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TRANSMITTAL OF RESPONSES TO THE OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE SOUTH FIELD INJECTION TES PHASE II REPORT

01/08/97

DOE-0399-97
DOE-FEMP EPAS
18
RESPONSES

Department of Energy

Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
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JAN 8 1997

DOE-0399-97

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HSF-5J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF RESPONSES TO THE OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE SOUTH FIELD INJECTION TEST PHASE II REPORT

Enclosed for your review are responses to the Ohio Environmental Protection Agency (OEPA) comments on the South Field Injection Test Phase II Report. The U.S. Environmental Protection Agency (U.S. EPA) approved the report as written.

If you have any questions, please contact John Kappa at (513) 648-3149, or Robert Janke at (513) 648-3124.

Sincerely,

Johnny Reising

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Kappa

Enclosure: As Stated

Recycled and Recyclable

cc w/enc:

S. Fauver, EM-42/CLOV
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RESPONSES TO OHIO EPA COMMENTS ON SOUTH FIELD INJECTION TEST PHASE II REPORT

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: 1.0 Introduction Pg.#: 2 Line#: 20-23 Code: M
Original Comment# 1

Comment: This statement is not supported by the conclusions in the Appendix F, which is the referenced geochemical study. The geochemical study says nothing about injected effluent from the SPIT and iron bacterial plugging problems.

Response: DOE believes that the statement in question is supported by the conclusions presented in Appendix F. Section 4 of Appendix F, presents three geochemical modeling scenarios. Scenario 3 is a modeling simulation that depicts the injection of oxidized SPIT effluent into oxidized regions of the GMA. The SPIT effluent was sampled for iron (see Table 5-2 in Section 5 of the main report). No iron was detected in the SPIT effluent at a detection limit of 100 μg/L. The SPIT effluent was therefore modeled using an iron concentration of 50 μg/L. The 50 μg/L represents one half of the detection limit concentration. Figure 5, pg. 20 of Appendix F, illustrates the mixing results for SPIT effluent and groundwater in Injection Well 31567. The figure shows that iron precipitate will not form unless groundwater iron concentrations rise above the solubility curve.

Section 6 of Appendix F presents Conclusions and Recommendations. The second paragraph of Section 6 discusses Scenario 3. The following is stated; "However, precipitation problems can be avoided by proper selection of Eh/pH conditions for SPIT effluent and the targeted injection zone (Scenario 3). Treated groundwater that is oxidized on the surface to lower iron concentration to 0.05 mg/L or less will cause no precipitate problems when injected into relatively oxidized regions of the GMA."

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Pg.#: Line#: Code: C
Original Comment# 2

Comment: Why were slug tests not completed in the well installed in the sandpack around the injection well? Completion of these tests, though not possible in the strictest definition of a slug test, might yield valuable information of the degree to which fouling may be taking place. This would, at least, provide comparative results before and after injection.

Response: The decision was made to conduct the slug tests within the injection well itself rather than in the observation wells completed in the filter pack of the injection well. Both locations will provide information on the degree to which biofouling may be taking place. The best chance of detecting the beginning of biofouling conditions is at the location where the greatest amount of biofouling can occur. The greatest amount of biofouling can occur in the area where the greatest change in temperature and/or pressure is taking place. This is within the screen of the injection well itself, and for this reason the injection well was selected.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: 1.0 Introduction Pg.#: 2-3 Line#: 30-1 Code: E
Original Comment# 3

Comment: This sentence appears to be two incomplete sentences. Please correct the text.

Response: Agree. The sentence should read, "The results of the test indicate that the cause of the plugging problem encountered during the first South Field Injection Test was properly identified and that injection appears to be a promising supplement to the FEMP Groundwater remedy."

Action: A revised page with the corrected sentence will be issued with these comment responses.

Commenting Organization: OEPA Commentor: OFFO
Section#: 2 Pg.#: Table 2-1 Line#: Code:
Original Comment# 4
Comment: The iron concentration in Well 31567 is listed as 123.4ug/l in Table 2-1 and in Table 5-2 the iron concentration in well 31567 is listed as ND with a detection limit of 100 ug/l. Is the reason for the discrepancy known? Does this in any way affect the validity of the conclusions drawn in this report?
Response: Table 2-1 lists iron results (123.4 μg/L and 165 μg/L) which were measured from groundwater samples collected from Well 31567 in December of 1995. The pre-injection iron concentrations listed in Table 5-2 (Non-detects at 100 μg/L) were measured from groundwater collected from Well 31567 in March of 1996, just prior to the Phase II Injection Test. The geochemical modeling which was conducted to predict the outcome of the Phase II Injection Test used an iron concentration of 123 μg/L (Appendix F, Table 4). Using this iron concentration the geochemical model predicted that iron hydroxide would not precipitate as a result of injection. Having the March groundwater samples indicate a lower iron concentration than what was measured in December was not a concern because the geochemical modeling was conducted using a higher December level. The change in iron concentration has been attributed to natural changes in the aquifer, perhaps resulting from seasonal recharge.
Action: No revision to report required.

Commenting Organization: OEPA Commentor: DDAGW
Section#: 4.4 Pg.#: 16 Line#: Code:
Original Comment# 5
Comment: Was monitoring equipment repaired or replaced after failure?
Response: No, the monitoring equipment was not repaired or replaced after it failed due to a dead battery. The battery in the water quality monitor being used at Well 3065 went dead on April 1. The problem went unnoticed until April 2nd when hourly water quality monitoring was stopped. The monitors were rented, so following the test they were returned to the supplier.
Action: No revision to the report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: 5.1 Water Level Monitoring Results Pg.#: 23-27 Line#: Code: C
Original Comment# 6
Comment: Were the water levels recorded during the injection test evaluated to determine hydraulic conductivity? If they were how do the results compare to past tests conducted at the same well and are they consistent with expected distribution of hydraulic conductivity in the South Field area.
Response: The water levels recorded during the injection test were not evaluated for hydraulic conductivity. A pumping test was conducted in 1995 at a location which was very close to the injection well. The calculations conducted to determine hydraulic conductivity for the pumping test were fairly involved due to the partial penetration effects of the pumping well. It is not clear if the equations used for pumping conditions would be valid for injection. Therefore the decision was made not to try to determine hydraulic conductivity using injection data due to the high degree of uncertainty that would be associated with the calculation.
Action: No revision to report required.

