as GM-74 and the sampler rinsate. The other three laboratory blanks run and reported all contained acetone above the quantitation limit.
 - Sampler Rinsate: Acetone and 2-butanone were found above CLP quantitation limits. See comments above under method blanks about acetone. Acetone results compromise all sample results. 2-butanone was flagged by the

laboratory as also being in the laboratory blank; however, the laboratory blank results did not show 2-butanone, so these results are questionable. No sample results are compromised.

- o Surrogate Spikes: Acceptable
 - o Matrix Spike, Matrix Spike Duplicates, %R, and %RPD: Acceptable data for GM-75. Unacceptable data for 1,1-Dichloroethene and Trichloroethene for GM-66. This is due to the laboratory not diluting the sample when it contained high levels of 1,1-Dichloroethene and Trichloroethene prior to spiking with these same compounds. Results for other spiked compounds for GM-66 are acceptable.
 - o Replicate (Field): Not acceptable, however a determination of the samples cannot be made on only the field replicate.
 - o Reported Compounds: Acceptable except 1,1-dichloroethene, trans-1,2-dichloroethene, and trichloroethene results for GM-66. Results for these compounds were not in the linear range of the instrument and the sample was not diluted and re-analyzed; therefore, the results are qualitative only.
- 2) BNs
- o Extraction and Analysis Times: Acceptable
 - o Tentatively Identified Compounds: Acceptable
 - o Blanks:
 - Field: 1,2-Dichlorobenzene and naphthalene were found above the CLP quantitation limit. Results for 1,2-Dichlorobenzene in GM-64 and GM-66 and naphthalene in GM-66 should be flagged as estimated.
 - Method: Acceptable
 - o Surrogate Spikes: Acceptable except for GM-66. BN results should be flagged as estimated because Dinitrobenzene-d5 was not added and terphenyl-d14 was less than the minimum recovery allowable under CLP.
 - o Matrix Spike, Matrix Spike Duplicate, %R and %RPD: Acceptable
- Acceptable

- o Replicate (Field): Acceptable
 - o Reported Compounds: Acceptable
- D) Conclusions (see note below): All data is validated to level B and suitable for quantitative use with the exception of the following:
1,2-Dichlorobenzene for GM-64,
1,1-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and Base Neutral results for GH-66, and acetone for GM-9, GM-65, GM-74, and GM-84.

Note: This revised validation is based on receipt of additional data from the laboratory project manager.

577/36

M E M O R A N D U M

July 27, 1988

TO: William P. Bocskocsky
Julie Mattick

FROM: Debra Brown *D.B.*

RE: Results of Data Validation of Analytical Results for
Corrective-Action and Point-of-Compliance (POC)
Monitor Wells Sampled at NAS Pensacola WWTP, June
1988

The attached data validation checklist summarizes the results of the data validation procedure for the analytical results of the corrective action and POC monitor wells from the June 1988 sampling event. All results are suitable for quantitative use with the following exceptions:

- 1) Results for toluene for DG-5 should not have been reported because sample results were not 10x above the method blank. The detection limits should be flagged with a J as estimated.
- 2) Detection limits for benzene, toluene, and ethylbenzene should be flagged with a J as estimated for wells GM-9, GM-62, GM-65, and GM-84 because holding time was exceeded.

In addition, it should be noted that the sampler rinsate collected during the June 1, 2, and 3, 1988 sampling showed 2 ug/L of trans-1,2-dichloroethene and 29 ug/L of trichloroethene. These results do not invalidate any sample results. Trans-1,2-dichloroethene and trichloroethene were only detected in GM-66 and at concentrations high enough that the values cannot be attributed to field contamination and are therefore quantitative.

621/46
TF0290PN11

PAGE I DATA VALIDATION CHECKLIST 1-00
WAIF-I (R2)

PROJECT NAME: NAS Pensacola
 PROJECT NUMBER: TEA, JG, PNI
 SAMPLE IDENTIFICATION: NAS Pensacola Corrective Action
and Point-of-Compliance (PCC)
 SAMPLING TEAM: T. G. Lee, T. Kuziske (06/12/88); D. Brown & O. Schmidt (06/30/88)
 ANALYZING LABORATORY: Pioneer Laboratory
 ANALYSES PERFORMED: Sodium, chloride, manganese,
VCC, BLS, BIAS
 SAMPLE MATRIX: groundwater
 A REPORTING LEVEL: II

EXPLANATION OF VALIDATION AND CLASSIFICATION CODES:

SAMPLE QUALIFIER CODES

- R CODE: DATA FLAGGED WITH AN 'R' WAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS. THIS DATA IS UNUSABLE EVEN IF FIELD QC DATA IS ACCEPTABLE.
- J CODE: DATA FLAGGED WITH A 'J' WAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS BUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE DATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUANTITATIVE (ESTIMATED) PROVIDED THE FIELD DATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.
- U CODE: DATA FLAGGED WITH A 'U' MEANS THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.
- B CODE: DATA FLAGGED WITH A 'B' CODE MEANS THAT THE ANALYTE WAS PRESENT ABOVE REPORTING DETECTION LIMITS WITHIN LABORATORY BLANKS; B CODES DO NOT NECESSARILY INVALIDATE THE DATA BUT ARE DEPENDENT UPON THE JUDGEMENT OF THE REVIEWER IN APPLYING THE VALIDATION GUIDELINES;

CLASSIFICATION CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS DATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINED B QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A DATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS B DATA.

CLASS B DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS B) DATA.

UNUSABLE DATA: DATA IN THIS CLASS HAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

FIELD DATA PACKAGE DOCUMENTATION

CLASS A (QUALITATIVE)	PERFORMANCE		
	REPORTED	ACCEPTABLE	NOT REQUIRED
FIELD (WATER AND SOIL) SAMPLE LOGS: COMPLETELY PROPERLY AND SIGNED	✓	✓	—
SAMPLING DATES	✓	✓	—
SAMPLING TEAM INDICATED	✓	✓	—
SAMPLE IDENTIFICATION TRACEABLE TO LOCATION COLLECTED	✓	✓	—
SAMPLE LOCATION	✓	✓	—
SAMPLE DEPTH FOR 'SOILS	—	—	✓
COLLECTION TECHNIQUE (BAILER, PUMP ETC)	✓	✓	—
FIELD SAMPLE PREPARATION TECHNIQUES	✓	✓	—
SAMPLE TYPE (GRAB, COMPOSITE)	✓	✓	—
SAMPLE CONTAINER TYPE	✓	✓	—
PRESERVATION METHODS	✓	✓	—
CHAIN OF CUSTODY FORM COMPLETED	✓	✓	—
REQUIRED ANALYTICAL METHODS REQUESTED	✓	✓	—
NUMBER AND TYPE OF FIELD QC SAMPLES COLLECTED (BLANKS, REPLICATES, SPLITS, ETC.)	✓	✓	—
FIELD EQUIPMENT CALIBRATION	✓	✓	—
FIELD EQUIPMENT DECONTAMINATION	✓	—	—
SAMPLE SHIPPING	✓	✓	—
LABORATORY TASK ORDER	—	—	✓

REMARKS: Samples rinsed for 06/12/88 showed trace volatiles, don't affect samples

FIELD DOCUMENTATION AND PERFORMANCE: Acceptable

D-11

CONTRACT REQUIREMENTS FOR ANALYTICAL DATA PACKAGE DOCUMENTATION AND PERFORMANCE CLASS A (QUALITATIVE)

SECTION I. GENERAL INFORMATION

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. SAMPLE RESULTS	✓	✓	—
2. PARAMETERS ANALYZED	✓	✓	—
3. METHOD OF ANALYSIS	✓	✓	—
4. DETECTION LIMITS OF ANALYSIS	✓	✓	—
5. MASTER TRACKING LIST	✓	✓	—
6. SAMPLE COLLECTION DATE	✓	✓	—
7. LAB SAMPLE RECEIVED DATE	✓	✓	—
8. SAMPLE PREPARATION/EXTRACTION OAXC	✓	✓	—
9. SAMPLE ANALYSIS DATE	✓/J	—	—
10. COPY OF CHAIN-OF-CUSTODY FORM SIGNED BY THE LAB SAMPLE CUSTODIAN	✓	✓	—
11. A NARRATIVE SUMMARY OF QA OR SAMPLE PROBLEMS IS PROVIDED.	—	—	✓

REMARKS: Samples collected 6/30/88 were not analyzed within 7 days, so detection limits are estimated in hexane, toluene, and ethyl benzene

D-12

DOCUMENTATION (A)/PERFORMANCE (B)

SECTION II. INORGANIC ANALYSES

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. ICVS AND CCVS	—	—	✓
2. LCS (DIGESTED)	—	—	✓
3. QC CHECK SAMPLE (UNDIGESTED)	✓	✓	—
4. METHOD BLANKS	✓	✓	—
5. INTERFERENCE CHECK SAMPLE (ICP ONLY)	—	—	✓

SECTION II. INORGANIC ANALYSES CONTINUED

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
6. DILUTION CHECK SAMPLE-2XCDL (ICP ONLY)	—	—	✓
7. LABORATORY DUPLICATES AND IRSD OR RPD	✓	✓	—
8. MATRIX SPIKES	✓	✓	—
9. ANALYTICAL (POST-DIGESTED) SPIKES (FURNACE AAS ONLY)	—	—	✓

COMMENTS:

SECTION III. ORGANIC ANALYSES

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
A. GAS CHROMATOGRAPHY AND MASS SPECT.			
1. WATER BLANKS (VOA)	—	—	—
2. EXTRACTION BLANKS	—	—	—
3. TRIP BLANKS	—	—	—
4. INDEPENDENT QC CHECK SAMPLES	—	—	—
5. REAGENT WATER SPIKE (RWS)	—	—	—
6. REAGENT WATER SPIKE DUPLICATE	—	—	—
7. RWS RPD AND CONTROL LIMITS	—	—	—
8. MATRIX SPIKES (MS)	—	—	—
9. MATRIX SPIKE DUPLICATES	—	—	—
10. MS RPD AND CONTROL LIMITS	✓	—	—
11. LABORATORY DUPLICATES (OPTIONAL)	—	—	—
12. SURROGATE SPIKES	—	—	—

COMMENTS:

