

NCC-1W2

NCC-DZMWI

Program Management at Risk Services for Water, Wastewater & Irrigation Facilities

W-7C North Cape Reverse Osmosis Water Treatment Plant and Water Reclamation Facility Class I Deep Injection Well System

Appendices

A through D and F through Q

February 2009



MWH



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APPENDIX B – Deviation Surveys

APPENDIX C – Lithologic Logs

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APPENDIX Q – Injection Test

Appendix A

FDEP Construction Permit



Jeb Bush
Governor

Department of Environmental Protection

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549
Ph. (239) 332-6975 / Fax (239) 332-6969

Colleen M. Castille
Secretary

SENT VIA ELECTRONIC MAIL:

In the Matter of an
Application for Permit by:

December 11, 2006

Mr. Charles G. Pavlos, P.E., Director of Public Works
City of Cape Coral
1015 Cultural Park Blvd
Cape Coral, FL 33915
Email: cpavlos@capecoral.net

Lee County – UIC
File Number: 257996-001 & 002-UC
North Reverse Osmosis Water Treatment Plant
Class I Injection Wells

NOTICE OF PERMIT ISSUANCE

Enclosed are Permit Numbers 257996-001 & 002-UC to Construct two (2) Class I Injection Wells (IW-1, IW-2) system, issued pursuant to Section(s) 403.087, Florida Statutes.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Jon M. Iglehart
Director of District Management


CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this PERMIT and all copies were mailed before the close of business on December 11, 2006 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to Section.120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.


Clerk 12/11/2006
Date

JMI/DR/rcd

Enclosure

Copies furnished to:

cc Philip L. Waller, P.E. (philip.waller@mwhglobal.com)
Nancy Marsh, EPA (marsh.nancy@epa.gov)
Ron Reese, USGS (rsreese@usgs.gov)
Steve Anderson, SFWMD (sanderso@sfwmd.gov)
Joe Haberfeld, FDEP (joe.haberfeld@dep.state.fl.us)



Jeb Bush
Governor

Department of Environmental Protection

South District
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Colleen M. Castille
Secretary

PERMIT

PERMITTEE:

Mr. Charles G. Pavlos, P.E., Director of Public Works
City of Cape Coral
1015 Cultural Park Blvd
Cape Coral, FL 33915
Email: cpavlos@capecoral.net

Lee County -
File Number: 257996-001 & 002-UC
Date of Issue: December 5, 2006
Expiration Date: December 4, 2011
Latitude: 26° 41' 37.8" N
Longitude: 81° 59' 59" W
Town/Range/Section:
North Reverse Osmosis Water Treatment Plant
Class I Injection Wells

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Rules 62-4, 62-520, 62-528, 62-550, 62-600, and 62-601. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the Department and made a part hereof and specifically described as follows:

Construct two (2) tubing and packer Class I injection wells, (IW-1, IW-2), with cemented 22" twenty-two inch steel casing to approximately 2400 feet below land surface (bls) and 15.8-inch OD FRP injection tubing cemented to approximately 2400 feet bls and a total depth of approximately 3000 feet bls. Injection is into the Oldsmar Formation for the primary means of disposal of non-hazardous secondary treated domestic wastewater from the North Water Reclamation Facility and a non-hazardous reverse osmosis concentrate from the North Reverse Osmosis Water Treatment Plant for a maximum disposal of 7.4 million gallons per day (MGD) at a maximum injection rate of 5,136 gpm. The dual zone monitoring well (DZMW-1) will be completed from approximately 1300 to 1350 feet bls and from approximately 1600 to 1650 feet bls.

The Application to Construct/Operate/Abandon Class I, III, or V Injection well System, DEP Form 62-528.900(1), was received November 23, 2005, with supporting documents and additional information last received March 6, 2006. The Certificate of Demonstration of Financial Responsibility was approved March 6, 2006. The project is located at the North Reverse Osmosis Water Treatment Plant at 1200 Block Kismet Parkway West, Cape Coral, FL 33915, Lee County, Florida.

Subject to Specific Conditions 1-14.

1. GENERAL CRITERIA

- a. Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.
- b. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- c. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.
- d. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.
- e. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.
- f. When requested by the Department, the permittee shall furnish, within the time specified, any information needed to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
- g. Signatories and Certification Requirements
 - (1) All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.
 - (2) In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”
- h. The permittee shall notify the Department and obtain approval prior to any physical alterations or additions to the injection or monitor well, including removal of the well head.
- i. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity that may result in noncompliance with permit requirements.
- j. The permittee shall report any noncompliance that may endanger health or the environment, including:

- (1) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or
 - (2) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.
 - (3) Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
- k. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water.
- l. The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under Rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.
- m. If injection is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain an operation permit. If necessary to complete the two-year operational testing period, the permittee shall apply for renewal of the construction permit at least 60 days prior to the expiration date of this permit.

2. SITE REQUIREMENTS

- a. A drilling pad shall be provided to collect spillage of contaminants and to support the heaviest load that will be encountered during drilling.
- b. The disposal of drilling fluids, cuttings, formation water or waste shall be in a sound environmental manner that avoids violation of surface and ground water quality standards. The disposal method shall be approved by the Department prior to start of construction.
- c. Specific drilling pad dimensions and design details shall be provided to and approved by the Department prior to commencing construction (and shortly after selection of drilling contractor).
- d. The water table monitoring wells surrounding the injection well and monitor well pads shall be sampled and analyzed prior to drilling this injection well and then weekly thereafter. Sampling shall include specific conductance, pH, chloride, temperature and water level.
- e. Pursuant to Rule 62-528.455(1)(c)6., F.A.C., a survey indicating the exact location in metes and bounds of all wells authorized by this permit shall be provided prior to issuance of an operating permit.

3. CONSTRUCTION AND TESTING REQUIREMENTS

- a. The permittee shall contact the Technical Advisory Committee (TAC) chairman so that he may schedule progress review meetings at appropriate times with the TAC and permittee for the purpose of reviewing the results of tests, geophysical logging, surveys, drilling records and construction problems.
- b. All drilling shall be inside a blow out preventer upon penetration of the Floridian Aquifer.
- c. Mechanical integrity testing is a two-part demonstration which includes a pressure test to demonstrate that no leaks are present in the casing, tubing or packer and a temperature or noise log and radioactive tracer survey to demonstrate the absence of leaks behind the casing. Verification of pressure gauge calibration must be provided at the scheduled tests.
- d. Department approval and Technical Advisory Committee (TAC) review pursuant to F.A.C. Rule 62-528 is required for the following stages of construction:
 - (1) Intermediate casing seat selection for injection and monitor wells.
 - (2) Final casing seat selection for injection and monitor wells.
 - (3) Prior to conducting the 24-hour injection test with reclaimed water.
 - (4) Prior to operational (long term) testing with effluent.
 - (5) The permittee shall submit all necessary supporting documentation/data, with interpretation, to the TAC for review.
- e. The cementing program, as required in Section 62-528.410(5), Florida Administrative Code, shall be submitted to the Department and the Technical Advisory Committee for review. Cementing shall not commence prior to approval being granted.
- f. All temperature surveys (except for mechanical integrity demonstration) shall be run within 48 hours after cementing.
- g. TAC meetings are scheduled on the 1st Tuesday of each month subject to a 5 working day prior notice and timely receipt of critical data by all TAC members. Emergency meetings may be arranged when justified to avoid undue construction delay.
- h. The Permittee shall insure that safe internal pressures are maintained during the cementing of all casings.
- i. The injection zone and monitoring zones shall be sampled for background water quality prior to commencement of any injection testing. Parameters to be measured are the primary and secondary drinking water standards (except asbestos, dioxin, epichlorhydrin, and acrylamide) and the minimum criteria for municipal effluent.
- j. The injection and monitor well(s) at the site shall be abandoned when no longer usable for their intended purpose, or when posing potential threat to the quality of the waters of the State. Within 180 days of well abandonment, the permittee shall submit to the Department and the TAC the proposed plugging method, pursuant to Rule 62-528.435, F.A.C.

- k. All salt used in well drilling shall be stored in an environmentally sound manner. Accurate records shall be kept on the amount of salt used.
- l. All dual induction, sonic and caliper geophysical logs run on the pilot holes of the injection well and monitor wells shall be submitted with scales of one inch equals one hundred feet (1"=100'), two inches equals one hundred feet (2"=100'), and five inches equals one hundred feet (5"=100')
- m. An engineering drawing showing the drill pad construction (including material used) and locations of the injection well, dual zone monitor well, and the water table monitor wells shall be provided for Department approval prior to pad construction and well construction.

4. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

- a. This permit approval is based upon evaluation of the data contained in the application dated August 2005 and the plans and/or specifications submitted in support of the application. Any proposed modifications to this permit shall be submitted in writing to the Underground Injection Control program manager, the TAC for review and clearance prior to implementation. Changes of negligible impact to the environment and staff time will be reviewed by the program manager, cleared when appropriate and incorporated into this permit. Changes or modifications other than those described above will require submission of a completed application and appropriate processing fee as per Rule 62-4.050, F.A.C.
- b. A professional engineer registered pursuant to Chapter 471, Florida Statutes shall be retained throughout the construction period to be responsible for the construction operation and to certify the application, specifications, completion report and other related documents. The Department shall be notified immediately of any change of engineer.
- c. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) F.S., applicable portions of permit applications and supporting documents that are submitted to the Department for public record shall be signed and sealed by the professional(s) who approved or prepared them.
- d. The Department shall be notified immediately of any problems that may seriously hinder compliance with this permit, construction progress, or good construction practice. The Department may require a detailed written report describing the problem, remedial measures taken to assure compliance and measures taken to prevent recurrence of the problem.
- e. Issuance of a Class I Test/Injection well construction and testing permit does not obligate the Department to authorize operation of the injection well system, unless the wells qualify for an operation permit applied for by the permittee and issued by the Department.

5. REPORTING REQUIREMENTS

- a. All reports and surveys required by this permit must be submitted concurrently to all the members of the TAC. The TAC consists of representatives from these agencies:

Florida Department of Environmental Protection
South District
P.O. Box 2549
Fort Myers, FL 33902-2549

Florida Department of Environmental Protection
Bureau of Water Facilities Regulation
UIC Program, MS 3530
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

South Florida Water Management District
P.O. Box 24860
West Palm Beach, FL 33416-4860

United States Geological Survey
9100 NW 36th Street, Suite 107
Miami, FL 33178

- b. Members of the TAC shall receive a weekly summary of the daily log kept by the contractor. The reporting period shall run for seven (7) days and reports shall be mailed or emailed within 48 hours of the last day of the reporting period. The report shall include but is not limited to the following:
- (1) Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used;
 - (2) Description of formation and depth encountered; and specific conductance of water samples collected during drilling. Description of work during installation and cementing of casings; include amounts of casing and actual cement used versus calculated volume required.
 - (3) Lithological description of drill cuttings collected every ten (10) feet or at every change in formation. Description of work and type of testing accomplished, geophysical logging, pumping tests, deviation survey results, and coring results.
 - (4) Description of any construction problems that develop and their status to include a description of what is being done or has been done to correct the problem.
 - (5) Description of the amount of salt used.
 - (6) Results of any water quality analyses performed as required by this permit, including pad monitor wells.
 - (7) Copies of the driller's log are to be submitted with the weekly summary.
- c. The Department must be notified seventy-two (72) hours prior to all testing for mechanical integrity on the injection well. Testing should begin during daylight hours Monday through Friday.
- d. Annotated copies of geophysical logs, lithologic descriptions and logs and water quality data (from drilling and packer tests) must be submitted to TAC, with interpretation, for intermediate and final casing seat selection approvals by the Department.
- e. An interpretation of all test results must be submitted with all test data and geophysical logs.
- f. After completion of construction and testing, a final report, certified by a P.E. and P.G., shall be submitted to the Department and the TAC. The report shall include, but not be limited to, all information and data collected under Rule 62-528.450(2) and Rule 62-528.450(3), F.A.C., with appropriate

interpretations. Mill certificates for the casing(s) shall be included in this report. To the extent possible, the transmissivity of the injection zone and maximum injection rate within safe pressure limits shall be estimated.

6. The construction permit includes a period of temporary injection operation for the purposes of long term testing. Prior to commencement of operational testing:
 - a. Construction of the injection well shall be complete and the permittee shall submit a notice of completion of construction certified by a P.E. to the Department.
 - b. Each well shall first be tested for integrity of construction, and shall be followed by a short-term injection test of such duration to allow for the prediction of the operating pressure.
 - c. The permittee shall submit the following information to each member of the Technical Advisory Committee:
 - (1) A copy of the borehole television survey(s)
 - (2) Geophysical logs
 - (3) Mechanical integrity test data
 - (4) Data obtained during the short term injection testing conducted pursuant to Rules 62-528.405(3)(a) and 62-528.410(7)(e), and 62-528.450(3)(a)2., F.A.C.
 - (5) Confining zone data
 - (6) Background water quality data for the injection and monitor zones
 - (7) Waste stream analysis
 - (8) As-built well construction specifications
 - (9) Draft operation and maintenance manual with emergency procedures
 - (10) Other data obtained during well construction needed by the Department to evaluate whether the well will operate in compliance with Department rules.
 - d. The emergency discharge method shall be fully operational and no emergency discharge shall occur until the permittee has obtained all necessary permits.
 - e. Any corrective action required under Rule 62-528.300(5)(c)2., F.A.C., has been completed.
 - f. Written authorization shall be obtained from the Department. Authorization shall be for up to two years or the expiration date of the construction permit, whichever is less, and is nonrenewable. The authorization shall specify the conditions under which operational testing is approved. The authorization shall include:
 - (1) Injection pressure limitation

- (2) Injection flow rate limitation
 - (3) Monthly specific injectivity testing
 - (4) Reporting requirements, and
 - (5) An expiration date for the operational testing period not to exceed two years.
- g. Before authorizing operational testing the Department shall conduct an inspection of the facility to determine if the conditions of the permit have been met.

7. OPERATIONAL TESTING REQUIREMENTS

a. Operational Testing Conditions - Injection Well System

- (1) The injection system shall be monitored in accordance with rule 62-528.425(1)(g) and 62-528.430(2), F.A.C.
- (2) The following injection well performance data shall be recorded and reported at the frequency indicated from the injection well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

The permittee shall monitor injection flow rate and injection pressure. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

INJECTION WELL IW-I . The proposed specifications for the injection well is as follows:

<i>Casing Diameter (OD)</i>	<i>Depth (bls) Cased</i>	<i>Open Hole (bls)</i>
44" Steel	500'	
36" Steel	1400'	
24" Steel	2400'	
		2400'-3000'

<i>Parameters</i>	<i>Reporting Frequency</i>
Injection Pressure (psi)	Daily/Monthly
Maximum Injection Pressure	Daily/Monthly
Minimum Injection Pressure	Daily/Monthly
Average Injection Pressure	Daily/Monthly
Flow Rate (gpm)	Daily/Monthly
Maximum Flow Rate	Daily/Monthly
Minimum Flow Rate	Daily/Monthly
Average Flow Rate	Daily/Monthly

Total Volume WRF Effluent Injected (gallons)	Daily
Total Volume WRF Effluent Injected (gallons)	Monthly

Injctate Water Quality

WRF Effluent Water Quality

<i>Parameters</i>	<i>Reporting Frequency</i>
Ammonia (mg/l)	Monthly
Total Kjeldahl Nitrogen (TKN) (mg/L)	Monthly
Nitrate + Nitrite as N (mg/l)	Monthly

b. Operational Testing Conditions - Monitor Well System.

(1) The monitor well system will consist of one Dual Zone Monitor Well as described below:

<i>Well Number</i>	<i>Casing Dia. (OD)</i>	<i>Depth (bls) Cased/Total</i>
DZMW-1 (Upper)	16" Steel	1300'/1350'
DZMW-1 (Lower)	6.625" FRP	1800'/1850'

(2) All monitor wells shall be monitored in accordance with rule 62-528.425 and 62-528.430, F.A.C. The following monitor well performance data shall be recorded and reported at the frequency indicated from the monitor well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The permittee shall use continuous indicating and recording devices to monitor the monitor zone pressures or water levels. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

DZMW-1

<i>Parameters</i>	<i>Reporting Frequency</i>
Maximum Water Level/Pressure (Ft NGVD or psi)	Daily/Monthly
Minimum Water Level/Pressure (Ft NGVD or psi)	Daily/Monthly
Average Water Level/Pressure (Ft NGVD or psi)	Monthly

Water Quality

<i>Parameters</i>	<i>Reporting Frequency</i>
Specific Conductivity (µmhos/cm)	Weekly
Total Dissolved Solids (mg/L)	Weekly
pH (std. units)	Weekly
Chloride (mg/L)	Weekly

Sulfate (mg/L)	Weekly
Field Temperature (°C)	Weekly
Ammonia (mg/l)	Weekly
Total Kjeldahl Nitrogen (TKN) (mg/L)	Weekly
Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly

(3) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

- c. The permittee shall calibrate all pressure gauge(s), flow meter(s), chart recorder(s), and other related equipment associated with the injection well system on a semi-annual basis. The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in Standard Methods for the Examination of Water and Wastewater. The pressure gauge(s), flow meter(s), and chart recorder(s) shall be calibrated using standard engineering methods.
- d. The permittee shall submit monthly to the Department the results of all injection well and monitor well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, P.O. Box 2549, Fort Myers, Florida 33902-2549. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.
- e. The Engineer of Record or designated qualified representative must be present for the start-up operations and the Department must be notified in writing of the date operational testing commenced for the well.

8. ABNORMAL EVENTS

- a. In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by electronic mail within 24 hours of breakdown or malfunction to the UIC Program staff, South District office.
- b. A written report of any noncompliance referenced in 1) above shall be submitted to the South District office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.

9. EMERGENCY DISPOSAL

- a. All applicable federal, state and local permits must be in place to allow for any alternate discharges due to emergency or planned outage conditions.

- b. Any changes in emergency disposal methods must be submitted for Technical Advisory Committee (TAC) and USEPA review and Department approval.
- c. The permittee shall notify the Department within 24 hours whenever an emergency discharge has occurred (Rule 62-528.415(4)(c)1., F.A.C.). Written notification shall be provided to the Department within 5 days after each occurrence. The Permittee shall indicate the location and duration of the discharge and the volume of fluid discharged.

10. FINANCIAL RESPONSIBILITY

- a. The permittee shall maintain the resources necessary to close, plug and abandon the injection and associated monitor wells, at all times (Rule 62-528.435(9), F.A.C.).
- b. The permittee shall review annually the plugging and abandonment cost estimates. The permittee shall resubmit documentation necessary to demonstrate financial responsibility using the revised cost estimates on or before March 31 of each year.
- c. In the event that the mechanism used to demonstrate financial responsibility should become invalid for any reason, the permittee shall notify the Department of Environmental Protection in writing within 14 days of such invalidation. The permittee shall, within 30 days of said notification, submit to the Department for approval, new financial documentation in order to comply with Rule 62-528.435(9), F.A.C., and the conditions of this permit.

11. MECHANICAL INTEGRITY

- a. Injection is prohibited until the permittee affirmatively demonstrates that the well has mechanical integrity. Prior to operational testing the permittee shall establish, and thereafter maintain, mechanical integrity of the well at all times.
 - b. If the Department determines that the injection well lacks mechanical integrity, written notice shall be given to the permittee.
 - c. Unless the Department requires the immediate cessation of injection, within 48 hours of receiving written notice from the department that the well lacks mechanical integrity the permittee shall cease injection into the well unless the Department allows continued injection pursuant to (d) below.
 - d. The Department may allow the permittee to continue operation of a well that lacks mechanical integrity if the permittee demonstrates that fluid movement into or between underground sources of drinking water is not occurring.
12. The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. These regulations may include, but not limited to, those of the Federal Emergency Management Agency in implementing flood control measures. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.
13. The permittee shall be aware of and operate under the general conditions in Rule 62-528.307(1)(a) through (x) and Rule 62-528.307(2)(a) through (f), F.A.C. These general conditions are binding upon the permittee and enforceable pursuant to Chapter 403 of the Florida Statutes.

Charles G. Pavlos, P.E., Director of Public Works
City of Cape Coral

Permit/Cert No. 257996-001 & 002-UC
Date of Issue: **December 5, 2006**
Expiration Date: **December 4, 2011**

Note: In the event of an emergency the permittee shall contact the Department by calling (850) 488-1320. During normal business hours, the permittee shall call (239) 332-6975.

Issued this 11th day of December 2006.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION



Jon M. Iglehart
Director of District Management

JMI/DR/rcd

FACT SHEET
Permit No. 257996-001 and 002-UC
August 17, 2006

Construction permit for the Cape Coral North Water Treatment Plant Injection Wells IW-1 and IW-2 and Monitor Well System

1. General Information

A. Name and Address of Applicant

Mr. Charles G. Pavlos, P.E., Director of Public Works
City of Cape Coral
1015 Cultural Park Blvd.
Cape Coral, Florida 33915

B. Description of Applicant's Operation

To construct and test two Class I injection wells, IW-1 and IW-2, and a corresponding dual zone monitor well to be located at the Cape Coral North Reverse Osmosis Water Treatment Plant (WTP) at the 1200 block of Kismet Parkway West, Cape Coral, Lee County. The injection wells are to be used for the disposal of non-hazardous reverse osmosis concentrate from the WTP as well as non-hazardous secondary treated municipal effluent from the Cape Coral North Water Reclamation Facility (WRF). The maximum capacity for each well shall be 7.4 MGD. See Document 1, p. 4-1.

C. Permitting History of this Facility

None

D. Documents Used in Permitting Decision

1. Application to construct injection wells and monitor wells with supporting information and contract documents, November 2005.
2. Response to comments, Montgomery Watson Harza, January 26, 2006.
3. Financial responsibility documentation submitted March 3, 2006.
4. Response to comments, Montgomery Watson Harza, March 2, 2006.

2. Reasons Permit Was Issued; Derivation of Conditions

A. Mechanical Integrity Demonstration (Rule 62-528.300(6), F.A.C.)

1. To be demonstrated by a one hour pressure test of at least 1.50 X the maximum injection pressure on the cemented casing and on the cemented tubing. The pressure test will be considered successful if the pressure change is not in excess of 5 percent (Document 1, Section 7).
2. A temperature log and radioactive tracer log will be run on the completed injection well (Document 1, Section 7).

B. Confinement (Rule 62-528.405(2), F.A.C.)

To be demonstrated through packer tests, ground water samples every 30 feet, formation sampling every 10 feet, coring, a television survey, and geophysical logs. Confinement is expected in the Ocala, Avon Park and upper Oldsmar Formations at a depth of approximately 1400 to 2400 feet below land surface (bls). See document 1, Section 2, and document 2).

C. Injection Zone Testing (Rule 62-528.405(3), F.A.C.)

To be performed through lithologic sampling, water quality tests, geophysical logs, formation sampling and long and short term injection tests (Document 1, Section 7). The injection zone is expected in the Oldsmar Formation between 2400 and 3000 feet bls (Document 1, Section 2 and Section 7).

D. Underground Source of Drinking Water (Rule 62-528.405(1)(a), F.A.C.)

The base of the lowermost Underground Source of Drinking Water (USDW) is expected to occur in the Ocala limestone at approximately 1400 feet bls (Document 1, Section 2). The depth of the 10,000 mg/L total dissolved solids (TDS) interface and the background water quality of the monitoring zones will be determined by geophysical logging, water samples while drilling, coring, and packer tests. See Document 1, Section 7, and Document 2. The injection zone is expected to completely underlie the USDW in the area of review (Document 1, Section 2).

E. Well Construction

Proposed casing program for IW-1 and IW-2 (all casings are to be new, unused steel, cemented to land surface). Actual depths of casings will be determined from drilling and testing data. See Document 1, Sections 4 and 7, and Document 2.

42" OD (0.375" thick) steel casing set to 500 feet bls
34" OD (0.375" thick) steel casing set to 1400 feet bls
22" OD (0.50" thick) steel casing set to 2400 feet bls
14.5" ID (0.66" thick) FRP tubing set to 2400 feet bls and cemented to land surface

Total well depth is to be 3000 feet bls.

F. Monitor Plan (Rule 62-528.425(1), F.A.C.)

A dual zone monitor well is to be located within 150 feet of injection well IW-1 (Document 1, Section 5). The monitor intervals are proposed at 1350 to 1400 feet bls (Ocala Group) and 1600-1650 feet bls (Avon Park Formation), but depths may change due to site specific conditions. The upper monitor well shall be used to monitor the basal portion of the USDW. The lower zone is for early warning monitoring below the USDW. See Document 1, Section 5, and Document 2.

Packer tests, water quality tests, formation sampling, coring and geophysical logs will be used to define the characteristics of the monitoring zones (Document 1, Section 7).

Required parameters to be monitored during the operational testing phase of the permit include daily injection volume, continuous flow rate and injection pressure; weekly monitoring of the injectate for chemical parameters; monthly specific injectivity testing; continuous monitor well pressure; and weekly sampling of the monitor wells for chemical parameters. See Document 1, Section 5 for details.

As part of the specific injectivity test a pressure fall-off test is required (Rule 62-528.430(2)(c), F.A.C.).

G. Financial Responsibility (Rules 62-528.435(9) and 62-528.455(3)(b)8., F.A.C.)

Demonstrated by local government guarantee. Financial responsibility approved March 6, 2006. See Document 3 for details.

H. Emergency Disposal (Rule 62-528.455(1)(d), F.A.C.)

Each injection can be used as a backup disposal option to the other. See Document 1, Section 4 for details.

3. Technical Advisory Committee (TAC) Recommendation

TAC recommended approval of the construction permit.

4. Public Rights (Rules 62-528.310, 62-528.315, 62-528.325, F.A.C.)

Any interested person may submit written comments on the draft permit, and may request a public meeting, within 30 days of the public notice. A request for a public meeting shall be in writing and shall state the nature of the issues proposed to be raised in the meeting. If a public meeting is later scheduled, there will be another 30-day notice period for that meeting. Written comments or a public meeting request may be submitted to the Department of Environmental Protection, P. O. Box 2549, Fort Myers, Florida 33902-2549. All comments received within the 30-day period will be considered in formulation of the Department's final decision regarding permit issuance.

After the conclusion of the public comment period and public meeting described above the Department will consider all comments received during the public comment period in making a final decision concerning this permit action. When the Department has made a decision concerning the final permit, the applicant will publish notice of the proposed agency action. A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing). Accordingly, the Department's final action may be different from the position taken by it in the Notice.
Persons

whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified in the Notice and be filed (received) within 14 days of publication of this Notice in the Office of General Counsel, 3900 Commonwealth Blvd., Mail Station 35, Tallahassee, Florida 32399-3000. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application and draft permit are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at Department of Environmental Protection, South District Office, 2295 Victoria Ave., Suite 364, Fort Myers, Florida 33901.

