Engineers
Planners
Economists
Scientists

April 26, 1988

SE24770.S6

Mr. Don White, P.E.
TAC Chairman
Florida Department of
Environmental Regulation
1900 South Congress Avenue, Suite A
West Palm Beach, Florida 33406

Dear Mr. White:

Subject: Palm Beach County UIC Class I Injection Well
Operating Permit for WWTP System 9(N)

This submittal is in response to the issues raised in the draft of your letter to Mr. Weisman, dated September 21, 1987.

Several of the comments contained in that letter address items relative to the documentation that was submitted on November 27, 1985, in support of the operating permit application for the System 9(N) Deep Injection Well. In order to meet the optimistic schedule contained in Consent Order No. 83-0728, two of the supporting documents, the Engineering Report and the Operation and Maintenance Manual, were submitted in draft form. These documents were completed and provided in final format to DER West Palm Beach on January 27, 1986, and to members of the Technical Advisory Committee on March 24, 1986.

For convenience of the review effort, the responses included in this submittal reference the same item numbers used in the draft letter.

I. Well Completion

A. The 10 parameters referenced in the letter are included as Table 4-1 of the Engineering Report submitted on March 24, 1986.

The additional sampling requested for the two monitoring zones is presented as Attachment A to this submittal.

B. The daily shift report of August 28, 1985, a copy of which was provided to DER and all TAC members, gives the casing test pressure and a record of the test pressure at 10-minute intervals throughout the duration of the 1-hour test. The initials on the shift report are those of William Rice, the Engineer's authorized representative onsite at the time of the test.

The Engineering Report submitted to the Palm Beach County Water Utilities Department on February 18, 1986, and distributed to DER and members of the TAC committee on March 24, 1986, was signed and sealed by the Engineer of Record. The Registered Engineer attested by his signature and seal that the well had been completed in accordance with the contract specifications. The pressure test of the final casing string was a specific requirement of the contract, and as noted by the report from the Engineer's authorized representative, this requirement was satisfactorily fulfilled on August 28, 1985.

A copy of the daily shift report of August 28, 1985, is included as Attachment B.

The Engineer of Record, Dr. J.I. Garcia-Bengochea, is preparing a second letter of certification to address only the casing pressure test.

C. Attachment C contains the temperature log of the complete casing and injection zone that was run on March 9, 1988, after the well had been shut-in for 48 hours.

While it is evident from an examination of the log that the fluid within the casing had not reached temperature equilibrium with the fluid outside the casing, the log can provide a basis for comparison for future surveys, provided they are run after the well has been shut-in for the same amount of time, 48 hours.

The primary feature of interest for comparison with future temperature surveys will be the rapid temperature drop occurring between 2320 and 2380 feet in depth. This feature corresponds to the 3-degree temperature drop noted at a depth of 2,360 feet on the open hole temperature survey completed on July 8, 1985.

Future temperature surveys should replicate both the amount of temperature drop and the slope of the graph above and below this feature.

D. Rule 17-28.230 (1)(e) states as follows:

> The maximum velocity of injected fluid shall not exceed the point where the mechanical limits of well design or structure of the formation will be adversely affected. The maximum injection velocity of a well that begins operation after June 1, 1985 shall not exceed eight ft/sec unless the applicant can prove the the satisfaction of the Department that higher velocities will not compromise the integrity or operation of the well.

An injection velocity of 8 ft/sec was the design parameter used for the Palm Beach County System 9(N) deep injection well. Injection at this rate will have no adverse affect on the well design or on the structure of the receiving formation. This has been attested to by the Engineer of Record in the submittal of the operating permit application.

The comment by DER states that "Rule 17-28.22(7)(e) implies the need for reasonable assurance that the injection rates can be sustained as a practical matter."

As a practical matter, the transmissivity values for the boulder zone are generally so high that the limiting factor during an injection test of the boulder zone is the ability of the test injection pump to maintain the high rates of injection needed to perform the test.

Of necessity, these installations are temporary; in most cases the test pump is diesel-powered. As a result, it can be difficult to maintain a specific pumping rate, particularly towards the end of a step-test, when the pump is hot and is operating in the upper reaches of its performance curve. During the injection test of the completed well, injection rates in excess of 10,000 gpm were achieved. However, pump performance became erratic at the higher rates, making it difficult to identify actual injection pressures. Because the information gathered at a stable injection rate is of more value in judging the performance of a well, the decision was made to complete the test at the somewhat lower injection rate. The fact that a stable injection rate of 10,500 gpm could not be maintained is entirely due to the test injection pump and does not reflect any feature of the well.

The true limiting factor for safe operation of the well is the protection offered by the surge control system. The surge control system installed at System 9(N) was sized to accommodate the anticipated "normal" peak flow of 8,050 gpm with a safety factor of 30 percent. The safety factor is built into the system to allow the well to handle flows to 10,500 gpm.

It is the Engineer's opinion that the well can safely be operated at the design velocity of 8 feet/sec, and that the maximum allowable injection rate should be set at the design rate of 10,500 gpm.

E. What has been interpreted as "poor printing quality" on the VDL is actually attenuation of signal.

This can be distinguished from printing quality by examining the other data tracks printed on the log. All three data tracks are printed in the same operation, and as inspection of the log shows, the gamma and CBL tracks are crisp and clear. In addition, both the right and left border of the VDL are clear.

The VDL signal is a record of the total acoustic energy returning to the receiver. Signal strength is represented by the intensity of the printed track. Where the returning signal is weak, the intensity of the printed track is low. Where the returning signal is strong, the intensity of the printed track is high.

An examination of the VDL log shows that casing arrivals are present but relatively weak, a condition indicative of good casing-to-cement bond (as is confirmed by the relatively low travel time and low amplitude recorded on the CBL). Formation arrivals are present but are highly attenuated and signal strength is very weak.

If the VDL tool were being operated in a casing size of less than 10 inches, this combination of signal events could be interpreted as evidence of a good casing-to-cement bond coupled with a less effective cement-to-formation bond. In this instance the casing (24-inch) is beyond the effective diameter for the tool, and the attenuation is more likely the result of loss of signal to fluids within the casing and to cement behind the casing.

It is instructive to compare the log of the injection well with the log of the monitor well. Both logs were run on the same day using the same tool and were printed and developed at the same time. The only material difference is the diameter of two casings.

II. Operational Testing

Four months of operating data, from November 1987 through February 1987 have been compiled as requested and are provided in Attachment D to this letter.

In addition to the requested monthly report forms, the data have been displayed graphically to highlight deviations from the norm.

No significant deviations from the anticipated values were noted except in the weeks of February 11 and 18. During this period, it appears that the samples drawn from the monitor zones were either improperly collected or were confused during analysis. The data reported for chloride and conductivity of the lower monitor zone match that reported for the upper monitor zone.

On three different occasions the specific injectivity test varied from baseline value. However, these variations are the result of a 1/2-psi difference in recorded shut-in pressure and could be attributed to one of many potential sources of error. The variations appear to be spurious events, with no evidence of a true change in specific injectivity occurring.

III. Operation and Maintenance (O&M) Manual Completion

On November 27, 1985, the draft O&M Manual was submitted for review and comment by DER.

On January 27, 1986, the O&M Manual was submitted to DER with a request for confirmation of the specific monitoring requirements as submitted.

On March 24, 1986, following approval of the specific monitoring requirements, the O&M Manual was distributed to members of the Technical Advisory Committee.

The letter of September 21, 1987, implies that the final document has not been received by DER. Copies of the transmittal letters and UPS Acknowledgement of Delivery are provided in Attachment E.

In addition, a supplement to the existing plant O&M Manual was prepared to address the changes to the plant facilities and operating procedures that resulted from the combining of effluent flows from System 9(S) and System 9(N). This supplement was submitted to the Domestic Waste Permitting Section of DER in January 1986.

The comments contained in the letter of September 21, 1987, appear to address only the draft of the O&M Manual for the System 9 Deep Injection Well. Unless

otherwise noted, the responses to the specific questions reference the final version of the O&M Manual for the System 9 Deep Injection Well, as submitted on March 24, 1987.

A. Step 5 on page 3-10 of O&M Manual for the System 9 Deep Injection Well clearly states that the shut-in pressure of the well is to be recorded.

B. 1. Instructions for the operation of the injection system are included in the Operations and Maintenance Manual Supplement for the Effluent Disposal System. This document provides a plant schematic diagram, Figure 1-3, which shows all piping, valves, and equipment that are critical to the operation of the plant. Specific valves are indicated on the plant schematic diagram by their tag numbers, and their use is detailed in Section 3, Operation of the Injection Facilities.

2. One of the major advantages of the deep injection well effluent disposal system is its simplicity. The only major equipment that can significantly affect safe operation is the surge control system.

Both the O&M Manual for the System 9 Deep Injection Well and the Operations and Maintenance Manual Supplement for the Effluent Disposal System address the normal operation of this equipment along with specific instructions to the operator for actions to be taken if the equipment is found to be operating out of specification.

Monitoring instrumentation is addressed by the O&M Manual for the System 9 Deep Injection Well. The Operations and Maintenance Manual Supplement addresses the operation of the pump station.

Emergency power for the plant was already in place at the time of installation of the deep well effluent disposal system and is addressed in the existing plant O&M Manual.

3. Both the O&M Manual for the System 9 Deep Injection Well and the Operations and Maintenance Manual Supplement for the Effluent Disposal System provide checklists for specific items that are to be checked during daily, weekly, and monthly operational maintenance. Where appropriate, manufacturer's technical information has been included to assist in the maintenance effort.

4. This statement requires no response.

IV. Operating Permit

A. A waste stream analysis for the parameters requested is included in Attachment A.

B. This item has been addressed by earlier submittals from the Palm Beach County Water Utilities Department.

C. These items have been addressed by earlier submittals from the Palm Beach County Water Utilities Department.

We trust this response resolves all outstanding questions about the construction and testing of the Class 1 Deep injection well at the PBCWUD System 9(N) Wastewater Treatment Plant, and that an operating permit can soon be issued for this facility.

Should you have any further questions concerning the injection well system or this response, please contact me at (305) 426-4008 or (407) 737-6665.

Very truly yours,

Thomas M. McCormick
Senior Hydrogeologist

DBT087/008
Attachments
cc. Robert Weisman/PBCWUD
Bevin Beaudet/PBCWUD
Lawton McCall/PDCWUD

CH2M HILL
Engineers
Planners
Economists
Scientists

June 8, 1988

SEF24770.S6

Mr. Don White, P.E.
TAC Chairman
Florida Department of
Environmental Regulation
Suite A
1900 South Congress Avenue
West Palm Beach, Florida 33406

Dear Mr. White:

Subject: Palm Beach County UIC Class I Injection Well Operating Permit for WWTP System 9(N), UIC Permit Application UO-112903

This is in response to your letter to Mr. Tom McCormick, dated May 23, 1988, regarding the comments to our submittal of April 26, 1988.

For convenience, our responses will reference the same item numbers used in your letter.

I. Well Completion

A. The temperature of the fecal coliform sample was not presented in Attachment A of the submittal package. This omission was an oversight on our part while collecting the samples in the field. Background temperature data for the monitor well will be discussed further in Item II.B of this letter.

Several of the additional parameters requested for upper and lower monitor zone background values were not included in Attachment A. Those parameters are sulfide, soluble ortho-phosphate, ammonium, organic nitrogen, and antimony. A revised "Report of Analysis" of these parameters was included in the submittal to the TAC members. A copy of this "Report of Analysis" is also enclosed in this letter for your records.

Attachment A included 1,2-dichloroethylene in the EPA Method 601 analysis performed on the injectant effluent and the monitor well. Trans-1,2-dichloroethene, as reported, is synonymous with 1,2-dichloroethylene.

II. Operational Testing

B. Fecal coliform and BOD_5 values were included in the submittal to members of the TAC. A copy of these values have also been enclosed for your use. Background temperature values for the monitor zones were collected but were not available before the submittal was distributed. Temperature values corresponding to the sample dates when the fecal coliform and BOD_5 analyses were performed will be compiled and distributed at the June 14, 1988, TAC meeting.

III. O&M Manual

B. Members of the TAC have not received a copy of the O&M Manual Supplement. However, it is our understanding that Mr. Lawton McCall previously submitted additional copies to DER.

IV. Operating Permit

B. Enclosed is a copy of the Operating Permit Application as submitted to FDER in November of 1985.

We trust that this reply resolves the questions concerning the submittal dated April 26, 1988, regarding the System WWTP Injection Well Operating Permit.

Should you have any further questions, please feel free to contact me.

Very truly yours,

Bart Ziegler
Civil Engineer

DBT087/021
Attachments
cc: Robert Weisman/PBCWUD
Bevin Beaudet/PBCWUD
Lawton McCall/PBCWUD

page 1
of 2

TAC Meeting
Dayton 9
6-14-88

Applicant was able to shut-in well for only 48 hours. It did not reach equilibrium

9:00 - 11:00 - upper monitor zone
17:00 - 18:00 - lower monitor zone

1775 sharp increase in Cl

TAC agreed that temperature log yields ambiguous results. Recommend a RAT test.

Date	Lower	Upper 2 zone
2-4-88	5748	2899
2-11-88	2849	2899
2-10-88	7900 ✡	2800
2-18-88	2899	2799
2-25-88	8097 ✡	2849

sample taken by CH2M Hill

TAC also requested ~~the~~ that the applicant continue to sample on a weekly basis. This request was due to the fluctuation in Cl and ~~[illegible]~~ Specific conductivity. Sampling will continue until RAT test results is approved.

1. Increase usage of western wellfield
2. SWIMM data for May and June
3.

Wells 17 & 20 are being used
Well 17 on line
Expect either 18 or 19 come on line
fairly soon

Applicant request ~~maximum~~ maximum injection rate of 10,500 GPM.
TAC agreed.

TAC accepts specific injectivity test

~~Applicant~~ Applicant will send each TAC member a copy of the supplemental O&M Manual.

Applicant will submit a letter to the TAC which discusses procedure for RAT test. ~~Suggested~~ The suggested injection ~~rate~~ velocity is 5 ft/min.

June 20, 1988

Mr. Don White, P.E.
TAC Chairman
Florida Department of
Environmental Regulation
1900 S. Congress Avenue
Suite A
West Palm Beach, Florida 33406

Reference: Operating Permit for Class I Injection Well
Wastewater Treatment Plant System 9(N)
UIC Permit Application UO-112903

Dear Mr. White:

This letter is to comment on some of the points discussed at the Technical Advisory Committee (TAC) meeting of June 14, 1988. In this meeting, the TAC discussed the approval of the operating permit for System 9(N) deep injection well system.

When the injection well for the referenced system was constructed in 1985, Section 17-28 of the Florida Administrative Code, Underground Injection Control, did not require a Radioactive Tracer Survey (RTS). The construction permit under which the injection well and dual-zone monitor well were installed also did not require an RTS on the final casing string of the injection well. The TAC has stipulated that an RTS will be required within 6 months of the issuance of an operating permit. This test is to be completed, provided there is a dry spell (1 to 3 weeks without rainfall) within the 6-month period after the operating permit is issued, and DER allows use of the emergency discharge.

We realize that the temperature log conducted on March 9, 1988, does not correlate exactly with the temperature shifts of the log run during construction on July 8, 1985. Differences in temperature shifts of the two logs are due to the

BOX 16097 WEST PALM BEACH, FLORIDA 33416-6097 (407) 641-3403

warming of the injection well casings surrounding cemented annuli by the effluent over the past 2 years. We are not certain of the time required for casing temperatures to reach ambient conditions of the formation after the injection well has been shut-in, but it is definitely more than the 48 hours (time elapsed between shut-in on March 7 and the log run on March 9). The most recent log performed on the well should provide adequate background data for future temperature logs that are run 48 hours after the injection well is shut-in.