Commenting Organization: OEPA Commentor: DDAGW
Section#: 5.2 Pg.#: 27 Line#: 22 Code:
Original Comment# 7
Comment: Why did the O_2 fluctuate. Is this a reflection of a higher O_2 concentration in the test influent?
Response: The O_2 concentration in the injection well and Well 2065 fluctuated in response to injection. Table B-4 indicates that the DO concentration in the SPIT effluent was below 1 mg/L. Figure 5-9 indicates that DO in the injection well jumped from below 1 mg/L to above 10 mg/L during the

injection test. Therefore the concentration rose as a result of injection and was probably due to a cascading delivery of the injection water. Efforts were made to control cascading water during the test by limiting the egress area at the discharge end of the downcomer, but these efforts were not 100% successful. The cascading was detected by a vacuum which was noticeable in the injection tubing at the well head. Duct tape was used to seal the tubing but a small amount of air was probably still getting in during the test.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: 5.2 Groundwater Quality Monitoring Results Pg.#: 28 Line#: 3-4 Code: C
Original Comment# 8

Comment: This statement is significant in the analysis of these test results. This may indicate that iron bacterial fouling will be a concern for long-term operation of injection wells.

Response: DOE agrees. The increase in dissolved oxygen is believed to have resulted because injected water cascaded down the well creating a vacuum in the injection tubing which pulled oxygen into the injection flow. The injection test was conducted with a temporary injection tubing setup. Actual injection will have a permanent injection tubing system, and leaks that create vacuums and pull oxygen into the injection flow should not exist. Therefore this situation is not considered to be a concern for the long term operation of the injection wells.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Table 5-3 Pg.#: Line#: Code: C
Original Comment# 9

Comment: What is the smallest change in the hydraulic conductivity that is statistically significant? Ninety percent confidence limits could be used to make this determination. A two-tailed students t-test indicates the ranges of values at the 90% confidence interval for the pre-injection test results are from 290 to 306 feet per day with a mean of 298 feet per day and the post-injection test results range from 279 to 315 feet per day with a mean of 297 feet per day. As these ranges indicate, the hydraulic conductivity would have to be significantly impacted before a statistical significance could be implied. If this magnitude of change occurred in three days, what would the operational life of the wells be? Is it possible that even with the apparently unchanged hydraulic conductivity observed in this test, these wells could still have a short operational period between required maintenance events?

Response: It was not the intent of this injection test to determine what the operational life of the injection wells would be. The intent was to determine if the aggressive iron fouling which occurred during the first injection test could be controlled or eliminated. Information concerning the operational life of the injection wells, and needed maintenance will be addressed in the upcoming injection demonstration project.

Hydraulic conductivity calculations (using slug test data) were compared with other data (i.e., downhole camera surveys, water levels) to determine if physical plugging of the injection well was detectable during the injection test. Hydraulic conductivity calculations were made so that pre-injection hydraulic conductivity values could be compared against post-injection hydraulic conductivity values for the purpose of indicating if a change had occurred. As EPA points out, the hydraulic conductivity would have to be significantly impacted before a statistical significance can be implied.

It is very possible that even with the apparently unchanged hydraulic conductivity observed in this injection test that the well might have a short operational period between required maintenance events. Long term operation of the injection wells during the injection demonstration will provide information on how much maintenance will be required. The injection demonstration will utilize

injection wells that range from 8 inches in diameter to 16 inches in diameter to determine if the added cost of installing a large diameter well is offset by future maintenance work that will be required to maintain injection efficiencies.

Action: No revision to the report required.

Commenting Organization: OEPA Commentor: GeoTrans
Section#: 5.3 Slug Test Results Pg.#: 29-30 Line#: Code: C
Original Comment# 10

Comment: Please provide an explanation of the methods and reasons for the "transformation" of the water level data from that recorded by the data logger to the "actual" water level displacement.

Response: The water level data collected during the slug tests (transducer readings) were transformed into actual water level displacements to facilitate the calculation of hydraulic conductivity. The data, both raw and transformed, are presented in Appendix D. The initial starting time in hours and minutes was referenced to "0" seconds. The other recorded times are also listed as elapsed seconds from the initial time. The actual transducer reading was transformed to an actual water level displacement by subtracting out the initial static transducer reading. For example, in Table D-1, the transducer reading for an elapsed time of 0 seconds was 1.257 feet. Subtracting out a static transducer reading of 1.20 feet results in an actual water level displacement of 0.057 feet.

Action: No revision to the report required.

Commenting Organization: OEPA Commentor: GeoTrans
Section#: 6.1 Conclusions Pg.#: Line#: Code: M
Original Comment# 11

Comment: The conclusions to this report would be more meaningful and defensible if they were discussed in terms of the two problems to be overcome.

The first problem is chemical precipitation of iron in the well which will cause plugging of the well, well pack, or surrounding formation. This problem has been evaluated and apparently solved by removing iron from the water prior to injection.

The second problem is possible iron bacterial growth in the well, well pack, or surrounding formation. The bacterial sampling results as well as the chemistry of the mixed water indicate this will be a problem. A solution to the operational problems iron bacteria can cause needs to be developed.

Response: DOE agrees that the report could be rewritten as described in the comment, but DOE also feels that the conclusions presented in the report are both meaningful and defensible in their present format. Long term operational problems presented by iron precipitation and iron bacteria will be addressed in the upcoming injection demonstration.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: 6.1 Conclusions Pg.#: 50-51 Line#: 39-3 Code: M
Original Comment# 12

Comment: This conclusion that iron biological growth can be controlled is not supported by the data. The duration of this test was not sufficient to determine the extent to which iron bacteria will cause plugging of the well and formation. As the biological sampling results on Table 5-4 indicate, the bacteria are present in the well and will probably spread into the formation if they are not already present. Injection of water from the SPIT will create environmental conditions in the aquifer (DO levels) which will promote the growth of iron bacteria thus causing plugging in the aquifer proper. This will not easily be corrected by well treatment or redevelopment.

Response: DOE believes that data collected during the injection tests support the conclusion that well plugging due to iron precipitation and biological growth can be controlled. DOE agrees with the EPA that

the duration of the second injection test was not sufficient to determine the extent to which iron bacteria will cause plugging of the well and formation during the upcoming injection demonstration. The duration of the test though was long enough to demonstrate that the physical iron plugging which resulted during the first injection test did not occur during the second test. For this reason the statement was made that although iron precipitation and biological growth cannot be completely stopped it can be controlled.

Iron precipitation and biological growth can probably never be stopped completely. A routine well maintenance program during the injection demonstration will be needed to keep growth down to acceptable levels. The excessive biological growth and iron fouling that was experienced during the first injection test was unacceptable for supporting a longer term injection demonstration. The lack of physical plugging during the second injection test is sufficient evidence to support going forward with a longer term demonstration.