5. Agency Contact

Abdul Ahmadi, P.E. Ph.D.
Florida Department of Environmental Protection
2295 Victoria Ave.
Fort Myers, FL 33901
239-332-6975, ext. 141

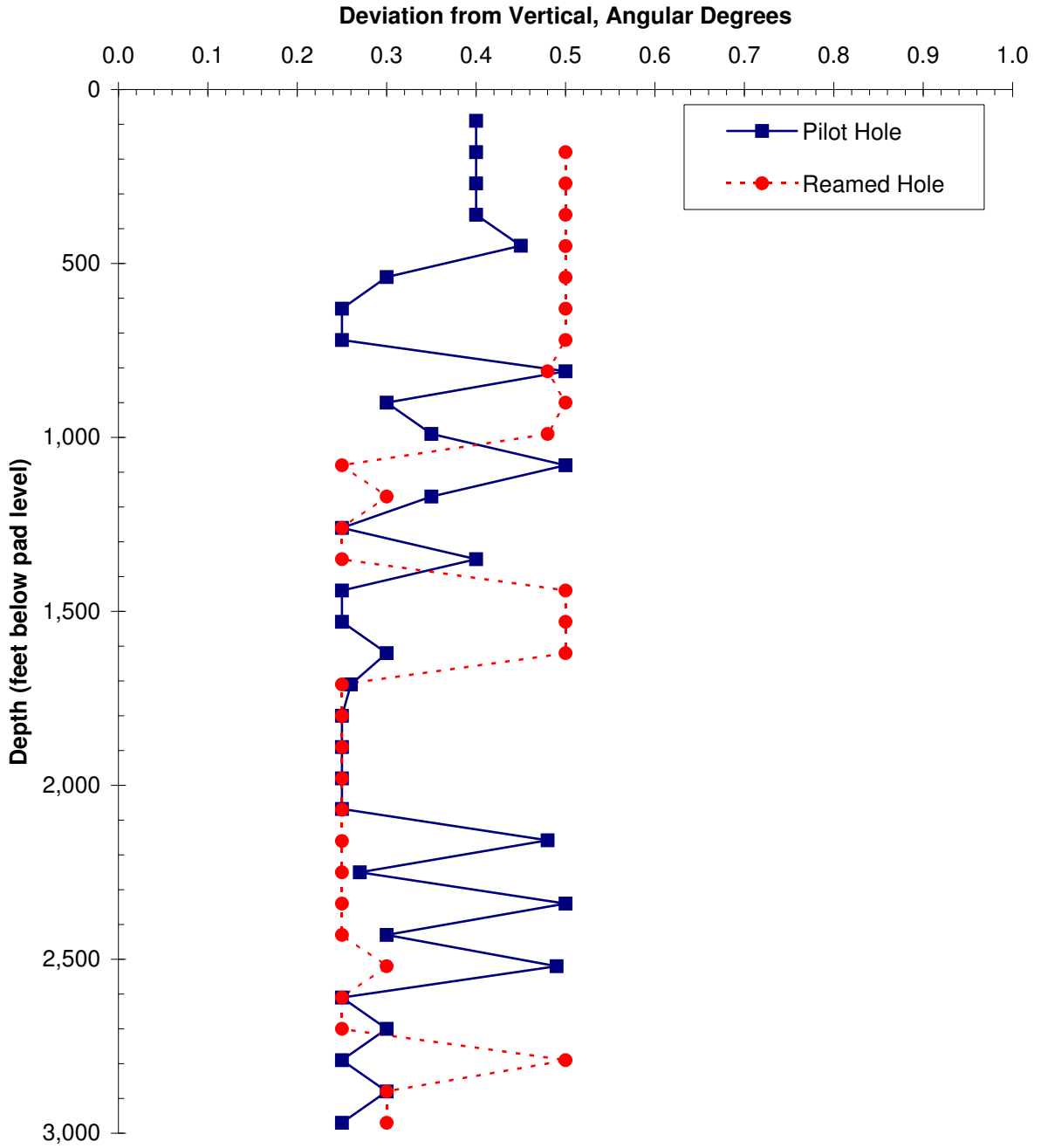
Appendix B

Deviation Surveys

Injection Well IW-2

Deviation Surveys

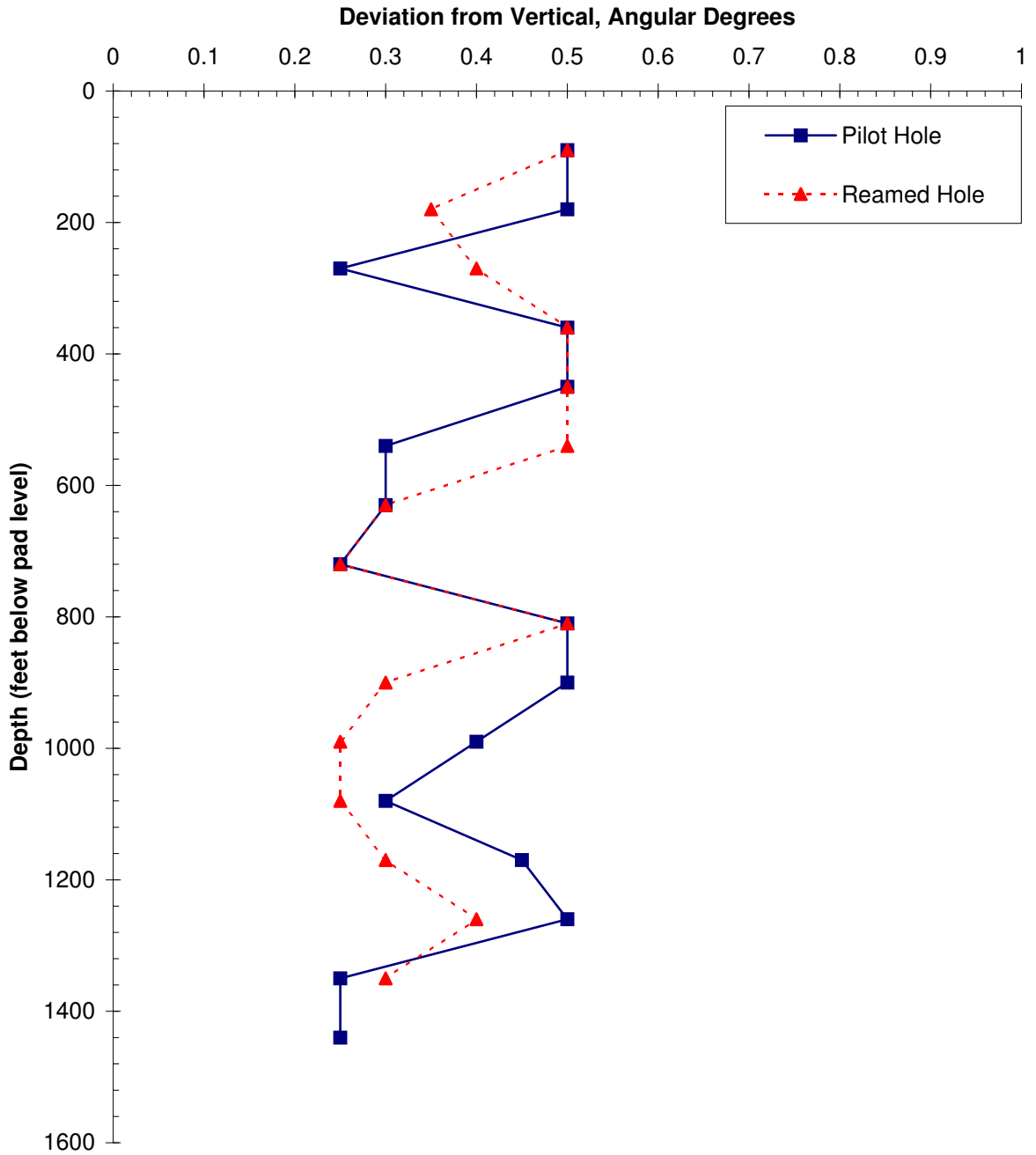
**City of Cape Coral North RO WTP
Injection Well (IW-2)
Pilot Hole & Reamed Hole
Deviation Surveys**



Monitor Well DZMW-1

Deviation Surveys

**City of Cape Coral North RO WTP
Monitor Well (DZMW-1)
Pilot Hole & Reamed Hole
Deviation Surveys**



Appendix C

Lithologic Logs

Injection Well IW-2

Lithologic Log

**CITY OF CAPE CORAL
NORTH CAPE RO WTP
LITHOLOGIC DESCRIPTION OF SAMPLES**

NJECTION WELL IW-2

UNDIFFERENTIATED MARINE TERRACE DEPOSITS
SURFICIAL AQUIFER SYSTEM

DEPTH	DESCRIPTION
0 – 18	Sand, very pale orange (10 YR 8/2) to black (N1), intergranular porosity, possibly high permeability, fine to medium grained, subrounded, unconsolidated, organics (25%), shell (15%), heavy minerals (trace), mollusks

TAMIAMI FORMATION

18 – 30	Limestone, very pale orange (10 YR 8/2), intergranular, moldic, and vugular porosity, medium permeability, grain types are micrite, biogenic, and skeletal, moderated induration with micrite cement, sand (15%), mollusks, echinoids
30 – 40	As above, limestone and shell
40 – 50	Limestone, yellowish gray (5Y 7/2), intercrystalline and vugular porosity, low to medium permeability, grain types are, crystal, micrite, and biogenic, good induration with sparry calcite cement, mollusks

**HAWTHORN GROUP
PEACE RIVER FORMATION
INTERMEDIATE AQUIFER SYSTEM
Upper Hawthorn Confining Zone**

50 – 60	Clayey silt, light olive green (), intergranular porosity, low permeability, very fine grained dolomite silt, poor induration with dolosilt, clay, and micrite cements, sand (40%), phosphate (5%), mollusks
60 – 70	Shell bed, light olive green, intergranular porosity, medium permeability, unconsolidated to slightly consolidated, dolosilt (5%), clay (trace), sand (25%), phosphate (5%), mollusks

Sandstone Aquifer

- 70 – 80 Limestone (mudstone to wackestone), yellowish gray (5 Y 7/2), intergranular, moldic and vugular porosity, medium to high permeability, grain types are micrite and biogenic, 10 % allochems, moderate induration with micrite and sparry calcite cements, sand (25 %), phosphate (10%), mollusks
- 80 – 100 Limestone, light olive gray (5 Y 5/2), intercrystalline and vugular porosity, low to medium permeability, grain types are crystal and micrite, less than 10% allochems, good induration with sparry calcite and micrite cements, sand (15%), phosphate (5%), unfossiliferous
- 100 – 110 Limestone, yellowish gray (5 Y 7/2), intergranular and vugular porosity, medium permeability, grain types are micrite and biogenic, 10 % allochems, moderate induration with micrite cement, sand (40%), phosphate (5%), mollusks

Middle Hawthorn Confining Zone

- 110 – 140 Dolosilt/clay, olive gray (5 Y 3/2), intergranular porosity, low permeability, very fine grained subhedral crystals, poor induration with dolosilt and clay cements, clay (5%), sand (5%), phosphate (trace), sand grains are medium to coarse and rounded
- 140 – 160 As above, more silt size phosphate (10%), and medium size carbonate pellets (foraminifera?)
- 160 – 180 Dolosilt/clay, olive gray (5 Y 3/2), intergranular porosity, low permeability, very fine grained subhedral to euhedral crystals, medium to high alteration, poor induration with dolostone, micrite, and clay cements, sand (10%), phosphate (4%)
- 180 -190 As above, with oyster shells and coarse phosphate (rubble bed?)
- 190 – 220 Clayey sand, olive gray (5 Y 3/2), intergranular porosity, low to medium permeability, very fine to coarse grained, subrounded to rounded, poor induration with dolomite and clay cements, phosphate (20%) some coarse size, clay (2%), dolosilt (5%), fossil fragments

ARCADIA FORMATION

Mid Hawthorn Aquifer ?

- 220 – 230 Siltstone, yellowish gray (5 Y 7/2), intergranular porosity, medium permeability, dolomite silt and micrite, moderated induration with dolomite and micrite cements, sand (25%), sand (10%)

- 230 – 250 Limestone (packstone), very pale orange (10 YR 8/2), intergranular and moldic porosity, medium to high permeability, grain types are micrite, skeletal, and biogenic, 50% allochems, moderate induration with micrite cement, bryozoans, mollusks
- 250 - 260 Dolosilt with sandy limestone
- 260 – 280 Sandy limestone (mudstone to wackestone), very pale orange (10 YR 8/2), intergranular and moldic porosity, medium permeability, grain types are micrite, skeletal, and biogenic, 20 % allochems, moderate induration with micrite and sparry calcite cements, sand (30%), phosphate (10%), mollusks, bryozoans
- 280 – 290 No sample

Lower Hawthorn Confining Zone

- 290 – 300 Interbedded limestone and dolosilt, very phosphatic
- 300 – 310 Dolosilt, olive gray (5 Y 3/2), intergranular porosity, low permeability, very fine grained euhedral and subhedral crystals, high alteration, poor induration with dolomite and clay cements, clay (2%), phosphate (5%), sand (10%), limestone fragments (15%)
- 310 – 320 Dolostone, pale yellowish brown (10 YR 6/2), intercrystalline and vugular porosity, low to medium permeability, very fine grained subhedral crystals, high alteration, good induration with dolomite and micrite cements, sand (3%), phosphate (15%)
- 320 – 330 Limestone (mudstone to wackestone), very pale orange (10 YR 8/2) to white (N 9), intergranular and vugular porosity, grain types are micrite, biogenic, and skeletal, moderate induration with micrite cement, sand (2%), phosphate (10%), echinoid spines
- 330 -340 Limestone (mudstone), very pale orange (10 YR 8/2), intergranular porosity, low permeability, grain types are micrite and biogenic, 5 % allochems, poor induration with micrite cement, sand (5%), phosphate (10%)
- 340 - 350 Limestone (wackestone), very pale orange (10 YR 8/2), intergranular and vugular porosity, medium permeability, grain types are crystal, micrite, and biogenic, 15 % allochems, moderate induration with micrite and sparry calcite cements, sand (5%), phosphate (10%), mollusks

- 350 – 360 Limestone (wackestone), very pale orange (10YR 8/2), moderately soft, moderately indurated, intergranular porosity, moderate permeability, grains are crystal and biogenic, sparry calcite and micritic matrix, phosphate (10%), dolosilt/clay (50%)
- Dolosilt (Clay), light olive gray (5Y 6/1), soft, slightly cohesive, sticky, intergranular porosity, poor permeability, clay to fine silt sized grains, dolomite and clay allochems, phosphate (10%)
- 360 – 370 Limestone, (wackestone), very pale orange (10YR 8/2), moderately soft, moderately indurated, intergranular porosity, moderate permeability, grains are crystal and biogenic, sparry calcite and micritic matrix, phosphate (10%), dolosilt/clay (20%)
- Dolosilt (Clay), light olive gray (5Y 6/1), soft, slightly cohesive, sticky, intergranular porosity, poor permeability, clay to fine silt sized grains, dolomite and clay allochems, phosphate (10%)
- 370 – 380 Limestone, very pale orange (10YR 8/2), wackestone, moderately soft, moderately indurated, intergranular porosity, moderate permeability, grains are crystal and biogenic, sparry calcite and micritic matrix, phosphate (10%), clay/dolosilt (10%)
- Dolosilt (Clay), light olive gray (5Y 6/1), soft, slightly cohesive, sticky, intergranular porosity, poor permeability, clay to fine silt sized grains, dolomite and clay allochems, phosphate (10%)
- 380 – 390 Limestone (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, low permeability, grains are < 10% allochems (biotics, sand), micritic matrix, phosphate (10%)
- 390 – 400 Limestone (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, low permeability, grains are < 10% allochems (biotics, sand), micritic matrix, phosphate (25%)
- 400 – 410 Limestone (mudstone to wackestone), very pale orange (10YR 8/2), soft, moderately indurated, intergranular porosity, moderate permeability, grains consist of biotics (skeletal) and silt/sand, micrite matrix, phosphate (10%)
- 410 – 430 Limestone (wackestone), very pale orange (10YR 8/2), wackestone, moderately soft, moderately indurated, intergranular and fenestral porosity, moderate permeability, grains are crystal and biogenic, sparry calcite and micritic matrix, phosphate (10%)

- 430 – 440 Limestone (mudstone), very pale orange (10YR 8/2), mudstone to wackestone, soft, moderately indurated, intergranular porosity, moderate permeability, grains consist of biotics (skeletal) and silt/sand, micrite matrix, phosphate (10%)
- 440 – 450 Limestone (wackestone), very pale orange (10YR 8/2), moderate hardness, moderate induration, intergranular porosity, moderate permeability, grains consist of biotics (skeletal) and crystals, micrite matrix, mollusca (5%), phosphate (10%)
- 450 – 460 Limestone (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, poor permeability, grains are silt sized, clays (10%) and phosphate (10%)
- 460 – 470 Limestone (wackestone), very pale orange (10YR 8/2), hard, well indurated, intergranular and fenestral porosity, moderate permeability, grains consist of crystals and biotics, micrite and sparry calcite matrix, phosphate (5%)
- 470 – 490 Limestone (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, poor permeability, grains are silt sized, clays (10%) and phosphate (10%)
- 490 – 500 Limestone (wackestone), very pale orange (10YR 8/2), moderate hardness, moderate induration, intergranular porosity, moderate permeability, grains consist of biotics (skeletal) and crystals, micrite matrix, phosphate (10%)
- 500 – 530 Limestone (packstone), very pale orange (10YR 8/2) to light olive gray (5Y 6/1), packstone, hard, well indurated, interparticle, fenestral, and moldic porosity, moderate permeability, grains are crystals and biotics, micrite and sparry calcite matrix, phosphate (5%)
- 530 – 540 Limestone (packstone), very pale orange (10YR 8/2) to light olive gray (5Y 6/1), packstone, hard, well indurated, interparticle, fenestral, and moldic porosity, moderate permeability, grains are crystals and biotics, micrite and sparry calcite matrix, phosphate (5%)
- Limestone (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, poor permeability, grains are silt sized, clays (10%) and phosphate (10%)
- 540 – 550 Limestone (mudstone to wackestone), very pale orange (10YR 8/2), soft, poorly indurated, intergranular porosity, poor permeability, grains are biotics (mollusca present), micritic matrix, phosphate (5%)

- 550 – 570 Limestone (packstone), very pale orange (10YR 8/2) to light olive gray (5Y 6/1), hard, well indurated, interparticle, fenestral, and moldic porosity, moderate permeability, grains are crystals and biotics, micrite and sparry calcite matrix, phosphate (5%)
- Limestone, (mudstone), very pale orange (10YR 8/2), soft, poor induration, intergranular porosity, poor permeability, grains are silt sized, clays (25%) and phosphate (10%)
- 570 – 580 Limestone, (wackestone), very pale orange (10YR 8/2), soft, poorly indurated, intergranular porosity, poor permeability, grains are biotics (mollusca present), micritic matrix, phosphate (5%)
- 580 – 600 Limestone, very pale orange (10 YR 8/2), intergranular and vugular porosity, medium permeability, grain types are biogenic and crystal, poor to moderate induration with micrite and spar cements, sand (trace), phosphate (5%)
- 600 – 620 As above with more phosphate (10%)
- 620 – 630 Limestone, yellowish gray (5 Y 7/2), vugular porosity, possibly low permeability, grain type is biogenic and crystal, good induration with sparry calcite and micrite cements, sand (5%), phosphate (5%), highly recrystallized dolomite in sample
- 630 – 640 Dolostone, pale yellowish brown (10YR 6/2), intercrystalline, vugular, and moldic porosity, medium permeability, very fine grained euhedral crystals, high alteration, good induration with dolomite cement, phosphate (trace), fossil molds
- 640 – 650 Dolostone, greenish gray (5GY 6/1), pin point vugular porosity, possibly low permeability, microcrystalline to very fine grained subhedral crystals, good induration with dolomite and micrite cements, phosphate (1%)
- 650 – 660 Dolostone, pale yellowish brown (10YR 6/2), intercrystalline, moldic and vugular porosity, medium to high permeability, very fine grained euhedral crystals, good induration with dolomite cement, fossil molds
- 660 – 670 Dolostone, dark yellowish brown (10YR 4/2), intercrystalline and vugular porosity, microcrystalline to very fine grained subhedral to euhedral crystals, high alteration, good induration with dolomite cement
- 670 – 680 Limestone, mudstone, very pale orange (10YR 8/2), vugular and intergranular porosity, low to medium permeability, grain types are biogenic and micrite, 5% allochems, moderate induration with micrite and sparry calcite cements, sand (5%), phosphate (2%), mollusks, bryozoans

- 680 - 700 Dolostone, greenish gray (5GY 6/1), pinpoint vugular porosity, very fine to microcrystalline euhedral crystals, high alteration, good induration with dolomite cement, sand (5%), phosphate (10%)
- 700 – 720 As above, less sand and phosphate
- 720 – 730 Sandstone and dolostone, sandstone was causing drilling problems
- Sandstone, dark yellowish brown (10YR 4/2), intergranular porosity, medium permeability, fine to medium subangular sand, moderate induration with dolomite and sparry calcite cements, phosphate (15%), dolomite (20%), spar (10%), mollusks, dolostone (50%)
- Dolostone, dark yellowish brown (10YR 4/2), intercrystalline and vugular porosity, possibly low permeability, very fine grained euhedral crystals, high alteration, good induration with dolomite cement, sand (5%), phosphate (5%)
- 730 – 740 Dolostone, as above

TAMPA MEMBER OF THE HAWTHORN GROUP
 FLORIDAN AQUIFER SYSTEM
 Lower Hawthorn/Tampa Producing Zone

- 740 – 750 Limestone (wackestone), very pale orange (10YR 8/2), intergranular, vugular and moldic porosity, medium permeability, grain types are micrite, crystal and biogenic, moderate induration with micrite and sparry calcite cements, sand (5%), phosphate (5%), fossil molds
- 750 – 770 Sandy, phosphatic limestone, dark yellowish brown (10YR 4/2), intergranular porosity, medium to high permeability, grain type is crystal, good induration with sparry calcite cement, sand (25%), phosphate (25%)
- 770 – 800 As above, less sand (10%) and phosphate (10%)
- 800 – 810 Limestone, very pale orange (10YR 8/2) to white (N9), intergranular and moldic porosity, possibly high permeability, grain types are skeletal, micrite, and biogenic, 40 allochems, moderate induration with micrite cement, sand (10%), phosphate (10%), echinoids, bryozoans
- 810 – 830 Crystalline limestone, light olive gray (5Y 5/2), intercrystalline and vugular porosity, possibly low permeability, grain types are crystal and micrite, good induration with sparry calcite and micrite cements, sand (10%), phosphate (10%)

SUWANNEE LIMESTONE

Suwannee Aquifer

- 830 – 850 Limestone (grainstone), very pale orange (10YR 8/2), intergranular and moldic porosity, possibly high permeability, grain types are skeletal, micrite, and biogenic, 55% allochems, moderate induration with micrite and sparry calcite cements, benthonic foraminifera (*Rotalia sp.*), milliolid, echinoids, mollusks, echinoid spines
- 850 – 870 Limestone (packstone to wackestone), very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are crystal, micrite, and biogenic, <50% allochems, moderate induration with sparry calcite and micrite cements, benthonic foraminifer
- 870 – 880 Limestone (mudstone), very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), intergranular porosity, possibly low permeability, grain types are micrite and biogenic, 10% allochems, poor induration with micrite cement, phosphate (5%)
- 880 – 900 Limestone, (grainstone or calcarenite), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, biogenic, and micrite, >65% allochems, moderate induration with micrite cement, mollusks, milliolid
- 900 – 920 As above
- 920 – 940 Limestone (packstone to wackestone), very pale orange (10YR 8/2), medium permeability, grain types are, micrite, biogenic, and skeletal, <50% allochems, moderate induration with micrite cement, pellets
- 940 -960 Limestone (wackestone), very pale orange (10YR 8/2), intergranular porosity, medium permeability, grain types are, crystal, micrite, and skeletal, 50% allochems, moderate induration with sparry calcite and micrite cements, ostracods, milliolid, benthonic foraminifera, mollusks
- 960 – 980 Limestone (packstone), very pale orange (10YR 8/2), intergranular and vugular porosity, low to medium permeability, grain types are skeletal, micrite, and crystal, <50% allochems, moderate induration with sparry calcite and micrite cements, milliolid, benthonic foraminifera, bryozoans
- 980 – 1000 Limestone (grainstone or calcarenite), very pale orange (10YR 8/2), intergranular porosity, medium to high permeability, grain types are biogenic, skeletal, and micrite, >65% allochems, moderate induration with

sparry calcite and micrite cements, benthonic foraminifer (*Dictyoconus cookei*, *Rotalia sp.*, and *Operculinooides sp.*), milliolids, echinoids, mollusks

- 1000 – 1010 Limestone (wackestone), very pale orange (10YR 8/2), intergranular and vugular porosity, possibly low permeability, grain types are micrite, biogenic, skeletal, <50% allochems, moderate induration with sparry calcite and micrite cements, sand (trace), mollusks, benthonic foraminifera (*Dictyoconus cookei*)
- 1010 – 1020 Limestone (grainstone), light olive green (5Y 6/1) to yellowish gray (5Y 8/1), intergranular porosity, medium permeability, grain types are skeletal, biogenic, and micrite, >65% allochems, moderate induration with micrite cement, benthonic foraminifera, pellets
- 1020 – 1040 Limestone (grainstone or calcarenite), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are biogenic, skeletal, and micrite, >65% allochems, moderate induration with micrite cement, benthonic foraminifera, ostracods, mollusks
- 1040 – 1060 Limestone (packstone), very pale orange (10YR 8/2), intergranular and moldic porosity, medium permeability, grain types are crystal, micrite, and skeletal, <50% allochems, moderate induration with sparry calcite and micrite cements, benthonic foraminifera, pellets
- 1060 – 1070 Limestone (grainstone or calcarenite), very pale orange (10YR 8/2), intergranular porosity, medium to high permeability, grain types are skeletal, biogenic, and micrite, >65% allochems, moderate induration with micrite and sparry calcite cements, benthonic foraminifera, bryozoans, mollusks
- 1070 – 1090 Limestone (mudstone), very pale orange (10YR 8/2), intergranular porosity, possibly low permeability, grain types are micrite and biogenic, < 20% allochems, poor induration with micrite cement, sand (2%), phosphate (2%)
- 1090 – 1100 Dolostone, moderate olive brown (5Y 4/4), pin point vugular porosity and intercrystalline porosity, low permeability, microcrystalline to very fine grained subhedral crystals, medium alteration, good induration with dolomite and micrite cement, sand (5%), phosphate (5%), appears bioturbated
- 1100 – 1120 Dolostone, pale yellowish brown (10Y 6/2), vugular and intercrystalline porosity, possibly low permeability, very fine grained euhedral crystals, high alteration, good induration with dolomite cement, sand (5%), phosphate (5%)

- 1120 – 1140 Carbonate clay (mudstone), very pale orange (10YR 8/2) to white (N7), intergranular porosity, low permeability, grain type is micrite and biogenic, <2% allochems, poorly indurated to unconsolidated with micrite cement, sand (5%), phosphate (5%), reworked zone or disconformity
- 1140 – 1160 Limestone (packstone), very pale orange (10YR 8/2), intergranular porosity, medium permeability, grain types are micrite, skeletal, and biogenic, <50% allochems, moderate induration with micrite and sparry calcite cements, benthonic foraminifera
- 1160 – 1180 Limestone (grainstone or calcarenite), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, crystal, and biogenic, >65% allochems, moderate induration with sparry calcite and micrite cements, miliolids, pellets, mollusks, forams
- 1180 1190 Limestone (grainstone), very pale orange (10YR 8/2) to greenish gray (5GY 6/1), intergranular porosity, medium permeability, grain types are crystal, skeletal, and biogenic, >65% allochems, moderate induration with sparry calcite and micrite cements, benthonic foraminifera, mollusks, miliolids
- 1190 – 1200 Limestone (packstone), very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are crystal, biogenic and skeletal, <40% allochems, moderate induration with sparry calcite and micrite cements, miliolids
- 1200 – 1230 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, biogenic, and crystal, >65% allochems, moderate induration with sparry calcite cement, miliolids, pellets, spines, echinoids, fossil fragments
- 1230 – 1260 Limestone (packstone to grainstone), very pale orange (10YR 8/2) intergranular porosity, medium permeability, grain types are crystal, skeletal, and biogenic, moderate induration with sparry calcite and micrite cements, forams, pellets, fossil fragments
- 1260 – 1295 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, biogenic and micrite, >65% allochems, moderate induration with micrite cement, pellets, echinoids, spines, mollusks
- 1295 - 1300 Dolostone, dark yellowish brown (10YR 4/2), pin point vugular and intracrystalline porosity, low permeability, fine to very fine grained subhedral crystals, good induration with dolomite and micrite cements

1300 – 1320 Dolostone, moderate yellowish brown (10YR 5/4), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement

OCALA LIMESTONE

Deeper Aquifer

1320 – 1345 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, crystal and biogenic, >65% allochems, moderate induration with micrite and sparry calcite cements, benthonic foraminifera (*Gypsina globula*), pellets, mollusks, bryozoans

1350 – 1370 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are biogenic, skeletal, and micrite, >65% allochems, moderate induration with micrite cement, benthonic foraminifera (*Lepidocyclina ocalana* and *Gypsina globula*), echinoid spines, bryozoans, and mollusks

1370 – 1380 Limestone (packstone) very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are crystal, skeletal, and biogenic, 40% allochems, moderate induration with sparry calcite and micrite cement, benthonic foraminifera, mollusks, echinoids

1380 – 1400 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, biogenic, and micrite, >65% allochems, moderate induration with micrite cement, benthonic foraminifer (*Operculinoides ocalana*), mollusks, bryozoans

AVON PARK FORMATION

1400 – 1410 Dolostone, dark yellowish orange (10YR 6/6), intercrystalline porosity, medium permeability, fine to very fine grained subhedral crystals, high alteration, moderate induration with dolomite and sparry calcite cement, limestone in sample containing various Eocene forams

1410 – 1430 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, moderate induration, poorly to moderately consolidated, moderately hard, intercrystalline porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix, sample contains cement

- 1430 – 1460 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, moderate induration, poorly to moderately consolidated, moderately hard, intercrystalline porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1460 – 1480 Dolostone, dark yellowish brown (10YR 4/2) to dark yellowish orange (10 YR 6/6), crystalline, well indurated, moderate to good consolidated, moderately hard, intercrystalline and vug porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1480 - 1530 Dolostone, dark yellowish brown (10YR 4/2) to dark yellowish orange (10 YR 6/6), crystalline, well indurated and consolidated, moderately hard, intercrystalline and vug porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1530 – 1550 Dolostone, dark yellowish brown (10YR 4/2) to dark yellowish orange (10 YR 6/6), crystalline, well indurated, moderate to good consolidated, moderately hard, intercrystalline and vug porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1550 – 1560 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, moderate induration, poorly to moderately consolidated, moderately hard, intercrystalline porosity, moderate permeability, fine to coarse sand subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1560 – 1570 Dolostone, dark yellowish brown (10YR 4/2) to dark yellowish orange (10 YR 6/6), crystalline, well indurated, moderate to good consolidated, moderately hard, intercrystalline and vug porosity, moderate permeability, fine to very fine subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1570 – 1590 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, moderate induration, poorly to moderately consolidated, moderately hard, intercrystalline porosity, moderate permeability, fine to coarse sand subhedral crystals, dolomite and minor sparry calcite cement matrix
- 1590 – 1610 Dolostone, pale yellowish brown (10 YR 6/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, moderate to good induration with micrite, sparry calcite, and dolomite cements, unfossiliferous.