There was reason for concern over the weekly monitor well water quality discrepancies in February 1988. After the meeting on June 14, 1988, J. I. Garcia-Bengochea and Bart Ziegler, of CH2M Hill, investigated the monitor well and sampling routine typically followed by the operators. They found that the discrepancies in the chloride and conductivity readings were due to the existing wellhead piping and sampling routine. Both zones are connected into a 2-inch line leading to the plant mud well (see the attached figure). The pressures on the upper and lower monitor zones are approximately 10 psi and 6 psi, respectively. Before sampling, the operator opened both monitor well zones to purge the system. Back pressure that could build in the 2-inch line could cause water from the upper monitor zone to enter into piping in the lower zone. In the sampling routine, the zones were allowed to flow separately for only 5 or 10 minutes before the samples are collected.

On February 11 and 18, water from the upper zone backflowed and filled the top portion of the 6-inch casing (the lower zone) during purging. Time constraints prevented separate purging of the lower zone before sampling, which resulted in similar water samples from both zones. These procedures have been corrected for the future collection of water quality samples.

Because problems associated with the sampling procedure have been recognized, we suggest waiving the proposed multiple daily sampling episodes (7:00 A.M., 11:00 A.M., and 3:00 P.M.) requested by the TAC. However, weekly sample collection will continue until the RTS has been run and approved.

We also question the necessity of performing a Radioactive Tracer Survey due to the sampling protocol previously utilized, as discussed and explained above. We would prefer to continue data collection on the monitor well with the new sampling routine for the next few months. We therefore request the TAC to reevaluate the requirement to perform the RTS.

We trust that this response resolves any unanswered questions revised during the recent TAC meeting on the Class I deep injection well at the PBC WUD System 9(N) Wastewater Treatment Plant.

Should you have any questions concerning this letter, please contact me.

Very truly yours,

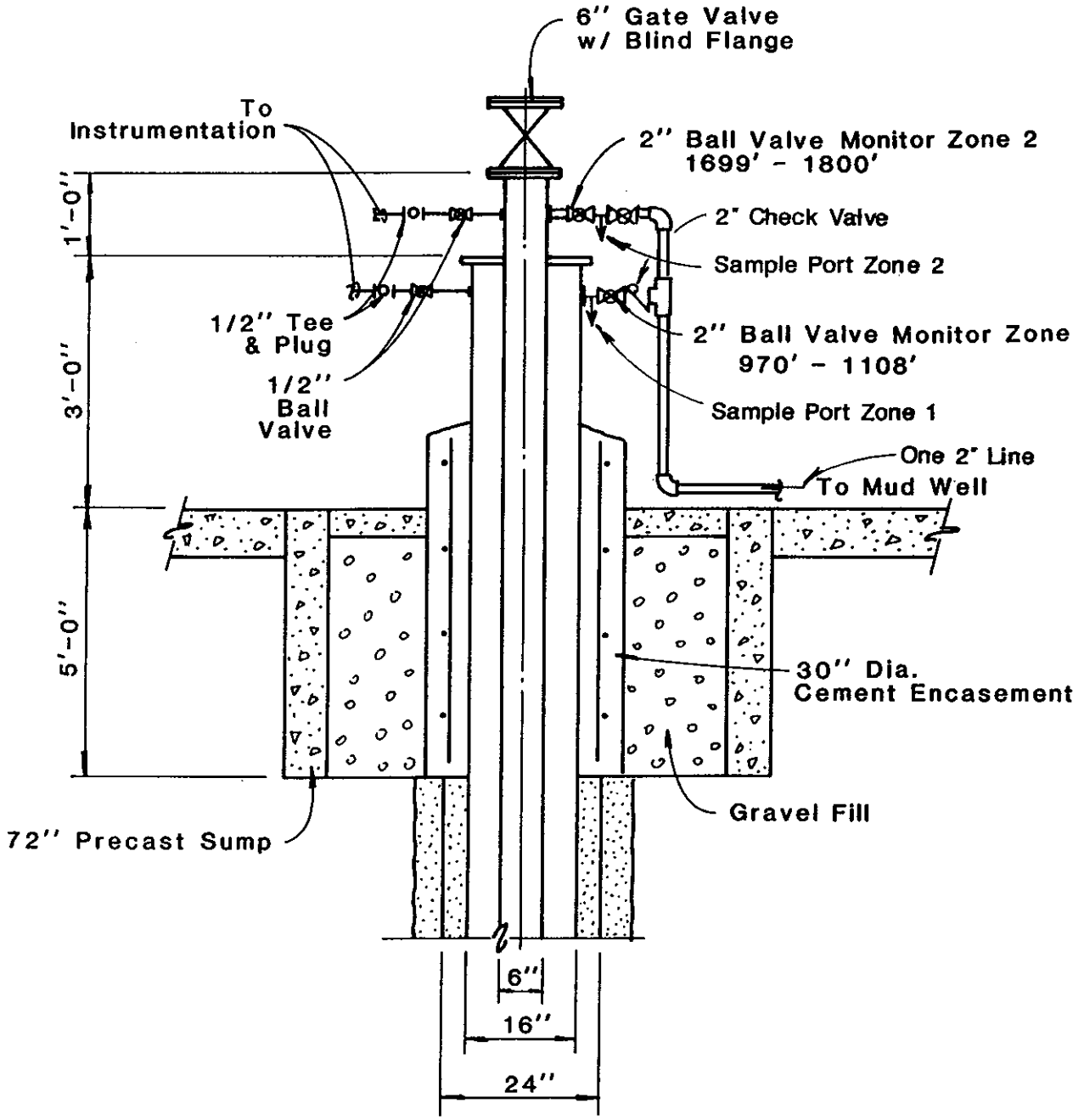
For Bevin A. Beaudet, P.E.
Director
PBC Water Utilities Department

BAB/em

Attachment

cc: Scott Benyon/DER WPB
TAC Members
C. Lawton McCall/PBC WUD
J. I. Garcia-Bengochea/CH2M Hill
Bart Ziegler/CH2M Hill
Gerald Foess/CH2M Hill

Ser24770.00



Dual-Zone Monitor Well Head

CH2MHILL

MEMORANDUM

CH2M HILL

TO: Donald B. White/DER/WPB
Peggie Highsmith/DER/WPB
Oliver P. Board/DER/WPB
Cathy Conrardy/DER/TLH
Richard J. Deuerling/DER/TLH
David Butler/SFWMD
Michael Merritt/USGS/Miami
Gene Coker/EPA/ATL
Anthony LasCasas/PBCHD

COPIES: Bevin Beaudet/PBCWUD
Lawton McCall/PBCWUD
Alex Padva/DER/WPB
J.I. Garcia-Bengochea/CH2M HILL
Tom McCormick/CH2M HILL

FROM: Bart Ziegler/CH2M HILL

DATE: August 3, 1988

SUBJECT: SEF24770.JO

PROJECT: Palm Beach County System 9(N) Injection Well UIC Permit Application UO-112903

Enclosed for your review are water quality data from the dual-zone monitor well at the System 9(N) Waste Water Treatment Plant (WWTP).

On June 14, 1988 a site visit was made by CH2M HILL to investigate the sampling routine. The source of the anomalies in the water quality data was due to the existing well head piping and sampling routine, as outlined in Mr. Bevin Beaudet's letter on June 20, 1988 to Mr. Donald White.

The sampling routine was then corrected. Since these corrections were made the water quality has remained consistent. This consistency is shown in the tables on the following pages.

A brief slide show will be presented at the Technical Advisory Committee (TAC) meeting scheduled for 1:00 p.m. on August 9, 1988. At this time we would respectfully request that members of the TAC reconsider the necessity to perform the radio active tracer survey scheduled for later this year.

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

	DATE	CHLORIDES Lower Zone 6" Casing (mg/l)	CHLORIDES Upper Zone 16" Casing (mg/l)
	11/12/87	5648	2949
	11/19/87	6398	2799
	11/24/87	6048	2649
	12/03/87	6198	2849
	12/10/87	6348	2749
	12/17/87	6398	2799
	12/23/87	5998	2749
	12/30/87	6548	3149
	01/07/88	6148	2999
	01/14/88	6378	3049
	01/21/88	6148	2949
	01/28/88	6698	2549
	02/04/88	5798	2949
	02/04/88	5748	2899
	02/11/88	2849	2899
	02/18/88	2899	2799
	02/23/88	3948	2699
	02/25/88	8097	2849
	03/03/88	4374	3074
	03/10/88	5948	3099
	03/17/88	6348	2999
	03/24/88	5800	2725
	03/31/88	5998	3099
	04/07/88	5698	2999
	04/14/88	5798	2999
	04/21/88	5298	2699
	04/28/88	6266	3199
	05/05/88	5348	2999
	05/12/88	6398	2849
	05/19/88	5548	2749
	05/26/88	6048	2799
	06/02/88	5098	2849
	06/09/88	6048	2899
	06/15/88	2849	2849
*	06/17/88	8747	3699
	06/22/88	8697	2799
	06/30/88	8497	2999
	07/06/88	8197	
DUPLICATE	07/06/88	8197	
	07/07/88		2649
DUPLICATE	07/07/88		2699
	07/13/88	8003	
	07/14/88		2644

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

DATE	CHLORIDES Lower Zone 6" Casing (mg/l)	CHLORIDES Upper Zone 16" Casing (mg/l)
07/20/88	7893	
07/21/88		2749
07/27/88	9547	
07/28/88		2699

NOTE * DENOTES FIRST SAMPLING EVENT AFTER CH2M HILL INVESTIGATED MONITOR WELL WATER QUALITY ANOMALIES.

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

	DATE	CONDUCTIVITY Lower Zone 6" Casing (umhos/cm)	CONDUCTIVITY Lower Zone 16" Casing (umhos/cm)
	11/12/87	16930	8500
	11/19/87	16980	8490
	11/24/87	17180	8400
	12/03/87	17110	8530
	12/10/87	16520	8520
	12/17/87	16680	8420
	12/23/87	16000	8460
	12/30/87	16830	8370
	01/07/88	16240	8470
	01/14/88	16895	8420
	01/21/88	15780	8360
	01/28/88	17170	8380
	02/04/88	15304	8410
	02/04/88	15200	8420
	02/11/88	8430	8320
	02/18/88	8410	8380
	02/23/88	11690	8400
	02/25/88	19720	8370
	03/03/88	11510	8420
	03/10/88	15630	8360
	03/17/88	16860	8500
	03/24/88	16250	8430
	03/31/88	16260	8430
	04/07/88	15275	8380
	04/14/88	15720	8330
	04/21/88	15040	8390
	04/28/88	15980	8250
	05/05/88	14670	8340
	05/12/88	16000	8260
	05/19/88	14900	8460
	05/26/88	16540	8350
	06/02/88	14750	8390
	06/09/88	16660	8490
	06/15/88	8330	8400
*	06/17/88	27000	8300
	06/22/88	22700	8350
	06/30/88	22600	8380
	07/06/88	22500	
DUPLICATE	07/06/88	22700	
	07/07/88		8390
DUPLICATE	07/07/88		8400
	07/13/88	22500	
	07/14/88		8290

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

DATE	CONDUCTIVITY Lower Zone 6" Casing (umhos/cm)	CONDUCTIVITY Lower Zone 16" Casing (umhos/cm)
07/20/88	22100	
07/21/88		8310
07/27/88	23000	
07/28/88		8330

NOTE * DENOTES FIRST SAMPLING EVENT AFTER CH2M HILL INVESTIGATED MONITOR WELL WATER QUALITY ANOMALIES.

MEMORANDUM

CH2M HILL

TO: Donald B. White/DER/WPB
Peggie Highsmith/DER/WPB
Oliver P. Board/DER/WPB
Cathy Conrardy/DER/TLH
Richard J. Duerling/DER/TLH
R. Shelton Graves/DER/TLH
David Butler/SFWMD
Michael Merritt/USGS/Miami
Gene Coker/EPA/ATL
Lawton McCall/PBCWUD
J. I. Garcia-Bengochea/CH2M HILL/GNV
Tom McCormick/CH2M HILL

FROM: Bart Ziegler/CH2M HILL/DFB

DATE: August 9, 1988

SUBJECT: Palm Beach County Water Utilities Department System #9(N) Deep Injection Well Technical Advisory Committee Meeting Permit Number UO-112903

PROJECT: SEF24770.J0

AGENDA

1. Comments from the last TAC meeting on June 14, 1988.

2. Comments regarding Mr. Bevin Beaudet's letter to Mr. Donald White of June 20, 1988.

3. Monitor well water quality.

4. Reevaluation of the radio active tracer survey.

5. Other matters of interest.

DBT087/035

Palm Beach Co System 9 TAC 8/9/88

Name	Co/Agency	Ph #
Peggie Highsmith	DER/WPB	407/964-9668
LAWTON MCCLAIN	PBC WUD	407-641 3403
J.I. GARCIA-BENGOCHEA	CH2M HILL	904-377-2442
MICHAEL MERRITT	USGS/MIA	305-594-0655
BART ZIEGLER	CH2M HILL	305 426-4008
David Butler	SFWMD	407-686-8800
Anthony LasCasas	PBCHD	407-820-3070
Thomas M. McCormick	CH2M Hill	305-426-4008
Woody Board	DER/WPB	407/964-9668
Cathy Cernansky	DER/Tall	904/488-3601
James H. Carey	EPA/ATL	404/347-3866
Donald B White	DER-WPB	407-964-9668

ATTACHMENT A

Sample 50666 Background water quality data for the upper monitor zone (970 to 1105 ft bls) of the Onsite Monitor Well at the Palm Beach County Water Utilities Department System 9 (N) WWTP.

Sample 50667 Background water quality data for the lower monitor zone (1699 to 1800 ft bls) of the Onsite Monitor Well at the Palm Beach County Water Utilities Department System 9 (N) WWTP.

Sample 50668 Waste Stream Analysis for injectant effluent from the Palm Beach County Water Utilities Department System 9 (N) WWTP.

Sample 50669 Travel Blank for quality control.

GEO TEC inc. 1602 CLARE AVENUE · WEST PALM BEACH, FL 33401 · 305/833-7280

BFORM BACTERIOLOGICAL ANALYSIS

CH2M HILL — CLIENT NAME AND ADDRESS

550 FAIRWAY DRIVE SUITE 205

DEERFIELD BEACH, FLORIDA 33441

FECAL COLIFORM MPN — BACTERIOLOGY

SYSTEM 9 DIW — PROJECT NAME

SE24770.S6 — PROJECT NUMBER

CLIENT — SAMPLE COLLECTED BY

NO.	COLLECTED	RECEIVED	SET UP	NBR	RESULT ORG/100mL
SAMPLE POINT #1 UPPER MONITOR ZONE					
31682	02-10 1500	02-10 1700	02-10 1825	61-322	<2
SAMPLE POINT #2 LOWER MONITOR ZONE					
31683	02-10-1445	02-10 1700	02-10 1825	61-322	<2
SAMPLE POINT #3 INJECTANT FLUID					
31684	02-10 1500	02-10 1700	02-10 1825	61-322	54C

DATE 02-15-88 LAB ID 86122,86109,E86048

BY _____ DIRECTOR

_____ QAO

CH2M HILL ENVIRONMENTAL LABORATORIES
7201 N.W. 11th Place, P.O. Box 1647
Gainesville, Florida 32602
904/377-2442
State of Florida Certification No.: 82112, E82124

Sample Nos. 50666-50669
Number of Samples: 4
Date Completed: 02/21/88
Date Reported: 03/02/88

REPORT OF ANALYSIS

Client: Palm Beach County Water Utilities Dept.
Attention: Tom McCormick/Bart Ziegler
Address: CH2M HILL Deerfield Beach Office

Project No. SE24770.S6
Received: 02/12/88

Description of Sample: Water Samples
Collected on 02/10/88 by Bart Ziegler
Samples were iced and chemically preserved

EPA Method 601	#50666 Upper Monitor Zone (ppb)	#50667 Lower Monitor Zone (ppb)	#50668 Injectant Effluent (ppb)	#50669 Travel Blank (ppb)
Chloromethane	BMDL	BMDL	BMDL	BMDL
Bromomethane	BMDL	BMDL	BMDL	BMDL
Vinyl Chloride	BMDL	BMDL	BMDL	BMDL
Chloroethane	BMDL	BMDL	BMDL	BMDL
Dichloromethane	BMDL	BMDL	26	BMDL
1,1-Dichloroethene	BMDL	BMDL	BMDL	BMDL
1,1-Dichloroethane	BMDL	BMDL	BMDL	BMDL
Trans-1,2-Dichloroethene	BMDL	BMDL	BMDL	BMDL
Chloroform	BMDL	BMDL	2.2	BMDL
1,2-Dichloroethane	BMDL	BMDL	BMDL	BMDL
1,1,1-Trichloroethane	BMDL	BMDL	BMDL	BMDL
Carbon Tetrachloride	BMDL	BMDL	BMDL	BMDL
Dichlorobromomethane	BMDL	BMDL	BMDL	BMDL
1,2-Dichloropropane	BMDL	BMDL	BMDL	BMDL
Cis-1,3-Dichloropropene	BMDL	BMDL	BMDL	BMDL
Trichloroethene	BMDL	BMDL	BMDL	BMDL
Dibromochloromethane and 1,1,2-Trichloroethane and Trans-1,3,-Dichloropropene	BMDL	BMDL	BMDL	BMDL
Bromoform	BMDL	BMDL	BMDL	BMDL
Tetrachloroethene and 1,1,2,2-Tetrachloroethane	BMDL	BMDL	BMDL	BMDL

NOTE: Method Detection Limit = 1 ppb
unless specified otherwise
ppb = Parts per billion
BMDL = Below Method Detection Limit

Respectfully submitted,

Laboratory Manager

The information shown on this sheet is test data only and no interpretation of this data is intended or implied.