Although it is true that during the second injection test, injection of water from the SPIT caused the DO levels in the aquifer to go up, it is believed that the increase was due to the delivery system which was used. Leaks in the injection tubing at the wellhead created a vacuum in the tubing, resulting in a cascading delivery of the injection water. The cascading water picked up oxygen and caused the DO levels to rise in the aquifer. This situation will be corrected for the injection demonstration and therefore should not be a problem. The impact to the DO level should be minimal because injection will take place near the water table, where the groundwater is already relatively high in DO. Oxygen is only one ingredient which the iron bacteria need to thrive. They also need iron, and the injection water will be very low in iron. It is anticipated that an upcoming injection demonstration will show that the small amount of iron hydroxide precipitate or iron bacteria can be controlled economically.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Appendix B, Table B-1 Pg.#: 3 of 10 Line#: Code: C
Original Comment# 13

Comment: In Table B-1, the data shows a DO increase in well 2065 presumably as a result of injection of aerated water into well 31567. Interestingly, there is also an approximately 15% increase in TDS at about the same time (3/22/96 through 3/23/98). Were any analytical tests performed on the groundwater from this well to determine what inorganic compounds were responsible for this apparent in TDS. This information may give insights into how this injected water will affect the geochemistry of the aquifer.

Response: Groundwater samples were not collected from Well 2065 but both pre- and post injection groundwater samples were collected from the injection well (Table 5-2). The data collected from the injection well could also be used to determine what inorganic compounds were responsible for the apparent increase in TDS. The data indicates that the apparent concentration of the following inorganic compounds increased by the following percentages as a result of injection; silicon 4.3%, sodium 5.7%, chloride 14.5%, sulfate 11.7%. Total dissolved solids increased 1.6%. What effect the increase in TDS will have on the injection process is not known at this time. Work will be done during the injection demonstration to further address this issue.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Appendix B Pg.#: Table B-3 Line#: Column 7 Code:
Original Comment# 14

Comment: Should this column be labeled DO mg/l, as it is in Table B-2, instead of % DO mg/l?

Response: Agree, the column label should be labeled to read "DO mg/L".

Action: A revised table will be issued with these comment responses.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Appendix D Slug Test Data and Results Pg.#: Line#: Code: C
Original Comment# 15

Comment: The data presented in the tables states that the initial displacement of water in the wells was five and 10 feet, yet the actual water level displacement once the data has been transformed is somewhat less than that. When the tests were evaluated with AQTESOLV the initial displacement presented at the top of each table was used in the evaluation. It is not known exactly how much of an error is introduced by this. This issue should be addressed.

Response: The individual data plots for each test indicate that the initial values of water level displacement are lower that what would be expected. This is attributed to the fact that at the start of the test a vacuum exists within the well which effects transducer readings. The vacuum effect is apparent for approximately two seconds because it is not possible to instantaneously release the vacuum from such a large diameter well. Therefore, at the start of each test, transducer readings collected for the first two seconds will be under the effect of a partial vacuum, producing smaller than expected water level displacement readings. However, the data collected after dissipation of the vacuum can be projected back to the Y-axis (displacement), providing a check as to the original displacement. These Y-intercepts are in good agreement with actual displacement levels. The vacuum effect on early time data therefore does not introduce error into the evaluation of the slug test data.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Appendix F Pg.#: 14 Line#: last sentence on page Code:
Original Comment# 16

Comment: Precipitation of iron hydroxide can result in lower arsenic and uranium concentrations in the ground water if the precipitate is removed from the aquifer. Otherwise, it will go back into solution if the Eh drops again.

Response: Agree, the uranium and arsenic will adsorb onto the iron precipitate and if the precipitate is removed, the uranium and arsenic that is adsorbed onto it will also be removed.

Action: No revision to report required.

Commenting Organization: OEPA Commentor: GeoTrans, Inc.
Section#: Appendix F Pg.#: 22 Line#: last paragraph Code:
Original Comment# 17

Comment: This is based on reaching a porosity of 0. Injection becomes impractical long before porosity reaches 0. At what porosity would injection be significantly impacted? How long will it take to reach this point?

Response: DOE agrees that injection will become impractical long before the porosity surrounding the injection well reaches 0. The injection test was not designed to determine threshold levels in porosity relative to a successful injection program, or the estimated time that it would take to reach a decisive porosity reduction. These questions will be addressed during the upcoming injection demonstration. DOE does not intend to address this issue by measuring porosity. DOE will address plugging in the injection well by monitoring water levels and injection pressures in the injection well itself, similar to the previous two injection tests. A well maintenance schedule will be implemented to keep the injection wells operating in an efficient manner. The routine maintenance program will be designed to sustain enough porosity to support injection.

Action: No revision to report required.

During the South Field Injection Test, South Plume groundwater that was reduced relative to iron was injected into South Field groundwater which was oxidized relative to iron resulting in the precipitation of ferric hydroxide within the injection well. The oxidizing reaction created an environment in which *Gallionella* iron bacteria could obtain energy and thrive. The *Gallionella* iron bacteria served as a catalyst to the precipitation reaction.

Iron bacteria is found almost everywhere, in both water and soil, and is particularly prevalent in the upper midwestern United States. Iron bacteria plug wells by enzymatically catalyzing the oxidation of ferrous iron to ferric iron and using the energy released from the reaction to promote the growth of thread-like slimes that serve to accumulate large amounts of ferric hydroxide. The ferric iron is drawn onto or into the mucilaginous slimy sheaths of the bacteria. Precipitation of the ferric iron coupled with the rapid growth of the iron bacteria creates a voluminous material that quickly plugs the screen pores of the well and the aquifer material surrounding the well bore (Driscoll 1986). Iron plugging interferes with the efficiency of the injection operation. If the plugging becomes excessive, the maintenance and associated costs required to control the plugging limit the intended usefulness of the injection operation.

Following the South Field injection test, a geochemical study was conducted to further evaluate the Great Miami Aquifer and the injection process. The purpose of the study was to determine the chemistry of the injection water needed to eliminate iron plugging within the injection well. It was determined through geochemical modeling (IT 1996) that injecting treated effluent from the South Plume Interim Treatment (SPIT) system into insitu South Field groundwater would not result in iron precipitate and iron bacteria plugging problems.

This report presents the results of a second injection test, called the "Phase II South Field Injection Test" in which groundwater which was treated in the SPIT system was injected into insitu groundwater in the South Field Area (DOE 1995d). Figure 1-1 identifies where the Phase II South Field Injection Test was conducted. The goal of this test was to determine if physical plugging would occur when treated water from the SPIT system was injected into the aquifer, rather than untreated water. The results of the test indicate that the cause of the plugging problem encountered during the first South Field Injection Test was properly identified and that injection appears to be a promising supplement to the FEMP Groundwater remedy. By controlling iron plugging within the injection well, injection appears to be a promising supplement to the FEMP groundwater remedy. A larger field scale demonstration of the application of the injection process is currently being planned.