- 1610 – 1620 Dolostone, dark yellowish orange (10 YR 6/6), intercrystalline porosity, possibly high permeability, very fine to fine grained euhedral crystals, high alteration, poor to moderate induration with dolomite cement, sucrosic
- 1620 – 1630 Dolostone, pale yellowish brown (10 YR 6/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement
- 1630 – 1650 Dolostone, moderate yellowish brown (10 YR 5/4), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained subhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, lignite (2%), phosphate (trace)
- 1650 – 1670 Dolostone, moderate yellowish brown (10 YR 5/4) to pale yellowish brown (10 YR 6/2), intergranular, vugular, and moldic porosity, medium permeability, microcrystalline to very fine grained subhedral crystals, high alteration, moderate induration with dolomite and sparry calcite cements, phosphate (trace), fossil molds
- 1670 – 1690 Dolostone, dark yellowish brown (10 YR 4/2), intracrystalline and vugular porosity, possibly low permeability, microcrystalline size subhedral crystals, good induration with dolomite cement
- 1690 – 1710 Dolostone, pale yellowish brown (10 YR 6/4), intercrystalline and vugular porosity, low permeability, microcrystalline to very fine grained subhedral crystals, moderate to good induration with dolomite and sparry calcite cements
- 1710 – 1740 Dolostone, dark yellowish orange (10 YR 6/6), intergranular and intercrystalline porosity, possibly high permeability, very fine to fine grained euhedral crystals, high alteration, poor induration with dolomite cement, sucrosic
- 1738 – 1790 Dolomite silt filling cavities encountered in this interval
- 1740 – 1770 Dolostone, dark yellowish brown (10 YR 4/2), intergranular and intercrystalline porosity, possibly high permeability, very fine to medium grained euhedral crystals, high alteration, poor induration with dolomite cement,
- 1770 – 1790 Dolostone, dark yellowish orange (10 YR 6/6), as above

- 1790 – 1810 Dolostone, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, low to medium permeability, microcrystalline to very fine grained subhedral crystals, high alteration, good induration with dolomite cement, sucrosic dolomite crystals in sample
- 1810 - 1840 Dolostone, dark yellowish orange (10 YR 6/6), intercrystalline and intergranular porosity, possibly high permeability, fine to medium grained euhedral crystals, high alteration, loosely consolidated, poorly indurated with dolomite cement
- 1840 – 1870 Dolostone, as above, trace phosphate and magnesite
- 1870 – 1900 Dolostone, dark yellowish brown (10 YR 4/2), intercrystalline and intergranular porosity, possibly high permeability, microcrystalline to fine grained euhedral crystals, poor induration with dolomite cement
- 1900 – 1910 Dolostone, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained subhedral crystals, good induration with dolomite cement
- 1910 – 1940 Dolostone, dark yellowish orange (10 YR 6/6), intercrystalline and intergranular porosity, possibly high permeability, microcrystalline to very fine grained euhedral crystals, poor to moderate induration with dolomite cement
- 1940 – 1960 Dolostone, as above, micritic limestone (2%) in sample
- 1960 – 1970 Dolostone, dark yellowish brown (10 YR 4/2), intercrystalline and intergranular porosity, possibly high permeability, very fine to fine euhedral crystals, poor induration with dolomite cement
- 1970 – 1980 As above, hard dolomite at 1975
- 1980 – 2010 Dolostone, dark yellowish brown (12 YR 4/2), intercrystalline and vugular porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, moderate induration with dolomite and sparry calcite cements
- 2010 – 2040 Limestone (wackestone), very pale orange (10 YR 8/2) to grayish orange (10 YR 7/4), intergranular and vugular porosity, medium permeability, grain types are micrite, skeletal, and biogenic, 20% allochems, moderate induration with micrite cement, benthonic foraminifera, pellets, milliolids, *Dictyoconus cookei*

OLDSMAR FORMATION

- 2040 – 2060 Limestone (packstone), pale yellowish brown (10 YR 6/2), intergranular and vugular porosity, grain types are micrite, skeletal, and biogenic, 60% allochems, moderate induration with micrite cement, glauconite (trace), benthonic foraminifera, milliolid
- 2060 – 2070 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, poor to moderate induration, intercrystalline and intergranular porosity, potentially high permeability, fine to coarse grained crystals, dolomite cement, minor micritic limestone.
- 2070 – 2110 Dolostone, dark yellowish brown (12 YR 4/2), crystalline, moderate induration, intercrystalline, interparticle, and vuggy porosity, moderate permeability, very fine to medium grained crystals, dolomite and sparry calcite cement, very minor micritic limestone, benthic forams.
- 2110 – 2140 Dolostone, dark yellowish orange (10 YR 6/6), crystalline, poor to moderate induration, intercrystalline to interparticle porosity, potentially high permeability, microcrystalline to fine grained sucrosic crystals, dolomite cement, trace micritic limestone.
- 2140 – 2150 Dolostone, dark yellowish brown (12 YR 4/2), crystalline, moderate induration, intercrystalline porosity, moderate permeability, microcrystalline to fine grain crystals, dolomite and sparry calcite cement, trace micritic limestone.
- 2150 – 2160 Dolostone, dark yellowish brown (12 YR 4/2) to black (N1), crystalline, moderate induration, intercrystalline porosity, moderate permeability, microcrystalline to fine grain crystals, dolomite and sparry calcite cement, trace micritic limestone.
- 2160 - 2210 Dolostone, dark yellowish brown (12 YR 4/2), crystalline, poor to moderate induration, intercrystalline and interparticle porosity, moderate to possibly high permeability, microcrystalline to fine grain crystals, dolomite cement, trace micritic limestone.
- 2210 – 2290 Dolostone, dark yellowish brown (12 YR 4/2) and medium dark gray (N4), crystalline, poor to moderate induration, intercrystalline, vug, and interparticle porosity, moderate to potentially high permeability, very fine to coarse grain dolomite crystals, dolomite and trace sparry calcite cement, trace micritic limestone and benthic forams.

- 2290 – 2330 Dolostone, dark yellowish brown (12 YR 4/2), intercrystalline, vugular, and moldic porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement
- 2330 – 2350 Dolostone, grayish brown (5YR 3/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, good induration with dolomite cement, organics
- 2350 – 2370 Dolostone, dark yellowish orange (10 YR 6/6), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained subhedral to euhedral crystals, good induration with dolomite cement
- 2370 2390 Dolostone, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, low to medium permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement, micrite (trace)
- 2390 – 2430 Dolostone, moderate yellowish brown (10 YR 5/4), intercrystalline and vugular porosity, medium permeability, microcrystalline to very fine grained subhedral crystals, good induration with dolomite and micrite cements, micrite (2%)
- 2430 – 2480 Dolostone, grayish orange (10 YR 7/4), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained subhedral to euhedral crystals, good induration with dolomite cement
- 2480 – 2510 Dolostone, dark yellowish brown (10 YR 4/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, moderate permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2510 – 2520 Dolostone, mottled dark yellowish brown (10YR 4/2), pale yellowish brown (10YR 6/2), and grayish black (N2), crystalline, good induration, very hard, intercrystalline and vugular porosity, moderate permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2520 – 2530 Dolostone, dark yellowish brown (10YR 4/2) and pale yellowish brown (10YR 6/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, moderate permeability, microcrystalline to very fine grained crystals, dolomite cement and trace calcite spar matrix.

- 2530 – 2540 Dolostone, dusky yellowish brown (10YR 2/2), crystalline, good induration, very hard, intercrystalline, vugular, and possibly fracture porosity, possibly high permeability, microcrystalline to fine grained crystals, minor sucrosic crystals along plane, dolomite and trace calcite cement matrix.
- 2540 – 2560 Dolostone, moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), crystalline, good induration, very hard, intercrystalline, vugular, and possibly fracture porosity, possibly high permeability, microcrystalline to fine grained crystals, dolomite cement matrix.
- 2560 – 2570 Dolostone, moderate yellowish brown and dark gray (N3), crystalline, good induration, very hard, intercrystalline, vugular, and possibly fracture porosity, possibly high permeability, microcrystalline to fine grained crystals, minor sucrosic crystals along plane, dolomite cement matrix.
- 2570 – 2620 Dolostone, moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to fine grained crystals, dolomite cement matrix.
- 2620 – 2630 Dolostone, pale yellowish brown (10YR 6/2), crystalline, good induration, intercrystalline porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2630 – 2640 Dolostone, pale yellowish brown (10YR 6/2) and dark yellowish brown (10YR 4/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to fine grained crystals, some sucrosic crystallization, dolomite cement matrix.
- 2640 – 2650 Dolostone, moderate yellowish brown (10YR 5/4) and very pale orange (10YR 8/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2650 – 2660 Dolostone, moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2660 – 2700 Dolostone, moderate yellowish brown (10YR 5/4) and black (N1), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, minor sucrosic crystallization, dolomite cement matrix.

- 2700 – 2720 Dolostone, moderate yellowish brown (10YR 5/4) and grayish black (N2), crystalline, good induration, very hard to mildly friable, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, minor sucrosic crystallization, dolomite cement matrix.
- 2720 – 2770 Dolostone, moderate yellowish brown (10YR 5/4) and grayish black (N2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix, trace sucrosic crystals.
- 2770 – 2780 Dolostone, moderate yellowish brown (10YR 5/4), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2780 – 2790 Dolostone, moderate yellowish brown (10YR 5/4) and grayish black (N2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2790 – 2810 Dolostone, moderate yellowish brown (10YR 5/4), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2810 – 2850 Dolostone, moderate yellowish brown (10YR 5/4) and grayish black (N2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2850 – 2860 Dolostone, moderate yellowish brown (10YR 5/4), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2860 – 2900 Dolostone, moderate yellowish brown (10YR 5/4) and grayish black (N2), crystalline, good induration, very hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2900 – 2960 Dolostone, moderate yellowish brown (10YR 5/4), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.

- 2960 – 2980 Dolostone, moderate yellowish brown (10YR 5/4) and pale yellowish brown (10YR 6/2), crystalline, good induration, hard, intercrystalline and vugular porosity, moderate permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2980 – 2990 Dolostone, moderate yellowish brown (10YR 5/4), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly high permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.
- 2990 – 3000 Dolostone, moderate yellowish brown (10YR 5/4) and pale yellowish brown (10YR 6/2), crystalline, good induration, hard, intercrystalline and vugular porosity, moderate permeability, microcrystalline to very fine grained crystals, dolomite cement matrix.

Monitor Well DZMW-1

Lithologic Log

**CITY OF CAPE CORAL
NORTH CAPE RO WTP
LITHOLOGIC DESCRIPTION OF SAMPLES**

MONITOR WELL DZMW-1

DEPTH	DESCRIPTION
0 – 10	Sand, very pale orange (10YR 8/2) to black (N1), intergranular porosity, possibly high permeability, fine to medium grained, subrounded, unconsolidated, shell (15%), limestone (25%), heavy minerals (trace), mollusks
10 – 20	Limestone, very pale orange (10YR 8/2) to pale olive (10Y 6/2), intergranular, moldic, and vugular porosity, medium permeability, grain types are micrite, biogenic, and skeletal, moderated induration with micrite cement, sand (15%), mollusks, echinoids
20 – 40	As above, limestone and shell
40 – 50	Limestone, pale olive (10Y 6/2), intercrystalline and vugular porosity, low to medium permeability, grain types are, crystal, micrite, and biogenic, poor induration with sparry calcite cement, (sand 25%), phosphate (2%), mollusks, echinoids
50 – 60	Clayey silt, pale olive (10Y 6/2), intergranular porosity, low permeability, very fine grained dolomite silt, poor induration with dolosilt, clay, and micrite cements, sand (40%), phosphate (5%), mollusks
60 – 70	Shell bed, light olive gray (5Y 6/1), intergranular porosity, medium permeability, unconsolidated to slightly consolidated, dolosilt (5%), clay (trace), sand (25%), phosphate (5%), mollusks
70 – 90	Limestone (mudstone to wackestone), yellowish gray (5Y 7/2), intergranular, moldic and vugular porosity, medium to high permeability, grain types are micrite and biogenic, 10% allochems, moderate induration with micrite and sparry calcite cements, sand (25 %), phosphate (10%), mollusks, much unconsolidated sand in sample
80 – 100	Limestone, light olive gray (5Y 5/2), intercrystalline and vugular porosity, low to medium permeability, grain types are crystal and micrite, less than 10% allochems, good induration with sparry calcite and micrite cements, sand (15%), phosphate (5%), unfossiliferous

- 100 – 140 Dolosilt/clay, olive gray (5Y 3/2), intergranular porosity, low permeability, very fine grained subhedral crystals, poor induration with dolosilt and clay cements, clay (5%), sand (5%), phosphate (trace), sand grains are medium to coarse and rounded
- 140 – 160 As above, more silt size phosphate (10%), and medium size carbonate pellets (foraminifera?)
- 160 – 170 Dolosilt/clay, olive gray (5Y 3/2), intergranular porosity, low permeability, very fine grained subhedral to euhedral crystals, medium to high alteration, poor induration with dolomite, micrite, and clay cements, sand (10%), phosphate (4%)
- 170 - 190 As above, with oyster shells and coarse phosphate (rubble bed?)
- 190 - 200 Siltstone, yellowish gray (5Y 7/2), intergranular porosity, medium permeability, dolomite silt and micrite, moderated induration with dolomite and micrite cements, sand (25%), sand (10%)
- 200 – 220 Limestone, very pale orange (10YR 8/2), intergranular and moldic porosity, medium to high permeability, grain type is micrite, crystal, and skeletal 50% allochems, moderated induration micrite and sparry calcite cements, phosphate (15%), sand (10%), mollusks
- 220 – 240 Dolosilt, olive gray (5Y 3/2), intergranular porosity, low permeability, very fine grained euhedral and subhedral crystals, high alteration, poor induration with dolomite and clay cements, clay (20%), phosphate (5%), sand (10%), limestone fragments (15%)
- 240 – 250 Siltstone, yellowish gray (5Y 7/2), intergranular porosity, medium permeability, dolomite silt and micrite, moderated induration with dolomite and micrite cements, sand (25%), sand (10%)
- 250 - 260 Limestone (packstone), very pale orange (10YR 8/2), intergranular and moldic porosity, medium to high permeability, grain types are micrite, skeletal, and biogenic, 50% allochems, moderate induration with micrite cement, bryozoans, mollusks
- 250 - 260 Siltstone, yellowish gray (5Y 7/2), intergranular porosity, medium permeability, dolomite silt and micrite, moderated induration with dolomite and micrite cements, sand (25%), sand (10%)

- 260 – 280 Sandy limestone (mudstone to wackestone), very pale orange (10YR 8/2), intergranular and moldic porosity, medium permeability, grain types are micrite, skeletal, and biogenic, 20% allochems, moderate induration with micrite and sparry calcite cements, sand (30%), phosphate (10%), mollusks, bryozoans
- 290 – 320 No sample
- 320 – 330 Clay/dolosilt, pale olive (10Y 6/2), intergranular porosity, low permeability, poor induration with clay and dolomite cements, sand (5%), phosphate (5%)
- 330 – 350 Limestone (mudstone to wackestone), very pale orange (10YR 8/2) to white (N9), intergranular and vugular porosity, grain types are micrite, biogenic, and skeletal, moderate induration with micrite cement, sand (2%), phosphate (10%), echinoid spines
- 350 – 360 Dolosilt, olive gray (5Y 3/2), intergranular porosity, low permeability, very fine grained euhedral and subhedral crystals, high alteration, poor induration with dolomite and clay cements, clay (2%), phosphate (5%), sand (10%), limestone fragments (15%)
- 360 – 400 As above, with calcareous clay and limestone fragments, 25% phosphatic sand
- 400 – 440 Dolosilt, olive gray (5Y 3/2), intergranular porosity, low permeability, very fine grained euhedral and subhedral crystals, high alteration, poor induration with dolomite and clay cements, clay (20%), phosphate (5%), sand (10%), limestone fragments (15%)
- 440 – 460 Dolosilt, pale olive (10Y 6/2), intergranular porosity, low permeability, very fine grained euhedral to subhedral crystals, poor induration with dolomite and clay cements, phosphate (10%), sand (2%)
- 460 – 470 Limestone, very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are biogenic and crystal, poor to moderate induration with micrite and spar cements, sand (trace), phosphate (5%), clay in sample
- 470 – 480 Dolostone, pale olive (10Y 6/2), intercrystalline and intergranular porosity, medium permeability, very fine to fine grained crystals, medium alteration, moderate induration with dolomite and micrite cements, phosphate (5%), sand (trace)

- 480 – 490 As above, with crystalline limestone
- 490 – 500 Limestone (wackestone to packstone), white (N9) to very pale orange (10YR 8/2), intergranular, moldic, and vugular porosity, medium to high permeability, grain types are crystal, micrite, and skeletal, 35% allochems, moderate induration with micrite and sparry calcite cements, phosphate (5%), sand (3%), mollusks, fossil molds
- 500 – 510 As above, with some dolostone in sample
- 510 – 520 Dolostone, pale olive (10Y 6/2), intercrystalline and intergranular porosity, medium permeability, very fine to fine grained crystals, high alteration, moderate induration with dolomite and micrite cements, phosphate (5%), sand (trace), benthonic foraminifera
- 520 – 540 Clayey sand, pale olive (10Y 6/2), intergranular porosity, medium permeability, very fine to medium grained, subangular, poor induration with clay and dolosilt cements, phosphate (10%), mollusks, echnoids
- 540 – 570 Dolosilt, pale olive (10Y 6/2) to grayish olive (10Y 4/2), intergranular porosity, low permeability, poor induration with dolomite and clay cements, sand and phosphate (trace)
- 570 – 580 Limestone (wackestone to packstone), white (N9) to very pale orange (10YR 8/2), intergranular, moldic, and vugular porosity, medium to high permeability, grain types are crystal, micrite, and skeletal, 35% allochems, moderate induration with micrite and sparry calcite cements, phosphate (5%), sand (3%), mollusks, fossil molds
- 580 – 590 Clayey sand, pale olive (10Y 6/2), intergranular porosity, medium permeability, very fine to medium grained, subangular, poor induration with clay and dolosilt cements, phosphate (10%), mollusks, echnoids
- 590 – 600 Dolostone, yellowish gray (5Y 7/2), intercrystalline porosity, possibly low permeability, microcrystalline to very fine grained subhedral crystals, medium alteration, moderate induration with dolomite and micrite cements, sand and phosphate (trace)
- 600 – 610 Limestone (packstone), very pale orange (10YR 8/2), intergranular and moldic porosity, possibly high permeability, grain types are biogenic, micrite, and skeletal, moderate induration with micrite cement, mollusks
- 610 – 630 Dolostone, pale yellowish brown (10YR 6/2), intercrystalline, vugular, and moldic porosity, medium permeability, very fine grained euhedral crystals, high alteration, moderate induration with dolomite cement, phosphate (5%), sand (10%), limestone cavings (20%)

- 630 – 650 Dolostone, yellowish gray (5Y 7/2), intercrystalline porosity, possibly low permeability, microcrystalline to very fine grained subhedral crystals, medium alteration, moderate induration with dolomite and micrite cements, sand and phosphate (trace)
- 650 – 660 Dolostone, greenish gray (5GY 6/1), pin point vugular porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement, phosphate (1%)
- 660 – 670 Clayey sand, pale olive (10Y 6/2), intergranular porosity, medium to high permeability, very fine to medium grained, subangular, poor induration with clay and dolosilt cements, phosphate (10%), limestone (20%), mollusks, echnoids
- 670 – 688 Limestone (mudstone), very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are biogenic, crystal, and micrite, moderate induration with micrite and sparry calcite cements, phosphate (5%), sand (5%)
- 688 – 700 Dolostone, dark yellowish brown (10YR 4/2), intercrystalline and vugular porosity, microcrystalline to very fine grained subhedral to euhedral crystals, high alteration, good induration with dolomite cement, sand (2%), phosphate (2%)
- 700 – 710 Dolostone, greenish gray (5GY 6/1), intercrystalline and vugular porosity, possibly high permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement, sand (5%), phosphate (5%)
- 710 – 719 Limestone (wackestone), very pale orange (10YR 8/2), intergranular, vugular and moldic porosity, medium permeability, grain types are micrite, crystal and biogenic, moderate induration with micrite and sparry calcite cements, sand (5%), phosphate (5%), fossil molds
- 719 – 720 Dolostone, pale yellowish brown (10YR 6/2), intercrystalline, moldic and vugular porosity, medium permeability, very fine grained euhedral crystals, good induration with dolomite cement, sand (trace), phosphate (trace)
- 720 – 740 Dolostone, light olive gray (5Y 6/1), crystalline, well indurated, intercrystalline, moldic and vugular porosity, moderate permeability, microcrystalline to fine grained crystals, dolomite cement and trace sparry calcite cement matrix, trace phosphate.
- 740 – 750 Dolostone (90%), light olive gray (5Y 6/1), crystalline, well indurated, intercrystalline, moldic and vugular porosity, moderate permeability,

- microcrystalline to fine grained crystals, dolomite cement and sparry calcite cement matrix, trace phosphate. 10% Limestone (wackestone), very pale orange (10YR 8/2), moderate induration, intergranular and moldic porosity, moderate permeability, grains are biogenic, micrite and sparry calcite cement matrix, trace phosphate, trace sand.
- 750 – 760 Dolostone (50%), pale yellowish brown (10YR 6/2), crystalline, well indurated, moldic and intercrystalline porosity, moderate permeability, microcrystalline to very fine crystals, dolomite and trace sparry calcite cement matrix, trace sand, trace phosphate. 50% Limestone (wackestone), very pale orange (10YR 8/2), moderate induration, intergranular and moldic porosity, moderate permeability, grains are biogenic, micrite and sparry calcite cement matrix, trace phosphate, trace sand.
- 760 – 770 Dolostone, pale yellowish brown (10YR 6/2), crystalline, well indurated, moldic and intercrystalline porosity, moderate permeability, microcrystalline to coarse sand, dolomite and trace sparry calcite cement matrix, trace micrite, trace sand, trace phosphate.
- 770 – 780 Dolostone, medium light gray (N6) to pale yellowish brown (10YR 6/2), crystalline, well indurated, intercrystalline, moldic, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement matrix, trace sand.
- 780 – 790 Dolostone (90%), medium light gray (N6) to pale yellowish brown (10YR 6/2), crystalline, well indurated, intercrystalline, moldic, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement matrix, trace sand. 10% Limestone (wackestone), very pale orange (10YR 8/2), moderate induration, calcarentic, intergranular porosity, moderate permeability, grains are biogenic, micrite and sparry calcite cement matrix, trace phosphate, trace sand.
- 790 – 800 Dolostone, medium light gray (N6) to pale yellowish brown (10YR 6/2), crystalline, well indurated, intercrystalline, moldic, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement matrix, trace sand.
- 800 – 810 Dolostone, light olive gray (5Y 6/1), crystalline, well indurated, intercrystalline, moldic and vugular porosity, moderate permeability, microcrystalline to fine grained crystals, dolomite cement and trace sparry calcite cement matrix, trace phosphate.
- 810 – 820 Limestone (90%), yellowish gray (5Y 8/1) wackestone, moderate induration, intergranular and moldic porosity, moderate permeability, grains are biogenic, micrite and sparry calcite cement matrix, trace sand

- and lime mud. 10% Dolostone, light olive gray (5Y 6/1), crystalline, well indurated, intercrystalline, moldic and vugular porosity, moderate permeability, microcrystalline to fine grained crystals, dolomite cement and trace sparry calcite cement matrix.
- 820 – 830 Limestone, light olive gray (5Y 5/2), crystalline, intercrystalline porosity, possibly low permeability, grain types are crystal and micrite, good induration with sparry calcite and micrite cements, sand (10%), phosphate (10%)
- 830 – 850 Dolostone (50%), medium light gray (N6) to pale yellowish brown (10YR 6/2), crystalline, well indurated, intercrystalline, moldic, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement matrix, trace sand, trace micrite. 50% Carbonate clay, yellowish gray (5Y 8/1), soft, moderate plasticity, intergranular porosity, low permeability, clay to silt sized micritic calcareous grains
- 850 – 870 Limestone (60%), yellowish gray (5Y 8/1), wackestone, moderately soft, intergranular porosity, moderate to low permeability, grains are biomicritic, micrite matrix, trace sand, trace marl. 40% Dolostone, medium light gray (N6) to pale yellowish brown (10YR 6/2), crystalline, well indurated, intercrystalline, moldic, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement matrix, trace sand, trace micrite.
- 870 – 880 Limestone (wackestone), yellowish gray (5Y 8/1), good induration, hard, intergranular and moldic porosity, moderate to poor permeability, microcrystalline to silt sized grains, micrite and sparry calcite cement matrix, trace sand. 50% Dolostone, medium dark gray (N4), microcrystalline, good induration, hard, moldic, intergranular, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement.
- 880 – 890 Limestone, yellowish gray (5Y 8/1), wackestone to packstone, moderate induration, moldic and interparticle porosity, moderate permeability, microcrystalline to coarse sand skeletal and biomicritic grains, fossiliferous, sparry calcite cement and trace micrite matrix.
- 890 – 900 Limestone (wackestone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate to low permeability, grains are biomicritic, micrite matrix, trace sand. 50% Dolostone, medium dark gray (N4) and moderate yellowish brown (10YR 5/4), microcrystalline, good induration, hard, moldic, intergranular, and vugular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement.

- 900 – 920 Limestone (grainstone), light gray (N7), moderately indurated, minor alteration, moldic and intergranular porosity, moderate to low permeability, grains are skeletal and biomicritic, micrite and sparry calcite cement matrix, fossiliferous, trace sand, trace phosphate. 10% Dolostone, light bluish gray (5B 7/1), microcrystalline, good induration, intergranular porosity, moderate permeability, microcrystalline grains, dolomite and sparry calcite cement, trace phosphate.
- 920 -940 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, minor alteration, moldic and intergranular porosity, moderate to low permeability, grains are skeletal and biomicritic, micrite and trace sparry calcite cement matrix, fossiliferous, trace sand, trace phosphate. 20% Dolostone, pale yellowish brown (10YR 6/2), crystalline, good induration, highly altered, intercrystalline and vugular porosity, moderate permeability, microcrystalline grains and minor sucrois crystals lining vugs, dolomite cement matrix, trace phosphate.
- 940 – 950 Limestone (wackestone to packstone), yellowish gray (5Y 8/1), moderately indurated, minor alteration, moldic and intergranular porosity, moderate to low permeability, grains are skeletal and biomicritic, micrite and trace sparry calcite cement matrix, fossiliferous, trace sand, trace phosphate.
- 950 – 960 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate to low permeability, grains are crystal and biomicirtic, trace micrite and sparry calcite cement matrix, fossiliferous, trace sand, trace phosphate.
- 960 – 980 Limestone (packstone to crystalline), yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace crystals, trace micrite cement matrix, fossiliferous, trace sand, trace phosphate.
- 980 – 990 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand, trace marl.
- 990 – 1000 Limestone (packstone to crystalline), yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace crystals, trace micrite cement matrix, fossiliferous, trace sand, trace phosphate.

- 1000 – 1010 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand.
- 1010 – 1020 Limestone (packstone to grainstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand. 30% Limemud, yellowish gray (5Y 8/1), poorly consolidated, intergranular porosity, possibly low permeability, fine silt to silt sized grains, fossiliferous, trace sand.
- 1020 – 1030 Limestone (packstone to crystalline), yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace crystals, trace micrite cement matrix, fossiliferous, trace sand, trace phosphate. 30% Limemud, yellowish gray (5Y 8/1), poorly consolidated, intergranular porosity, possibly low permeability, fine silt to silt sized grains, fossiliferous, trace sand.
- 1030 – 1040 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand. 50% Limemud, yellowish gray (5Y 8/1), poorly consolidated, intergranular porosity, possibly low permeability, fine silt to silt sized grains, fossiliferous, trace sand.
- 1040 – 1050 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand.
- 1050 – 1080 Limestone (packstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand. 50% Limemud, yellowish gray (5Y 8/1), poorly consolidated, intergranular porosity, possibly low permeability, fine silt to silt sized grains, fossiliferous, trace sand.
- 1080 – 1090 Carbonate clay, yellowish gray (5Y 8/1), poorly consolidated, slightly plastic, slightly sticky, intergranular porosity, possibly low permeability, fine silt micritic grains, trace micrite, trace phosphate.
- 1090 – 1110 Dolostone, light olive gray (5Y 6/1), crystalline, good induration, very hard, intercrystalline porosity, moderate to possibly low permeability, microcrystalline grains, dolomite cement matrix, trace phosphate, trace marl.

- 1110 – 1120 Carbonate clay, yellowish gray (5Y 8/1), poorly consolidated, plastic, slightly sticky, intergranular porosity, possibly low permeability, fine silt micritic grains, trace micrite, trace phosphate.
- 1120 – 1130 Carbonate clay (50%), yellowish gray (5Y 8/1), poorly consolidated, plastic, slightly sticky, intergranular porosity, possibly low permeability, fine silt micritic grains, trace micrite, trace phosphate.
- Dolostone (50%), light olive gray (5Y 6/1), crystalline, good induration, very hard, intercrystalline porosity, moderate to possibly low permeability, microcrystalline grains, dolomite cement matrix, trace phosphate, trace marl.
- 1130 – 1150 Carbonate clay, yellowish gray (5Y 8/1), poorly consolidated, plastic, slightly sticky, intergranular porosity, possibly low permeability, fine silt micritic grains, trace micrite, trace phosphate.
- 1150 – 1270 Limestone (packstone to grainstone), yellowish gray (5Y 8/1), moderately indurated, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand.
- 1270 – 1290 Limestone (packstone), yellowish gray (5Y 8/1), good induration, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, trace micrite cement matrix, fossiliferous, trace sand.
- 1290 – 1300 Dolostone, dark yellowish brown (10YR 4/2), crystalline, good induration, hard, intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained crystals, high alteration, dolomite cement matrix, trace sand.
- 1300 – 1320 Limestone (wackestone), yellowish gray (5Y 8/1), chalk, good induration, intergranular porosity, moderate permeability, grains are skeletal and biomicritic, micrite cement matrix, fossiliferous.
- 1320 – 1340 Limestone (packstone) very pale orange (10YR 8/2), intergranular and vugular porosity, medium permeability, grain types are crystal, skeletal, and biogenic, 40% allochems, moderate induration with sparry calcite and micrite cement, benthonic foraminifera, mollusks, echinoids
- 1340 – 1360 Limestone (packstone) yellowish gray (5Y 8/1), intergranular porosity, medium permeability, grain types are crystal, skeletal, and biogenic, 40% allochems, moderate induration with sparry calcite and micrite cement, benthonic foraminifera, mollusks, echinoids

- 1360 – 1370 Limestone (grainstone), very pale orange (10YR 8/2), intergranular porosity, possibly high permeability, grain types are skeletal, biogenic, and micrite, >65% allochems, moderate induration with micrite cement,
- 1370 – 1410 Limestone (wackestone), yellowish gray (5Y 8/1), intergranular porosity, medium permeability, moderately indurated, fine to medium sand biomicrite grains, micrite cement matrix, fossiliferous (lepidocyclina ocalana)
- 1410 – 1420 Limestone (wackestone to packstone) very pale orange (5YR 8/2), good induration, intergranular porosity, moderate permeability, grains are skeletal and biomicritic.
- 1420 – 1460 Limestone (wackestone) very pale orange (5YR 8/2), moderate induration, low porosity, moderate permeability, grains are skeletal and biomicritic, micrite to sparry matrix.
- 1460 – 1470 Carbonate clay, very pale orange (5YR 8/2), very soft moderately cohesive, plastic, marl.
- 1470 – 1475 Dolostone, yellowish gray (5Y 8/1) to grayish orange (10YR 7/4) intercrystalline porosity, medium permeability, fine to very fine grained euhedral crystals, low induration with dolomite and sparry calcite cement

Appendix D

Cores

Injection Well IW-2

**Core No. 1
1,630 – 1,640**



DZMW-1 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP MONITOR WELL DZMW-1

CORE #3

1,475 – 1,487 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 10/17/2007

Cored Interval (feet): 12.0

Recovered Core (feet): 10.0

Recovery: 83%

DEPTH (feet bls)	DESCRIPTION
1475.0 to 1481.7	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, hard, intergranular and moldic porosity, possibly low permeability, grains are fine to coarse grained, skeletal and biogenic, moderate alteration, 20% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams
1481.7 to 1482.9	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, moderately hard, intergranular and moldic porosity, possibly low permeability, grains are very fine to coarse grained, skeletal and biogenic, moderate alteration, 25% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams, and echinoid spines present.
1482.9 to 1483.9	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, moderately hard, intergranular and moldic porosity, possibly low permeability, grains are fine to coarse grained, skeletal and biogenic, moderate alteration, 30% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams, and echinoid spines present.
1483.9 to 1485.0	LIMESTONE, yellowish gray (5Y 8/1), wackestone, chalky, calcarenitic, good induration, moderately hard, intergranular porosity, possibly low permeability, grains are very fine to medium, biogenic, 40% allochems with micrite cement, trace calcite spars in matrix, forams present.