EPA Method 602	#50666 Upper Monitor Zone (ppb)	#50667 Lower Monitor Zone (ppb)	#50668 Injectant Effluent (ppb)	#50669 Travel Blank (ppb)
Tert-Butyl Methyl Ether	BMDL	BMDL	BMDL	BMDL
Benzene	BMDL	BMDL	BMDL	BMDL
Toluene	BMDL	BMDL	16	BMDL
Chlorobenzene	BMDL	BMDL	BMDL	BMDL
Ethyl Benzene	BMDL	BMDL	BMDL	BMDL
o-,m- and p-Xylene	BMDL	BMDL	BMDL	BMDL
1,3-Dichlorobenzene	BMDL	BMDL	BMDL	BMDL
1,2-Dichlorobenzene	BMDL	BMDL	BMDL	BMDL
1,4-Dichlorobenzene	BMDL	BMDL	1.4	BMDL
Tetrachloroethene*	BMDL	BMDL	BMDL	BMDL

NOTE: Method Detection Limit = 1 ppb
unless specified otherwise
ppb = Parts per billion
BMDL = Below Method Detection Limit
*From Photo Ionization Detector

Respectfully submitted,

Laboratory Manager

The information shown on this sheet is test data only and no interpretation of this data is intended or implied.

ORGANIC ANALYSIS

ANALYTICAL INSTRUMENTATION

- Finnigan Models 4021, 5100, 4510 Gas Chromatographs/Mass Spectrometer/Data Systems equipped with Tekmar's LSC-2, LSC-3, and the 4200 automatic Heated Sample Module.
- Varian Models 3700 and 6000 Gas Chromatographs equipped with flame ionization, electron capture, thermionic specific, flame photometric detectors and autosamplers. State of the art Varian Vista 402 Data System and Hewlett Packard integrators.
- Dohrman DX-20 Total Organic Halide System.
- Water High Pressure Liquid Chromatograph with UV and Fluorescence detectors.

ANALYTICAL METHODOLOGY

- Priority Pollutants: The water samples are analyzed in accordance with procedures described in methods 608, 624, and 625, EPA-600/4-82-057 (1982). The soil samples are analyzed in accordance with procedures described in Methods 8080, 8240, and 8270, Test Methods for Evaluating Solid Waste, 1982.
- Phenoxyacid Herbicides: Samples are analyzed in accordance with procedures outlined in Method 7, Federal Register, Vol. 38, No. 75, Part II, November 28, 1973.
- Total Organic Halides: Samples are analyzed in accordance with procedures outlined in Method 9020, USEPA, Test Methods for Evaluating Solid Waste, 1982, SW-846, Second Edition.
- Trihalomethanes: Samples are analyzed in accordance with procedures described in Method 501.2, Federal Register, Vol. 44, No. 231, Part II, November 29, 1979.
- Ethylene dibromide: Water samples are analyzed in accordance with procedures outlined in Method 504, Federal Register (50 FR 46902), November 13, 1985.

CH2M HILL ENVIRONMENTAL LABORATORIES
7201 NW ELEVENTH PLACE
P.O. DRAWER 1647
GAINESVILLE, FLORIDA 32602

STATE OF FLORIDA
CERTIFICATION NUMBERS: 82112; E82124

03/16/88

REPORT OF ANALYSIS REVISED Sample Nos. 50666 - 50669

3-23-88 PAC

Client: PALM BEACH COUNTY
Attention: TOM MCCORMICK
Address: DFB OFFICE

Project No. SE24770.56
Received: 02/12/88

Description of Sample:

WATER, GRAB
Location: SYSTEM #9 DIW
Collected on 02/10/88 by BART ZIEGLER

PARAMETER	50666 UPPER MONITOR ZONE	50667 LOWER MONITOR ZONE	50668 INJECTANT EFFLUENT
GENERAL			
pH (Units)	7.65	7.50	7.50
Total Alkalinity (as CaCO3)	128	134	180
Color (APHA)	10	10	55
Calcium Hardness (as CaCO3)	900	2900	106
Turbidity (NTU)	26	6.1	3.5
Odor (TON)	1.4	N.O.O.	N.O.O.
SOLIDS			
Total Dissolved Solids	5360	13230	338
METALS			
Antimony	<0.2	0.7	<0.2
Arsenic	<0.002	<0.002	<0.002
Barium	<0.2	<0.2	<0.2
Cadmium	<0.01	<0.01	<0.01
Chromium, Total	<0.05	<0.05	<0.05
Copper	<0.02	0.03	0.06
Iron	4.26	1.00	0.14
Lead, Total	<0.05	<0.05	<0.05
Manganese	0.07	0.04	0.02
Mercury	<0.0002	<0.0002	0.0002
Selenium	<0.001	<0.001	<0.001
Silver	<0.05	<0.05	<0.05
Sodium	1290	3490	46
Zinc	<0.01	<0.01	0.02

NOTE: Values are mg/L as substance unless otherwise stated.
N.O.O. = No odor observed.

Respectfully submitted,

Analyses performed in accordance with methods approved by the USEPA

Thomas C. Emenhiser, Laboratory Manager

This information is test data and no interpretation is intended or implied.

CH2M HILL ENVIRONMENTAL LABORATORIES
7201 NW ELEVENTH PLACE
P.O. DRAWER 1647
GAINESVILLE, FLORIDA 32602

STATE OF FLORIDA
CERTIFICATION NUMBERS: 82112; E82124

03/16/88

REPORT OF ANALYSIS

REVISED
3-23-88 EAC

Sample Nos. 50666 - 50669

PARAMETER	50666 UPPER MONITOR ZONE	50667 LOWER MONITOR ZONE	50668 INJECTANT EFFLUENT
ANIONS			
Chloride	2800	7900	86
Fluoride	1.05	0.76	0.24
Sulfate	567	780	36
Sulfide	1.14	1.75	0.06
NUTRIENTS			
Ammonia (as N)	0.80	0.59	22.7
Nitrate & Nitrite (as N)	<0.02	<0.02	0.04
Organic Nitrogen (as N)	0.21	0.06	3.00
Soluble Ortho-Phosphorus(as P)	<0.01	<0.01	4.90
ORGANICS			
Surfactants (MBAS)	<0.02	<0.02	0.15

NOTE: Values are mg/L as substance unless otherwise stated.
N.O.O. = No odor observed.

Analyses performed in accordance with methods approved by the USEPA

Respectfully submitted,

Thomas C. Eaenhiser, Laboratory Manager

This information is test data and no interpretation is intended or implied.

CH2M HILL ENVIRONMENTAL LABORATORIES
7201 NW ELEVENTH PLACE
P.O. DRAWER 1647
GAINESVILLE, FLORIDA 32602

STATE OF FLORIDA
CERTIFICATION NUMBERS: 82112: E82124

03/16/88

REPORT OF ANALYSIS REVISED Sample Nos. 50666 - 50669

3-23-88 EAC

Client: PALM BEACH COUNTY
Attention: TOM MCCORMICK
Address: DFB OFFICE

Project No. SE24770.56
Received: 02/12/88

Description of Sample:

WATER, GRAB
Location: SYSTEM #9 DIW
Collected on 02/10/88 by BART ZIEGLER

PARAMETER	50669 TRAVEL BLANK
METALS	
Antimony	<0.2
Arsenic	<0.002
Barium	<0.2
Cadmium	<0.01
Chromium, Total	<0.05
Copper	<0.02
Iron	0.06
Lead, Total	<0.05
Manganese	<0.01
Mercury	<0.0002
Selenium	<0.001
Silver	<0.05
Sodium	<0.05
Zinc	<0.01

NOTE: Values are mg/L as substance unless otherwise stated.
N.O.O. = No odor observed.

Respectfully submitted,

Thomas C. Eaenniser, Laboratory Manager

Analyses performed in accordance with methods approved by the USEPA

This information is test data and no interpretation is intended or implied.

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

DATE	LOWER ZONE FECAL COLIFORM (no/100mls)	LOWER ZONE BOD (ppm)	UPPER ZONE FECAL COLIFORM (no/100mls)	UPPER ZONE BOD (ppm)
11/12/87	-1	1	-1	1
11/19/87	-1	1	3	1
11/24/87	-1	1	-1	1
12/03/87	-1	<1	-1	<1
12/10/87	-1	<1	-1	<1
12/17/87	-1	<1	-1	<1
12/23/87	-1	<1	-1	<1
12/30/87	-1	<1	-1	<1
01/07/88	-1	<1	-1	<1
01/14/88	-1	<1	-1	<1
01/21/88	-1	<1	-1	<1
01/28/88	-1	<1	-1	<1
02/04/88	-1	<1	-1	<1
02/11/88	-1	<1	-1	<1
02/18/88	-1	<1	-1	<1
02/23/88	-	-	-	-
02/25/88	-1	<1	-1	<1
03/03/88	-1	<1	-1	<1
03/10/88	-1	<1	-1	<1
03/17/88	-1	<1	-1	<1
03/24/88	-1	<1	-1	<1
03/31/88	-1	<1	-1	<1

PALM BEACH COUNTY SYSTEM 9 NORTH DEEP INJECTION
CLASS I INJECTION WELL OPERATING PERMIT APPLICATION
- RESPONSES -

(1) A report shall be submitted with each application for a Class I well operation permit, which shall include, but not be limited to, the following information:

a. Results of the information obtained under the construction permit described in (B) CLASS I TEST/INJECTION WELL CONSTRUCTION AND TESTING PERMIT including:

1. All available logging and testing program data and construction data on the well or well field.

2. A satisfactory demonstration of mechanical integrity for all new wells pursuant to Florida Administrative Code Rule 17-28.13(6)(b).

For responses to items (1)a.1. and (1)a.2. please see the draft of the Engineering Report "Drilling and Testing of the Injection and Monitoring Wells for Palm Beach County System 9 North."

3. The actual operating data, including injection pressures versus pumping rates where feasible, or the anticipated maximum pressure and flow rate at which the permittee will operate, if approved by the Department.

At this time it is proposed that the combined effluent from the System 9 North and System 9 South wastewater treatment plants be injected into the well. Actual operating data is being gathered and will be included in the Operation and Maintenance Manual. The proposed maximum injection rate for the well is 15 mgd with an anticipated injection pressure of less than 60 psi.

4. The actual injection procedure:

Injection of the combined effluents from the System 9 North and South wastewater treatment plants is to be controlled by the North Plant Operator and the injection procedure will be detailed in the Plant Operator's Manual being prepared for submittal with the Plant Operating Permit Application.

Four injection pumps (two 100 hp and two 50 hp) draw from a common wet well and discharge into a common header leading to the injection well. Pump controllers are activated by a bubbler system sensing fluid level in the wet well. Pump activity is monitored at the Motor Control Center in the Operator's Room. Surge protection for the entire effluent injection system is provided by a 6,000-gallon hydropneumatic surge control system located next to the injection well pump station.

5. The compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and confining zone.

   The proposed injection of secondary treated municipal effluent represents no risk to the native fluids or minerals present in the injection zone.

6. The status of corrective action on defective wells in the area of review.

   No defective wells were found in the area of review.

b. Record drawings, based upon inspections by the Engineer or persons under his direct supervision, with all deviations noted.

   Please see the draft of the Engineering Report "Drilling and Testing of the Injection and Monitoring Wells for Palm Beach County System 9 North."

c. Certification of completion submitted by the Engineer of Record;

   Attached.

d. If requested by the Department, operation manual including emergency procedures;

   To be submitted at the completion of data collection.

e. Proposed monitoring and data to be submitted:

   Detailed monitoring program to be submitted with operation and maintenance manual.

f. Proof that the existence of the well has been recorded on the surveyor's plan at the County Courthouse.

Attached.

g. Proposed plugging and abandonment plan pursuant to Florida Administrative Code Rule 17-28.27(2).

Should abandonment of the deep injection well become necessary, the proposed procedure would be dependent upon the nature of the event leading to the abandonment action.

The following procedure is predicated upon the basis for abandonment being the Owner's decision to retire the well, and not detection of effluent escaping the injection zone.

A bridge plug, either mechanical or cement, would be established in the confining interval above the injection zone. The well bore would then be filled with neat cement to the top of the confining zone. At the regulatory agencies' option, the well bore could then be monitored for a period to assure restoration of the integrity of the confining interval, or the well bore could be cemented to surface using either neat or lighter weight cements.

Protection of the drinking water sources would continue to be provided by the fully cemented concentric 24-, 34-, 44-, and 54-inch casings.

Post closure monitoring would be carried out using the newly constructed Floridan Aquifer Multi-zone Monitor Well and the existing Biscayne Aquifer Monitor Wells. The parameters to be monitored would include conductivity, chloride, artesian pressure of the monitor zones, and the presence of E.coli bacteria.

The sampling frequency and the length of the post closure monitoring are highly dependent upon the nature of the event leading to the abandonment of the monitor well and cannot be accurately predicted. In the case hypothesized, it is proposed to monitor the water quality of the zone continuously for

pressure, using existing equipment, for a 6-month period. Water quality data would be collected and reported on a monthly basis for the same period.

A cost estimate of the work involved cannot be provided. The expense is dependent upon time, labor and material costs at the time the abandonment procedure is to be carried out.

ATTACHMENT B

Engineer's report of pressure test of final casing.