TABLE B-3

WATER QUALITY IN WELL 31567 - OUT
WEDNESDAY, MARCH 20, 1996, THROUGH TUESDAY, APRIL 2, 1996
(Measurements Recorded Every Hour)

Log File Name: 31567.OU
Setup Date (MMDDYY): 032096
Setup Time (HHMMSS): 112852
Starting Date (MMDDYY): 032096
Starting Time (HHMMSS): 120000
Stopping Date (MMDDYY): 123199
Stopping Time (HHMMSS): 235959
Interval (HHMMSS): 010000
Warmup: Disable

==> Follow Variable and Calibration Change(s) <==

Temperature: Centigrade
Specific Conductance/Resistivity: Specific Conductance,mS/cm,Salt,Auto range,TDS,Temperature compensated,A->Comp 1,A->Method 1
% Sat: 734.0
DO: DO,LoFlow,Salinity compensated,Oxygen-26.7K
Depth/Level: Feet,Level
Turbidity: Ratio,Auto range
Buzzer: Disable
Stirrer: Enable

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
Date (MMDDYY): 032096										
120000	10.96	7.00	0.732	0.468	12.0	1.28	292	2.36	N/A	13.0
130000	11.00	7.06	0.737	0.472	6.8	0.73	293	2.37	N/A	12.7
140000	11.01	7.06	0.754	0.483	9.8	1.04	295	2.37	N/A	12.7
150000	11.00	7.06	0.763	0.488	6.5	0.69	296	2.37	N/A	12.7
160000	11.01	7.07	0.770	0.493	5.9	0.63	296	2.38	N/A	12.7
170000	11.00	7.07	0.774	0.496	5.7	0.61	296	2.38	N/A	12.7
180000	11.01	7.07	0.778	0.498	5.5	0.59	296	2.38	N/A	12.6
190000	11.01	7.08	0.781	0.500	5.5	0.59	296	2.39	N/A	12.6
200000	11.01	7.08	0.783	0.501	5.5	0.59	295	2.39	N/A	12.6
210000	11.01	7.09	0.786	0.503	5.4	0.57	295	2.39	N/A	12.6
220000	11.01	7.09	0.788	0.504	5.5	0.59	295	2.39	N/A	12.5
230000	11.01	7.09	0.789	0.505	5.4	0.57	295	2.39	N/A	12.6
Date (MMDDYY): 032196										
000000	11.01	7.09	0.790	0.506	6.8	0.73	294	2.40	N/A	12.5
010000	11.01	7.09	0.790	0.506	6.3	0.67	294	2.40	N/A	12.5
020000	11.01	7.10	0.793	0.508	5.9	0.63	294	2.40	N/A	12.5
030000	11.01	7.10	0.793	0.508	5.9	0.63	293	2.40	N/A	12.5
040000	11.01	7.10	0.796	0.510	5.7	0.61	293	2.40	N/A	12.5
050000	11.01	7.10	0.795	0.509	5.5	0.59	293	2.40	N/A	12.5
060000	11.01	7.10	0.797	0.510	5.4	0.57	293	2.40	N/A	12.5
070000	11.01	7.11	0.796	0.510	5.0	0.53	293	2.40	N/A	12.5

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
080000	11.01	7.11	0.796	0.510	5.0	0.53	293	2.40	N/A	12.6
090000	11.01	7.11	0.794	0.508	4.8	0.51	292	2.41	N/A	12.6
100000	11.01	7.11	0.796	0.510	5.5	0.59	292	2.41	N/A	12.7
110000	11.01	7.11	0.795	0.509	5.4	0.57	291	2.41	N/A	12.7
120000	11.01	7.12	0.797	0.510	5.0	0.53	291	2.41	N/A	12.7
130000	11.01	7.12	0.797	0.510	4.8	0.51	291	2.41	N/A	12.7
140000	11.01	7.12	0.793	0.508	4.8	0.51	291	2.41	N/A	12.7
150000	11.01	7.12	0.798	0.511	4.6	0.49	290	2.41	N/A	12.7
160000	11.01	7.12	0.797	0.510	4.1	0.43	291	2.41	N/A	12.7
170000	11.01	7.13	0.798	0.511	3.9	0.41	291	2.41	N/A	12.7
180000	11.01	7.13	0.795	0.509	4.1	0.43	290	2.41	N/A	12.7
190000	11.01	7.13	0.799	0.511	5.4	0.57	290	2.42	N/A	12.6
200000	11.01	7.13	0.797	0.510	5.4	0.57	290	2.41	N/A	12.6
210000	11.01	7.13	0.795	0.509	5.2	0.55	290	2.42	N/A	12.6
220000	11.01	7.13	0.792	0.507	5.2	0.55	289	2.42	N/A	12.6
230000	11.01	7.13	0.793	0.508	5.0	0.53	288	2.42	N/A	12.5
Date (MMDDYY): 032296										
000000	11.01	7.13	0.797	0.510	5.0	0.53	289	2.42	N/A	12.5
010000	11.00	7.13	0.797	0.510	4.4	0.47	288	2.41	N/A	12.5
020000	11.01	7.14	0.796	0.510	4.3	0.45	287	2.42	N/A	12.5
030000	11.01	7.14	0.794	0.508	4.3	0.45	287	2.42	N/A	12.5
040000	11.01	7.14	0.792	0.507	5.4	0.57	287	2.42	N/A	12.5
050000	11.01	7.14	0.795	0.509	5.4	0.57	287	2.42	N/A	12.5
060000	11.01	7.14	0.795	0.509	3.9	0.41	287	2.42	N/A	12.4
070000	11.01	7.14	0.798	0.511	3.9	0.41	287	2.42	N/A	12.4
080000	11.01	7.14	0.796	0.510	4.1	0.43	287	2.42	N/A	12.5
090000	11.01	7.15	0.794	0.508	3.7	0.39	284	2.42	N/A	12.6
100000	11.01	7.15	0.794	0.508	3.7	0.39	283	2.42	N/A	12.7
110000	11.01	7.15	0.793	0.508	4.1	0.43	281	2.42	N/A	12.7
120000	11.01	7.15	0.796	0.510	3.7	0.39	281	2.42	N/A	12.8
130000	11.01	7.15	0.793	0.508	3.7	0.39	280	2.42	N/A	12.8
140000	11.01	7.15	0.792	0.507	3.5	0.37	279	2.42	N/A	12.8
150000	11.03	7.15	0.795	0.509	3.9	0.41	278	2.42	N/A	12.8
160000	11.01	7.16	0.793	0.508	4.1	0.43	277	2.42	N/A	12.8
170000	11.03	7.16	0.792	0.507	4.3	0.45	276	2.42	N/A	12.8
180000	11.03	7.16	0.794	0.508	4.3	0.45	276	2.42	N/A	12.8
190000	11.03	7.16	0.794	0.508	4.4	0.47	277	2.43	N/A	12.7
200000	11.03	7.16	0.794	0.508	4.3	0.45	276	2.43	N/A	12.6
210000	11.03	7.16	0.794	0.508	5.4	0.57	275	2.43	N/A	12.6
220000	11.03	7.16	0.792	0.507	4.8	0.51	274	2.43	N/A	12.6