IW-2 CORING WORKSHEET

DATE(S): 3/20/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Wayne Fargo

TYPE OF BIT USED: Diamond

CORE NUMBER: 1

DIAMETER: 4-inches

START/ FINISH TIME CORING: 8:28 TO: 17:20

CORED INTERVAL: 1630 ft bls TO: 1639.5 ft bls

LENGTH OF CORED INTERVAL: 9.5 feet

LENGTH OF CORE SAMPLE RECOVERED: 6.5 feet

PERCENT OF SAMPLED LENGTH RECOVERED: 68 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1631	Dolostone (95%), lignite nodule and lignite (5%)	21	64	4-6	0-100
1632	Dolostone (98%), lignite (2%)	21	73	6-7	0-10
1633	Dolostone	21	60	5-7	0-100
1634	Dolostone	21	50	5-7	0-10
1635	Dolostone	21	57	4-6	0-600
1636	Dolostone	21	35	4-6	0-150
1637	Dolostone	21	41	4-7	0-100
1638	Dolostone	21	42	4-7	0-5
1639		21	60	4-7	0-10
1639.5		21	50	4-7	0-1000



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #1

1,630 – 1,640 feet bls

Core Diameter (inches): 4	Bit Type: Diamond	Date: 03/20/2007
Cored Interval (feet): 9.5	Recovered Core (feet): 6.5	Recovery: 68%

DEPTH (feet bls)	DESCRIPTION
1,631.0 – 1,631.2	DOLOSTONE, dark yellowish orange (10 YR 6/6), intergranular, intercrystalline, and moldic porosity, possibly high permeability, very fine to medium grained euhedral crystals, high alteration, moderate induration with dolomite cement, lignite nodule and lignite (5%)
1,631.2 to 1,631.5	DOLOSTONE, pale yellowish brown (10 YR 6/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, spar filling vugs
1,631.5 to 1,632.0	DOLOSTONE, moderate yellowish brown (10 YR 5/4), intercrystalline, moldic, and vugular porosity, medium permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, sucrosic dolomite crystals and spar lining vugs, possibly high horizontal permeability (moldic)
1,632.0 to 1,632.5	DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline, vugular, and moldic porosity, medium permeability, very fine to medium grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, lignite (2%)
1,632.5 to 1,633.0	DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement, lignite (trace)
1,633.0 to 1,634.0	As above, bedding plane at 2.50 ft, large fossil molds along plane

- 1,634.0 to 1,635.0 DOLOSTONE, moderate yellowish brown (10 YR 5/4), intercrystalline, vugular, and moldic porosity, medium permeability, microcrystalline to fine grained euhedral to subhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, sparry calcite lining insides of vugs
- 1,635.0 to 1,636.5 DOLOSTONE, dark yellowish orange (10 YR 6/2), intercrystalline, vugular, and moldic porosity, low to medium permeability, microcrystalline to very fine grained euhedral crystals, good induration with dolomite cement
- 1,636.5 to 1,637.5 DOLOSTONE, moderate yellowish brown (10 YR 5/4) to dark yellowish orange (10 YR 6/2), intercrystalline, vugular, and fracture porosity, possibly high permeability, microcrystalline dolomite, high alteration, good induration with dolomite and sparry calcite cements, vugs (vertical fracture) filled with sucrosic dolomite crystals
- 1,637.5 to 1,638.0 As above, gravel size pieces

Injection Well IW-2

**Core No. 2
1,810 – 1,816**



IW-2 CORING WORKSHEET

DATE(S): 3/22/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Wayne Fargo/Phillip Shand

TYPE OF BIT USED: Diamond

CORE NUMBER: 2

DIAMETER: 4-inches

START/ FINISH TIME CORING: 15:00 TO: 0:36

CORED INTERVAL: 1810 ft bls TO: 1816.3 ft bls

LENGTH OF CORED INTERVAL: 6.3 feet

LENGTH OF CORE SAMPLE RECOVERED: 8 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 127 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1810	Dolostone	20	120	5-6	0
1811	Dolostone	22	60	6-8	0
1812	Dolostone	22	50	6-8	-
1813	Dolostone	20	72	6-8	0-200
1814	Dolostone	28	105	8	0-200
1815	Dolostone	25	114	8	0-200
1816	Dolostone	27	55	8	0-10
1816.3	Dolostone	-	-	-	-



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #2

1,810 – 1,816 feet bls

Core Diameter (inches): 4	Bit Type: Diamond	Date: 03/22/2007
Cored Interval (feet): 6.3	Recovered Core (feet): 6.3	Recovery: 100%

DEPTH (feet bls)	DESCRIPTION
1,810.0 to 1,810.2	DOLOSTONE, dusky yellowish brown (10 YR 2/2), intergranular and intercrystalline porosity, possibly high permeability, microcrystalline to fine grained euhedral crystals, high alteration, moderate induration with dolomite cement
1,810.2 to 1,810.5	DOLOSTONE, dark yellowish orange (10 YR 6/6), intercrystalline, vugular, and moldic porosity, medium permeability, very fine to medium grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, sucrosic
1,810.5 to 1,810.7	DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement, angular fractures with secondary porosity
1,810.7 to 1,811.0	DOLOSTONE (fractured with secondary porosity), moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/2), intercrystalline, vugular, and intergranular porosities, possibly high permeability microcrystalline to very fine grained euhedral crystals, fine grained dolomite rhombs filling vugs and fractures, good induration with dolomite cement
1,811.0 to 1,812.5	DOLOSTONE, pale yellowish brown (10 YR 6/2) to grayish orange (10 YR 7/4), intercrystalline, vugular, and moldic porosity, low permeability, microcrystalline to very fine grained euhedral to subhedral crystals, high alteration, good induration with dolomite cements, sucrosic dolomite rhombs lining insides of vugs

- 1,812.5 to 1,813.5 DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline, vugular, and intergranular porosity, low to medium permeability, microcrystalline to very fine grained euhedral crystals, good induration with dolomite cement
- 1,813.5 to 1,814.0 DOLOSTONE (fractured), moderate yellowish brown (10 YR 5/4) to dark yellowish orange (10 YR 6/2), intercrystalline, vugular, and fracture porosity, possibly high vertical permeability, microcrystalline dolomite, high alteration, good induration with dolomite and sparry calcite cements, vugs (vertical fracture) filled with sucrosic dolomite crystals
- 1,814.0 to 1,814.6 DOLOSTONE (fractured with secondary vertical porosity), moderate yellowish brown (10 YR 5/4), intercrystalline, vugular, and fracture porosity, possibly high permeability, microcrystalline to fine grained euhedral to subhedral crystals, high alteration, good induration with dolomite cement
- 1,814.6 to 1,815.5 DOLOSTONE, dark yellowish orange (10 YR 6/6), intercrystalline, vugular, and moldic porosity, medium permeability, very fine to medium grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, sucrosic
- 1,815.5 to 1,816.3 DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement, angular fractures with secondary porosity

Injection Well IW-2

**Core No. 3
1,978 – 1,986**



IW-2 CORING WORKSHEET

DATE(S): 3/26/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Doug Drayer

TYPE OF BIT USED: Diamond

CORE NUMBER: 3

DIAMETER: 4-inches

START/ FINISH TIME CORING: 7:10 TO: 16:45

CORED INTERVAL: 1978' TO: 1986

LENGTH OF CORED INTERVAL: 8 ft

LENGTH OF CORE SAMPLE RECOVERED: 5 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 63 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1978	Dolostone	22	15	3-5	0
1980	Dolostone	22	15	5	25
1981	Dolostone	22	20	6	35
1981.3	Dolostone	22	60	7	40
1981.5	Dolostone	22	120	7	40
1982	Dolostone	22	60	7	40
1983	Dolostone	22	60	7	40
1985		22	30	7	40
1985.2		22	360	7	40
1985.3		22	720	7	40
1985.5		22	360	7	40



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #3

1,978 – 1,986 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 03/26/2007

Cored Interval (feet): 8.0

Recovered Core (feet): 5.0

Recovery: 63%

DEPTH (feet bls)	DESCRIPTION
1,978.0 to 1,979.2	DOLOSTONE (broken pieces), dusky yellowish brown (10 YR 2/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement
1,979.2 to 1,980.0	DOLOSTONE (broken pieces), dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements, sparry calcite lining vugs
1,980.0 to 1,981.0	DOLOSTONE, dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement
1,981.0 to 1,981.5	DOLOSTONE, dark yellowish orange (10 YR 6/6), intercrystalline, vugular, and fracture porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and sparry calcite cements
1,981.5 to 1,982.5	DOLOSTONE (broken pieces), dark yellowish brown (10 YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement
1,982.5 to 1,983.0	DOLOSTONE, moderate yellowish brown (10 YR 5/4), intercrystalline and vugular porosities, possibly low permeability microcrystalline to very fine grained euhedral crystals, fine grained dolomite rhombs filling vugs and fractures, good induration with dolomite cement

Injection Well IW-2

**Core No. 4
2,068 – 2,079**



IW-2 CORING WORKSHEET

DATE(S): 3/27/2007
3/28/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Wayne Fargo

TYPE OF BIT USED: Diamond

CORE NUMBER: 4

DIAMETER: 4-inches

START/ FINISH TIME CORING: 20:46 TO: 2:54

CORED INTERVAL: 2,068 ft bls TO: 2,079 ft bls

LENGTH OF CORED INTERVAL: 11 feet

LENGTH OF CORE SAMPLE RECOVERED: 5.5 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 50 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
2068	Dolostone	15	7	3 - 5	30
2069	Dolostone	20	7	3 - 5	30
2070	Dolostone	26	12	5 - 7	30
2071	Dolostone	26	20	5 - 8	30
2072	Dolostone	30	21	5 - 8	35
2073	Dolostone	30	64	5 - 8	45
2074		26	10	5 - 8	30
2075		25	27	5 - 8	40
2076		25	44	5 - 8	40
2077		25	16	5 - 8	40
2078		25	16	5 - 8	49
2079		-	-	-	-



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #4

2,068 – 2,079 feet bls

Core Diameter (inches): 4	Bit Type: Diamond	Date: 03/28/2007
Cored Interval (feet): 11.0	Recovered Core (feet): 5.5	Recovery: 50%

DEPTH (feet bls)	DESCRIPTION
2,068.0 to 2,068.3	DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug, fracture, and intercrystalline porosity, moderate to possibly high permeability, dolomite cement and sucrosic dolomite crystals lining vugs and possible fracture plane.
2,068.3 to 2,068.9	DOLOSTONE, medium gray (N5) to moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs.
2,068.9 to 2,069.4	DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs, high alteration.
2,069.4 to 2,069.8	DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs.
2,069.8 to 2,070.6	DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug, fracture, and intercrystalline porosity, moderate to possibly high permeability, dolomite cement and sucrosic dolomite crystals lining vugs and possible fracture plane.
2,070.6 to 2,071.8	DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug, fracture, and intercrystalline porosity, possibly high permeability, dolomite cement and sucrosic dolomite crystals lining vugs and verticle fracture plane.

- 2,071.8 to 2,072.8 DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs.
- 2,072.8 to 2,073.5 DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs, high alteration.

Injection Well IW-2

**Core No. 5
2,215 – 2,226**



IW-2 CORING WORKSHEET

DATE(S): 4/2/2007
4/3/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Doug Drayer/Wayne Fargo
 TYPE OF BIT USED: Diamond
 CORE NUMBER: 5
 DIAMETER: 4-inches

START/ FINISH TIME CORING: 22:58 TO: 11:20
 CORED INTERVAL: 2,215 ft. bls TO: 2,226 ft bls
 LENGTH OF CORED INTERVAL: 11 ft
 LENGTH OF CORE SAMPLE RECOVERED: 9 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 82 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
2215	Dolostone				
2216	Dolostone (98%), micrite (2%)	19 - 12	102	4 - 6	50 - 350
2217	Dolostone(97%), micrite (3%)	12	120	4 - 6	50
2218	Dolostone	12	45	4 - 6	50
2219	Dolostone	12	10	3 - 4	40
2220	Dolostone	12	65	4 - 7	40
2221	Dolostone	12	90	5 - 8	50
2222	Dolostone	12	55	6 - 8	50
2223	Dolostone (95%), micrite (5%)	12	73	7	40
2224	Dolostone (97%), micrite (3%)	12	92	7	40
2225	Dolostone (97%), micrite (3%)	12	40	7	40
2226	Dolostone (97%), micrite (3%)	12	60	7	40



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #5

2,215 – 2,226 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 04/03/2007

Cored Interval (feet): 11.0

Recovered Core (feet): 9.0

Recovery: 82%

DEPTH (feet bls)	DESCRIPTION
2,215.0 to 2,215.2	DOLOSTONE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), vugular, moldic and intercrystalline porosity, low to medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement, sucrosic dolomite crystals lining vugs
2,215.2 to 2,116.0	DOLOSTONE, moderate yellowish brown (10YR 5/4),intercrystalline, vugular, and moldic porosity, possibly low permeability, microcrystalline to medium grained euhedral dolomite crystals, good induration with dolomite cement, sucrosic dolomite crystals lining vugs.
2,216.0 to 2,216.5	DOLOSTONE (broken), moderate yellowish brown (10YR 5/4),vugular and intercrystalline porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (2%)
2,216.5 to 2,217.0	DOLOSTONE, moderate yellowish brown (10YR 5/4), vugular, moldic, and intercrystalline porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (5%), fine grained dolomite rhombs lining vugs
2,217.0 to 2,217.6	DOLOSTONE, moderate yellowish brown (10YR 5/4), intercrystalline, vugular, and moldic porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (3%), dolomite cement and sucrosic dolomite crystals lining vugs, vertical vugs

- 2,217.6 to 2,218.6 DOLOSTONE, dark yellowish brown (10YR 4/2), fracture, vugular, and intercrystalline porosity, possibly high permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement, dolomite crystals lining vugs and angular fracture planes.
- 2,218.6 to 2,221.0 DOLOSTONE (broken), moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), intercrystalline and vugular porosity, possibly high permeability, microcrystalline to medium grained subhedral to euhedral crystals, good induration with dolomite cement, sucrosic dolomite crystals lining vugs.
- 2,221.0 to 2,222.0 DOLOSTONE, moderate yellowish brown (10YR 5/4), crystalline, good induration, vug and intercrystalline porosity, moderate permeability, dolomite cement and sucrosic dolomite crystals lining vugs, high alteration.
- 2,222.0 to 2,223.0 DOLOSTONE, dark yellowish brown (10YR 4/2), vugular and intercrystalline porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement, angular fractures with sucrosic dolomite fill
- 2,223.0 to 2,224.0 DOLOSTONE (broken), moderate yellowish brown (10YR 5/4), vugular, moldic, and intercrystalline porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (5%), medium grained dolomite rhombs lining vugs

Injection Well IW-2

**Core No. 6
2,323 – 2,334**



IW-2 CORING WORKSHEET

DATE(S): 4/5/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Phillip Shand/Wayne Fargo

TYPE OF BIT USED: Diamond

CORE NUMBER: 6

DIAMETER: 4-inches

START/ FINISH TIME CORING: 1:50 TO: 9:33

CORED INTERVAL: 2,323 ft bls TO: 2,334 ft bls

LENGTH OF CORED INTERVAL: 11 ft

LENGTH OF CORE SAMPLE RECOVERED: 10 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 91 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
2323		16		7-8	150
2323.3		20	50	7-8	150
2324		20	50	7-8	156
2324.3		20	60	8	200
2327		20	77	8	200
2328		20	43	8	200
2329		18	18	8	0-250
2330		20	14	5-8	65
2331		18	20	8	0-100
2332		18	41	8	0-100
2333		18	41	8	0-100
2334		-	49	-	-



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #6

2,323 – 2,334 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 04/05/2007

Cored Interval (feet): 11.0

Recovered Core (feet): 10.0

Recovery: 91%

DEPTH (feet bls)	DESCRIPTION
2,324.0 to 2,325.0	DOLOSTONE, moderate yellowish brown (10YR 5/4), vugular and intercrystalline porosity, meium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, sucrosic dolomite crystals lining vugs, micrite (5%), large vertical vugs on one side of core
2,325.0 to 2,326.0	DOLOSTONE (two pieces), moderate yellowish brown (10YR 5/4),intercrystalline, vugular, and moldic porosity, possibly low permeability, microcrystalline to medium grained euhedral dolomite crystals, good induration with dolomite cement, sucrosic medium grained dolomite crystals lining vugs.
2,326.0 to 2,327.0	DOLOSTONE moderate yellowish brown (10YR 5/4),vugular and intercrystalline porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement
2,327.0 to 2,328.0	DOLOSTONE, moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), vugular and intercrystalline porosity, possibly low permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (5%), medium grained dolomite rhombs lining vugs
2,328.0 to 2,329.0	DOLOSTONE (two pieces), moderate yellowish brown (10YR 5/4), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to fine grained euhedral crystals, high alteration, good induration with dolomite cement, dolomite cement and sucrosic dolomite crystals lining vugs

- 2,329.0 to 2,330.0 DOLOSTONE, dark yellowish brown (10YR 4/2), fracture, vugular, and intercrystalline porosity, possibly high permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement, dolomite crystals lining vugs and angular fracture planes.
- 2,330.0 to 2,331.7 DOLOSTONE, moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), intercrystalline and vugular porosity, possibly low permeability, microcrystalline to medium grained euhedral crystals, good induration with dolomite cement, sucrosic dolomite crystals lining vugs.
- 2,331.7 to 2,333.0 DOLOSTONE, moderate yellowish brown (10YR 5/4), intercrystalline, vugular and fracture porosity, possibly high vertical permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement, medium size dolomite crystals fracture, core in two pieces split by fracture
- 2,333.0 to 2,334.0 DOLOSTONE (pieces), dark yellowish brown (10YR 4/2), vugular and intercrystalline porosity, medium permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite cement

Injection Well IW-2

**Core No. 7
2,356 – 2,367**



IW-2 CORING WORKSHEET

DATE(S): 4/8/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Phillip Shand/Doug Drayer

TYPE OF BIT USED: Diamond

CORE NUMBER: 7

DIAMETER: 4-inches

START/ FINISH TIME CORING: 2:25 TO: 10:20

CORED INTERVAL: 2,356 ft bls TO: 2,366.8 ft bls

LENGTH OF CORED INTERVAL: 10.8 ft

LENGTH OF CORE SAMPLE RECOVERED: 6.5 ft

PERCENT OF SAMPLED LENGTH RECOVERED: 60 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
2356	Dolostone (95%), micrite (5%)	20	-	8-10	45
2358	Dolostone	25	35	8-10	100
2360	Dolostone	25	30	8	160
2361	Dolostone	25	30	7-8	160
2362	Dolostone	25	30	8	200
2363	Dolostone	25	60	8	200
2364		25	60	8	210
2365		15	46	8	225
2366		15	62	8-9	225
2366.8		-	122	8-10	-



IW-2 CORE DESCRIPTION

CITY OF CAPE CORAL NORTH CAPE RO WTP INJECTION WELL IW-2

CORE #7

2,356 – 2,367 feet bls

Core Diameter (inches): 4	Bit Type: Diamond	Date: 04/08/2007
Cored Interval (feet): 10.8	Recovered Core (feet): 7.5	Recovery: 69%

DEPTH (feet bls)	DESCRIPTION
2,356.0 to 2,356.7	DOLOSTONE, pale yellowish brown (10YR 5/4), vugular and intercrystalline porosity, low permeability, microcrystalline to very fine grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, dolomite crystals lining vugs, micrite (5%), base of core appears to be angular fracture plane, brecciated
2,356.7 to 2,357.0	DOLOSTONE, as above, top of core is angular fracture plane coinciding with base of above core
2,357.0 to 2,359.0	DOLOSTONE (broken pieces), dark yellowish brown (10YR 4/2), vugular and intercrystalline porosity, possibly low permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement
2,359.0 to 2,360.0	DOLOSTONE (3 pieces), moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), vugular and intercrystalline porosity, medium permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite and micrite cements, micrite (5%), medium grained dolomite rhombs lining vugs
2,360.0 to 2,362.0	DOLOSTONE, moderate yellowish brown (10YR 5/4), intercrystalline and vugular porosity, low permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement, dolomite rhombs and sucrosic dolomite crystals lining vugs
2,362.0 to 2,363.5	DOLOSTONE (broken), dark yellowish brown (10YR 4/2), fracture, vugular, and intercrystalline porosity, possibly high permeability, microcrystalline to medium grained euhedral crystals, high alteration, good induration with dolomite cement, dolomite crystals lining vugs

Monitor Well DZMW-1

**Core No. 1
1,308 – 1,318**



DZMW-1 CORING WORKSHEET

DATE(S): 4/16/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Philip Shand
TYPE OF BIT USED: Diamond
CORE NUMBER: 1
DIAMETER: 4-inches

START/ FINISH TIME CORING: 12:21 TO: 13:09
CORED INTERVAL: 1308 ft bls TO: 1318 ft bls
LENGTH OF CORED INTERVAL: 9.5 feet
LENGTH OF CORE SAMPLE RECOVERED: 7.33 feet

PERCENT OF SAMPLED LENGTH RECOVERED: 77 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1309		30	1	3	45
1310		30	1	3	45
1311		30	1	4	45
1312		30	3	4	45
1313		30	9	4-6	45
1314		30	11	5	55-100
1315		30	9	5	60
1316		30	8	5-6	240
1317		30	4	3-6	100
1318		30	2	4-6	100



DZMW-1 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP MONITOR WELL DZMW-1

CORE #1

1,308 – 1,318 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 04/16/2007

Cored Interval (feet): 10.0

Recovered Core (feet): 7.3

Recovery: 77%

**DEPTH
(feet bls)**

DESCRIPTION

1308 to 1315.3

LIMESTONE, yellowish gray (5Y 8/1), wackestone to packstone, good induration, moderately hard, intergranular porosity, moderate to possibly low permeability, fine silt to silt sized grains, micrite with trace calcite spar cement, fossiliferous (benthic forams, echinoids), trace sand, trace phosphate.

Monitor Well DZMW-1

**Core No. 2
1,410 – 1,420**



DZMW-1 CORING WORKSHEET

DATE(S): 10/16/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Bill Steele

TYPE OF BIT USED: Diamond

CORE NUMBER: 2

DIAMETER: 4-inches

START/ FINISH TIME CORING: 9:58 TO: 12:24

CORED INTERVAL: 1410 ft bls TO: 1,420 ft bls

LENGTH OF CORED INTERVAL: 10 feet

LENGTH OF CORE SAMPLE RECOVERED: 0 feet

PERCENT OF SAMPLED LENGTH RECOVERED: 0 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1411	No Recovery	6	12.4	7-4	25
1412		6	10.8	3	27
1413		6	10.2	3	20
1414		6	17.5	3	20
1415		6	11.2	3-2	20-25
1416		6	13.3	1-2	20
1417		6	15	2	20
1418		6	14.3	2	20
1419		6	14.9	2	20
1420		6	17.3	2	20



MWH

DZMW-1 CORE DESCRIPTION

CITY OF CAPE CORAL

NORTH CAPE RO WTP MONITOR WELL DZMW-1

CORE #2

1,308 – 1,318 feet bls

Core Diameter (inches): 4

Bit Type: Diamond

Date: 10/16/2007

Cored Interval (feet): 10.0

Recovered Core (feet): 0.0

Recovery: 0%

**DEPTH
(feet bls)**

DESCRIPTION

No recovery

Monitor Well DZMW-1

**Core No. 3
1,475 – 1,487**



DZMW-1 CORING WORKSHEET

DATE(S): 10/17/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: Bill Steele

TYPE OF BIT USED: Diamond

CORE NUMBER: 3

DIAMETER: 4-inches

START/ FINISH TIME CORING: 16:52 TO: 18:45

CORED INTERVAL: 1475 ft bls TO: 1,487 ft bls

LENGTH OF CORED INTERVAL: 12 feet

LENGTH OF CORE SAMPLE RECOVERED: 8 feet

PERCENT OF SAMPLED LENGTH RECOVERED: 67 %

DEPTH	CORE DESCRIPTION	RPM of Drill String	PENETRATION TIME (minutes)	WEIGHT ON BIT x1000 (lbs)	PUMP PRESSURE (psi)
1476	DOLOMITIC LIMESTONE-yellowish gray (5Y 7/2)	6	14.2	1-2	20-22
1477	massive, fine to medium grained, soft, very well	6	14.1	1-2	22
1478	indurated fossiliferous wackestone with abundant,	6	14.4	1-2	22-40
1479	fine grained euhebral Dolomite crystals.	6	15.5	1-2	40-50
1480		10	7.8	1-2	70
1481		10	6.1	1-2	65
1482		10	6.2	1-2	65
1483		10	7.3	1-2	65
1484		10	6	1-2	65
1485		10	6.8	1-2	65
1486		10	6.7	1-2	65
1487		10	6.7	1-2	65



DZMW-1 CORE DESCRIPTION

CITY OF CAPE CORAL NORTH CAPE RO WTP MONITOR WELL DZMW-1

CORE #3

1,475 – 1,487 feet bls

Core Diameter (inches): 4	Bit Type: Diamond	Date: 10/17/2007
Cored Interval (feet): 12.0	Recovered Core (feet): 10.0	Recovery: 83%

DEPTH (feet bls)	DESCRIPTION
1475.0 to 1481.7	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, hard, intergranular and moldic porosity, possibly low permeability, grains are fine to coarse grained, skeletal and biogenic, moderate alteration, 20% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams
1481.7 to 1482.9	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, moderately hard, intergranular and moldic porosity, possibly low permeability, grains are very fine to coarse grained, skeletal and biogenic, moderate alteration, 25% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams, and echinoid spines present.
1482.9 to 1483.9	DOLOMITIC LIMESTONE, yellowish gray (5Y 8/1), packstone to crystalline, good induration, moderately hard, intergranular and moldic porosity, possibly low permeability, grains are fine to coarse grained, skeletal and biogenic, moderate alteration, 30% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, casts and molds infilled with calcite and micrite cements, reconstituted mullusca, forams, and echinoid spines present.
1483.9 to 1485.0	LIMESTONE, yellowish gray (5Y 8/1), wackestone, chalky, calcarenitic, good induration, moderately hard, intergranular porosity, possibly low permeability, grains are very fine to medium, biogenic, 40% allochems with micrite cement, trace calcite spars in matrix, forams present.

Core Analysis Laboratory Reports

Youngquist Brothers, Inc.

TRANSMITTAL

No. 00056

15465 Pine Ridge Road
Ft. Myers, FL 33908

Phone: 239-489-4444

PROJECT: 278002 North Cape Coral Inj. Well

DATE: 9/13/2007

TO: Mont. Watson Harza Constructors, Inc
1200 Kismet Parkway West
Cape Coral, FL. 33993

REF: Rock Core Testing Report

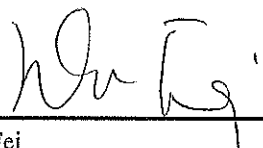
ATTN: Christine Stuckey

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
<input type="checkbox"/> Shop Drawings	<input type="checkbox"/> Approval	<input type="checkbox"/> Approved as Submitted
<input type="checkbox"/> Letter	<input checked="" type="checkbox"/> Your Use	<input type="checkbox"/> Approved as Noted
<input type="checkbox"/> Prints	<input checked="" type="checkbox"/> As Requested	<input type="checkbox"/> Returned After Loan
<input type="checkbox"/> Change Order	<input type="checkbox"/> Review and Comment	<input type="checkbox"/> Resubmit
<input type="checkbox"/> Plans		<input type="checkbox"/> Submit
<input type="checkbox"/> Samples	SENT VIA:	<input type="checkbox"/> Returned
<input type="checkbox"/> Specifications	<input checked="" type="checkbox"/> Attached	<input type="checkbox"/> Returned for Corrections
<input checked="" type="checkbox"/> Other: Rock Core Testing Report	<input type="checkbox"/> Separate Cover Via:	<input type="checkbox"/> Due Date:

ITEM	PACKAGE	SUBMITTAL	DRAWING	REV.	ITEM NO.	COPIES	DATE	DESCRIPTION	STATUS
						1	9/13/2007	Ardaman & Associates, Inc. Rock Core Testing Report Date: Sep. 07, 07 File No.: 07-087	NEW

Remarks:

CC:

Signed: 
Wu Fei



Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

RECEIVED
SEP 10 2007

September 7, 2007
File Number 07-087

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Attention: Craig Brugger

Subject: Rock Core Testing, North Cape Coral Punta Gorda, Florida

Gentlemen:

As requested, vertical and horizontal permeability, unconfined compression and specific gravity tests have been completed on limestone core samples provided for testing by your firm. The samples were received on 05/03/07. The designations for the sixteen samples are listed below.

Core	Depth (feet)
1	1310.75-1311.8
1	1313.8-1314.35
1	1314.8-1315.3
1	1633.5-1634.0
2	1811.6-1812.1
3	1980.3-1981.2
4	2073.0-2073.5
5	2216.7-2217.2
5	2222.6-2223.5
5	2223.3-2224.1
6	2323.6-2324.0
6	2325.9-2326.4
6	2326.4-2326.9
7	2358.5-2359.25
7	2359.25-2359.5
7	2360.4-2361.7

The permeability tests were performed in general accordance with ASTM Standard D 5084 "Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter" using the constant head test method (Method A). The permeability test results are presented on the attached test reports. A total of 10 vertical and 10 horizontal permeability tests were performed. The results from 19 of the 20 permeability tests were previously submitted on 08/22/07.

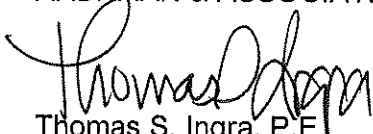
The unconfined compression tests were performed in general accordance with ASTM Standard D 7012 "Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures" using the unconfined test method (Method C). The unconfined compression test results are presented on the attached test reports. Sufficient core samples were provided to perform four unconfined compression tests.