SECTION III. ORGANIC ANALYSES CONTINUED

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. GAS CHROMATOGRAPHY/MASS SPECTROMETER			
• BFD on DFPP TUNING	—	—	K
2. INITIAL CALIBRATION (IC)			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	—	—	K
B. CCC COMPOUNDS (RSD < 30% IN RF)	—	—	K
C. OTHER COMPOUNDS (AV.RF > 0)	—	—	K
D. FREQUENCY (AT LEAST EVERY 3 Mos)	—	—	K
• CONTINUING CALIBRATION			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	—	—	K
B. CCC COMPOUNDS (MAX XD FROM IC AV. RF IS 25%)	—	—	K
C. OTHER COMPOUNDS (AV.RF >0)	—	—	K
D. FREQUENCY (DAILY AFTER TUNING)	—	—	K
• WATER BLANKS (CALIBRATION BLANKS)	K	K*	—
• EXTRACTION (METHOD) BLANKS	K	K	—
• TRIP BLANKS	K	K	—
• REAGENT WATER SPIKES (RWS)	—	—	K
• REAGENT WATER SPIKE DUPLICATE	—	—	K
• RWS RPD AND CONTROL LIMITS	—	—	K
• MATRIX SPIKES (MS)	K	K	—
1. MATRIX SPIKE DUPLICATE (MSD)	K	K	—
7. SURROGATE SPIKE	K	K	—
RESULTS OF LATEST INDEPENDENT QC CHECK SAMPLES (EPA OR NDS TRACEABLE) ANALYZED, EXPECTED VALUE, AND SOURCE (LOT NO. & MANUFACTURER)	✓	✓	—
RESULTS OF BLANK SPIKE ANALYSIS FOR MATRIX SPIKE OR MATRIX SPIKE DUPLICATE PARAMETERS NOT MEETING RECOVERY REQUIREMENTS	—	—	—

COMMENTS: * see attached memo

CLASS D (QUANTITATIVE) REQUIREMENTS

DATA EVALUATION SUMMARY

	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. FIELD MEASUREMENTS OF PH AND SPECIFIC CONDUCTANCE ARE CONSISTENT WITH HISTORICAL DATA	✓	✓	—
2. ANALYTICAL METHODS	K	K	—
3. EXTRACTION HOLDING TIMES	K	K	—
4. ANALYSIS HOLDING TIMES	K	K	—
7. DETECTION LIMITS	K	K	—
8. SAMPLER RINSEATE BLANKS	K	K*	—
9. FIELD BLANKS	K	K	—
10. TRIP BLANKS	K	K	—
11. LABORATORY BLANKS			
A. WATER BLANKS	K	K	—
O. CALIBRATION BLANKS	K	K	—
C. METHOD BLANKS	K	K	—
O. EXTRACTION BLANKS	K	K	—
15. FIELD REPLICATES	K	K	—
16. FIELD SPLITS	—	—	K
17. GEOPHYSICAL COMPARISONS			
A. CATION VS ANION	—	—	K
O. TDS VS SPEC. CONDUCTANCE	—	—	K
C. PH VS ALK/ACIDITY	—	—	K
O. OTHER	—	—	K
18. INORGANIC OA DATA (SECTION II)	K	K	—
19. ORGANIC OA DATA (SECTION III A)	—	—	K
20. ORGANIC OA DATA (SECTION III B)	K	K	—
21. CLASSICAL ANALYTICAL METHODS OA DATA	—	—	K

COMMENTS: * see attached memo

D-13

DATA VALIDATION CODING

QUALIFIER CODES ASSIGNED TO OATA	CODES					NO FLAGS
	R	O	U	J	U/J	

IDENTIFICATION OF SAMPLES AND PARAMETERS WITH CODES:

CODE 1: _____
 CODE 2: _____
 CODE 3: _____
 CODE 4: _____
 CODE 5: _____
 CODE 6: _____
 CODE 7: _____
 CODE 8: _____
 CODE 9: _____
 CODE 10: _____
 CODE 11: _____
 CODE 12: _____
 CODE 13: _____
 CODE 14: _____
 CODE 15: _____
 CODE 16: _____
 CODE 17: _____
 CODE 18: _____
 CODE 19: _____
 CODE 20: _____
 CODE 21: _____
 CODE 22: _____
 CODE 23: _____
 CODE 24: _____
 CODE 25: _____
 CODE 26: _____
 CODE 27: _____
 CODE 28: _____
 CODE 29: _____
 CODE 30: _____
 CODE 31: _____
 CODE 32: _____
 CODE 33: _____
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 CODE 36: _____
 CODE 37: _____
 CODE 38: _____
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 CODE 84: _____
 CODE 85: _____
 CODE 86: _____
 CODE 87: _____
 CODE 88: _____
 CODE 89: _____
 CODE 90: _____
 CODE 91: _____
 CODE 92: _____
 CODE 93: _____
 CODE 94: _____
 CODE 95: _____
 CODE 96: _____
 CODE 97: _____
 CODE 98: _____
 CODE 99: _____
 CODE 100: _____

CLASSIFICATION:

DATA CLASS: A B UNUSABLE

SAMPLE MATRIX: groundwater

EXPLANATION:

IDENTITY OF SAMPLES AND PARAMETERS THAT ARE IN DIFFERENT USE CASES:

LABORATION PERFORMED BY: Debra E. Brown

SIGNED: Debra E. Brown

EXPLANATION OF VALIDATION AND CLASSIFICATION CODES:

SAMPLE QUALIFIER CODES

- R CODE: DATA FLAGGED WITH AN "R" HAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS. THIS OATA IS UNUSABLE EVEN IF FIELD QC DATA IS ACCEPTABLE.
- J CODE: DATA FLAGGED WITH A "J" HAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS BUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE DATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUALITATIVE (ESTIMATED) PROVIDED THE FIELD OATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.
- U CODE: DATA FLAGGED WITH A "U" MEANS THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.
- B CODE: DATA FLAGGED WITH A "B" CODE MEANS THAT THE ANALYTE WAS PRESENT ABOVE REPORTING DETECTION LIMITS WITHIN LABORATORY BLANKS. B CODES DO NOT NECESSARILY INVALIDATE THE DATA BUT ARE DEPENDENT UPON THE JUDGEMENT OF THE REVIEWER IN APPLYING THE VALIDATION GUIDELINES.

CLASSIFICATION CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS DATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINED B QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A OATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS B DATA.

CLASS B DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS B) DATA.

UNUSABLE DATA: DATA IN THIS CLASS HAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

D-1-4

M E M O R A N D U M

October 5, 1988

TO: Julie Mattick
William Bocskocsky

.FROM: Debra Brown

RE: Results of Data Validation of Analytical Results for
Corrective-Action and Point-of-Compliance (POC)
Monitor Wells Sampled at NAS Pensacola WWTP, August
1988

The attached data validation checklist summarizes the results of the data validation procedure for the analytical results of the corrective action and POC monitor wells from the August 1988 sampling. All results are suitable for quantitative use with the following exceptions:

methylene chloride detection limits for UG-1, GM-65 and GM-68 should be flagged 100 UJ because sample results were not 10x above the method blank. The acetone detection limit for UG-1 should be flagged 300 UJ because the sample result was not 10x above the method blank.

Attachments
635/56

PROJECT NAME: NAS Pensacola
 PROJECT NUMBER: TP02902N11
 SAMPLE IDENTIFICATION: Corrective Action and 4-point-of-Compliance Wells at WWTP
 SAMPLING TEAM: L. Reynolds and M. Scruggs
 ANALYZING LABORATORY: Planner
 ANALYSES PERFORMED: Sodium, Chloride, Manganese, VOCs, BAs and BAs
 SAMPLE MATRIX: groundwater
 QA REPORTING LEVEL: 1

FIELD DATA PACKAGE DOCUMENTATION

CLASS A (QUALITATIVE)	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
1. FIELD (WATER AND SOIL) SAMPLE LOGS COMPLETED PROPERLY AND SIGNED	✓	✓	—
2. SAMPLING DATES	✓	✓	—
3. SAMPLING TEAM INDICATED	✓	✓	—
4. SAMPLE IDENTIFICATION TRACEABLE TO LOCATION COLLECTED	✓	✓	—
5. SAMPLE LOCATION	✓	✓	—
6. SAMPLE DEPTH FOR SOILS	—	—	✓
7. COLLECTION TECHNIQUE (BAILER, PUMP ETC)	✓	✓	—
8. FIELD SAMPLE PREPARATION TECHNIQUES	✓	✓	—
9. SAMPLE TYPE (GRAB, COMPOSITE)	✓	A	—
9. SAMPLE CONTAINER TYPE	✓	b	—
10. PRESERVATION METHODS	✓	✓	—
12. CHAIN OF CUSTODY FORM COMPLETED	✓	✓	—
13. REQUIRED ANALYTICAL METHODS REQUESTED	✓	✓	—
14. NUMBER AND TYPE OF FIELD QC SAMPLES COLLECTED (BLANKS, REPLICATES, SPLITS, ETC.)	✓	✓	—
15. FIELD EQUIPMENT CALIBRATION	—	✓	—
16. FIELD EQUIPMENT DECONTAMINATION	—	✓	—
17. SAMPLE SHIPPING	✓	✓	—
18. LABORATORY TASK ORDER	—	—	✓

COMMENTS: _____

FIELD DOCUMENTATION AND PERFORMANCE: Acceptable

EXPLANATION OF VALIDATION AND CLASSIFICATION CODES

SAMPLE QUALIFIER CODES

- R CODE:** DATA FLAGGED WITH AN 'R' HAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS. THIS DATA IS UNUSABLE EVEN IF FIELD QC DATA IS ACCEPTABLE.
- J CODE:** DATA FLAGGED WITH A 'J' HAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS OUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE DATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUALITATIVE (ESTIMATED) PROVIDED THE FIELD DATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.
- U CODE:** DATA FLAGGED WITH A 'U' MEANS THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.
- B CODE:** DATA FLAGGED WITH A 'B' CODE MEANS THAT THE ANALYTE WAS PRESENT ABOVE REPORTING DETECTION LIMITS WITHIN LABORATORY BLANKS; B CODES DO NOT NECESSARILY INVALIDATE THE DATA BUT ARE DEPENDENT UPON THE JUDGEMENT OF THE REVIEWER IN APPLYING THE VALIDATION GUIDELINES.

CLASSIFICATION CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS DATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINABLE B QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A DATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS B DATA.

CLASS B DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS B) DATA.