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
230000	11.01	7.16	0.793	0.508	4.6	0.49	274	2.43	N/A	12.5
Date (MMDDYY): 032396										
000000	11.03	7.16	0.794	0.508	5.2	0.55	273	2.43	N/A	12.5
010000	11.03	7.16	0.793	0.508	3.9	0.41	273	2.43	N/A	12.5
020000	11.03	7.17	0.793	0.508	3.7	0.39	273	2.43	N/A	12.5
030000	11.03	7.17	0.793	0.508	3.7	0.39	274	2.44	N/A	12.5
040000	11.02	7.17	0.793	0.507	3.5	0.37	273	2.44	N/A	12.5
050000	11.03	7.17	0.791	0.506	3.5	0.37	272	2.44	N/A	12.4
060000	11.03	7.17	0.794	0.508	3.5	0.37	271	2.44	N/A	12.5
070000	11.03	7.17	0.792	0.507	3.3	0.35	272	2.44	N/A	12.4
080000	11.03	7.17	0.792	0.507	3.0	0.31	272	2.44	N/A	12.4
090000	11.03	7.17	0.792	0.507	3.0	0.31	271	2.44	N/A	12.6
100000	11.03	7.18	0.792	0.507	5.5	0.59	271	2.45	N/A	12.7
110000	11.03	7.18	0.793	0.508	9.1	0.96	270	2.45	N/A	12.7
120000	11.03	7.18	0.793	0.508	7.9	0.84	271	2.45	N/A	12.8
130000	11.03	7.18	0.790	0.506	8.1	0.86	270	2.45	N/A	12.8
140000	11.03	7.18	0.791	0.506	8.3	0.88	270	2.45	N/A	12.9
150000	11.03	7.18	0.791	0.506	8.9	0.94	270	2.45	N/A	12.8
160000	11.03	7.18	0.793	0.508	8.5	0.90	269	2.45	N/A	12.8
170000	11.03	7.18	0.792	0.507	8.3	0.88	268	2.45	N/A	12.8
180000	11.03	7.18	0.791	0.506	8.3	0.88	267	2.45	N/A	12.7
190000	11.03	7.19	0.790	0.506	7.9	0.84	266	2.45	N/A	12.7
200000	11.03	7.19	0.790	0.506	7.6	0.80	265	2.45	N/A	12.6
210000	11.03	7.19	0.789	0.505	7.0	0.75	265	2.45	N/A	12.6
220000	11.03	7.19	0.788	0.505	7.0	0.75	265	2.45	N/A	12.6
230000	11.03	7.19	0.789	0.505	6.5	0.69	264	2.45	N/A	12.6
Date (MMDDYY): 032496										
000000	11.03	7.19	0.789	0.505	6.5	0.69	263	2.45	N/A	12.6
010000	11.03	7.19	0.787	0.504	6.1	0.65	263	2.45	N/A	12.5
020000	11.03	7.19	0.788	0.505	6.1	0.65	262	2.45	N/A	12.6
030000	11.03	7.20	0.789	0.505	6.1	0.65	262	2.45	N/A	12.6
040000	11.03	7.20	0.789	0.505	5.9	0.63	262	2.45	N/A	12.6
050000	11.03	7.20	0.788	0.505	5.9	0.63	261	2.44	N/A	12.5
060000	11.03	7.20	0.787	0.503	5.7	0.61	261	2.45	N/A	12.5
070000	11.03	7.20	0.788	0.505	5.7	0.61	260	2.45	N/A	12.5
080000	11.03	7.20	0.788	0.505	5.7	0.61	260	2.44	N/A	12.6
090000	11.03	7.20	0.787	0.504	5.7	0.61	260	2.44	N/A	12.7
100000	11.03	7.20	0.787	0.503	5.9	0.63	259	2.44	N/A	12.7
110000	11.03	7.20	0.787	0.503	5.7	0.61	259	2.44	N/A	12.8

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
120000	11.03	7.20	0.786	0.503	5.7	0.61	258	2.44	N/A	12.8
130000	11.03	7.20	0.784	0.502	5.7	0.61	258	2.43	N/A	12.8
140000	11.03	7.21	0.783	0.501	5.5	0.59	259	2.43	N/A	12.8
150000	11.03	7.21	0.785	0.502	6.1	0.65	260	2.43	N/A	12.8
160000	11.03	7.21	0.784	0.502	5.9	0.63	259	2.43	N/A	12.8
170000	11.03	7.21	0.784	0.502	7.2	0.76	258	2.43	N/A	12.8
180000	11.03	7.21	0.785	0.502	5.2	0.55	255	2.43	N/A	12.8
190000	11.03	7.21	0.785	0.502	6.8	0.73	254	2.42	N/A	12.7
200000	11.01	7.21	0.784	0.502	6.7	0.71	252	2.42	N/A	12.7
210000	11.01	7.21	0.785	0.502	6.3	0.67	251	2.42	N/A	12.7
220000	11.01	7.22	0.785	0.502	5.7	0.61	251	2.42	N/A	12.7
230000	11.01	7.22	0.783	0.501	5.7	0.61	251	2.42	N/A	12.7
Date (MMDDYY): 032596										
000000	11.01	7.22	0.784	0.502	5.7	0.61	251	2.42	N/A	12.7
010000	11.01	7.22	0.782	0.500	5.0	0.53	250	2.41	N/A	12.7
020000	11.01	7.22	0.782	0.500	5.5	0.59	250	2.41	N/A	12.7
030000	11.01	7.22	0.782	0.500	5.9	0.63	249	2.41	N/A	12.7
040000	11.01	7.22	0.781	0.500	4.8	0.51	250	2.42	N/A	12.7
050000	11.01	7.22	0.781	0.500	5.5	0.59	250	2.41	N/A	12.6
060000	11.01	7.22	0.781	0.500	5.2	0.55	250	2.41	N/A	12.6
070000	11.01	7.23	0.782	0.500	4.6	0.49	249	2.41	N/A	12.7
080000	11.01	7.23	0.780	0.499	4.1	0.43	249	2.41	N/A	12.6
090000	11.01	7.23	0.781	0.500	3.7	0.39	249	2.41	N/A	12.6
100000	11.01	7.23	0.762	0.488	3.7	0.39	249	2.41	N/A	12.6
110000	11.01	7.24	0.742	0.475	3.5	0.37	244	2.41	N/A	12.7
120000	11.03	7.24	0.752	0.481	3.5	0.37	242	2.41	N/A	12.7
130000	11.03	7.24	0.775	0.496	3.5	0.37	248	2.41	N/A	12.7
140000	11.03	7.24	0.778	0.498	3.5	0.37	251	2.42	N/A	12.7
150000	11.03	7.23	0.776	0.497	3.9	0.41	252	2.42	N/A	12.7
160000	11.03	7.23	0.775	0.496	3.5	0.37	253	2.42	N/A	12.6
170000	11.03	7.23	0.775	0.496	3.7	0.39	254	2.43	N/A	12.6
180000	11.03	7.23	0.774	0.495	4.6	0.49	255	2.43	N/A	12.6
190000	11.03	7.23	0.774	0.495	3.1	0.33	255	2.44	N/A	12.6
200000	11.03	7.23	0.774	0.495	3.1	0.33	255	2.44	N/A	12.6
210000	11.03	7.24	0.776	0.497	3.3	0.35	255	2.44	N/A	12.5
220000	11.03	7.24	0.777	0.497	3.3	0.35	255	2.45	N/A	12.5
230000	11.03	7.24	0.776	0.497	3.1	0.33	255	2.45	N/A	12.5
Date (MMDDYY): 032696										
000000	11.03	7.24	0.776	0.497	3.3	0.35	255	2.45	N/A	12.5

