

URS Greiner Woodward Clyde

A Division of URS Corporation

2822 O'Neal Lane
Baton Rouge, LA 70816
Tel: 225.751.1873
Fax: 225.753.3616
Offices Worldwide

April 13, 1999

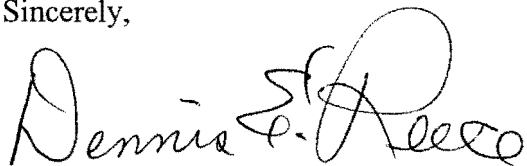
Mr. Keith Brown
Manager, State Permits, Water Division
Arkansas Department of Environmental Quality
8001 National Drive
Little Rock, AR 72219-8913

Re: Enhanced In-Situ Bioremediation
Report On Initial Sampling and Testing and Plan
For Preliminary Field Testing
El Dorado Chemical Company
El Dorado, Arkansas
URSGWC 3500009153.00

Dear Mr. Brown:

Attached are three copies of the referenced report for you, Art Riddle, and Belinda Colby. If you have questions or comments, we can be reached at (225) 756-1431.

Sincerely,



Dennis E. Reece
Vice President



William Beal, P.G., P.E.

cc: Art Riddle, ADEQ
Belinda Colby, ADEQ

F I N A L R E P O R T

**ENHANCED IN-SITU
BIOREMEDIATION**

**REPORT ON INITIAL SAMPLING AND TESTING AND
PLAN FOR PRELIMINARY FIELD TESTING**

**RESPONSE TO PARAGRAPH 4(B) OF CONSENT
ADMINISTRATIVE ORDER LIS 98-119**

**EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS**

Prepared for
El Dorado Chemical Company
El Dorado, Arkansas

April 14, 1999

File No. 3500009153.00

URS Greiner Woodward Clyde

A Division of URS Corporation

2822 O'Neal Lane
Baton Rouge, Louisiana 70816
(225) 751-1873

TABLE OF CONTENTS

Section 1	Introduction.....	1-1
Section 2	Hydraulic Conductivity Tests	2-1
Section 3	Sampling and Analysis of Monitor Wells	3-1
Section 4	Planned Preliminary Field Test	4-1
	4.1 General Approach	4-1
	4.2 Test Protocol	4-2
Section 5	References	5-1

TABLES

Table 1	Summary of Hydraulic Conductivity Values
Table 2	Analytical Results, Sampling and Analysis of Monitor Wells
Table 3	Preliminary Field Test Sampling Schedule, Parameters, and Methods

FIGURES

Figure 1	Site Map
----------	----------

APPENDICES

Appendix A	Calculations-Hydraulic Conductivity Tests
Appendix B	Groundwater Collection Report Forms
Appendix C	Analytical Laboratory Reports

This letter report presents the results of the initial sampling and testing and the plans for the preliminary field testing of enhanced in-situ bioremediation at the El Dorado Chemical Company (EDCC) site.

This work was completed in accordance with the Work Plan dated December 1998 which was prepared by URS Greiner Woodward-Clyde (URSGWC) for EDCC and submitted to the Arkansas Department of Environmental Quality (ADEQ). The ADEQ approved the Work Plan in a letter dated February 12, 1999 from Mr. Robert Allen of ADEQ to Mr. Byron Smith of EDCC. This work addresses requirements of paragraph 4(B) of Consent Administrative Order LIS 98-119.

This report is organized as follows:

- Section 2.0 Documents and presents results of the hydraulic conductivity tests.
- Section 3.0 Documents and presents results of the sampling and analysis of monitor wells.
- Section 4.0 Presents the planned preliminary field tests.
- Section 5.0 Presents references.

Slug tests to determine hydraulic conductivity were completed for each of the ten monitor wells included in the in-situ bioremediation program. These wells are MW-EDC-6, 7, 8, 9, 10, 11, 14, 15, 16, and 17. The monitor well locations are shown on Figure 1. The tests were completed in accordance with the procedures in Section 3.1.3 of the approved Work Plan.

Table 1 summarizes the calculated values of hydraulic conductivity using the Bouwer-Rice method for both slug in and slug out tests. The results for individual tests range from 1.04×10^{-5} ft/min (5.28×10^{-6} cm/sec) to 0.00208 ft/min (0.00106 cm/sec). Appendix A presents the calculations of the hydraulic conductivity values.

SECTION THREE

Sampling and Analysis of Monitor Wells

The ten monitor wells included in the enhanced in-situ bioremediation program were sampled on March 9-10, 1999 in accordance with the procedures in the approved Work Plan. The results of field measurements and laboratory results are summarized in Table 2. Appendix B presents the Ground Water Collection Report forms with the field measurements. Appendix C presents the analytical laboratory reports.

The analytical results are discussed in the following paragraphs with respect to in-situ bioremediation considerations.

pH. The average pH in the monitoring wells was pH 4.03 for the March 1999 sampling event. This pH is inhibitory to the growth of many microorganisms. The optimum pH range for denitrification is 7.0 to 8.0 (Hiscock et. al) and denitrification has been shown to be limited in groundwater with pH 4 (Bradley et. al). The low pH was not consistently observed in previous sampling events and may reflect temporal variations. The microorganisms may be stressed by low pH conditions, prolonging the lag period before stable, viable populations can be restored.

Specific conductance. Specific conductance is measured primarily to determine when well development is complete and is not a primary microbiological indicator. Successful denitrification may lower the specific conductance of the groundwater.

Temperature. The average temperature of the groundwater is 18.3°C. Microbiological activity is temperature dependent, and increases with increasing temperature up to approximately 35°C. Most microorganisms do not survive about 55°C. The groundwater temperature is moderate and is not likely to limit denitrification.

Dissolved oxygen (DO). The average DO concentration at the site is 0.6 mg/L and some wells have DO above 1 mg/L. DO concentrations above 0.2 mg/L have been observed to limit nitrate reduction. The DO values are high enough to suggest denitrification is limited in part due to the presence of oxygen in the groundwater. During in-situ bioremediation, the added carbon substrate rapidly utilizes the available DO; therefore, the presence of DO is not a significant factor in promoting or limiting enhanced bioremediation of nitrate.

Oxidation Reduction Potential (ORP). The average ORP at the site is +170mV. Positive ORP values are consistent with waters that contain oxygen and/or nitrate. As nitrate is

removed from the groundwater, the ORP of the water should decrease; therefore, ORP may be useful for monitoring denitrification.

Ferrous iron. Ferrous iron concentrations at the site range from <0.01 to 1.09 mg/L. Ferrous iron is often produced in groundwater by iron reducing bacteria. Due to the presence of both oxygen and nitrate in the groundwater, iron reducing bacterial activity is likely not significant. Ferrous iron may also be produced by autotrophic bacteria. If available iron is in the form of pyrite, sulfate is also produced during autotrophic denitrification. Ferrous iron will be monitored during the preliminary field test to determine if there is evidence of autotrophic denitrification.

Carbon dioxide. Dissolved carbon dioxide can be an indicator of the level of microbiological activity. Both aerobic metabolism and denitrification produce carbon dioxide. The measured carbon dioxide concentrations vary from 83 to 990 mg/L. The pH of the groundwater is approximately pH 4; therefore, nearly all of the carbonate in the groundwater is in the form of carbon dioxide (carbonic acid). As the pH of the groundwater is increased, the carbon dioxide concentration is expected to diminish rapidly with a stoichiometric increase in alkalinity.

Denitrifying bacteria. A field screening kit was used to test for the presence of denitrifying bacteria. Although some wells tested negative to the field screen, denitrifying bacteria are likely to be present, but not active due to the presence of oxygen or the low pH. After nutrient (carbon substrate and pH buffer) introduction into the groundwater, the groundwater is expected to test strongly positive for denitrifying bacteria.

Total iron. Total iron concentrations ranged from <0.03 mg/L to 5.4 mg/L. Total iron concentration indicates the potential to supply iron to iron reducing bacteria or autotrophic denitrifying bacteria. Total iron concentrations do not appear to be significant except in well MW-EDC-10.

Total manganese. Manganese can be used as a terminal electron acceptor by manganese reducing microorganisms. Manganese reduction may compete with nitrate reduction; however, the low manganese concentrations (0.8 mg/L) suggest manganese reduction is not likely a significant mechanism at the site.

Ammonia and Total Kjeldahl Nitrogen (TKN). Ammonia is a source of nitrogen, which is an essential nutrient for the growth of microorganisms. The ammonia concentration at the site varies widely, from 0.1 to 700 mg/L. In wells where the ammonia concentration is > 5 mg/L, additional ammonia will not be required to complement the added carbon source. The reported ammonia concentrations and TKN concentrations are not consistent. TKN is a measure of both ammonia and organic nitrogen; however, many of the TKN values are less than the ammonia values. Ammonia will be reevaluated during the preliminary field test before full scale implementation of the bioremediation program. Addition of ammonia to the wells will not be required for the preliminary field test.

Chloride. Chloride can be used as a tracer to characterize abiotic factors that influence environmental contaminants. For example, if chloride is released as a co-contaminant, the downgradient chloride concentrations can be used to calculate abiotic attenuation factors such as dilution and dispersion. However, chloride concentrations at this site do not appear to be useful in characterizing groundwater flow.

Methane. Methane can be an indicator of methanogenic activity, or can be used as a carbon source by methylotrophic bacteria. Methane concentrations at the site are low and are not likely to have an influence on denitrification.

Nitrate. Nitrate is the constituent of concern. Nitrate concentrations (as nitrogen) in the ten monitor wells included in the in-situ bioremediation program ranged from 10.2 to 1,060 mg/L in the March 1999 sampling event.

Nitrite. Nitrite can be produced from the partial reduction of nitrate. The maximum concentration of nitrite (as nitrogen) at the site is 0.31 mg/L. Nitrite is generally only produced as an intermediate prior to full denitrification (nitrogen gas production). Given the elevated nitrate concentrations at the site, the absence of significant concentrations of nitrite support the observation that natural nitrate reduction is not significant. The presence of nitrite during enhanced bioremediation of nitrate may be an indication that the conditions are not ideal for denitrification and nutrient concentrations and/or types may need to be enhanced.

Sulfate. Sulfate concentrations from the March 1999 sampling event ranged from <10 to 438 mg/L. Sulfate monitoring will not be required for the preliminary field test unless there is evidence of autotrophic nitrate reduction (ferrous iron and nutrient mass balance data).

Total Organic Carbon (TOC). Total Organic Carbon is an indication of the potential driving force for microbial reactions. In aerobic waters, TOC is often low (<1 mg/L) due to utilization by microorganisms. Due to the presence of both oxygen and nitrate in the groundwater, the presence of significant TOC was not expected. The presence of TOC is an indication that denitrification is inhibited by the low pH. The presence of TOC in the groundwater is also an indicator that there may be significant levels of sorbed TOC which could drive denitrification if groundwater pH rises.

Total phosphorous. Phosphorous is an essential macronutrient for microbial growth. With the exception of well MW-EDC-9, the phosphorous concentrations were <0.05 mg/L. At the low groundwater pH, insoluble forms of phosphorous would be more likely than at neutral pH. Therefore, phosphorus is likely to be a limiting nutrient for bioremediation. Phosphorous will be included as a nutrient for the preliminary field test. Phosphorous will be supplied in basic form, and therefore contribute to the overall pH control in the groundwater.

Alkalinity. Alkalinity is a titration which lowers the pH to 4.5. Due to the average pH of 4, alkalinity tests were not meaningful. Alkalinity will, however, be monitored during the preliminary field test. Alkalinity will be an important parameter that will be used to evaluate whether or not groundwater buffering is successful, and also may show carbon dioxide production due to denitrification.

Turbidity. Turbidity is generally used to determine the progress of well development; however, one of the criteria for the selection of the two monitoring wells for the preliminary field test was low turbidity (which eliminated only well MW-EDC-10). High turbidity may interfere with some of the field measurements to be used during the preliminary tests.

Due to the low pH of the groundwater, natural denitrification appears to be minimal. The pH of the groundwater averages approximately pH 4 which may inhibit denitrification. In general, the pH range that is conducive to most microbiological activity is pH 6 – 8. Bradley et. al. reported insignificant denitrification from two sites at pH 4: both sites had significant denitrification rates at higher pHs. It is possible that pH adjustment alone may stimulate indigenous denitrifying microorganisms. As a result, nutrient selection for the preliminary field tests of enhanced in-situ bioremediation was based on the need to adjust the groundwater pH at the site, as well as to add carbon substrate and nutrients.

4.1 GENERAL APPROACH

The purpose of the preliminary field test is to evaluate the denitrification potential and identify conditions for implementation. The methods described to introduce nutrients into the groundwater and the nutrient concentrations and methods of applications are specific to the preliminary field test. The principal constraints in the design of the test are, in order of decreasing importance:

- groundwater pH adjustment and buffering
- biofouling potential and nutrient demand
- nutrient phosphate precipitation
- technical implementability

Evaluation of the available data suggests that the groundwater pH may be the primary inhibitor of denitrification. Groundwater pH adjustment will be achieved primarily by amending the reinjected water with sodium carbonate. In addition, nutrients will be added in basic form to elevate the pH and add buffering capacity. The two nutrients will be citric acid as a carbon source and phosphate. Phosphate will be added as trisodium phosphate (NaP); however, due to the relatively low phosphate nutrient need, phosphate does not contribute substantially toward pH adjustment and buffering. Citric acid will be added as trisodium citrate (NaC). NaC was selected because it provides buffering capacity and is a readily utilizable natural organic compound. The pH adjustment and buffering will be provided by carbonate. Carbonate in the groundwater is primarily in the form of dissolved carbon dioxide (carbonic acid) due to the low groundwater pH. As the pH of the groundwater is increased, the carbonic acid will dissociate and form the bicarbonate ion ($pK_a = 6.37$). Two wells have very high carbon dioxide concentrations (> 900 mg/L). High concentrations of carbon dioxide can lead to carbon dioxide gas bubble formation, which may result in clogging of the pore spaces in the soil and of the monitor well screen.

Biofouling has been commonly observed in enhanced in-situ denitrification applications. Biofouling can be limited by using low concentrations of injected nutrients, pulse injecting, injection of a disinfectant, and by other methods. Since the purpose of the preliminary field test is to demonstrate the potential for in-situ denitrification in a single well over a short time period, optimum conditions to limit fouling may not be practical. Wells MW-EDC-11 and MW-EDC-17 will be used for the preliminary field test and contain nitrate concentrations (as nitrogen) of 10.2 and 86.5 mg/L, respectively. The carbon concentration that would be

required to fully denitrify the groundwater (calculated as described in Cookson) is 31 and 271 mg/L NaC, respectively. Biofouling is not likely at 31 mg/L NaC, but may occur at 271 mg/L NaC. If evidence of biofouling in well MW-EDC-17 is observed during the test (by reduced injection rates) the NaC concentration may be reduced or the application method may be changed. Total organic carbon was observed during the screening analysis; therefore, there may be sufficient carbon in the water and associated with the soil to drive further denitrification if the NaC concentration must be reduced.

Another potential cause of biofouling is calcium phosphate precipitation. The calculated required phosphate concentrations for denitrification for wells MW-EDC-11 and MW-EDC-17 are 3.8 and 33 mg/L, respectively. Due to the low pH of the groundwater, phosphate precipitation is not anticipated to be a concern; however, at neutral pH, 33 mg/L phosphate could precipitate calcium phosphate. The concentration of phosphate will therefore also be reduced to 30% of the calculated required concentration (10 mg/L).

Wells MW-EDC-11 and MW-EDC-17, which will be used to perform the preliminary field test, are relatively easy to access. The moderate nitrate concentrations require less nutrient demand, which limits biofouling potential and makes it more likely to observe a differential nitrate concentration. There are no parameters in either of these wells that are uncharacteristic of the other wells.

4.2 TEST PROTOCOL

To begin the preliminary field test, groundwater from the test wells will be extracted from the wells and collected into containers (e.g. 55 gallon drums) located next to the well. The groundwater from the drums will be amended with nutrients and well mixed. The pH and dissolved carbon dioxide will be tested and sodium carbonate will be added, if necessary, until the pH is $6 < \text{pH} < 6.5$. Groundwater in the containers will then be returned to the wells by siphoning the water through flexible tubing. The test wells will be sampled weekly and analyzed for the parameters shown on Table 3. During each sampling event, approximately one casing volume will be removed from the well before samples are collected for analysis. After samples have been collected, an additional two casing volumes of water will be removed from the well. Most parameters will be analyzed in the field, as shown on Table 3. During the first sampling event, nitrate, nitrite, phosphate, ammonia, and alkalinity will be analyzed in the field and a duplicate sample will be analyzed by a commercial laboratory to determine if there are any chemical interferences which affect the accuracy of the field tests.

Purge water withdrawn from the well will be returned to the well after the addition of additional nutrients and/or sodium carbonate. Nutrient additions will be adjusted based on the most recently available groundwater data. If the nitrate concentration in the purge water is less than 25% of the original nitrate concentration, the purge water will be discarded and the well will be re-purged, or the preliminary field test for that well may be suspended if the data clearly indicate successful denitrification. After each sampling event, available data will be evaluated to determine if field changes are required to the preliminary field test. The testing schedule described in Table 3 specifies weekly sampling; however, the sampling interval may be modified as appropriate (for example, the sampling interval might be increased if there appears to be significant lag time in re-establishing stable denitrifying bacteria populations). At the conclusion of the preliminary test, a written report will be provided with recommendations with respect to remedial application.

- ADPC&E, 1998. Consent Administrative Order (CAO) LIS 98-119 between the Arkansas Department of Pollution Control and Ecology and El Dorado Chemical Company (EDCC). August 1998.
- Bouwer and Rice, 1976. A Slug Test for Determining Hydraulic Specific Conductance of Unconfined Groundwaters with Completely or Partially Penetrating Wells, *Water Resources Research*, Volume 12, No. 3, Pages 423-428.
- Bradley, P.M., M. Fernandez, Jr., and F.H. Chapelle. 1992. Carbon Limitation of Denitrification Rates in an Anaerobic Groundwater System, *Environmental Science Technology*, Vol. 26, No. 12, Page 2377-2380.
- Cookson, J.T., 1995. *Bioremediation Engineering: Design and Application*, McGraw-Hill.
- Cooper, et. al., 1967. Response of a Finite Diameter Well to an Instantaneous Charge of Water, *Water Resource Research*, Volume 3, No. 1, Pages 263-269.
- Hiscock, K.M., J.W. Lloyd and D.N. Lerner. 1991. Review of Natural and Artificial Denitrification of Groundwater, *Water Resources*, Vol. 25, No. 9, pp. 1099-1111, 1991.

TABLES

TABLE 1

**SUMMARY OF HYDRAULIC CONDUCTIVITY VALUES
EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS**

Monitor Well Number	Hydraulic Conductivity (ft/min)		
	Slug In	Slug Out	Mean
MW-EDC-6	3.72×10^{-4}	4.92×10^{-4}	4.32×10^{-4}
MW-EDC-7	6.00×10^{-4}	5.98×10^{-4}	5.99×10^{-4}
MW-EDC-8	1.52×10^{-3}	2.08×10^{-3}	1.80×10^{-3}
MW-EDC-9	1.50×10^{-4}	1.56×10^{-4}	1.53×10^{-4}
MW-EDC-10	7.30×10^{-5}	1.04×10^{-5}	4.17×10^{-5}
MW-EDC-11	1.33×10^{-4}	3.12×10^{-4}	2.23×10^{-4}
MW-EDC-14	1.49×10^{-4}	1.77×10^{-4}	1.63×10^{-4}
MW-EDC-15	1.88×10^{-4}	1.58×10^{-4}	1.73×10^{-4}
MW-EDC-16	4.41×10^{-4}	5.70×10^{-4}	5.06×10^{-4}
MW-EDC-17	3.84×10^{-4}	3.84×10^{-4}	3.84×10^{-4}

NOTE: Slug tests were conducted in March 1999.

TABLE 2
ANALYTICAL RESULTS
SAMPLING AND ANALYSIS OF MONITOR WELLS
SAMPLES COLLECTED MARCH 9 AND 10, 1999
EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS

Analyte	Units	MW-EDC-6	MW-EDC-7	MW-EDC-8	MW-EDC-9	MW-EDC-10	MW-EDC-11	MW-EDC-14	MW-EDC-15	MW-EDC-16	MW-EDC-17
pH	S.U.	4.39	3.39	3.49	5.27	3.75	4.02	4.33	4.09	3.9	3.69
Specific Conductance	umhos/cm	1448	2852	8808	1948	1830	1020	853	260	1012	1008
Temperature	Degrees C	18.5	19.4	19.3	18.9	20.9	18.1	17.6	14.6	16.1	19.8
Turbidity	NTU	8.72	3.08	0.95	29.02	1020.68	26.72	56.9	5	3.01	5.93
Dissolved Oxygen	mg/L	0.4	0.25	0.29	1.1	0.43	0.24	1.3	0.34	0.33	1.11
Oxidation Reduction Potential	mv	102	384	188	94	180	155	133	142	161	144
Ferrous Iron	mg/L	ND	1.09	0.16	ND	0.07	0.03	ND	0.04	0.01	0.03
Carbon Dioxide	mg/L	83	980	990	80	155	275	155	118	100	115
Denitrifying Bacteria	CFU/ml	1000	Negative	Negative	Negative	1000	1000	Negative	1000	Negative	Negative
Total Iron	mg/L	0.071	0.9	<0.03	0.166	5.4	0.456	0.31	0.29	<0.03	0.055
Total Manganese	mg/L	0.516	0.789	0.764	0.354	0.594	0.097	0.092	0.135	0.508	0.581
Ammonia	mg/L as N	0.2	460	700	0.1	0.1	38.5	0.1	0.5	5.2	1.3
Chloride	mg/L	47.9	32.1	39.6	332	24.3	7.13	76.8	1	5.5	12.8
Methane	mg/L	0.0008	0.006	0.015	0.017	0.0006	0.18	0.003	0.003	0.002	0.014
Nitrate	mg/L as N	162	312	1060	26.5	187	10.2	27.4	28.4	120	86.5
Nitrite	mg/L as N	<0.01	0.2	0.05	0.06	0.31	0.03	0.02	0.02	<0.01	0.03
Sulfate	mg/L as SO4	12.6	373	80.8	438	143	368	20.6	10.2	<10	159
Total Alkalinity	mg/L as CaCO3	<1	<1	<1	24	<1	<1	5	<1	<1	<1
Total Kjeldahl Nitrogen	mg/L as N	<1	154	510	1.5	<1	11.2	1.7	<1	<1	<1
Total Organic Carbon	mg/L as C	2.8	6.5	10.3	51	9.8	25.8	20.2	3.2	3.2	5.8
Total Phosphorous	mg/L as P	<0.05	<0.05	0.05	0.37	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

NOTES:

pH, Specific Conductance, Temperature, Turbidity, Dissolved Oxygen, and Oxidation Reduction Potential values are means of four replicate measurements.

Total Iron, Total Manganese, and Carbon Dioxide values are means of duplicate measurements.

Denitrifying Bacteria results are reported as either Positive -Aggressive(1000 CFU/mL) or Negative-NonAggressive.

ND indicates the analyte was not detected by the field measurement.

TABLE 3

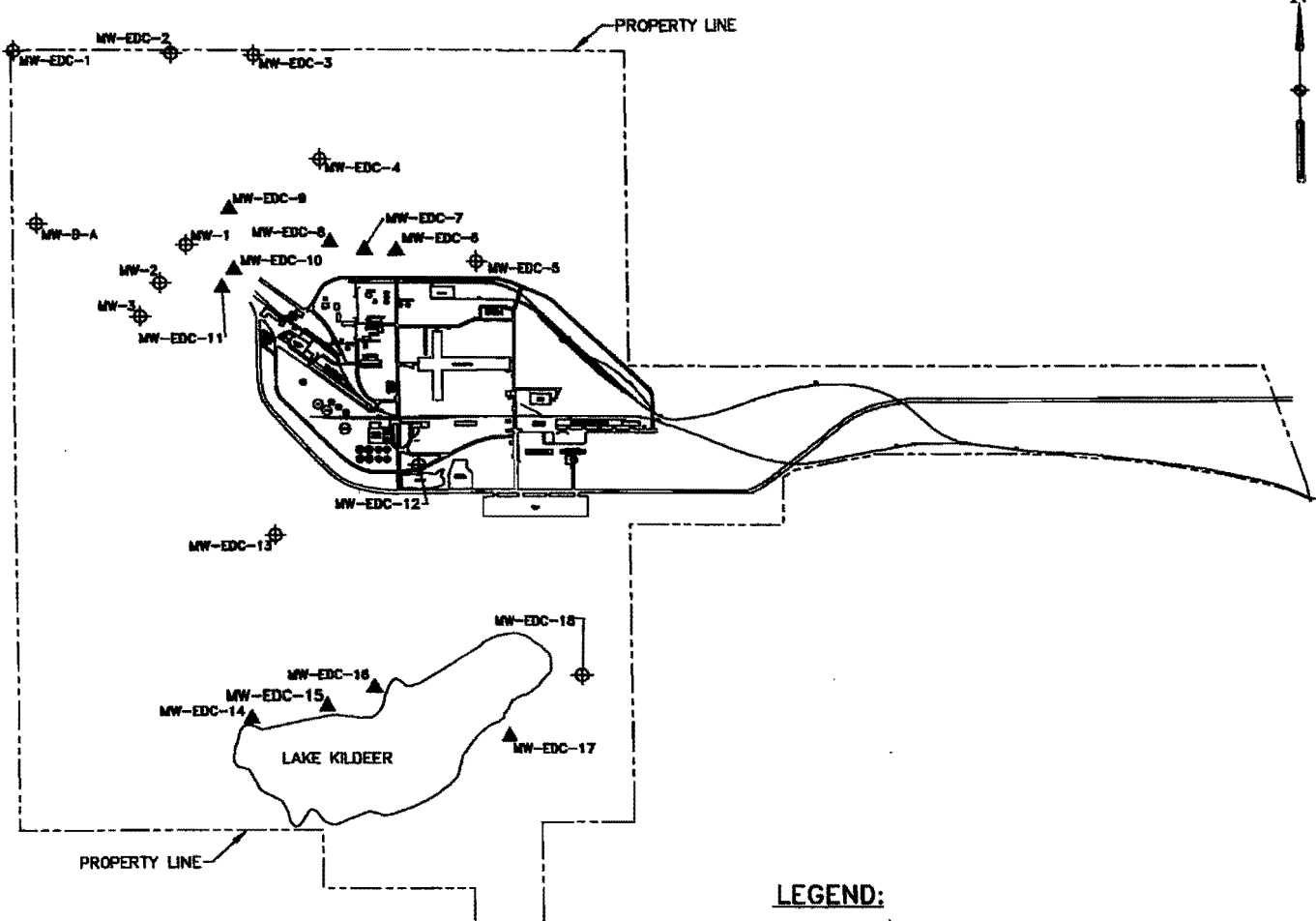
**PRELIMINARY FIELD TEST SAMPLING SCHEDULE, PARAMETERS, AND METHODS
EL DORADO CHEMICAL COMPANY
EL DORADO, ARKANSAS**

Parameter or Activity	Week									Test kit/method	
	0	1	2	3	4	5	6	7	8		
Water withdrawn from MW-EDC-11	20 gallons	7 gallons minimum	7 gallons minimum	7 gallons minimum	7 gallons minimum	7 gallons minimum	7 gallons minimum	7 gallons minimum	7 gallons minimum	-	Minimal drawdown purging
Water withdrawn from MW-EDC-17	50 gallons	17 gallons minimum	17 gallons minimum	17 gallons minimum	17 gallons minimum	17 gallons minimum	17 gallons minimum	17 gallons minimum	17 gallons minimum	-	Minimal drawdown purging
pH	X	X	X	X	X	X	X	X	X	X	Field meter or test kit
DO	X	X	X		X					X	CHEMetrics K-7501
Carbon Dioxide	X		X		X		X			X	CHEMetrics K-1910 and K-1920
Nitrite*	X		X			X				X	CHEMetrics K-7002
Phosphate*	X	X	X	X	X	X	X	X	X	X	CHEMetrics K-8510
Denitrifying Bacteria	X		X		X		X			X	HACH 26194-09
Ferrous Iron	X				X					X	HACH 25140-25 or CHEMetrics K-6210 with spectrophotometer
Injection Rate	X	X	X	X	X	X	X	X	X	X	See footnote.
ORP	X	X	X	X	X	X	X	X	X	X	Orion 108 QuiKcheK or field meter
Nitrate*	X	X	X	X	X	X	X	X	X	X	CHEMetrics K-6933 with spectrophotometer
Ammonia*	X		X		X		X			X	CHEMetrics K-1510
TKN	X				X					X	Laboratory analysis
TOC	X		X		X		X			X	Laboratory analysis
Alkalinity*	X	X	X	X	X	X	X	X	X	X	CHEMetrics K-9810, K-9815 and K-9820
Temperature	X	X	X	X	X	X	X	X	X	X	Field meter

NOTE: Measure injection rate by timing a discrete water level drop. The same reference point must be used for each measurement.

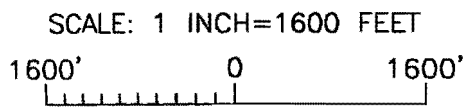
*During the initial sampling a field measurement and a laboratory analysis will be completed.

FIGURES



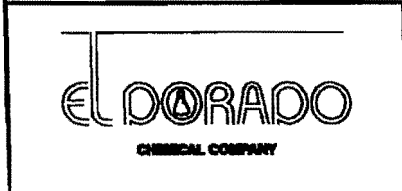
LEGEND:

- MW-1 ⊕ MONITOR WELL WITH NITRATE < 10 mg/l
- ▲ MONITOR WELL WITH NITRATE > 10 mg/l



NOTE: THE BASE FOR THIS DRAWING WAS CREATED USING THE FOLLOWING REFERENCES

1. EL DORADO CHEMICAL CO. PLOT PLAN, DWG. NO. 7045-1.
2. SMITH-ROBERTS AND ASSOCIATES TRACT LOCATION MAP (QUAD), SC31,663C DWG. NO. SHT.4.
3. BALL AND PAULUS SURVEYORS, INC. JOB NO. 161F-95, MONITORING WELLS.