Specific gravity tests were performed in general accordance with ASTM Standard D 854 "Specific Gravity of Soil Solids by Water Pycnometer" on test specimens ground to pass the U.S. Standard No. 40 sieve. The measured mineral specific gravities are presented on the attached reports.

The specimens were reported to be from the samples designated herein. The test results are indicative of only the specimens that were actually tested. The test results presented are based upon accepted industry practice as well as test method(s) listed. Ardaman & Associates, Inc. neither accepts responsibility for, nor makes claims to the final use and purpose of the material.

If you have any questions about the test results or require additional information, please contact us. We will forward additional test results as the tests are completed.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.



Thomas S. Ingra, P.E.
Laboratory Director
Florida License No. 31987

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ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

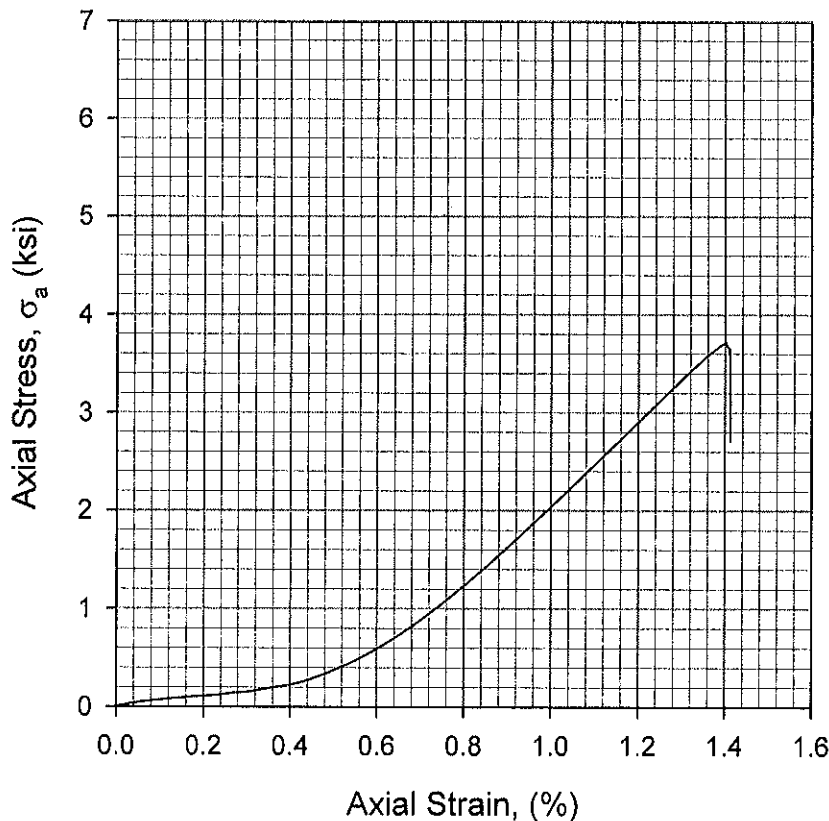
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087

INCOMING SAMPLE NO.: Core 1, 1310.75'
 BORING Core 1 SAMPLE -
 DEPTH 1310.75 ft; m
 LABORATORY IDENTIFICATION NO.: 07087/C1
 SAMPLE DESCRIPTION: Light Brown Limestone

DATE SAMPLE RECEIVED: 05/03/07
 DATE TEST SET-UP: 08/23/07
 DATE REPORTED: 09/07/07

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Unconfined Compressive Strength, σ_a (ult) (lb/in ²)	Young's Modulus, E (lb/in ²)
H (cm)	D (cm)	H/D	w _c (%)	γ_d (lb/ft ³)	S (%)	$\dot{\epsilon}$ (cm/minute)	$\dot{\epsilon}$ (%/minute)			
9.26	5.01	1.8	0.6	145.4	9	0.013	0.14	10.0	3723	4.3x10 ⁵



TEST PROCEDURES

ASTM Standard D 7012, Method C

Air Temperature (°C): 22.0

Capping Material: None
 Lab-Stone
 Sulfur

Comments: _____

SPECIMEN PREPARATION

Original Core Diameter (inch): 4

Specimen Sub-Cored for Testing:
 Yes
 No

G_s: 2.75 Assumed
 Measured

FAILURE SKETCH

/
/
/

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\dot{\epsilon}$ = Vertical displacement rate; and G_s = Specific gravity.

Checked By: PM Date: 09/07/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

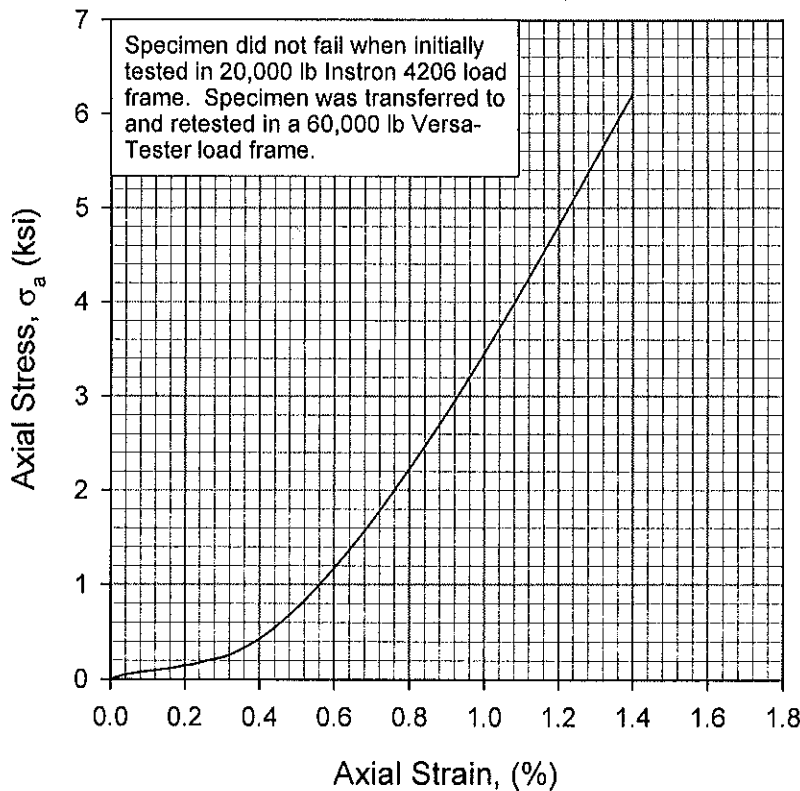
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087

DATE SAMPLE RECEIVED: 05/03/07
 DATE TEST SET-UP: 08/23/07
 DATE REPORTED: 09/07/07

INCOMING SAMPLE NO.: Core 5, 2223.3'
 BORING Core 5 SAMPLE -
 DEPTH 2223.3 ft; m
 LABORATORY IDENTIFICATION NO.: 07087/C5
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Unconfined Compressive Strength, σ_a (ult) (lb/in ²)	Young's Modulus, E (lb/in ²)
H (cm)	D (cm)	H/D	w _c (%)	γ_d (lb/ft ³)	S (%)	$\dot{\epsilon}$ (cm/minute)	$\dot{\epsilon}$ (%/minute)			
9.23	5.03	1.8	0.5	170.8	32	0.013	0.14	3.5	11,400	7.0×10^5 at 45% σ_a (ult)



TEST PROCEDURES

ASTM Standard D 7012, Method C

Air Temperature (°C): 22.0

Capping Material: None
 Lab-Stone
 Sulfur

Comments: Maximum load in Versa-Tester load frame was 35,000 lb. Time to failure from Versa-Tester portion of test. Rate of loading from Instron 4206 portion of test.

SPECIMEN PREPARATION

Original Core Diameter (inch): 4

Specimen Sub-Cored for Testing:
 Yes
 No

G_s: 2.86 Assumed
 Measured

FAILURE SKETCH

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\dot{\epsilon}$ = Vertical displacement rate; and G_s = Specific gravity.

Checked By: PM Date: 09/07/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY

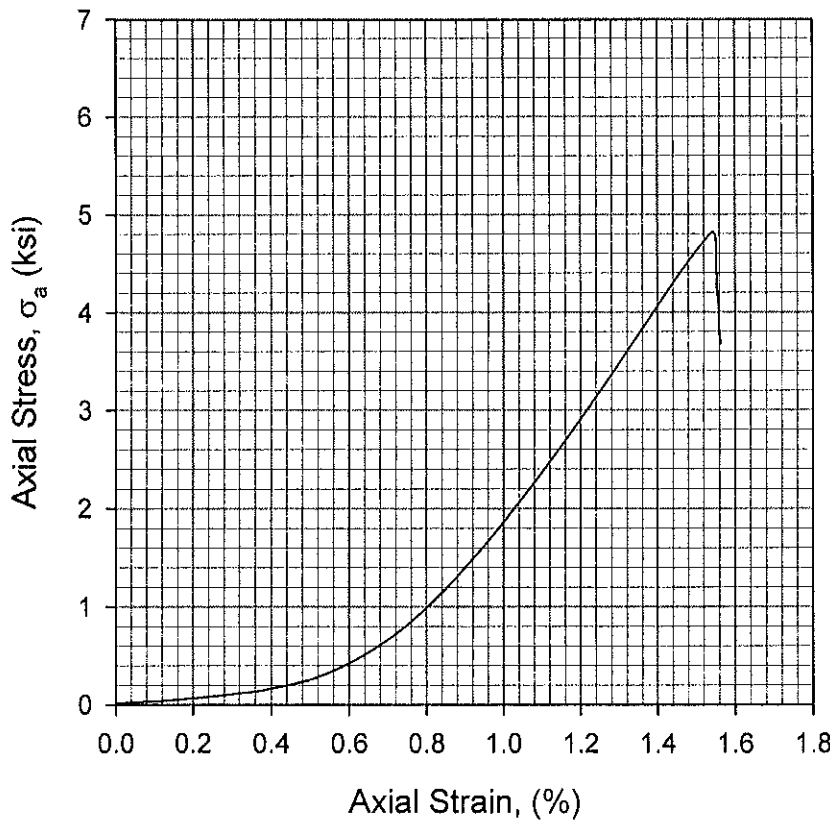
INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087

INCOMING SAMPLE NO.: Core 6, 2326.4'
 BORING Core 6 SAMPLE -
 DEPTH 2326.4 ft, m
 LABORATORY IDENTIFICATION NO.: 07087/C6
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone with vugs

DATE SAMPLE RECEIVED: 05/03/07
 DATE TEST SET-UP: 08/23/07
 DATE REPORTED: 09/07/07

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Unconfined Compressive Strength, σ_c (ult) (lb/in ²)	Young's Modulus, E (lb/in ²)
H (cm)	D (cm)	H/D	w _c (%)	γ_d (lb/ft ³)	S (%)	$\dot{\epsilon}$ (cm/minute)	$\dot{\epsilon}$ (%/minute)			
9.56	5.02	1.9	0.9	166.7	36	0.013	0.14	11.0	4820	5.7×10^5



TEST PROCEDURES

ASTM Standard D 7012, Method C

Air Temperature (°C): 20.0

Capping Material: None
 Lab-Stone
 Sulfur

Comments: _____

SPECIMEN PREPARATION

Original Core Diameter (inch): 4

Specimen Sub-Cored for Testing:
 Yes
 No

G_s: 2.85 Assumed
 Measured

FAILURE SKETCH

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\dot{\epsilon}$ = Vertical displacement rate; and G_s = Specific gravity.

Checked By: TM Date: 09/07/07

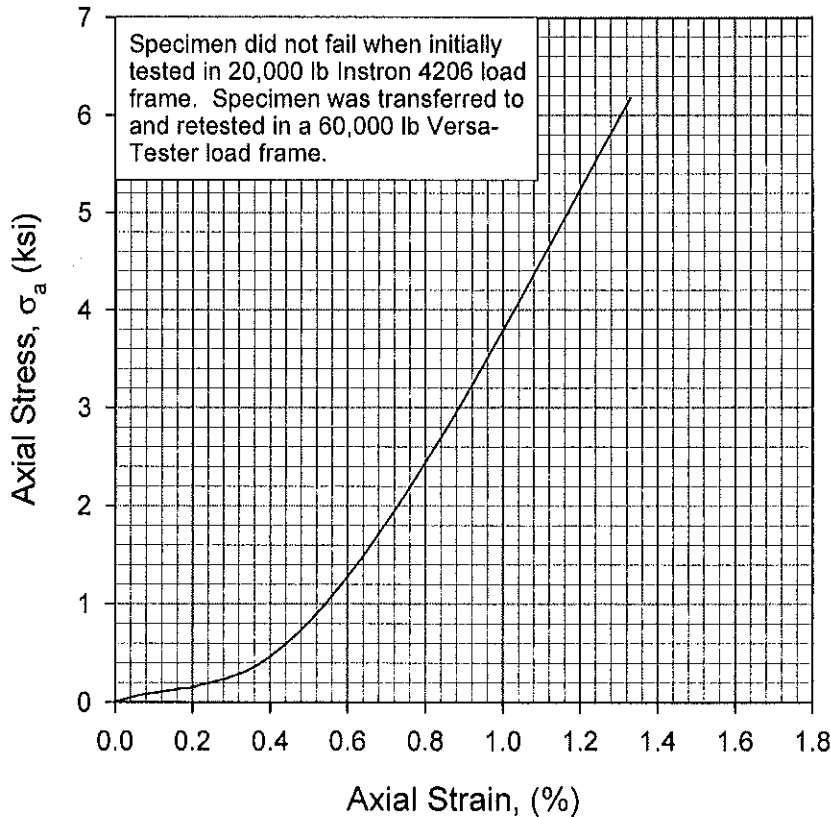
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY INTACT ROCK CORE UNCONFINED COMPRESSION TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087

DATE SAMPLE RECEIVED: 05/03/07
 DATE TEST SET-UP: 08/23/07
 DATE REPORTED: 09/07/07

INCOMING SAMPLE NO.: Core 7, 2360.4'
 BORING Core 7 SAMPLE -
 DEPTH 2360.4 ft; m
 LABORATORY IDENTIFICATION NO.: 07087/C7
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

Specimen Dimensions			Initial Conditions			Rate of Loading		Time to Failure (minutes)	Unconfined Compressive Strength, σ_a (ult) (lb/in ²)	Young's Modulus, E (lb/in ²)
H (cm)	D (cm)	H/D	w _e (%)	γ_d (lb/ft ³)	S (%)	$\dot{\epsilon}$ (cm/minute)	$\dot{\epsilon}$ (%/minute)			
10.07	5.03	2.0	0.4	171.3	32	0.013	0.14	5.0	11,500	7.1x10 ⁵ at 45% σ_a (ult)



TEST PROCEDURES

ASTM Standard D 7012, Method C

Air Temperature (°C): 22.0

Capping Material: None
 Lab-Stone
 Sulfur

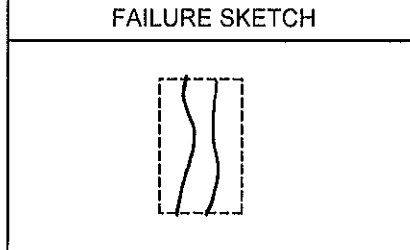
Comments: Maximum load in Versa-Tester load frame was 35,500 lb. Time to failure from Versa-Tester portion of test. Rate of loading from Instron 4206 portion of test.

SPECIMEN PREPARATION

Original Core Diameter (inch): 4

Specimen Sub-Cored for Testing:
 Yes
 No

G_s: 2.85 Assumed
 Measured



The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; w_e = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\dot{\epsilon}$ = Vertical displacement rate; and G_s = Specific gravity.

Checked By: TM Date: 09/07/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 1-1310.75
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/11310.75H
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Light Brown Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/13/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 74 (stable) % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 3; 6; 9; 11

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 13.1 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.75 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.18	5.01	141.54	10.6	131.7	0.232	96	30	160	35	3.5	4	298.80	10.6	96	7.2x10 ⁻⁸
COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w _c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 1-1314.8
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/11314.8V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Light Brown Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/26/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 96 % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 4; 7; 9

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 5.9 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.74 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
8.56	9.80	646.09	13.2	123.1	0.280	93	30	160	30	0.8	1	1274.9	13.3	94	2.1x10 ⁻⁶
COMMENTS: As-received total core length = 5.9". Usable core length = 4.3". The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc. Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 1-1633.5
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/11633.5V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/06/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: _____ - _____ %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): _____

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 6.7 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.83 Assumed Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.63	10.01	600.49	0.7	165.9	0.061	30	40	150	190	0.1	10	1595.4	0.8	35	5.2x10-11
COMMENTS: As-received total core length = 6.7". Usable core length = 3.2".															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w _c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: TM
Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 08/09/07
 DATE REPORTED: 09/07/07

INCOMING LABORATORY SAMPLE NO.: 1-1633.5
 LABORATORY IDENTIFICATION NO.: 07087/11633.5H
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 74 (stable) % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 3; 5; 8

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 6.7 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.83 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
6.16	5.02	121.72	0.97	170.1	0.037	77	30	160	460	0.4	18	331.60	1.1	80	2.8x10-10

COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: JM
 Form SR-2B: Rev. 0

Date: 09/07/07

**ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT**

CLIENT: Youngquist Brothers, Inc.
PROJECT: North Cape Coral Punta Gorda
FILE NO.: 07-087
DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/22/07
DATE REPORTED: 08/22/07

INCOMING LABORATORY SAMPLE NO.: 2-1811.6
LABORATORY IDENTIFICATION NO.: 07087/21811.6V
SAMPLE DESCRIPTION: Brown Dolomitic Limestone

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 99 % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 4; 8; 12

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
As-Received Length (inch): 6.0 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.90 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	Y _d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u _b (psi)	i _{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
9.92	10.02	782.38	1.0	170.1	0.060	46	30	160	19	9.3	3	2132.7	1.0	46	3.9x10 ⁻⁷

COMMENTS: As-received total core length = 6.0". Usable core length = 4.0".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); Y_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k₂₀ = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: TM
Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 2-1811.6
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/21811.6H
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/13/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 73 (stable) % Beginning of Test;
 End of Test

$\Delta\sigma_c$ (psi): 3; 6; 9

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 6.0 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.90 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
6.56	5.02	129.87	0.9	170.5	0.058	44	40	150	433	0.9	26	354.37	1.0	49	1.5x10 ⁻⁹
COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: JM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 3-1980.3
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/31980.3V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/29/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 85 (stable) % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 4; 7; 10

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 10.6 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.83 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.53	10.04	595.88	0.7	167.4	0.052	34	30	160	190	4.1	30	1597.9	0.8	39	2.2x10 ⁻⁹

COMMENTS: As-received total core length = 10.8". Usable core length = 3.0".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 3-1980.3
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/31980.3H
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 08/09/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 90 (stable) %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 3; 5; 8; 11

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 10.6 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.83 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.28	5.02	144.29	0.7	171.4	0.030	66	160	30	191	0.2	8	396.06	0.8	69	4.7x10-10
COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w _c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 4-2073.0
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/42073.0V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Light Brown Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/28/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 95 %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 3; 6; 9

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 7.5 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.87 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.57	9.96	589.37	1.9	159.8	0.107	46	30	160	46	27.5	7	1509.7	1.9	46	1.2x10 ⁻⁷

COMMENTS: As-received total core length = 7.5". Usable core length = 3.0".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 5-2216.7
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/52216.7V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Vuggy Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/24/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 84 (stable) %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 3; 6; 8

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 7.4 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.85 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
8.46	10.04	669.00	1.1	164.9	0.073	38	30	70	2.2	6.8	1	1766.8	1.1	40	2.8x10 ⁻⁴
COMMENTS: As-received total core length = 7.4". Usable core length = 3.4".															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc.

INCOMING LABORATORY SAMPLE NO.: 5-2216.7

PROJECT: North Cape Coral Punta Gorda

LABORATORY IDENTIFICATION NO.: 07087/52216.7H

FILE NO.: 07-087

SAMPLE DESCRIPTION: Brown Vuggy Dolomitic Limestone

DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/16/07

DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No

As-Received Length (inch): 7.4 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

B-FACTOR: 100 % Beginning of Test;

End of Test

$\Delta\sigma_c$ (psi): 3; 6; 9; 11

SPECIFIC GRAVITY, G_s : 2.85 Assumed

Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions						Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	Y _d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u _b (psi)	i _{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)		
4.96	5.02	98.06	0.9	169.9	0.045	54	30	160	38	25.4	2	267.00	0.9	54	5.6x10-4	
COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.																
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.																
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w _c = Moisture content (ASTM D 2216); Y _d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u _b = Back-pressure; i _{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k ₂₀ = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G _s = Specific gravity.																

Checked By: TM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 5-2222.3
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/52222.3V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone with Fissures
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/26/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 92 (stable) %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 3; 6; 9

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 10.9 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.86 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
7.78	10.08	620.87	1.1	168.7	0.055	55	30	160	36	8.1	1	1677.8	1.1	55	1.1x10 ⁻⁴

COMMENTS: As-received total core length = 10.9". Usable core length = 8.0".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: JM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 5-2222.3
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/52222.3H
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/16/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 85 (stable) %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 3; 7; 10

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 10.9 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.86 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
6.55	5.02	129.86	0.9	168.4	0.057	43	35	155	286	0.6	21	350.19	1.0	47	4.8x10-10

COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: PM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 6-2325.9
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/62325.9V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/29/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 97 % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 4; 8; 10

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 5.9 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.86 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u _b (psi)	i _{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
6.46	10.06	513.67	0.4	170.9	0.043	28	40	150	434	0.1	25	1406.3	0.5	29	7.2x10-12

COMMENTS: As-received total core length = 5.9". Usable core length = 2.6".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: *JM*
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 08/09/07
 DATE REPORTED: 08/22/07

INCOMING LABORATORY SAMPLE NO.: 6-2325.9
 LABORATORY IDENTIFICATION NO.: 07087/62325.9H
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 87 (stable) %

- Beginning of Test;
- End of Test

$\Delta\sigma_c$ (psi): 4; 7; 11

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 5.9 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.86 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
8.02	5.02	158.75	0.9	171.4	0.040	62	32	158	223	2.0	8	435.82	1.0	67	1.5x10-9
COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.															
The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.															
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w _c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.															

Checked By: *TM*
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc. INCOMING LABORATORY SAMPLE NO.: 7-2360.4
 PROJECT: North Cape Coral Punta Gorda LABORATORY IDENTIFICATION NO.: 07087/72360.4V
 FILE NO.: 07-087 SAMPLE DESCRIPTION: Brown Dolomitic Limestone
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/29/07
 DATE REPORTED: 08/22/07

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 96 % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 3; 6; 9

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 17.3 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.85 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w_c (%)	γ_d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u_b (psi)	i_{avg}	Q (cm ³)	t (days)	WDS (g)	w_c (%)	S (%)	
9.95	10.09	795.56	0.2	173.8	0.023	24	40	150	281	2.5	28	2214.2	0.2	24	7.1x10-10

COMMENTS: As-received total core length = 17.3". Usable core length = 13.5".

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); γ_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k_{20} = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: JM
 Form SR-2B: Rev. 0

Date: 08/22/07

ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY ROCK CORE HYDRAULIC CONDUCTIVITY TEST REPORT

CLIENT: Youngquist Brothers, Inc.
 PROJECT: North Cape Coral Punta Gorda
 FILE NO.: 07-087
 DATE SAMPLE RECEIVED: 05/03/07 SET UP: 08/09/07
 DATE REPORTED: 09/07/07

INCOMING LABORATORY SAMPLE NO.: 7-2360.4
 LABORATORY IDENTIFICATION NO.: 07087/72360.4H
 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

ASTM D 5084 TEST METHOD:

- A - Constant Head
- B - Falling Head; Constant Tailwater
- C - Falling Head; Rising Tailwater
- F - Constant Volume; Falling Head - Rising Tailwater

B-FACTOR: 88 (stable) % Beginning of Test;
 End of Test
 $\Delta\sigma_c$ (psi): 4; 7; 11

SPECIMEN DATA:

As-Received Diameter (inch): 4 Diameter Trimmed: Yes No
 As-Received Length (inch): 17.3 Length Trimmed: Yes No

TEST SPECIMEN ORIENTATION: Vertical Horizontal

SPECIFIC GRAVITY, G_s : 2.85 Assumed
 Measured (ASTM D 854)

PERMEANT: Deaired Tap Water Other _____

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
H (cm)	D (cm)	V (cm ³)	w _c (%)	Y _d (pcf)	n	S (%)	$\bar{\sigma}_c$ (psi)	u _b (psi)	i _{avg}	Q (cm ³)	t (days)	WDS (g)	w _c (%)	S (%)	
7.01	5.02	138.63	0.3	175.0	0.016	5.9	40	150	400	2.9	22	388.72	0.4	61	4.4x10 ⁻¹⁰

COMMENTS: Horizontal permeability test specimen cored from vertical test specimen.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client or Ardaman & Associates, Inc. Physical and electronic records of each project are kept for a minimum of 7 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w_c = Moisture content (ASTM D 2216); Y_d = Dry density; S = Saturation; $\bar{\sigma}_c$ = Isotropic effective confining stress; u_b = Back-pressure; i_{avg} = Average hydraulic gradient; Q = Flow volume; t = Test duration; k₂₀ = Saturated hydraulic conductivity at 20°C; n = Total porosity; and G_s = Specific gravity.

Checked By: PM
 Form SR-2B: Rev. 0

Date: 09/07/07

Appendix E

Geophysical Logs

Appendix F

Pilot Hole Water Quality

Injection Well IW-2

Pilot Hole Water Quality

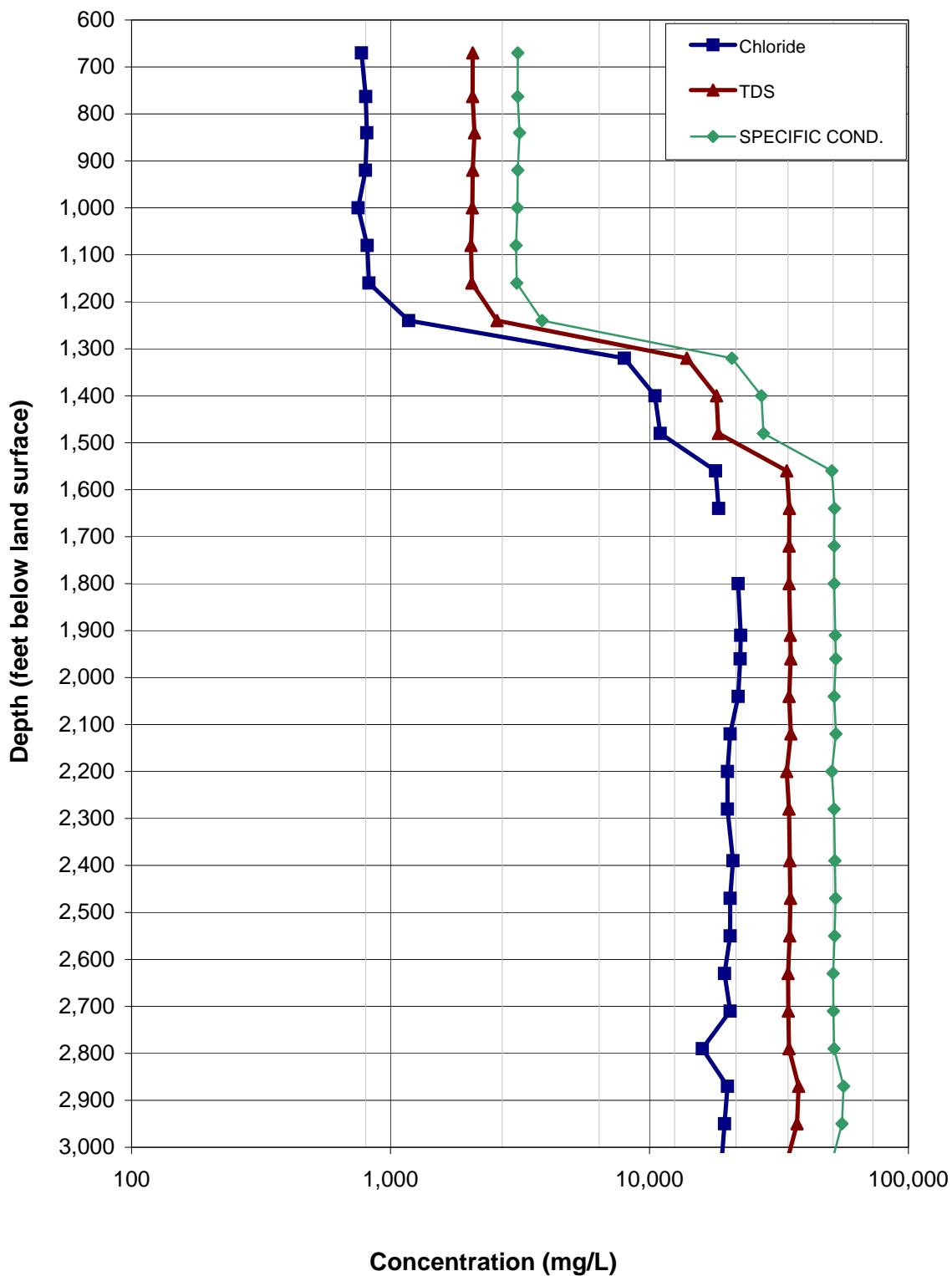
NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102
 CONTRACTOR: Youngquist Brothers, Inc.
 PROJECT MANAGER: Neil Johnson
 OWNER: City of Cape Coral

DATE	TIME	DEPTH (feet)	TEMP. (°C)	pH	SPECIFIC COND. (µmhos/cm)	TDS field calculated (mg/L)	CHLORIDE (mg/L)	COMMENTS	OBSERVERS INITIALS
2/9/2007	7:45	670	26.7	7.80	3,099	2,076	773		CLM
2/11/2007	9:55	763	26.4	5.41	3,098	2,076	803		CLM
2/11/2007	16:05	840	27.1	6.10	3,150	2,111	810		CLM
2/11/2007	21:30	920	27.3	5.68	3,100	2,077	800		MK
2/12/2007	1:40	1,000	27.1	5.66	3,089	2,070	750		MK
2/12/2007	6:12	1,080	26.8	5.60	3,052	2,045	813		MK
2/12/2007	17:02	1,160	27.0	5.37	3,073	2,059	825		CLM
2/12/2007	21:45	1,240	27.8	5.28	3,851	2,580	1,175		MK
2/13/2007	4:28	1,320	28.8	5.08	20,800	13,936	8,000		MK
2/13/2007	11:09	1,400	29.0	5.60	27,080	18,144	10,500		CLM
3/17/2007	10:58	1,480	27.9	8.42	27,550	18,459	11,000		RAW
3/18/2007	0:00	1,560	27.4	7.55	50,600	33,902	18,000		MS
3/21/2007	4:05	1,640	28.9	7.61	51,800	34,706	18,500		MS
3/21/2007	12:32	1,720	32.4	7.5	51,700	34,639			MK
3/21/2007	0:59	1,800	30.1	7.6	51,700	34,639	22,000		CLM
3/25/2007	5:00	1,910	31.8	7.53	52,200	34,974	22,500		CLM