000013

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
010000	11.03	7.24	0.776	0.497	3.9	0.41	255	2.45	N/A	12.5
020000	11.03	7.24	0.777	0.497	5.9	0.63	256	2.45	N/A	12.4
030000	11.03	7.24	0.777	0.497	6.7	0.71	257	2.45	N/A	12.4
040000	11.03	7.24	0.777	0.497	6.8	0.73	257	2.45	N/A	12.4
050000	11.03	7.24	0.775	0.496	6.5	0.69	256	2.45	N/A	12.4
060000	11.03	7.24	0.777	0.497	6.3	0.67	256	2.46	N/A	12.4
070000	11.03	7.24	0.776	0.497	6.1	0.65	256	2.46	N/A	12.4
080000	11.03	7.24	0.774	0.495	6.1	0.65	257	2.46	N/A	12.4
090000	11.03	7.24	0.774	0.495	5.9	0.63	258	2.47	N/A	12.4
100000	11.03	7.24	0.774	0.495	5.9	0.63	259	2.47	N/A	12.4
110000	11.03	7.24	0.775	0.496	5.7	0.61	260	2.47	N/A	12.5
120000	11.03	7.24	0.777	0.497	5.7	0.61	261	2.47	N/A	12.6
130000	11.03	7.24	0.776	0.497	5.9	0.63	261	2.47	N/A	12.6
140000	11.03	7.24	0.775	0.496	5.9	0.63	261	2.47	N/A	12.6
150000	11.03	7.24	0.775	0.496	5.7	0.61	261	2.47	N/A	12.6
160000	11.03	7.24	0.775	0.496	5.5	0.59	262	2.47	N/A	12.7
170000	11.03	7.25	0.775	0.496	5.7	0.61	262	2.47	N/A	12.7
180000	11.03	7.25	0.774	0.495	5.9	0.63	263	2.47	N/A	12.6
190000	11.03	7.25	0.773	0.495	5.7	0.61	263	2.47	N/A	12.5
200000	11.03	7.25	0.774	0.495	5.4	0.57	264	2.47	N/A	12.5
210000	11.03	7.25	0.774	0.495	5.5	0.59	264	2.47	N/A	12.5
220000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.47	N/A	12.4
230000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.47	N/A	12.4
Date (MMDDYY): 032796										
000000	11.03	7.25	0.774	0.495	5.4	0.57	265	2.48	N/A	12.4
010000	11.03	7.25	0.775	0.496	5.5	0.59	266	2.47	N/A	12.3
020000	11.03	7.25	0.775	0.496	5.4	0.57	266	2.47	N/A	12.3
030000	11.03	7.25	0.774	0.495	5.5	0.59	267	2.47	N/A	12.3
040000	11.03	7.26	0.772	0.494	5.5	0.59	268	2.47	N/A	12.3
050000	11.03	7.26	0.773	0.495	5.5	0.59	268	2.48	N/A	12.3
060000	11.03	7.26	0.773	0.495	5.4	0.57	268	2.48	N/A	12.3
070000	11.03	7.26	0.773	0.495	5.2	0.55	268	2.48	N/A	12.3
080000	11.03	7.26	0.773	0.495	5.4	0.57	270	2.48	N/A	12.3
090000	11.03	7.26	0.772	0.494	5.4	0.57	271	2.48	N/A	12.4
100000	11.03	7.26	0.771	0.494	5.4	0.57	271	2.48	N/A	12.5
110000	11.03	7.26	0.771	0.494	5.4	0.57	272	2.48	N/A	12.6
120000	11.03	7.26	0.772	0.494	5.2	0.55	273	2.47	N/A	12.6
130000	11.63	7.44	0.680	0.435	117.7	12.33	277	2.70	N/A	12.6
140000	11.50	7.38	0.687	0.439	74.3	7.80	292	2.48	N/A	12.7
150000	11.52	7.40	0.679	0.435	100.9	10.59	293	2.71	N/A	12.7