URS Greiner Woodward Clyde
 2822 O'Neal Lane
 Baton Rouge, Louisiana 70816
 225/751-1873

SCALE:	DRAWN BY: PCG	DATE: 12/3/98
AS SHOWN	CHKD. BY: DR	DATE: 12/3/98

WORK PLAN
 IN-SITU BIOREMEDIATION

SITE MAP

FILE NO.
 98B319

FIG. NO.
 1

APPENDIX A
CALCULATIONS-HYDRAULIC
CONDUCTIVITY TESTS

**ELDORADO CHEMICAL COMPANY
SLUG TEST RESULTS**

WELL ID	SLUG IN			SLUG OUT		
	Cooper et al.		Bouwer-Rice	Cooper et al.		Bouwer-Rice
	T (ft ² /min)	S	K (ft/min)	T (ft ² /min)	S	K (ft/min)
MW-EDC-6	0.146	1 X 10 ⁻⁵	0.0003721	0.1867	1 X 10 ⁻⁵	0.0004924
MW-EDC-7	0.2727	1 X 10 ⁻⁵	0.0006002	0.2509	1 X 10 ⁻⁵	0.0005976
MW-EDC-8	0.5025	1 X 10 ⁻⁵	0.001521	0.6896	1 X 10 ⁻⁵	0.002079
MW-EDC-9	0.02253	0.005321	0.00015	0.03635	0.0003749	0.0001564
MW-EDC-10	0.01333	0.0007045	7.3 X 10 ⁻⁵	5.814 X 10 ⁻⁵	0.5	1.043 X 10 ⁻⁵
MW-EDC-11	0.03228	0.0002062	0.0001332	0.1061	1 X 10 ⁻⁵	0.0003115
MW-EDC-14	0.007717	0.1292	0.0001488	0.004986	0.5	0.0001771
MW-EDC-15	0.06909	1 X 10 ⁻⁵	0.0001877	0.05434	1 X 10 ⁻⁵	0.0001575
MW-EDC-16	0.1836	1 X 10 ⁻⁵	0.0004408	0.1873	1 X 10 ⁻⁵	0.0005701
MW-EDC-17	0.04278	0.0401	0.000384	0.2103	0.00429	0.000384
AVERAGE	0.1292527	0.03510634	0.000437533	0.191841778	0.251166225	0.000547289
AVEDEV	0.11755784	0.039634928	0.0001228	0.06895584	0.248833775	0.000125608

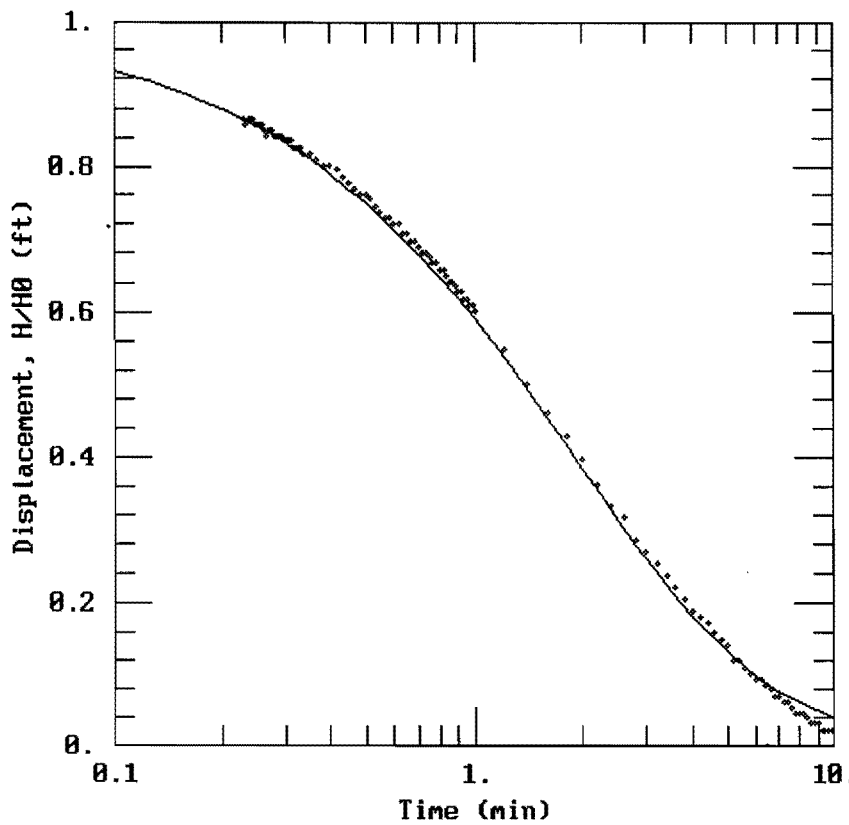
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MA-6 - SLUG IN



DATA SET:
MAG-IN.DAT
03/18/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.146$ ft²/min
 $S = 1.E-05$

AQTESOLU

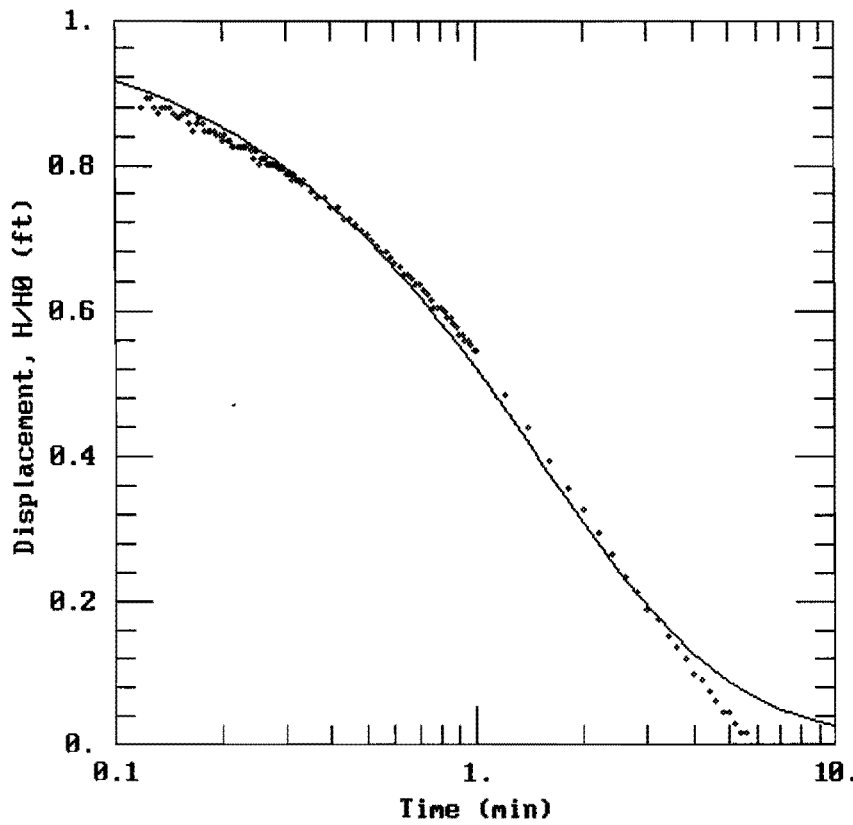
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-6 - SLUG OUT



DATA SET:
MW6-OUT.DAT
03/17/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.42$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.1867$ ft²/min
 $S = 1.E-05$

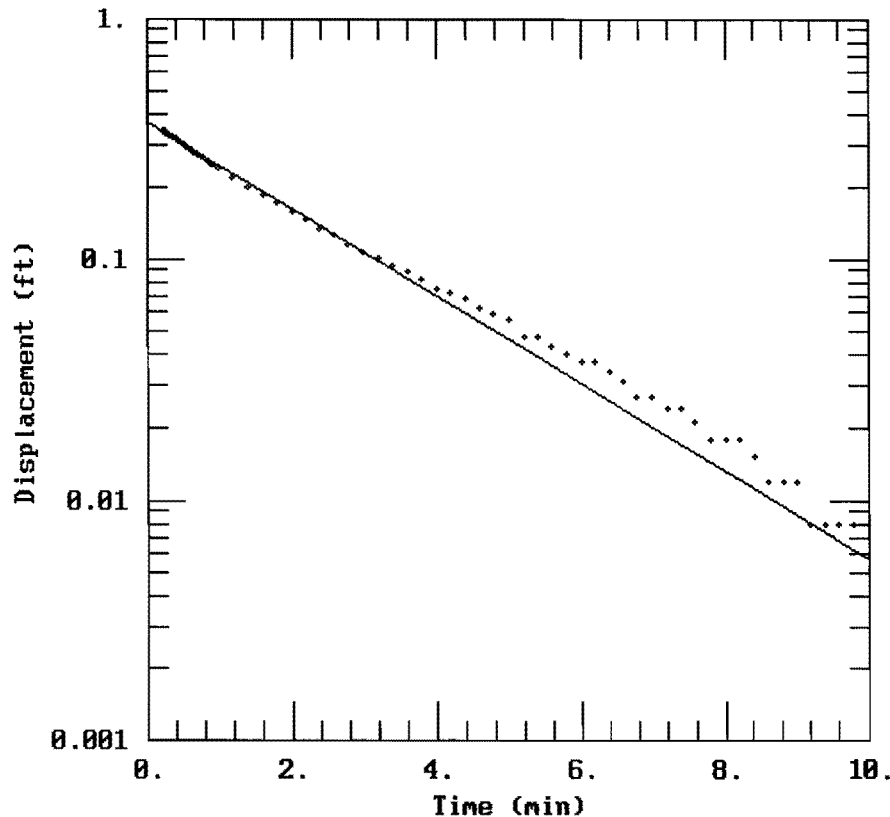
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-6 - SLUG IN



DATA SET:
MW6-IN.DAT
03/18/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0003721$ ft/min
 $y_0 = 0.3758$ ft

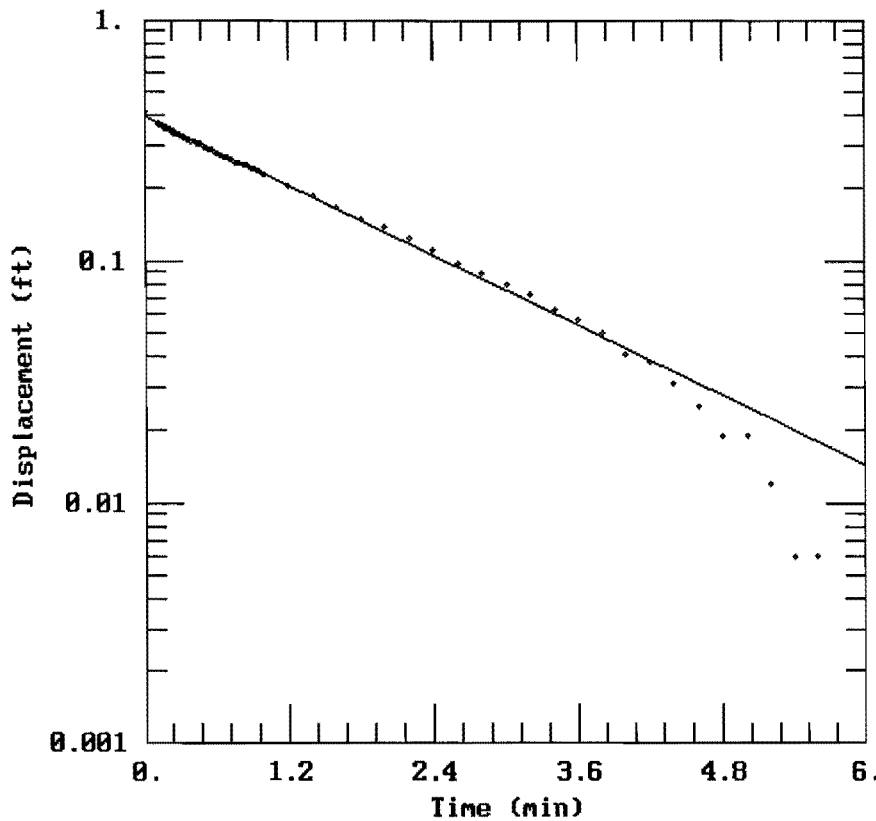
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-6 - SLUG OUT



DATA SET:
MW6-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.42$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0004924$ ft/min
 $y_0 = 0.3935$ ft

MW-6 : SLUB IN

SE1000C
Environmental Logger
03/05 11:53

Unit# 00000 Test 12

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00006

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 08:56:26

Elapsed Time INPUT 1

0.0000 0.028
0.0033 0.025
0.0066 0.016
0.0100 0.012
0.0133 0.009
0.0166 0.121
0.0200 0.114
0.0233 0.124
0.0266 0.204
0.0300 0.251
0.0333 0.213
0.0366 0.213
0.0400 0.277
0.0433 0.344
0.0466 0.337
0.0500 0.271
0.0533 0.321
0.0566 0.487
0.0600 0.628
0.0633 0.628
0.0666 0.433
0.0700 0.376
0.0733 0.436
0.0766 0.532
0.0800 0.532
0.0833 0.388
0.0866 0.379
0.0900 0.490
0.0933 0.548
0.0966 0.455
0.1000 0.411

0.1033	0.478
0.1066	0.541
0.1100	0.474
0.1133	0.379
0.1166	0.357
0.1200	0.449
0.1233	0.481
0.1266	0.430
0.1300	0.462
0.1333	0.631
0.1366	0.675
0.1400	0.516
0.1433	0.385
0.1466	0.379
0.1500	0.334
0.1533	0.388
0.1566	0.503
0.1600	0.497
0.1633	0.408
0.1666	0.337
0.1700	0.366
0.1733	0.474
0.1766	0.519
0.1800	0.462
0.1833	0.401
0.1866	0.414
0.1900	0.462
0.1933	0.471
0.1966	0.446
0.2000	0.424
0.2033	0.433
0.2066	0.449
0.2100	0.452
0.2133	0.443
0.2166	0.433
0.2200	0.436
0.2233	0.443
0.2266	0.443
0.2300	0.436
0.2333	0.433
0.2366	0.436
0.2400	0.436
0.2433	0.436
0.2466	0.433
0.2500	0.433
0.2533	0.433
0.2566	0.433
0.2600	0.433
0.2633	0.430
0.2666	0.427
0.2700	0.430
0.2733	0.430
0.2766	0.430
0.2800	0.427

0.2833	0.427
0.2866	0.427
0.2900	0.427
0.2933	0.427
0.2966	0.424
0.3000	0.424
0.3033	0.424
0.3066	0.424
0.3100	0.424
0.3133	0.424
0.3166	0.420
0.3200	0.420
0.3233	0.420
0.3266	0.420
0.3300	0.420
0.3333	0.417
0.3500	0.417
0.3666	0.414
0.3833	0.411
0.4000	0.411
0.4166	0.408
0.4333	0.404
0.4500	0.401
0.4666	0.398
0.4833	0.395
0.5000	0.395
0.5166	0.392
0.5333	0.388
0.5500	0.385
0.5666	0.382
0.5833	0.382
0.6000	0.379
0.6166	0.379
0.6333	0.373
0.6500	0.373
0.6666	0.369
0.6833	0.369
0.7000	0.366
0.7166	0.363
0.7333	0.363
0.7500	0.360
0.7666	0.357
0.7833	0.357
0.8000	0.353
0.8166	0.353
0.8333	0.350
0.8500	0.347
0.8666	0.347
0.8833	0.344
0.9000	0.341
0.9166	0.341
0.9333	0.337
0.9500	0.337
0.9666	0.334

0.9833	0.334
1.0000	0.331
1.2000	0.309
1.4000	0.290
1.6000	0.274
1.8000	0.261
2.0000	0.248
2.2000	0.235
2.4000	0.223
2.6000	0.216
2.8000	0.204
3.0000	0.197
3.2000	0.191
3.4000	0.184
3.6000	0.178
3.8000	0.172
4.0000	0.165
4.2000	0.162
4.4000	0.159
4.6000	0.153
4.8000	0.149
5.0000	0.146
5.2000	0.137
5.4000	0.137
5.6000	0.133
5.8000	0.130
6.0000	0.127
6.2000	0.127
6.4000	0.124
6.6000	0.121
6.8000	0.117
7.0000	0.117
7.2000	0.114
7.4000	0.114
7.6000	0.111
7.8000	0.108
8.0000	0.108
8.2000	0.108
8.4000	0.105
8.6000	0.102
8.8000	0.102
9.0000	0.102
9.2000	0.098
9.4000	0.098
9.6000	0.098
9.8000	0.098
10.0000	0.098

END

SE1000C
Environmental Logger
03/05 11:55

Unit# 00000 Test 13

MW-6 : SLUG OUT

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00006

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 09:07:00

Elapsed Time INPUT 1

0.0000 0.086
0.0033 -0.146
0.0066 -0.286
0.0100 -0.325
0.0133 -0.213
0.0166 0.111
0.0200 0.143
0.0233 0.153
0.0266 -0.321
0.0300 -0.207
0.0333 0.239
0.0366 0.385
0.0400 -0.121
0.0433 -0.678
0.0466 -0.736
0.0500 -0.340
0.0533 -0.152
0.0566 -0.331
0.0600 -0.538
0.0633 -0.503
0.0666 -0.337
0.0700 -0.293
0.0733 -0.379
0.0766 -0.458
0.0800 -0.423
0.0833 -0.353
0.0866 -0.347
0.0900 -0.388
0.0933 -0.414
0.0966 -0.391
0.1000 -0.366
0.1033 -0.366
0.1066 -0.382
0.1100 -0.388
0.1133 -0.379
0.1166 -0.366
0.1200 -0.369

0.1233	-0.375
0.1266	-0.375
0.1300	-0.369
0.1333	-0.366
0.1366	-0.369
0.1400	-0.369
0.1433	-0.369
0.1466	-0.366
0.1500	-0.363
0.1533	-0.363
0.1566	-0.366
0.1600	-0.366
0.1633	-0.360
0.1666	-0.356
0.1700	-0.360
0.1733	-0.363
0.1766	-0.360
0.1800	-0.356
0.1833	-0.356
0.1866	-0.356
0.1900	-0.356
0.1933	-0.353
0.1966	-0.353
0.2000	-0.350
0.2033	-0.353
0.2066	-0.350
0.2100	-0.350
0.2133	-0.347
0.2166	-0.347
0.2200	-0.347
0.2233	-0.347
0.2266	-0.347
0.2300	-0.347
0.2333	-0.347
0.2366	-0.347
0.2400	-0.344
0.2433	-0.340
0.2466	-0.344
0.2500	-0.344
0.2533	-0.337
0.2566	-0.340
0.2600	-0.340
0.2633	-0.340
0.2666	-0.337
0.2700	-0.337
0.2733	-0.337
0.2766	-0.337
0.2800	-0.337
0.2833	-0.337
0.2866	-0.334
0.2900	-0.334
0.2933	-0.334
0.2966	-0.334
0.3000	-0.331

0.3033	-0.331
0.3066	-0.331
0.3100	-0.331
0.3133	-0.328
0.3166	-0.331
0.3200	-0.328
0.3233	-0.328
0.3266	-0.328
0.3300	-0.325
0.3333	-0.328
0.3500	-0.321
0.3666	-0.318
0.3833	-0.318
0.4000	-0.312
0.4166	-0.312
0.4333	-0.305
0.4500	-0.305
0.4666	-0.302
0.4833	-0.299
0.5000	-0.296
0.5166	-0.293
0.5333	-0.289
0.5500	-0.286
0.5666	-0.286
0.5833	-0.283
0.6000	-0.280
0.6166	-0.277
0.6333	-0.273
0.6500	-0.273
0.6666	-0.270
0.6833	-0.267
0.7000	-0.267
0.7166	-0.264
0.7333	-0.261
0.7500	-0.258
0.7666	-0.254
0.7833	-0.254
0.8000	-0.254
0.8166	-0.251
0.8333	-0.248
0.8500	-0.248
0.8666	-0.245
0.8833	-0.242
0.9000	-0.238
0.9166	-0.238
0.9333	-0.235
0.9500	-0.235
0.9666	-0.232
0.9833	-0.229
1.0000	-0.229
1.2000	-0.203
1.4000	-0.184
1.6000	-0.165
1.8000	-0.149

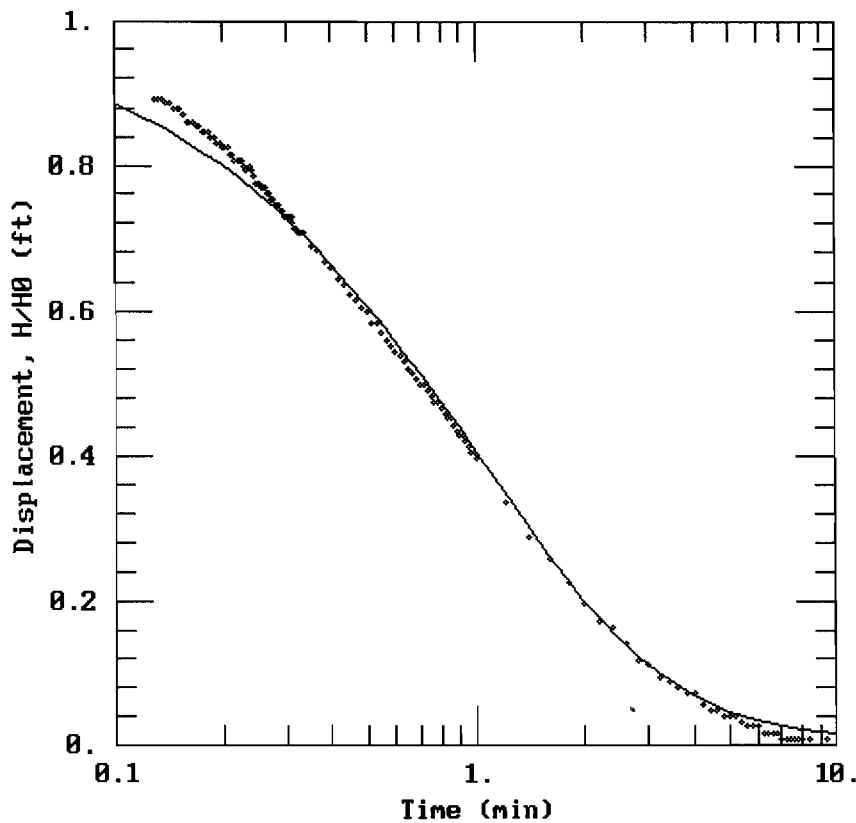
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-7 - SLUG IN



DATA SET:
MW7-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
H₀ = 0.41 ft
r_c = 0.33 ft
r_w = 0.83 ft

PARAMETER ESTIMATES:
I = 0.2727 ft²/min
S = 1.E-05

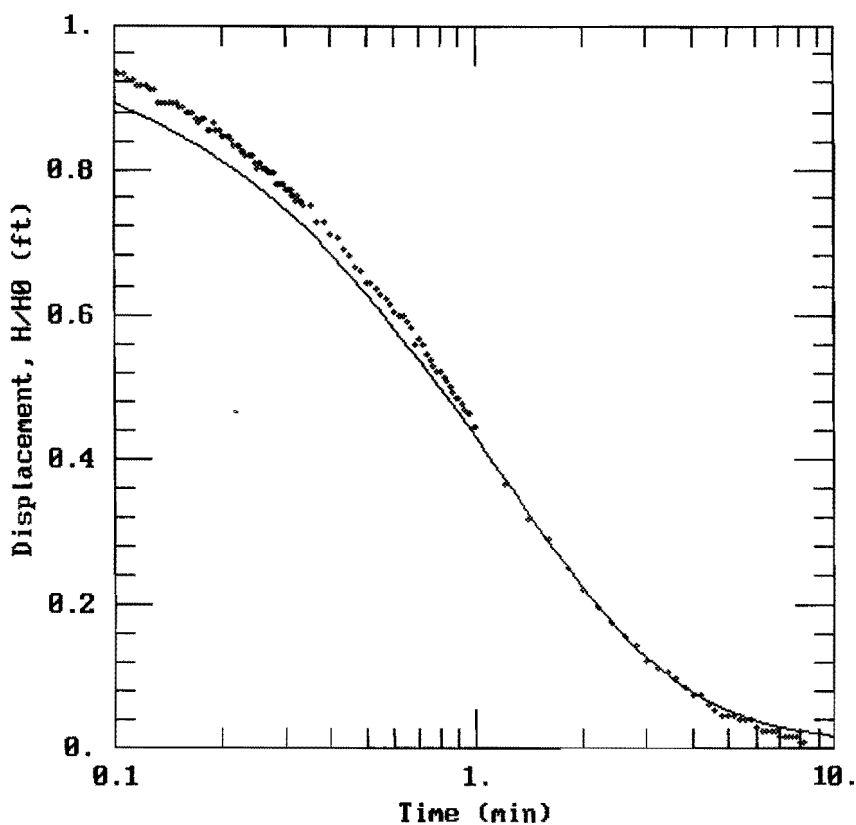
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-7 - SLUG OUT



DATA SET:
MW7-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.42$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.2509$ ft²/min
 $S = 1.E-05$

AQTESOLV

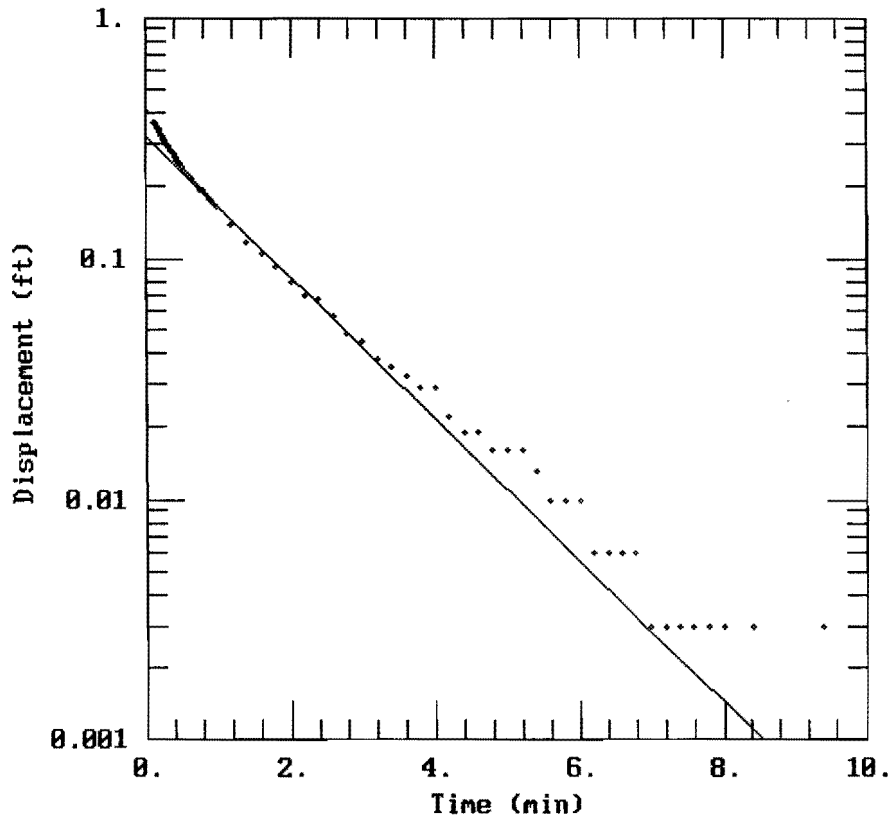
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-7 - SLUG IN



DATA SET:
MW7-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.41$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0006002$ ft/min
 $y_0 = 0.3212$ ft

AQTESOLV

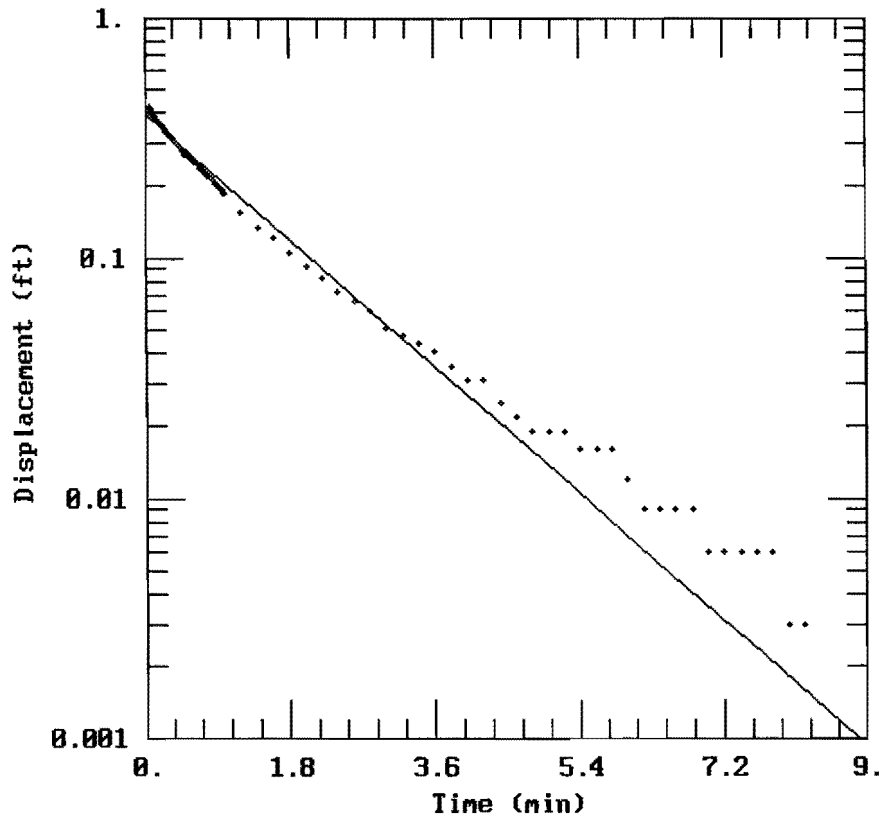
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-7 - SLUG OUT



DATA SET:
MW7-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.42$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0005976$ ft/min
 $y_0 = 0.391$ ft

AQTESOLV

MW-EDC-7 SUB IN

SE1000C
Environmental Logger
03/05 11:46

Unit# 00000 Test 10

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00007

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 08:25:07

Elapsed Time INPUT 1

0.0000 0.019
0.0033 0.019
0.0066 0.098
0.0100 0.143
0.0133 0.194
0.0166 0.254
0.0200 0.219
0.0233 0.283
0.0266 0.433
0.0300 0.557
0.0333 0.503
0.0366 0.464
0.0400 0.436
0.0433 0.417
0.0466 0.522
0.0500 0.547
0.0533 0.516
0.0566 0.503
0.0600 0.503
0.0633 0.557
0.0666 0.509
0.0700 0.404
0.0733 0.414
0.0766 0.506
0.0800 0.429
0.0833 0.407
0.0866 0.407
0.0900 0.404
0.0933 0.407
0.0966 0.391
0.1000 0.805

0.1033	0.363
0.1066	0.394
0.1100	0.464
0.1133	0.404
0.1166	0.388
0.1200	0.394
0.1233	0.401
0.1266	0.394
0.1300	0.391
0.1333	0.391
0.1366	0.391
0.1400	0.388
0.1433	0.388
0.1466	0.385
0.1500	0.385
0.1533	0.385
0.1566	0.382
0.1600	0.378
0.1633	0.378
0.1666	0.378
0.1700	0.375
0.1733	0.375
0.1766	0.372
0.1800	0.372
0.1833	0.372
0.1866	0.369
0.1900	0.369
0.1933	0.366
0.1966	0.366
0.2000	0.363
0.2033	0.363
0.2066	0.363
0.2100	0.359
0.2133	0.359
0.2166	0.356
0.2200	0.356
0.2233	0.356
0.2266	0.356
0.2300	0.353
0.2333	0.350
0.2366	0.353
0.2400	0.350
0.2433	0.347
0.2466	0.343
0.2500	0.343
0.2533	0.343
0.2566	0.340
0.2600	0.340
0.2633	0.340
0.2666	0.337
0.2700	0.337
0.2733	0.334
0.2766	0.334
0.2800	0.331

0.2833	0.331
0.2866	0.331
0.2900	0.327
0.2933	0.327
0.2966	0.324
0.3000	0.324
0.3033	0.324
0.3066	0.324
0.3100	0.324
0.3133	0.321
0.3166	0.318
0.3200	0.318
0.3233	0.315
0.3266	0.315
0.3300	0.315
0.3333	0.315
0.3500	0.308
0.3666	0.305
0.3833	0.299
0.4000	0.296
0.4166	0.289
0.4333	0.286
0.4500	0.280
0.4666	0.277
0.4833	0.273
0.5000	0.270
0.5166	0.264
0.5333	0.264
0.5500	0.258
0.5666	0.254
0.5833	0.251
0.6000	0.248
0.6166	0.245
0.6333	0.242
0.6500	0.238
0.6666	0.235
0.6833	0.232
0.7000	0.229
0.7166	0.229
0.7333	0.226
0.7500	0.222
0.7666	0.219
0.7833	0.219
0.8000	0.216
0.8166	0.213
0.8333	0.210
0.8500	0.210
0.8666	0.206
0.8833	0.203
0.9000	0.200
0.9166	0.200
0.9333	0.197
0.9500	0.194
0.9666	0.191

0.9833	0.191
1.0000	0.187
1.2000	0.162
1.4000	0.143
1.6000	0.130
1.8000	0.117
2.0000	0.105
2.2000	0.095
2.4000	0.092
2.6000	0.082
2.8000	0.073
3.0000	0.070
3.2000	0.063
3.4000	0.060
3.6000	0.057
3.8000	0.054
4.0000	0.054
4.2000	0.047
4.4000	0.044
4.6000	0.044
4.8000	0.041
5.0000	0.041
5.2000	0.041
5.4000	0.038
5.6000	0.035
5.8000	0.035
6.0000	0.035
6.2000	0.031
6.4000	0.031
6.6000	0.031
6.8000	0.031
7.0000	0.028
7.2000	0.028
7.4000	0.028
7.6000	0.028
7.8000	0.028
8.0000	0.028
8.2000	0.025
8.4000	0.028
8.6000	0.025
8.8000	0.025
9.0000	0.025
9.2000	0.025
9.4000	0.028
9.6000	0.025
9.8000	0.025
10.0000	0.025

END

MW-EDC-7 SLO6 DUT

SE1000C
Environmental Logger
03/05 11:48

Unit# 00000 Test 11

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00007

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 08:36:54

Elapsed Time INPUT 1

0.0000 0.009
0.0033 0.012
0.0066 0.003
0.0100 -0.184
0.0133 -0.385
0.0166 -0.156
0.0200 0.025
0.0233 -0.172
0.0266 -0.430
0.0300 -0.512
0.0333 -0.506
0.0366 -0.449
0.0400 -0.442
0.0433 -0.442
0.0466 -0.433
0.0500 -0.426
0.0533 -0.417
0.0566 -0.423
0.0600 -0.423
0.0633 -0.420
0.0666 -0.414
0.0700 -0.414
0.0733 -0.414
0.0766 -0.407
0.0800 -0.407
0.0833 -0.407
0.0866 -0.404
0.0900 -0.401
0.0933 -0.398
0.0966 -0.398
0.1000 -0.394
0.1033 -0.391
0.1066 -0.391
0.1100 -0.388
0.1133 -0.388
0.1166 -0.385
0.1200 -0.385

0.1233	-0.385
0.1266	-0.382
0.1300	-0.382
0.1333	-0.375
0.1366	-0.375
0.1400	-0.375
0.1433	-0.375
0.1466	-0.375
0.1500	-0.375
0.1533	-0.372
0.1566	-0.372
0.1600	-0.369
0.1633	-0.369
0.1666	-0.369
0.1700	-0.366
0.1733	-0.363
0.1766	-0.366
0.1800	-0.366
0.1833	-0.359
0.1866	-0.359
0.1900	-0.363
0.1933	-0.359
0.1966	-0.359
0.2000	-0.356
0.2033	-0.356
0.2066	-0.356
0.2100	-0.356
0.2133	-0.353
0.2166	-0.350
0.2200	-0.350
0.2233	-0.350
0.2266	-0.347
0.2300	-0.347
0.2333	-0.344
0.2366	-0.344
0.2400	-0.344
0.2433	-0.344
0.2466	-0.340
0.2500	-0.337
0.2533	-0.340
0.2566	-0.340
0.2600	-0.337
0.2633	-0.337
0.2666	-0.337
0.2700	-0.334
0.2733	-0.334
0.2766	-0.334
0.2800	-0.334
0.2833	-0.328
0.2866	-0.328
0.2900	-0.328
0.2933	-0.328
0.2966	-0.328
0.3000	-0.324