UNUSABLE DATA: DATA IN THIS CLASS HAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

CWA F-1
1-88
R-2

CONTRACT REQUIREMENTS FOR ANALYTICAL DATA PACKAGE DOCUMENTATION AND PERFORMANCE CLASS A (QUALITATIVE)

SECTION I: GENERAL INFORMATION	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. SAMPLE RESULTS	✓	✓	—
2. PARAMETERS ANALYZED	✓	✓	—
3. METHOD OF ANALYSIS	✓	✓	—
4. DETECTION LIMITS OF ANALYSIS	✓	✓	—
5. MASTER TRACKING LIST	✓	✓	—
6. SAMPLE COLLECTION DATE	✓	✓	—
7. LAB SAMPLE RECEIVED DATE	✓	✓	—
8. SAMPLE PREPARATION/EXTRACTION DATE	✓	✓	—
9. SAMPLE ANALYSIS DATE	✓	✓	—
10. COPY OF CHAIN-OF-CUSTODY FORM SIGNED BY THE LAO SAWLE CUSTODIAN	✓	✓	—
11. A NARRATIVE SUMMARY OF QA OR SAMPLE PROBLEMS IS PROVIDED.	—	—	✓

COMMENTS: _____

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CWA F-1 (R2)
1-88

DOCUMENTATION (A) / PERFORMANCE (B)

SECTION II. INORGANIC ANALYSES	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
1. ICVS AND CCVS	—	—	✓
2. LCS (DIGESTED)	—	—	✓
3. OC CHECK SAMPLE (UNDIGESTED)	✓	✓	—
4. METHOD BLANKS	✓	✓	—
5. INTERFERENCE CHECK SAMPLE (ICP ONLY)	—	—	✓

CWA/F-1 (R2)
1-88

SECTION II. INORGANIC ANALYSES CONTINUED	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
6. DILUTION CHECK SAMPLE-2XCROL (ICP ONLY)	—	—	✓
7. LABORATORY DUPLICATES AND XRSO OR RPD	✓	✓	—
8. MATRIX SPIKES	✓	✓	—
9. ANALYTICAL (POST-DIGESTED) SPIKES (FURNACE AAS ONLY)	—	—	✓

COMMENTS: _____

CWA F-1
1-88
R-2

SECTION III. ORGANIC ANALYSES	REPORTED	PERFORMANCE ACCEPTABLE	NOT REQUIRED
A. GAS CHROMATOGRAPHY AND MASS SPECT.			
1. WATER BLANKS (VOA)	—	—	—
2. EXTRACTION BLANKS	—	—	—
3. TRIP BLANKS	—	—	—
4. INDEPENDENT OC CHECK SAMPLES	—	—	—
5. REAGENT WATER SPIKE (RWS)	—	—	—
6. REAGENT WATER SPIKE DUPLICATE	—	—	—
7. RWS RPD AND CONTROL LIMITS	—	—	—
8. MATRIX SPIKES (MS)	—	—	—
9. MATRIX SPIKE DUPLICATES	—	—	—
10. MS RPD AND CONTROL LIMITS	—	—	—
11. LABORATORY DUPLICATES (OPTIONAL)	—	—	—
12. SURROGATE SPIKES	—	—	—

COMMENTS: Not Applicable

SECTION III. ORGANIC ANALYSES CONTINUED

a. GAS CHROMATOGRAPHY/MASS SPECTROMETER	PERFORMANCE		
	REPORTED	ACCEPTABLE	NOT REQUIRED
1. BFB OR DFTPP TUNING	—	—	✓
2. INITIAL CALIBRATION (IC)			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	—	—	✓
B. CCC COMPOUNDS (RSD < 30% IN RF)	—	—	✓
C. OTHER COMPOUNDS (AV.RF > 0)	—	—	✓
D. FREQUENCY (AT LEAST EVERY 3 MOS)	—	—	✓
3. CONTINUING CALIBRATION			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	—	—	✓
B. CCC COMPOUNDS (MAX XD FROM IC AV. RF IS 25%)	—	—	✓
C. OTHER COMPOUNDS (AV.RF >0)	—	—	✓
D. FREQUENCY (DAILY AFTER TUNING)	—	—	✓
4. WATER BLANKS (CALIBRATION BLANKS)	✓	✓*	—
5. EXTRACTION (METHOD) BLANKS	✓	✓	—
6. TRIP OLANKS	✓	✓	—
7. REAGENT WATER SPIKES (RWS)	—	—	—
8. REAGENT WATER SPIKE OUPPLICATE	—	—	—
9. RWS RPD AND CONTROL LIMITS	—	—	—
10. MATRIX SPIKES (MS)	✓	✓	—
11. MATRIX SPIKE OUPPLICATE (MSD)	✓	✓	—
12. SURROGATE SPIKE	✓	✓**	—
13. RESULTS OF LATEST INDEPENDENT QC CHECK SAWLES (EPA OR NDS TRACEABLE) ANALYZED, EXPECTED VALUE, AND SOURCE (LOT NO. & MANUFACTURER)	✓	✓	—
14. RESULTS OF BLANK SPIKE ANALYSIS FOR MATRIX SPIKE OR MATRIX SPIKE OUPPLICATE PARAMETERS NOT METING RECOVERY REQUIREMENTS	—	—	✓

COMMENTS: * see attached memo

** surrogates for GM-69 were not recoverable, the sample was reanalyzed and still not recoverable in base neutral. However positive results in BA analysis was confirmed in volatile analysis so results are not flagged.

CLASS O (QUANTITATIVE) REQUIREMENTS

PERFORMANCE NOT

DATA EVALUATION SUMMARY

REPORTED ACCEPTABLE REQUIRED

1. FIELD MEASUREMENTS OF PH AND SPECIFIC CONDUCTANCE ARE CONSISTENT WITH HISTORICAL DATA	✓	✓	—
2. ANALYTICAL METHODS	✓	✓	—
3. EXTRACTION HOLDING TIMES	✓	✓	—
4. ANALYSIS HOLDING TIMES	✓	✓	—
7. DETECTION LIMITS	✓	✓	—
0. SAMPLER RINSEATE OLANKS	✓	✓	—
9. FIELD OLANKS	✓	✓	—
10. TRIP OLANKS	✓	✓	—
11. LABORATORY OLANKS			
A. WATER OLANKS	✓	✓	—
B. CALIBRATION OLANKS	✓	✓	—
C. METHOD OLANKS	✓	✓	—
D. EXTRACTION OLANKS	✓	✓	—
15. FIELD REPLICATES	✓	✓	—
16. FIELD SPLITS	—	—	✓
17. GEOPHYSICAL COMPARISONS			
A. CATION VS ANION	—	—	✓
B. TDS VS SPEC. CONDUCTANCE	—	—	✓
C. PH VS ALK/ACIDITY	—	—	✓
D. OTHER	—	—	✓
18. INORGANIC OA DATA (SECTION II)	✓	✓	—
19. ORGANIC OA DATA (SECTION III A)	—	—	—
20. ORGANIC OA DATA (SECTION III B)	✓	✓	—
21. CLASSICAL ANALYTICAL METHODS OA DATA	—	—	—

COMMENTS:

DATA VALIDATION CODING

CODES

	R	D	U	J	U/J	No FLAGS
1. QUALIFIER CODES ASSIGNED TO DATA					<input checked="" type="checkbox"/>	

IDENTIFICATION OF SAMPLES AND PARAMETERS WITH CODES:

SAMPLE ID PARAMETERS

A CODE: _____

B CODE: _____

U CODE: _____

J CODE: _____

U/J CODE: GM-65, GM-68 Acetone, Methylene Chloride

EXPLANATION: UG-1

DATA CLASSIFICATION:

DATA CLASS: A D UNUSABLE

SAMPLE MATRIX: groundwater _____

EXPLANATION:

IDENTITY OF SAMPLES AND PARAMETERS THAT ARE IN DIFFERENT USE CLASSES:

VALIDATION PERFORMED BY: Debra E. Brown

SIGNED: Debra E. Brown

D-19

EXPLANATION OF VALIDATION AND CLASSIFICATION CODES:

SAMPLE QUALIFIER CODES

R CODE: DATA FLAGGED WITH AN 'R' HAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS. THIS DATA IS UNUSABLE EVEN IF FIELD QC DATA IS ACCEPTABLE.

J CODE: DATA FLAGGED WITH A 'J' HAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS BUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE DATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUALITATIVE (ESTIMATED) PROVIDED THE FIELD DATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.

U CODE: DATA FLAGGED WITH A 'U' MEANS THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.

D CODE: DATA FLAGGED WITH A 'D' CODE MEANS THAT THE ANALYTE WAS PRESENT ABOVE REPORTING DETECTION LIMITS WITHIN LABORATORY BLANKS. D CODES DO NOT NECESSARILY INVALIDATE THE DATA BUT ARE DEPENDENT UPON THE JUDGMENT OF THE REVIEWER IN APPLYING THE VALIDATION GUIDELINES;

CLASSIFICATION CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS DATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINED D QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A DATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS D DATA.

CLASS D DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS D) DATA.

UNUSABLE DATA: DATA IN THIS CLASS HAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

M E M O R A N D U M

TO: Julie Mattick

FROM: Debra E. Brown

DATE: December 9, 1988

RE: Data Validation of Analytical Results for the Fourth
Quarter Sampling of the Point-of-Compliance (POC)
Wells, NAS Pensacola

I have reviewed the analytical and field data packages for the fourth quarter sampling of the POC wells at NAS Pensacola. The attached Data Validation Checklist gives the results of that review. In summary, results for all wells are validated to Level B and can be used for quantitative purposes with one exception. The acetone results for UG-1 are estimated and should be flagged with a J. The associated laboratory blank showed acetone above the detection limit. Since the sample result was less than 10x the level in the blank, the sample result is estimated.

Also, DG-4 showed 7 ug/L of 1,1-dichloroethane, while its associated field replicate did not show 1,1-dichloroethane above the detection limit. However, the detection limit is 5 ug/L so these results could be simply a result of sample variability. Therefore, the results for 1,1-dichloroethane in DG-4 can be considered quantitative.

707/27

DATA VALIDATION CHECKLIST

CVA/F-1 (R2) 1-01)

PROJECT NAME: NAS - Pensacola
 PROJECT NUMBER: TFE 2902PNI1
 SAMPLE IDENTIFICATION: UG-1, DG-4, DG-3
 SAMPLING TEAM: Tim Zabulak, Chris Powell
 ANALYZING LABORATORY: Pioneer
 ANALYSES PERFORMED: H₂, B390 + Dichlorobenzene, B370
 SAMPLE MATRIX: GROUNDWATER
 QA REPORTING LEVEL: X

FIELD DATA PACKAGE DOCUMENTATION

CLASS A (QUALITATIVE)	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
1. FIELD (WATER AND SOIL) SAMPLE LOGS COMPLETED PROPERLY AND SIGNED	X	X	---
2. SAMPLING DATES	X	X	---
3. SAMPLING TEAM INDICATED	X	X	---
4. SAMPLE IDENTIFICATION TRACEABLE TO LOCATION COLLECTED	X	X	---
5. SAMPLE LOCATION	X	X	---
6. SAMPLE DEPTH FOR SOILS	---	---	X
7. COLLECTION TECHNIQUE (BAILER, PUMP ETC)	X	X	---
8. FIELD SAMPLE PREPARATION TECHNIQUES	X	X	---
9. SAMPLE TYPE (GRAB, COMPOSITE)	X	X	---
9. SAMPLE CONTAINER TYPE	X	X	---
10. PRESERVATION METHODS	X	X	---
12. CHAIN OF CUSTODY FORM COMPLETED	X	X	---
13. REQUIRED ANALYTICAL METHODS REQUESTED	X	X	---
14. NUMBER AND TYPE OF FIELD QC SAMPLES COLLECTED (BLANKS, REPLICATES, SPLITS, ETC.)	X	X	---
15. FIELD EQUIPMENT CALIBRATION	---	X	---
16. FIELD EQUIPMENT DECONTAMINATION	---	X	---
17. SAMPLE SHIPPING	X	X	---
18. LABORATORY TASK ORDER	---	---	X

COMMENTS: _____

FIELD DOCUMENTATION AND PERFORMANCE: Acceptable

EXPLANATION OF VALIDATION AND CLASSIFICATION CODES:

SAMPLE QUALIFIER CODES

R CODE: DATA FLAGGED WITH AN 'R' HAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS, THIS DATA IS UNUSABLE EVEN IF FIELD QC DATA IS ACCEPTABLE.