000014

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
160000	11.39	7.40	0.679	0.435	100.5	10.58	296	2.71	N/A	12.7
170000	11.29	7.40	0.680	0.435	100.6	10.61	299	2.70	N/A	12.7
180000	11.21	7.40	0.680	0.435	99.8	10.55	300	2.70	N/A	12.7
190000	11.04	7.40	0.680	0.435	99.0	10.50	302	2.71	N/A	12.6
200000	11.04	7.40	0.680	0.435	98.6	10.46	303	2.71	N/A	12.6
210000	11.02	7.40	0.679	0.435	98.6	10.47	303	2.69	N/A	12.6
220000	11.01	7.41	0.680	0.435	98.7	10.49	304	2.70	N/A	12.6
230000	11.01	7.41	0.679	0.435	98.2	10.43	306	2.71	N/A	12.5
Date (MMDDYY): 032896										
000000	11.03	7.41	0.680	0.435	98.1	10.42	306	2.71	N/A	12.5
010000	11.01	7.41	0.680	0.435	98.0	10.41	307	2.70	N/A	12.5
020000	11.00	7.41	0.680	0.435	97.7	10.38	308	2.70	N/A	12.5
030000	11.06	7.41	0.680	0.435	97.6	10.36	309	2.70	N/A	12.5
040000	11.06	7.41	0.680	0.435	97.6	10.36	309	2.70	N/A	12.5
050000	11.06	7.41	0.680	0.435	97.8	10.38	310	2.69	N/A	12.5
060000	11.00	7.41	0.679	0.435	97.7	10.38	311	2.70	N/A	12.5
070000	11.05	7.41	0.680	0.435	97.5	10.35	312	2.69	N/A	12.5
080000	11.08	7.41	0.680	0.435	96.8	10.27	312	2.70	N/A	12.5
090000	11.13	7.41	0.679	0.435	96.1	10.18	313	2.70	N/A	12.5
100000	11.08	7.41	0.680	0.435	96.1	10.19	314	2.70	N/A	15.5
110000	11.11	7.41	0.680	0.435	96.0	10.17	315	2.70	N/A	15.5
120000	11.16	7.41	0.679	0.435	95.8	10.14	316	2.69	N/A	15.5
130000	11.19	7.41	0.679	0.435	96.2	10.17	317	2.69	N/A	15.5
140000	11.16	7.41	0.679	0.435	96.5	10.21	318	2.69	N/A	15.5
150000	11.24	7.41	0.679	0.435	96.7	10.22	319	2.68	N/A	15.4
160000	11.19	7.42	0.679	0.435	96.6	10.21	320	2.68	N/A	15.5
170000	11.18	7.42	0.679	0.435	96.6	10.22	321	2.67	N/A	15.5
180000	11.18	7.42	0.679	0.435	96.6	10.22	322	2.68	N/A	15.4
190000	11.16	7.42	0.679	0.435	96.3	10.19	324	2.68	N/A	15.4
200000	11.09	7.42	0.680	0.435	96.4	10.22	325	2.67	N/A	15.4
210000	11.08	7.42	0.695	0.445	82.8	8.78	333	2.45	N/A	15.4
220000	11.16	7.42	0.679	0.435	96.7	10.23	332	2.68	N/A	15.4
230000	11.11	7.42	0.680	0.435	95.4	10.11	333	2.68	N/A	15.4
Date (MMDDYY): 032996										
000000	11.09	7.42	0.680	0.435	95.7	10.14	335	2.68	N/A	15.4
010000	11.13	7.42	0.679	0.435	95.5	10.12	337	2.69	N/A	15.4
020000	11.14	7.42	0.679	0.435	95.5	10.11	339	2.68	N/A	15.4
030000	11.14	7.42	0.679	0.435	95.8	10.15	341	2.68	N/A	15.3
040000	11.09	7.42	0.680	0.435	95.8	10.16	344	2.68	N/A	[illegible]

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
050000	11.08	7.42	0.679	0.434	95.9	10.17	346	2.68	N/A	15.3
060000	11.13	7.42	0.679	0.435	96.1	10.18	349	2.69	N/A	15.3
070000	11.13	7.42	0.679	0.435	96.1	10.18	352	2.69	N/A	15.3
080000	11.14	7.42	0.679	0.435	96.0	10.17	355	2.69	N/A	15.4
090000	11.19	7.42	0.679	0.435	96.0	10.15	358	2.69	N/A	15.3
100000	11.21	7.42	0.679	0.435	96.1	10.16	362	2.69	N/A	15.3
110000	11.26	7.42	0.679	0.435	96.5	10.19	367	2.69	N/A	15.3
120000	11.32	7.42	0.679	0.434	96.4	10.17	371	2.69	N/A	15.2
130000	11.31	7.43	0.679	0.434	96.3	10.16	376	2.69	N/A	12.9
140000	11.40	7.43	0.678	0.434	97.0	10.21	381	2.69	N/A	12.7
150000	11.34	7.43	0.679	0.434	96.7	10.19	387	2.69	N/A	12.8
160000	11.26	7.43	0.679	0.435	96.5	10.19	393	2.69	N/A	12.8
170000	11.24	7.43	0.679	0.435	96.2	10.16	399	2.69	N/A	12.7
180000	11.22	7.42	0.679	0.435	95.9	10.13	405	2.69	N/A	12.7
190000	11.19	7.42	0.679	0.435	95.3	10.08	412	2.70	N/A	12.7
200000	11.19	7.42	0.679	0.435	94.9	10.04	421	2.70	N/A	12.7
210000	11.18	7.42	0.679	0.435	95.7	10.12	429	2.70	N/A	12.7
220000	11.18	7.43	0.679	0.435	96.3	10.18	436	2.70	N/A	12.7
230000	11.18	7.43	0.679	0.435	95.9	10.14	442	2.70	N/A	12.7
Date (MMDDYY): 033096										
000000	11.16	7.43	0.677	0.434	96.5	10.21	448	2.71	N/A	12.6
010000	11.16	7.43	0.678	0.434	96.7	10.23	454	2.70	N/A	12.6
020000	11.16	7.43	0.679	0.435	96.5	10.21	458	2.70	N/A	12.6
030000	11.13	7.43	0.679	0.434	96.6	10.23	464	2.70	N/A	12.6
040000	11.14	7.43	0.678	0.434	97.1	10.28	469	2.70	N/A	12.6
050000	11.13	7.43	0.679	0.434	96.8	10.25	474	2.70	N/A	12.6
060000	11.13	7.43	0.679	0.434	96.8	10.25	478	2.70	N/A	12.6
070000	11.14	7.43	0.678	0.434	96.8	10.24	481	2.70	N/A	12.7
080000	11.16	7.43	0.679	0.435	96.9	10.25	485	2.70	N/A	12.6
090000	11.24	7.44	0.679	0.435	97.3	10.28	488	2.70	N/A	12.6
100000	11.44	7.44	0.678	0.434	98.5	10.36	491	2.70	N/A	12.7
110000	11.73	7.44	0.678	0.434	99.8	10.43	493	2.70	N/A	12.7
120000	11.81	7.44	0.678	0.434	100.6	10.49	494	2.70	N/A	12.7
130000	11.81	7.44	0.679	0.434	102.0	10.64	497	2.70	N/A	12.8
140000	11.81	7.44	0.678	0.434	103.3	10.77	498	2.69	N/A	12.8
150000	11.93	7.45	0.679	0.434	103.9	10.80	500	2.69	N/A	12.8
160000	11.86	7.45	0.678	0.434	103.8	10.81	501	2.68	N/A	12.8
170000	11.71	7.45	0.678	0.434	103.9	10.85	502	2.68	N/A	12.8
180000	11.45	7.45	0.678	0.434	103.2	10.84	504	2.68	N/A	12.8
190000	11.34	7.44	0.679	0.434	100.7	10.62	485	2.68	N/A	12.8