0.3033	-0.324
0.3066	-0.324
0.3100	-0.324
0.3133	-0.321
0.3166	-0.321
0.3200	-0.318
0.3233	-0.321
0.3266	-0.318
0.3300	-0.318
0.3333	-0.315
0.3500	-0.315
0.3666	-0.305
0.3833	-0.305
0.4000	-0.299
0.4166	-0.296
0.4333	-0.289
0.4500	-0.286
0.4666	-0.280
0.4833	-0.277
0.5000	-0.270
0.5166	-0.270
0.5333	-0.267
0.5500	-0.264
0.5666	-0.261
0.5833	-0.258
0.6000	-0.254
0.6166	-0.251
0.6333	-0.251
0.6500	-0.248
0.6666	-0.245
0.6833	-0.235
0.7000	-0.238
0.7166	-0.235
0.7333	-0.229
0.7500	-0.226
0.7666	-0.222
0.7833	-0.219
0.8000	-0.219
0.8166	-0.216
0.8333	-0.213
0.8500	-0.210
0.8666	-0.207
0.8833	-0.203
0.9000	-0.203
0.9166	-0.200
0.9333	-0.197
0.9500	-0.194
0.9666	-0.194
0.9833	-0.187
1.0000	-0.187
1.2000	-0.153
1.4000	-0.133
1.6000	-0.121
1.8000	-0.105

2.0000	-0.092
2.2000	-0.082
2.4000	-0.073
2.6000	-0.066
2.8000	-0.060
3.0000	-0.051
3.2000	-0.047
3.4000	-0.044
3.6000	-0.041
3.8000	-0.035
4.0000	-0.031
4.2000	-0.031
4.4000	-0.025
4.6000	-0.022
4.8000	-0.019
5.0000	-0.019
5.2000	-0.019
5.4000	-0.016
5.6000	-0.016
5.8000	-0.016
6.0000	-0.012
6.2000	-0.009
6.4000	-0.009
6.6000	-0.009
6.8000	-0.009
7.0000	-0.006
7.2000	-0.006
7.4000	-0.006
7.6000	-0.006
7.8000	-0.006
8.0000	-0.003
8.2000	-0.003
8.4000	0.000
8.6000	0.000
8.8000	0.000
9.0000	0.000
9.2000	0.003
9.4000	0.000
9.6000	0.003
9.8000	0.003
10.0000	0.003

END

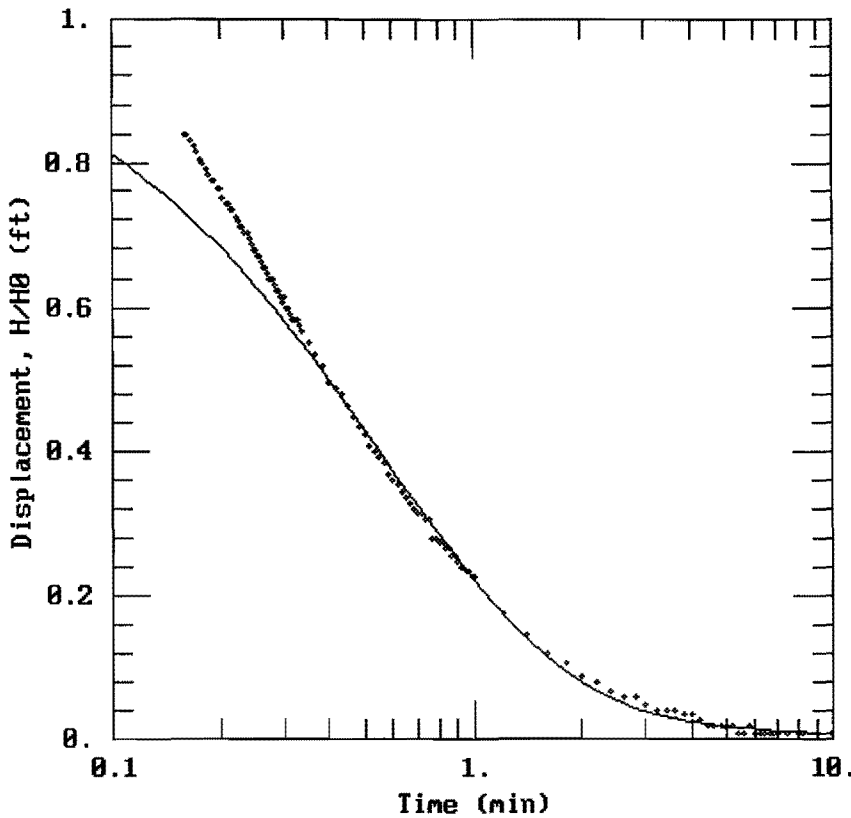
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-8 - SLUG IN



DATA SET:
MW8-IN.DAT
03/18/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $I = 0.5025$ ft²/min
 $S = 1.E-05$

AQTESOLU

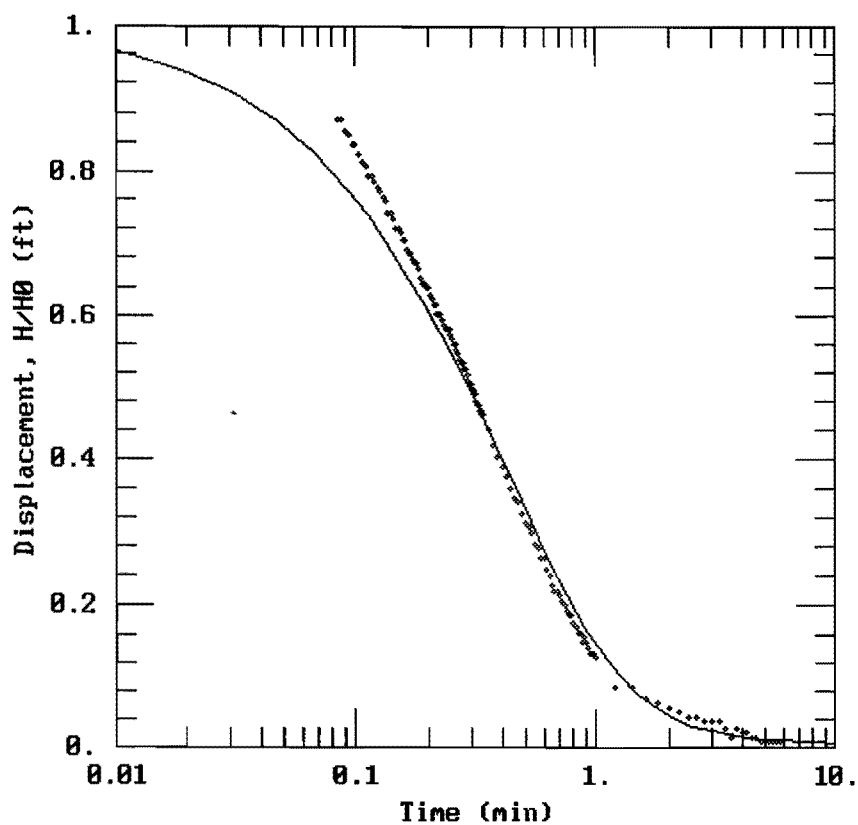
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-8 - SLUG OUT



DATA SET:
MW8-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.45$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.6896$ ft²/min
 $S = 1.E-05$

AQTESOLU

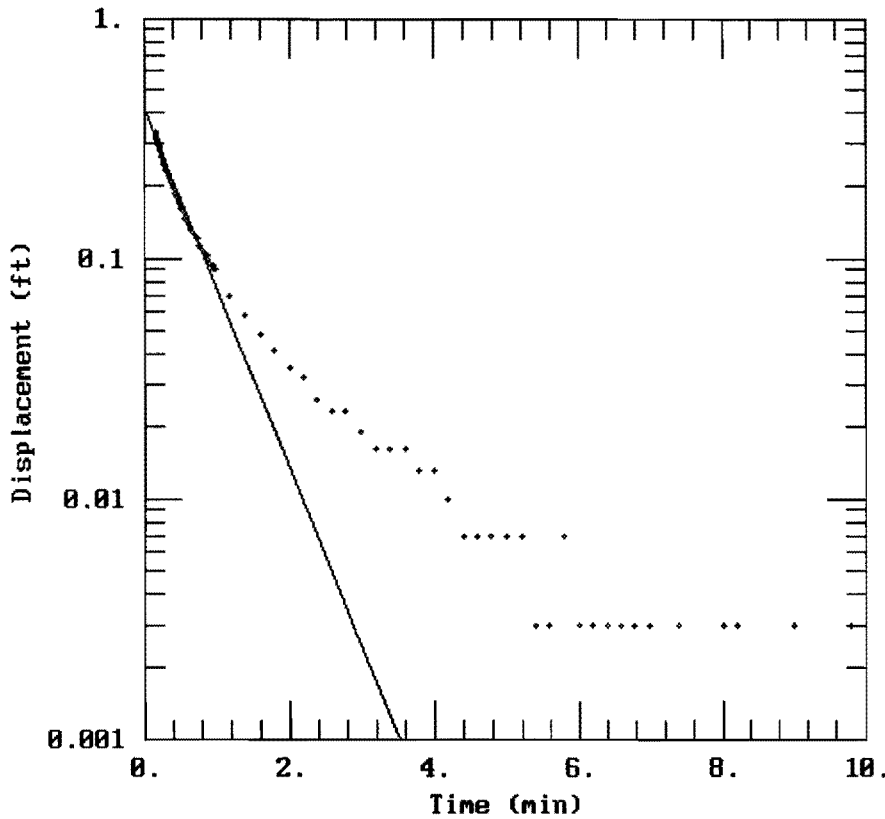
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-8 - SLUG IN



DATA SET:
MW8-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
H0 = 0.4 ft
r_c = 0.33 ft
r_w = 0.83 ft
L = 10. ft
b = 10. ft
H = 1. ft

PARAMETER ESTIMATES:
K = 0.001521 ft/min
y0 = 0.4184 ft

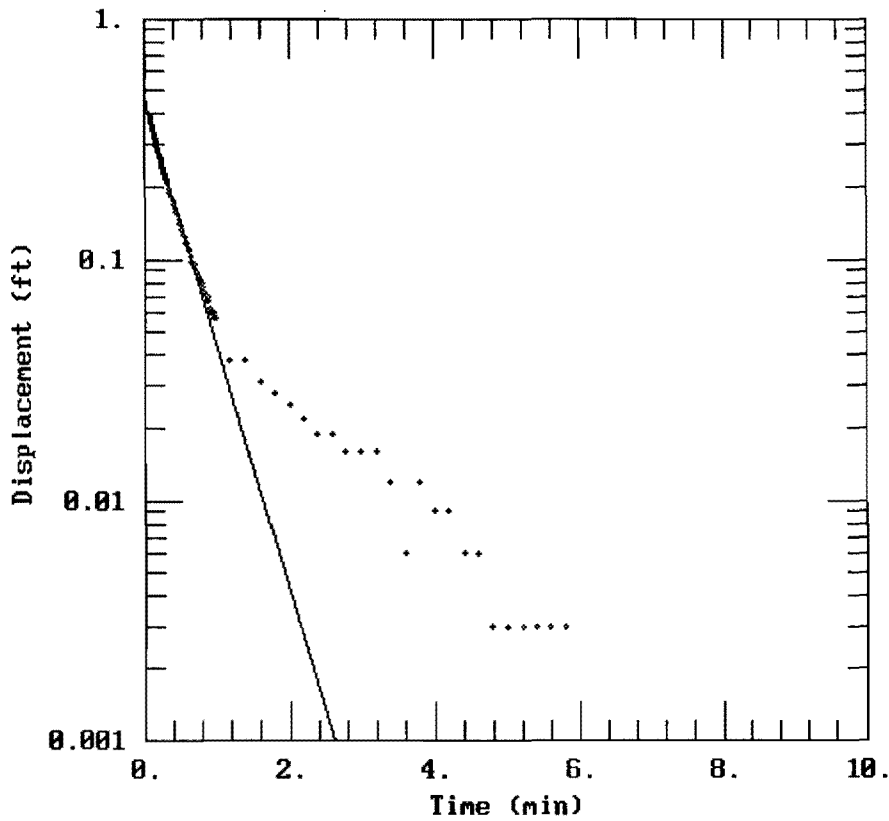
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-8 - SLUG OUT



DATA SET:
MW8-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.45$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.002079$ ft/min
 $y_0 = 0.4608$ ft

MW- EPL-8

Sub In

SE1000C
Environmental Logger
03/05 12:12

Unit# 00000 Test 14

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00008

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 09:30:05

Elapsed Time INPUT 1

0.0000 0.000
0.0033 0.000
0.0066 0.000
0.0100 0.000
0.0133 0.000
0.0166 0.000
0.0200 0.000
0.0233 0.000
0.0266 0.000
0.0300 0.000
0.0333 0.006
0.0366 0.003
0.0400 -0.006
0.0433 0.258
0.0466 0.089
0.0500 0.185
0.0533 0.306
0.0566 0.347
0.0600 0.389
0.0633 0.328
0.0666 0.475
0.0700 0.465
0.0733 0.411
0.0766 0.427
0.0800 0.395
0.0833 0.436
0.0866 0.564
0.0900 0.478
0.0933 0.341
0.0966 0.430
0.1000 0.472
0.1033 0.459

0.1066	0.427
0.1100	0.389
0.1133	0.245
0.1166	0.392
0.1200	0.535
0.1233	0.443
0.1266	0.398
0.1300	0.436
0.1333	0.417
0.1366	0.334
0.1400	0.344
0.1433	0.264
0.1466	0.232
0.1500	0.379
0.1533	0.338
0.1566	0.360
0.1600	0.347
0.1633	0.347
0.1666	0.344
0.1700	0.341
0.1733	0.338
0.1766	0.334
0.1800	0.331
0.1833	0.328
0.1866	0.325
0.1900	0.322
0.1933	0.322
0.1966	0.318
0.2000	0.318
0.2033	0.312
0.2066	0.309
0.2100	0.309
0.2133	0.306
0.2166	0.306
0.2200	0.302
0.2233	0.299
0.2266	0.296
0.2300	0.296
0.2333	0.293
0.2366	0.293
0.2400	0.290
0.2433	0.287
0.2466	0.283
0.2500	0.283
0.2533	0.280
0.2566	0.280
0.2600	0.277
0.2633	0.274
0.2666	0.274
0.2700	0.271
0.2733	0.267
0.2766	0.267
0.2800	0.267
0.2833	0.264

0.2866	0.261
0.2900	0.261
0.2933	0.258
0.2966	0.255
0.3000	0.258
0.3033	0.251
0.3066	0.251
0.3100	0.248
0.3133	0.248
0.3166	0.245
0.3200	0.245
0.3233	0.245
0.3266	0.245
0.3300	0.242
0.3333	0.239
0.3500	0.232
0.3666	0.226
0.3833	0.220
0.4000	0.210
0.4166	0.207
0.4333	0.204
0.4500	0.197
0.4666	0.191
0.4833	0.185
0.5000	0.181
0.5166	0.175
0.5333	0.172
0.5500	0.168
0.5666	0.165
0.5833	0.159
0.6000	0.156
0.6166	0.153
0.6333	0.149
0.6500	0.146
0.6666	0.143
0.6833	0.140
0.7000	0.137
0.7166	0.137
0.7333	0.134
0.7500	0.134
0.7666	0.124
0.7833	0.124
0.8000	0.121
0.8166	0.121
0.8333	0.118
0.8500	0.118
0.8666	0.114
0.8833	0.114
0.9000	0.111
0.9166	0.108
0.9333	0.108
0.9500	0.105
0.9666	0.105
0.9833	0.102

1.0000	0.102
1.2000	0.082
1.4000	0.070
1.6000	0.060
1.8000	0.054
2.0000	0.047
2.2000	0.044
2.4000	0.038
2.6000	0.035
2.8000	0.035
3.0000	0.031
3.2000	0.028
3.4000	0.028
3.6000	0.028
3.8000	0.025
4.0000	0.025
4.2000	0.022
4.4000	0.019
4.6000	0.019
4.8000	0.019
5.0000	0.019
5.2000	0.019
5.4000	0.015
5.6000	0.015
5.8000	0.019
6.0000	0.015
6.2000	0.015
6.4000	0.015
6.6000	0.015
6.8000	0.015
7.0000	0.015
7.2000	0.012
7.4000	0.015
7.6000	0.012
7.8000	0.009
8.0000	0.015
8.2000	0.015
8.4000	0.012
8.6000	0.012
8.8000	0.012
9.0000	0.015
9.2000	0.012
9.4000	0.012
9.6000	0.012
9.8000	0.015
10.0000	0.012

END

MW-EDC-8 Sub Out

SE1000C

Environmental Logger

03/05 12:09

Unit# 00000 Test 15

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00008

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 09:41:04

Elapsed Time INPUT 1

0.0000 -0.248
0.0033 -0.424
0.0066 -0.197
0.0100 -0.079
0.0133 -0.063
0.0166 -0.226
0.0200 0.057
0.0233 -0.041
0.0266 -0.207
0.0300 -0.379
0.0333 -0.487
0.0366 -0.491
0.0400 -0.484
0.0433 -0.472
0.0466 -0.465
0.0500 -0.456
0.0533 -0.449
0.0566 -0.440
0.0600 -0.436
0.0633 -0.427
0.0666 -0.420
0.0700 -0.414
0.0733 -0.411
0.0766 -0.405
0.0800 -0.401
0.0833 -0.392
0.0866 -0.392
0.0900 -0.385
0.0933 -0.382
0.0966 -0.376
0.1000 -0.376
0.1033 -0.370
0.1066 -0.366
0.1100 -0.363
0.1133 -0.357
0.1166 -0.357
0.1200 -0.354
0.1233 -0.350

0.1266	-0.347
0.1300	-0.344
0.1333	-0.341
0.1366	-0.334
0.1400	-0.334
0.1433	-0.331
0.1466	-0.325
0.1500	-0.325
0.1533	-0.322
0.1566	-0.318
0.1600	-0.318
0.1633	-0.312
0.1666	-0.309
0.1700	-0.309
0.1733	-0.306
0.1766	-0.303
0.1800	-0.303
0.1833	-0.299
0.1866	-0.293
0.1900	-0.290
0.1933	-0.290
0.1966	-0.287
0.2000	-0.287
0.2033	-0.283
0.2066	-0.280
0.2100	-0.277
0.2133	-0.277
0.2166	-0.271
0.2200	-0.271
0.2233	-0.271
0.2266	-0.267
0.2300	-0.264
0.2333	-0.264
0.2366	-0.261
0.2400	-0.261
0.2433	-0.261
0.2466	-0.258
0.2500	-0.255
0.2533	-0.251
0.2566	-0.251
0.2600	-0.248
0.2633	-0.245
0.2666	-0.242
0.2700	-0.242
0.2733	-0.239
0.2766	-0.239
0.2800	-0.236
0.2833	-0.236
0.2866	-0.232
0.2900	-0.229
0.2933	-0.226
0.2966	-0.226
0.3000	-0.223
0.3033	-0.223

0.3066	-0.220
0.3100	-0.220
0.3133	-0.216
0.3166	-0.213
0.3200	-0.213
0.3233	-0.210
0.3266	-0.210
0.3300	-0.207
0.3333	-0.207
0.3500	-0.197
0.3666	-0.188
0.3833	-0.181
0.4000	-0.175
0.4166	-0.169
0.4333	-0.162
0.4500	-0.156
0.4666	-0.153
0.4833	-0.146
0.5000	-0.140
0.5166	-0.137
0.5333	-0.134
0.5500	-0.127
0.5666	-0.124
0.5833	-0.118
0.6000	-0.118
0.6166	-0.111
0.6333	-0.108
0.6500	-0.102
0.6666	-0.098
0.6833	-0.098
0.7000	-0.095
0.7166	-0.092
0.7333	-0.089
0.7500	-0.086
0.7666	-0.083
0.7833	-0.083
0.8000	-0.079
0.8166	-0.076
0.8333	-0.073
0.8500	-0.073
0.8666	-0.067
0.8833	-0.070
0.9000	-0.067
0.9166	-0.063
0.9333	-0.060
0.9500	-0.060
0.9666	-0.060
0.9833	-0.057
1.0000	-0.057
1.2000	-0.038
1.4000	-0.038
1.6000	-0.031
1.8000	-0.028
2.0000	-0.025

2.2000	-0.022
2.4000	-0.019
2.6000	-0.019
2.8000	-0.016
3.0000	-0.016
3.2000	-0.016
3.4000	-0.012
3.6000	-0.006
3.8000	-0.012
4.0000	-0.009
4.2000	-0.009
4.4000	-0.006
4.6000	-0.006
4.8000	-0.003
5.0000	-0.003
5.2000	-0.003
5.4000	-0.003
5.6000	-0.003
5.8000	-0.003
6.0000	0.000
6.2000	-0.003
6.4000	-0.003
6.6000	0.000
6.8000	0.000
7.0000	-0.003
7.2000	-0.003
7.4000	-0.003
7.6000	0.000
7.8000	-0.003
8.0000	0.000
8.2000	0.000
8.4000	0.000
8.6000	0.000
8.8000	-0.003
9.0000	0.000
9.2000	0.000
9.4000	-0.003
9.6000	-0.003
9.8000	0.000
10.0000	0.003

END

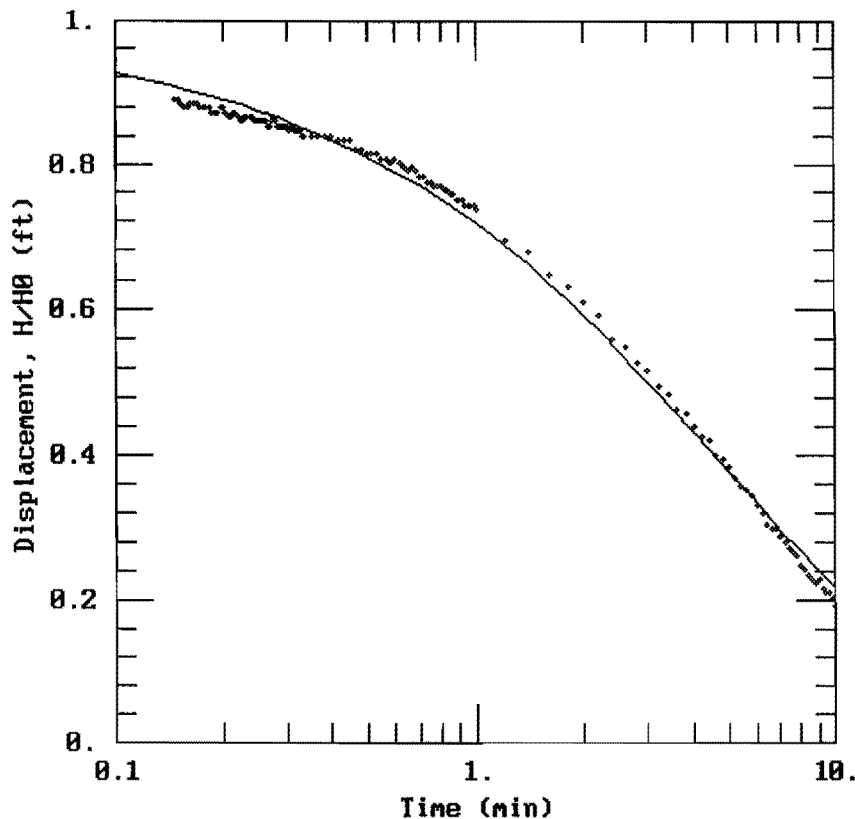
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-9 - SLUG IN



DATA SET:
MW9-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.5$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $I = 0.02253$ ft²/min
 $S = 0.005321$

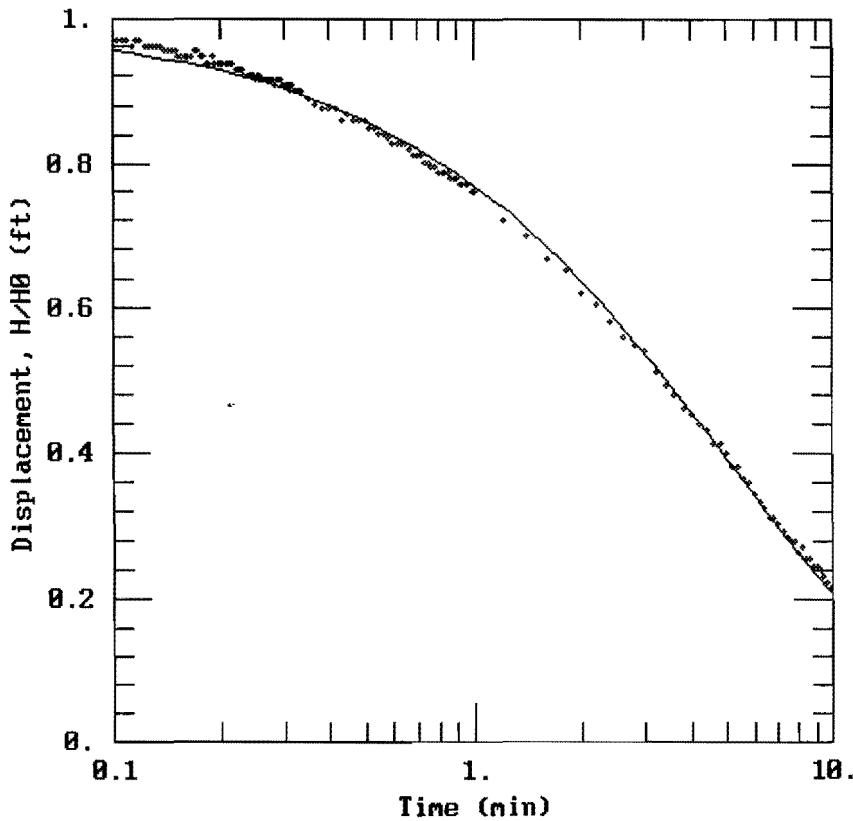
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-9 - SLUG OUT



DATA SET:
MW9-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.03635$ ft²/min
 $S = 0.0003749$

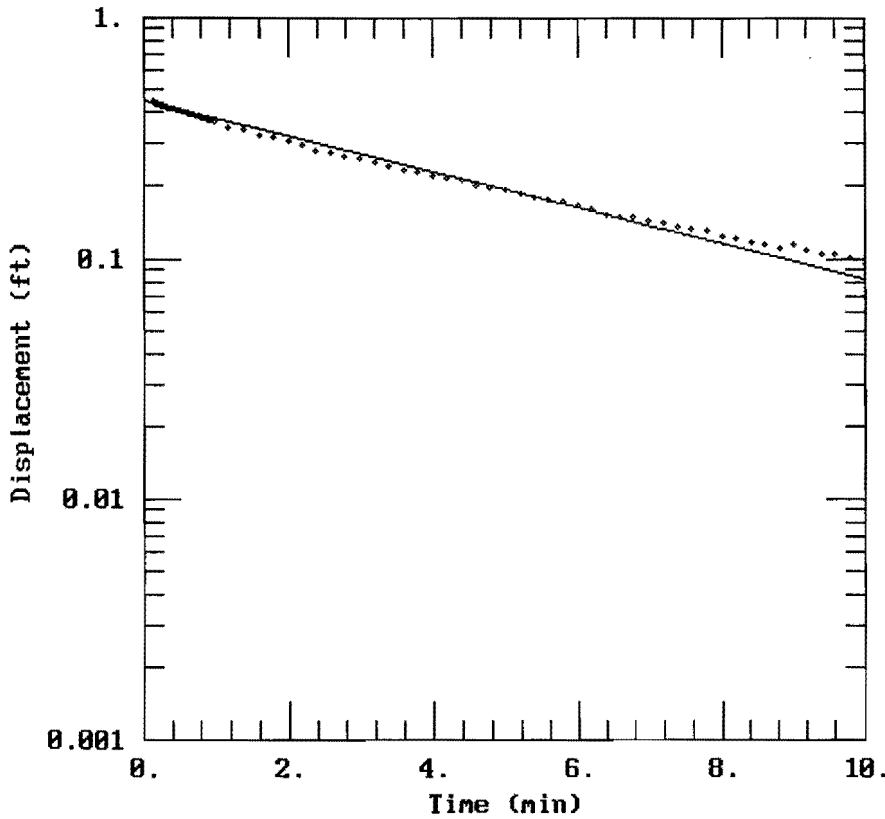
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-9 - SLUG IN



DATA SET:
MW9-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.5$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.00015$ ft/min
 $y_0 = 0.4459$ ft

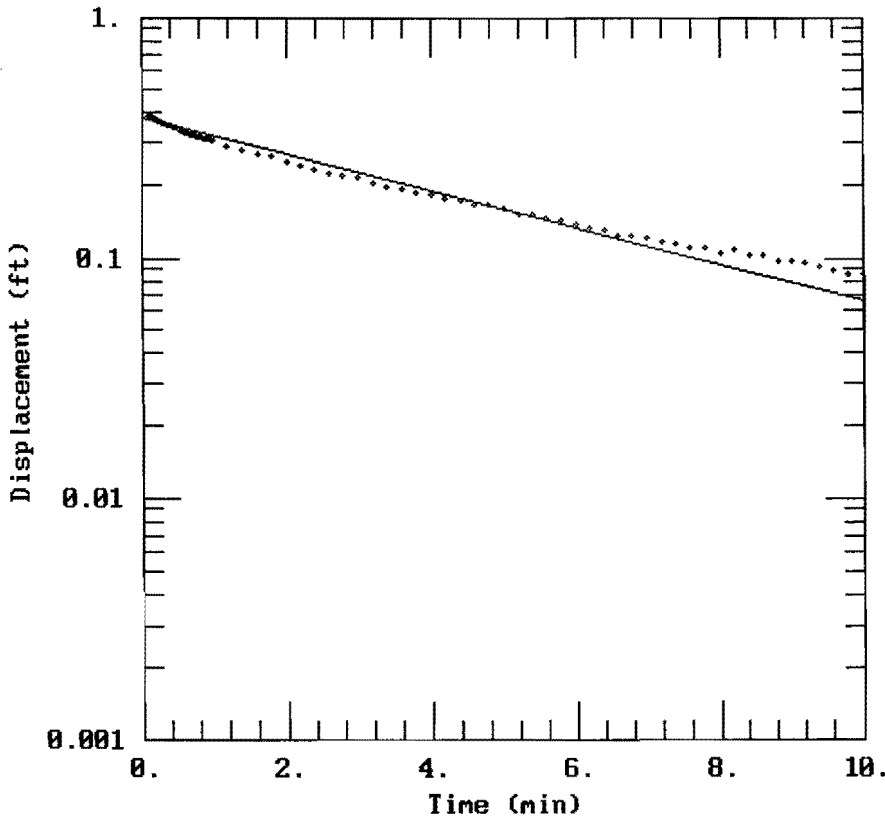
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-9 - SLUG OUT



DATA SET:
MW9-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001564$ ft/min
 $y_0 = 0.3808$ ft

AQTESOLV

MW-EDL-9 SLUB IN

SE1000C
Environmental Logger
03/05 12:18

Unit# 00000 Test 16

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00009

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 10:41:32

Elapsed Time INPUT 1

0.0000 0.000
0.0033 0.000
0.0066 0.000
0.0100 0.000
0.0133 -0.003
0.0166 0.098
0.0200 0.379
0.0233 0.433
0.0266 0.277
0.0300 0.248
0.0333 0.420
0.0366 0.598
0.0400 0.611
0.0433 0.519
0.0466 0.474
0.0500 0.528
0.0533 0.614
0.0566 0.567
0.0600 0.433
0.0633 0.420
0.0666 0.506
0.0700 0.503
0.0733 0.388
0.0766 0.347
0.0800 0.391
0.0833 0.372
0.0866 0.407
0.0900 0.490
0.0933 0.506
0.0966 0.465
0.1000 0.426

0.1033	0.426
0.1066	0.449
0.1100	0.465
0.1133	0.462
0.1166	0.445
0.1200	0.439
0.1233	0.442
0.1266	0.449
0.1300	0.452
0.1333	0.449
0.1366	0.442
0.1400	0.442
0.1433	0.442
0.1466	0.445
0.1500	0.445
0.1533	0.442
0.1566	0.439
0.1600	0.439
0.1633	0.442
0.1666	0.442
0.1700	0.442
0.1733	0.439
0.1766	0.439
0.1800	0.439
0.1833	0.439
0.1866	0.436
0.1900	0.436
0.1933	0.436
0.1966	0.439
0.2000	0.439
0.2033	0.436
0.2066	0.433
0.2100	0.433
0.2133	0.436
0.2166	0.436
0.2200	0.433
0.2233	0.430
0.2266	0.430
0.2300	0.433
0.2333	0.433
0.2366	0.433
0.2400	0.433
0.2433	0.430
0.2466	0.430
0.2500	0.430
0.2533	0.430
0.2566	0.430
0.2600	0.430
0.2633	0.430
0.2666	0.426
0.2700	0.426
0.2733	0.430
0.2766	0.433
0.2800	0.430

0.2833	0.426
0.2866	0.426
0.2900	0.426
0.2933	0.426
0.2966	0.426
0.3000	0.426
0.3033	0.423
0.3066	0.426
0.3100	0.426
0.3133	0.426
0.3166	0.423
0.3200	0.423
0.3233	0.423
0.3266	0.423
0.3300	0.420
0.3333	0.420
0.3500	0.420
0.3666	0.420
0.3833	0.420
0.4000	0.420
0.4166	0.417
0.4333	0.417
0.4500	0.417
0.4666	0.410
0.4833	0.410
0.5000	0.407
0.5166	0.407
0.5333	0.407
0.5500	0.404
0.5666	0.404
0.5833	0.401
0.6000	0.404
0.6166	0.401
0.6333	0.398
0.6500	0.395
0.6666	0.398
0.6833	0.395
0.7000	0.391
0.7166	0.391
0.7333	0.388
0.7500	0.388
0.7666	0.385
0.7833	0.385
0.8000	0.385
0.8166	0.382
0.8333	0.382
0.8500	0.379
0.8666	0.379
0.8833	0.375
0.9000	0.375
0.9166	0.375
0.9333	0.372
0.9500	0.372
0.9666	0.372