3/25/2007	9:31	1,960	31.8	7.6	52,400	35,108	22,400		MK
3/27/2007	3:08	2,040	32.1	7.62	51,700	34,639	22,000		CLM
3/28/2007	16:32	2,120	34	7.46	52,500	35,175	20,500		MS
3/29/2007	2:50	2,200	33.3	7.51	50,600	33,902	20,000		RAW
4/4/2007	3:25	2,280	32.7	7.56	51,600	34,572	20,000		RAW
4/9/2007	2:10	2,390	32.4	7.67	52,000	34,840	21,000		MK
4/9/2007	14:46	2,470	33	7.53	52,300	35,041	20,500		CLM
4/12/2007	12:25	2,550	32.1	7.66	51,900	34,773	20,500		RAW
4/13/2007		2,630		7.99	51,200	34,304	19,500	Collected by driller overnight, analyzed by RAW	
4/13/2007	8:30	2,710	32.1	7.71	51,300	34,371	20,500		RAW
4/14/2007	2:50	2,790	31.1	7.59	51,600	34,572	16,000	Data entered by RAW	MS
4/14/2007	17:20	2,870		7.64	56,200	37,654	20,000	DZMW-1 not contributing to backside	RAW
4/15/2007	3:58	2,950	29.9	7.62	55,400	37,118	19,500	Data entered by RAW	MS
4/16/2007	2:15	3,030	27.3	7.64	50,700	33,969	19,000	Data entered by RAW	MS

City of Cape Coral North RO WTP Injection Well (IW-2) Pilot Hole Water Quality



Monitor Well DZMW-1

Pilot Hole Water Quality



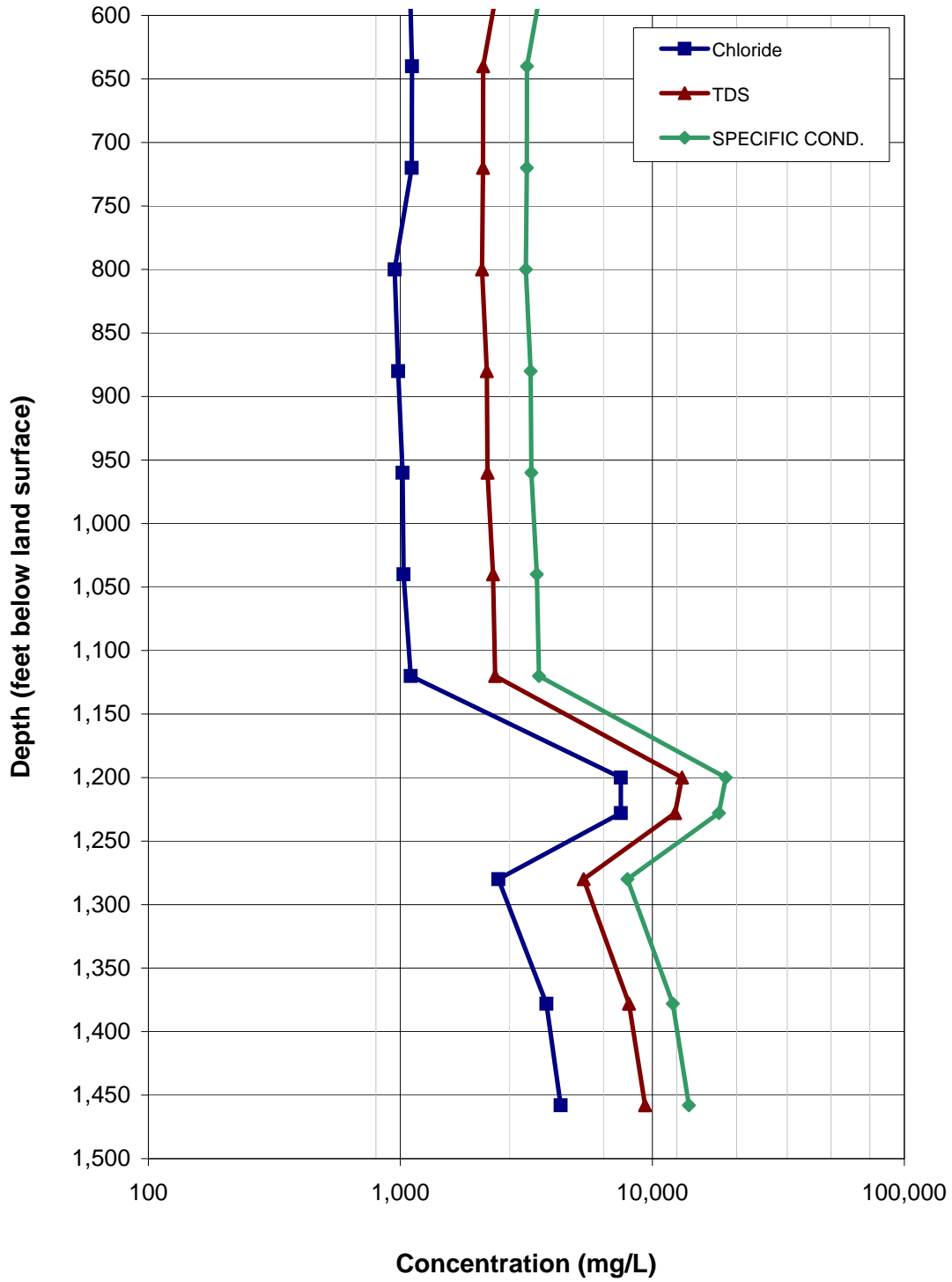
DZMW-1 WATER QUALITY DATA FROM PILOT HOLE DRILLING

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102
 CONTRACTOR: Youngquist Brothers, Inc.
 PROJECT MANAGER: Neil Johnson
 OWNER: City of Cape Coral

DATE	TIME	DEPTH (feet)	TEMP. (°C)	pH	SPECIFIC COND. (µmhos/cm)	TDS field calculated (mg/L)	CHLORIDE (mg/L)	COMMENTS	OBSERVERS INITIALS
4/10/2007	6:31	560	25.4	8.06	3,758	2,518	1,088		CLM
4/10/2007	16:45	640	27.2	8.12	3,180	2,131	1,112	Entered by RAW	MK
4/11/2007	5:45	720	27.3	8.18	3,177	2,129	1,110	Entered by RAW	MK
4/11/2007	15:55	800	28.6	7.95	3,150	2,111	950		RAW
4/12/2007	11:25	880	28.8	8.04	3,291	2,205	980		RAW
4/12/2007	16:00	960	28.9	8.01	3,310	2,218	1,020		RAW
4/13/2007	10:00	1,040	28.4	8.11	3,480	2,332	1,030		RAW
4/13/2007	18:55	1,120	29.4	7.78	3,550	2,379	1,100		RAW
4/14/2007	14:30	1,200	30.5	7.89	19,570	13,112	7,500		RAW
4/14/2007	16:05	1,228	30.0	7.82	18,370	12,308	7,500		RAW
4/15/2007	8:40	1,280	28.4	7.94	7,970	5,340	2,450		RAW
10/15/2007	16:20	1,378	25.4	7.68	12,060	8,080	3,800	TDS meter 10,320 ppm	JL
10/17/2007	3:45	1,458	24.3	7.63	13,970	9,360	4,325	TDS meter 12,220 ppm	JL

City of Cape Coral North RO WTP
Monitor Well (DZMW-1)
Pilot Hole Water Quality



Appendix G

Video Surveys

Injection Well IW-2

Video Survey 1,400 – 3,000 feet bls



CITY OF CAPE CORAL
NORTH CAPE RO WTP INJECTION WELL IW-2
OPEN HOLE VIDEO SURVEY
1,400 – 3,000 feet bls

Starting Depth (feet)	Ending Depth (feet)	Description
1413.0	1420.0	Gauge hole (smooth), vertical fracture
1420.0	1423.0	Gauge hole (smooth), confinement
1423.0	1437.0	Gauge hole (smooth), highly fractured
1437.0	1441.0	Large cavity
1441.0	1443.0	Gauge hole (smooth), confinement
1443.0	1452.0	Irregular hole, highly fractured
1452.0	1456.0	Gauge hole (smooth), vertical fracture
1456.0	1459.0	Irregular hole, highly fractured
1459.0	1468.0	Gauge hole (smooth), vertical fracture
1468.0	1472.0	Gauge hole (smooth), vertical fracture
1472.0	1474.0	Gauge hole (smooth), confinement
1474.0	1480.0	Gauge hole (smooth), vertical fracture
1480.0	1494.0	Gauge hole (smooth), confinement
1494.0	1496.0	Gauge hole (smooth), vertical fracture
1496.0	1497.0	Gauge hole (smooth), confinement
1497.0	1500.0	Gauge hole (smooth), vertical fracture
1500.0	1509.0	Large cavity
1509.0	1526.0	Irregular hole, highly fractured
1526.0	1527.0	Gauge hole (smooth), confinement

Starting Depth (feet)	Ending Depth (feet)	Description
1527.0	1530.0	Irregular hole, highly fractured
1530.0	1532.0	Small cavity (appears to be light brown dolostone), highly fractured
1532.0	1535.0	Gauge hole (smooth), highly fractured
1535.0	1539.0	Gauge hole (smooth), confinement
1539.0	1545.0	Gauge hole (smooth), vertical fracture
1545.0	1555.0	Possible vertical fractures(solution cavities) in dolostone
1555.0	1567.0	Gauge hole (smooth), confinement
1567.0	1594.0	Numerous cavities and possible vertical fracture features
1594.0	1600.0	Numerous cavities, highly fractured
1600.0	1601.0	Alternating smooth dolostone with small cavities and vugs, highly fractured
1601.0	1603.0	Alternating smooth dolostone with small cavities and vugs, confinement
1603.0	1606.0	Alternating smooth dolostone with small cavities and vugs, vertical fractures
1606.0	1610.0	Alternating smooth dolostone with small cavities and vugs, confinement
1610.0	1620.0	Gauge hole with minor solution features, vertical fractures
1620.0	1635.0	Small cavities and vugs (rough hole), vertical fractures
1635.0	1640.0	Large cavities (dolostone), highly fractured
1640.0	1652.0	Large cavities (dolostone)
1652.0	1660.0	Possible vertical fractures(solution cavities) in dolostone
1660.0	1685.0	Possible vertical fractures(solution cavities) in dolostone (rough hole)
1685.0	1692.0	Relatively smooth almost gauge hole
1692.0	1698.0	Solution features - possible fractures
1698.0	1702.0	Cavities

Starting Depth (feet)	Ending Depth (feet)	Description
1702.0	1710.0	Smooth (gauge hole - dolostone)
1710.0	1714.0	Alternating smooth dolostone with small cavities and vugs
1714.0	1734.0	Large cavities and possible vertical fractures
1734.0	1738.0	Large cavities, irregular hole, boulders on sides of hole, dolostone
1738.0	1744.0	Gauge hole
1744.0	1780.0	Alternating large cavities, possible vertical fracture features, and boulders on sides
1780.0	1782.0	Camera hitting ledge at 1782 - working around ledges and boulders
1782.0	1792.0	Large cavities with boulders
1793.0		Boulder blocking hole - retrieving camera
1793.0	1800.0	Camera passing boulders
1800.0	1810.0	Rugged hole, possible vertical fractures
1810.0	1820.0	Possible vertical fractures
1820.0	1834.0	Possible vertical fractures, large cavity from 1830 to 1834
1834.0	1840.0	Irregular hole, possible fractures
1840.0	1850.0	Irregular hole, possible fractures
1850.0	1860.0	
1860.0	1870.0	Cavities and possible vertical fracture features
1870.0	1880.0	Boulders lining sides of irregular hole
1880.0	1888.0	Boulders broken on sides of hole
1888.0	1893.0	Gauge hole, but rough
1893.0	1900.0	Possible vertical fracture features (dolostone)
1900.0	1910.0	Rugged hole, near gauge
1910.0	1920.0	Cavities at 1915 and 1919 ft bpl
1920.0	1930.0	Rugged hole, near gauge

Starting Depth (feet)	Ending Depth (feet)	Description
1930.0	1940.0	Near gauge, cavity at 1935 ft bls
1940.0	1954.0	Gauge hole, light color, appears to be limestone
1954.0	1966.0	Dolostone, irregular hole, small cavity at 1966 ft bpl
1966.0	1978.0	Cavities, dolostone, possible vertical fracture features
1978.0	1983.0	Boulders on side of hole
1983.0	1989.0	Gauge hole, irregular shape
1989.0	1996.0	Cobble size boulders falling on camera
1996.0	2003.0	Low visibility
2003.0	2006.0	Low visibility
2006.0	2020.0	Clear, appears to be limestone, gauge hole
2020.0	2030.0	Limestone, gauge hole, some vugs
2030.0	2035.0	Limestone, gauge hole, some vugs
2035.0	2058.0	Limestone, appears dense, crystalline, horizontal bedding planes, gauge hole, some vugs
2058.0	2062.0	Limestone, gauge hole, some vugs, possibly brecciated
2062.0	2068.0	Limestone and dolostone beds, vuggy, fractures, gauge hole, small cavities, vugs
2068.0	2084.0	Dolostone, gauge hole, small cavities, vugs, possible fractures, boulders
2084.0	2087.0	Dolostone, gauge hole, small cavities, vugs, Side looking, possible vertical fracture features, boulders on side of hole
2087.0	2092.0	Large cavity, Side looking, possible vertical fracture features, boulders on side of hole
2092.0	2100.0	Boulders on side of hole, rough hole, Side looking, possible vertical fracture features, boulders on side of hole
2100.0	2105.0	Small cavities and vugs (rough hole), some possible fracture features
2105.0	2110.0	Large vugs, some possible fracture features, gauge hole

Starting Depth (feet)	Ending Depth (feet)	Description
2110.0	2117.0	Dolostone, molds and vugs, some possible fracture, gauge hole, vugs
2117.0	2120.0	Dolostone, molds and vugs, some possible fracture, cavities
2120.0	2130.0	Gauge hole, small cavities, vugular porosity
2130.0	2135.0	Gauge hole, vugs, vugular porosity
2135.0	2136.0	Possible vertical fractures, Side looking, molds and and vugs, possible vertical fracture features
2136.0	2140.0	Gauge hole, dolostone, vugs, side looking, molds and and vugs, possible vertical fracture features
2140.0	2142.0	Gauge hole, dolostone, vugs, Side looking, dolostone, molds and vugs
2142.0	2150.0	Side looking, dolostone, molds and vugs, Cavities, possible vertical fracture features, boulders on side of hole
2150.0	2160.0	Cavities, possible vertical fracture features, boulders on side of hole, Side looking, possible vertical fracture features
2160.0	2165.0	Large cavity, Side looking, boulders on side of hole
2165.0	2172.0	Large cavity, Side looking, coming out of hole, dolostone
2172.0	2177.0	Dolostone, large cavity
2177.0	2191.0	Dolostone, slightly cavernous, possible fractures
2191.0	2199.0	Cavity increases, possible fractures
2199.0	2205.0	Diameter decreases to nearly gauge
2205.0	2208.0	Cavity increases, vertical fracturing
2208.0	2215.5	Nearly gauge, fracturing and solution features
2215.5	2219.0	Gauge hole, minimal solution features
2219.0	2227.0	Nearly gauge, fracturing and solution features
2227.0	2229.0	Gauge hole, minimal solution features

Starting Depth (feet)	Ending Depth (feet)	Description
2229.0	2230.0	Gauge hole, vertical fracturing
2230.0	2233.0	Large cavity, fracturing
2233.0	2247.0	Nearly gauge, fracturing and solution features
2247.0	2250.0	Gauge, minimal solution features
2250.0	2252.5	Large cavity, fracturing
2252.5	2257.0	Gauge, fracturing and possible solution features
2257.0	2264.0	Very large cavity, abundant fracturing
2264.0	2269.0	Gauge, solution features including vugs
2269.0	2272.0	Gauge, solution features and fracturing
2272.0	2287.0	Gauge, solution features (vugs and bedding planes), vertical fractures
2287.0	2292.5	Large cavity with multiple fractures
2292.5	2299.0	Gauge, vuggy solution features and fracturing
2299.0	2314.0	Nearly gauge, fracturing and solution features
2314.0	2316.0	Gauge, vuggy solution features and enlarged bedding planes
2316.0	2319.5	Gauge, vugs
2319.5	2320.0	Enlarged bedding plane
2320.0	2322.0	Gauge, solution features, possible fracturing
2322.0	2325.5	Gauge, minimal solution features
2325.5	2327.0	Gauge, fracturing and possible solution features
2327.0	2331.0	Gauge, minimal vuggy solution features
2331.0	2335.0	Large cavity, abundant fracturing
2335.0	2338.0	Gauge, solution features and fracturing
2338.0	2340.0	Gauge, minimal solution features
2340.0	2341	Enlarged bedding plane

Starting Depth (feet)	Ending Depth (feet)	Description
2341.0	2344.5	Gauge, solution features and vugs
2344.5	2346	Gauge, fractured
2346.0	2348.0	Gauge, abundant solution features
2348.0	2356.0	Gauge, abundant solution features and fracturing
2356.0	2358.0	Gauge, solution features
2358.0	2361.0	Massive vertical fractures
2361.0	2365.0	Gauge, fracturing and solution features
2365.0	2369.5	Nearly gauge, fracturing and solution features
2369.5	2382.5	Gauge, solution features, fracturing and enlarged bedding planes
2382.5	2383.5	Cavity, fracturing
2383.5	2403.0	Gauge, solution features and fractures
2403.0	2405.0	Cavity, fracturing
2405.0	2417.0	Gauge, fractured and possible solution features
2417.0	2419.0	Cavity, fracturing
2419.0	2430.0	Gauge, fracturing and solution features
2430.0	2432.5	Cavity, highly fractured
2432.5	2448.0	Gauge, multiple fractures and small cavities
2448.0	2450.0	Gauge, smooth hole with minimal vugs
2450.0	2466.0	Multiple fractures and moderate sized cavities
2466.0	2474.0	Large vertical fracture and solution features
2474.0	2476.0	Gauge, minor fractures and solution features
2476.0	2485.0	Large vertical fractures and cavities, boulders on sides
2485.0	2490.5	Vertical fractures, small cavities and solution features
2490.5	2494.0	Gauge, minimal vugs

Starting Depth (feet)	Ending Depth (feet)	Description
2494.0	2520.0	Gauge alternating with small to medium cavities, vertical fracturing
2520.0	2523.0	Abundant fracturing
2523.0	2534.0	Gauge alternating with small cavities, fracturing and solution features
2534.0	2539.0	Gauge, minimal vugs and solution features with possible fracturing
2539.0	2548.0	Abundant fracturing, slightly cavernous
2548.0	2552.0	Gauge, fractured, solution features
2552.0	2558.0	Cavernous, boulders on sides
2558.0	2559.0	Nearly gauge, fracturing and solution features
2559.0	2561.0	Large cavity, boulders against walls
2561.0	2568.0	Gauge, solution features and fracturing, some spauling on walls
2568.0	2572.0	Nearly gauge alternating with small fracture cavities
2572.0	2576.5	Gauge, smooth hole with minimal vugs
2576.5	2596.0	Nearly gauge, highly fractured, abundant solution features
2596.0	2604.0	Large diameter alternating with small cavities, highly fractured
2604.0	2609.0	Nearly gauge alternating with small cavities, solution features, fractured
2609.0	2615.0	Gauge, smooth hole with minimal vugs alternating with fracture cavities
2615.0	2620.0	Nearly gauge, highly fractured, abundant solution features
2620.0	2622.0	Small cavity with solution features
2622.0	2628.0	Nearly gauge, highly fractured, abundant solution features
2628.0	2631.0	Fracture cavity with solution features, boulders on sides
2631.0	2638.0	Nearly gauge, highly fractured, abundant solution features
2638.0	2640.5	Gauge, smooth hole with minimal vugs

Starting Depth (feet)	Ending Depth (feet)	Description
2640.5	2661.0	Nearly gauge with alternating small cavities, highly fractured, solution features
2661.0	2697.0	very cavernous, abundant boulders on sides
2697.0	2726.0	Nearly gauge alternating with small cavities, fractured, abundant solution features
2726.0	2738.0	Large vertical fracturing, abundant solution features
2738.0	2741.0	Large cavity, fractures and solution features
2741.0	2785.0	Nearly gauge alternating with small cavities, highly fractured with solution features
2785.0	2788.0	Gauge, solution features and sucosic crystals
2788.0	2791.0	highly fractured
2791.0	2817.0	Nearly gauge alternating with small cavities, highly fractured with solution features
2817.0	2832.0	slightly cavernous with vertical fracturing
2832.0	2855.0	Nearly gauge alternating with small cavities, highly fractured with solution features
2855.0	2858.0	Gauge, solution features
2858.0	2862.0	Nearly gauge, highly fractured with abundant solution features
2862.0	2866.0	Gauge, large vugs and solution features
2866.0	2870.0	Large cavity, fractures and solution features
2870.0	2895.0	roughly gauge, abundant solution features, possible fracturing
2895.0	2897.0	Large cavity, fractures and solution features
2897.0	2910.0	roughly gauge, abundant solution features, possible fracturing
2910.0	2921.0	vertical fracturing, abundant solution features
2921.0	2937.0	roughly gauge, abundant solution features, possible fracturing
2937.0	2941.0	Gauge, smooth hole with minimal vugs
2941.0	2968.0	Nearly gauge alternating with enlarged cavities, abundant solution features and fracturing

Starting Depth (feet)	Ending Depth (feet)	Description
2968.0	2984.0	Gauge hole, solution features and possible fracturing
2984.0	3002.0	Nearly gauge, highly fractured with abundant solution features

Monitor Well DZMW-1

Video Survey 0 – 1,347 feet bls



CITY OF CAPE CORAL
NORTH CAPE RO WTP DUAL-ZONE MONITOR WELL DZMW-1
6.625-INCH FRP CASING & OPEN HOLE VIDEO SURVEY
0 – 1,346 feet bls

Depth (feet bls)	Description
0	Begin video.
16.2	Casing threaded connection.
33.4	Good visibility.
45.9	Casing threaded connection. Visibility is fair to good.
75.1	Casing threaded connection.
77.8	Logging tool centralizer marks in lower right quadrant of casing extending to 86.9 feet bpl.
104.3	Casing threaded connection.
106.8	Side view of casing.
112.5	Downhole view.
133.4	Casing threaded connection. Logging tool centralizer marks below connection in bottom of screen.
137.2	Logging tool centralizer marks in lower right quadrant extending to 180.2 feet bpl.
162.8	Casing threaded connection.
192.1	Casing threaded connection. Logging tool centralizer marks in lower left quadrant. Visibility is good.
221.6	Casing threaded connection.
251.7	Casing Threaded Connection. 360° rotation side-view. Pipe dope visible on threads. Integrity of connection appears intact. Visibility is good.
280.5	Casing threaded connection.
281.2	Logging tool centralizer marks visible in upper left quadrant extending to 380 feet bpl.

Depth (feet bls)	Description
309.8	Casing threaded connection.
339.3	Casing threaded connection. Visibility fair.
368.7	Casing threaded connection. 360° rotation side-view. Pipe dope visible on threads. Integrity of connection appears intact. Sediment following camera downhole.
382.3	Logging tool centralizer marks in lower left quadrant extending to 413 feet bpl.
398.2	Casing threaded connection. Pipe dope visible.
427.3	Casing threaded connection. Visibility is good.
457.2	Casing threaded connection.
483.2	Logging tool centralizer marks visible in upper left quadrant extending to 516 feet bpl.
486.3	Casing threaded connection.
516.1	Casing threaded connection. Threads visible. Logging tool centralizer marks in center right quadrant extending to 545 feet.
574.6	Casing threaded connection. Logging tool centralizer marks visible in center right of screen extending to 584 feet.
638.6	Logging tool centralizer marks in upper right quadrant extending to 689 feet bpl.
662.1	Casing threaded connection. Visibility is fair.
692.1	Casing threaded connection.
721.1	Casing threaded connection.
751.4	Casing threaded connection. 360° rotation side-view. Integrity of casing appears good.
780.6	Casing threaded connection.
788.2	Logging tool centralizer marks in lower right quadrant extending to 868 feet bpl.
810.3	Casing threaded connection.
839.4	Casing threaded connection.
868.9	Casing threaded connection.

Depth (feet bls)	Description
898.3	Casing threaded connection. 360° rotation side-view. Integrity of casing and connection appears good.
901.1	Logging tool centralizer marks visible in upper right quadrant extending to 924 feet bpl.
927.7	Casing threaded connection.
957.6	Casing threaded connection.
986.5	Casing threaded connection.
1010.6	Logging tool centralizer marks in upper right quadrant extending to 1,027 feet bpl.
1015.6	Casing threaded connection.
1045.6	Casing threaded connection. 360° rotation side-view. Integrity of casing and connection appears good.
1074.6	Casing threaded connection.
1076.1	Logging tool centralizer marks in upper left quadrant and lower right quadrant extending to 1079 feet bpl.
1095.1	Logging tool centralizer marks in lower right quadrant extending to 1,115 feet bpl.
1104.1	Casing threaded connection.
1133.5	Casing threaded connection.
1141.3	Logging tool centralizer marks in all quadrants extending to 1,143 feet bpl.
1158.7	Casing threaded connection. Logging tool centralizer marks in all quadrants extending to 1,163 feet bpl.
1163.7	Casing threaded connection. Logging tool centralizer marks in all quadrants extending to 1,169 feet bpl.
1169.9	Logging tool centralizer marks in lower left quadrant extending to 1,172 feet bpl.
1176.1	Logging tool centralizer marks in upper right quadrant extending to 1,183 feet bpl.
1192.2	Casing threaded connection. 360° rotation side-view. Integrity of casing and connection appears good. Logging tool centralizer marks in all quadrants to 1,200 feet bpl.
1221.9	Casing threaded connection.
1251.8	Casing threaded connection.
1280.9	Casing threaded connection.

Depth (feet bls)	Description
1310.3	Casing threaded connection. Top of stainless steel casing. The last joint.
1317.1	Bottom of stainless steel casing. Beginning of open hole for deep monitor zone. 360° rotation side-view. Integrity of casing appears good.
1317.1	Side view of open hole was logged from bottom to top of open hole and included a white limestone with vugular and intergranular porosity.
1347.5	Bottom of hole.