J CODE: DATA FLAGGED WITH A 'J' HAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS BUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE DATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUALITATIVE (ESTIMATED) PROVIDED THE FIELD DATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.

U CODE: DATA FLAGGED WITH A 'U' MEANS THE ANALYTE WAS ANALYZED FOR BUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.

B CODE: DATA FLAGGED WITH A 'B' CODE MEANS THAT THE ANALYTE WAS PRESENT ABOVE REPORTING DETECTION LIMITS WITHIN LABORATORY BLANKS; B CODES DO NOT NECESSARILY INVALIDATE THE DATA BUT ARE DEPENDENT UPON THE JUDGEMENT OF THE REVIEWER IN APPLYING THE VALIDATION GUIDELINES;

CLASSIFICATION CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS DATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINED B QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A DATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS A DATA.

CLASS B DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS B) DATA.

UNUSABLE DATA: DATA IN THIS CLASS HAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

CWA F-1
1-80
R-2CONTRACT REQUIREMENTS FOR
ANALYTICAL DATA PACKAGE DOCUMENTATION AND PERFORMANCE
CLASS A (QUALITATIVE)

SECTION I. GENERAL INFORMATION	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
1. SAMPLE RESULTS	X	X	---
2. PARAMETERS ANALYZED	X	X	---
3. METHOD OF ANALYSIS	X	X	---
4. DETECTION LIMITS OF ANALYSIS	X	X	---
5. MASTER TRACKING LIST	X	X	---
6. SAMPLE COLLECTION DATE	X	X	---
7. LAB SAMPLE RECEIVED DATE	X	X	---
8. SAMPLE PREPARATION/EXTRACTION DATE	X	X	---
9. SAMPLE ANALYSIS DATE	X	X	---
10. COPY OF CHAIN-OF-CUSTODY FORM SIGNED BY THE LAB SAMPLE CUSTODIAN	X	X	---
11. A NARRATIVE SUMMARY OF QA OR SAMPLE PROBLEMS IS PROVIDED.	---	---	---

COMMENTS: Narrative Summary not provided
Acceptable

CWA F-1 (R2)
1-80

DOCUMENTATION (A) / PERFORMANCE (B)

SECTION II. INORGANIC ANALYSES	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
1. ICVS AND CCVS	---	---	X
2. LCS (DIGESTED)	---	---	X
3. QC CHECK SAMPLE (UNDIGESTED)	X	X	---
4. METHOD BLANKS	X	X	---
5. INTERFERENCE CHECK SAMPLE (ICP ONLY)	---	---	X

CWA/F-1 (R2)
1-88

SECTION II. INORGANIC ANALYSES CONTINUED

	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
6. DILUTION CHECK SAMPLE-2XCROL (TCP ONLY)	---	---	X
7. LABORATORY DUPLICATES AND TRSD OR RPD	X	X	---
8. MATRIX SPIKES	X	X	---
9. ANALYTICAL (POST-DIGESTED) SPIKES (FURNACE AAS ONLY)	---	---	X

COMMENTS: AcceptableCWA F-1
1-00
R-2

SECTION III. ORGANIC ANALYSES

A. GAS CHROMATOGRAPHY (NO MASS SPEC)	PERFORMANCE		NOT REQUIRED
	REPORTED	ACCEPTABLE	
1. WATER BLANKS (VOA)	---	---	---
2. EXTRACTION BLANKS	---	---	---
3. TRIP BLANKS	---	---	---
4. INDEPENDENT QC CHECK SAMPLES	---	---	---
5. REAGENT WATER SPIKE (RWS)	---	---	---
6. REAGENT WATER SPIKE DUPLICATE	---	---	---
7. RWS RPD AND CONTROL LIMITS	---	---	---
8. MATRIX SPIKES (MS)	---	---	---
9. MATRIX SPIKE DUPLICATES	---	---	---
10. MS RPD AND CONTROL LIMITS	---	---	---
11. LABORATORY DUPLICATES (OPTIONAL)	---	---	---
12. SURROGATE SPIKES	---	---	---

COMMENTS: _____

SECTION III. ORGANIC ANALYSES CONTINUED

8. GAS CHROMATOGRAPHY/MASS SPECTROMETER	PERFORMANCE		
	REPORTED	ACCEPTABLE	NOT REQUIRED
1. BFB OR DFTPP TUNING	---	---	X
2. INITIAL CALIBRATION (IC)			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	---	---	X
B. CCC COMPOUNDS (RSD < 30% IN RF)	---	---	X
C. OTHER COMPOUNDS (AV.RF > 0)	---	---	X
D. FREQUENCY (AT LEAST EVERY 3 Mos)	---	---	X
3. CONTINUING CALIBRATION			
A. SPCC COMPOUNDS (AV.RF >0.3/0.05)	---	---	X
B. CCC COMPOUNDS (MAX %D FROM IC AV. RF IS 25%)	---	---	X
C. OTHER COMPOUNDS (AV.RF >0)	---	---	X
D. FREQUENCY (DAILY AFTER TUNING)	---	---	X
4. WATER BLANKS (CALIBRATION BLANKS)	X	X	---
5. EXTRACTION (METHOD) BLANKS	X	X	---
6. TRIP BLANKS	X	X	---
7. REAGENT WATER SPIKES (RWS)	---	---	X
8. REAGENT WATER SPIKE DUPLICATE	---	---	X
9. RWS RPD AND CONTROL LIMITS	---	---	X
10. MATRIX SPIKES (MS)	X	X	---
11. MATRIX SPIKE DUPLICATE (MSD)	X	X	---
12. SURROGATE SPIKE	X	X	---
13. RESULTS OF LATEST INDEPENDENT GC CHECK SAMPLES (EPA OR NBS TRACEABLE) ANALYZED, EXPECTED VALUE, AND SOURCE (LOT NO. & MANUFACTURER)	X	X	X*
14. RESULTS OF BLANK SPIKE ANALYSIS FOR MATRIX SPIKE OR MATRIX SPIKE DUPLICATE PARAMETERS NOT MEETING RECOVERY REQUIREMENTS	---	---	---

COMMENTS: * Acetone was detected in 11/14 blank, MeCl was detected in all other blanks

** EPA GC % recovery not within control limits for 4-bromobiphenyl phenyl ether, doesn't effect sample results

CLASS O (QUANTITATIVE) REQUIREMENTS

DATA EVALUATION SUMMARY	PERFORMANCE		
	REPORTED	ACCEPTABLE	NOT REQUIRED
1. FIELD MEASUREMENTS OF PH AND SPECIFIC CONDUCTANCE ARE CONSISTENT WITH HISTORICAL DATA	X	X	---
2. ANALYTICAL METHODS	X	X	---
3. EXTRACTION HOLDING TIMES	X	X	---
4. ANALYSIS HOLDING TIMES	X	X	---
7. DETECTION LIMITS	X	X	---
8. SAMPLER RINSE BLANKS	X	X	---
9. FIELD BLANKS	X	X	---
10. TRIP BLANKS	X	X	---
11. LABORATORY BLANKS			
A. WATER BLANKS	X	*	---
B. CALIBRATION BLANKS	X	X	---
C. METHOD BLANKS	X	X	---
D. EXTRACTION BLANKS	X	X	---
15. FIELD REPLICATES	X	X	---
16. FIELD SPLITS	---	---	---
17. GEOPHYSICAL COMPARISONS			
A. CATION VS ANION	---	---	---
B. TDS VS SPEC. CONDUCTANCE	---	---	---
C. PH VS ALK/ACIDITY	---	---	---
D. OTHER	---	---	---
18. INORGANIC QA DATA (SECTION II)	X	X	---
19. ORGANIC QA DATA (SECTION III A)	---	---	X
20. ORGANIC QA DATA (SECTION III B)	X	X	---
21. CLASSICAL ANALYTICAL METHODS QA DATA	---	---	X

COMMENTS: * Acetone in 11/14 Lab Blank affects sample results. ** 1,1-Dichloroethane was detected in DE 4 but not detected in Replicate A. However, value in DE 4 was just above detection limit and could simply reflect sample variability. Not enough to qualify result.

D-22

DATA VALIDATION CODING

	CODES					
	R	e	U	J	U/J	No FLAGS
1. QUALIFIER CODES ASSIGNED TO DATA	_____	_____	_____	<u>X</u>	_____	_____

IDENTIFICATION OF SAMPLES AND PARAMETERS WITH CODES:
SAMPLE ID PARAMETERS

R CODE: _____

e CODE: _____

U CODE: _____

J CODE: UG-1 Acetone

U/J CODE: _____

EXPLANATION: Acetone in sample was < 10% acetone
in blank.

DATA CLASSIFICATION:

DATA CLASS: A B UNUSABLE

SAMPLE MATRIX: _____ _____ X _____

EXPLANATION:

IDENTITY OF SAMPLES AND PARAMETERS THAT ARE IN DIFFERENT USE CLASSES:

_____ Acetone _____

VALIDATION PERFORMED BY: Debra E. Brown

SIGNED: Debra E. Brown

EXPLANATION OF VALIOATION AND CLASSIFICATION CODES:

SAMPLE QUALIFIER CODES

R CODE: DATA FLAGGED WITH AN "R" HAS NOT MET THE REQUIRED ANALYTICAL QA REQUIREMENTS. THIS OATA IS UNUSABLE EVEN IF FIELD OC OATA IS ACCEPTABLE.

J CODE: DATA FLAGGED WITH A "J" HAS FAILED SOME OF THE ANALYTICAL QA REQUIREMENTS BUT NOT SUFFICIENT TO WARRANT CLASSIFYING THE OATA AS UNUSABLE. DATA IN THIS CATEGORY IS QUALITATIVE (ESTIMATED) PROVIDED THE FIELD OATA MEETS ALL CRITERIA AND THE SAMPLE IS VALID.

U CODE: DATA FLAGGED WITH A "U" MEANS THE ANALYTE HAS ANALVED, FOR OUT NOT DETECTED, I.E. THE ANALYTE WAS BELOW DETECTION LIMIT.

D CODE: DATA FLAGGED WITH A "D" CODE MEANS THAT THE ANALYTE WAS PRESENT AOOVE REPORTING DETECTION LIMITS WITHIN LAOORATORY BLANKS; B CODES OO NOT NECESSARILY INVALIDATE THE OATA BUT ARE OEPENDENT UPON THE JUOJEMENT OF THE REVIEWER IN APPLYING THE VALIOATIOU GUIDELINES;

CLASSIFICAT ON CODES

CLASS A DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN SECTION I OF THE ANALYTICAL CHECKLIST. THIS OATA IS QUALITATIVE. ANY SAMPLE DATA RECEIVING AN R QUALIFIER CODE OR AN UNEXPLAINED B QUALIFIER CODE MAY NOT BE CLASSIFIED AS CLASS A OATA. DATA THAT HAS BEEN GIVEN A J CODE MAY NOT BE CONSIDERED AS CLASS A OATA.