0.9833	0.372
1.0000	0.369
1.2000	0.347
1.4000	0.340
1.6000	0.324
1.8000	0.315
2.0000	0.305
2.2000	0.296
2.4000	0.280
2.6000	0.274
2.8000	0.264
3.0000	0.258
3.2000	0.248
3.4000	0.242
3.6000	0.232
3.8000	0.229
4.0000	0.219
4.2000	0.213
4.4000	0.210
4.6000	0.200
4.8000	0.197
5.0000	0.191
5.2000	0.184
5.4000	0.178
5.6000	0.175
5.8000	0.172
6.0000	0.165
6.2000	0.159
6.4000	0.152
6.6000	0.149
6.8000	0.149
7.0000	0.143
7.2000	0.140
7.4000	0.136
7.6000	0.133
7.8000	0.130
8.0000	0.124
8.2000	0.121
8.4000	0.117
8.6000	0.114
8.8000	0.111
9.0000	0.114
9.2000	0.108
9.4000	0.105
9.6000	0.105
9.8000	0.101
10.0000	0.095

END

MW-EDC-9 SLUG DVT

SE1000C

Environmental Logger

03/05 12:22

Unit# 00000 Test 17

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00009

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 10:53:34

Elapsed Time INPUT 1

0.0000 -0.194
0.0033 -0.538
0.0066 -0.248
0.0100 0.356
0.0133 0.598
0.0166 0.165
0.0200 -0.379
0.0233 -0.360
0.0266 -0.175
0.0300 0.168
0.0333 0.286
0.0366 -0.089
0.0400 -0.474
0.0433 -0.576
0.0466 -0.500
0.0500 -0.388
0.0533 -0.353
0.0566 -0.388
0.0600 -0.426
0.0633 -0.430
0.0666 -0.404
0.0700 -0.366
0.0733 -0.360
0.0766 -0.385
0.0800 -0.420
0.0833 -0.407
0.0866 -0.388
0.0900 -0.388
0.0933 -0.391
0.0966 -0.391
0.1000 -0.395
0.1033 -0.388
0.1066 -0.388
0.1100 -0.388
0.1133 -0.385
0.1166 -0.388
0.1200 -0.388

0.1233	-0.385
0.1266	-0.385
0.1300	-0.385
0.1333	-0.385
0.1366	-0.385
0.1400	-0.382
0.1433	-0.382
0.1466	-0.382
0.1500	-0.382
0.1533	-0.379
0.1566	-0.379
0.1600	-0.379
0.1633	-0.379
0.1666	-0.379
0.1700	-0.382
0.1733	-0.382
0.1766	-0.379
0.1800	-0.379
0.1833	-0.375
0.1866	-0.375
0.1900	-0.379
0.1933	-0.375
0.1966	-0.375
0.2000	-0.375
0.2033	-0.375
0.2066	-0.375
0.2100	-0.375
0.2133	-0.375
0.2166	-0.375
0.2200	-0.372
0.2233	-0.372
0.2266	-0.372
0.2300	-0.372
0.2333	-0.369
0.2366	-0.369
0.2400	-0.369
0.2433	-0.369
0.2466	-0.369
0.2500	-0.366
0.2533	-0.369
0.2566	-0.369
0.2600	-0.366
0.2633	-0.366
0.2666	-0.366
0.2700	-0.366
0.2733	-0.366
0.2766	-0.366
0.2800	-0.366
0.2833	-0.363
0.2866	-0.366
0.2900	-0.366
0.2933	-0.366
0.2966	-0.363
0.3000	-0.363

0.3033	-0.363
0.3066	-0.363
0.3100	-0.363
0.3133	-0.360
0.3166	-0.363
0.3200	-0.360
0.3233	-0.360
0.3266	-0.360
0.3300	-0.360
0.3333	-0.360
0.3500	-0.356
0.3666	-0.353
0.3833	-0.350
0.4000	-0.350
0.4166	-0.350
0.4333	-0.344
0.4500	-0.347
0.4666	-0.344
0.4833	-0.344
0.5000	-0.344
0.5166	-0.340
0.5333	-0.340
0.5500	-0.337
0.5666	-0.337
0.5833	-0.334
0.6000	-0.331
0.6166	-0.331
0.6333	-0.331
0.6500	-0.331
0.6666	-0.328
0.6833	-0.325
0.7000	-0.325
0.7166	-0.325
0.7333	-0.321
0.7500	-0.321
0.7666	-0.318
0.7833	-0.318
0.8000	-0.315
0.8166	-0.315
0.8333	-0.315
0.8500	-0.315
0.8666	-0.312
0.8833	-0.312
0.9000	-0.312
0.9166	-0.309
0.9333	-0.309
0.9500	-0.309
0.9666	-0.309
0.9833	-0.305
1.0000	-0.305
1.2000	-0.289
1.4000	-0.280
1.6000	-0.267
1.8000	-0.261

2.0000	-0.248
2.2000	-0.242
2.4000	-0.232
2.6000	-0.223
2.8000	-0.219
3.0000	-0.216
3.2000	-0.204
3.4000	-0.197
3.6000	-0.191
3.8000	-0.184
4.0000	-0.181
4.2000	-0.175
4.4000	-0.172
4.6000	-0.165
4.8000	-0.165
5.0000	-0.159
5.2000	-0.152
5.4000	-0.152
5.6000	-0.146
5.8000	-0.143
6.0000	-0.137
6.2000	-0.133
6.4000	-0.130
6.6000	-0.124
6.8000	-0.124
7.0000	-0.121
7.2000	-0.117
7.4000	-0.114
7.6000	-0.111
7.8000	-0.111
8.0000	-0.105
8.2000	-0.108
8.4000	-0.102
8.6000	-0.102
8.8000	-0.098
9.0000	-0.098
9.2000	-0.095
9.4000	-0.092
9.6000	-0.089
9.8000	-0.086
10.0000	-0.086

END

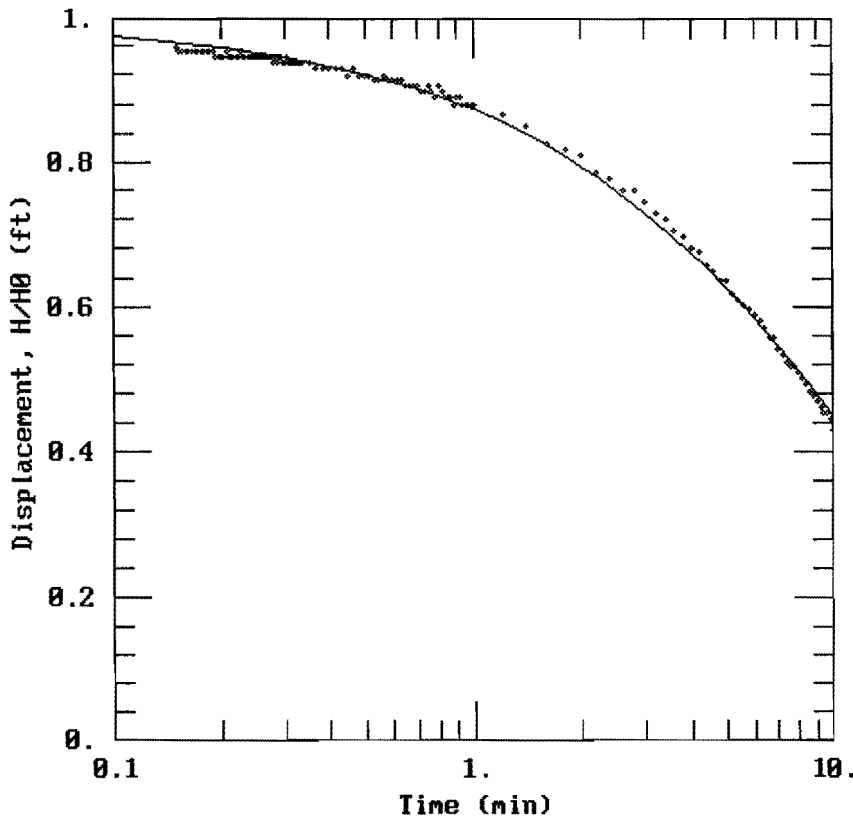
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-10 - SLUG IN



DATA SET:
MW10-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
H0 = 0.4 ft
rc = 0.33 ft
rw = 0.83 ft

PARAMETER ESTIMATES:
T = 0.01333 ft²/min
S = 0.0007045

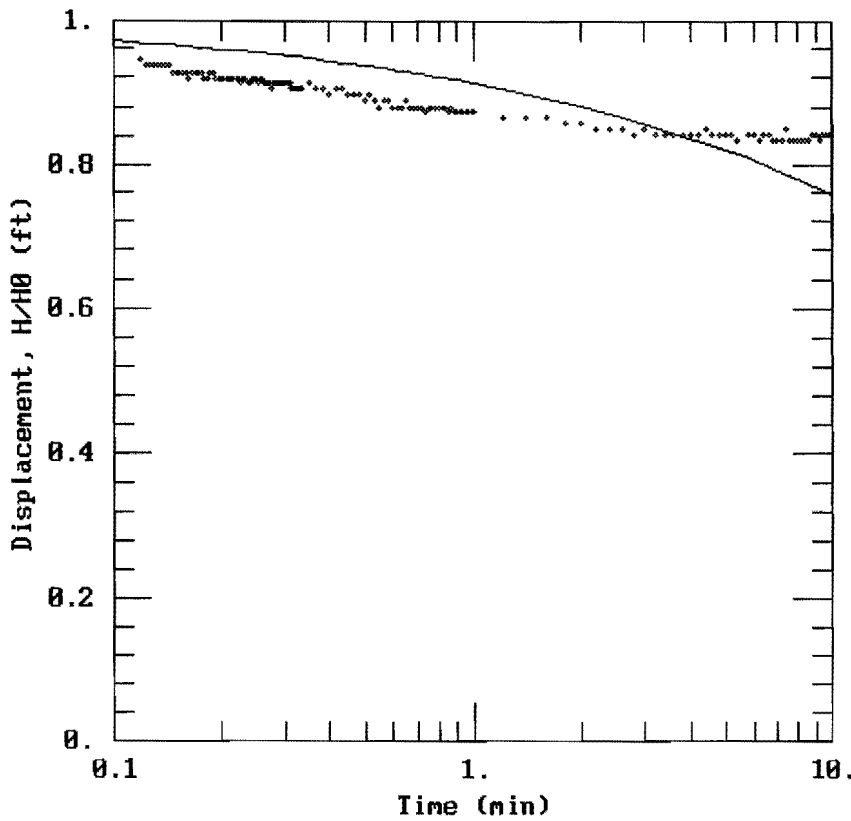
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-10 - SLUG OUT



DATA SET:
MW10-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 5.814E-05$ ft²/min
 $S = 0.5$

AQTESOLV

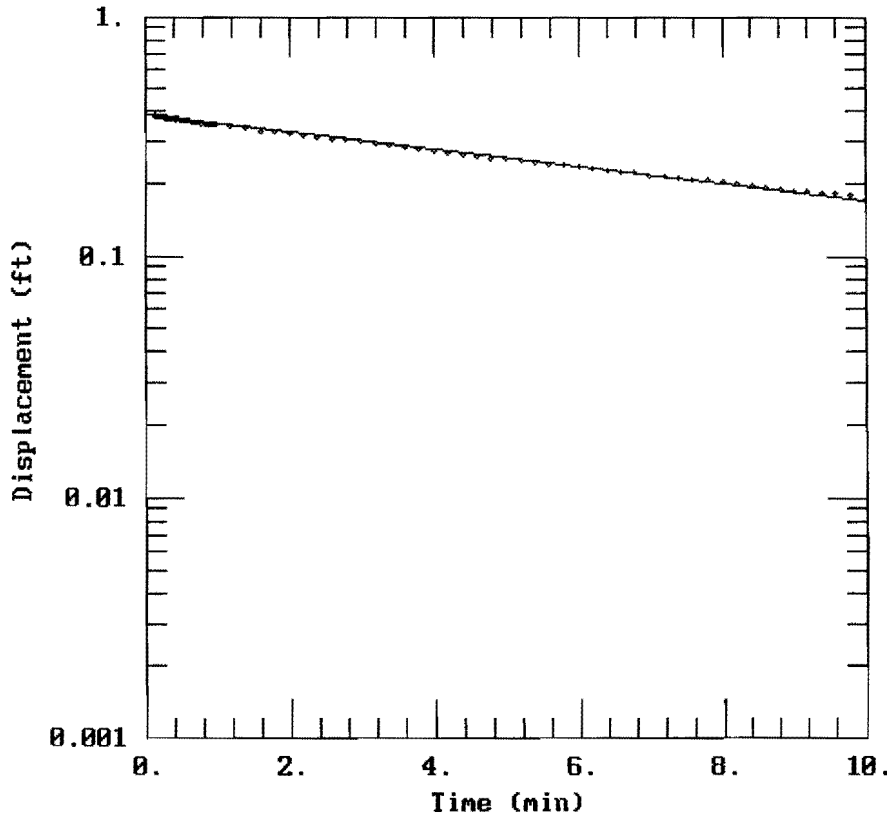
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-10 - SLUG IN



DATA SET:
MW10-IN.DAT
03/18/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 7.3E-05$ ft/min
 $y_0 = 0.3842$ ft

AQTESOLV

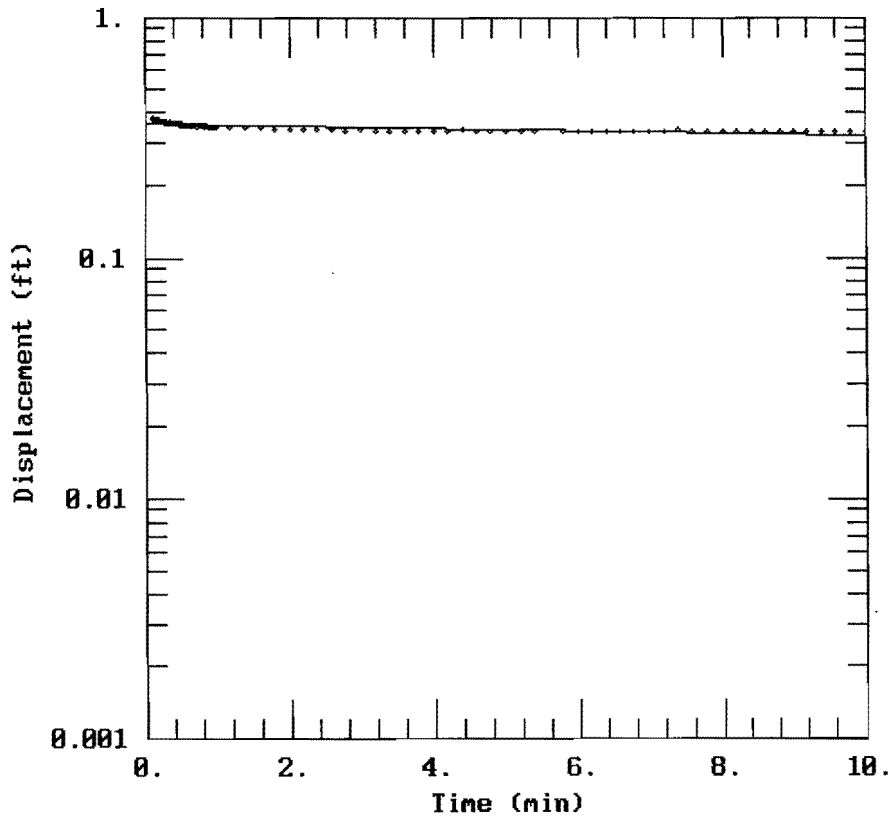
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-10 - SLUG OUT



DATA SET:
MW10-OUT.DAT
03/18/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
H₀ = 0.4 ft
r_c = 0.33 ft
r_w = 0.83 ft
L = 10. ft
b = 10. ft
H = 1. ft

PARAMETER ESTIMATES:
K = 1.043E-05 ft/min
y₀ = 0.363 ft

AQTESOLV

MW-EDC-10 SLUG IN

SE1000C
Environmental Logger
03/05 13:17

Unit# 00000 Test 18

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00010

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 12:47:01

Elapsed Time INPUT I

0.0000 -0.012
0.0033 -0.009
0.0066 -0.012
0.0100 -0.012
0.0133 -0.012
0.0166 -0.009
0.0200 -0.012
0.0233 -0.012
0.0266 -0.009
0.0300 -0.009
0.0333 -0.012
0.0366 0.028
0.0400 0.009
0.0433 0.060
0.0466 0.235
0.0500 0.486
0.0533 -0.019
0.0566 0.092
0.0600 0.588
0.0633 0.241
0.0666 0.394
0.0700 0.435
0.0733 0.445
0.0766 0.442
0.0800 0.282
0.0833 0.337
0.0866 0.448
0.0900 0.419
0.0933 0.419
0.0966 0.276
0.1000 0.454

0.1033	0.467
0.1066	0.378
0.1100	0.403
0.1133	0.203
0.1166	0.340
0.1200	0.413
0.1233	0.349
0.1266	0.387
0.1300	0.356
0.1333	0.362
0.1366	0.407
0.1400	0.368
0.1433	0.384
0.1466	0.381
0.1500	0.384
0.1533	0.381
0.1566	0.381
0.1600	0.381
0.1633	0.381
0.1666	0.381
0.1700	0.381
0.1733	0.381
0.1766	0.381
0.1800	0.381
0.1833	0.381
0.1866	0.381
0.1900	0.381
0.1933	0.378
0.1966	0.378
0.2000	0.378
0.2033	0.378
0.2066	0.381
0.2100	0.378
0.2133	0.378
0.2166	0.378
0.2200	0.378
0.2233	0.378
0.2266	0.381
0.2300	0.378
0.2333	0.378
0.2366	0.378
0.2400	0.378
0.2433	0.378
0.2466	0.378
0.2500	0.378
0.2533	0.378
0.2566	0.378
0.2600	0.378
0.2633	0.378
0.2666	0.378
0.2700	0.378
0.2733	0.378
0.2766	0.378
0.2800	0.375

0.2833	0.378
0.2866	0.375
0.2900	0.378
0.2933	0.378
0.2966	0.375
0.3000	0.375
0.3033	0.378
0.3066	0.375
0.3100	0.375
0.3133	0.375
0.3166	0.375
0.3200	0.375
0.3233	0.375
0.3266	0.375
0.3300	0.375
0.3333	0.375
0.3500	0.375
0.3666	0.372
0.3833	0.372
0.4000	0.372
0.4166	0.372
0.4333	0.372
0.4500	0.368
0.4666	0.372
0.4833	0.368
0.5000	0.368
0.5166	0.368
0.5333	0.365
0.5500	0.365
0.5666	0.368
0.5833	0.365
0.6000	0.365
0.6166	0.365
0.6333	0.365
0.6500	0.362
0.6666	0.362
0.6833	0.362
0.7000	0.362
0.7166	0.359
0.7333	0.359
0.7500	0.362
0.7666	0.359
0.7833	0.356
0.8000	0.362
0.8166	0.359
0.8333	0.356
0.8500	0.356
0.8666	0.356
0.8833	0.352
0.9000	0.356
0.9166	0.356
0.9333	0.352
0.9500	0.352
0.9666	0.352

0.9833	0.352
1.0000	0.352
1.2000	0.346
1.4000	0.340
1.6000	0.330
1.8000	0.327
2.0000	0.324
2.2000	0.314
2.4000	0.311
2.6000	0.305
2.8000	0.305
3.0000	0.298
3.2000	0.292
3.4000	0.289
3.6000	0.282
3.8000	0.279
4.0000	0.273
4.2000	0.270
4.4000	0.263
4.6000	0.260
4.8000	0.254
5.0000	0.254
5.2000	0.247
5.4000	0.244
5.6000	0.241
5.8000	0.238
6.0000	0.235
6.2000	0.232
6.4000	0.228
6.6000	0.222
6.8000	0.222
7.0000	0.216
7.2000	0.213
7.4000	0.209
7.6000	0.206
7.8000	0.206
8.0000	0.203
8.2000	0.200
8.4000	0.197
8.6000	0.193
8.8000	0.190
9.0000	0.187
9.2000	0.184
9.4000	0.181
9.6000	0.181
9.8000	0.178
10.0000	0.171

END

MW-EDC-10 SWG DVT

SE1000C

Environmental Logger

03/05 13:19

Unit# 00000 Test 19

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00010

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 12:57:43

Elapsed Time INPUT 1

0.0000 -0.057
0.0033 -0.508
0.0066 -0.254
0.0100 -0.114
0.0133 0.648
0.0166 -0.235
0.0200 0.031
0.0233 -0.461
0.0266 -0.270
0.0300 -0.270
0.0333 -0.286
0.0366 -0.314
0.0400 -0.998
0.0433 -1.325
0.0466 -1.233
0.0500 -0.845
0.0533 -0.400
0.0566 -0.448
0.0600 -0.378
0.0633 -0.394
0.0666 -0.391
0.0700 -0.394
0.0733 -0.391
0.0766 -0.384
0.0800 -0.381
0.0833 -0.384
0.0866 -0.384
0.0900 -0.387
0.0933 -0.375
0.0966 -0.371
0.1000 -0.384
0.1033 -0.371
0.1066 -0.378
0.1100 -0.378
0.1133 -0.375
0.1166 -0.375
0.1200 -0.378

0.1233	-0.375
0.1266	-0.375
0.1300	-0.375
0.1333	-0.375
0.1366	-0.375
0.1400	-0.375
0.1433	-0.375
0.1466	-0.371
0.1500	-0.371
0.1533	-0.371
0.1566	-0.371
0.1600	-0.371
0.1633	-0.368
0.1666	-0.371
0.1700	-0.371
0.1733	-0.371
0.1766	-0.371
0.1800	-0.368
0.1833	-0.368
0.1866	-0.371
0.1900	-0.371
0.1933	-0.368
0.1966	-0.368
0.2000	-0.368
0.2033	-0.368
0.2066	-0.368
0.2100	-0.368
0.2133	-0.368
0.2166	-0.368
0.2200	-0.368
0.2233	-0.368
0.2266	-0.365
0.2300	-0.368
0.2333	-0.368
0.2366	-0.365
0.2400	-0.365
0.2433	-0.368
0.2466	-0.368
0.2500	-0.368
0.2533	-0.365
0.2566	-0.368
0.2600	-0.368
0.2633	-0.365
0.2666	-0.365
0.2700	-0.365
0.2733	-0.365
0.2766	-0.362
0.2800	-0.365
0.2833	-0.365
0.2866	-0.365
0.2900	-0.365
0.2933	-0.365
0.2966	-0.365
0.3000	-0.365

0.3033	-0.365
0.3066	-0.365
0.3100	-0.365
0.3133	-0.362
0.3166	-0.362
0.3200	-0.362
0.3233	-0.362
0.3266	-0.362
0.3300	-0.362
0.3333	-0.362
0.3500	-0.365
0.3666	-0.362
0.3833	-0.362
0.4000	-0.359
0.4166	-0.362
0.4333	-0.362
0.4500	-0.359
0.4666	-0.359
0.4833	-0.359
0.5000	-0.356
0.5166	-0.359
0.5333	-0.356
0.5500	-0.352
0.5666	-0.356
0.5833	-0.356
0.6000	-0.352
0.6166	-0.352
0.6333	-0.352
0.6500	-0.356
0.6666	-0.352
0.6833	-0.352
0.7000	-0.352
0.7166	-0.352
0.7333	-0.349
0.7500	-0.352
0.7666	-0.352
0.7833	-0.352
0.8000	-0.352
0.8166	-0.352
0.8333	-0.352
0.8500	-0.349
0.8666	-0.352
0.8833	-0.349
0.9000	-0.349
0.9166	-0.349
0.9333	-0.349
0.9500	-0.349
0.9666	-0.349
0.9833	-0.349
1.0000	-0.349
1.2000	-0.346
1.4000	-0.346
1.6000	-0.346
1.8000	-0.343

2.0000	-0.343
2.2000	-0.340
2.4000	-0.340
2.6000	-0.340
2.8000	-0.337
3.0000	-0.340
3.2000	-0.337
3.4000	-0.337
3.6000	-0.337
3.8000	-0.337
4.0000	-0.337
4.2000	-0.337
4.4000	-0.340
4.6000	-0.337
4.8000	-0.337
5.0000	-0.337
5.2000	-0.337
5.4000	-0.333
5.4000	-0.333
5.8000	-0.337
6.0000	-0.337
6.2000	-0.333
6.4000	-0.337
6.6000	-0.337
6.8000	-0.333
7.0000	-0.333
7.2000	-0.333
7.4000	-0.340
7.6000	-0.333
7.8000	-0.333
8.0000	-0.333
8.2000	-0.333
8.4000	-0.333
8.6000	-0.333
8.8000	-0.337
9.0000	-0.337
9.2000	-0.333
9.4000	-0.337
9.6000	-0.337
9.8000	-0.337
10.0000	-0.337

END

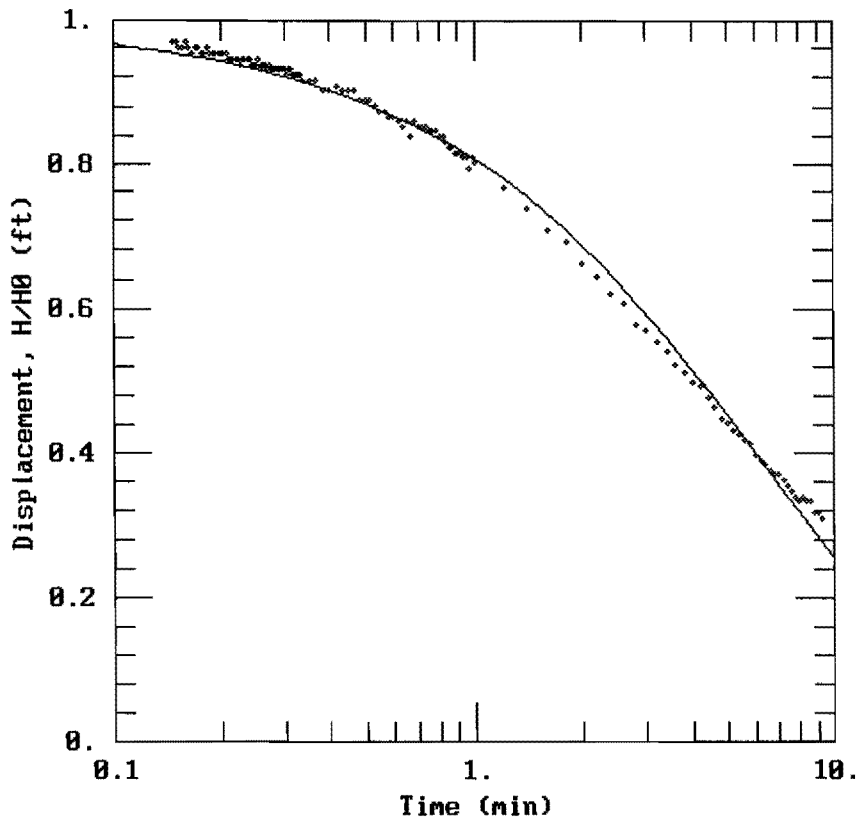
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-11 - SLUG IN



DATA SET:
MW11-IN.DAT
03/19/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.44$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.03228$ ft²/min
 $S = 0.0002062$

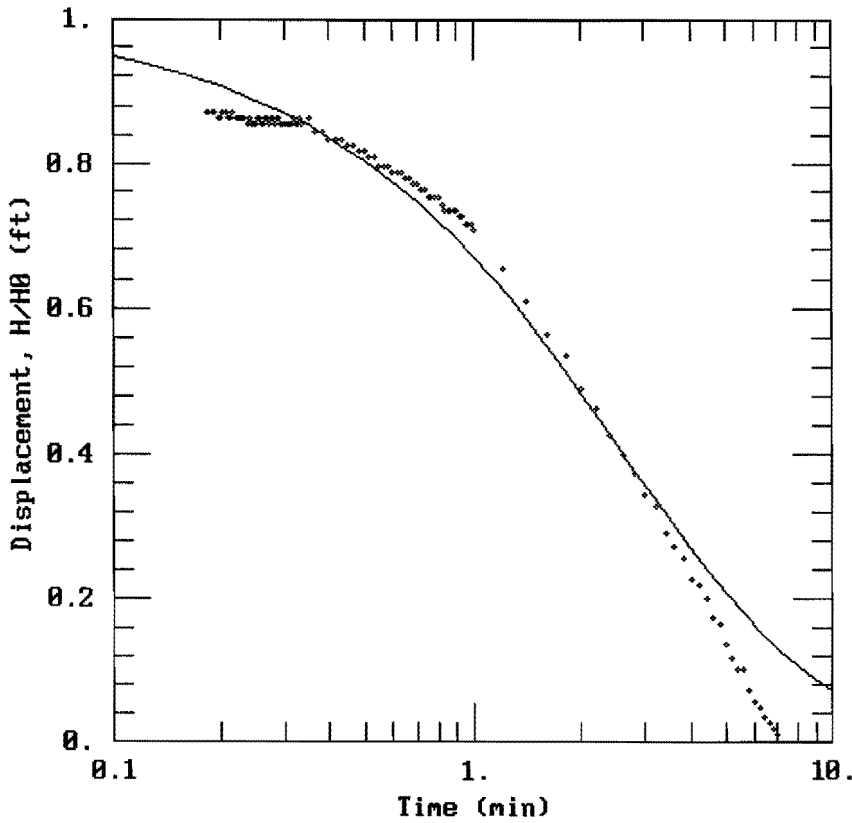
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-11 - SLUG OUT



DATA SET:
MW11-OUT.DAT
03/19/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.35$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.1061$ ft²/min
 $S = 1.E-05$

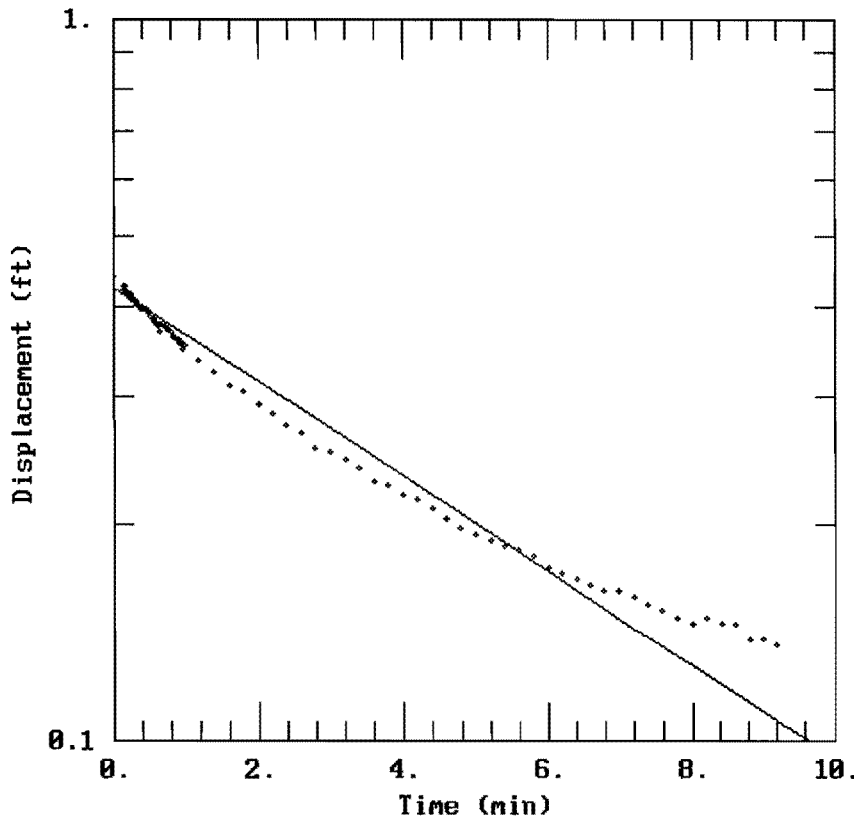
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-11 - SLUG IN



DATA SET:
MW11-IN.DAT
03/19/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.44$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001332$ ft/min
 $y_0 = 0.4234$ ft