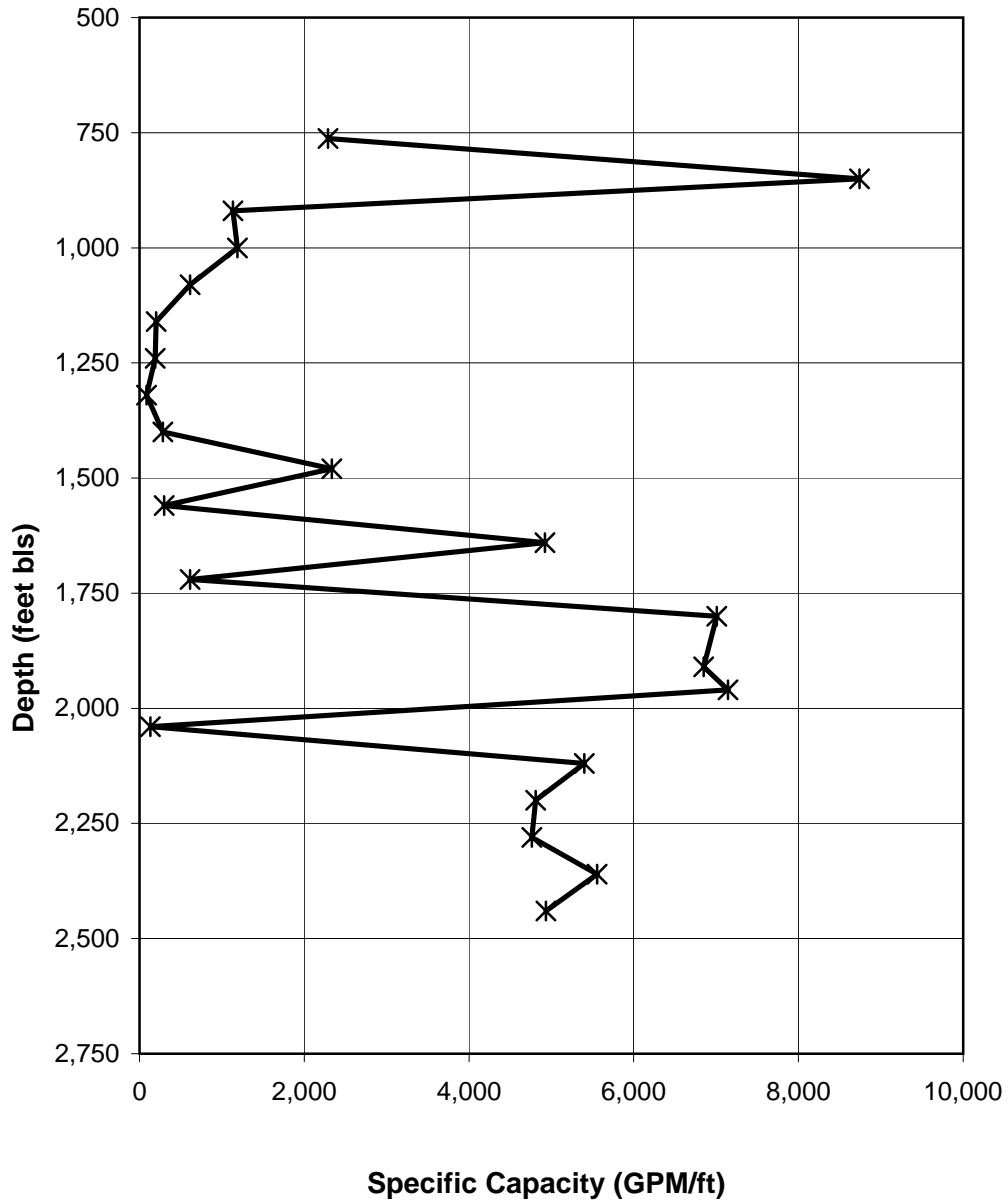
Appendix H

Specific Capacity Testing

Injection Well IW-2

Pilot Hole Specific Capacity

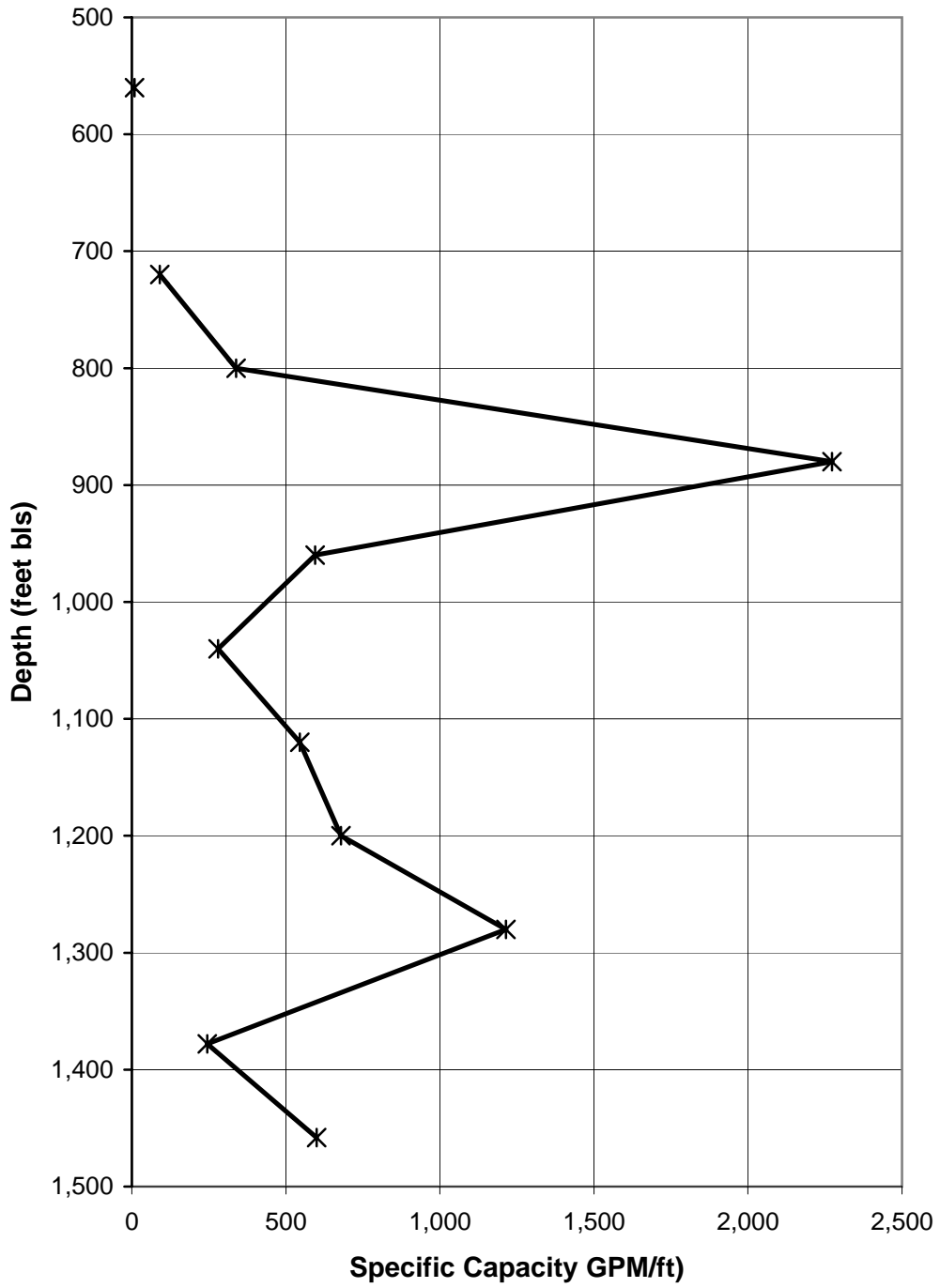
**City of Cape Coral North RO WTP
Injection Well (IW-2)
Pilot Hole Specific Capacity**



Monitor Well DZMW-1

Pilot Hole Specific Capacity

**City of Cape Coral North RO WTP
Monitor Well (DZMW-1)
Pilot Hole Specific Capacity**



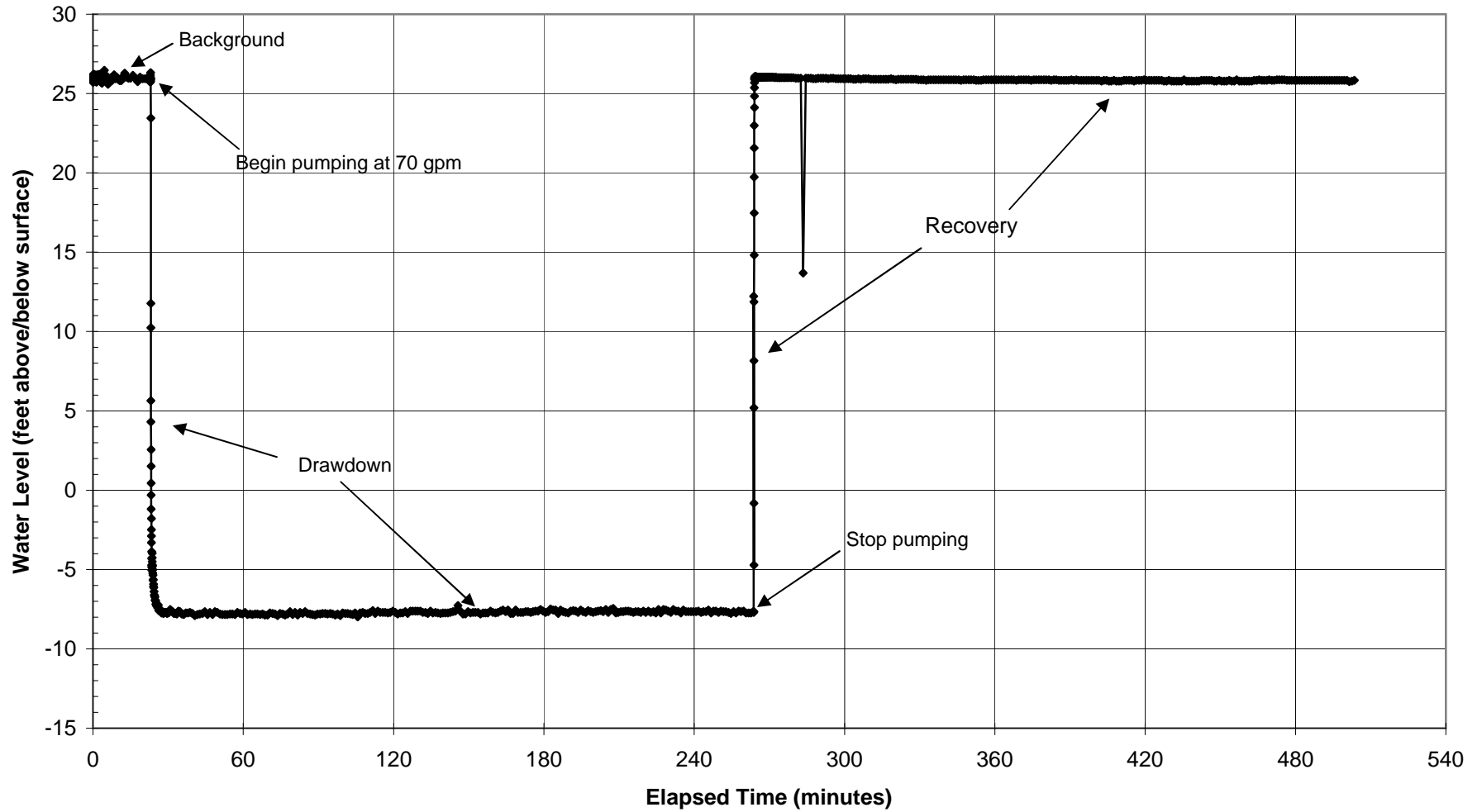
Appendix I

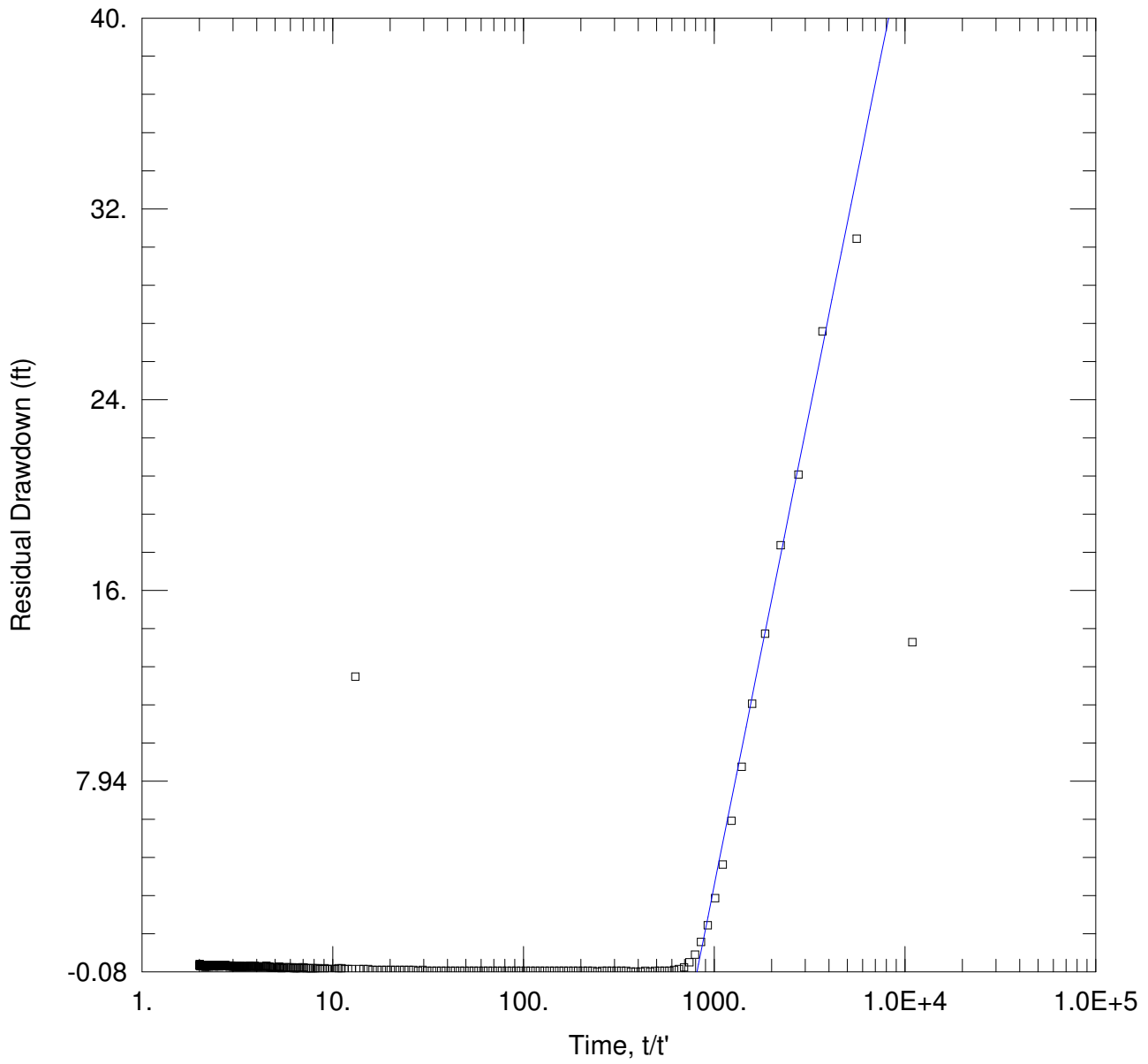
Packer Testing Data and Graphs

Injection Well IW-2

Packer Test - 1,165 to 1,205 feet bls

City of Cape Coral North RO WTP
Injection Well IW-2
Packer Test - 1,165 to 1,205 ft bls
Background, Drawdown & Recovery





NORTH CAPE IW-2 PACKER TEST 1 (1,165 TO 1,205 FT BLS)

PROJECT INFORMATION

Test Well: IW-2

AQUIFER DATA

Saturated Thickness: 40 ft

Anisotropy Ratio (K_z/K_r): 1

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

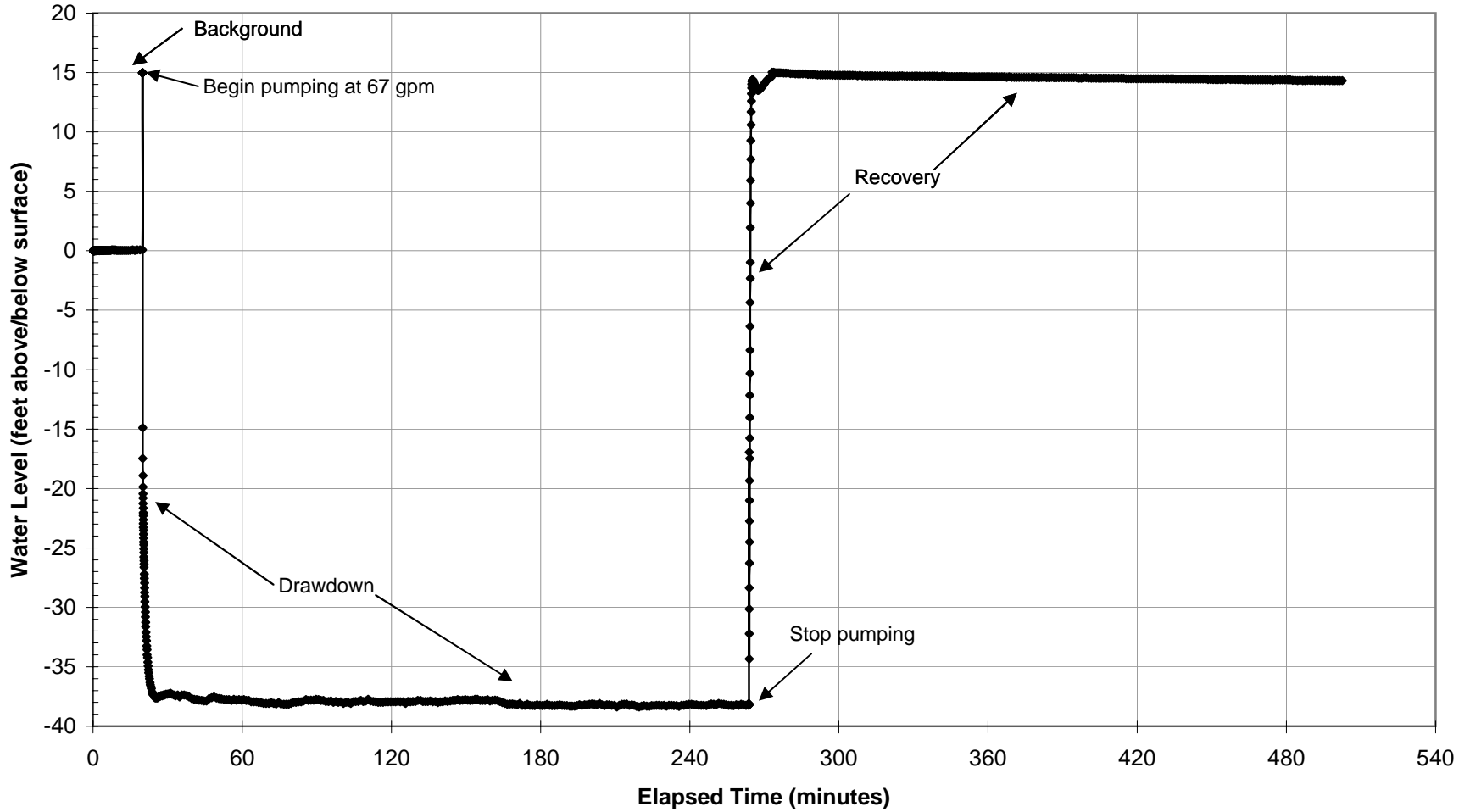
$T = \underline{61.88}$ ft²/day

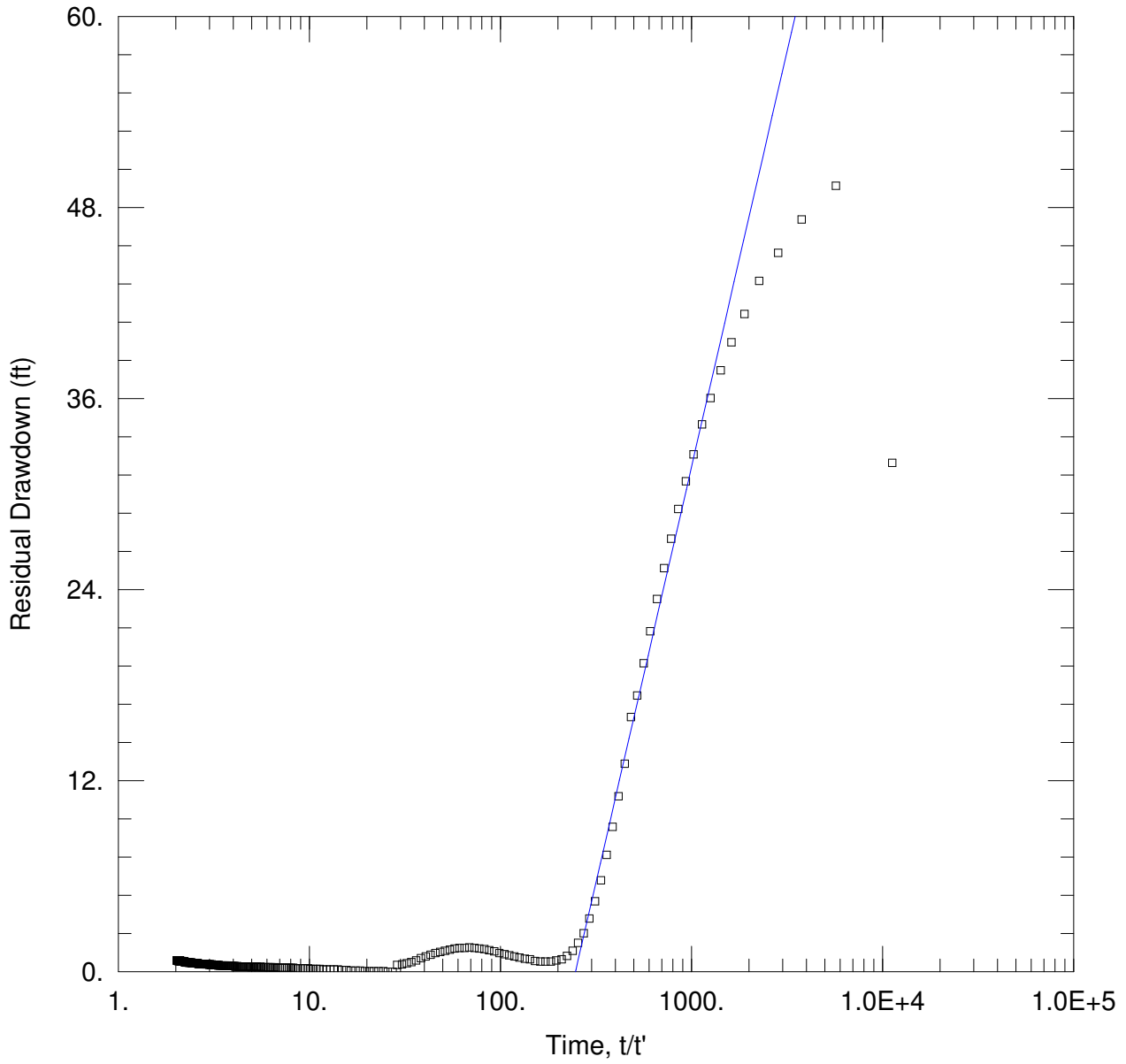
$S/S' = \underline{816.2}$

Injection Well IW-2

Packer Test - 1,245 to 1,265 feet bls

City of Cape Coral North RO WTP
Injection Well IW-2
Packer Test - 1,245 to 1,265 ft bls
Background, Drawdown & Recovery





NORTH CAPE IW-2 PACKER TEST 2 (1,245 TO 1,265 FT BLS)

AQUIFER DATA

Saturated Thickness: 20. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

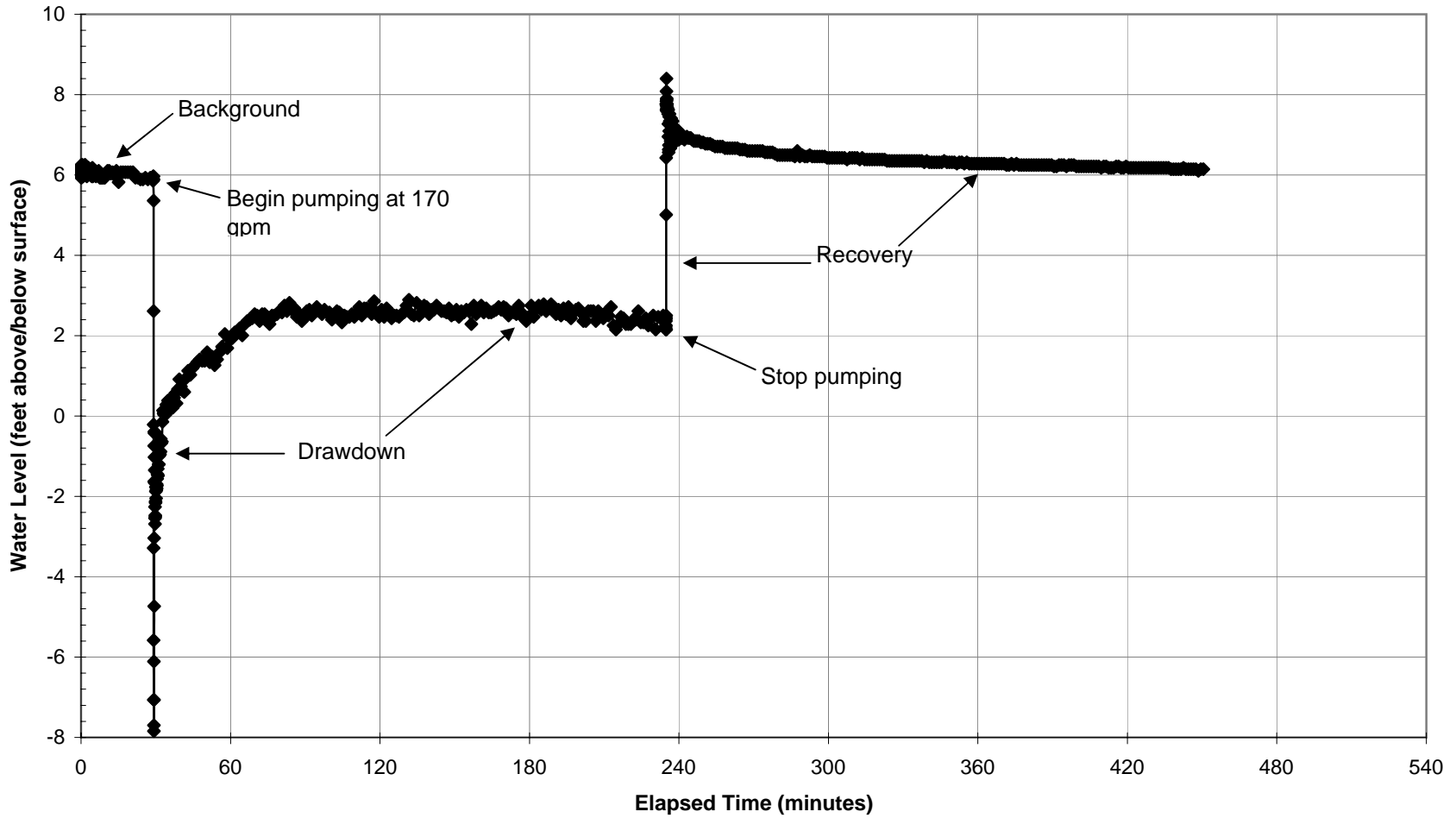
$T = 45.3$ ft²/day

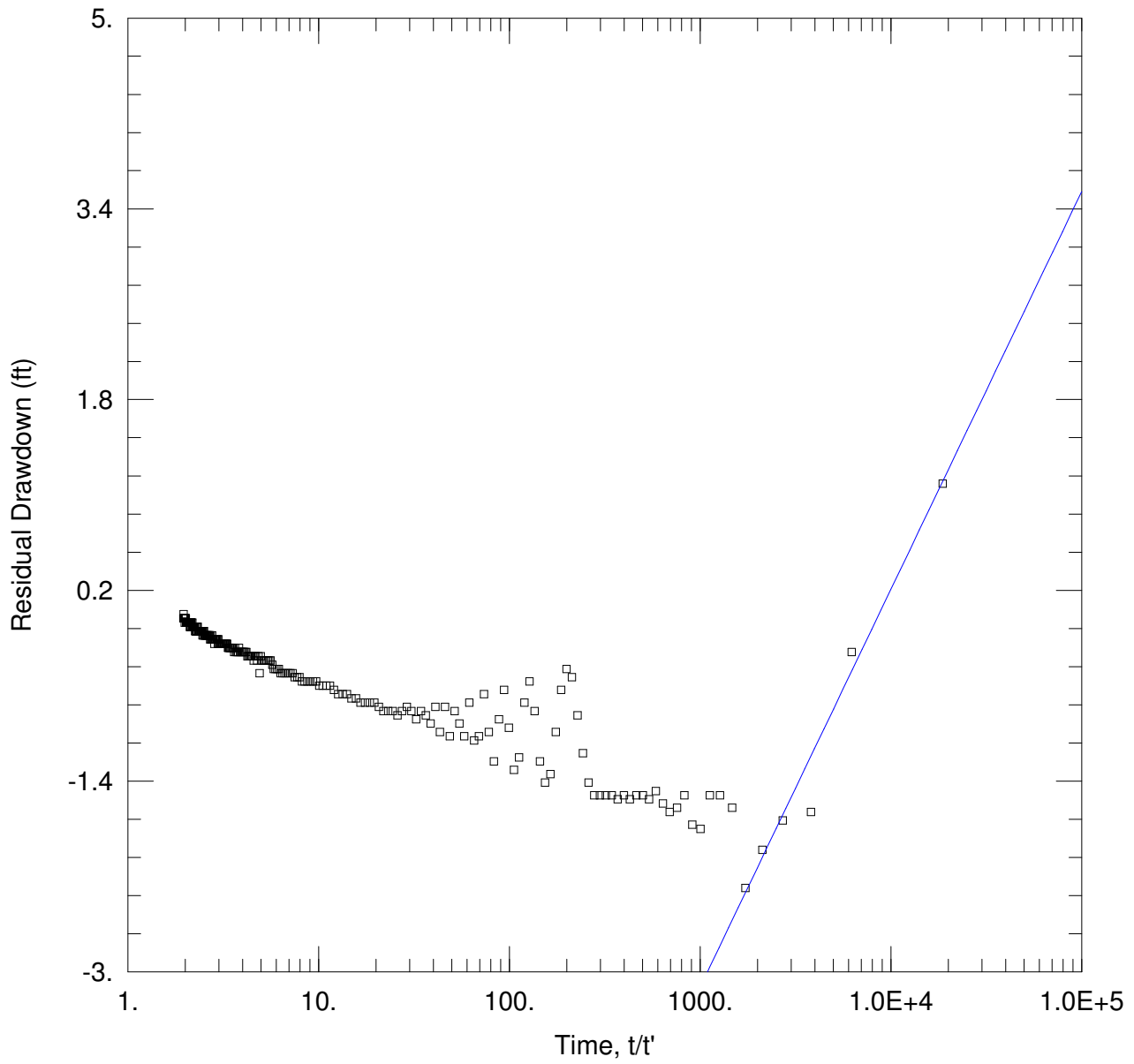
$S/S' = 247.1$

Injection Well IW-2

Packer Test - 1,270 to 1,310 feet bls

City of Cape Coral North RO WTP
Injection Well IW-2
Packer Test - 1,270 to 1,310 ft bls
Background, Drawdown & Recovery





NORTH CAPE IW-2 PACKER TEST 3 (1,270 TO 1,310 FT BLS)