DAILY SHIFT REPORT

CH2M HILL

Project No. FC18009.B3 Date 8-23-85
Client PALM BEACH COUNTY
Contractor LAYNE ATLANTIC
Well No. IW-1

Day Shift 7:00 am to 7:00

Weather: Fair ☐ Cloudy ☒ Rain ☒

Activity
- Drilling ☐
- Reaming ☐
- Running Casing ☐
- Cementing ☐
- Testing ☐
- Waiting ☒
- ON CEMENT ☒
- ☐

Depth
- Start ____ ft.
- End ____ ft.
- Bit Size ____ in.
- Recorded By: WJR

Formation Samples Collected ____

Water Samples Collected ____

Description of Operations 7:00 - 7:30 A.M. TAGGED THE CEMENT ON THE OUTSIDE OF THE 24" CASING: NORTH SIDE 32.2' BELOW PAD, SOUTH SIDE 28.79' BELOW PAD. THE REMAINDER OF THE SHIFT LAYNE WORKED AROUND THE RIG WHILE WAITING ON CEMENT. SAMPLED MONITOR WELLS 1 & 2. BOTH WELLS WERE 25.5°C

Night Shift 7:00 pm to 7:00 am

Weather: Fair ☐ Cloudy ☒ Rain ☐

Activity
- Drilling ☐
- Reaming ☐
- Running Casing ☐
- Cementing ☐
- Testing ☐
- Waiting ☒
- ON CEMENT ☐
- ☐

Depth
- Start ____ ft.
- End ____ ft.
- Bit Size ____ in.
- Recorded By: WJR

Formation Samples Collected ____

Water Samples Collected ____

Description of Operations WAITED ON CEMENT UNTIL 8:00 P.M. STARTED PREPARING FOR 24" CASING PRESSURE TEST. 11:40 P.M. STARTED PRESSURE TEST SET PRESSURE AT 100 PSI.

TIME	PRESSURE PSI
11:40 P.M	100
11:53 P.M	100
12:00 A.M	100
12:10 A.M	100
12:20 A.M	100
12:30 A.M	100
12:40 A.M	100
18:45 A.M	100

THE CREW SPENT THE REST OF THE SHIFT PREPARING TO GO BACK IN TO TAG THE CEMENT IN THE 24" CASING.

ATTACHMENT C

Temperature survey of well after 48 hours of shut-in time.

Sheet 1 of 1 File # 0050-0099

GEOPHYSICAL WELL SURVEY

CH2M HILL

CLIENT: Palm Beach County	Date: March 9, 1988
Well No.: IW	Project No.: SE24770.S6
Location: State Florida	County: Palm Beach
¼ ¼ ¼ Sec. 7	T. 47 ☐N ■S R. ■E ☐W
Logged by: S. Skehan	Observer: Bart Ziegler
Owner: Palm Beach County	
Well: IW	
Driller: Layne Atlantic	Date Drilled: APR-Sept 1985
Surface Elevation: 20 ft. ■ Estimated ☐ Measured Above MSL	
T.D. Logged: 3300	T.D. Driller: 3300
Hole Dia.: 24" 2640' to 3300'	
Casing Dia.: 24" 0 to 2640'	
Finish: ■ Open hole ☐ Screen ☐ Gravel ☐ Other	
Water Level: N/A ft. ☐ Above ☐ Below MP: AT ☐ Above ☐ Below ☐ Land Surface ■ Pad Surface	
Yield: Flow N/A gpm Pump gpm	
Drawdown: N/A ft. after hours pumping @ gpm	
Use: ☐ Dom. ☐ Stock ☐ PS ☐ Ind. ☐ Irr. ☐ Test ☐ Heating or cooling ☐ Drainage ■ Disposal ☐ Obs.	
Water Quality: N/A	
Temp. 79 °F; Sp. Cond. ; Iron mg/L	
Cl⁻ mg/L; $SO_4^=$ mg/L; Total Hardness mg/L	
Color Odor Taste	
Remarks:	

Electric: ☐ 16" Normal ☐ 64" Normal ☐ Single Point ☐ S.P.
☐ Caliper ☐ Fluid Resistivity ☐ Fluid Velocity ☐ Gamma Ray ■ Temperature

Log Scales

Electric Log	Fluid Resisvitivy
SP millivolts/inch	ohm meters/inch
Res. ohm-meters/inch	
Res. ohms/inch	@ °F
Gamma Ray Log	Fluid Velocity
Counts/sec/inch	Counts/min/inch
Time Constant sec.	FPM (Continuous)
Logging speed FPM	Q = gpm
Temperature	Caliper
60 °F to 80 °F	inches to inches
Logging speed 35 FPM	Logging speed FPM
Water Samples	
Depths sampled:	

CH2M HILL
Water Resources Division
P.O. Box 1647
Gainesville, Florida 32620
904/377-2442

Fort Myers Office
The Financial Center
1550 College Parkway, Suite 307
Fort Myers, Florida 33907
813/275-3121

Deerfield Beach Office
Hillsboro Executive Center North
350 Fairway Drive, Suite 210
Deerfield Beach, Florida 33441
Palm Beach County—305/395-3800
Broward County—305/426-4008

Tampa Office
Rocky Point Centre
3030 North Rocky Point Drive, West
Suite 350
Tampa Florida 33607
Hillsborough County—813/888-6777
Pinellas County—813/536-9454

ATTACHMENT D

Summary of Operating Data for the months of November, 1987 through February, 1988.

Replace Page 1 of Attachment 10

PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL

DATE COLLECTED	LOWER ZONE FECAL COLIFORM (no/100mls)	LOWER ZONE BOD (ppm)	LOWER ZONE TEMP. C° ‡	UPPER ZONE FECAL COLIFORM (no/100mls)	UPPER ZONE BOD (ppm)	UPPER ZONE TEMP. C° ‡
11/12/87	-1	1	24	-1	1	24
11/19/87	-1	1	24	3	1	24
11/24/87	-1	1	24	-1	1	24
12/03/87	-1	<1	24	-1	<1	24
12/10/87	-1	<1	24	-1	<1	24
12/17/87	-1	<1	23	-1	<1	23
12/23/87	-1	<1	23	-1	<1	23
12/30/87	-1	<1	23	-1	<1	23
01/07/88	-1	<1	24	-1	<1	24
01/14/88	-1	<1	24	-1	<1	24
01/21/88	-1	<1	24	-1	<1	24
01/28/88	-1	<1	23	-1	<1	23
02/04/88	-1	<1	24	-1	<1	24
02/11/88	-1	<1	24	-1	<1	24
02/18/88	-1	<1	24	-1	<1	24
02/23/88	-	-	24	-	-	24
02/25/88	-1	<1	24	-1	<1	24
03/03/88	-1	<1	24	-1	<1	24
03/10/88	-1	<1	24	-1	<1	24
03/17/88	-1	<1	24	-1	<1	24
03/24/88	-1	<1	24	-1	<1	24
03/31/88	-1	<1	24	-1	<1	24

‡: Temperature data compiled from Palm Beach County Utilities Water & Wastewater Testing Laboratory Chain of Custody forms. Monitor Well Analysis Report form has been edited to include the sample temperatures.

PALM BEACH COUNTY
WATER UTILITIES DEPARTMENT WWTP 9N

Deep Injection and Monitoring Well System

Monitoring Data Report

Month Nov. 19 87

Compiled By Art Ziegler/Cham Hill

	1	2	3	4	5	6	7	8	9	10	11
	~~Plant Influent~~ Injected Effluent		Injection Well No. 1				Monitoring Zones		Injected Effluent		
Day of Month	Totalizer Reading (mgd)	Flow (mgd)	Injection Flow Rate at 9:00	Injection Pressure at 9:00 a.m. (psi)	Maximum Flow Rate (mgd)	Maximum Pressure (psi)	Zone 1 970-1108 (psi)	Zone 2 1699-1800 (psi)	Suspended Solids (mg/L)	Specific Conductance (Uhos/cm)	Collected By
1	3605548	6.153	2600 GPM	22.0		40.0	7.0	10.0			
2	3611447	5.899	5000 "	37.5		55.0	7.0	10.0			
3	3617960	6.513	6800 "	37.0		39.5	7.0	10.0			
4	3627180	9.220	6950 "	37.0		39.5	7.0	10.0			
5	385.26 3	—	6900 "	37.0		38.5	7.0	10.0			
6	—	—	6900 "	37.0		40.0	7.0	10.0			
7	3649946	—	3700 "	—		—	—	—			
8	3656631	6.685	5000 "	31.0		40.0	7.0	10.0			
9	3665.269	8.638	6900 "	32.0		38.5	7.0	10.0			
10	3672338	7.069	6900 "	32.0		39.0	7.0	10.0			
11	3679355	—	6900 "	37.0		40.0	6.8	8.0			
12	—	—	5100 "	31.0		40.0	7.0	10.0			
13	—	—	5100 "	31.5		39.5	6.8	10.0			
14	3699.541	—	6850 "	30.5		39.0	7.0	10.0			
15	3706497	6.956	5000 "	31.0		39.5	6.9	10.0			
16	3713089	6.592	7000 "	36.8		40.0	6.9	9.9			
17	3719.163	6.074	7100 "	37.0		40.0	6.9	9.8			
18	—	—	—	38.0		39.0	6.9	10.0			
19	3725126	—	7100 "	37.0		38.5	6.0	9.5			
20	—	—	7150 "	25.0		40.0	6.5	10.0			
21	3744399	—	4900 "	32.0		40.0	6.3	9.8			
22	3751.086	6.687	7100 "	37.0		60.0+	6.5	10.0			
23	3757620	6.534	1700 "	26.0		60.0+	6.5	9.8			
24	3764194	6.574	7200 "	38.0		40.0	6.5	8.0			
25	3770351	6.157	1300 "	37.0		40.0	6.5	9.5			
26	3777112	6.761	4800 "	32.0		43.0	6.9	9.9			
27	3784722	7.610	4900 "	32.0		39.5	6.9	9.9			
28	3791.749	7.027	5300 "	32.0		39.0	7.0	10.0			
29	3798.709	6.960	5200 "	32.0		55.0	7.0	10.0			
30	3804999	6.298	1700 "	27.0		60.0+	7.0	10.0			
~~31~~											
Total		205.6									
Max		9.220	7150 GPM	38.0		60.0+	7.0	10.0			
Min		5.899	1300 "	22.0			6.3	8.0			
Average											

NOTES:

1. To Convert Injection Pressure psi To Feet of Head msl, Multiply psi X 2.31 and Add 23'.
2. To Convert Monitor Zones 1 or 2 psi To Feet of Head msl, Multiply psi X 2.31 and Add 23.14'.

CH2M HILL

PALM BEACH COUNTY
WATER UTILITIES DEPARTMENT WWTP 9N
Deep Injection and Monitoring Well System

Monitoring Data Report

Month Dec 19 87
Compiled By BART ZIEGLER / CH2M HILL

	1	2	3	4	5	6	7	8	9	10	11
	Plant Influent		Injection Well No. 1				Monitoring Zones		Injected Effluent		
Day of Month	Totalizer Reading (mgd)	Flow (mgd)	Injection Flow Rate at 9:00	Injection Pressure at 9:00 a.m. (psi)	Maximum Flow Rate (mgd)	Maximum Pressure (psi)	Zone 1 970-1108 (psi)	Zone 2 1699-1800 (psi)	Suspended Solids (mg/L)	Specific Conductance (Uhos/cm)	Collected By
1	3811.545	6.546	7150 GPM	37.0		60.0+	6.8	10.0			
2	3817.232	6.177	7200 "	37.0		39.0	6.5	8.0			
3	—	—	7180 "	37.3		40.0	6.2	9.8			
4	—	—	7200 "	37.0		40.0	6.5	10.0			
5	3826027	6.039	7100 "	37.0		40.0	6.5	9.8			
6	3842.838	6.770	7200 "	37.0		41.0	6.5	10.0			
7	3849.027	6.209	7200 "	37.0		40.0	6.2	9.8			
8	3855.105	6.078	7230 "	37.0		40.0	6.5	9.9			
9	3861.462	6.247	7200 "	37.0		39.5	6.5	8.0			
10	3867.774	6.312	3000 "	27.5		38.0	6.5	9.5			
11	—	—	5400 "	31.5		39.5	6.5	10.0			
12	3883.959	—	3000 "	31.5		35.0	6.8	10.0			
13	3887.529	6.570	3000 "	26.5		38.0	6.5	9.9			
14	3894.275	6.746	1700 "	26.5		60.0+	6.5	9.5			
15	3900.517	6.242	5400 "	31.0		34.5	6.5	9.8			
16	3907.144	6.627	3,000 "	26.5		34.0	6.5	8.0			
17	—	—	5500 "	31.0		34.0	6.1	—			
18	3919406	—	5400 "	31.0		36.0	6.5	9.8			
19	3925.760	6.354	3000 "	31.0		34.0	6.5	9.8			
20	3932.174	6.414	3000 "	26.3		34.0	6.5	9.9			
21	3938.754	6.810	5400 "	31.0		38.5	6.5	9.5			
22	3945.598	6.644	5400 "	31.5		34.0	6.5	8.0			
23	3952.240	6.642	2900 "	26.5		34.0	6.5	9.5			
24	3959.211	6.971	5400 "	31.5		39.0	6.6	9.9			
25	3966143	6932	1600 "	26.7		39.0	6.5	9.9			
26	3973029	6886	5400 "	31.5		39.0	6.8	10.0			
27	—	—	7100 "	31.5		40.0	6.5	9.9			
28	3986400	—	2800 "	37.0		38.0	6.9	9.9			
29	3993.268	6858	5250 "	31.0		42.0	6.2	8.0			
30	3999.275	6.017	5700 "	33.0		36.0	6.2	9.8			
31	4005.915	6.640	3500 "	27.0		40.0	6.2	9.8			
Total		200.9									
Max		6.971	7200 GPM			60.0+	6.9	10.0			
Min		6.017	1700 "				6.1	8.0			
Average											

NOTES: 1. To Convert Injection Pressure psi To Feet of Head msl, Multiply psi X 2.31 and Add 23'.

2. To Convert Monitor Zones 1 or 2 psi To Feet of Head msl, Multiply psi X 2.31 and Add 23.14'.

CH2MHILL

PALM BEACH COUNTY
WATER UTILITIES DEPARTMENT WWTP 9N

Deep Injection and Monitoring Well System

Monitoring Data Report

Month JAN. 19 88

Compiled By KAST ZIEGLER/CH2M HILL

	1	2	3	4	5	6	7	8	9	10	11
	Plant Influent		Injection Well No. 1				Monitoring Zones		Injected Effluent		
Day of Month	Totalizer Reading (mgd)	Flow (mgd)	Injection Flow Rate at 9:00	Injection Pressure at 9:00 a.m. (psi)	Maximum Flow Rate (mgd)	Maximum Pressure (psi)	Zone 1 970-1108 (psi)	Zone 2 1699-1800 (psi)	Suspended Solids (mg/L)	Specific Conductance (Uhos/cm)	Collected By
1	4012677	6.762	5500 GPM	25.5		35.5	6.5	10.0			
2	4019258	6.581	6200 "	33.0		35.5	6.5	9.9			
3	4026204	6.946	6100 "	33.0		35.0	7.0	10.0			
4	4032815	6.631	6200 "	33.0		36.0	6.8	10.0			
5	4038826	5.991	6200 "	33.0		35.0	7.0	10.0			
6	4045368	6.542	5900 "	25.0		35.0	6.7	8.0			
7	—	—	—	33.0		35.0	6.5	—			
8	—	—	5900 GPM	33.0		41.0	6.8	10.0			
9	4064814	—	—	37.5		41.0	6.9	10.0			
10	4071795	6781	7500+ GPM	39.0		42.0	6.8	10.0			
11	4078672	6897	7500+ "	38.5		41.0	6.5	9.9			
12	4085146	6.454	6000 "	32.8		40.0	6.5	10.0			
13	4091672	6.526	7500+ "	BAD PSI		BAD PSI	6.8	8.0			
14	4098090	6.418	—	"		"	6.5	9.9			
15	4104860	6.770	—	—		—	—	—			
16	4111644	6.784	7500 GPM	BAD PSI		BAD PSI	6.8	10.0			
17	4117955	6.311	7500 "	"		"	6.5	10.0			
18	4125827	7.872	5500 "	"		"	6.8	10.0			
19	4130143	4.316	5900 "	"		"	7.0	10.0			
20	4136080	5.937	7200 "	"		"	6.9	10.0			
21	4141966	5.886	3000 "	26.0		40.0	6.5	9.0			
22	4148267	6.301	—	27.5		45.0	6.5	10.0			
23	4154520	5.354	7800 "	37.2		42.0	6.5	10.0			
24	4160427	6.707	1500 "	25.8		43.0	6.8	10.0			
25	4166.03	5.976	7300 "	37.5		40.0	6.5	10.0			
26	4172639	5.576	7500 "	21.0		BAD PSI	6.5	10.0			
27	4178046	6.407	7200 "	23.0		"	6.5	10.0			
28	—	—	2600 "	26.5		42.0	6.2	10.0			
29	—	—	1500 "	27.0		40.0	6.1	10.0			
30	—	—	2900 "	26.8		38.0	6.5	10.0			
31	4201775	—	3000 "	27.0		40.1	6.5	9.9			
Total		195.8	///////								
Max		7.872	7500 GPM	39.0		41.0	7.0	10.0			
Min		4.316	1500 "	21.0			6.1	8.0			
Average											

NOTES: 1. To Convert Injection Pressure psi To Feet of Head msl, Multiply psi X 2.31 and Add 23'.