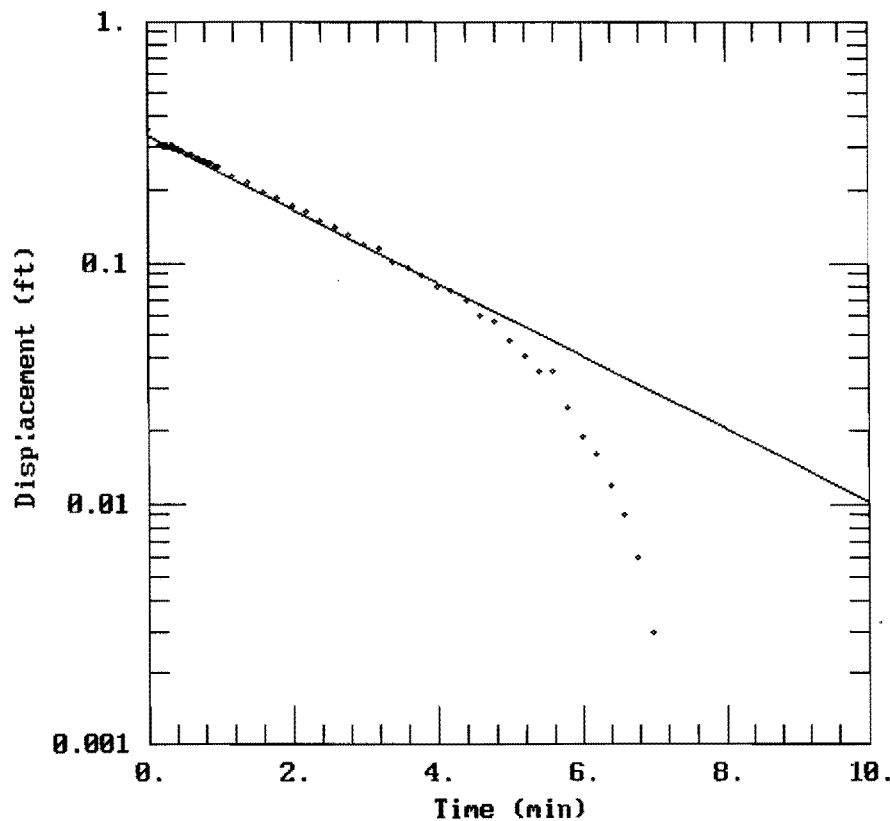
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-11 - SLUG OUT



DATA SET:
MW11-OUT.DAT
03/19/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.35$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10$ ft
 $b = 10$ ft
 $H = 1$ ft

PARAMETER ESTIMATES:
 $K = 0.0003115$ ft/min
 $y_0 = 0.3351$ ft

MW-EDC-11 Sub In

SE1000C
Environmental Logger
03/05 12:26

Unit# 00000 Test 18

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00011

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 11:15:05

Elapsed Time INPUT 1

0.0000 0.012
0.0033 0.012
0.0066 0.012
0.0100 0.009
0.0133 0.009
0.0166 0.009
0.0200 0.009
0.0233 0.251
0.0266 0.120
0.0300 0.314
0.0333 0.534
0.0366 0.467
0.0400 0.496
0.0433 0.486
0.0466 0.438
0.0500 0.464
0.0533 0.508
0.0566 0.470
0.0600 0.486
0.0633 0.438
0.0666 0.394
0.0700 0.388
0.0733 0.518
0.0766 0.410
0.0800 0.464
0.0833 0.289
0.0866 0.391
0.0900 0.477
0.0933 0.442
0.0966 0.397
0.1000 0.438
0.1033 0.451

0.1066	0.413
0.1100	0.419
0.1133	0.442
0.1166	0.426
0.1200	0.416
0.1233	0.432
0.1266	0.432
0.1300	0.423
0.1333	0.426
0.1366	0.432
0.1400	0.423
0.1433	0.423
0.1466	0.426
0.1500	0.426
0.1533	0.423
0.1566	0.423
0.1600	0.426
0.1633	0.423
0.1666	0.419
0.1700	0.423
0.1733	0.423
0.1766	0.419
0.1800	0.419
0.1833	0.423
0.1866	0.419
0.1900	0.419
0.1933	0.419
0.1966	0.419
0.2000	0.419
0.2033	0.419
0.2066	0.419
0.2100	0.416
0.2133	0.416
0.2166	0.416
0.2200	0.416
0.2233	0.416
0.2266	0.413
0.2300	0.416
0.2333	0.416
0.2366	0.416
0.2400	0.416
0.2433	0.413
0.2466	0.413
0.2500	0.413
0.2533	0.416
0.2566	0.410
0.2600	0.413
0.2633	0.413
0.2666	0.413
0.2700	0.410
0.2733	0.413
0.2766	0.410
0.2800	0.410
0.2833	0.410

0.2866	0.410
0.2900	0.410
0.2933	0.410
0.2966	0.410
0.3000	0.410
0.3033	0.407
0.3066	0.410
0.3100	0.410
0.3133	0.410
0.3166	0.407
0.3200	0.407
0.3233	0.407
0.3266	0.407
0.3300	0.407
0.3333	0.403
0.3500	0.403
0.3666	0.403
0.3833	0.397
0.4000	0.397
0.4166	0.400
0.4333	0.397
0.4500	0.397
0.4666	0.397
0.4833	0.391
0.5000	0.391
0.5166	0.391
0.5333	0.388
0.5500	0.384
0.5666	0.384
0.5833	0.381
0.6000	0.381
0.6166	0.378
0.6333	0.375
0.6500	0.378
0.6666	0.369
0.6833	0.378
0.7000	0.375
0.7166	0.375
0.7333	0.375
0.7500	0.372
0.7666	0.372
0.7833	0.372
0.8000	0.369
0.8166	0.369
0.8333	0.365
0.8500	0.362
0.8666	0.362
0.8833	0.359
0.9000	0.359
0.9166	0.359
0.9333	0.356
0.9500	0.356
0.9666	0.349
0.9833	0.356

1.0000	0.353
1.2000	0.337
1.4000	0.324
1.6000	0.311
1.8000	0.305
2.0000	0.292
2.2000	0.283
2.4000	0.273
2.6000	0.267
2.8000	0.254
3.0000	0.251
3.2000	0.244
3.4000	0.238
3.6000	0.229
3.8000	0.225
4.0000	0.219
4.2000	0.216
4.4000	0.209
4.6000	0.203
4.8000	0.197
5.0000	0.194
5.2000	0.190
5.4000	0.187
5.6000	0.184
5.8000	0.181
6.0000	0.174
6.2000	0.171
6.4000	0.168
6.6000	0.165
6.8000	0.162
7.0000	0.162
7.2000	0.159
7.4000	0.155
7.6000	0.152
7.8000	0.149
8.0000	0.146
8.2000	0.149
8.4000	0.146
8.6000	0.146
8.8000	0.139
9.0000	0.139
9.2000	0.136
9.4000	0.133
9.6000	0.133
9.8000	0.133
10.0000	0.133

END

MW-EDC-11 SLUG OUT

SE1000C
Environmental Logger
03/05 12:29

Unit# 00000 Test 19

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00011

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/05 11:25:46

Elapsed Time INPUT 1

0.0000 -0.566
0.0033 -0.499
0.0066 0.241
0.0100 0.703
0.0133 -0.295
0.0166 -0.413
0.0200 -0.003
0.0233 -0.534
0.0266 -0.410
0.0300 -0.149
0.0333 -0.419
0.0366 -0.400
0.0400 -0.210
0.0433 -0.365
0.0466 -0.391
0.0500 -0.270
0.0533 -0.330
0.0566 -0.365
0.0600 -0.292
0.0633 -0.318
0.0666 -0.353
0.0700 -0.311
0.0733 -0.314
0.0766 -0.337
0.0800 -0.314
0.0833 -0.311
0.0866 -0.327
0.0900 -0.318
0.0933 -0.314
0.0966 -0.324
0.1000 -0.318
0.1033 -0.311
0.1066 -0.321
0.1100 -0.314
0.1133 -0.311
0.1166 -0.318
0.1200 -0.318
0.1233 -0.311

0.1266	-0.311
0.1300	-0.314
0.1333	-0.311
0.1366	-0.308
0.1400	-0.311
0.1433	-0.308
0.1466	-0.311
0.1500	-0.308
0.1533	-0.308
0.1566	-0.308
0.1600	-0.308
0.1633	-0.305
0.1666	-0.308
0.1700	-0.308
0.1733	-0.305
0.1766	-0.305
0.1800	-0.308
0.1833	-0.305
0.1866	-0.305
0.1900	-0.305
0.1933	-0.305
0.1966	-0.302
0.2000	-0.302
0.2033	-0.305
0.2066	-0.305
0.2100	-0.302
0.2133	-0.302
0.2166	-0.305
0.2200	-0.302
0.2233	-0.302
0.2266	-0.302
0.2300	-0.302
0.2333	-0.302
0.2366	-0.299
0.2400	-0.302
0.2433	-0.299
0.2466	-0.299
0.2500	-0.299
0.2533	-0.302
0.2566	-0.302
0.2600	-0.299
0.2633	-0.299
0.2666	-0.302
0.2700	-0.302
0.2733	-0.299
0.2766	-0.302
0.2800	-0.302
0.2833	-0.299
0.2866	-0.302
0.2900	-0.302
0.2933	-0.299
0.2966	-0.299
0.3000	-0.299
0.3033	-0.299

0.3066	-0.299
0.3100	-0.299
0.3133	-0.299
0.3166	-0.299
0.3200	-0.302
0.3233	-0.299
0.3266	-0.299
0.3300	-0.302
0.3333	-0.299
0.3500	-0.302
0.3666	-0.295
0.3833	-0.295
0.4000	-0.292
0.4166	-0.292
0.4333	-0.292
0.4500	-0.289
0.4666	-0.289
0.4833	-0.286
0.5000	-0.286
0.5166	-0.283
0.5333	-0.283
0.5500	-0.279
0.5666	-0.279
0.5833	-0.279
0.6000	-0.276
0.6166	-0.276
0.6333	-0.276
0.6500	-0.273
0.6666	-0.273
0.6833	-0.270
0.7000	-0.270
0.7166	-0.267
0.7333	-0.267
0.7500	-0.264
0.7666	-0.264
0.7833	-0.264
0.8000	-0.264
0.8166	-0.260
0.8333	-0.257
0.8500	-0.257
0.8666	-0.257
0.8833	-0.257
0.9000	-0.257
0.9166	-0.254
0.9333	-0.254
0.9500	-0.251
0.9666	-0.251
0.9833	-0.251
1.0000	-0.248
1.2000	-0.229
1.4000	-0.213
1.6000	-0.197
1.8000	-0.187
2.0000	-0.171

2.2000	-0.162
2.4000	-0.149
2.6000	-0.140
2.8000	-0.130
3.0000	-0.120
3.2000	-0.114
3.4000	-0.101
3.6000	-0.095
3.8000	-0.089
4.0000	-0.079
4.2000	-0.076
4.4000	-0.070
4.6000	-0.060
4.8000	-0.057
5.0000	-0.047
5.2000	-0.041
5.4000	-0.035
5.6000	-0.035
5.8000	-0.025
6.0000	-0.019
6.2000	-0.016
6.4000	-0.012
6.6000	-0.009
6.8000	-0.006
7.0000	-0.003
7.2000	0.000
7.4000	0.003
7.6000	0.006
7.8000	0.009
8.0000	0.012
8.2000	0.015
8.4000	0.019
8.6000	0.019
8.8000	0.022
9.0000	0.025
9.2000	0.025
9.4000	0.034
9.6000	0.031
9.8000	0.031
10.0000	0.034

END

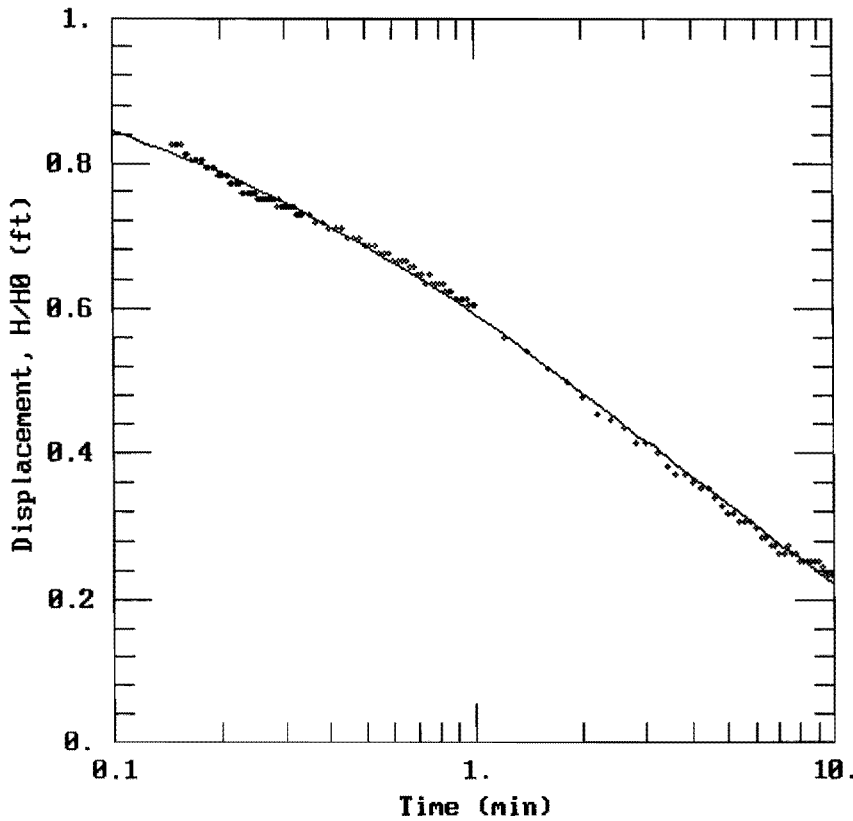
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-14 - SLUG IN



DATA SET:
MW14-IN.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
H₀ = 0.3 ft
r_c = 0.33 ft
r_w = 0.83 ft

PARAMETER ESTIMATES:
I = 0.007717 ft²/min
S = 0.1292

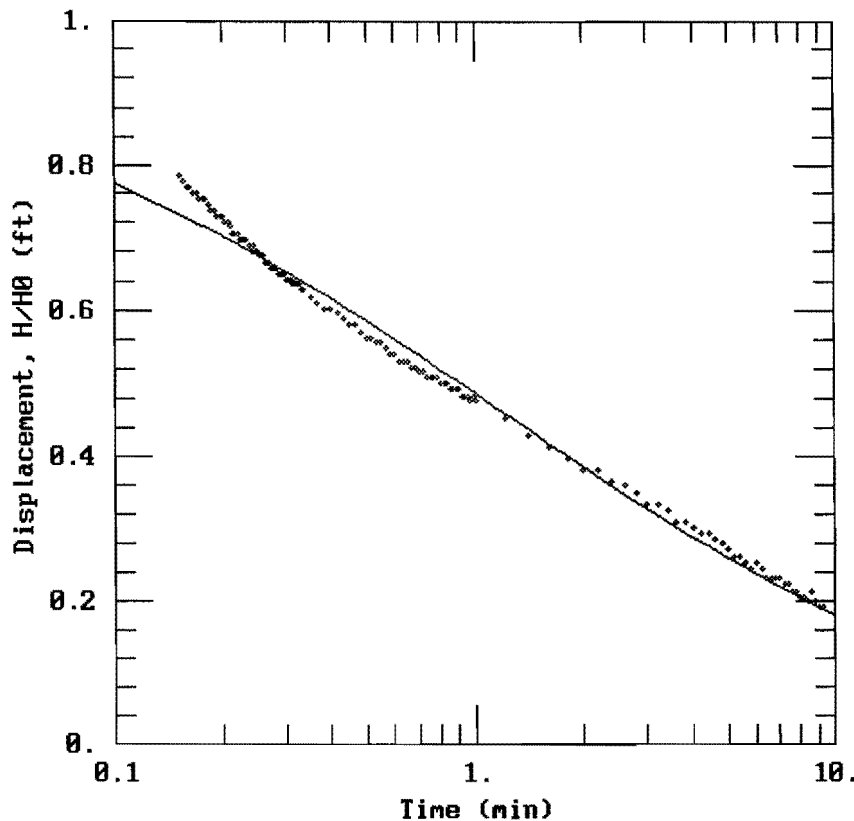
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-14 - SLUG OUT



DATA SET:
MW14-OUT.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
H0 = 0.4 ft
rc = 0.33 ft
rw = 0.83 ft

PARAMETER ESTIMATES:
I = 0.004986 ft²/min
S = 0.5

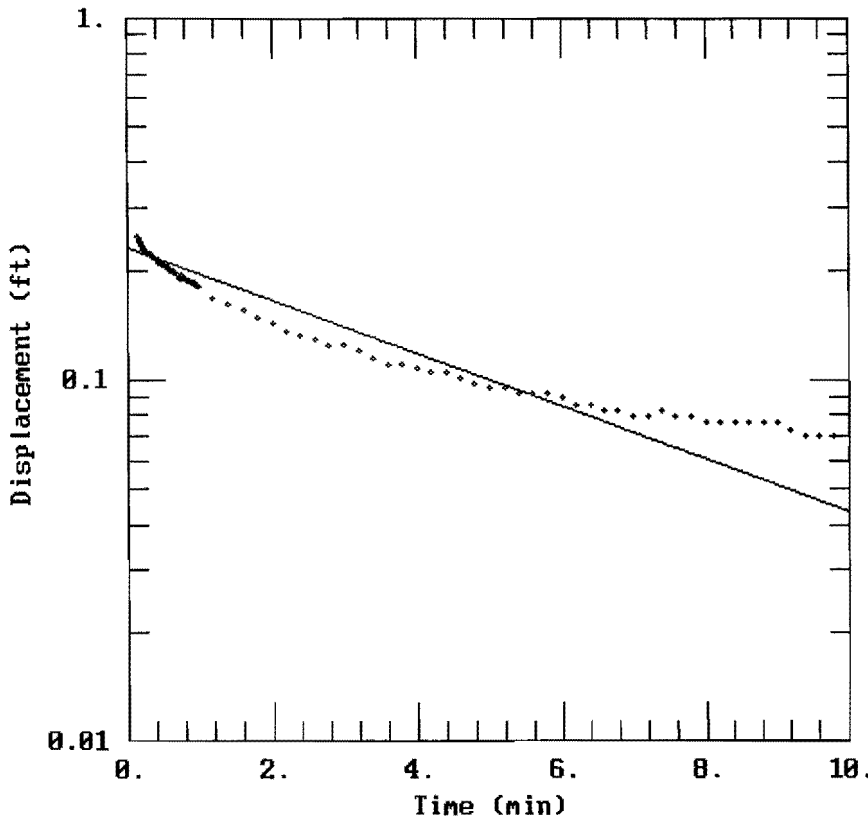
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-14 - SLUG IN



DATA SET:
MW14-IN.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.3$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001488$ ft/min
 $y_0 = 0.2313$ ft

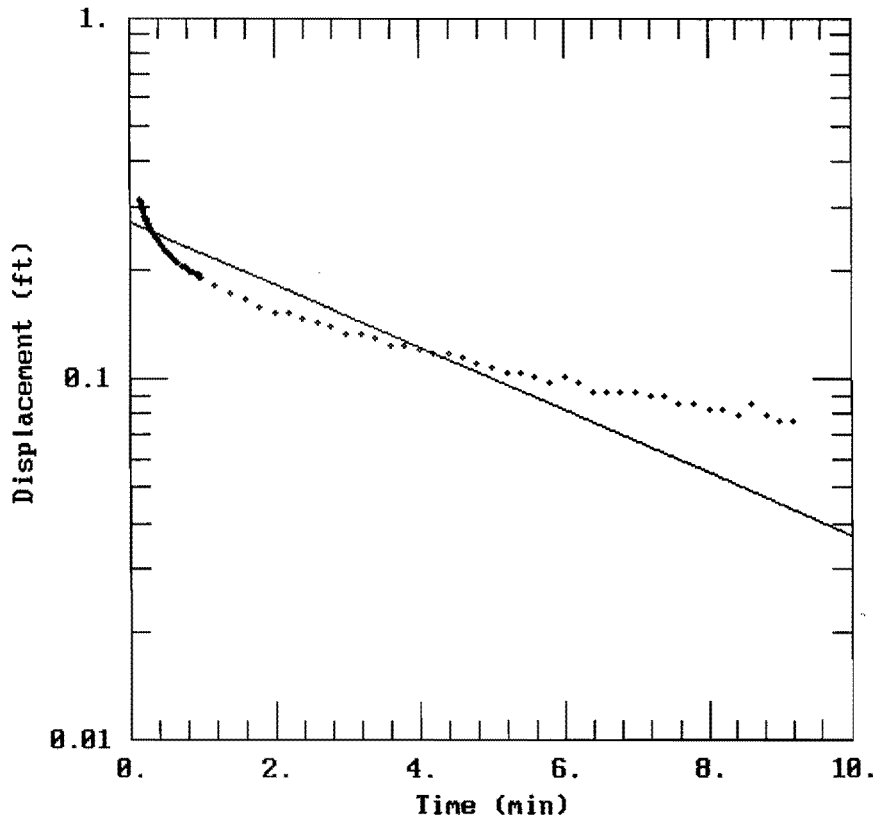
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-14 - SLUG OUT



DATA SET:
MW14-OUT.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001771$ ft/min
 $y_0 = 0.2716$ ft

MW-EDC-14 Sub In

SE1000C
Environmental Logger
03/04 15:57

Unit# 00000 Test 6

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00014

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 12:07:50

Elapsed Time INPUT 1

0.0000 -3.993
0.0033 -3.993
0.0066 -3.990
0.0100 -3.993
0.0133 -3.993
0.0166 -3.993
0.0200 -3.993
0.0233 -3.993
0.0266 -3.993
0.0300 -3.993
0.0333 -3.993
0.0366 -3.993
0.0400 -3.809
0.0433 -3.723
0.0466 -3.672
0.0500 -3.644
0.0533 -3.618
0.0566 -3.701
0.0600 -3.625
0.0633 -3.567
0.0666 -3.587
0.0700 -3.564
0.0733 -3.599
0.0766 -3.660
0.0800 -3.790
0.0833 -3.815
0.0866 -3.494
0.0900 -3.809
0.0933 -3.698
0.0966 -3.653
0.1000 -3.771

0.1033	-3.691
0.1066	-3.710
0.1100	-3.742
0.1133	-3.707
0.1166	-3.733
0.1200	-3.736
0.1233	-3.723
0.1266	-3.739
0.1300	-3.736
0.1333	-3.736
0.1366	-3.742
0.1400	-3.739
0.1433	-3.742
0.1466	-3.745
0.1500	-3.745
0.1533	-3.745
0.1566	-3.745
0.1600	-3.749
0.1633	-3.749
0.1666	-3.752
0.1700	-3.752
0.1733	-3.752
0.1766	-3.752
0.1800	-3.752
0.1833	-3.755
0.1866	-3.755
0.1900	-3.755
0.1933	-3.755
0.1966	-3.758
0.2000	-3.758
0.2033	-3.758
0.2066	-3.758
0.2100	-3.758
0.2133	-3.761
0.2166	-3.761
0.2200	-3.761
0.2233	-3.761
0.2266	-3.761
0.2300	-3.765
0.2333	-3.765
0.2366	-3.765
0.2400	-3.765
0.2433	-3.765
0.2466	-3.765
0.2500	-3.765
0.2533	-3.768
0.2566	-3.768
0.2600	-3.768
0.2633	-3.768
0.2666	-3.768
0.2700	-3.768
0.2733	-3.768
0.2766	-3.768
0.2800	-3.768

0.2833	-3.768
0.2866	-3.771
0.2900	-3.768
0.2933	-3.771
0.2966	-3.771
0.3000	-3.771
0.3033	-3.771
0.3066	-3.771
0.3100	-3.771
0.3133	-3.771
0.3166	-3.771
0.3200	-3.771
0.3233	-3.774
0.3266	-3.774
0.3300	-3.774
0.3333	-3.774
0.3500	-3.774
0.3666	-3.777
0.3833	-3.777
0.4000	-3.780
0.4166	-3.780
0.4333	-3.780
0.4500	-3.784
0.4666	-3.784
0.4833	-3.784
0.5000	-3.787
0.5166	-3.787
0.5333	-3.787
0.5500	-3.790
0.5666	-3.790
0.5833	-3.790
0.6000	-3.793
0.6166	-3.793
0.6333	-3.793
0.6500	-3.793
0.6666	-3.796
0.6833	-3.796
0.7000	-3.799
0.7166	-3.799
0.7333	-3.803
0.7500	-3.799
0.7666	-3.803
0.7833	-3.803
0.8000	-3.803
0.8166	-3.803
0.8333	-3.806
0.8500	-3.806
0.8666	-3.806
0.8833	-3.809
0.9000	-3.809
0.9166	-3.809
0.9333	-3.809
0.9500	-3.809
0.9666	-3.812

0.9833	-3.812
1.0000	-3.812
1.2000	-3.825
1.4000	-3.831
1.6000	-3.838
1.8000	-3.844
2.0000	-3.850
2.2000	-3.857
2.4000	-3.860
2.6000	-3.863
2.8000	-3.869
3.0000	-3.869
3.2000	-3.873
3.4000	-3.879
3.6000	-3.882
3.8000	-3.882
4.0000	-3.885
4.2000	-3.888
4.4000	-3.888
4.6000	-3.892
4.8000	-3.895
5.0000	-3.898
5.2000	-3.898
5.4000	-3.901
5.6000	-3.901
5.8000	-3.901
6.0000	-3.904
6.2000	-3.908
6.4000	-3.908
6.6000	-3.911
6.8000	-3.911
7.0000	-3.914
7.2000	-3.914
7.4000	-3.911
7.6000	-3.914
7.8000	-3.914
8.0000	-3.917
8.2000	-3.917
8.4000	-3.917
8.6000	-3.917
8.8000	-3.917
9.0000	-3.917
9.2000	-3.920
9.4000	-3.923
9.6000	-3.923
9.8000	-3.923
10.0000	-3.923

END

MW - EDC-14 SLOUT OUT

SE1000C
Environmental Logger
03/04 16:01

Unit# 00000 Test 7

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00014

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 12:18:42

Elapsed Time INPUT 1

0.0000 -3.927
0.0033 -3.930
0.0066 -4.174
0.0100 -4.381
0.0133 -4.216
0.0166 -3.952
0.0200 -3.739
0.0233 -4.346
0.0266 -4.073
0.0300 -4.467
0.0333 -4.311
0.0366 -4.267
0.0400 -4.371
0.0433 -4.273
0.0466 -4.311
0.0500 -4.298
0.0533 -4.295
0.0566 -4.302
0.0600 -4.295
0.0633 -4.298
0.0666 -4.295
0.0700 -4.292
0.0733 -4.289
0.0766 -4.289
0.0800 -4.286
0.0833 -4.286
0.0866 -4.282
0.0900 -4.279
0.0933 -4.276
0.0966 -4.276
0.1000 -4.273
0.1033 -4.270
0.1066 -4.270
0.1100 -4.267
0.1133 -4.267
0.1166 -4.263
0.1200 -4.260

0.1233	-4.260
0.1266	-4.257
0.1300	-4.254
0.1333	-4.254
0.1366	-4.251
0.1400	-4.251
0.1433	-4.247
0.1466	-4.244
0.1500	-4.244
0.1533	-4.241
0.1566	-4.238
0.1600	-4.235
0.1633	-4.235
0.1666	-4.232
0.1700	-4.232
0.1733	-4.228
0.1766	-4.228
0.1800	-4.228
0.1833	-4.225
0.1866	-4.222
0.1900	-4.222
0.1933	-4.219
0.1966	-4.219
0.2000	-4.219
0.2033	-4.216
0.2066	-4.216
0.2100	-4.213
0.2133	-4.209
0.2166	-4.209
0.2200	-4.209
0.2233	-4.206
0.2266	-4.206
0.2300	-4.206
0.2333	-4.206
0.2366	-4.203
0.2400	-4.200
0.2433	-4.203
0.2466	-4.200
0.2500	-4.200
0.2533	-4.197
0.2566	-4.197
0.2600	-4.197
0.2633	-4.193
0.2666	-4.193
0.2700	-4.193
0.2733	-4.190
0.2766	-4.190
0.2800	-4.190
0.2833	-4.190
0.2866	-4.187
0.2900	-4.187
0.2933	-4.187
0.2966	-4.187
0.3000	-4.184

0.3033	-4.184
0.3066	-4.184
0.3100	-4.184
0.3133	-4.181
0.3166	-4.181
0.3200	-4.181
0.3233	-4.181
0.3266	-4.181
0.3300	-4.178
0.3333	-4.178
0.3500	-4.174
0.3666	-4.171
0.3833	-4.168
0.4000	-4.168
0.4166	-4.165
0.4333	-4.162
0.4500	-4.159
0.4666	-4.159
0.4833	-4.155
0.5000	-4.152
0.5166	-4.152
0.5333	-4.149
0.5500	-4.149
0.5666	-4.146
0.5833	-4.143
0.6000	-4.143
0.6166	-4.139
0.6333	-4.139
0.6500	-4.139
0.6666	-4.136
0.6833	-4.136
0.7000	-4.133
0.7166	-4.133
0.7333	-4.130
0.7500	-4.130
0.7666	-4.130
0.7833	-4.130
0.8000	-4.127
0.8166	-4.127
0.8333	-4.127
0.8500	-4.124
0.8666	-4.124
0.8833	-4.124
0.9000	-4.124
0.9166	-4.120
0.9333	-4.120
0.9500	-4.120
0.9666	-4.117
0.9833	-4.120
1.0000	-4.117
1.2000	-4.108
1.4000	-4.098
1.6000	-4.092
1.8000	-4.085

2.0000	-4.079
2.2000	-4.079
2.4000	-4.073
2.6000	-4.070
2.8000	-4.066
3.0000	-4.060
3.2000	-4.060
3.4000	-4.057
3.6000	-4.050
3.8000	-4.050
4.0000	-4.047
4.2000	-4.044
4.4000	-4.044
4.6000	-4.041
4.8000	-4.038
5.0000	-4.035
5.2000	-4.031
5.4000	-4.031
5.6000	-4.028
5.8000	-4.025
6.0000	-4.028
6.2000	-4.025
6.4000	-4.019
6.6000	-4.019
6.8000	-4.019
7.0000	-4.019
7.2000	-4.016
7.4000	-4.016
7.6000	-4.012
7.8000	-4.012
8.0000	-4.009
8.2000	-4.009
8.4000	-4.006
8.6000	-4.012
8.8000	-4.006
9.0000	-4.003
9.2000	-4.003
9.4000	-4.000
9.6000	-4.000
9.8000	-4.000
10.0000	-4.000

END

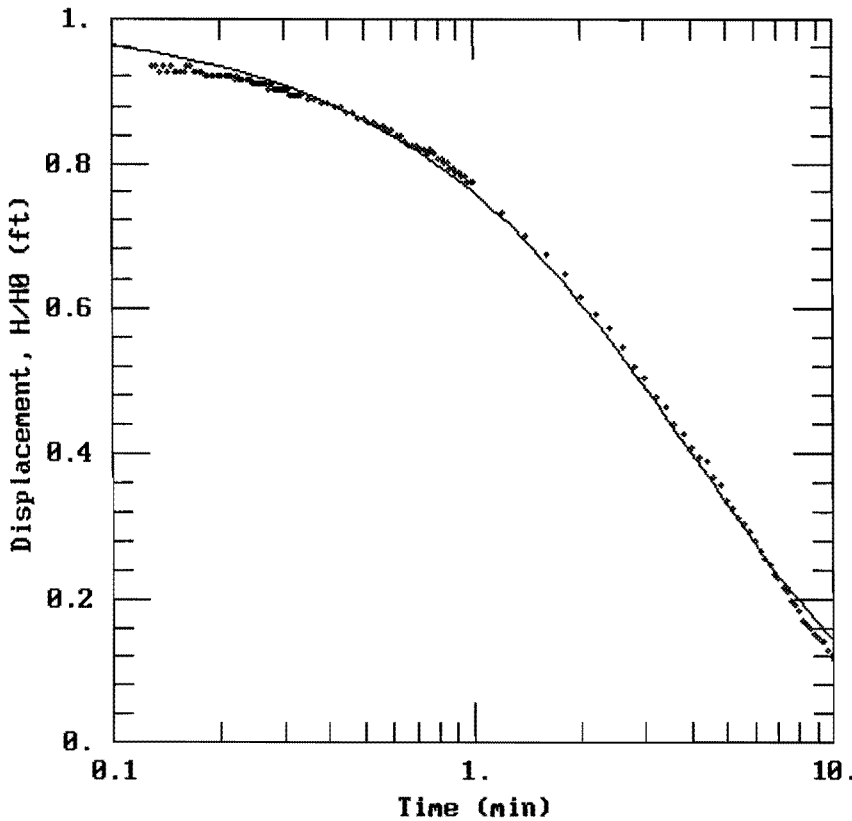
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-15 - SLUG IN



DATA SET:
MW15-IN.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.5$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.06909$ ft²/min
 $S = 1.E-05$

AQTESOLV

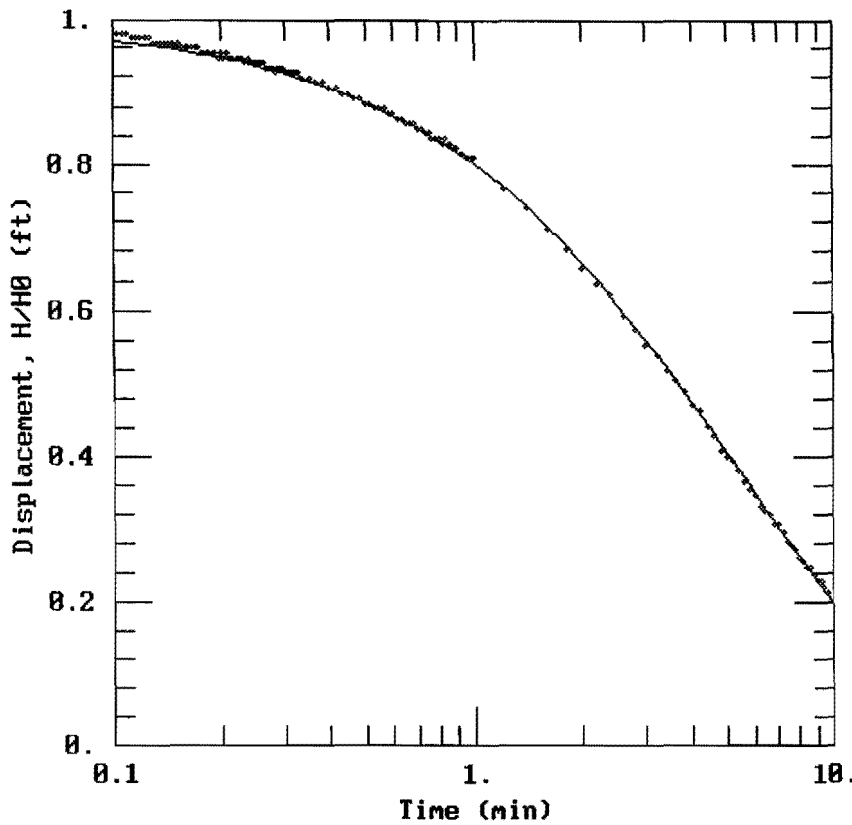
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-15 - SLUG OUT



DATA SET:
MW15-OUT.DAT
03/22/99

AQUIFER MODEL:
Confined

SOLUTION METHOD:
Cooper et al.