CLASS B DATA: DATA IN THIS CLASS MUST HAVE MET ALL THE REQUIREMENTS SPECIFIED IN THE FIELD CHECKLIST AND IN ALL SECTIONS (I, II, AND III) WHERE APPLICABLE FOR THE LEVEL OF REPORTING IN ORDER TO BE CONSIDERED AS QUANTITATIVE (CLASS B) OATA.

UNUSABLE DATA: DATA IN THIS CLASS MAS FAILED ANY OF THE REQUIREMENTS WITHIN THE FIELD CHECKLIST OR THE ANALYTICAL CHECKLIST. THIS DATA SHOULD BE FLAGGED WITH AN R AND MAY NOT BE USED FOR ANY PURPOSE.

D-24

APPENDIX E

Water-Quality Data for
Corrective-Action Monitor Wells

pH and Specific Conductance
Organic Compounds and Inorganic Elements

**pH AND SPECIFIC CONDUCTANCE
MEASUREMENTS FROM CORRECTIVE-ACTION MONITOR WELLS**

MONITOR WELL UG-1 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84		160
31-Oct-84	7.1	190
04-Feb-87	5.4	156
05-Ieb-87	5.5	133
06-Feb-87	5.6	141
03-he-87	6.2	120
22-feb-88	5.9	170
02-Jun-88	5.5	260
15-Aug-88	5.9	170
08-Nov-88	6.4	230

MONITOR WELL DG-2 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.5	1053
05-Feb-87	5.8	986
06-Feb-87	5.4	994
01-Dec-87	6.4	535
22-Fib-88	6.1	495
23-Feb-88	Well abandoned	

MONITOR WELL GM-9 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84		950
31-Oct-84	6.3	760
03-Feb-87	6.4	1380
05-Ieb-87	6.2	1740
06-fob-87	6.0	1182
10-wit-87	6.5	960
16-Apr-87	6.2	905
15-May-87	5.8	585
26-Jun-87	6.5	402
21-Jul-87	6.5	600
18-Aug-87	6.4	210
21-Sep-87	6.3	210
21-Oct-87	6.4	180
01-Dec-87	6.6	164
24-Feb-88	5.8	320
29-Apr-88	6.2	600
02-Jun-88	6.0	475
20-Jun-88	6.1	230
17-Aug-88	6.1	260

MONITOR WELL GM-62 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.8	871
05-Feb-87	6.3	845
06-Feb-87	5.9	875
02-Dec-87	6.5	283
23-Feb-88	6.2	380
20-Jun-88	6.1	390
16-Aug-88	6.0	220

MONITOR WELL GM-63 (D)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	6.3	4430
05-Feb-87	7.4	4220
06-Feb-87	6.7	3960
02-Dec-87	6.7	1430
23-Feb-88	6.5	3100
02-Jun-88	6.8	4200
16-Aug-88	6.6	2600

MONITOR WELL GM-64 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.3	5330
05-Feb-87	8.8	5240
06-Feb-87	6.6	3840
02-Dec-87	7.2	1360
23-Feb-88	7.3	1800
02-Jun-88	6.6	1360
16-Aug-88	6.6	1220

MONITOR WELL GM-65 (D)*

Date	pH (units)	Specific Conductance (umhos/cm)
03-Feb-87	6.1	1134
05-Feb-87	6.7	1233
06-Feb-87	6.6	1196
01-Dec-87	6.3	467
24-Feb-88	6.1	625
29-Apr-88	6.8	1750
02-Jun-88	6.8	210
20-Jun-88	6.7	1020
15-Aug-88	6.3	600

MONITOR WELL GM-66 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
03-Feb-87	3.3	8880
05-Feb-87	3.3	9600
06-Feb-87	2.9	9330
10-Mar-87	3.1	7820
16-Apr-87	3.6	7320
15-May-87	3.3	7740
26-Jun-87	3.0	6990
21-Jul-87	3.2	7000
18-Aug-87	2.6	7900
21-Sep-87	3.0	7000
21-Oct-87	2.8	3700
01-Dec-87	2.9	4880
24-Feb-88	2.6	8000
29-Apr-88	3.4	7800
02-Jun-88	3.0	4000
17-Aug-88	3.6	7000

MONITOR WELL GM-67 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
03-Feb-87	5.7	920
05-Feb-87	5.8	903
06-Feb-87	5.8	887
10-Mar-87	6.6	680
16-Apr-87	5.7	598
15-May-87	6.0	651
26-Jun-87	5.7	577
21-Jul-87	6.4	1000
18-Aug-87	7.8	550
21-Sep-87	6.5	1700
21-et-87	6.1	850
01-kc-87	6.5	370
24-Feb-88	5.7	1900
29-Apr-88	6.4	350
02-Juri-00	6.3	360
17-4-00	6.5	400

MONITOR WELL GM-68 (D)*

Date	pH (units)	Specific Conductance (umhos/cm)
03-Feb-87	6.1	727
06-Feb-87	6.3	751
01-he-87	6.2	315
24-Feb-88	5.9	500
29-Apr-88	6.3	1190
02-Jun-88	5.9	1000
15-Aug-88	6.2	600

MONITOR WELL GM-69 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
03-Feb-87	6.9	3570
05-Feb-87	7.0	3400
26-Feb-87	6.8	3490
10-Mar-87	7.4	4120
16-Apr-87	7.3	3000
15-May-87	6.7	2840
26-Jun-87	7.0	2720
21-Jul-87	7.1	2900
18-Aug-87	7.3	2500
21-Sep-87	6.7	2890
21-Oct-87	7.1	2050
01-Dec-87	7.2	1068
24-Feb-88	6.9	2400
29-Apr-88	7.2	7000
02-Jun-88	7.1	4400
17-Aug-88	7.1	3000

MONITOR WELL GM-71 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.5	420
05-Feb-87	6.1	427
06-Feb-87	5.8	408
03-Dec-88	6.1	202
2b-Feb-88	5.8	220
01-Jun-88	5.7	250
16-Aug-88	5.9	280

MONITOR WELL GM-72 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.8	677
05-Feb-87	6.3	688
06-Feb-87	6.3	676
03-Dec-87	6.7	480
23-Feb-88	6.1	430
01-Jun-88	6.3	480
16-Aug-88	6.4	780

MONITOR WELL GM-74 (D)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	6.8	1680
05-Feb-87	9.5	1283
06-Feb-87	8.0	1180
01-Dec-87	6.0	435
22-Feb-88	6.1	510
23-Feb-88	Well abandoned	

MONITOR WELL GM-75 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	6.2	3770
05-Feb-87	6.7	3770
06-Feb-87	7.1	3920
01-Dec-87	6.5	1840
22-Feb-88	6.8	2800
23-Feb-88	Well abandoned	

MONITOR WELL GM-76 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.0	1119
05-Feb-87	5.4	1060
06-Feb-87	5.5	1144
03-Dec-87	6.2	1063
23-Feb-88	6.1	1420
01-Jun-88	6.5	1160
16-Aug-88	6.2	b200

MONITOR WELL GM-77 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	5.5	790
05-Feb-87	5.9	781
06-Feb-87	5.6	817
03-he-87	6.3	410
23-Feb-88	6.1	490
01-Juri-88	6.1	540
16-Aug-88	4.9	2800

MONITOR WELL GM-78 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	4.7	204
05-Feb-87	5.2	204
06-Feb-87	5.3	199
03-Dec-87	5.7	115
23-Feb-88	5.4	170
01-Jun-88	5.5	200
16-Aug-88	4.9	102

MONITOR WELL GM-79 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	4.6	435
05-Feb-87	5.0	496
06-Feb-87	5.4	518
03-Dec-87	5.5	189
23-Feb-88	5.4	150
01-Jun-88	5.6	200
16-Aug-88	4.9	162

MONITOR WELL GM-83 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
0b-Feb-87	4.1	170
06-Feb-87	4.5	162
0f-Dec-87	5.0	147
23-Feb-88	4.7	152
01-Jun-88	5.0	250
16-Aug-88	4.8	135

MONITOR WELL GM-84 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
25-Apr-06	6.4	10400
16-Apr-87	7.1	15100
18-Aug-87	6.5	11800
02-Dec-67	6.9	4550
24-Feb-88	7.0	8000
20-sun-88	6.9	18000
17-Aug-88	6.8	16200

COMPOSITE DISCHARGE
RW-1, RW-2, RU-3, RW-4, RW-5, RW-6

Date	pH (units)	Specific Conductance (umhos/cm)
19-Feb-87	6.0	1600
27-Feb-87/a	5.9	210
20-Mar-87	5.3	1500
30-Mar-87	6.5	1200
20-Apr-87	6.6	1350
08-May-87	6.6	1100
15-May-87/b	4.1	1390
22-May-87/b	3.0	1600
29-May-87/c	4.5	1350
05-Jun-87/b	3.7	1375
12-Jun-87/b	5.5	1150
19-Jun-87/b	3.3	2200
25-Jun-87	3.5	2100
01-Jul-87/c	5.8	1000
10-Jul-87/c	6.2	900
20-Jul-87/c	6.1	850
30-Jul-87/c	6.4	1100
07-Aug-87/c	6.6	1050
13-Aug-87/c	6.2	900
18-Aug-87/c	6.3	1700
28-Aug-87/c	6.4	875
04-Sep-87/c	6.4	1200
10-Sep-87/c	6.3	1000
18-Sep-87/c	6.5	1100
21-Sep-87/c	6.4	1400
02-Oct-87/c	6.6	900
13-Oct-87/c	6.4	1000
21-Oct-87/c	6.7	975
13-Nov-87	6.6	900
02-Dec-87	6.6	722
21-Dec-87/c	6.6	870
05-Jan-88/c	6.3	900
23-Feb-88	4.2	1300
24-Mar-88	5.4	1100
01-Jun-88	4.4	950
16-Aug-88	6.3	1200

/a = sample collected & tor heavy rain
 /b = composite sample from RU-1, W-2, RW-3, XU-5
 /c = composite sample from RU-1, RW-2, RW-3, RW-4, W-6

*(s) = shallow monitor well, about 13 ft deep
 (I) = intermediate monitor well, about 40 ft deep
 (D) = deep monitor well, about 65 ft deep

Data Revised: November 16, 1988

(NAVY.PBSCAM)

**RESULTS OF ANALYSES
WASTEWATER TREATMENT PLANT
NAS PENSACOLA, FLORIDA**

T Vocs = Total Volatile Organic Compounds
Bene = Benzene
Ctet = Carbon Tetrachloride
Cbene = Chlorobenzene
Cane = Chloroethane
Cform = Chloroform
Dicbene = Dichlorobenzenes
11Diane = 1,1-Dichloroethane
12Diane = 1,2-Dichloroethane
11Diene = 1,1-Dichloroethene
12Diene = trans-1,2-Dichloroethene
Ebene = Ethyl Benzene
Tetene = Tetrachloroethene
Tol = Toluene
111Triane = 1,1,1-Trichloroethane
Tee = Trichloroethene
vo = Vinyl Chloride
Nd = None Detected or Below Quantitation Levels
NA = Not Analyzed
T Bnas = Total Base Neutral Extractables
T Aes = Total Acid Extractables
(Data) = Sampled according to operating permit
(S) = Shallow monitor well, about 13 ft deep
(I) = Intermediate monitor well, about 40 ft deep
(D) = Deep monitor well, about 65 ft deep

NOTE: All blank entries designate that the compound was below the detection limit or below quantitation levels.