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TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
200000	11.29	7.45	0.679	0.434	101.3	10.69	505	2.69	N/A	12.8
210000	11.19	7.44	0.679	0.435	100.8	10.66	507	2.69	N/A	12.7
220000	11.18	7.44	0.678	0.434	100.1	10.59	508	2.68	N/A	12.7
230000	11.16	7.44	0.678	0.434	99.1	10.49	509	2.68	N/A	12.7
Date (MMDDYY): 033196										
000000	11.14	7.44	0.678	0.434	99.7	10.56	509	2.68	N/A	12.7
010000	11.18	7.44	0.678	0.434	100.1	10.59	510	2.68	N/A	12.6
020000	11.18	7.44	0.678	0.434	99.2	10.49	510	2.68	N/A	12.6
030000	11.18	7.44	0.677	0.434	99.4	10.51	511	2.68	N/A	12.6
040000	11.18	7.44	0.678	0.434	99.6	10.53	511	2.68	N/A	12.6
050000	11.18	7.44	0.678	0.434	99.4	10.51	512	2.68	N/A	12.6
060000	11.18	7.45	0.677	0.434	99.4	10.51	512	2.68	N/A	12.6
070000	11.22	7.45	0.678	0.434	99.5	10.52	513	2.68	N/A	12.6
080000	11.31	7.45	0.679	0.434	99.0	10.45	513	2.68	N/A	12.6
090000	11.27	7.45	0.679	0.435	99.5	10.51	514	2.68	N/A	12.6
100000	11.29	7.45	0.679	0.434	99.5	10.50	515	2.68	N/A	12.6
110000	11.35	7.45	0.679	0.434	99.2	10.45	515	2.68	N/A	12.6
120000	11.65	7.45	0.679	0.434	100.7	10.54	515	2.68	N/A	12.7
130000	11.47	7.45	0.678	0.434	100.0	10.51	516	2.68	N/A	12.7
140000	11.39	7.45	0.679	0.434	99.1	10.43	516	2.67	N/A	12.6
150000	11.52	7.45	0.678	0.434	101.3	10.63	516	2.67	N/A	12.7
160000	11.62	7.45	0.678	0.434	101.4	10.62	516	2.67	N/A	12.7
170000	11.44	7.45	0.678	0.434	100.7	10.59	517	2.67	N/A	12.7
180000	11.44	7.45	0.696	0.446	90.9	9.56	537	2.44	N/A	12.7
190000	11.31	7.45	0.678	0.434	100.1	10.56	516	2.67	N/A	12.7
200000	11.24	7.45	0.678	0.434	100.0	10.57	519	2.67	N/A	12.8
210000	11.16	7.45	0.678	0.434	99.4	10.52	519	2.67	N/A	12.7
220000	11.11	7.45	0.679	0.434	99.6	10.56	519	2.68	N/A	12.7
230000	11.03	7.45	0.678	0.434	99.4	10.55	519	2.69	N/A	12.6

TABLE B-3
(Continued)

Time HHMMSS	Temp deg C	pH units	SpCond mS/cm	TDS Kmg/L	DO % Sat	DO mg/L	Redox mV	Level feet	Turb NTU	Batt volts
Date (MMDDYY): 040196										
000000	10.98	7.45	0.678	0.434	99.1	10.53	519	2.68	N/A	12.6
010000	10.95	7.45	0.678	0.434	99.2	10.55	520	2.68	N/A	12.6
020000	10.93	7.45	0.678	0.434	98.9	10.52	520	2.68	N/A	12.6
030000	10.87	7.45	0.678	0.434	98.8	10.53	520	2.68	N/A	12.6
040000	10.85	7.46	0.678	0.434	99.2	10.58	520	2.69	N/A	12.6
050000	10.77	7.45	0.677	0.433	98.8	10.55	520	2.69	N/A	12.6
060000	10.69	7.45	0.676	0.433	98.4	10.53	521	2.69	N/A	12.5
070000	10.77	7.45	0.678	0.434	93.8	10.01	520	2.69	N/A	12.5
080000	10.80	7.45	0.678	0.434	93.8	10.01	522	2.70	N/A	12.5
090000	10.80	7.45	0.694	0.444	85.4	9.12	452	2.46	N/A	12.5
100000	10.80	7.45	0.696	0.445	84.9	9.06	429	2.46	N/A	12.5
110000	10.80	7.45	0.684	0.438	83.8	8.94	510	2.46	N/A	12.5
120000	10.80	7.45	0.690	0.442	82.5	8.80	499	2.46	N/A	12.5
130000	10.80	7.44	0.683	0.437	70.3	7.50	531	2.45	N/A	12.6
140000	10.80	7.44	0.690	0.442	73.9	7.88	539	2.46	N/A	12.6
150000	10.80	7.44	0.699	0.447	73.1	7.80	541	2.46	N/A	12.6
160000	10.80	7.45	0.700	0.448	74.4	7.94	507	2.46	N/A	12.7
170000	10.80	7.44	0.700	0.448	74.4	7.94	511	2.46	N/A	12.7
180000	10.80	7.44	0.701	0.449	75.0	8.00	521	2.46	N/A	12.7
190000	10.80	7.44	0.702	0.449	75.2	8.02	531	2.46	N/A	12.7
200000	10.80	7.44	0.702	0.449	75.5	8.06	523	2.46	N/A	12.6
210000	10.80	7.45	0.702	0.449	75.0	8.00	519	2.46	N/A	12.6
220000	10.80	7.45	0.700	0.448	74.8	7.98	527	2.46	N/A	12.6
230000	10.80	7.45	0.703	0.450	74.8	7.98	538	2.47	N/A	12.5
Date (MMDDYY): 040296										
000000	10.80	7.44	0.704	0.450	72.4	7.72	537	2.46	N/A	12.5
010000	10.80	7.44	0.706	0.452	69.4	7.40	533	2.47	N/A	12.5
020000	10.80	7.44	0.707	0.452	67.2	7.17	533	2.46	N/A	12.5
030000	10.80	7.44	0.707	0.453	64.7	6.91	535	2.47	N/A	12.4
040000	10.80	7.44	0.709	0.454	62.1	6.63	538	2.47	N/A	12.4
050000	10.80	7.44	0.709	0.454	59.3	6.33	541	2.47	N/A	12.4
060000	10.80	7.44	0.711	0.455	56.9	6.07	542	2.47	N/A	12.4
070000	10.80	7.44	0.712	0.456	54.3	5.79	542	2.47	N/A	12.4
080000	10.80	7.43	0.714	0.457	51.9	5.53	542	2.47	N/A	12.4
090000	10.80	7.43	0.714	0.457	49.6	5.29	542	2.47	N/A	12.5

Recovery finished at 040296 092343

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