TEST DATA:
H0 = 0.46 ft
rc = 0.33 ft
rw = 0.83 ft

PARAMETER ESTIMATES:
T = 0.05434 ft²/min
S = 1.E-05

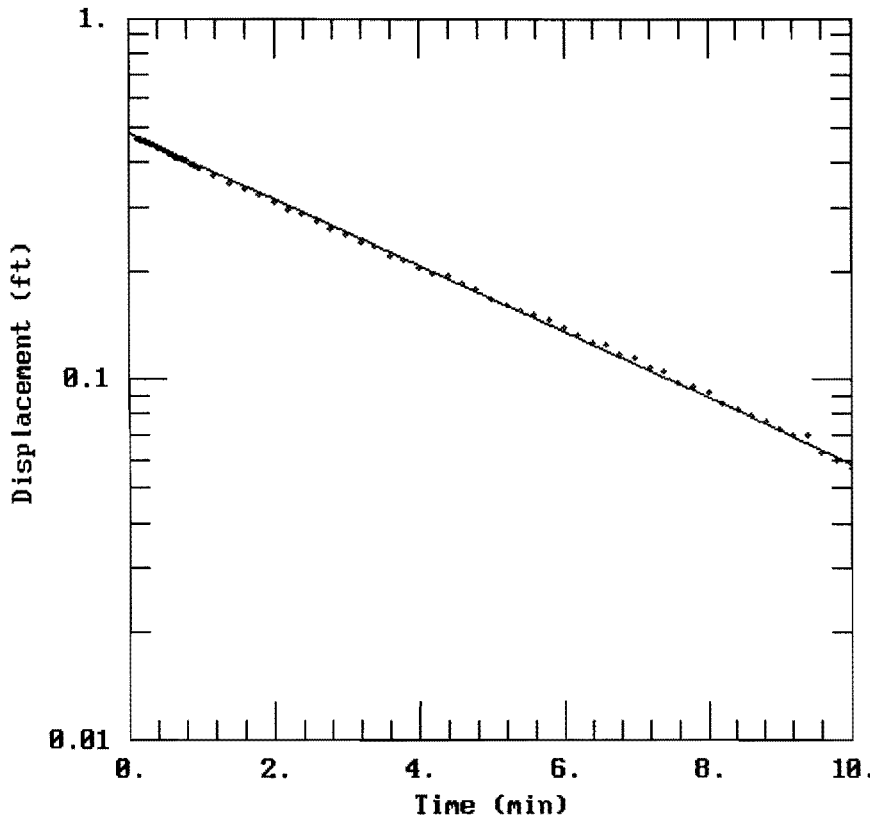
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-15 - SLUG IN



DATA SET:
MW15-IN.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.5$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001877$ ft/min
 $y_0 = 0.4796$ ft

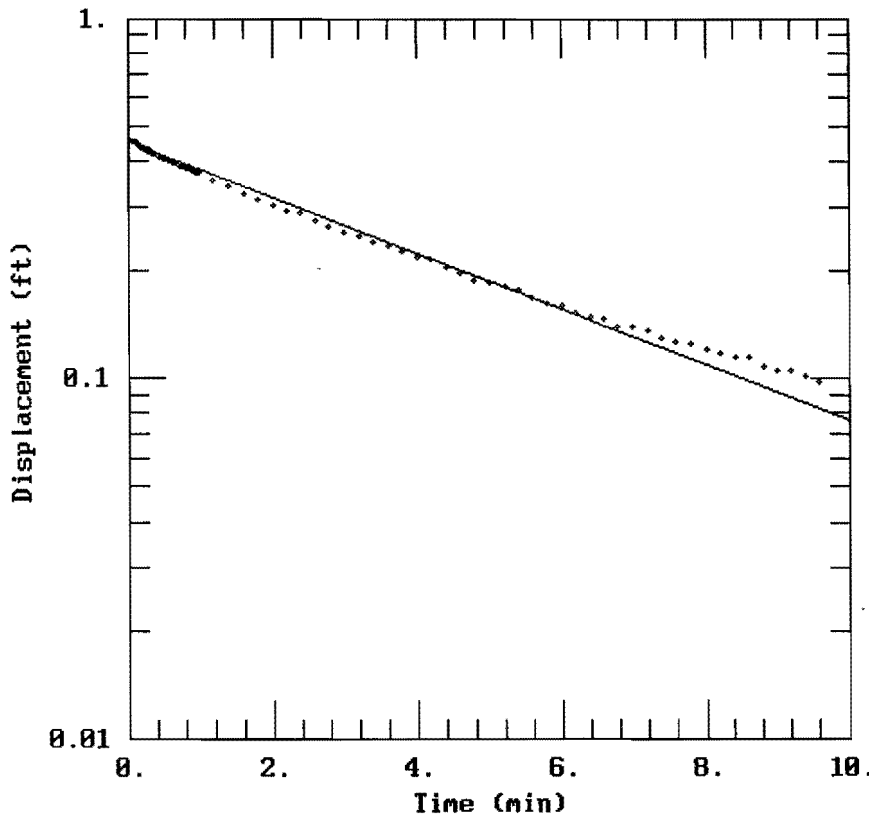
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-15 - SLUG OUT



DATA SET:
MW15-OUT.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.46$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0001575$ ft/min
 $y_0 = 0.4507$ ft

MW-EDC-15 SLUG IN

SE1000C
Environmental Logger
03/04 14:07

Unit# 00000 Test 4

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00015

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 11:35:18

Elapsed Time INPUT 1

0.0000 -0.003
0.0033 -0.006
0.0066 -0.035
0.0100 0.066
0.0133 0.041
0.0166 0.082
0.0200 0.130
0.0233 0.155
0.0266 0.210
0.0300 0.136
0.0333 0.480
0.0366 0.210
0.0400 0.455
0.0433 0.124
0.0466 0.334
0.0500 0.582
0.0533 0.515
0.0566 0.569
0.0600 0.353
0.0633 0.471
0.0666 0.499
0.0700 0.550
0.0733 0.566
0.0766 0.560
0.0800 0.534
0.0833 0.531
0.0866 0.509
0.0900 0.537
0.0933 0.560
0.0966 0.474
0.1000 0.451

0.1033	0.451
0.1066	0.480
0.1100	0.630
0.1133	0.547
0.1166	0.458
0.1200	0.474
0.1233	0.464
0.1266	0.471
0.1300	0.467
0.1333	0.467
0.1366	0.464
0.1400	0.467
0.1433	0.464
0.1466	0.467
0.1500	0.464
0.1533	0.464
0.1566	0.464
0.1600	0.464
0.1633	0.467
0.1666	0.467
0.1700	0.464
0.1733	0.464
0.1766	0.464
0.1800	0.464
0.1833	0.461
0.1866	0.461
0.1900	0.461
0.1933	0.461
0.1966	0.461
0.2000	0.461
0.2033	0.461
0.2066	0.461
0.2100	0.461
0.2133	0.461
0.2166	0.461
0.2200	0.458
0.2233	0.461
0.2266	0.458
0.2300	0.458
0.2333	0.458
0.2366	0.458
0.2400	0.458
0.2433	0.458
0.2466	0.455
0.2500	0.455
0.2533	0.455
0.2566	0.455
0.2600	0.455
0.2633	0.455
0.2666	0.455
0.2700	0.455
0.2733	0.451
0.2766	0.455
0.2800	0.455

0.2833	0.451
0.2866	0.451
0.2900	0.451
0.2933	0.451
0.2966	0.451
0.3000	0.451
0.3033	0.451
0.3066	0.451
0.3100	0.448
0.3133	0.448
0.3166	0.448
0.3200	0.448
0.3233	0.448
0.3266	0.448
0.3300	0.448
0.3333	0.448
0.3500	0.445
0.3666	0.445
0.3833	0.442
0.4000	0.442
0.4166	0.439
0.4333	0.439
0.4500	0.436
0.4666	0.436
0.4833	0.432
0.5000	0.432
0.5166	0.429
0.5333	0.429
0.5500	0.426
0.5666	0.426
0.5833	0.423
0.6000	0.423
0.6166	0.420
0.6333	0.420
0.6500	0.416
0.6666	0.413
0.6833	0.413
0.7000	0.413
0.7166	0.410
0.7333	0.410
0.7500	0.407
0.7666	0.410
0.7833	0.407
0.8000	0.404
0.8166	0.404
0.8333	0.401
0.8500	0.401
0.8666	0.397
0.8833	0.397
0.9000	0.394
0.9166	0.394
0.9333	0.391
0.9500	0.391
0.9666	0.388

0.9833	0.388
1.0000	0.388
1.2000	0.366
1.4000	0.350
1.6000	0.337
1.8000	0.324
2.0000	0.308
2.2000	0.296
2.4000	0.286
2.6000	0.273
2.8000	0.260
3.0000	0.251
3.2000	0.238
3.4000	0.232
3.6000	0.219
3.8000	0.213
4.0000	0.203
4.2000	0.197
4.4000	0.194
4.6000	0.184
4.8000	0.178
5.0000	0.168
5.2000	0.162
5.4000	0.155
5.6000	0.152
5.8000	0.146
6.0000	0.140
6.2000	0.133
6.4000	0.127
6.6000	0.124
6.8000	0.117
7.0000	0.114
7.2000	0.108
7.4000	0.105
7.6000	0.098
7.8000	0.095
8.0000	0.092
8.2000	0.085
8.4000	0.082
8.6000	0.079
8.8000	0.076
9.0000	0.073
9.2000	0.070
9.4000	0.070
9.6000	0.063
9.8000	0.060
10.0000	0.057

END

MW-EDC-15 SLUG OUT

SE1000C
Environmental Logger
03/04 15:51

Unit# 00000 Test 5

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00015

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 11:46:25

Elapsed Time INPUT 1

0.0000 0.044
0.0033 0.009
0.0066 -0.372
0.0100 -0.388
0.0133 -0.047
0.0166 -0.241
0.0200 0.098
0.0233 -0.184
0.0266 0.541
0.0300 -0.181
0.0333 -0.162
0.0366 -0.273
0.0400 -0.311
0.0433 -0.429
0.0466 -0.537
0.0500 -0.413
0.0533 -0.470
0.0566 -0.461
0.0600 -0.451
0.0633 -0.461
0.0666 -0.455
0.0700 -0.455
0.0733 -0.455
0.0766 -0.455
0.0800 -0.455
0.0833 -0.451
0.0866 -0.455
0.0900 -0.455
0.0933 -0.451
0.0966 -0.451
0.1000 -0.451
0.1033 -0.451
0.1066 -0.451
0.1100 -0.451
0.1133 -0.448
0.1166 -0.448
0.1200 -0.448

0.1233	-0.448
0.1266	-0.448
0.1300	-0.445
0.1333	-0.445
0.1366	-0.445
0.1400	-0.445
0.1433	-0.445
0.1466	-0.445
0.1500	-0.442
0.1533	-0.445
0.1566	-0.442
0.1600	-0.442
0.1633	-0.442
0.1666	-0.442
0.1700	-0.442
0.1733	-0.442
0.1766	-0.439
0.1800	-0.439
0.1833	-0.439
0.1866	-0.439
0.1900	-0.439
0.1933	-0.439
0.1966	-0.435
0.2000	-0.439
0.2033	-0.435
0.2066	-0.439
0.2100	-0.435
0.2133	-0.435
0.2166	-0.435
0.2200	-0.435
0.2233	-0.435
0.2266	-0.435
0.2300	-0.435
0.2333	-0.432
0.2366	-0.435
0.2400	-0.432
0.2433	-0.432
0.2466	-0.432
0.2500	-0.432
0.2533	-0.432
0.2566	-0.432
0.2600	-0.432
0.2633	-0.432
0.2666	-0.429
0.2700	-0.429
0.2733	-0.429
0.2766	-0.429
0.2800	-0.429
0.2833	-0.426
0.2866	-0.429
0.2900	-0.429
0.2933	-0.429
0.2966	-0.429
0.3000	-0.426

0.3033	-0.426
0.3066	-0.426
0.3100	-0.426
0.3133	-0.426
0.3166	-0.426
0.3200	-0.426
0.3233	-0.426
0.3266	-0.426
0.3300	-0.423
0.3333	-0.423
0.3500	-0.423
0.3666	-0.420
0.3833	-0.420
0.4000	-0.416
0.4166	-0.416
0.4333	-0.413
0.4500	-0.413
0.4666	-0.410
0.4833	-0.410
0.5000	-0.407
0.5166	-0.407
0.5333	-0.404
0.5500	-0.404
0.5666	-0.404
0.5833	-0.400
0.6000	-0.400
0.6166	-0.397
0.6333	-0.397
0.6500	-0.394
0.6666	-0.394
0.6833	-0.394
0.7000	-0.391
0.7166	-0.391
0.7333	-0.388
0.7500	-0.388
0.7666	-0.385
0.7833	-0.385
0.8000	-0.385
0.8166	-0.381
0.8333	-0.385
0.8500	-0.381
0.8666	-0.381
0.8833	-0.378
0.9000	-0.378
0.9166	-0.375
0.9333	-0.375
0.9500	-0.372
0.9666	-0.372
0.9833	-0.372
1.0000	-0.372
1.2000	-0.353
1.4000	-0.340
1.6000	-0.327
1.8000	-0.315

2.0000	-0.302
2.2000	-0.292
2.4000	-0.286
2.6000	-0.273
2.8000	-0.264
3.0000	-0.254
3.2000	-0.248
3.4000	-0.238
3.6000	-0.232
3.8000	-0.225
4.0000	-0.216
4.2000	-0.213
4.4000	-0.203
4.6000	-0.197
4.8000	-0.187
5.0000	-0.184
5.2000	-0.181
5.4000	-0.175
5.6000	-0.168
5.8000	-0.162
6.0000	-0.159
6.2000	-0.152
6.4000	-0.149
6.6000	-0.146
6.8000	-0.140
7.0000	-0.140
7.2000	-0.136
7.4000	-0.130
7.6000	-0.127
7.8000	-0.124
8.0000	-0.120
8.2000	-0.117
8.4000	-0.114
8.6000	-0.114
8.8000	-0.108
9.0000	-0.105
9.2000	-0.105
9.4000	-0.101
9.6000	-0.098
9.8000	-0.092
10.0000	-0.092

END

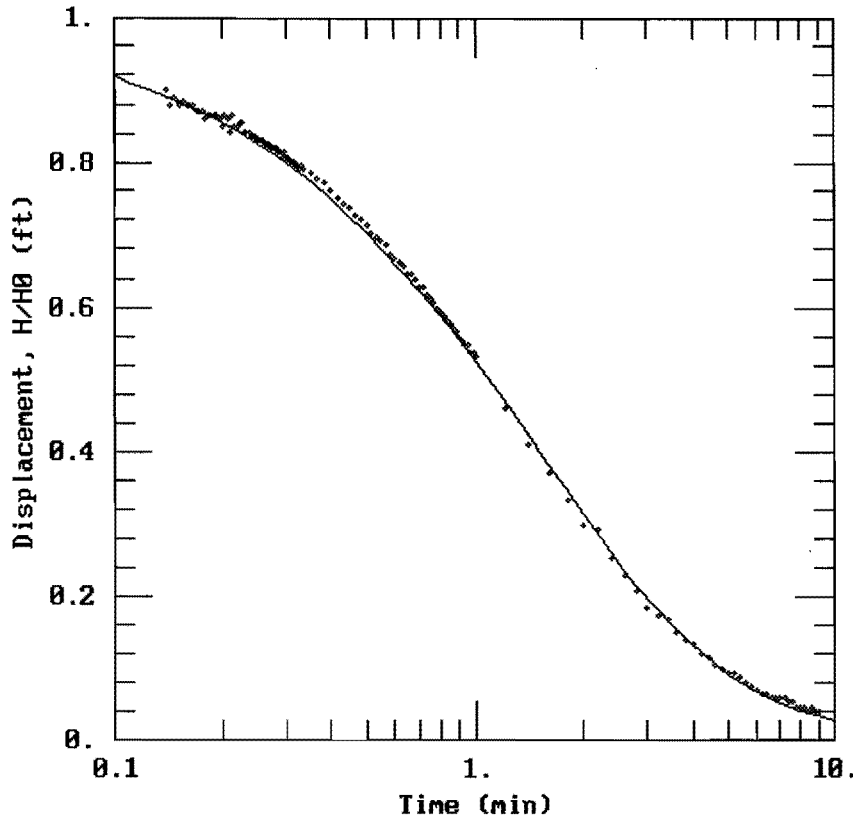
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-16 - SLUG IN



DATA SET:
MW16-IN.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.55$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.1836$ ft²/min
 $S = 1.E-05$

AQTESOLV

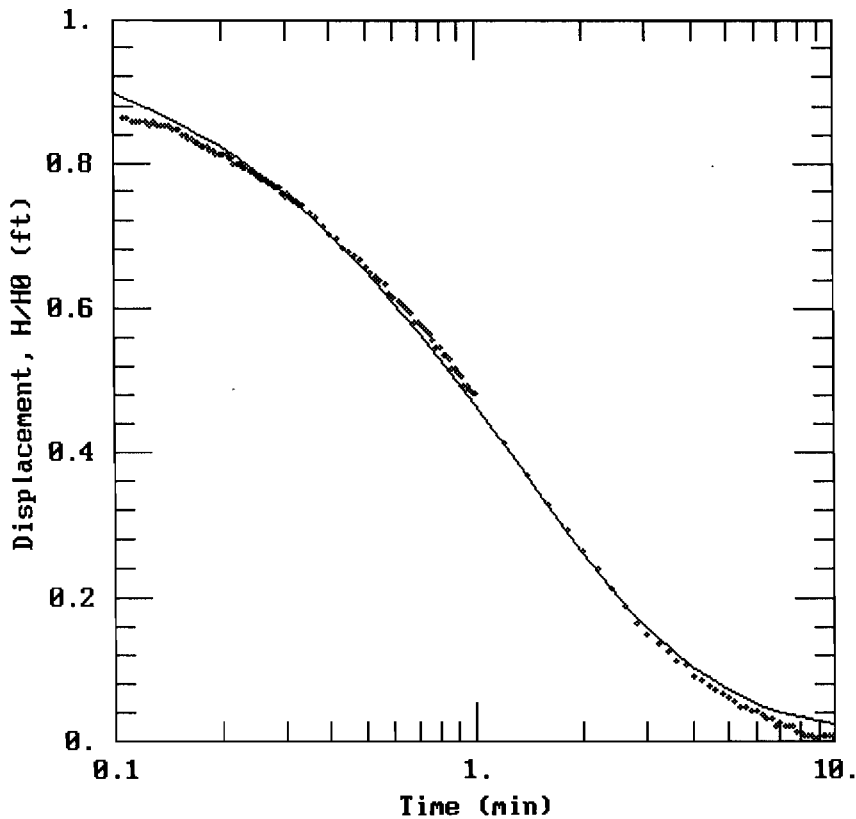
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-16 - SLUG OUT



DATA SET:
MW16-OUT.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.55$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.1873$ ft²/min
 $S = 5.101E-05$

AQTESOLV

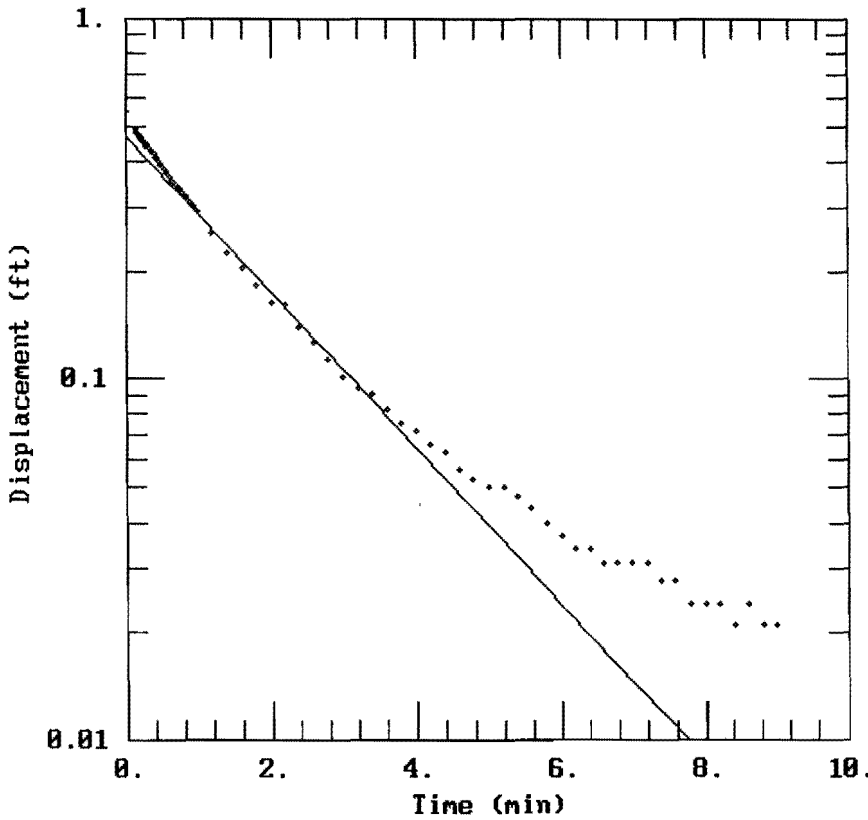
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-16 - SLUG IN



DATA SET:
MW16-IN.DAT
03/22/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.55$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.0004408$ ft/min
 $y_0 = 0.4703$ ft

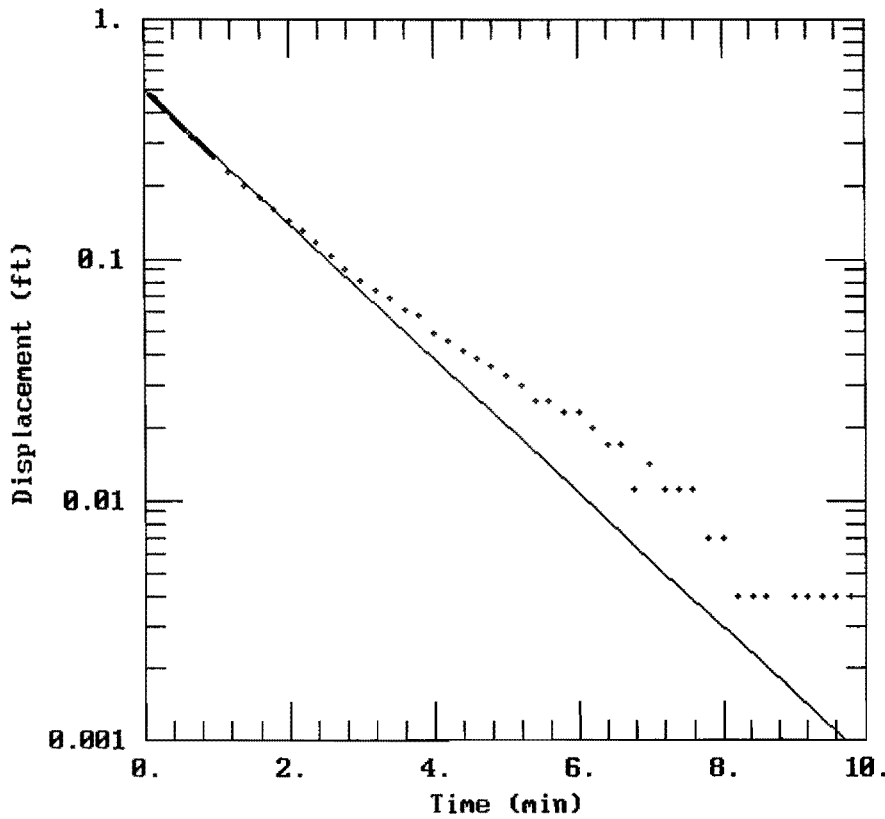
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-16 - SLUG OUT



DATA SET:
MW16-OUT.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
H₀ = 0.55 ft
r_c = 0.33 ft
r_w = 0.83 ft
L = 10. ft
b = 10. ft
H = 1. ft

PARAMETER ESTIMATES:
K = 0.0005701 ft/min
y₀ = 0.5057 ft

MW-EDC - 16 SUB IN

SE1000C
Environmental Logger
03/04 15:45

Unit# 00000 Test 2

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00016

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 11:02:53

Elapsed Time INPUT 1

0.0000 5.085
0.0033 5.085
0.0066 5.085
0.0100 5.085
0.0133 5.082
0.0166 5.082
0.0200 5.089
0.0233 5.085
0.0266 5.085
0.0300 5.085
0.0333 5.085
0.0366 5.085
0.0400 5.089
0.0433 5.311
0.0466 5.197
0.0500 5.289
0.0533 5.416
0.0566 5.451
0.0600 5.470
0.0633 5.493
0.0666 5.594
0.0700 5.607
0.0733 5.508
0.0766 5.677
0.0800 5.623
0.0833 5.613
0.0866 5.639
0.0900 5.623
0.0933 5.648
0.0966 5.626
0.1000 5.652
0.1033 5.629

0.1066	5.547
0.1100	5.550
0.1133	5.547
0.1166	5.515
0.1200	5.553
0.1233	5.556
0.1266	5.578
0.1300	5.690
0.1333	5.559
0.1366	5.566
0.1400	5.575
0.1433	5.563
0.1466	5.569
0.1500	5.566
0.1533	5.563
0.1566	5.566
0.1600	5.563
0.1633	5.563
0.1666	5.563
0.1700	5.559
0.1733	5.559
0.1766	5.559
0.1800	5.553
0.1833	5.556
0.1866	5.556
0.1900	5.556
0.1933	5.556
0.1966	5.553
0.2000	5.547
0.2033	5.556
0.2066	5.553
0.2100	5.543
0.2133	5.556
0.2166	5.547
0.2200	5.547
0.2233	5.550
0.2266	5.550
0.2300	5.543
0.2333	5.543
0.2366	5.543
0.2400	5.540
0.2433	5.540
0.2466	5.540
0.2500	5.537
0.2533	5.537
0.2566	5.537
0.2600	5.537
0.2633	5.534
0.2666	5.534
0.2700	5.534
0.2733	5.531
0.2766	5.531
0.2800	5.531
0.2833	5.531

0.2866	5.528
0.2900	5.528
0.2933	5.524
0.2966	5.528
0.3000	5.524
0.3033	5.524
0.3066	5.521
0.3100	5.521
0.3133	5.521
0.3166	5.521
0.3200	5.518
0.3233	5.518
0.3266	5.515
0.3300	5.518
0.3333	5.515
0.3500	5.512
0.3666	5.508
0.3833	5.505
0.4000	5.499
0.4166	5.493
0.4333	5.489
0.4500	5.486
0.4666	5.480
0.4833	5.477
0.5000	5.473
0.5166	5.467
0.5333	5.464
0.5500	5.461
0.5666	5.458
0.5833	5.451
0.6000	5.448
0.6166	5.445
0.6333	5.442
0.6500	5.435
0.6666	5.435
0.6833	5.432
0.7000	5.426
0.7166	5.426
0.7333	5.419
0.7500	5.416
0.7666	5.413
0.7833	5.410
0.8000	5.407
0.8166	5.403
0.8333	5.400
0.8500	5.397
0.8666	5.394
0.8833	5.391
0.9000	5.388
0.9166	5.384
0.9333	5.381
0.9500	5.381
0.9666	5.375
0.9833	5.375

1.0000	5.372
1.2000	5.333
1.4000	5.305
1.6000	5.283
1.8000	5.263
2.0000	5.244
2.2000	5.241
2.4000	5.219
2.6000	5.206
2.8000	5.193
3.0000	5.181
3.2000	5.174
3.4000	5.171
3.6000	5.162
3.8000	5.155
4.0000	5.152
4.2000	5.146
4.4000	5.143
4.6000	5.136
4.8000	5.133
5.0000	5.130
5.2000	5.130
5.4000	5.127
5.6000	5.124
5.8000	5.120
6.0000	5.117
6.2000	5.114
6.4000	5.114
6.6000	5.111
6.8000	5.111
7.0000	5.111
7.2000	5.111
7.4000	5.108
7.6000	5.108
7.8000	5.104
8.0000	5.104
8.2000	5.104
8.4000	5.101
8.6000	5.104
8.8000	5.101
9.0000	5.101

END

SE1000C

Environmental Logger

03/04 14:05

Unit# 00000 Test 3

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00016

MW-EDG-16

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 11:12:33

Elapsed Time INPUT 1

```
-----  
0.0000 4.580  
0.0033 4.977  
0.0066 5.041  
0.0100 4.961  
0.0133 4.592  
0.0166 5.318  
0.0200 4.602  
0.0233 5.493  
0.0266 4.770  
0.0300 4.678  
0.0333 4.774  
0.0366 4.681  
0.0400 4.576  
0.0433 4.611  
0.0466 4.595  
0.0500 4.532  
0.0533 4.551  
0.0566 4.564  
0.0600 4.570  
0.0633 4.570  
0.0666 4.570  
0.0700 4.576  
0.0733 4.580  
0.0766 4.583  
0.0800 4.586  
0.0833 4.589  
0.0866 4.592  
0.0900 4.595  
0.0933 4.595  
0.0966 4.599  
0.1000 4.602  
0.1033 4.602  
0.1066 4.605  
0.1100 4.605  
0.1133 4.608  
0.1166 4.608  
0.1200 4.608  
0.1233 4.608  
0.1266 4.611  
0.1300 4.608  
0.1333 4.611  
0.1366 4.611  
0.1400 4.611  
0.1433 4.611
```

0.1466	4.615
0.1500	4.615
0.1533	4.615
0.1566	4.618
0.1600	4.618
0.1633	4.621
0.1666	4.621
0.1700	4.624
0.1733	4.624
0.1766	4.627
0.1800	4.627
0.1833	4.627
0.1866	4.630
0.1900	4.630
0.1933	4.634
0.1966	4.634
0.2000	4.634
0.2033	4.634
0.2066	4.634
0.2100	4.637
0.2133	4.637
0.2166	4.640
0.2200	4.640
0.2233	4.640
0.2266	4.640
0.2300	4.643
0.2333	4.643
0.2366	4.643
0.2400	4.646
0.2433	4.646
0.2466	4.646
0.2500	4.650
0.2533	4.650
0.2566	4.653
0.2600	4.653
0.2633	4.653
0.2666	4.653
0.2700	4.656
0.2733	4.656
0.2766	4.656
0.2800	4.659
0.2833	4.659
0.2866	4.659
0.2900	4.659
0.2933	4.662
0.2966	4.662
0.3000	4.665
0.3033	4.662
0.3066	4.665
0.3100	4.665
0.3133	4.665
0.3166	4.669
0.3200	4.669
0.3233	4.669

0.3266	4.672
0.3300	4.672
0.3333	4.672
0.3500	4.678
0.3666	4.681
0.3833	4.688
0.4000	4.694
0.4166	4.697
0.4333	4.704
0.4500	4.707
0.4666	4.710
0.4833	4.713
0.5000	4.719
0.5166	4.723
0.5333	4.726
0.5500	4.729
0.5666	4.732
0.5833	4.739
0.6000	4.742
0.6166	4.745
0.6333	4.748
0.6500	4.751
0.6666	4.754
0.6833	4.761
0.7000	4.761
0.7166	4.764
0.7333	4.767
0.7500	4.770
0.7666	4.774
0.7833	4.780
0.8000	4.780
0.8166	4.786
0.8333	4.786
0.8500	4.789
0.8666	4.796
0.8833	4.796
0.9000	4.799
0.9166	4.802
0.9333	4.809
0.9500	4.809
0.9666	4.812
0.9833	4.815
1.0000	4.815
1.2000	4.853
1.4000	4.879
1.6000	4.901
1.8000	4.920
2.0000	4.936
2.2000	4.949
2.4000	4.964
2.6000	4.977
2.8000	4.990
3.0000	4.999
3.2000	5.006

3.4000	5.012
3.6000	5.019
3.8000	5.022
4.0000	5.031
4.2000	5.034
4.4000	5.038
4.6000	5.041
4.8000	5.044
5.0000	5.047
5.2000	5.050
5.4000	5.054
5.6000	5.054
5.8000	5.057
6.0000	5.057
6.2000	5.060
6.4000	5.063
6.6000	5.063
6.8000	5.069
7.0000	5.066
7.2000	5.069
7.4000	5.069
7.6000	5.069
7.8000	5.073
8.0000	5.073
8.2000	5.076
8.4000	5.076
8.6000	5.076
8.8000	5.079
9.0000	5.076
9.2000	5.076
9.4000	5.076
9.6000	5.076
9.8000	5.076
10.0000	5.079