MONITOR WELL UG-1 (S)

VOLATILE ORGANIC COMPOUNDS
Concentrations In ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctct	Cbene	Cans	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
17-Jul-84	ND						/b										
31-Oct-84	28/a	<1	<3				/b						<3	<1			
(22-Feb-88)	ND						/b										
(02-Jun-88)	ND																
(15-Aug-88)	ND																
(08-Nov-88)	40/c																

/a = sample also contained <5 ug/l 2-chloroethylvinyl ether, <10 ug/l methylene chloride and <5 ug/l 1,1,2,2-tetrachloroethane
/b = reported in base/neutral extractable analytical results.
/c = sample contained 40 ug/l acetone, suspected laboratory contamination based on review of QA/QC data.

BASE NEUTRAL EXTRACTABLES
Concentration in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
17-Jul-84	ND					
31-Oct-84	27/a					
(22-Feb-88)	10/b					
(02-Jun-88)	ND					
(15-Aug-88)	ND					
(08-Nov-88)	ND					

/a = sample contained 27 ug/l bis (2-ethylhexyl) phthalate
/b = sample contained 10 ug/l bis (2-ethylhexyl) phthalate

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
17-Jul-84	ND		
31-Oct-84	ND		
(22-Feb-88)	ND		
(02-Jun-88)	ND		
(15-Aug-88)	ND		
(08-Nov-88)	ND		

(Monitor Well DG-1 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride	Manganese
(03-Dec-87)	5.4	5.0	NA
(22-Feb-88)	4.6	9.0	0.015
(02-Jun-88)	8	22	
(15-Aug-88)	5	12	
(08-Nov-88)	NA	NA	

E-11

MONITOR WELL DG-2 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctct	Cbena	Cana	Cform	Dicbena	11Diana	12Diana	11Diene	12Diene	Ebena	Tetena	Toi	111Triana	Tce	Vc
12-Sep-85	303/a			6	28		/c	240				9	17	81		6	1
(01-Dec-87)	172			5	150		/c	12						5			
(22-Feb-88)	35/b			3	26		TC										
23-Feb-88	well abandoned																

/a = sample also contained 88 ug/l methylene chloride and 27 ug/l 1,1,2,2-tetrachloroethane

/b = sample also contained 6 ug/l total xylenes

/c = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	841/a	330	330	170		
(01-Dec-87)	310	160	36	66	48	
(22-Feb-88)	101	59	14	28		
23-Feb-88	well abandoned.					

/a = sample also contained 11 ug/l dl-n-butyl phthalate

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethyphenol	Phenol
12-Sep-85	780	760	20
(01-Dec-87)	ND		
23-Feb-88	well abandoned		

MONITOR WELL GM-9 (S)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vo
17-Jul-84	28,907			47			/c	6,900	9,600	125			675		11,500	60	
31-Oct-84	1,735/a			10	5	<5	1,000	660	<3		<5		4		<5	<1	21
03-Feb-87	1,784			80			885	403		11			42		356	7	
15-May-87	1,961/b			8			1,327	27				3	23	2		1	
18-Aug-87	ND																
(01-Dec-87)	ND						/d										
(24-Feb-88)	54/e						/d										
(20-Jun-88)	ND																
(17-Aug-88)	ND																

- /a = sample also contained <10 ug/l methylene chloride and 6 ug/l 1,1,2,2-tetrachloroethane
- /b = sample also contained 243 ug/l dibromochloromethane and 327 ug/l trichlorofluoromethane
- /c = not reported
- /d = reported in base/neutral extractable analytical results
- /e = sample contained 54 ug/l acetone; estimated value; suspected laboratory contamination based on review of QA/QC data

BASE NEUTRAL EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	9,450	3,200	2,250	4,000		
03-Feb-87	515	262	109	127	17	
18-Aug-87	ND					
(01-Dec-87)	28	17	11			
(24-Feb-88)	ND					
(20-Jun-88)	ND					
(17-Aug-88)	ND					

ACID EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	70/a	20	
03-Feb-87	ND		
(01-Dec-87)	ND		

- /a = sample also contained 50 ug/l p-chloro-m-crocol

(Monitor Well GM-9 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	2.1	2.9
(24-Feb-88)	1.8	1.8
(20-Jun-88)	3	5
(17-Aug-88)	2	4

MONITOR WELL GM-62 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	52/a						/b						6	2			
(02-Dec-87)	ND						/b										
(23-Feb-88)	9						/b				9						
(20-Jun-88)	161				31			102								28	
(16-Aug-88)	346							287								ca	

/a = sample also contained 21 ug/l methylene chloride and 23 ug/l 1,1,2,2-tetrachloroethane
 /b = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(02-Dec-87)	ND					
(23-Feb-88)	ND					
(20-Jun-88)	ND					
(16-Aug-88)	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

E-15

MONITOR WELL GM-63 (D)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctat	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	16/a						/b						6	2			
(02-Dec-87)	ND						/b										
(23-Feb-88)	ND						/b										
(02-Jun-88)	66			2			64										
(16-Aug-88)	ND																

/a = sample also contained 8 ug/l 1,1,2,2-tetrachloroethane
 /b = reported in base/neutral extractable analytical results

BASS NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Nes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(02-Dec-87)	ND					
(23-Feb-88)	ND					
(02-Jun-88)	ND					
(16-Aug-88)	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(02-Dec-87)	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(02-Dec-87)	470	830
(23-Feb-88)	4201	800
(02-Jun-88)	789	1140
(16-Aug-88)	448	850

MONITOR WELL 61-64 (I)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	23/a						/b						9				
(02-Dec-87)	102			19			/b	83									
(23-Feb-88)	12						/b	12									
(02-Jun-88)	2261			3	111		e	on	4		o						
(16-Aug-88)	ND																

/a = sample also contain 1 ug/l 1,1,2,2-tetrachloroethane
/b = in base/ne : extractable analytical results

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	610/a					
(02-Dec-87)	49		49			
(23-Feb-88)	22/b		10			
(02-Jun-88)	ND					
(16-Aug-88)	ND					

/a = sample contained 610 ug/l dl-n-butyl phthalate
/b = sample also contained 12 ug/l bis (2-ethylhexyl) phthalate; 10 ug/l 1,2-dichlorobenzene estimated value based on review of QA/QC data

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(02-Dec-87)	ND		

INORGANICS
Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(02-Dec-87)	330	470
(23-Feb-88)	2001	340
(02-Jun-88)	86	136
(16-ha-88)	142	235

MONITOR WELL GM-65 (D)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc	
12-Sep-85	4						/a										4	
(01-Dec-87)	50/b						/a										50	
(24-Feb-88)	25/c						/a											
(20-Jun-88)	ND																	
(15-Aug-88)	ND																	

/a = reported in base/neutral extractable analytical results

/b = field replicate of GM-65 contained no VOCs

/c = sample contained 25 ug/l acetone; estimated value; suspected laboratory contamination based on review of QA/QC data

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(01-Dec-87)	ND					
(24-Feb-88)	ND					
(20-Jun-88)	ND					
(15-Aug-88)	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(01-Dec-87)	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	120	180
(24-Feb-88)	110	180
(20-Jun-88)	110	192
(15-Aug-88)	76	156

MONITOR WELL GM-66 (I)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	3,717/a			16			/c	14		160	882		5	5		2,600	27
03-Feb-87	16,574			34				18		446			8	15		15,907	146
15-May-87	24,750															24,750	
18-Aug-87	14,730			140							990					13,600	
(01-Dec-87)	12,331			49			/c	15		390	1,600			7		10,000	270
(24-Feb-88)	6,377			61			/c	18		320/b	1,600/b			8		4,200/b	170
(02-Jun-88)	8,400									500	1,300			300		6,300	
(17-Aug-88)	5,600										600					5,000	

/a = sample also contained 8 ug/l 1,1,2,2-tetrachloroethane
/b = concentration exceeded calibrated rang. of instrument
/c = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
03-Feb-87	ND					
18-Aug-87	23/a					
(01-Dec-87)	23	13			10	
(24-Feb-88)	46/b	11			10	
(02-Jun-88)	29	17			12	
(17-Aug-88)	124	40		15	69	

/a = sample contained 23 ug/l diethylphthalate
/b = sample also contained 25 ug/l pyrene; 11 ug/l 1,2-dichlorobenzene and 10 ug/l naphthalene estimated values based on review of QA/QC data

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	WD		
03-Feb-87	ND		
(01-Dec-87)	30	30	

(Monitor Well CM-66 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	640	530
(24-Feb-88)	670	620
(02-Jun-88)	527	540
(17-Aug-88)	465	460

MONITOR WELL GM-67 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	85			12			/a	7			16					50	
03-Feb-87	753			70			507	85			12					78	1
15-May-87	8															8	
18-Aug-87	258	2		79			170	7									
(01-Dec-87)	ND						/a										
(24-Feb-88)	ND						/a										
(02-Jun-88)	4			4													
(17-Aug-88)	ND																

/a = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	510	160	150	200		
03-Feb-87	328	114	86	128		
18-Aug-87	145	62	38	45		
(01-Dec-87)	ND					
(24-Feb-88)	ND					
(02-Jun-88)	ND					
(17-Aug-88)	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
03-Feb-87	ND		
(01-Dec-87)	ND		

E-21

(Monitor Well CM-67 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	55	68
(24-Feb-88)	130	200
(02-Jun-88)	24	29
(17-Aug-88)	50	84

MONITOR WELL GM-68 (D)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc	
12-Sep-85	10						/a										10	
(01-Dec-87)	ND						/a											
(24-Feb-88)	ND						/a											
(02-Jun-88)	ND																	
(15-Aug-88)	ND																	

/a = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(01-Dec-87)	ND					
(24-Feb-88)	ND					
(02-Jun-88)	ND					
(15-Aug-88)	ND					

E-23

ACID EXTRACTABLES

Concentration in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(01-Dec-87)	ND		

INORGANICS

Concentration in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	61	120
(24-Feb-88)	67	120
(02-Jun-88)	72	138
(15-Aug-88)	79	146