2. To Convert Monitor Zones 1 or 2 psi To Feet of Head msl, Multiply psi X 2.31 and Add 23.14'.

CH2MHILL

PALM BEACH COUNTY
WATER UTILITIES DEPARTMENT WWTP 9N
Deep Injection and Monitoring Well System

Monitoring Data Report

Month FEB 19 88
Compiled By [illegible]

	1	2	3	4	5	6	7	8	9	10	11
	Plant Influent		Injection Well No. 1				Monitoring Zones		Injected Effluent		
Day of Month	Totalizer Reading (mgd)	Flow (mgd)	Injection Flow Rate at 9:00	Injection Pressure at 9:00 a.m. (psi)	Maximum Flow Rate (mgd)	Maximum Pressure (psi)	Zone 1 970-1108 (psi)	Zone 2 1699-1800 (psi)	Suspended Solids (mg/L)	Specific Conductance (Uhos/cm)	Collected By
1	4208447	6.452	2900 GPM	23.0		41.0	7.0	10.0			
2	4214000	5.653	—	24.0		42.0	6.5	9.8			
3	4230000	6.000	2900 GPM	27.5		53.0	7.0	10.0			
4	—	—	2900 "	32.0		42.0	6.2	9.5			
5	—	—	—	32.1		48.0	6.5	9.9			
6	4238.000	—	2900 GPM	27.0		59.0	6.5	10.0			
7	4244327	6.327	7500+ "	31.0		38.0	6.5	10.0			
8	4251010	6683	6000 "	31.5		39.0	6.5	9.5			
9	4258066	7.056	3500 "	34.0		38.0	6.5	10.0			
10	4264957	6.891	7000 "	34.5		37.0	6.6	10.0			
11	4271558	6.601	4900 "	29.0		38.0	5.5	BAD PUN			
12	4278483	6.925	7100 "	35.5		38.0	5.5	9.8			
13	4285727	7.244	6100 "	32.0		40.0	5.6	10.0			
14	4292577	6.833	6100 "	32.0		43.0	5.5	BAD PUN			
15	4300059	7.500	3400 "	36.0		38.0	6.0	10.0			
16	4306705	6.846	6100 "	32.0		41.0	5.8	9.8			
17	4313267	6.462	3400 "	26.5		40.0	6.2	7.5			
18	4320216	6.869	1700 "	26.5		38.0	6.0	9.8			
19	4327234	6.978	1700 "	25.0		38.0	6.0	9.8			
20	4334255	7.012	3400 "	26.8		38.0	6.0	9.8			
21	4341547	7.292	3400 "	—		—	—	—			
22	4347800	6.245	3400 "	26.2		38.0	6.0	7.9			
23	4354691	6.891	3400 "	26.5		38.0	6.1	9.5			
24	4361478	6.807	7100 "	—		—	—	—			
25	—	—	7400 "	24.5		37.0	6.2	9.5			
26	4375050	—	7400 "	21.0		37.5	6.3	9.6			
27	4381.500	3.450	—	35.5		36.0	6.8	10.0			
28	4387920	6.420	7500 (GPM)	30.5		38.0	6.8	10.0			
29	4394343	6.423	7400 "	35.5		38.0	6.8	10.0			
~~30~~											
~~31~~											
Total		192.5									
Max		7.500	7500+(GPM)	35.5		59.0	7.0	10.0			
Min		3.450	1700 "	21.0			5.5	7.9			
Average		6.638									

NOTES: 1. To Convert Injection Pressure psi To Feet of Head msl, Multiply psi X 2.31 and Add 23'.

2. To Convert Monitor Zones 1 or 2 psi To Feet of Head msl, Multiply psi X 2.31 and Add 23.14'.

CRMHILL

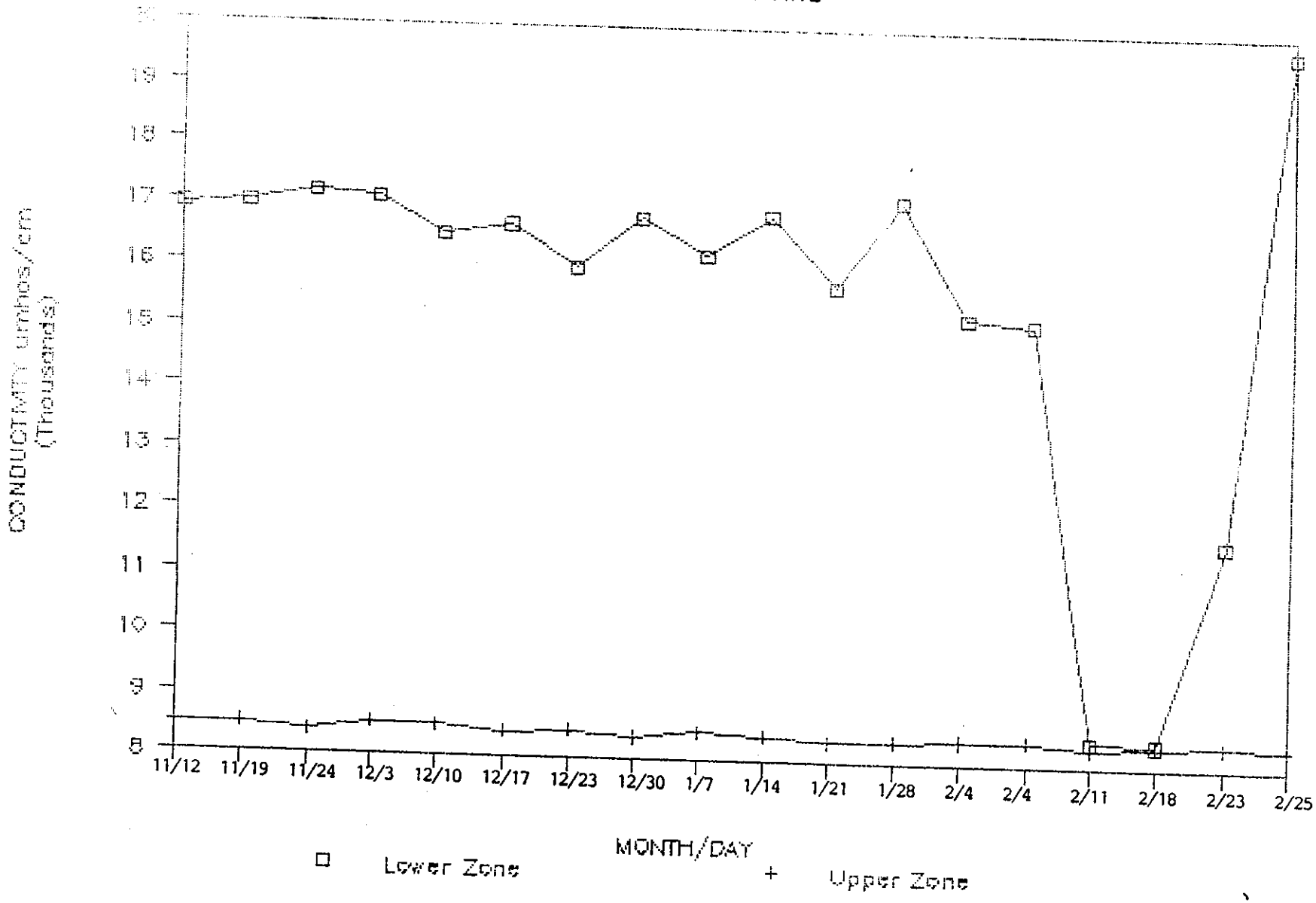
PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL
Conductivity Vs. Time

DATE	CONDUCTIVITY umhos/cm Lower Zone 6" Casing	CONDUCTIVITY umhos/cm Upper Zone 16" Casing
11/12/87	16930	8500
11/19/87	16980	8490
11/24/87	17180	8400
12/03/87	17110	8530
12/10/87	16520	8520
12/17/87	16680	8420
12/23/87	16000	8460
12/30/87	16830	8370
01/07/88	16240	8470
01/14/88	16895	8420
01/21/88	15780	8360
01/28/88	17170	8380
02/04/88	15304	8410
02/04/88	15200	8420
02/11/88	8430	8320
02/18/88	8410	8380
02/23/88	11690	8400
02/25/88	19720	8370

PALM BEACH COUNTY WATER UTILITIES

SYSTEM #9 DUAL ZONE MONITOR WELL

CONDUCTIVITY VS. TIME



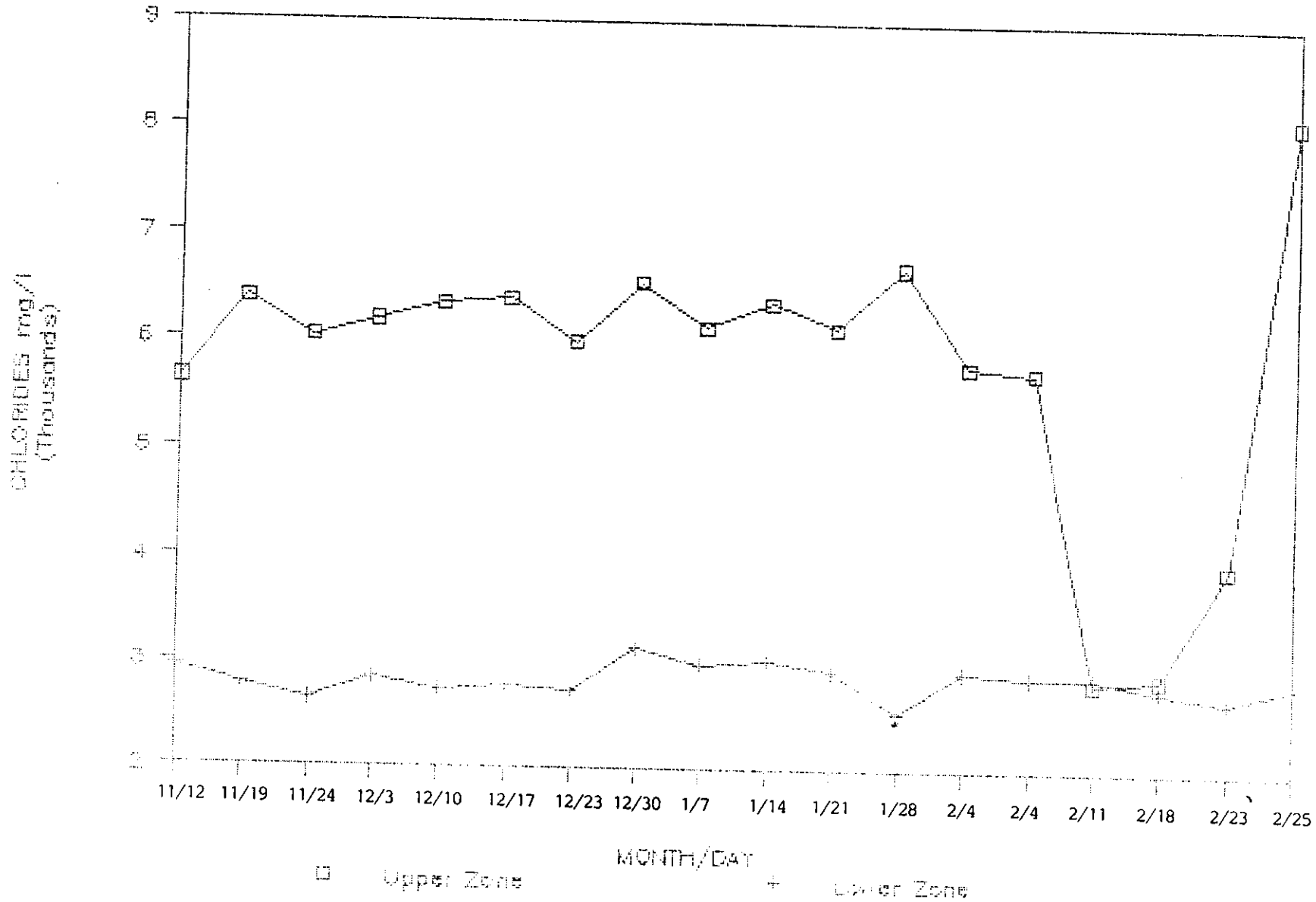
PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 DUAL-ZONE MONITOR WELL
Chlorides Vs. Time

DATE	CHLORIDES mg/l Lower Zone 6" Casing	CHLORIDES mg/l Upper Zone 16" Casing
11/12/87	5648	2949
11/19/87	6398	2799
11/24/87	6048	2649
12/03/87	6198	2849
12/10/87	6348	2749
12/17/87	6398	2799
12/23/87	5998	2749
12/30/87	6548	3149
01/07/88	6148	2999
01/14/88	6378	3049
01/21/88	6148	2949
01/28/88	6698	2549
02/04/88	5798	2949
02/04/88	5748	2899
02/11/88	2849	2899
02/18/88	2899	2799
02/23/88	3948	2699
02/25/88	8097	2849

PALM BEACH COUNTY WATER UTILITIES

SYSTEM #9 DUAL–ZONE MONITOR WELL

CHLORIDES VS. TIME



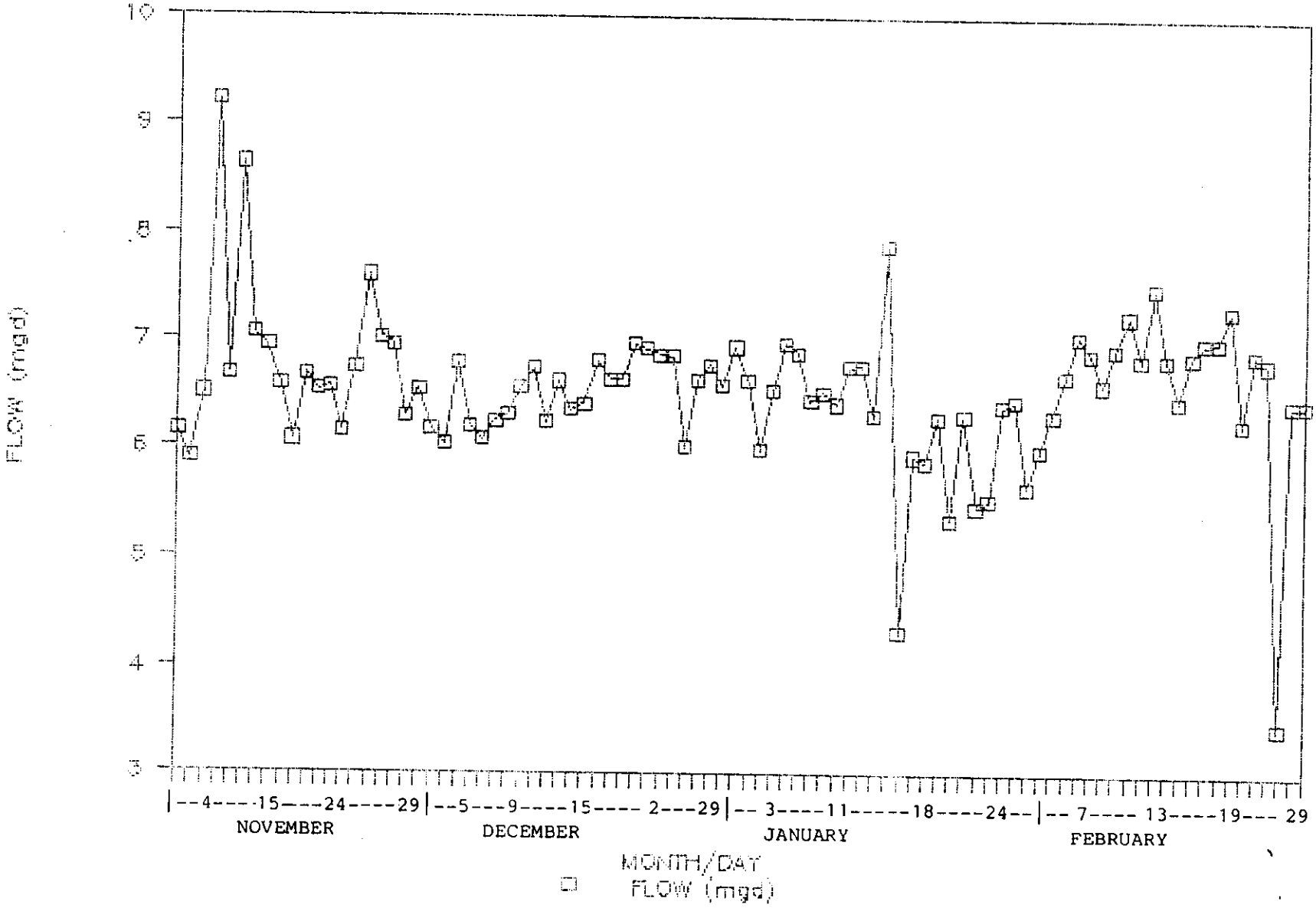
PALM BEACH COUNTY WATER UTILITIES
DEEP INJECTION AND MONITORING WELL SYSTEM
FLOW VS. TIME