END

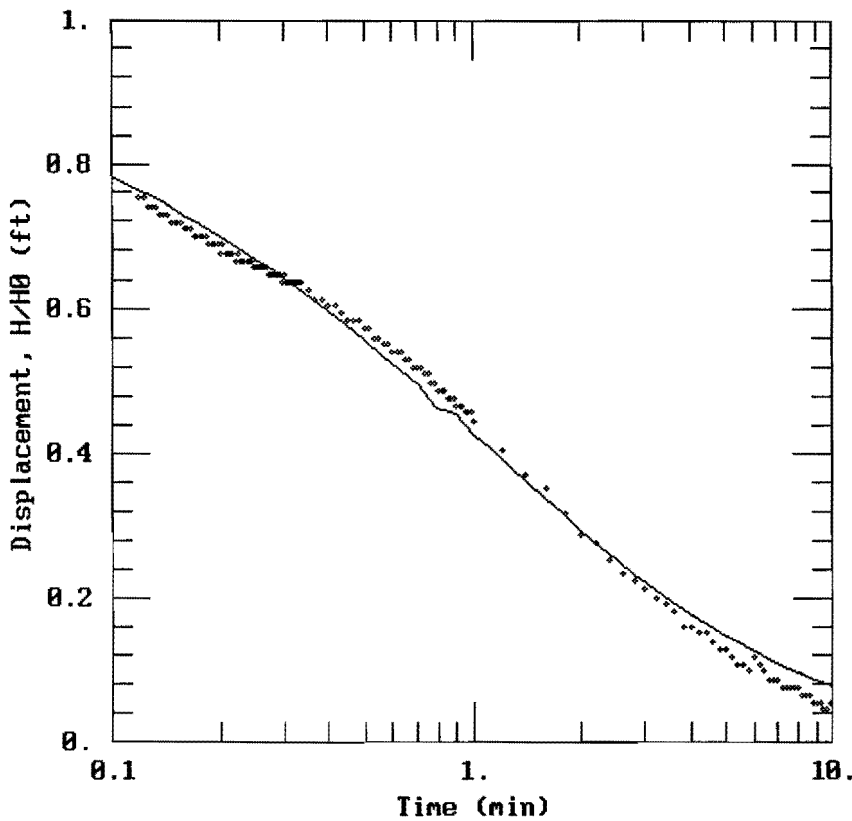
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-17 - SLUG IN



DATA SET:
MW17-IN.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
 $H_0 = 0.3$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft

PARAMETER ESTIMATES:
 $T = 0.04278$ ft²/min
 $S = 0.0401$

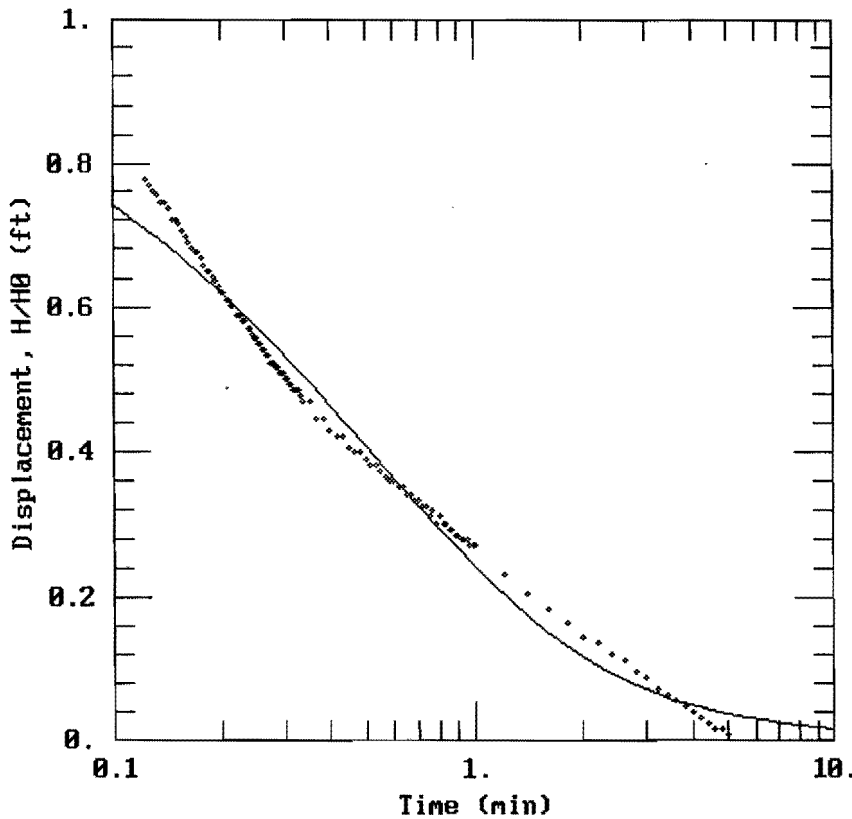
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-17 - SLUG OUT



DATA SET:
MW17-OUT.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Cooper et al.

TEST DATA:
H0 = 0.4 ft
rc = 0.33 ft
rw = 0.83 ft

PARAMETER ESTIMATES:
T = 0.2103 ft²/min
S = 0.00429

AQTESOLV

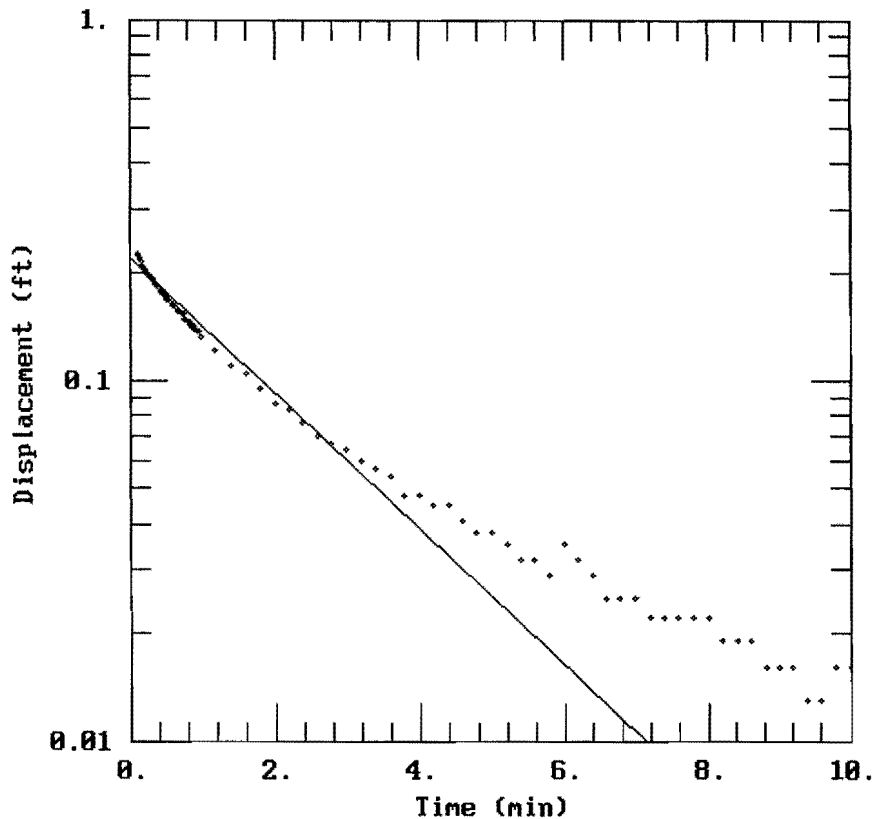
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-17 - SLUG IN



DATA SET:
MW17-IN.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bower-Rice

TEST DATA:
 $H_0 = 0.3$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.000384$ ft/min
 $y_0 = 0.2205$ ft

AQTESOLV

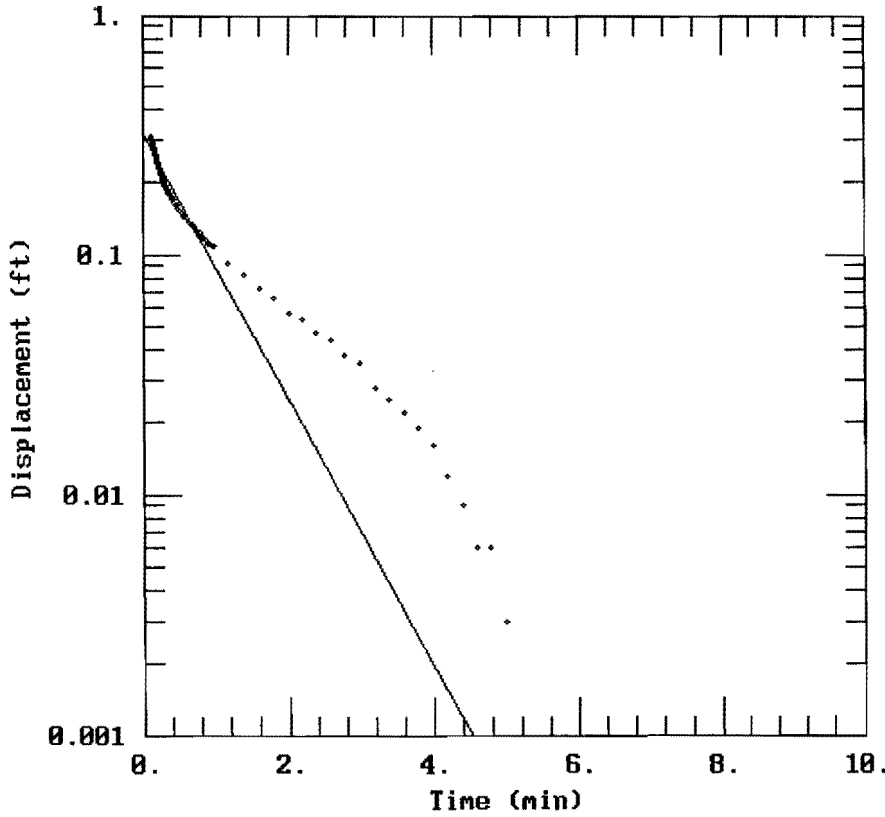
CLIENT: ELDORADO CHEMICAL COMPANY

COMPANY: ELDORADO CHEMICAL COMPANY

LOCATION: ELDORADO, ARKANSAS

PROJECT: 3500009153.00 TASK 00001

MW-17 - SLUG OUT



DATA SET:
MW17-OUT.DAT
03/23/99

AQUIFER MODEL:
Confined
SOLUTION METHOD:
Bouwer-Rice

TEST DATA:
 $H_0 = 0.4$ ft
 $r_c = 0.33$ ft
 $r_w = 0.83$ ft
 $L = 10.$ ft
 $b = 10.$ ft
 $H = 1.$ ft

PARAMETER ESTIMATES:
 $K = 0.001129$ ft/min
 $y_0 = 0.3185$ ft

MW-EDC-17 SLUG IN

SE1000C
Environmental Logger
03/04 16:05

Unit# 00000 Test 8

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00017

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 12:39:48

Elapsed Time INPUT 1

0.0000 -4.435
0.0033 -4.432
0.0066 -4.435
0.0100 -4.432
0.0133 -4.435
0.0166 -4.432
0.0200 -4.435
0.0233 -4.432
0.0266 -4.435
0.0300 -4.432
0.0333 -3.672
0.0366 -4.222
0.0400 -4.216
0.0433 -4.200
0.0466 -4.235
0.0500 -4.060
0.0533 -4.073
0.0566 -4.082
0.0600 -4.047
0.0633 -4.076
0.0666 -4.076
0.0700 -4.092
0.0733 -4.244
0.0766 -4.076
0.0800 -4.225
0.0833 -4.076
0.0866 -4.257
0.0900 -4.136
0.0933 -4.209
0.0966 -4.193
0.1000 -4.197
0.1033 -4.206

0.1066	-4.197
0.1100	-4.206
0.1133	-4.203
0.1166	-4.206
0.1200	-4.209
0.1233	-4.209
0.1266	-4.213
0.1300	-4.213
0.1333	-4.213
0.1366	-4.216
0.1400	-4.216
0.1433	-4.216
0.1466	-4.219
0.1500	-4.219
0.1533	-4.219
0.1566	-4.219
0.1600	-4.222
0.1633	-4.222
0.1666	-4.222
0.1700	-4.225
0.1733	-4.225
0.1766	-4.225
0.1800	-4.225
0.1833	-4.225
0.1866	-4.228
0.1900	-4.228
0.1933	-4.228
0.1966	-4.228
0.2000	-4.232
0.2033	-4.228
0.2066	-4.232
0.2100	-4.232
0.2133	-4.232
0.2166	-4.232
0.2200	-4.235
0.2233	-4.232
0.2266	-4.235
0.2300	-4.235
0.2333	-4.235
0.2366	-4.235
0.2400	-4.235
0.2433	-4.235
0.2466	-4.238
0.2500	-4.238
0.2533	-4.238
0.2566	-4.238
0.2600	-4.238
0.2633	-4.238
0.2666	-4.238
0.2700	-4.238
0.2733	-4.241
0.2766	-4.241
0.2800	-4.241
0.2833	-4.241

0.2866	-4.241
0.2900	-4.241
0.2933	-4.241
0.2966	-4.244
0.3000	-4.241
0.3033	-4.244
0.3066	-4.244
0.3100	-4.244
0.3133	-4.244
0.3166	-4.244
0.3200	-4.244
0.3233	-4.244
0.3266	-4.244
0.3300	-4.244
0.3333	-4.244
0.3500	-4.247
0.3666	-4.251
0.3833	-4.251
0.4000	-4.254
0.4166	-4.254
0.4333	-4.257
0.4500	-4.260
0.4666	-4.260
0.4833	-4.260
0.5000	-4.263
0.5166	-4.263
0.5333	-4.267
0.5500	-4.267
0.5666	-4.270
0.5833	-4.270
0.6000	-4.273
0.6166	-4.273
0.6333	-4.273
0.6500	-4.276
0.6666	-4.276
0.6833	-4.279
0.7000	-4.279
0.7166	-4.279
0.7333	-4.282
0.7500	-4.282
0.7666	-4.286
0.7833	-4.286
0.8000	-4.289
0.8166	-4.289
0.8333	-4.289
0.8500	-4.292
0.8666	-4.292
0.8833	-4.292
0.9000	-4.295
0.9166	-4.295
0.9333	-4.295
0.9500	-4.298
0.9666	-4.298
0.9833	-4.298

1.0000	-4.302
1.2000	-4.314
1.4000	-4.324
1.6000	-4.330
1.8000	-4.340
2.0000	-4.349
2.2000	-4.352
2.4000	-4.359
2.6000	-4.365
2.8000	-4.368
3.0000	-4.371
3.2000	-4.375
3.4000	-4.378
3.6000	-4.381
3.8000	-4.387
4.0000	-4.387
4.2000	-4.390
4.4000	-4.390
4.6000	-4.394
4.8000	-4.397
5.0000	-4.397
5.2000	-4.400
5.4000	-4.403
5.6000	-4.403
5.8000	-4.406
6.0000	-4.400
6.2000	-4.403
6.4000	-4.406
6.6000	-4.410
6.8000	-4.410
7.0000	-4.410
7.2000	-4.413
7.4000	-4.413
7.6000	-4.413
7.8000	-4.413
8.0000	-4.413
8.2000	-4.416
8.4000	-4.416
8.6000	-4.416
8.8000	-4.419
9.0000	-4.419
9.2000	-4.419
9.4000	-4.422
9.6000	-4.422
9.8000	-4.419
10.0000	-4.419

END

END

MW-EDC-17 SLUG OUT

SE1000C

Environmental Logger

03/04 16:09

Unit# 00000 Test 9

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 00017

Reference 0.000
Linearity 0.040
Scale factor 10.040
Offset -0.050
Delay mSEC 50.000

Step 0 03/04 12:51:31

Elapsed Time INPUT 1

0.0000 -4.467
0.0033 -4.775
0.0066 -4.861
0.0100 -4.352
0.0133 -4.591
0.0166 -4.416
0.0200 -4.934
0.0233 -4.870
0.0266 -4.842
0.0300 -4.969
0.0333 -4.905
0.0366 -4.870
0.0400 -4.892
0.0433 -4.886
0.0466 -4.867
0.0500 -4.870
0.0533 -4.867
0.0566 -4.857
0.0600 -4.857
0.0633 -4.851
0.0666 -4.842
0.0700 -4.838
0.0733 -4.832
0.0766 -4.832
0.0800 -4.826
0.0833 -4.823
0.0866 -4.819
0.0900 -4.816
0.0933 -4.813
0.0966 -4.810
0.1000 -4.803
0.1033 -4.800
0.1066 -4.797
0.1100 -4.794
0.1133 -4.791
0.1166 -4.784
0.1200 -4.781

0.1233	-4.778
0.1266	-4.775
0.1300	-4.772
0.1333	-4.769
0.1366	-4.765
0.1400	-4.765
0.1433	-4.762
0.1466	-4.756
0.1500	-4.756
0.1533	-4.753
0.1566	-4.749
0.1600	-4.746
0.1633	-4.743
0.1666	-4.740
0.1700	-4.737
0.1733	-4.737
0.1766	-4.734
0.1800	-4.730
0.1833	-4.727
0.1866	-4.727
0.1900	-4.724
0.1933	-4.721
0.1966	-4.718
0.2000	-4.715
0.2033	-4.715
0.2066	-4.711
0.2100	-4.711
0.2133	-4.708
0.2166	-4.708
0.2200	-4.702
0.2233	-4.702
0.2266	-4.702
0.2300	-4.699
0.2333	-4.699
0.2366	-4.695
0.2400	-4.695
0.2433	-4.692
0.2466	-4.689
0.2500	-4.689
0.2533	-4.686
0.2566	-4.686
0.2600	-4.683
0.2633	-4.683
0.2666	-4.680
0.2700	-4.680
0.2733	-4.676
0.2766	-4.676
0.2800	-4.676
0.2833	-4.673
0.2866	-4.673
0.2900	-4.670
0.2933	-4.670
0.2966	-4.670
0.3000	-4.667

0.3033	-4.667
0.3066	-4.664
0.3100	-4.664
0.3133	-4.664
0.3166	-4.661
0.3200	-4.661
0.3233	-4.661
0.3266	-4.661
0.3300	-4.657
0.3333	-4.654
0.3500	-4.654
0.3666	-4.645
0.3833	-4.645
0.4000	-4.638
0.4166	-4.635
0.4333	-4.635
0.4500	-4.629
0.4666	-4.626
0.4833	-4.626
0.5000	-4.622
0.5166	-4.619
0.5333	-4.619
0.5500	-4.616
0.5666	-4.613
0.5833	-4.610
0.6000	-4.610
0.6166	-4.607
0.6333	-4.607
0.6500	-4.603
0.6666	-4.603
0.6833	-4.600
0.7000	-4.600
0.7166	-4.597
0.7333	-4.597
0.7500	-4.591
0.7666	-4.594
0.7833	-4.587
0.8000	-4.591
0.8166	-4.587
0.8333	-4.587
0.8500	-4.584
0.8666	-4.584
0.8833	-4.581
0.9000	-4.581
0.9166	-4.578
0.9333	-4.578
0.9500	-4.578
0.9666	-4.575
0.9833	-4.575
1.0000	-4.575
1.2000	-4.559
1.4000	-4.549
1.6000	-4.540
1.8000	-4.533

2.0000	-4.524
2.2000	-4.521
2.4000	-4.514
2.6000	-4.511
2.8000	-4.505
3.0000	-4.502
3.2000	-4.495
3.4000	-4.492
3.6000	-4.489
3.8000	-4.486
4.0000	-4.483
4.2000	-4.479
4.4000	-4.476
4.6000	-4.473
4.8000	-4.473
5.0000	-4.470
5.2000	-4.467
5.4000	-4.467
5.6000	-4.464
5.8000	-4.464
6.0000	-4.460
6.2000	-4.460
6.4000	-4.457
6.6000	-4.454
6.8000	-4.454
7.0000	-4.454
7.2000	-4.454
7.4000	-4.451
7.6000	-4.448
7.8000	-4.451
8.0000	-4.451
8.2000	-4.448
8.4000	-4.441
8.6000	-4.444
8.8000	-4.444
9.0000	-4.444

END

APPENDIX B
GROUNDWATER COLLECTION
REPORT FORMS

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDL-6
 TYPE OF SAMPLE _____ () GRAB () COMPOSITE () OTHER _____
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-09-99 1015 METHOD OF EVACUATION PUMP ^{SUBMERSIBLE}
 INITIAL DEPTH TO WATER LEVEL 4.67 TOP OF CASING TO BOTTOM 22.10
 GALLONS PER WELL VOLUME 16.5 TOTAL GALLONS EVACUATED 35
 FINAL DEPTH TO WATER 14.86 ELEVATION TOP OF CASING _____
 SAMPLING: DATE/TIME 03-09-99 1115 METHOD OF SAMPLING PUMP ^{SUBMERSIBLE}
 DEPTH TO WATER LEVEL 14.86

<u>D.O (mg/L)</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>				<u>ORP</u>
<u>0.50</u>	FIELD REPLICATE #1	<u>1744</u>	TEMP. <u>18.2</u>	pH <u>4.34</u>	CONDUCTIVITY <u>1.57 ms</u>	<u>98</u>
<u>0.41</u>	FIELD REPLICATE #2	<u>8.9</u>	TEMP. <u>18.4</u>	pH <u>4.29</u>	CONDUCTIVITY <u>1.54 ms</u>	<u>103</u>
<u>0.93</u>	FIELD REPLICATE #3	<u>3.74</u>	TEMP. <u>18.6</u>	pH <u>4.24</u>	CONDUCTIVITY <u>1.46 ms</u>	<u>104</u>
<u>0.25</u>	FIELD REPLICATE #4	<u>4.89</u>	TEMP. <u>18.7</u>	pH <u>4.68</u>	CONDUCTIVITY <u>1.22 ms</u>	<u>105</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING CLEAR, Temp. ≈ 60° F WINDS N ≈ 5MPH
 SAMPLING CHARACTERISTICS SUBTLY CLOUDY AT START OF PUMP, CLEAR AFTER
 CONTAINERS AND PRESERVATIVES _____ ^{PUMP}

RECOMMENDATIONS/OBSERVATIONS

FERRUS IRON = 0.0 mg/l (1ST TEST) 0.0 mg/l (2ND TEST)
CARBON DIOXIDE = 85 mg/l (1ST TEST) 80 mg/l (2ND TEST)
DETECTABLE BACTERIA = POSITIVE - AGGRESSIVE APPROX DN POPULATION = 1000 CFU/ml

SAMPLE ID NUMBERS MW-EDL-6

SAMPLING PERSONNEL

TIME 1015 TO 1115

Paul Harper
 (SIGNED)

DATE 03-09-99

LOCK OR SEAL NUMBER N/A

REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. AW-EDC-7
 TYPE OF SAMPLE (A) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-09-99 1140 METHOD OF EVACUATION PUMP SUBMERSIBLE
 INITIAL DEPTH TO WATER LEVEL 7.68 TOP OF CASING TO BOTTOM 24.95
 GALLONS PER WELL VOLUME 112 TOTAL GALLONS EVACUATED 35
 FINAL DEPTH TO WATER _____ ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-09-99 1230 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL _____

P.D. mg/l
0.31
7.25
1.20
0.22

<u>SAMPLE DATE</u>	<u>TEMP.</u>	<u>pH</u>	<u>CONDUCTIVITY</u>	<u>DRP (mg/l)</u>
<u>5.41</u>	<u>19.2</u>	<u>3.29</u>	<u>2.81</u>	<u>365</u>
<u>3.05</u>	<u>19.5</u>	<u>3.30</u>	<u>3.04</u>	<u>372</u>
<u>1.87</u>	<u>19.6</u>	<u>3.31</u>	<u>2.51</u>	<u>391</u>
<u>1.97</u>	<u>19.4</u>	<u>3.66</u>	<u>3.05</u>	<u>402</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING Clear, Temp. 62°F, Winds N @ 8-10 mph
 SAMPLING CHARACTERISTICS Clean throughout purge and sample period
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS
FERRIC IRON = 1.20 mg/l (1st TEST) ; 0.97 mg/l 2nd TEST
CARBON DIOXIDE = 950 mg/l (1st TEST) ; 1010 mg/l 2nd TEST
IDENTIFYING BACTERIA = NEGATIVE - Non-AGGRESSIVE

SAMPLE ID NUMBERS MW-EDC-7
 SAMPLING PERSONNEL _____ TIME 1140 TO 1230
 _____ DATE 03-09-99
 (SIGNED)

LOCK OR SEAL NUMBER N/A REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 35000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDC-8
 TYPE OF SAMPLE (A) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-10-99 0915 METHOD OF EVACUATION PUMP SUBMERSIBLE
 INITIAL DEPTH TO WATER LEVEL 7.86 TOP OF CASING TO BOTTOM 29.95
 GALLONS PER WELL VOLUME 14 TOTAL GALLONS EVACUATED 45
 FINAL DEPTH TO WATER 15.49 ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 1000 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL 15.49

D.O. (mg/l)	SAMPLE DATE	TURBIDITY (NTU)	TEMP.	pH	CONDUCTIVITY	DRP (cm)
<u>0.39</u>	FIELD REPLICATE #1	<u>1.85</u>	<u>19.2</u>	<u>3.49</u>	<u>8.82</u>	<u>187</u>
<u>0.28</u>	FIELD REPLICATE #2	<u>0.85</u>	<u>19.3</u>	<u>3.48</u>	<u>8.79</u>	<u>189</u>
<u>0.24</u>	FIELD REPLICATE #3	<u>0.76</u>	<u>19.3</u>	<u>3.47</u>	<u>8.80</u>	<u>188</u>
<u>0.25</u>	FIELD REPLICATE #4	<u>0.34</u>	<u>19.3</u>	<u>3.53</u>	<u>8.82</u>	<u>198</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING PARTLY CLOUDY, Temp ~ 55°F, Wind NE 5-8 MPH
 SAMPLING CHARACTERISTICS CLEAN THROUGHOUT PURGE AND SAMPLING PERIOD.
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

FERROUS Iron = 0.16 mg/L 1st TEST ; 0.15 mg/L 2nd test
CARBON DIOXIDE = 900 mg/L 1st TEST ; 1080 mg/L 2nd test
DETRITMPYMB BACTERIA = NEGATIVE - Non-AGGRESSIVE
 SAMPLE ID NUMBERS MW-EDC-8

SAMPLING PERSONNEL

Paul C. Day
 (SIGNED)

TIME 0915 TO 1000

DATE 03-10-99

LOCK OR SEAL NUMBER N/A

REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDC-9
 TYPE OF SAMPLE GRAB COMPOSITE OTHER _____
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

SUBMERSIBLE

EVACUATION: DATE/TIME 03-10-99 0745 METHOD OF EVACUATION PUMP
 INITIAL DEPTH TO WATER LEVEL 2.57 TOP OF CASING TO BOTTOM 30.10
 GALLONS PER WELL VOLUME 14.0 TOTAL GALLONS EVACUATED 45
 FINAL DEPTH TO WATER 16.46' ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 0900 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL 16.46'

<u>D.O. mg/l</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>	<u>ORP mV</u>
<u>1.67</u>	FIELD REPLICATE #1	<u>48.0</u> TEMP. <u>19.0</u> pH <u>5.25</u> CONDUCTIVITY <u>1.93 mS</u>	<u>84</u>
<u>1.41</u>	FIELD REPLICATE #2	<u>89.6</u> TEMP. <u>18.8</u> pH <u>5.24</u> CONDUCTIVITY <u>1.92 mS</u>	<u>85</u>
<u>0.77</u>	FIELD REPLICATE #3	<u>35.2</u> TEMP. <u>18.9</u> pH <u>5.29</u> CONDUCTIVITY <u>1.96 mS</u>	<u>87</u>
<u>0.53</u>	FIELD REPLICATE #4	<u>23.9</u> TEMP. <u>19.0</u> pH <u>5.28</u> CONDUCTIVITY <u>1.98 mS</u>	<u>119</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING PARTLY CLOUDY TEMP ≈ 50 °F LIGHT NE SW WIND
 SAMPLING CHARACTERISTICS PARTLY CLOUDY THROUGHOUT PUMPS AND SAMPLING PERIOD
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

Ferrous Iron - 0.00 mg/L ; 0.00 2nd reading
 CARBON DIOXIDE = 50 mg/L 1st TEST ; 110 mg/L 2nd Test
 DENITRIFYING BACTERIA = NEGATIVE - Non-AGGRESSIVE

SAMPLE ID NUMBERS MW-EDC-9

SAMPLING PERSONNEL _____ TIME 0745 TO 0900

Paul Harper
 (SIGNED)

DATE 03-10-99

LOCK OR SEAL NUMBER N/A REPLACEMENT SEAL NUMBER N/A

* NOTE: ORP PROBE = 241 mV IN ZOBELL SOLUTION

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDC-1D
 TYPE OF SAMPLE _____ (GRAB) (COMPOSITE) (OTHER) _____
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-09-99 1510 METHOD OF EVACUATION Subm. pump
 INITIAL DEPTH TO WATER LEVEL 11.79 TOP OF CASING TO BOTTOM 28.80
 GALLONS PER WELL VOLUME 11.1 TOTAL GALLONS EVACUATED 26.0
 FINAL DEPTH TO WATER 28.00 ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-09-99 1615 METHOD OF SAMPLING Subm. pump
 DEPTH TO WATER LEVEL 11.79 DE 28.00

ORP & U) SAMPLE DATE

	D.O. (ppm)	TEMP.	pH		CONDUCTIVITY	Turb. (NTU)
165	0.51	19.7	3.76	1.67 ms	95.7	
173	0.35	20.8	3.76	1.80	1085	
192	0.41	21.3	3.75	0.87	1471	
189	0.46	21.8	3.73	1.98	1431	

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING CLEAR, Temp. = 66°F - Wind N = Small
 SAMPLING CHARACTERISTICS Slightly cloudy, turning cloudier, brown, very turbid
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

Ferrous Iron = 0.14 mg/L (1st) 0.00 mg/L (2nd)
CO₂ = 150 mg/L (2st); 160 mg/L 2nd
DENITRIFYING BACTERIA = POSITIVE - AGGRESSIVE APPROP. DN POPULATION = 1000 CFU/mL

SAMPLE ID NUMBERS MW-EDC-1D

SAMPLING PERSONNEL _____

TIME 1510 TO 1615

Paul Harper
 (SIGNED)

DATE 03-09-99

LOCK OR SEAL NUMBER N/A

REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 35000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-11
 TYPE OF SAMPLE (X) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-09-99 1640 METHOD OF EVACUATION SUBMERSIBLE PUMP
 INITIAL DEPTH TO WATER LEVEL 10.26 TOP OF CASING TO BOTTOM 19.90
 GALLONS PER WELL VOLUME 6.3 TOTAL GALLONS EVACUATED _____
 FINAL DEPTH TO WATER _____ ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-09-99 1725 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL _____

<u>0.0 (mg/L)</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>	<u>TEMP.</u>	<u>pH</u>	<u>CONDUCTIVITY</u>	<u>ORP</u>
<u>0.31</u>	FIELD REPLICATE #1	<u>5.51</u>	<u>18.4</u>	<u>3.97</u>	<u>1.05</u>	<u>143</u>
<u>0.23</u>	FIELD REPLICATE #2	<u>14.98</u>	<u>17.7</u>	<u>3.94</u>	<u>1.04</u>	<u>162</u>
<u>0.20</u>	FIELD REPLICATE #3	<u>91.60</u>	<u>17.9</u>	<u>4.08</u>	<u>1.01</u>	<u>158</u>
<u>0.20</u>	FIELD REPLICATE #4	<u>46.80</u>	<u>18.4</u>	<u>4.07</u>	<u>0.98</u>	<u>159</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING CLEAR; TEMP ≈ 60°F - WINDS N @ 3-5 MPH
 SAMPLING CHARACTERISTICS CLEAR AT START OF PULSE; SLIGHTLY CLOUDY AT SAMPLE TIME.
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

FERRUS IRON = 0.04 mg/l 1st TEST ; 0.02 2nd TEST
CARBON DIOXIDE = 270 mg/l 1st TEST ; 280 mg/l 2nd TEST
DENITRIFYING BACTERIA - POSITIVE - AGGRESSIVE APPROX DN POPULATION = 1000 CFU/ml

SAMPLE ID NUMBERS MW-EDC-11

SAMPLING PERSONNEL _____

TIME 1640 TO 1725

Paul Harper
 (SIGNED)

DATE 03-09-99

LOCK OR SEAL NUMBER N/A REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDC-14
 TYPE OF SAMPLE (X) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-10-99 1440 METHOD OF EVACUATION SUBMERSIBLE PUMP
 INITIAL DEPTH TO WATER LEVEL 10.97 TOP OF CASING TO BOTTOM 18.35
 GALLONS PER WELL VOLUME 5 TOTAL GALLONS EVACUATED 15
 FINAL DEPTH TO WATER 13.78 ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 1510 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL 13.78