MONITOR WELL GM-69 (I)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc	
12-Sep-85	64	3					/c	47						8			3	3
03-Feb-87	1,412	9		387	36		710	238				3		4			8	17
15-May-87	792/a	3		112			543	38				2		3				6
18-Aug-87	6,050			232			5,700	118										
(01-Dec-87)	450	6		240	93		/c	89										22
(24-Feb-88)	686/b	5		510	69		/c	76							5			19
(02-Jun-88)	5,080			220			4,700							160				
(17-Aug-88)	3,135			120			3,015											

/a = sample also contained 85 ug/l dibromochloromethane
 /b = sample also contained 8 ug/l total xylenes
 /c = reported in base/neutral extractable analytical results

BASB NEUTRAL EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	3,381	620	1,400	1,350	11	
03-Feb-87	505	148	192	165		
18-Aug-87	1,841	594	774	473		
(01-Dec-87)	2,540	660	1,000	880		
(24-Feb-88)	2,050	540	800	710		
(02-Jun-88)	1,771	454	729	588		
(17-Aug-88)	2,560	660	1,100	800		

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aca	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
03-Feb-87	ND		
(01-Dec-87)	ND		

(Monitor Well CM-69 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	510	120
(24-Feb-88)	500	730
(02-Jun-88)	561	720
(17-Aug-88)	598	785

MONITOR NELL GM-71 (S)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc	
12-Sep-85	23			10				12									1	

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Napthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

INORGANICS
Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	9.8	8.9
(24-Feb-88)	5.7	11.0
(01-June-88)	4	5
(16-Aug-88)	7	10

E-26

MONITOR WELL GM-72 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations In ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cans	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	1			1													

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

M
1

Date Sampled	Sodium	Chloride
(03-Dec-87)	79	98
(23-Feb-88)	42	46
(01-Juni-88)	44	b9
(16-Aug-88)	73	109

f*

MONITOR HELL 6M-74 (D)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctct	Cbene	Cane	Cform	Diobene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Ve
12-Sep-85	1						/b							1			
(01-Dec-87)	ND						/b										
(22-Feb-88)	22/a						/b										
23-Feb-88	well abandoned																

/a = sample contained 22 ug/l acetone; estimated value; suspected laboratory contamination based on review of QA/QC data
/b = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(01-Dec-87)	ND					
(22-Feb-88)	ND					
23-Feb-88	well abandoned					

ACID EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-83	10		10
(01-Dec-87)	ND		
23-Feb-88	well abandoned		

INORGANICS Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(01-Dec-87)	81	130
(22-Feb-88)	63	120
23-Feb-88	Well abandoned	

MONITOR WELL GM-75 (I)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctct	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	58/a			55			/b	1									1
(01-Dec-87)	170			110			/b	44						16			
(22-Feb-88)	160			160			/b										
(22-Feb-88)	170			170			/b										
23-Feb-88	well abandoned																

/a = sample also contained 1 ug/l bis (chloromethyl) ether
/b = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(01-Dec-87)	184	100	16	30	38	
(22-Feb-88)	24	24				
(22-Feb-88)	76/a	22				
23-Feb-88	well abandoned					

/a = sample also contained 54 ug/l bis (2-ethylhexyl) phthalate

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(01-Dec-87)	170	170	
(22-Feb-88)	ND		
23-Feb-88	well abandoned		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Manganese
12-Sep-88	0.065
23-Feb-88	well abandoned

MONITOR WELL GM-76 (S)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctat	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	11							11									

Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	210	250
(23-Feb-88)	190	220
(01-Jun-88)	207	305
(16-Aug-88)	501	980

MONITOR WELL GM-77 (S)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dlcbene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	16			15				1									

BASE NEUTRAL EXTRACTABLES Concentrations In ug/l (ppb)

Date Sampled	T Nes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	r
12-Sep-85	11				11	

b)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

INORGANICS

Concentrations In mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	53	50
(23-Feb-88)	43	48
(01-Juni-88)	40	44
(16-Aug-88)	303	680

MONITOR WELL GM-78 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	4			4													

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	11	17
(23-Feb-88)	14	22
(01-Jun-88)	10	18
(16-Aug-88)	4	6

MONITOR WELL GM-79 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tcoo	Vc
12-Sep-85	1													1			

BASE NEUTRAL EXTRACTABLES

Concentrations In ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	4-Trichlorobenzene
12-Sep-85	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-sop-85	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	34	50
(23-Feb-88)	17	18
(01-Jun-88)	14	20
(16-Aug-88)	20	24

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MONITOR WELL GM-83 (S)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
12-Sep-85	224/a													25	2		

/a = sample also contained 159 ug/l methylene chloride and 38 ug/l 1,1,2,2-tetrachloroethane

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	24	48
(23-Feb-88)	23	39
(01-Jun-88)	22	39
(16-Aug-88)	20	23

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MONITOR WELL GM-84 (I)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cene	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
25-Apr-86	13/a					6	/b										
18-Aug-87	5			5													
(02-Dec-87)	7			7			/b										
(24-Feb-88)	31/c						/b										
(20-Jun-88)	ND																
(17-Aug-88)	ND																

/a = sample also contained 7 ug/l m... lene chloride
 /b = port in l... tra... n... ts... laboratory... n... based... of QA/ data
 /c = file contained 31 l... e... t... value; sp...

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
25-Apr-86	71/a					
18-ma-87	NU					
(02-Dec-87)	ND					
(24-Feb-88)	ND					
(20-Jun-88)	NU					
(17-Atla-88)	ND					

/a = sample contained 71 ug/l bis(2-ethylhexyl)phthalate

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
25-Apr-86	ND		
(02-Dec-87)	ND		

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W
CT

COMPOSITE DISCHARGE
RW-1, RW-2, RW-3, RW-4, RW-5, RW-6

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vapor	Benz	Chet	Chene	Cene	Cform	Dichene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tee	Vo
18-Aug-87	3,008 ^{a/}			219			2,465	324									

a/ = well RW-5 down

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
18-Aug-87	1,361 ^{a/}	666	332	330	23	10

a/ = well RW-5 down

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride
(03-Dec-87)	170	200
(23-Feb-88)	150	200
(01-Jun-88)	108	190
(16-Aug-88)	123	185

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9-1-89

APPENDIX F

Water-Quality Data for
Point-of-Compliance Monitor Wells

pH and Specific Conductance
Organic Compounds and Inorganic Elements

**pH AND SPECIFIC CONDUCTANCE
MEASUREMENTS FROM POINT-OF-COMPLIANCE
MONITOR WELLS**

MONITOR WELL UG-1 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84		160
31-Oct-84	7.1	190
04-Feb-87	5.4	156
05-Feb-87	5.5	133
06-hb-87	5.6	141
05-Dec-87	6.2	120
22-Feb-88	5.9	170
02-Jun-88	5.5	260
15-Aug-88	5.9	170
08-Nov-88	6.4	230

MONITOR WELL DG-1 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84	6.8	1100
31-Oct-84	7.0	1400
04-Feb-87	5.6	480
05-Feb-87	5.6	117
06-Feb-87	5.4	97
22-Feb-88	6.0	255
23-Feb-88	Well abandoned	

MONITOR WELL DG-4 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84	6.8	950
31-Oct-84	7.0	880
04-Feb-87	1.6	546
05-Feb-87	6.0	239
06-Feb-87	6.1	202
03-Dec-87	6.6	522
23-Feb-88	6.6	840
29-Apr-88	6.5	2000
02-Jun-88	Well dry due to operation of dewatering system	

MONITOR WELL DG-5 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84		500
31-Oct-84	6.8	1150
04-Feb-87	5.9	880
05-Feb-87	6.3	696
06-Feb-87	6.2	740
23-Feb-88	6.4	660
02-Jun-88	6.6	700
16-Aug-88	5.8	260
08-Nov-88	6.7	520

MONITOR WELL DG-6 (S)*

Date	pH (units)	Specific Conductance (umhos/cm)
17-Jul-84		1200
31-Oct-84	7.0	1300
06-Feb-87	5.9	1006
05-Feb-87	6.2	1016
06-Feb-87	6.5	776
22-Feb-88	6.2	320
23-Feb-88	Well abandoned	

MONITOR WELL GM-75 (I)*

Date	pH (units)	Specific Conductance (umhos/cm)
04-Feb-87	6.2	3770
05-Feb-87	6.7	3770
06-Feb-87	7.1	3920
01-Dec-87	6.5	1840
22-Feb-88	6.8	2800

RESULTS OF ANALYSES
WASTEWATER TREATMENT PLANT
NAS PENSACOLA, FLORIDA

T Voc. = Total Volatile Organic Compounds
Bene = Benzene
Ctet = Carbon Tetrachloride
Cbene = Chlorobenzene
Cane = Chloroethane
Cfo m = Chloroform
Dicbene = Dichlorobenzenes
11Diane = 1,1-Dichloroethane
12Diane = 1,2-Dichloroethane
11Diene = 1,1-Dichloroethene
12Diene = trans-1,2-Dichloroethene
Ebene = Ethyl Benzene
Tetene = Tetrachloroethene
Tol = Toluene
111Triane = 1,1,1-Trichloroethane
Tce = Trichloroethene
vo = Vinyl Chloride
Nd = None Detected or Below Quantitation Levels
NA = Not Analyzed
T Bnes = Total Base Neutral Extractables
T Aes = Total Acid Extractables
(Date) = Sampled according to operating permit
(S) = Shallow monitor well, about 13 ft deep
(I) = Intermediate monitor well, about 40 ft deep
(D) = Deep monitor well, about 65 ft deep

NOTE: ALL blank entries designate that the compound was below the detection limit or below quantitation Levels.

MONITOR WELL UG-1 (S)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Voc	Bene	Ctet	Cbene	Cene	Cform	Dicbene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
17-Jul-84	ND						/b										
31-Oct-84	28/a	<1	<3				/b						<3	<1			
(22-Feb-88)	ND						/b										
(02-Jun-88)	ND																
(15-Aug-88)	ND																
(08-Nov-88)	40/c																

/a = sample also contained <5 ug/l 2-chloroethylvinyl ether, <10 ug/l methylene chloride and <5 ug/l 1,1,2,2-tetrachloroethane
 /b = reported in base/neutral extractable analytical results.
 /c = sample contained 40 ug/l acetone, suspected laboratory contamination based on review of QA/QC data.