DATE	FLOW
NOV. 1, 1987	6.153
NOV. 2, 1987	5.899
NOV. 3, 1987	6.513
NOV. 4, 1987	9.220
NOV. 8, 1987	6.685
NOV. 9, 1987	8.638
NOV. 10, 1987	7.069
NOV. 15, 1987	6.956
NOV. 16, 1987	6.592
NOV. 17, 1987	6.074
NOV. 22, 1987	6.687
NOV. 23, 1987	6.534
NOV. 24, 1987	6.574
NOV. 25, 1987	6.157
NOV. 26, 1987	6.761
NOV. 27, 1987	7.610
NOV. 28, 11987	7.027
NOV. 29, 1987	6.960
NOV. 30, 1987	6.294
DEC. 1, 1987	6.546
DEC. 2, 1987	6.177
DEC. 5, 1987	6.039
DEC. 6, 1987	6.790
DEC. 7, 1987	6.209
DEC. 8, 1987	6.078
DEC. 9, 1987	6.247
DEC. 10, 1987	6.312
DEC. 13, 1987	6.570
DEC. 14, 1987	6.746
DEC. 15, 1987	6.242
DEC. 16, 1987	6.627
DEC. 19, 1987	6.354
DEC. 20, 1987	6.414
DEC. 21, 1987	6.810
DEC. 22, 1987	6.644
DEC. 23, 1987	6.642
DEC. 24, 1987	6.971
DEC. 25, 1987	6.932
DEC. 26, 1987	6.866
DEC. 29, 1987	6.858
DEC. 30, 1987	6.017
DEC. 31, 1987	6.640
JAN. 1, 1988	6.782
JAN. 2, 1988	6.581
JAN. 3, 1988	6.946
JAN. 4, 1988	6.631
JAN. 5, 1988	5.991
JAN. 6, 1988	6.542

JAN. 10, 1988	6.981
JAN. 11, 1988	6.897
JAN. 12, 1988	6.454
JAN. 13, 1988	6.526
JAN. 14, 1988	6.418
JAN. 15, 1988	6.770
JAN. 16, 1988	6.784
JAN. 17, 1988	6.311
JAN. 18, 1988	7.892
JAN. 19, 1988	4.316
JAN. 20, 1988	5.937
JAN. 21, 1988	5.886
JAN. 22, 1988	6.301
JAN. 23, 1988	5.354
JAN. 24, 1988	6.307
JAN. 25, 1988	5.476
JAN. 26, 1988	5.536
JAN. 27, 1988	6.402
FEB. 1, 1988	6.452
FEB. 2, 1988	5.653
FEB. 3, 1988	6.000
FEB. 7, 1988	6.323
FEB. 8, 1988	6.683
FEB. 9, 1988	7.056
FEB. 10, 1988	6.891
FEB. 11, 1988	6.601
FEB. 12, 1988	6.925
FEB. 13, 1988	7.244
FEB. 14, 1988	6.833
FEB. 15, 1988	7.500
FEB. 16, 1988	6.846
FEB. 17, 1988	6.462
FEB. 18, 1988	6.869
FEB. 19, 1988	6.998
FEB. 20, 1988	7.012
FEB. 21, 1988	7.292
FEB. 22, 1988	6.245
FEB. 23, 1988	6.891
FEB. 24, 1988	6.807
FEB. 27, 1988	3.450
FEB. 28, 1988	6.420
FEB. 29, 1988	6.423

PALM BEACH CO' TY WATER UTILITIES

SYSTEM #9 DEEP INJECTION WELL
FLOW VS. TIME



PALM BEACH COUNTY WATER UTILITIES
SYSTEM #9 INJECTION WELL
SPECIFIC INJECTIVITY VS. TIME

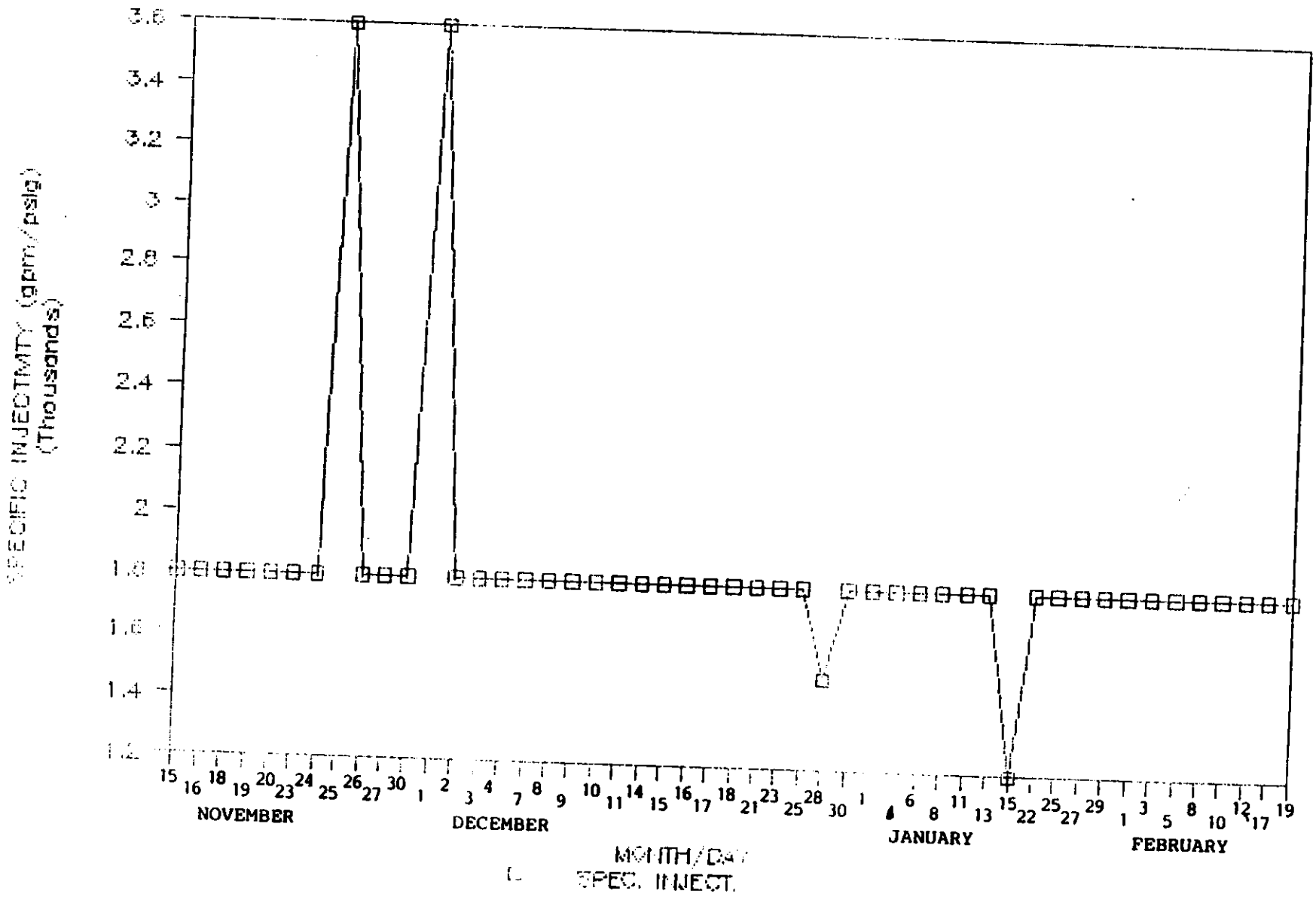
DATE	SPECIFIC INJECTIVITY (gpm/psig)
11/15/87	1800
11/16/87	1800
11/18/87	1800
11/19/87	1800
11/20/87	1800
11/23/87	1800
11/24/87	1800
11/25/87	3600
11/26/87	1800
11/27/87	1800
11/30/87	1800
12/01/87	3600
12/02/87	1800
12/03/87	1800
12/04/87	1800
12/07/87	1800
12/08/87	1800
12/09/87	1800
12/10/87	1800
12/11/87	1800
12/14/87	1800
12/15/87	1800
12/16/87	1800
12/17/87	1800
12/18/87	1800
12/21/87	1800
12/23/87	1800
12/25/87	1800
12/28/87	1500
12/30/87	1800
01/01/88	1800
01/04/88	1800
01/06/88	1800
01/08/88	1800
01/11/88	1800
01/13/88	1800
01/15/88	1200
01/22/88	1800
01/25/88	1800
01/27/88	1800
01/29/88	1800
02/01/88	1800
02/03/88	1800
02/05/88	1800
02/08/88	1800
02/10/88	1800
02/12/88	1800

02/17/88	1800
02/19/88	1800

PALM BEACH COUNTY WATER UTILITIES

SYSTEM #9 INJECTION WELL

SPECIFIC INJECTIVITY VS. TIME



ATTACHMENT E

Transmittal letter Draft O&M Manual	November 27, 1985
Transmittal letter final O&M Manual	January 27, 1986
Transmittal letter TAC members	March 24, 1986
UPS Aknowlogement of Delivery	March 25 through March 27, 1986

Engineers
Planners
Economists
Scientists

November 27, 1985

FC18009.B2

Mr. Don White
Department of Environmental Regulation
3301 Gun Club Road
West Palm Beach, Florida 33406

RE: Submittal of Operation Permit Applications to FDER for System 9 North WWTP, System 9 South WWTP, and System 9 North Deep Injection Well Effluent Disposal System

Dear Don:

In accordance with the requirements of Item 17 of Consent Order No. 83-0728 as amended January 22, 1985, we are submitting the following permit applications and supporting data:

- Application To Operate Domestic Wastewater Treatment and Disposal Systems
  Palm Beach County System 9 North WWTP
  DER Form 17-1.205(1)
- Application to Operate Domestic Wastewater Treatment and Disposal Systems
  Palm Beach County System 9 South WWTP
  DER Form 17-1.205(1)
- Certification by the Engineer of Completion of Construction of Wastewater Treatment and Disposal Systems in Accordance with the Plans and Specifications
- Application to Operate a Class I Deep Injection Well
  DER Form 17-1.209(9)
- The Operations Manual for Palm Beach County System 9 South WWTP - Draft
- The Operations Manual for Palm Beach County System 9 North WWTP - Draft

CH2M HILL, INC. Southeast Florida Office Hillsboro Executive Center N., 350 Fairway Dr., Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

- The Engineering Report on the Drilling and Testing of the Injection and Monitoring Wells for Palm Beach County System 9 North - Draft

The supporting documentation is being submitted in draft form for review and comment by your office. Following completion of review, the supporting documentation will be produced in final form and submitted.

Construction of the injection well was completed on October 23, 1985. Initial injection and debugging of the injection well pump station commenced on November 5, and the system went on 24-hour service on November 13. Operational data is now being gathered for the Operation and Maintenance Manual for the Deep Injection Well.

We would like to confirm that as the Palm Beach County Water Utility Department has complied with Item 17 of Consent Order No. 83-0728, fines accrued under Items 13 through 16 will not be assessed against Palm Beach County.

Very truly yours,

Thomas M. McCormick

tmTMC2/049
Enclosures
cc: R. Weisman/PBCWUD
T. Thornton/PBCWUD
L. McCall/PBCWUD
W. Board/DER
R. Duke/DER
R. Reis/DER
G. Fries/CH2M HILL
J.I. Garcia-Bengochea/CH2M HILL
J. Foess/CH2M HILL
S. Riley/CH2M HILL

Engineers
Planners
Economists
Scientists

January 27, 1986

FC18009.B2

Mr. Donald B. White, P.E.
UIC-TAC Chairman
Department of Environmental Regulation
3301 Gun Club Road
West Palm Beach, Florida 33402

RE: Operating Permit Application for the Test/Injection Well for the Palm Beach County Water Utilities System 9 (N) WWTP DIW

Dear Don:

Enclosed for your review are two copies of the final draft of the O&M manual prepared for the Palm Beach County System 9 (N) WWTP DIW.

Please examine Table 3-1, Injection System Monitoring Program, and confirm that frequency of monitoring is in accordance with FDER requirements. Upon receipt of your comments, this document will be produced in final form.

Also submitted with this delivery is one copy of the Engineering Report on the Drilling and Testing of the System 9 (N) DIW and one copy each of the television surveys of the injection well and the monitor well. It is my understanding that you now wish the Engineer to distribute these documents to members of the TAC. Accordingly, upon production of the final copy of the Operation and Maintenance Manual, CH2M HILL will distribute one copy each of the Engineering Report, the O&M Manual, and the television survey tapes as noted below:

Mr. Richard Deuerling/FDER Tallahassee
Mr. Michael Merritt/USGS Miami
Mr. Ron Lane/Palm Beach County Health Department

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Confirmation of the mailings will be forwarded to your office.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

tmTMC2/058
Enclosures
cc: Lawton McCall/PBCWUD
Thomas Thornton/PBCWUD
Robert Weisman/PBCWUD
J.I. Garcia-Bengochea/CH2M HILL/GNV
J. Foess/CH2M HILL/BCR

Engineers
Planners
Economists
Scientists

March 21, 1986

FC18009.B2

Mr. Lawton McCall
C.I.P. Coordinator
Utility Engineering Division
Palm Beach County Water Utilities Department
P. O. Box 16097
West Palm Beach, Florida 33406-0160

RE: Engineering Report on the Drilling and Testing of the Injection and Monitor Wells for System 9 and the Operation and Maintenance Manual for the Deep Injection Well System at the System 9 North Wastewater Treatment Plant

Dear Lawton:

In accordance with your instructions, we are distributing or have distributed the Operations and Maintenance Manual and the Engineering Report to members of the Technical Advisory Committee as noted below:

Mr. Don White FDER UIC-TAC Chairman FDER West Palm Beach	1 copy of ENR Report sealed by the Engineer of Record 2 copies of the O&M Manual 1 video survey, Injection Well 1 video survey, Monitor Well (delivered 1/27/86)
Ms. Kelsey Helton FDER TAC Member FDER Tallahassee	1 copy of ENR Report 1 copy of O&M Manual 1 video survey, Injection Well 1 video survey, Monitor Well
Mr. Leslie Wedderburn FDER TAC Member SFWMD West Palm Beach	1 copy of ENR report 1 copy of O&M Manual 1 video survey, Injection Well 1 video survey, Monitor Well

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Mr. Michael Merritt FDER TAC Member Palm Beach County Health Department	1 copy of ENR Report 1 video survey, Injection Well 1 video survey, Monitor Well
Mr. Tim Neal FDER TAC Member Palm Beach County Health Department	1 copy of ENR Report 1 copy of O&M Manual 1 video survey, Injection Well 1 video survey, Monitor Well
Mr. John Mason FDER TAC Member	1 copy of ENR Report 1 copy of O&M Manual 1 video survey, Monitor Well 1 video survey, Injection Well

In addition, 2 copies of the Engineering Report, 2 copies of the O&M Manual, and 1 copy each of the video surveys were delivered to your office on January 27, 1986.