<u>0.0 (mg/l)</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>	<u>TEMP.</u>	<u>pH</u>	<u>CONDUCTIVITY</u>	<u>ORP (mv)</u>
<u>1.64</u>	FIELD REPLICATE #1	<u>88.8</u>	<u>17.5</u>	<u>4.29</u>	<u>0.88</u>	<u>129</u>
<u>1.19</u>	FIELD REPLICATE #2	<u>73.3</u>	<u>18.1</u>	<u>4.49</u>	<u>0.90</u>	<u>132</u>
<u>1.15</u>	FIELD REPLICATE #3	<u>36.2</u>	<u>17.3</u>	<u>4.29</u>	<u>0.76</u>	<u>135</u>
<u>1.25</u>	FIELD REPLICATE #4	<u>29.3</u>	<u>17.6</u>	<u>4.23</u>	<u>0.87</u>	<u>137</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING Partly cloudy, Temp. = 68° Wind NE @ 5 mph
 SAMPLING CHARACTERISTICS Cloudy throughout purges + sampling period.
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS
FERRIC IRON = 0.0 mg/l 1st TEST ; 0.0 mg/l 2nd TEST
CARBON DIOXIDE = 145 mg/l 1st TEST ; 165 mg/l 2nd TEST
PERMUTATED BACTERIA = NEGATIVE - Non-AGGRESSIVE

SAMPLE ID NUMBERS MW-EDC-14
 SAMPLING PERSONNEL _____ TIME 1440 TO 1510
 _____ DATE 03-10-99
 (SIGNED)

LOCK OR SEAL NUMBER N/A REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME EI Dorado Chemical 35000915300 LOCATION EI Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDC-15
 TYPE OF SAMPLE (X) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-10-99 1340 METHOD OF EVACUATION Pump
 INITIAL DEPTH TO WATER LEVEL 4.85 TOP OF CASING TO BOTTOM 17.20
 GALLONS PER WELL VOLUME 8.0 TOTAL GALLONS EVACUATED 25
 FINAL DEPTH TO WATER 13.23' ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 1415 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL 13.23'

<u>0.0. (mg/L)</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>	<u>TEMP.</u>	<u>pH</u>	<u>CONDUCTIVITY</u>	<u>ORP(mV)</u>
<u>0.43</u>	FIELD REPLICATE #1	<u>3.56</u>	<u>14.6</u>	<u>4.11</u>	<u>0.27 mS</u>	<u>141</u>
<u>0.22</u>	FIELD REPLICATE #2	<u>6.52</u>	<u>14.4</u>	<u>4.04</u>	<u>0.24 mS</u>	<u>142</u>
<u>0.25</u>	FIELD REPLICATE #3	<u>4.90</u>	<u>14.6</u>	<u>4.04</u>	<u>0.26 mS</u>	<u>142</u>
<u>0.46</u>	FIELD REPLICATE #4	<u>5.03</u>	<u>14.9</u>	<u>4.17</u>	<u>0.27 mS</u>	<u>142</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING PARTLY CLOUDY, TEMP. = 66°F; WINDS NE ≈ 3 MPH
 SAMPLING CHARACTERISTICS CLEAR THROUGHOUT PUMPS + SAMPLING PERIODS.
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

FERRUS Iron = 0.08 mg/L 1ST TEST; 0.00 mg/L 2ND TEST
CARBON DIOXIDE = 125 mg/L 1ST TEST; 110 mg/L 2ND TEST
DETRIMENTAL BACTERIA = POSITIVE - AGGRESSIVE APPROX DN POPULATION = 1000 CFU/mL

SAMPLE ID NUMBERS MW-EDC-15

SAMPLING PERSONNEL

TIME 1340 TO 1415

Paul Harper
 (SIGNED)

DATE 03-10-99

LOCK OR SEAL NUMBER N/A

REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDL-16
 TYPE OF SAMPLE GRAB () COMPOSITE () OTHER _____
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-10-99 1235 METHOD OF EVACUATION SUBMERSIBLE PUMP
 INITIAL DEPTH TO WATER LEVEL 5.24 TOP OF CASING TO BOTTOM 19.45
 GALLONS PER WELL VOLUME 9.3 TOTAL GALLONS EVACUATED 30
 FINAL DEPTH TO WATER 8.38 ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 1330 METHOD OF SAMPLING SUBMERSIBLE PUMP
 DEPTH TO WATER LEVEL 8.38

<u>T.D. (mg/L)</u>	<u>SAMPLE DATE</u>	<u>TURBIDITY (NTU)</u>	<u>TEMP.</u>	<u>pH</u>	<u>CONDUCTIVITY</u>	<u>DRP(m)</u>
<u>0.34</u>	FIELD REPLICATE #1	<u>3.76</u>	<u>15.8</u>	<u>3.88</u>	<u>0.98 mS</u>	<u>159</u>
<u>0.33</u>	FIELD REPLICATE #2	<u>2.91</u>	<u>16.1</u>	<u>3.91</u>	<u>1.02 mS</u>	<u>160</u>
<u>0.33</u>	FIELD REPLICATE #3	<u>2.36</u>	<u>16.1</u>	<u>3.90</u>	<u>1.02 mS</u>	<u>160</u>
<u>0.32</u>	FIELD REPLICATE #4	<u>3.01</u>	<u>16.2</u>	<u>3.91</u>	<u>1.13 mS</u>	<u>166</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING PARTLY CLOUDY, TEMP ≈ 64°F, WINDS NE @ 10
 SAMPLING CHARACTERISTICS CLEAN THROUGHOUT PUNGE AND STANDARD METHOD
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

Ferrous Iron - 0.00 mg/L; 0.02 mg/L
Carbon Dioxide - 120 mg/L; 80 mg/L
DIETHYLENE DIAMINE = NEGATIVE - Non-ABSTRACTIVE

SAMPLE ID NUMBERS MW-EDL-16

SAMPLING PERSONNEL _____ TIME 1235 TO 1330

Paul Harper
 (SIGNED) DATE 03-10-99

LOCK OR SEAL NUMBER N/A REPLACEMENT SEAL NUMBER N/A

GROUND WATER COLLECTION REPORT

PROJECT NUMBER AND NAME El Dorado Chemical 350000915300 LOCATION El Dorado, Ark.
 COLLECTOR/OPERATOR Paul Harper / Dave Eddington WELL NO. MW-EDL-17
 TYPE OF SAMPLE (X) GRAB () COMPOSITE () OTHER
 METHOD OF SAMPLING IF OTHER THAN MONITOR WELL _____ SHUTTLE NO. _____

MONITOR WELL INFORMATION

EVACUATION: DATE/TIME 03-10-99 1030 METHOD OF EVACUATION Pump SUBMERSIBLE
 INITIAL DEPTH TO WATER LEVEL 28.66 TOP OF CASING TO BOTTOM 34.85
 GALLONS PER WELL VOLUME 4.0 TOTAL GALLONS EVACUATED 15
 FINAL DEPTH TO WATER 30.82 ELEVATION TOP OF CASING N/A

SAMPLING: DATE/TIME 03-10-99 1100 METHOD OF SAMPLING SUBMERSIBLE Pump
 DEPTH TO WATER LEVEL 30.82

DO (mg/L)	SAMPLE DATE	TEMP	pH	CONDUCTIVITY	DRP(m)
<u>1.54</u>	<u>7/24/07</u>	<u>8.90</u>	<u>19.7</u>	<u>3.67</u>	<u>0.87 mS</u>
<u>1.30</u>	<u>7/24/07</u>	<u>4.86</u>	<u>19.6</u>	<u>3.68</u>	<u>0.96 mS</u>
<u>0.79</u>	<u>7/24/07</u>	<u>4.33</u>	<u>19.9</u>	<u>3.70</u>	<u>1.09 mS</u>
<u>0.80</u>	<u>7/24/07</u>	<u>5.61</u>	<u>20.1</u>	<u>2.69</u>	<u>1.11 mS</u>

GENERAL INFORMATION

WEATHER CONDITIONS AT TIME OF SAMPLING Cloudy, Temp ≈ 60°F, Wind NE ≈ 3 mph
 SAMPLING CHARACTERISTICS Clear throughout purge and sampling period.
 CONTAINERS AND PRESERVATIVES _____

RECOMMENDATIONS/OBSERVATIONS

Ferrrous Iron = 0.02 mg/L 1st test ; 0.04 mg/L 2nd test
Carbon Dioxide = 110 mg/L 1st test 120 mg/L 2nd test
DINITRIFYING BACTERIA = NEGATIVE - Non-Aggressive

SAMPLE ID NUMBERS MW-EDL-17

SAMPLING PERSONNEL _____

TIME 1030 TO 1100

Paul L. Harper
 (SIGNED)

DATE 03-10-99

LOCK OR SEAL NUMBER N/A

REPLACEMENT SEAL NUMBER N/A

APPENDIX C

ANALYTICAL LABORATORY REPORTS



ANALYTICAL RESULTS

PERFORMED BY
GULF COAST ANALYTICAL LABORATORIES, INC.

REPORT DATE: 03/29/1999

**GCAL REPORT NO:
9901493**

DELIVER TO WOODWARD CLYDE/BR
WOODWARD CLYDE CONSULTANTS
2882 ONEAL LANE
BATON ROUGE, LA 70816
ATTENTION PAUL C. HARPER
CLIENT ID 0463

SAMPLE CROSS-REFERENCE

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903100019	WATER	MW-EDC-6	03/09/1999 11:15	03/10/1999 09:30
9903100020	WATER	MW-EDC-7	03/09/1999 12:30	03/10/1999 09:30
9903100021	WATER	MW-EDC-10	03/09/1999 16:15	03/10/1999 09:30
9903100022	WATER	MW-EDC-11	03/09/1999 17:25	03/10/1999 09:30

CASE NARRATIVE

Client: WOODWARD CLYDE/BR
Date: 03/29/1999

Group No: 9901493

INORGANIC QUALITY CONTROL CRITERIA:

Holding Times: All holding times were within method criteria.

Method Blanks: All method blanks were found to be within quality control criteria.

Spike/Duplicate (S/D): The RPD for duplicate Total Organic Carbon analysis is above the control limit; however, this RPD is not applicable because the batch duplicate sample concentration is less than five times the detection limit.

All other S/D recoveries were within quality control criteria.

Laboratory Control Samples: All LCS analyses met quality control criteria.

Calibration Verifications: All ICV, ICB, CCV, CCB analyses met all quality control criteria.

Analysis Comments: No other unusual analytical problems were encountered during the analysis of these samples.

LABORATORY ENDORSEMENT

Sample receipt at Gulf Coast Analytical Laboratories, Inc. is documented for your designated sample(s). Chain-of-custody documentation, if provided, is included in this report.

Sample analysis was performed in accordance with Environmental Protection Agency protocol or other approved methods as designated in this report. All Quality Control criteria were found to be within Method Control Limits unless otherwise noted in the Case Narrative of this report. All results reported are to be considered Wet Weight Results unless dry weight determinations are made and the Case Narrative includes a statement that results are reported on a Dry Weight Basis.

REPORT QUALIFIERS

<DL	RESULT IS LESS THAN THE DETECTION LIMIT
DO	PARAMETER WAS DILUTED OUT
fld **	PARAMETER WAS PERFORMED IN THE FIELD
MI	MATRIX INTERFERENCE
NA	NOT APPLICABLE
ND	NOT DETECTED
subc **	ANALYSIS WAS SUBCONTRACTED
TNTC	TOO NUMEROUS TO COUNT
00:00	TIME NOT PROVIDED OR MIDNIGHT

** These fields will appear in the analyt column

ISO GUIDE 25 DECLARATION

Gulf Coast Analytical Laboratories, Inc. is certified by The American Association For Laboratory Accreditation (A2LA). This certification ensures compliance with the laboratory standards outlined in ISO Guide 25. In accordance with ISO Guide 25, this report shall be reproduced only in full, and with the written permission of Gulf Coast Analytical Laboratories, Inc. The results herein relate only to the sample(s) tested. Documented results are shown on the following page(s).

We appreciate this opportunity to provide you with this analytical service. If we can be of further assistance, please do not hesitate to contact us at (504) 769-4900.


SCOTT A. BAILEY
OPERATIONS MANAGER

This Report Contains 10 Pages.

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903100019	WATER	MW-EDC-6	03/09/1999 11:15	03/10/1999 09:30

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/10/1999 17:32	03/11/1999 16:58
Ammonia (Electrode Method)	350.3	03/10/1999 11:00	03/10/1999 14:15
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/29/1999 15:36
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/10/1999 15:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 07:30	03/13/1999 17:40
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 07:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	2.8	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	97829	jar
Chloride	47.9	(mg/L Cl)	1	1	97846	bmc
Nitrate	162	(mg/L N)	1	100	97848	bmc
Nitrite	<DL	(mg/L N)	0.01	1	97849	bmc
Ammonia (Electrode Method)	0.2	(mg/L N)	0.1	1	97821	jar
Total Kjeldahl Nitrogen	<DL	(mg/L N)	1	1	97934	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	12.6	(mg/L SO4)	10	1	97915	jdt
Methane	0.757	(ug/L)	0.2	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.071	(mg/L)	0.03	1	97904	sab2
Manganese	0.516	(mg/L)	0.02	1	97904	sab2

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903100020	WATER	MW-EDC-7	03/09/1999 12:30	03/10/1999 09:30

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/10/1999 17:32	03/11/1999 16:58
Ammonia (Electrode Method)	350.3	03/10/1999 11:00	03/10/1999 14:15
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/29/1999 15:36
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/10/1999 15:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 07:30	03/13/1999 17:40
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 07:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	6.5	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	97829	jar
Chloride	32.1	(mg/L Cl)	1	1	97846	bmc
Nitrate	312	(mg/L N)	2	200	97848	bmc
Nitrite	0.20	(mg/L N)	0.01	1	97849	bmc
Ammonia (Electrode Method)	460	(mg/L N)	10	100	97821	jar
Total Kjeldahl Nitrogen	154	(mg/L N)	1	1	97934	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	373	(mg/L SO4)	100	10	97915	jdt
Methane	5.64	(ug/L)	0.2	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.900	(mg/L)	0.03	1	97904	sab2
Manganese	0.789	(mg/L)	0.02	1	97904	sab2

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903100021	WATER	MW-EDC-10	03/09/1999 16:15	03/10/1999 09:30

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/10/1999 17:32	03/11/1999 16:58
Ammonia (Electrode Method)	350.3	03/10/1999 11:00	03/10/1999 14:15
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/29/1999 15:36
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/10/1999 15:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 07:30	03/13/1999 17:40
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 07:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	9.8	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	97829	jar
Chloride	24.3	(mg/L Cl)	1	1	97846	bmc
Nitrate	187	(mg/L N)	1	100	97848	bmc
Nitrite	0.31	(mg/L N)	0.01	1	97849	bmc
Ammonia (Electrode Method)	0.1	(mg/L N)	0.1	1	97821	jar
Total Kjeldahl Nitrogen	<DL	(mg/L N)	1	1	97934	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	143	(mg/L SO4)	50	5	97915	jdt
Methane	0.623	(ug/L)	0.2	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	5.40	(mg/L)	0.03	1	97904	sab2
Manganese	0.594	(mg/L)	0.02	1	97904	sab2

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903100022	WATER	MW-EDC-11	03/09/1999 17:25	03/10/1999 09:30

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/10/1999 17:32	03/11/1999 16:58
Ammonia (Electrode Method)	350.3	03/10/1999 11:00	03/10/1999 14:15
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/29/1999 15:36
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/10/1999 15:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 07:30	03/13/1999 17:40
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 07:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	25.8	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	97829	jar
Chloride	7.13	(mg/L Cl)	1	1	97846	bmc
Nitrate	10.2	(mg/L N)	0.1	10	97848	bmc
Nitrite	0.03	(mg/L N)	0.01	1	97849	bmc
Ammonia (Electrode Method)	38.5	(mg/L N)	0.5	5	97821	jar
Total Kjeldahl Nitrogen	11.2	(mg/L N)	1	1	97934	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	368	(mg/L SO4)	100	10	97915	jdt
Methane	180	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.456	(mg/L)	0.03	1	97904	sab2
Manganese	0.097	(mg/L)	0.02	1	97904	sab2

QUALITY CONTROL SUMMARY

Report#: 9901493

Parameter	Units	METHOD BLANK		LABORATORY CONTROL STANDARD			DUPLICATE			SPIKE		
		Result	Detection Limit	Spiked Amount	Recovered Amount	Percent Recovery	Result 1	Result 2	RPD	Spiked Amount	Recovered Amount	Percent Recovery
QC Batch 97821 Ammonia (Electrode Method)	(mg/L N)	<DL	0.1	1.0	1.1	110	0.1	0.1	0	1.0	1.0	100
QC Batch 97829 Total Alkalinity	(mg/L CaCO3)			250	260	104	200	200	0	1000	960	96
QC Batch 97846 Chloride	(mg/L Cl)	<DL	1	60.0	71.3	119	47.9	48.2	1	60.0	62.1	104
QC Batch 97848 Nitrate	(mg/L N)	<DL	0.01	1.00	1.04	104	162	169	4	100	104	104
QC Batch 97849 Nitrite	(mg/L N)	<DL	0.01	1.00	1.07	107	<DL	0.02		1.00	1.10	110
QC Batch 97904 Iron	(mg/L)	<DL	0.03	5.00	4.84	97	0.642	0.621	3	5.00	4.68	94
Manganese	(mg/L)	<DL	0.02	2.50	2.40	96	0.023	0.028	20	2.50	2.34	94
QC Batch 97915 Sulfate (Turbidimetric)	(mg/L SO4)	<DL	10	20.0	18.9	94	2220	2240	1	2000	1770	88
QC Batch 97934 Total Kjeldahl Nitrogen	(mg/L N)	<DL	1	15.0	14.3	95	154	153	1	15.0	14.3	95
QC Batch 97935 Total Organic Carbon	(mg/L C)	<DL	1	50.0	49.4	99	2.8	3.5	22 *	50.0	44.7	89
QC Batch 97960 Total Phosphorus	(mg/L P)	<DL	0.05	1.00	1.01	101	<DL	<DL		1.00	1.18	118

*Outside QC Limits - See Narrative

WWC/463/990/493/ Due 3-17-99 (SFA)



Chain of Custody and Analysis Request

WCC Project No.: 35000915300		Project Name: EL DORADO CHEMICAL BIOREMEDIATION SAMPLING		Methods										Remarks							
Project Location: EL DORADO, ARKANSAS				Number of Containers	METHANE	Ammonia	Aluminum	BATON-ROUGE	TPC	TOTAL	TKN	TOTAL IRON	MANAGANISE								
Sampler Team Leader: PAUL C. HARPER		Telephone: 225-751-1873			Matrix *																
Company Name: WOODWARD-CLYDE																					
YEAR: 1999	Sample Date/Time	Field Identification																			
03-09-99	1115	MW-EDC-6		GW	8	3	/	/	/	/	/										990310-19
03-09-99	1230	MW-EDC-7		GW	8	3	/	/	/	/	/										-20
03-09-99	1615	MW-EDC-10		GW	8	3	/	/	/	/	/										-21
03-09-99	1725	MW-EDC-11		GW	8	3	/	/	/	/	/										-22
Preservatives used:																					
Signature				Date/Time				Method of Shipment: FEDERAL EXPRESS										Special Instructions			
Relinquished By: <i>Paul Harper</i>				03-09-99 1210				Airbill No.:										* MATRIX - Groundwater (GW) Blank water (BW) Soil (SO) Sediment (SE)			
Received By: <i>John Ex # 8762959752 David Taylor</i>				031099 0930				Laboratory Name: GULF COAST ANALYTICAL													
Relinquished By:								Laboratory Address/Phone No.: BATON ROUGE, LA.													
Received By:								Custody Seals Present? Yes No													
Relinquished By:								Custody Seals Intact? Yes No													
Received By Laboratory:																					



ANALYTICAL RESULTS

PERFORMED BY
GULF COAST ANALYTICAL LABORATORIES, INC.

REPORT DATE: 03/31/1999

GCAL REPORT NO: 9901533

DELIVER TO	WOODWARD CLYDE/BR WOODWARD CLYDE CONSULTANTS 2882 ONEAL LANE BATON ROUGE, LA 70816
ATTENTION	PAUL C. HARPER
CLIENT ID	0463

SAMPLE CROSS-REFERENCE

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110005	WATER	MW-EDC-9	03/10/1999 09:00	03/11/1999 08:55
9903110006	WATER	MW-EDC-8	03/10/1999 10:00	03/11/1999 08:55
9903110007	WATER	MW-EDC-17	03/10/1999 11:00	03/11/1999 08:55
9903110008	WATER	MW-EDC-16	03/10/1999 13:30	03/11/1999 08:55
9903110009	WATER	MW-EDC-15	03/10/1999 14:15	03/11/1999 08:55
9903110010	WATER	MW-EDC-14	03/10/1999 15:10	03/11/1999 08:55

CASE NARRATIVE

Client: WOODWARD CLYDE/BR
Date: 03/31/1999

Group No: 9901533

INORGANIC QUALITY CONTROL CRITERIA:

Holding Times: All holding times were within method criteria.

Method Blanks: All method blanks were found to be within quality control criteria.

Spike/Duplicate (S/D): The RPD for duplicate Total Organic Carbon analysis is above the control limit; however, this RPD is not applicable because the batch duplicate sample concentration is less than five times the detection limit.

All other S/D recoveries were within quality control criteria.

Laboratory Control Samples: All LCS analyses met quality control criteria.

Calibration Verifications: All ICV, ICB, CCV, CCB analyses met all quality control criteria.

Analysis Comments: In the Total Kjeldahl Nitrogen and Ammonia analysis, samples 9903110006 (MW-EDC-8), 9903110007 (MW-EDC-17), and 9903110008 (MW-EDC-16) were confirmed by re-analysis using the titration method for both tests. The confirmation results are as follows:

<u>GCAL ID</u>	<u>Test</u>	<u>Results (mg/L)</u>
9903110006	Total Kjeldahl Nitrogen	515
	Ammonia	526
9903110007	Total Kjeldahl Nitrogen	< 1
	Ammonia	1.4
9903110008	Total Kjeldahl Nitrogen	< 1
	Ammonia	3.6

Ammonia results should not exceed Total Kjeldahl Nitrogen results, so all of the Total Kjeldahl Nitrogen is due to Ammonia in sample 9903110006 (MW-EDC-8). The other results are at the detection limit.

No other unusual analytical problems were encountered during the analysis of these samples.

LABORATORY ENDORSEMENT

Sample receipt at Gulf Coast Analytical Laboratories, Inc. is documented for your designated sample(s). Chain-of-custody documentation, if provided, is included in this report.

Sample analysis was performed in accordance with Environmental Protection Agency protocol or other approved methods as designated in this report. All Quality Control criteria were found to be within Method Control Limits unless otherwise noted in the Case Narrative of this report. All results reported are to be considered Wet Weight Results unless dry weight determinations are made and the Case Narrative includes a statement that results are reported on a Dry Weight Basis.

REPORT QUALIFIERS


<DL	RESULT IS LESS THAN THE DETECTION LIMIT
DO	PARAMETER WAS DILUTED OUT
fld **	PARAMETER WAS PERFORMED IN THE FIELD
MI	MATRIX INTERFERENCE
NA	NOT APPLICABLE
ND	NOT DETECTED
subc **	ANALYSIS WAS SUBCONTRACTED
TNTC	TOO NUMEROUS TO COUNT
00:00	TIME NOT PROVIDED OR MIDNIGHT

** These fields will appear in the analyst column

ISO GUIDE 25 DECLARATION

Gulf Coast Analytical Laboratories, Inc. is certified by The American Association For Laboratory Accreditation (A2LA). This certification ensures compliance with the laboratory standards outlined in ISO Guide 25. In accordance with ISO Guide 25, this report shall be reproduced only in full, and with the written permission of Gulf Coast Analytical Laboratories, Inc. The results herein relate only to the sample(s) tested. Documented results are shown on the following page(s).

We appreciate this opportunity to provide you with this analytical service. If we can be of further assistance, please do not hesitate to contact us at (504) 769-4900.


SCOTT A. BAILEY
OPERATIONS MANAGER

This Report Contains 12 Pages.

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110005	WATER	MW-EDC-9	03/10/1999 09:00	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	51.0	(mg/L C)	1	1	97935	jar
Total Alkalinity	24.0	(mg/L CaCO3)	1	1	98163	jar
Chloride	332	(mg/L Cl)	2	2	97846	bmc
Nitrate	26.5	(mg/L N)	0.2	20	97848	bmc
Nitrite	0.06	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	1.5	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	0.1	(mg/L N)	0.1	1	98050	jar
Total Phosphorus	0.37	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	438	(mg/L SO4)	100	10	97915	jdt
Methane	16.8	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.166	(mg/L)	0.03	1	98081	jac
Manganese	0.354	(mg/L)	0.02	1	98081	jac

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110006	WATER	MW-EDC-8	03/10/1999 10:00	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	10.3	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	98163	jar
Chloride	39.6	(mg/L Cl)	1	1	97846	bmc
Nitrate	1060	(mg/L N)	10	1000	97848	bmc
Nitrite	0.05	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	510	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	700	(mg/L N)	10	100	98050	jar
Total Phosphorus	0.05	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	80.8	(mg/L SO4)	20	2	97915	jdt
Methane	15.0	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	<DL	(mg/L)	0.03	1	98081	jac
Manganese	0.764	(mg/L)	0.02	1	98081	jac

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110007	WATER	MW-EDC-17	03/10/1999 11:00	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	5.8	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	98163	jar
Chloride	12.8	(mg/L Cl)	1	1	97846	bmc
Nitrate	86.5	(mg/L N)	0.5	50	97848	bmc
Nitrite	0.03	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	<DL	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	1.3	(mg/L N)	0.1	1	98050	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	159	(mg/L SO4)	50	5	97915	jdt
Methane	14.3	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.055	(mg/L)	0.03	1	98081	jac
Manganese	0.581	(mg/L)	0.02	1	98081	jac

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110008	WATER	MW-EDC-16	03/10/1999 13:30	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	3.2	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	98163	jar
Chloride	5.50	(mg/L Cl)	1	1	97846	bmc
Nitrate	120	(mg/L N)	1	100	97848	bmc
Nitrite	<DL	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	<DL	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	5.2	(mg/L N)	0.1	1	98050	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	<DL	(mg/L SO4)	10	1	97916	jar
Methane	1.75	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	<DL	(mg/L)	0.03	1	98081	jac
Manganese	0.508	(mg/L)	0.02	1	98081	jac

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110009	WATER	MW-EDC-15	03/10/1999 14:15	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	3.2	(mg/L C)	1	1	97935	jar
Total Alkalinity	<DL	(mg/L CaCO3)	1	1	98163	jar
Chloride	1.00	(mg/L Cl)	1	1	97846	bmc
Nitrate	28.4	(mg/L N)	0.2	20	97848	bmc
Nitrite	0.02	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	<DL	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	0.5	(mg/L N)	0.1	1	98050	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	10.2	(mg/L SO4)	10	1	97916	jar
Methane	3.20	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.290	(mg/L)	0.03	1	98081	jac
Manganese	0.135	(mg/L)	0.02	1	98081	jac

SAMPLE ANALYSIS

SAMPLE IDENTIFICATION

Sample#	Matrix	Sample ID	Sample Date	Receive Date
9903110010	WATER	MW-EDC-14	03/10/1999 15:10	03/11/1999 08:55

METHOD SUMMARY

Test	Method	Prep Date	Analysis Date
Metals by EPA Method 6010	6010B	03/15/1999 12:58	03/16/1999 09:22
Ammonia (Electrode Method)	350.3	03/12/1999 10:45	03/16/1999 12:00
Chloride	325.2		03/11/1999 11:30
Methane	Microseeps	03/11/1999 14:48	03/31/1999 08:40
Nitrate	EPA353.2-NO3		03/11/1999 09:30
Nitrite	354.1		03/11/1999 09:30
Sulfate (Turbidimetric)	375.4		03/12/1999 15:02
Total Alkalinity	310.1		03/18/1999 14:00
Total Kjeldahl Nitrogen	4500-NH3 BE	03/11/1999 11:00	03/12/1999 17:00
Total Organic Carbon	9060		03/13/1999 13:23
Total Phosphorus	365.1	03/11/1999 12:00	03/12/1999 14:30

ANALYTICAL RESULTS

Miscellaneous Analyses	Result	Unit	Detection Limit	Dilution	QC Batch	By
Total Organic Carbon	20.2	(mg/L C)	1	1	97935	jar
Total Alkalinity	5.0	(mg/L CaCO3)	1	1	98163	jar
Chloride	76.8	(mg/L Cl)	1	1	97846	bmc
Nitrate	27.4	(mg/L N)	0.2	20	97848	bmc
Nitrite	0.02	(mg/L N)	0.01	1	97849	bmc
Total Kjeldahl Nitrogen	1.7	(mg/L N)	1	1	97933	jar
Ammonia (Electrode Method)	0.1	(mg/L N)	0.1	1	98050	jar
Total Phosphorus	<DL	(mg/L P)	0.05	1	97960	jeb
Sulfate (Turbidimetric)	20.6	(mg/L SO4)	50	5	97916	jar
Methane	2.98	(ug/L)	0.015	1	0	subc

Metals by EPA Method 6010	Result	Unit	Detection Limit	Dilution	QC Batch	By
Iron	0.310	(mg/L)	0.03	1	98081	jac
Manganese	0.092	(mg/L)	0.02	1	98081	jac

QUALITY CONTROL SUMMARY

Report#: 9901533

Parameter	Units	METHOD BLANK		LABORATORY CONTROL STANDARD			DUPLICATE			SPIKE		
		Result	Detection Limit	Spiked Amount	Recovered Amount	Percent Recovery	Result 1	Result 2	RPD	Spiked Amount	Recovered Amount	Percent Recovery
QC Batch 97846 Chloride	(mg/L Cl)	<DL	1	60.0	71.3	119	47.9	48.2	1	60.0	62.1	104
QC Batch 97848 Nitrate	(mg/L N)	<DL	0.01	1.00	1.04	104	162	169	4	100	104	104
QC Batch 97849 Nitrite	(mg/L N)	<DL	0.01	1.00	1.07	107	<DL	0.02		1.00	1.10	110
QC Batch 97915 Sulfate (Turbidimetric)	(mg/L SO4)	<DL	10	20.0	18.9	94	2220	2240	1	2000	1770	88
QC Batch 97916 Sulfate (Turbidimetric)	(mg/L SO4)	<DL	10	20.0	20.9	104	<DL	<DL		20.0	20.7	104
QC Batch 97933 Total Kjeldahl Nitrogen	(mg/L N)	<DL	1	15.0	15.1	101	510	504	1	15.0	13.9	93
QC Batch 97935 Total Organic Carbon	(mg/L C)	<DL	1	50.0	49.4	99	2.8	3.5	22 *	50.0	44.7	89
QC Batch 97960 Total Phosphorus	(mg/L P)	<DL	0.05	1.00	1.01	101	<DL	<DL		1.00	1.18	118
QC Batch 98050 Ammonia (Electrode Method)	(mg/L N)	<DL	0.1	1.0	1.1	110	700	680	3	1.0	1.1	110
QC Batch 98081 Iron	(mg/L)	<DL	0.03	5.00	4.80	96	0.166	0.167	1	5.00	4.63	93
Manganese	(mg/L)	<DL	0.02	2.50	2.38	95	0.354	0.371	5	2.50	2.29	92
QC Batch 98163 Total Alkalinity	(mg/L CaCO3)			250	255	102	24.0	26.0	8	50.0	50.0	100

*Outside QC Limits - See Narrative

WNC/463/99015331 Due 3-18-99 (RHH)



Chain of Custody and Analysis Request

WCC Project No.: 350000915300 Project Name: EL DORADO CHEMICAL BIOREMEDIATION SAMPLING
 Project Location: EL DORADO, ARKANSAS
 Sampler Team Leader: PAUL C. HARPER Telephone: 225-751-1873
 Company Name: WOODWARD-CLYDE

YEAR: 1999 Sample Date/Time	Field Identification	Matrix *	Number of Containers	Methods										Remarks			
				METHANE	AMMONIA	TOTAL PHOSPHATE	TKN	MANGANESE	TOTAL IRON	ALKALINITY	NITRATES AMMONIUM	TOL					
03-10-99 0900	MW-EDL-9	GW	8	3	1	1	1	1	1	1							990311-5
03-10-99 1000	MW-EDL-8	GW	8	3	1	1	1	1	1	1							-6
03-10-99 1100	MW-EDL-17	GW	8	3	1	1	1	1	1	1							-7
03-10-99 1330	MW-EDL-16	GW	8	3	1	1	1	1	1	1							-8
03-10-99 1415	MW-EDC-15	GW	8	3	1	1	1	1	1	1							-9
03-10-99 1510	MW-EDC-14	GW	8	3	1	1	1	1	1	1							-10

Preservatives used:

Relinquished By: <i>Paul C. Harper</i>	Signature	Date/Time	Method of Shipment: FEDERAL EXPRESS	Special Instructions * MATRIX - Groundwater (GW) Blank water (BW) Soil (SO) Sediment (SE)
Received By: <i>Dana Haydel</i>		03-10-99 1800	Airbill No.: 8722959785, 8762959796, 8762959833	
Relinquished By:		3-11-99 0835	Laboratory Name: GULF COAST ANALYTICAL	
Received By:			Laboratory Address/Phone No.: BATON ROUGE, LA.	
Relinquished By:			Custody Seals Present? Yes No	
Received By Laboratory:			Custody Seals Intact? Yes No	