BASS NEUTRAL EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Bne	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
17-Jul-84	ND					
31-Oct-84	27/a					
(22-Feb-88)	10/b					
(02-Jun-88)	ND					
(15-Aug-88)	ND					
(08-Nov-88)	ND					

/a = sample contained 27 ug/l bis (2-ethylhexyl) phthalate
 /b = sample contained 10 ug/l bis (2-ethylhexyl) phthalate

ACID EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
17-Jul-84	ND		
31-Oct-84	ND		
(22-Feb-88)	ND		
(02-Jun-88)	ND		
(15-Aug-88)	ND		
(08-Nov-88)	ND		

E-4

(Monitor Well UC-1 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Sodium	Chloride	Manganese
(03-Dec-87)	5.4	5.0	NA
(22-Feb-88)	4.6	9.0	0.015
(02-Jun-88)	8	22	
(15-Aug-88)	5	12	
(08-Nov-88)	NA	NA	

MONITOR WELL DG-1 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
17-Jul-84	17,820/a				180		/d	1,500						160	110		10
31-Oct-84	12,324/b	<1	425	160		320	/d	2,750		800		6	500	600	5,900	20	32
(22-Feb-88)	48/c				23		/d	11									
23-Feb-88	well abandoned																

/a = sample also contained 160 ug/l 2-hexanone, 11,000 ug/l methyl ethyl ketone and 4,100 ug/l acetone
 /b = sample also contained 800 ug/l 1,1,2,2-tetrachloroethane and <10 ug/l methylene chloride
 /c = sample also contained 14 ug/l acetone; estimated value based on review of QA/QC dot8
 /d = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
17-Jul-84	1,155/a	530	110	200	260	3
31-Oct-84	2,389/b	1,1631	193	187		
(22-Feb-88)	88/c	43	10	15		
23-Feb-88	well abandoned					

/a = sample also contained 2 ug/l acenaphthene and 50 ug/l 2-methyl naphthalene
 /b = sample also contained 8 ug/l di-n-octyl-phthalate and 638 ug/l nitrobenzene
 /c = sample also contained 20 ug/l bis (2-ethylhexyl) phthalate

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
17-Jul-84	3,810/a	480	3
31-Oct-84	35/b		
(22-Feb-88)	ND		
23-Feb-88	well abandoned		

/a = sample also contained 24 ug/l 2-chlorophenol, 3 ug/l 2,4-dichlorophenol and 3,300 ug/l 2-methyl phenol
 /b = sample contained 33 ug/l 2-chlorophenol

(Monitor Well DG-1 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Manganese
(22-Feb-88)	0.119
23-Feb-88	well abandoned

MONITOR WELL DG-4 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Diobene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vo
17-Jul-84	1,412/a			13	28		/a	850				2		210	61		20
31-Oct-84	1,218/b	2	<3	3		<5	/a	1,025	<3	<5	75	9	11	14	8	13	16
(03-Dec-87)	634/c			13	130		/a	310				5		34			
(23-Feb-88)	825						/a	140			410/d			25/f			250/d
(29-Apr-88)	1,810/g						/a	510			90	220		160			
(02-Jun-88)	well dry due to operation of dewatering system																
(17-Aug-88)	ND																
(08-Nov-88)	7							7									

- /a = sample also contained 43 ug/l total xylenes, 110 ug/l 2-hexanone and 75 ug/l 1,2-dichloro-1,1,2-trifluoroethane
- /b = sample also contained <10 ug/l methylene chloride and 16 ug/l 1,1,2,2-tetrachloroethane
- /c = sample also contained 07 ug/l 2-butanone, 21 ug/l 4-methyl-2-pentanone, 34 ug/l total xylenes, and 130 ug/l acetone (estimated value, suspected laboratory contamination based on review of QA/QC data)
- /d = concentration exceeded calibrated range of instrument
- /e = reported in base/neutral extractable analytical results
- /f = estimated value; holding time exceeded
- /g = sample also contained 150 ug/l styrene and 680 ug/l total xylenes

BASE NEUTRAL EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
17-Jul-84	ND					
31-Oct-84	716/a	194	38	90	383	
(03-Dec-87)	473/b	270	33	63	97	
(23-Feb-88)	342/c	180	24	45	77	
(29-Apr-88)	628/d	324	46	88	128	
(02-Jun-88)	well dry due to operation of dewatering system					
(17-Aug-88)	ND					
(08-Nov-88)	ND					

- /a = sample also contained 11 ug/l di-n-octyl-phthalate
- /b = sample also contained 10 ug/l 2-methylnaphthalene
- /c = sample also contained 16 ug/l 2-methylnaphthalene
- /d = sample also contained 42 ug/l 2-methylnaphthalene

(Monitor Well DG-4 continued)

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
17-Jul-84	ND		
31-Oct-84	137/a		95
(03-Dec-87)	199/b	85	
(23-Feb-88)	44/c		
(29-Apr-88)	26/d	14	

/a = sample also contained 12 ug/l 2-chlorophenol

/b = sample also contained 12 ug/l 2-chlorophenol, 37 ug/l 2-methylphenol, and 65 ug/l 4-methylphenol

/c = sample contained 12 ug/l 2-methylphenol and 32 ug/l 2,4-dimethylphenol

/d = sample also contained 12 ug/l M-cresol

INORGANICS

Concentration in mg/l (ppm)

Date Sampled	Manganese	Aluminum	Barium	Calcium	Chloride	Copper	Iron	Magnesium	Mercury	Potassium	Sodium	Fluoride	Sulfide	Sulfate
(03-Dec-87)	0.167	0.244	0.016	91.4	NA	0.003	0.262	14.3	0.0002	6.9	133	0.0002	0.036	NA
(23-Feb-88)	0.190	NOT ANALYZED												
(29-Apr-88)	0.25	NA		NA	138		0.29	NA		NA	106	NA		152
(02-Jun-88)	well dry due to operation of dewatering system													
(17-Aug-88)	0.10													
(08-Nov-88)	0.22													

MONITOR WELL DG-5 (S)

VOLATILE ORGANIC COMPOUNDS

Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctet	Cbene	Cane	Cform	Dicbene	11Diene	12Diene	11Diene	12Diene	Ebene	Tetene	Tol	111Triene	Tce	Vc
17-Jul-84	1,716/a						/d	37						6	26		
31-Oct-84	706/b	2		45	72	<5	/d	525	<3		<5	4	<3	18			9
(23-Feb-88)	126/c			9			/d	44				6					
(02-Jun-88)	24						22							2			
(16-Aug-88)	ND																
(08-Nov-88)	ND																

/a = sample also contained 450 ug/l methylene chloride, 7 ug/l 2-hexanone, 540 ug/l methyl ethyl ketone and 110 ug/l acetone
 /b = sample also contained <10 ug/l methylene chloride and <5 ug/l 1,1,2,2-tetrachloroethane
 /c = sample also contained 60 ug/l acetone (estimated value based on review of QA/QC data) and 7 ug/l total xylenes
 /d = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES

Concentration In ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
17-Jul-84	25	16	3	6		
31-Oct-84	1,218/a	708	80	170	250	
(23-Feb-88)	157/b	48	14	24	56	
(02-Jun-88)	ND					
(16-Aug-88)	ND					
(08-Nov-88)	ID					

ACID EXTRACTABLES

Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
17-Jul-84	ND		
31-Oct-84	15/a		
(23-Feb-88)	ND		
(02-Jun-88)	ND		
(16-Aug-88)	ND		
(08-Nov-88)	ID		

/a = sample contained 15 ug/l 2-chlorophenol

(Monitor Well DG-5 continued)

NORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Manganese
(23-Feb-88)	0.147
(02-Jun-88)	0.01
(16-Aug-88)	0.02
(08-Nov-88)	0.13

MONITOR WELL DG-6 (S)

VOLATILE ORGANIC COMPOUNDS
Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Bene	Ctot	Cbens	Cans	Cform	Dicbene	11Diane	12Diane	11Diene	12Diene	Ebene	Tetene	Tol	111Triane	Tce	Vc
16-May-84	916/a	<10			79	<10	/d	520		<10	14	<10	<10	140	79	21	
17-Jul-84	20,460/b						/d	1,500						170	330	20	
31-Oct-84	1,608/c	2	9	7	37	5	/d	1,225	<3	25	16	15	38	35	103	32	13
(22-Feb-88)	ND						/d										
23-Feb-88	well abandoned																

/a = sample also contained 13 ug/l methylene chloride
 /b = sample also contained 240 ug/l 2-hexanone, 10,200 ug/l methyl ethyl ketone and 0,000 ug/l acetone
 /c = sample also contained <10 ug/l methylene chloride and 33 ug/l 1,1,2,2-tetrachloroethane
 /d = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
16-May-84	988/a	470	41	77	380	
17-Jul-84	784/b	500	56	120	22	4
31-Oct-84	1,994/c	933	71	182	782	
(22-Feb-88)	ND					
23-Feb-88	well abandoned					

/a = sample also contained <10 ug/l of fluorene and phenanthrene
 /b = sample also contained 2 ug/l hexachloroethane and 80 ug/l 2-methyl naphthalene
 /c = sample also contained 26 ug/l di-n-octyl-phthalate

ACID EXTRACTABLES
Concentrations in ug/l (ppb)

Date Sampled	T Acs	2,4-Dimethylphenol	Phenol
16-May-84	1,783/a	730	1000
17-Jul-84	3,412/b	80	6
31-Oct-84	569/c	550	5
(22-Feb-88)	ND		
23-Feb-88	well abandoned		

/a = sample also contained 33 ug/l 2-chlorophenol, <10 ug/l 2,4-dichlorophenol and <10 ug/l pentachlorophenol
 /b = sample also contained 30 ug/l 2-chlorophenol, 2 ug/l 2,4-dichlorophenol and 3,300 ug/l 2-methyl phenol
 /c = sample also contained 14 ug/l 2-chlorophenol

(Monitor Well DG-6 continued)

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Manganese
(22-Feb-88)	0.016
23-Feb-88	well abandoned

MONITOR WELL GM-75 (I)

VOLATILE ORGANIC COMPOUNDS Concentrations in ug/l (ppb)

Date Sampled	T Vocs	Benz	Ctct	Cbenc	Cans	Cform	Dicbenc	11Diane	12Diane	11Diene	12Diene	Ebens	Tetene	Tol	111Triene	Tce	Vc
12-Sep-85	58/a			55			/b	1									1
(01-Dec-87)	170			110			/b	44						16			
(22-Feb-88)	160			160			/b										
(22-Feb-88)	170			170			/b										
23-Feb-88	well abandoned																

/a = sample also contained 1 ug/l bis (chloromethyl) ether
/b = reported in base/neutral extractable analytical results

BASE NEUTRAL EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Bnes	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Naphthalene	1,2,4-Trichlorobenzene
12-Sep-85	ND					
(01-Dec-87)	184	100	16	30	38	
(22-Feb-88)	24	24				
(22-Feb-88)	76/a	22				
23-Feb-88	well abandoned					

/a = sample also contained 54 ug/l bis (2-ethylhexyl) phthalate

ACID EXTRACTABLES Concentrations in ug/l (ppb)

Date Sampled	T Aes	2,4-Dimethylphenol	Phenol
12-Sep-85	ND		
(01-Dec-87)	170	170	
(22-Feb-88)	ND		
23-Feb-88	well abandoned		

INORGANICS

Concentrations in mg/l (ppm)

Date Sampled	Manganese
(22-Feb-88)	0.065
23-Feb-88	well abandoned