Delivered herewith are the remaining 13 copies of the Engineering Report, and 11 copies of the Operations and Maintenance Manual.

This completes the submittal of Documentation required under FDER Regulation 17-28.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC1/001/tm
Enclosures
cc: J.I. Garcia-Bengochea/CH2M HILL/GNV
Jerry Foess/CH2M HILL/BCR

Engineers
Planners
Economists
Scientists

March 24, 1986

FC18009.B2

Ms. Kelsey Helton
Department of Environmental Regulation
Twin Towers
2600 Blair Stone Road
Tallahassee, Florida 32301

RE: Submittal of Documentation in Support of Palm Beach County System 9 North Deep Injection Well Operating Permit

Dear Kelsey:

The accompanying package contains the documentation submitted in support of the operating permit application for the Palm Beach County System 9 North Deep Injection Well.

Enclosed is one copy each of the following:

- Engineering Report on the construction of the well (Volumes I and II)
- Operation and Maintenance Manual prepared for the Palm Beach County operations staff
- One copy of the video survey of the monitor well in color
- One copy of the video survey of the injection well in black and white.

This completes the submittal of documentation to the Technical Advisory Committee for the Palm Beach County System 9 Injection Well Project. Should you have any questions now or in the future about this project, please feel free to call.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC2/065/tm
Enclosures
cc: Mr. Lawton McCall/PBC Water Utilities Department
Mr. Don White/FDER/WPB

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Engineers
Planners
Economists
Scientists

March 24, 1986

FC18009.B2

Mr. Michael Merritt
Hydrologist
USGS
P. O. Box 026052
Miami, Florida 33102

RE: Submittal of Documentation in Support of Palm Beach County System 9 North Deep Injection Well Operating Permit

Dear Michael:

The accompanying package contains the documentation submitted in support of the operating permit application for the Palm Beach County System 9 North Deep Injection Well.

Enclosed is one copy each of the following:

- Engineering Report on the construction of the well (Volumes I and II)
- Operation and Maintenance Manual prepared for the Palm Beach County operations staff
- One copy of the video survey of the monitor well in color
- One copy of the video survey of the injection well in black and white.

This completes the submittal of documentation to the Technical Advisory Committee for the Palm Beach County System 9 Injection Well Project. Should you have any questions now or in the future about this project, please feel free to call.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC2/067/tm
Enclosures
cc: Mr. Lawton McCall/PBC Water Utilities Department
Mr. Don White/FDER/WPB

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Engineers
Planners
Economists
Scientists

March 24, 1986

FC18009.B2

Dr. Leslie Wedderburn, Deputy Director
Resource Control Department
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

RE: Submittal of Documentation in Support of Palm Beach County System 9 North Deep Injection Well Operating Permit

Dear Leslie:

The accompanying package contains the documentation submitted in support of the operating permit application for the Palm Beach County System 9 North Deep Injection Well.

Enclosed is one copy each of the following:

- Engineering Report on the construction of the well (Volumes I and II)
- Operation and Maintenance Manual prepared for the Palm Beach County operations staff
- One copy of the video survey of the monitor well in color
- One copy of the video survey of the injection well in black and white.

This completes the submittal of documentation to the Technical Advisory Committee for the Palm Beach County System 9 Injection Well Project. Should you have any questions now or in the future about this project, please feel free to call.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC2/066/tm
Enclosures
cc: Mr. Lawton McCall/PBC Water Utilities Department
Mr. Don White/FDER/WPB

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Engineers
Planners
Economists
Scientists

March 24, 1986

FC18009.B2

Mr. John Mason
Groundwater Section
Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30365

RE: Submittal of Documentation in Support of Palm Beach County System 9 North Deep Injection Well Operating Permit

Dear John:

The accompanying package contains the documentation submitted in support of the operating permit application for the Palm Beach County System 9 North Deep Injection Well.

Enclosed is one copy each of the following:

- Engineering Report on the construction of the well (Volumes I and II)
- Operation and Maintenance Manual prepared for the Palm Beach County operations staff
- One copy of the video survey of the monitor well in color
- One copy of the video survey of the injection well in black and white.

This completes the submittal of documentation to the Technical Advisory Committee for the Palm Beach County System 9 Injection Well Project. Should you have any questions now or in the future about this project, please feel free to call.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC2/068/tm
Enclosures
cc: Mr. Lawton McCall/PBC Water Utilities Department
Mr. Don White/FDER/WPB

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

Engineers
Planners
Economists
Scientists

March 24, 1986

FC18009.B2

Mr. Tim Neal
Palm Beach County Health Department
901 Evernia Street
West Palm Beach, Florida 33402

RE: Submittal of Documentation in Support of Palm Beach County System 9 North Deep Injection Well Operating Permit

Dear Tim:

The accompanying package contains the documentation submitted in support of the operating permit application for the Palm Beach County System 9 North Deep Injection Well.

Enclosed is one copy each of the following:

- Engineering Report on the construction of the well (Volumes I and II)
- Operation and Maintenance Manual prepared for the Palm Beach County operations staff
- One copy of the video survey of the monitor well in color
- One copy of the video survey of the injection well in black and white.

This completes the submittal of documentation to the Technical Advisory Committee for the Palm Beach County System 9 Injection Well Project. Should you have any questions now or in the future about this project, please feel free to call.

Very truly yours,

Thomas M. McCormick

Thomas M. McCormick
Project Manager

bcrTMC2/069/tm
Enclosures
cc: Mr. Lawton McCall/PBC Water Utilities Department
Mr. Don White/FDER/WPB

CH2M HILL, INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210
Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800
Broward Co. 305.426.4008

CH2MHI

March 2

FC18009

Mr. Law
C.I.P.
Utility
Palm Bea
P. O. Bo
West Pal

RE: Eng
Inj
tio
Sys

Dear Law

In accor
have dis
the Engi
Committe

Mr. Don
FDER UIC
FDER West

Ms. Kelse
FDER TAC
FDER Tall

Mr. Leslie
FDER TAC
SFWMD West

ACKNOWLEDGMENT OF DELIVERY

from: EL 3-43-434
(Stamp UPS shipper number above)

617 650 585
(Invoice or order number)

Receiving Company's Name: Environmental Protection Agency

Receiver's Signature (X): [signature] Date 3/27/86

INSTRUCTIONS TO DRIVER: Obtain receiver's signature and date above, detach card, and turn in to operating center that day. Signature must also be obtained on the delivery record.

ACKNOWLEDGMENT OF DELIVERY

from: EL 3-43-434
(Stamp UPS shipper number above)

617 650 585
(Invoice or order number)

Receiving Company's Name: United States Geological Survey

Receiver's Signature (X): Chris Williams Date 3/25/86

INSTRUCTIONS TO DRIVER: Obtai[illegible]

ACKNOWLEDGMENT OF DELIVERY

from: EL 3-43-434
(Stamp UPS shipper number above)

617 650 585
(Invoice or order number)

Receiving Company's Name: Palm Beach County Health Department

Receiver's Signature (X): [signature] Date 3/26/86

INSTRUCTIONS TO DRIVER: Obtain receiver's signature and date above, detach card, and turn in to operating center that day. Signature must also be obtained on the delivery record.

CH2M HILL INC. Southeast Florida Office Hillsboro Executive Center North 350 Drive, Suite 210 Deerfield Beach, Florida 33441 Palm Beach Co. 305.395.3800 Broward Co. 305.426.4008

Engineers
Planners
Economists
Scientists

BASE/NEUTRAL COMPOUNDS
GC/MS REPORT

Laboratory No : 10576001
Date Received : 02/16/88
Date Extracted: 02/19/88
Date Analyzed : 02/23/88

Client: PALM BEACH COUNTY

Sample Description: 50666
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Aniline	10	BMDL	1,2-Diphenylhydrazine	10	BMDL
Bis(2-chloroethyl)ether	10	BMDL	4-Bromophenyl phenyl ether	10	BMDL
1,3-Dichlorobenzene	10	BMDL	Hexachlorobenzene	10	BMDL
1,4-Dichlorobenzene	10	BMDL	Phenanthrene	10	BMDL
Benzyl Alcohol	10	BMDL	Anthracene	10	BMDL
1,2-Dichlorobenzene	10	BMDL	Dibutyl phthalate	10	BMDL
Bis(2-chloroisopropyl)ether	10	BMDL	Fluoranthene	10	BMDL
Hexachloroethane	10	BMDL	Pyrene	10	BMDL
N-nitroso-di-n-propylamine	10	BMDL	Benzidine	50	BMDL
Nitrobenzene	10	BMDL	Butyl benzyl phthalate	10	BMDL
Isophorone	10	BMDL	2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	BMDL
Bis(2-chloroethoxy)methane	10	BMDL	Benzo (a) anthracene	10	BMDL
1,2,4-Trichlorobenzene	10	BMDL	Chrysene	10	BMDL
Naphthalene	10	BMDL	3,3'-Dichlorobenzidine	50	BMDL
4-Chloroaniline	10	BMDL	Bis(2-ethylhexyl)phthalate	10	BMDL
Hexachlorobutadiene	10	BMDL	Di-n-octyl phthalate	10	BMDL
2-Methylnaphthalene	10	BMDL	Benzo (b) fluoranthene	10	BMDL
Hexachlorocyclopentadiene	10	BMDL	Benzo (k) fluoranthene	10	BMDL
2-Chloronaphthalene	10	BMDL	Benzo (a) pyrene	10	BMDL
Acenaphthylene	10	BMDL	Indeno (1,2,3-cd) pyrene	10	BMDL
Dimethyl phthalate	10	BMDL	Dibenzo (a,h) anthracene	10	BMDL
2,6-Dinitrotoluene	10	BMDL	Benzo (g,h,i) perylene	10	BMDL
2-Nitroaniline	50	BMDL			
Acenaphthene	10	BMDL			
Dibenzofuran	10	BMDL	OTHER COMPOUNDS:		
2,4-Dinitrotoluene	10	BMDL			
Fluorene	10	BMDL			
4-Chlorophenyl phenyl ether	10	BMDL			
4-Nitroaniline	50	BMDL			
Diethyl phthalate	10	BMDL			
N-nitrosodiphenylamine	10	BMDL			

SURROGATE RECOVERIES	%REC.
D5-Nitrobenzene	55
2-Fluorobiphenyl	77
D10-Pyrene	94
D14-Terphenyl	82

REVIEW

MTP

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

ACID COMPOUNDS
GC/MS REPORT

Laboratory No : 10576001
Date Received : 02/16/88
Date Extracted: 02/17/88
Date Analyzed : 02/20/88

Client: PALM BEACH COUNTY

Sample Description: 50666
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Phenol	10	BMDL			
2-Chlorophenol	10	BMDL			
2-Methylphenol	10	BMDL			
4-Methylphenol	10	BMDL			
2-Nitrophenol	10	BMDL			
2,4-Dimethylphenol	10	BMDL			
2,4-Dichlorophenol	10	BMDL			
Benzoic Acid	50	BMDL			
4-Chloro-3-methylphenol	10	BMDL			
2,4,6-Trichlorophenol	10	BMDL			
2,4,5-Trichlorophenol	10	BMDL			
2,4-Dinitrophenol	50	BMDL			
4-Nitrophenol	50	BMDL			
2-Methyl-4,6-dinitrophenol	50	BMDL			
Pentachlorophenol	10	BMDL			
OTHER COMPOUNDS:					

SURROGATE RECOVERIES	% REC.
2-Fluorophenol	74
D5-Phenol	57
2,4,6-Tribromophenol	86

REVIEW

MTP

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SDWA HERBICIDE ANALYSIS
GC REPORT

Laboratory No : 10576001
Date Received : 02/16/88
Date Extracted: 02/18/88
Date Analyzed : 03/04/88

Client: PALM BEACH COUNTY

Sample Description: 50666
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
2,4-D	0.5	BMDL			
Silvex	0.1	BMDL			
OTHER COMPOUNDS:					

SURROGATE RECOVERIES	% REC.
2,4,5-T	80

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SOWA PESTICIDE ANALYSIS
GC REPORT

Laboratory No : 10576001
Date Received : 02/16/88
Date Extracted: 02/16/88
Date Analyzed : 03/03/88

Client: PALM BEACH COUNTY

Sample Description: 50666
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Endrin	0.02	BMDL			
gamma-BHC	0.01	BMDL			
4,4'-Methoxychlor	0.04	BMDL			
Toxaphene	0.50	BMDL			
OTHER COMPOUNDS:					
Dieldrin	0.02	BMDL			
Aldrin	0.01	BMDL			

SURROGATE RECOVERIES	% REC.
2,4,6-Tribromobiphenyl	84
Dibutylchlorendate	74

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

BASE/NEUTRAL COMPOUNDS
GC/MS REPORT

Laboratory No : 10576002
Date Received : 02/16/88
Date Extracted: 02/19/88
Date Analyzed : 02/23/88

Client: PALM BEACH COUNTY

Sample Description: 50667
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Aniline	10	BMDL	1,2-Diphenylhydrazine	10	BMDL
Bis(2-chloroethyl)ether	10	BMDL	4-Bromophenyl phenyl ether	10	BMDL
1,3-Dichlorobenzene	10	BMDL	Hexachlorobenzene	10	BMDL
1,4-Dichlorobenzene	10	BMDL	Phenanthrene	10	BMDL
Benzyl Alcohol	10	BMDL	Anthracene	10	BMDL
1,2-Dichlorobenzene	10	BMDL	Dibutyl phthalate	10	BMDL
Bis(2-chloroisopropyl)ether	10	BMDL	Fluoranthene	10	BMDL
Hexachloroethane	10	BMDL	Pyrene	10	BMDL
N-nitroso-di-n-propylamine	10	BMDL	Benzidine	50	BMDL
Nitrobenzene	10	BMDL	Butyl benzyl phthalate	10	BMDL
Isophorone	10	BMDL	2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	BMDL
Bis(2-chloroethoxy)methane	10	BMDL	Benzo (a) anthracene	10	BMDL
1,2,4-Trichlorobenzene	10	BMDL	Chrysene	10	BMDL
Naphthalene	10	BMDL	3,3'-Dichlorobenzidine	50	BMDL
4-Chloroaniline	10	BMDL	Bis(2-ethylhexyl)phthalate	10	BMDL
Hexachlorobutadiene	10	BMDL	Di-n-octyl phthalate	10	BMDL
2-Methylnaphthalene	10	BMDL	Benzo (b) fluoranthene	10	BMDL
Hexachlorocyclopentadiene	10	BMDL	Benzo (k) fluoranthene	10	BMDL
2-Chloronaphthalene	10	BMDL	Benzo (a) pyrene	10	BMDL
Acenaphthylene	10	BMDL	Indeno (1,2,3-cd) pyrene	10	BMDL
Dimethyl phthalate	10	BMDL	Dibenzo (a,h) anthracene	10	BMDL
2,6-Dinitrotoluene	10	BMDL	Benzo (g,h,i) perylene	10	BMDL
2-Nitroaniline	50	BMDL			
Acenaphthene	10	BMDL			
Dibenzofuran	10	BMDL	OTHER COMPOUNDS:		
2,4-Dinitrotoluene	10	BMDL			
Fluorene	10	BMDL			
4-Chlorophenyl phenyl ether	10	BMDL			
4-Nitroaniline	50	BMDL			
Diethyl phthalate	10	BMDL			
N-nitrosodiphenylamine	10	BMDL			

SURROGATE RECOVERIES	%REC.
D5-Nitrobenzene	46
2-Fluorobiphenyl	71
D10-Pyrene	87
D14-Terphenyl	74

REVIEW

MTP

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

ACID COMPOUNDS
GC/MS REPORT

Laboratory No : 10576002
Date Received : 02/16/88
Date Extracted: 02/17/88
Date Analyzed : 02/20/88

Client: PALM BEACH COUNTY

Sample Description: 50667
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Phenol	10	BMDL			
2-Chlorophenol	10	BMDL			
2-Methylphenol	10	BMDL			
4-Methylphenol	10	BMDL			
2-Nitrophenol	10	BMDL			
2,4-Dimethylphenol	10	BMDL			
2,4-Dichlorophenol	10	BMDL			
Benzoic Acid	50	BMDL			
4-Chloro-3-methylphenol	10	BMDL			
2,4,6-Trichlorophenol	10	BMDL			
2,4,5-Trichlorophenol	10	BMDL			
2,4-Dinitrophenol	50	BMDL			
4-Nitrophenol	50	BMDL			
2-Methyl-4,6-dinitrophenol	50	BMDL			
Pentachlorophenol	10	BMDL			
OTHER COMPOUNDS:					

SURROGATE RECOVERIES	%REC.	
2-Fluorophenol	45	
D5-Phenol	8.5x	
2,4,6-Tribromophenol	51	

REVIEW

MTP

Comments: x Surrogate below normal recovery limit.

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SDWA HERBICIDE ANALYSIS
GC REPORT

Laboratory No : 10576002
Date Received : 02/16/88
Date Extracted: 02/18/88
Date Analyzed : 03/04/88

Client: PALM BEACH COUNTY

Sample Description: 50667
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
2,4-D	0.5	BMDL			
Silvex	0.1	BMDL			
OTHER COMPOUNDS:					

SURROGATE RECOVERIES	% REC.
2,4,5-T	91

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW
HLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL
Engineers
Planners
Economists
Scientists

SDWA PESTICIDE ANALYSIS
GC REPORT

Laboratory No : 10576002
Date Received : 02/16/88
Date Extracted: 02/16/88
Date Analyzed : 03/03/88

Client: PALM BEACH COUNTY

Sample Description: 50667
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB
Endrin	0.02	BMDL
gamma-BHC	0.01	BMDL
4,4'-Methoxychlor	0.04	BMDL
Toxaphene	0.50	BMDL
OTHER COMPOUNDS:		
Dieldrin	0.02	BMDL
Aldrin	0.01	BMDL

SURROGATE RECOVERIES	%REC.
2,4,6-Tribromobiphenyl	86
Dibutylchlorendate	77

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL
Engineers
Planners
Economists
Scientists

BASE/NEUTRAL COMPOUNDS
GC/MS REPORT

Laboratory No : 10576003
Date Received : 02/16/88
Date Extracted: 02/19/88
Date Analyzed : 02/23/88

Client: PALM BEACH COUNTY

Sample Description: 50668
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Aniline	10	BMDL	1,2-Diphenylhydrazine	10	BMDL
Bis(2-chloroethyl)ether	10	BMDL	4-Bromophenyl phenyl ether	10	BMDL
1,3-Dichlorobenzene	10	BMDL	Hexachlorobenzene	10	BMDL
1,4-Dichlorobenzene	10	BMDL	Phenanthrene	10	BMDL
Benzyl Alcohol	10	BMDL	Anthracene	10	BMDL
1,2-Dichlorobenzene	10	BMDL	Dibutyl phthalate	10	BMDL
Bis(2-chloroisopropyl)ether	10	BMDL	Fluoranthene	10	BMDL
Hexachloroethane	10	BMDL	Pyrene	10	BMDL
N-nitroso-di-n-propylamine	10	BMDL	Benzidine	50	BMDL
Nitrobenzene	10	BMDL	Butyl benzyl phthalate	10	BMDL
Isophorone	10	BMDL	2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	BMDL
Bis(2-chloroethoxy)methane	10	BMDL	Benzo (a) anthracene	10	BMDL
1,2,4-Trichlorobenzene	10	BMDL	Chrysene	10	BMDL
Naphthalene	10	BMDL	3,3'-Dichlorobenzidine	50	BMDL
4-Chloroaniline	10	BMDL	Bis(2-ethylhexyl)phthalate	10	BMDL
Hexachlorobutadiene	10	BMDL	Di-n-octyl phthalate	10	BMDL
2-Methylnaphthalene	10	BMDL	Benzo (b) fluoranthene	10	BMDL
Hexachlorocyclopentadiene	10	BMDL	Benzo (k) fluoranthene	10	BMDL
2-Chloronaphthalene	10	BMDL	Benzo (a) pyrene	10	BMDL
Acenaphthylene	10	BMDL	Indeno (1,2,3-cd) pyrene	10	BMDL
Dimethyl phthalate	10	BMDL	Dibenzo (a,h) anthracene	10	BMDL
2,6-Dinitrotoluene	10	BMDL	Benzo (g,h,i) perylene	10	BMDL
2-Nitroaniline	50	BMDL			
Acenaphthene	10	BMDL			
Dibenzofuran	10	BMDL	OTHER COMPOUNDS:		
2,4-Dinitrotoluene	10	BMDL			
Fluorene	10	BMDL			
4-Chlorophenyl phenyl ether	10	BMDL			
4-Nitroaniline	50	BMDL			
Diethyl phthalate	10	BMDL			
N-nitrosodiphenylamine	10	BMDL			

SURROGATE RECOVERIES	% REC.
D5-Nitrobenzene	47
2-Fluorobiphenyl	78
D10-Pyrene	76
D14-Terphenyl	70

REVIEW

MTP

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

CH2M HILL
Engineers
Planners
Economists
Scientists

ACID COMPOUNDS
GC/MS REPORT

Laboratory No : 10576003
Date Received : 02/16/88
Date Extracted: 02/17/88
Date Analyzed : 02/20/88

Client: PALM BEACH COUNTY

Sample Description: 50668
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Phenol	10	BMDL			
2-Chlorophenol	10	BMDL			
2-Methylphenol	10	BMDL			
4-Methylphenol	10	BMDL			
2-Nitrophenol	10	BMDL			
2,4-Dimethylphenol	10	BMDL			
2,4-Dichlorophenol	10	BMDL			
Benzoic Acid	50	BMDL			
4-Chloro-3-methylphenol	10	BMDL			
2,4,6-Trichlorophenol	10	BMDL			
2,4,5-Trichlorophenol	10	BMDL			
2,4-Dinitrophenol	50	BMDL			
4-Nitrophenol	50	BMDL			
2-Methyl-4,6-dinitrophenol	50	BMDL			
Pentachlorophenol	10	BMDL			
OTHER COMPOUNDS:					
SURROGATE RECOVERIES	% REC.				
2-Fluorophenol	83				
D5-Phenol	72				
2,4,6-Tribromophenol	99				

REVIEW

MTP

Comments:

Engineers
Planners
Economists
Scientists

SDWA HERBICIDE ANALYSIS
GC REPORT

Laboratory No : 10576003
Date Received : 02/16/88
Date Extracted: 02/18/88
Date Analyzed : 03/04/88

Client: PALM BEACH COUNTY

Sample Description: 50668
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
2,4-D	0.5	BMDL			
Silvex	0.1	BMDL			
OTHER COMPOUNDS:					
SURROGATE RECOVERIES	% REC.				
2,4,5-T	96				

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

HLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SDWA PESTICIDE ANALYSIS
GC REPORT

Laboratory No : 10576003
Date Received : 02/16/88
Date Extracted: 02/16/88
Date Analyzed : 03/03/88

Client: PALM BEACH COUNTY

Sample Description: 50668
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB
Endrin	0.02	BMDL
gamma-BHC	0.01	BMDL
4,4'-Methoxychlor	0.04	BMDL
Toxaphene	0.50	BMDL
OTHER COMPOUNDS:		
Dieldrin	0.02	BMDL
Aldrin	0.01	BMDL

SURROGATE RECOVERIES	%REC.
2,4,6-Tribromobiphenyl	54
Dibutylchlorendate	25

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

ORGANIC REPORT OF ANALYSIS

CH2M HILL/GNV
P.O. BOX 1647
GAINESVILLE, FLORIDA 32602

Date: 03/08/88

Project Number: SE24770.S6

ATTN: MR. DON HASH

Laboratory Number: 10576

RE: Sample(s) received by CH2M HILL on 02/16/88.
PALM BEACH COUNTY

Analysis Description	50666	50667	50668
	WATER	WATER	WATER
EDB (ug/L)	<0.02	<0.02	<0.02
1,1,2,2-Tetrachloroethane (%)	93	94	98

Analyses performed in accordance with methods approved by the USEPA.

Respectfully Submitted,

Ward Dickens

Ward Dickens
Organic Laboratory Manager

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

BASE/NEUTRAL COMPOUNDS
GC/MS REPORT

Laboratory No : W02198B1
Date Received : 02/19/88
Date Extracted: 02/19/88
Date Analyzed : 02/23/88

Client: QUALITY CONTROL DATA

Sample Description: BLANK DATA FOR YOUR SAMPLES
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Aniline	10	BMDL	1,2-Diphenylhydrazine	10	BMDL
Bis(2-chloroethyl)ether	10	BMDL	4-Bromophenyl phenyl ether	10	BMDL
1,3-Dichlorobenzene	10	BMDL	Hexachlorobenzene	10	BMDL
1,4-Dichlorobenzene	10	BMDL	Phenanthrene	10	BMDL
Benzyl Alcohol	10	BMDL	Anthracene	10	BMDL
1,2-Dichlorobenzene	10	BMDL	Dibutyl phthalate	10	BMDL
Bis(2-chloroisopropyl)ether	10	BMDL	Fluoranthene	10	BMDL
Hexachloroethane	10	BMDL	Pyrene	10	BMDL
N-nitroso-di-n-propylamine	10	BMDL	Benzidine	50	BMDL
Nitrobenzene	10	BMDL	Butyl benzyl phthalate	10	BMDL
Isophorone	10	BMDL	2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	BMDL
Bis(2-chloroethoxy)methane	10	BMDL	Benzo (a) anthracene	10	BMDL
1,2,4-Trichlorobenzene	10	BMDL	Chrysene	10	BMDL
Naphthalene	10	BMDL	3,3'-Dichlorobenzidine	50	BMDL
4-Chloroaniline	10	BMDL	Bis(2-ethylhexyl)phthalate	10	BMDL
Hexachlorobutadiene	10	BMDL	Di-n-octyl phthalate	10	BMDL
2-Methylnaphthalene	10	BMDL	Benzo (b) fluoranthene	10	BMDL
Hexachlorocyclopentadiene	10	BMDL	Benzo (k) fluoranthene	10	BMDL
2-Chloronaphthalene	10	BMDL	Benzo (a) pyrene	10	BMDL
Acenaphthylene	10	BMDL	Indeno (1,2,3-cd) pyrene	10	BMDL
Dimethyl phthalate	10	BMDL	Dibenzo (a,h) anthracene	10	BMDL
2,6-Dinitrotoluene	10	BMDL	Benzo (g,h,i) perylene	10	BMDL
2-Nitroaniline	50	BMDL			
Acenaphthene	10	BMDL			
Dibenzofuran	10	BMDL	OTHER COMPOUNDS:		
2,4-Dinitrotoluene	10	BMDL			
Fluorene	10	BMDL			
4-Chlorophenyl phenyl ether	10	BMDL			
4-Nitroaniline	50	BMDL			
Diethyl phthalate	10	BMDL			
N-nitrosodiphenylamine	10	BMDL			

SURROGATE RECOVERIES	%REC.
05-Nitrobenzene	47
2-Fluorobiphenyl	58
010-Pyrene	89
014-Terphenyl	78

1 MDL = Method Detection Limit
2 BMDL = Below Method Detection Limit
3 ND = Not Determined

REVIEW

MTP

Comments:

Engineers
Planners
Economists
Scientists

ACID COMPOUNDS
GC/MS REPORT

Laboratory No : H0217881
Date Received : 02/17/88
Date Extracted: 02/17/88
Date Analyzed : 02/20/88

Client: QUALITY CONTROL DATA

Sample Description: BLANK DATA FOR YOUR SAMPLES
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Phenol	10	BMDL			
2-Chlorophenol	10	BMDL			
2-Methylphenol	10	BMDL			
4-Methylphenol	10	BMDL			
2-Nitrophenol	10	BMDL			
2,4-Dimethylphenol	10	BMDL			
2,4-Dichlorophenol	10	BMDL			
Benzoic Acid	50	BMDL			
4-Chloro-3-methylphenol	10	BMDL			
2,4,6-Trichlorophenol	10	BMDL			
2,4,5-Trichlorophenol	10	BMDL			
2,4-Dinitrophenol	50	BMDL			
4-Nitrophenol	50	BMDL			
2-Methyl-4,6-dinitrophenol	50	BMDL			
Pentachlorophenol	10	BMDL			
OTHER COMPOUNDS:					

SURROGATE RECOVERIES	%REC.3
2-Fluorophenol	85
D5-Phenol	69
2,4,6-Tribromophenol	77

1 MDL = Method Detection Limit
2 BMDL = Below Method Detection Limit
3 ND = Not Determined

REVIEW

MTP

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SDWA HERBICIDE ANALYSIS
GC REPORT

Laboratory No : W0218881
Date Received : 02/18/88
Date Extracted: 02/18/88
Date Analyzed : 03/04/88

Client: QUALITY CONTROL DATA

Sample Description: BLANK DATA FOR YOUR SAMPLES
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
2,4-D	0.5	BMDL			
Silvex	0.1	BMDL			
OTHER COMPOUNDS:					
SURROGATE RECOVERIES	% REC.				
2,4,5-T	85				

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

SDWA PESTICIDE ANALYSIS
GC REPORT

Laboratory No : W0216881
Date Received : 02/16/88
Date Extracted: 02/16/88
Date Analyzed : 03/03/88

Client: QUALITY CONTROL DATA

Sample Description: BLANK DATA FOR YOUR SAMPLES
Matrix: WATER

Compounds	MDL1 PPB	Conc.2 PPB	Compounds	MDL1 PPB	Conc.2 PPB
Endrin	0.02	BMDL			
gamma-BHC	0.01	BMDL			
4,4'-Methoxychlor	0.04	BMDL			
Toxaphene	0.50	BMDL			
OTHER COMPOUNDS:					
Dieldrin	0.02	BMDL			
Aldrin	0.01	BMDL			

SURROGATE RECOVERIES	%REC.
2,4,6-Tribromobiphenyl	85
Dibutylchlorendate	84

1 MDL = METHOD DETECTION LIMIT
2 BMDL = BELOW METHOD DETECTION LIMIT

REVIEW

WLH

Comments:

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444

Engineers
Planners
Economists
Scientists

ORGANIC REPORT OF ANALYSIS

QUALITY CONTROL DATA
FOR YOUR SAMPLES

Date: 03/08/88

Project Number: NO CHARGE

ATTN: Q.C. OFFICER

Laboratory Number: W0216

RE: Sample(s) collected by CH2M HILL on 02/16/88.

Analysis Description	BLANK DATA FOR YOUR SAMPLES
	WATER
EDB (ug/L)	<0.02
1,1,2,2-Tetrachloroethane (%)	93

Analyses performed in accordance with methods approved by the USEPA.

Respectfully Submitted,

Ward Dickens

Ward Dickens
Organic Laboratory Manager

CH2M HILL Montgomery Office 2567 Fairlane Drive, P.O. Box 230548, Montgomery, Alabama 36116 205.271.1444