AQUIFER DATA

Saturated Thickness: 40. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

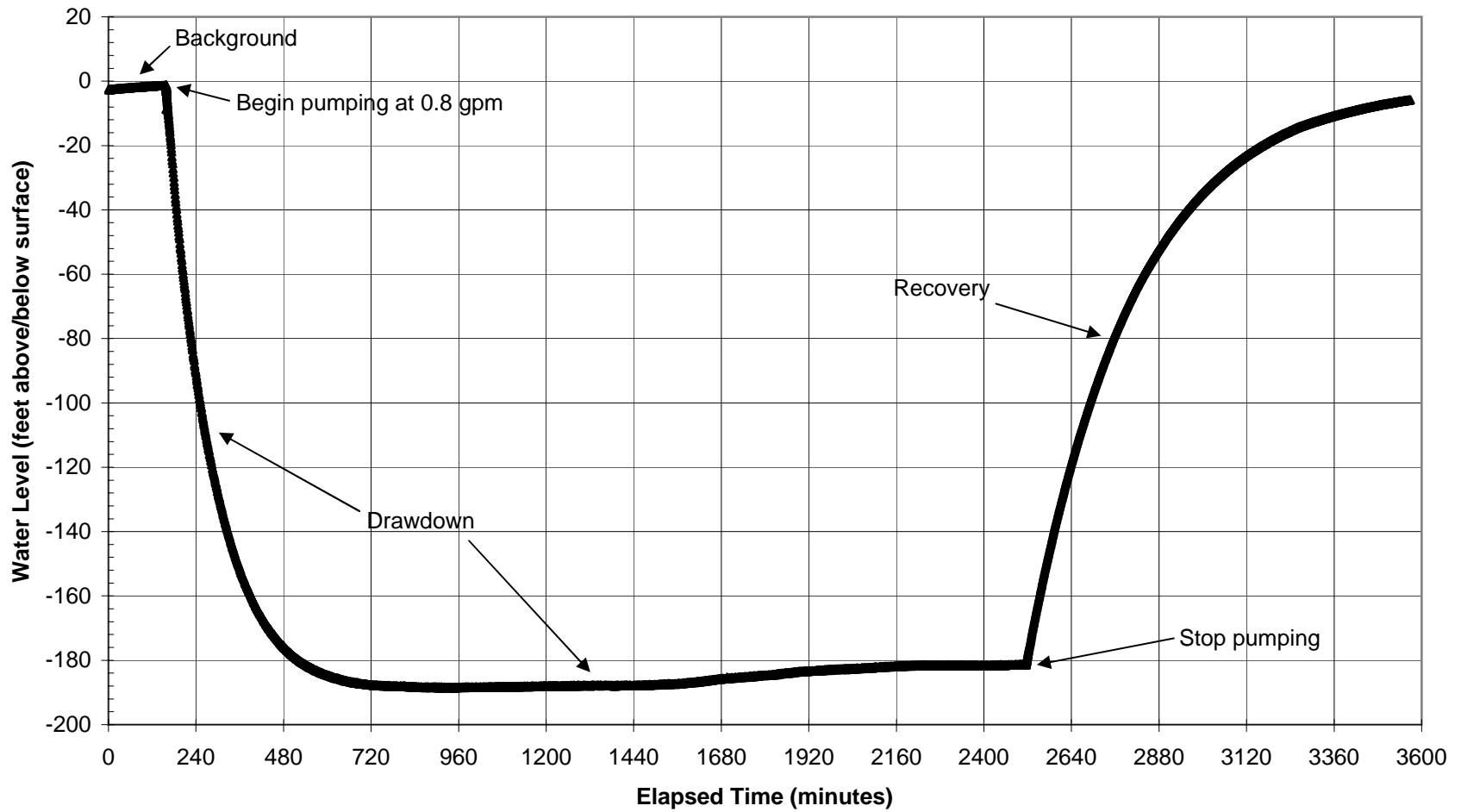
$T = 1797.7$ ft²/day

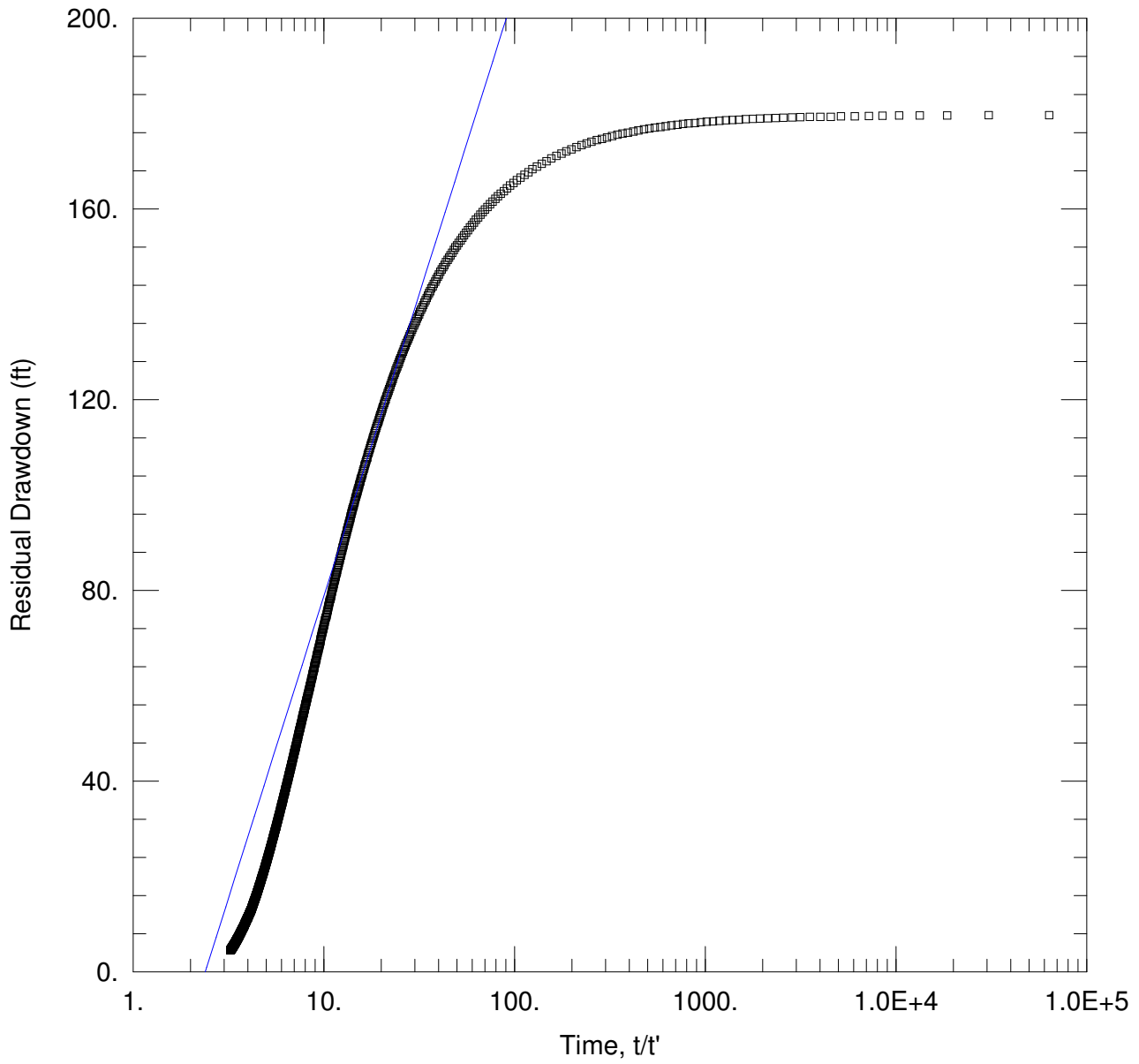
$S/S' = 8671$.

Injection Well IW-2

Packer Test - 2,010 to 2,030 feet bls

City of Cape Coral North RO WTP
Injection Well IW-2
Packer Test - 2,010 to 2,030 feet bls
Background, Drawdown & Recovery





NORTH CAPE IW-2 PACKER TEST 4 (2,010 TO 2,030 FT BLS)

AQUIFER DATA

Saturated Thickness: 20. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

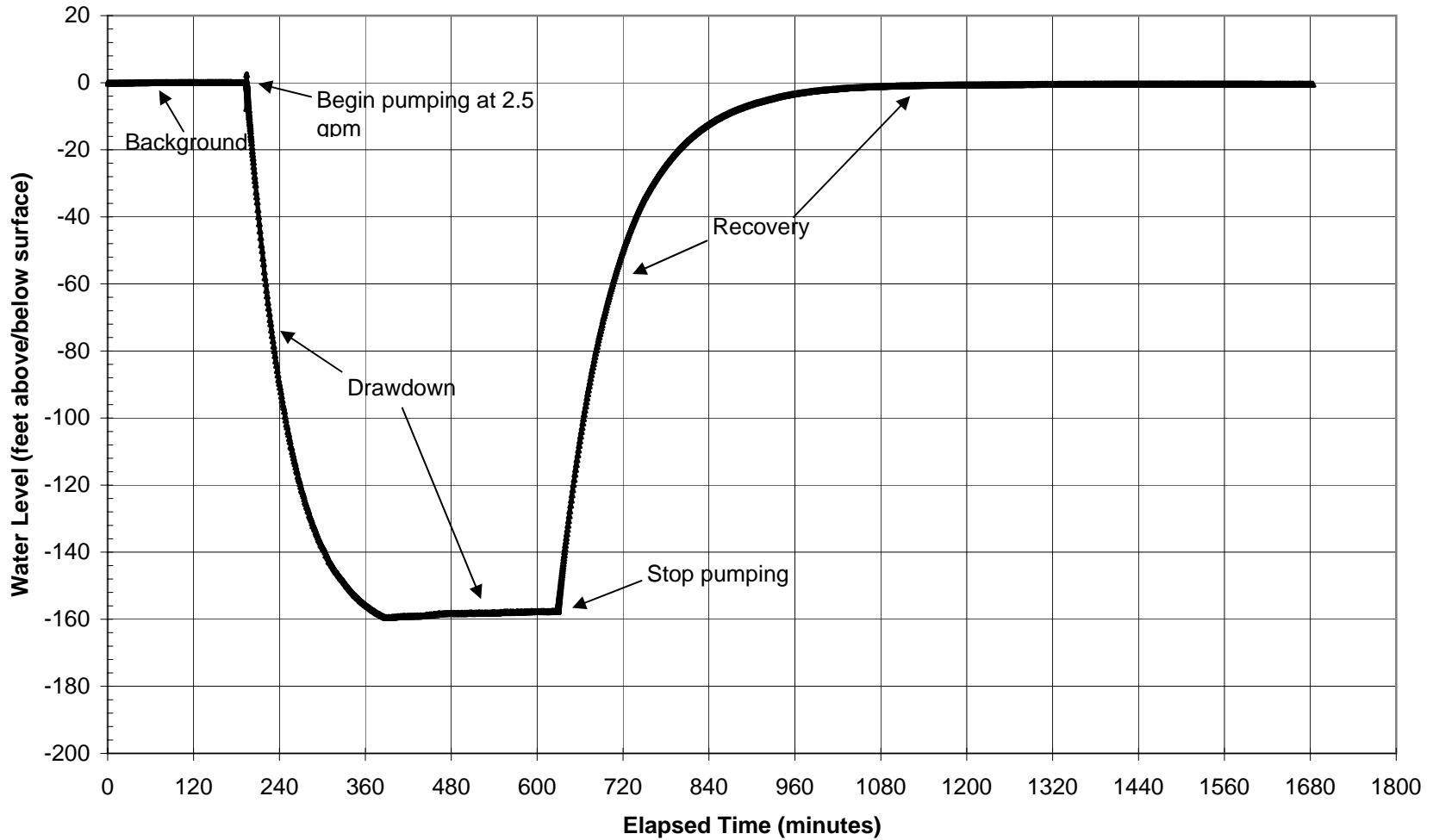
$T = 0.2228$ ft²/day

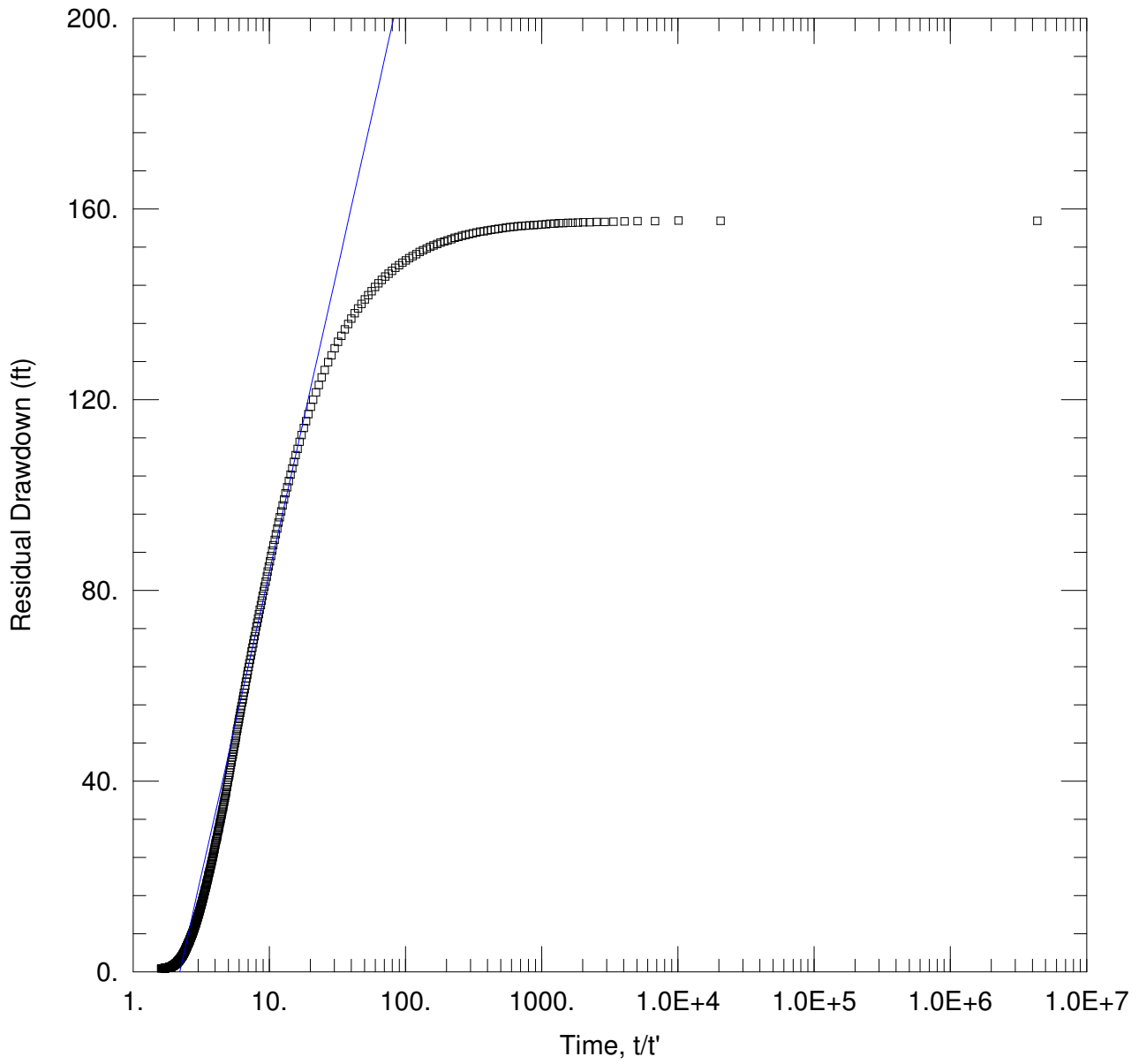
$S/S' = 2.391$

Injection Well IW-2

Packer Test - 2,030 to 2,050 feet bls

City of Cape Coral North RO WTP
Injection Well IW-2
Packer Test - 2,030 to 2,050 feet bls
Background, Drawdown & Recovery





NORTH CAPE IW-2 PACKER TEST 5 (2,030 TO 2,050 FEET BLS)

AQUIFER DATA

Saturated Thickness: 20. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

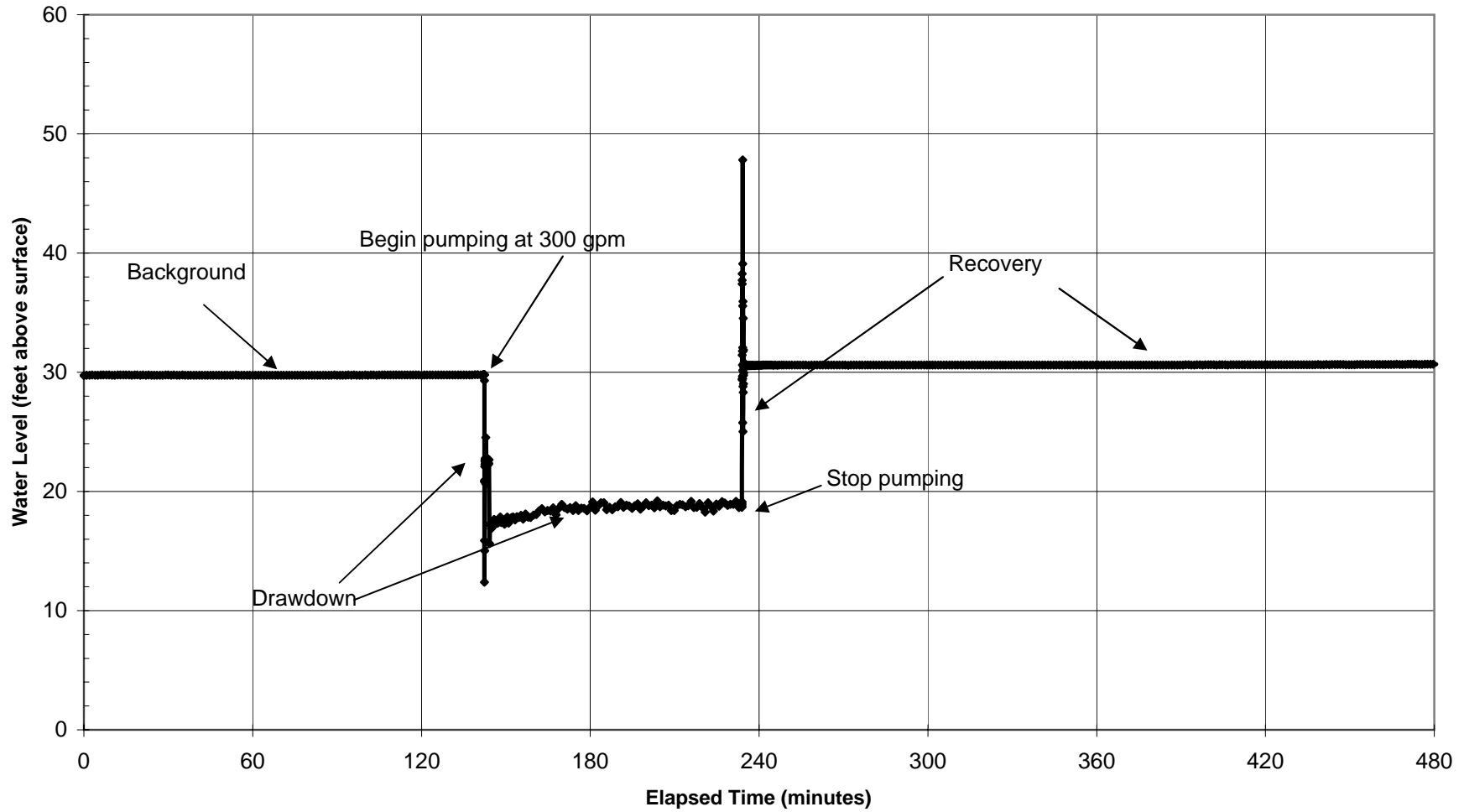
$T = 0.693$ ft²/day

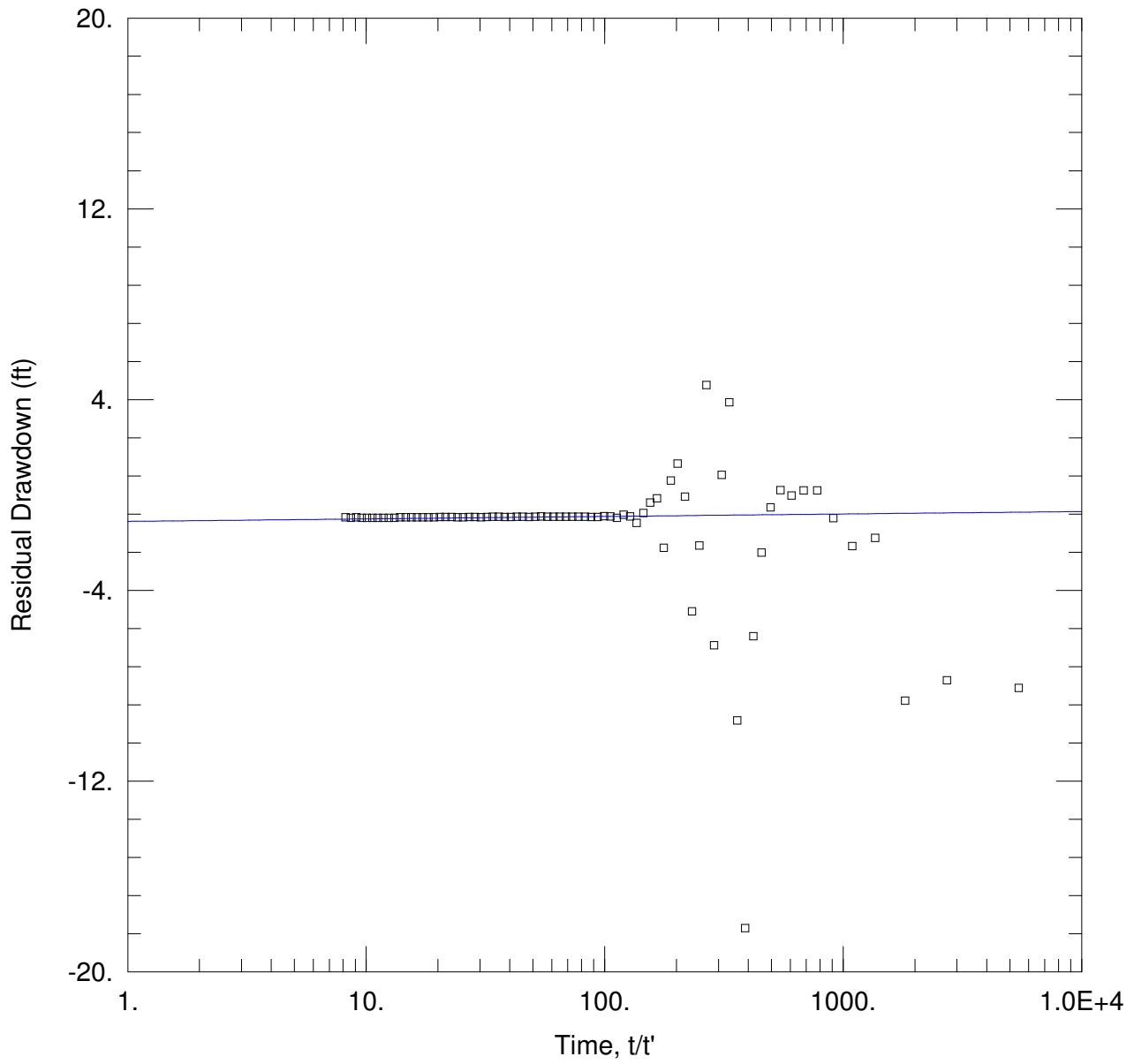
$S/S' = 2.2$

Monitor Well DZMW-1

Packer Test – 1,090 to 1,150 feet bls

City of Cape Coral North RO WTP
Monitor Well DZMW-1
Packer Test 1,090 to 1,150 feet bls
Background, Drawdown & Recovery





NORTH CAPE DZMW-1 PACKER TEST 1 (1,090 TO 1,150 FEET BLS)

AQUIFER DATA

Saturated Thickness: 60. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

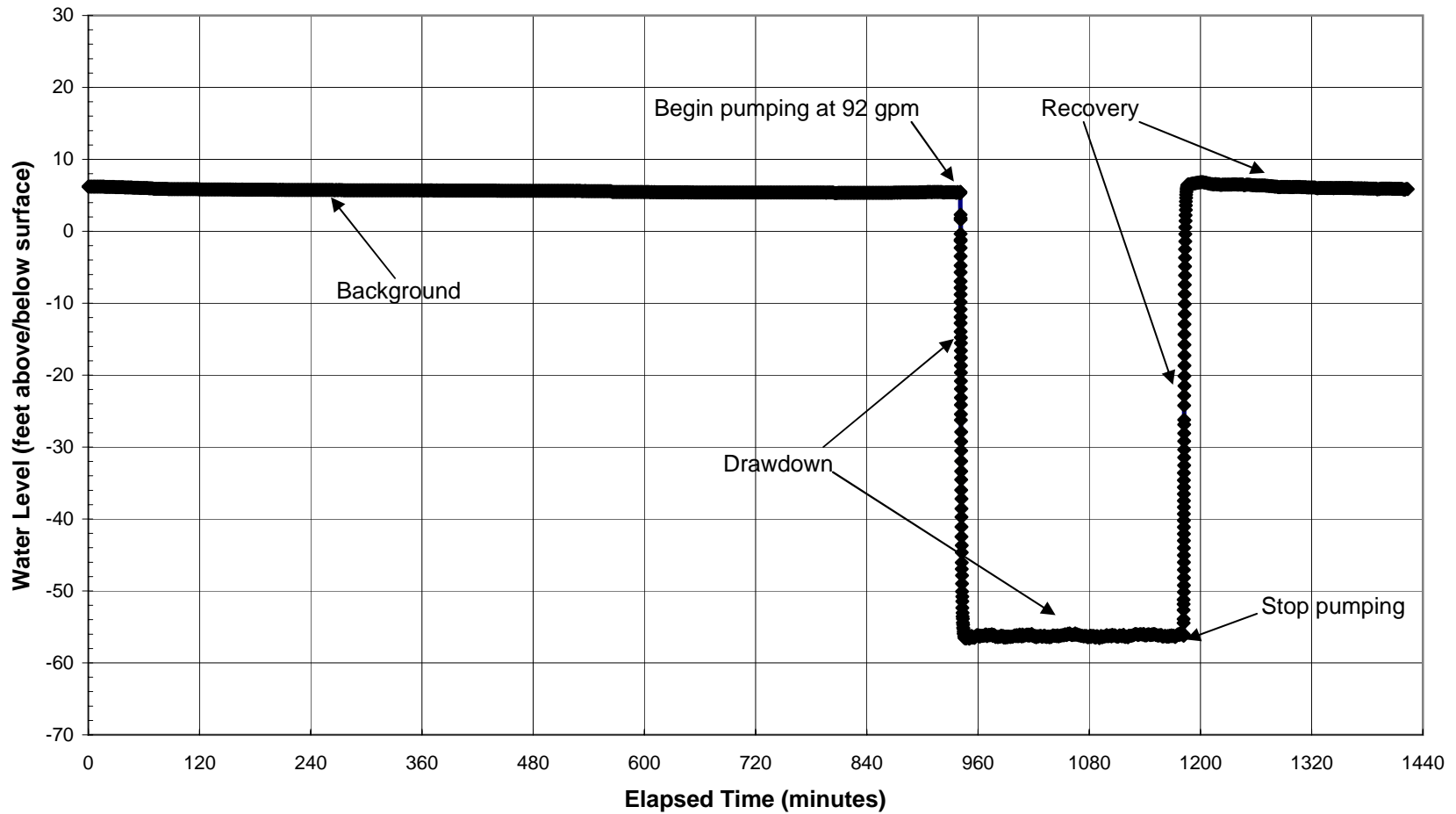
$T = 1.023E+5$ ft²/day

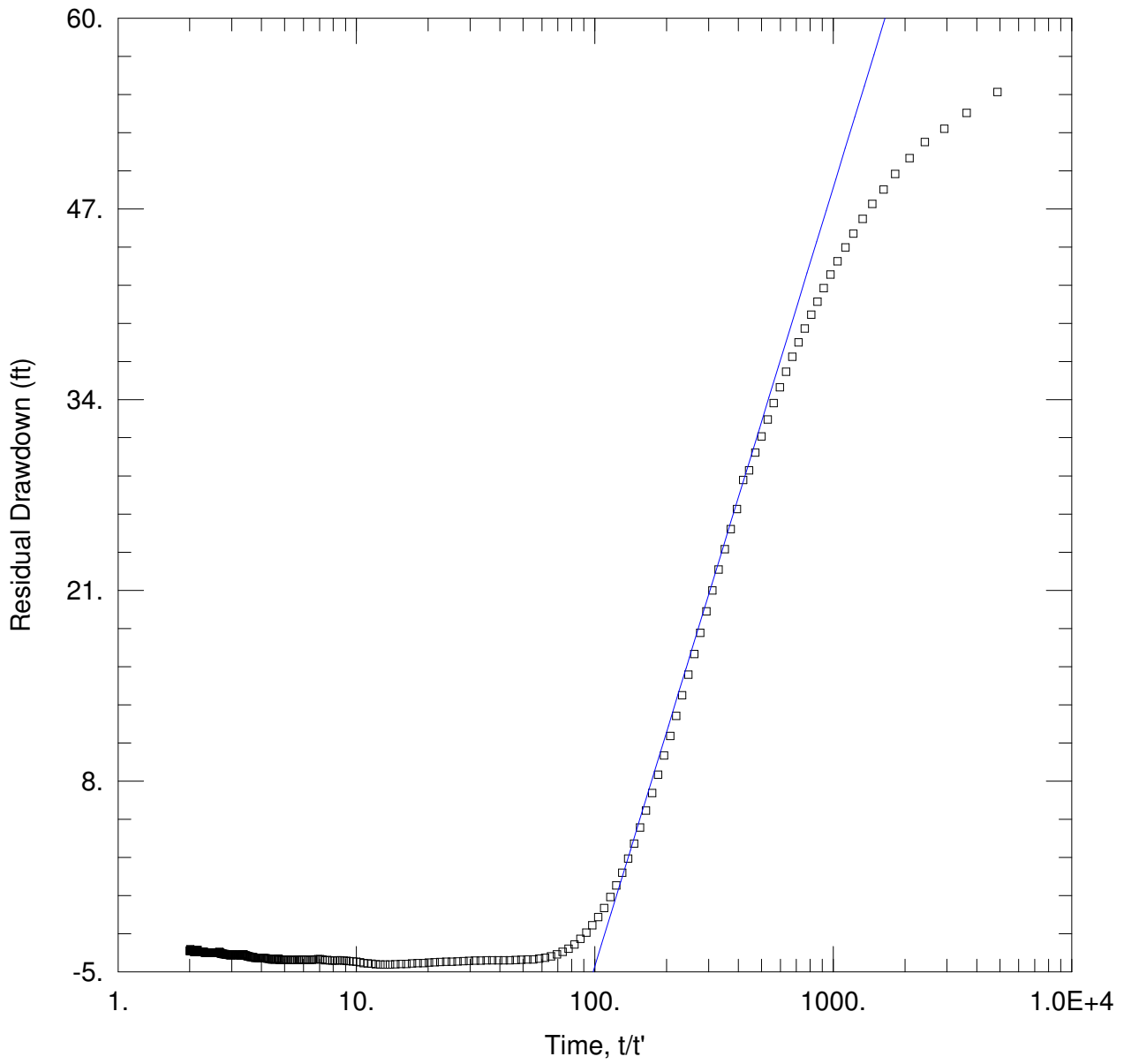
$S/S' = 5.32E+10$

Monitor Well DZMW-1

Packer Test – 1,302 to 1,350 feet bls

City of Cape Coral North RO WTP
Monitor Well DZMW-1
Packer Test 1,302 to 1,350 feet bls
Background, Drawdown & Recovery





NORTH CAPE DZMW-1 PACKER TEST 2 (1,302 TO 1,350 FEET BLS)

AQUIFER DATA

Saturated Thickness: 48. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

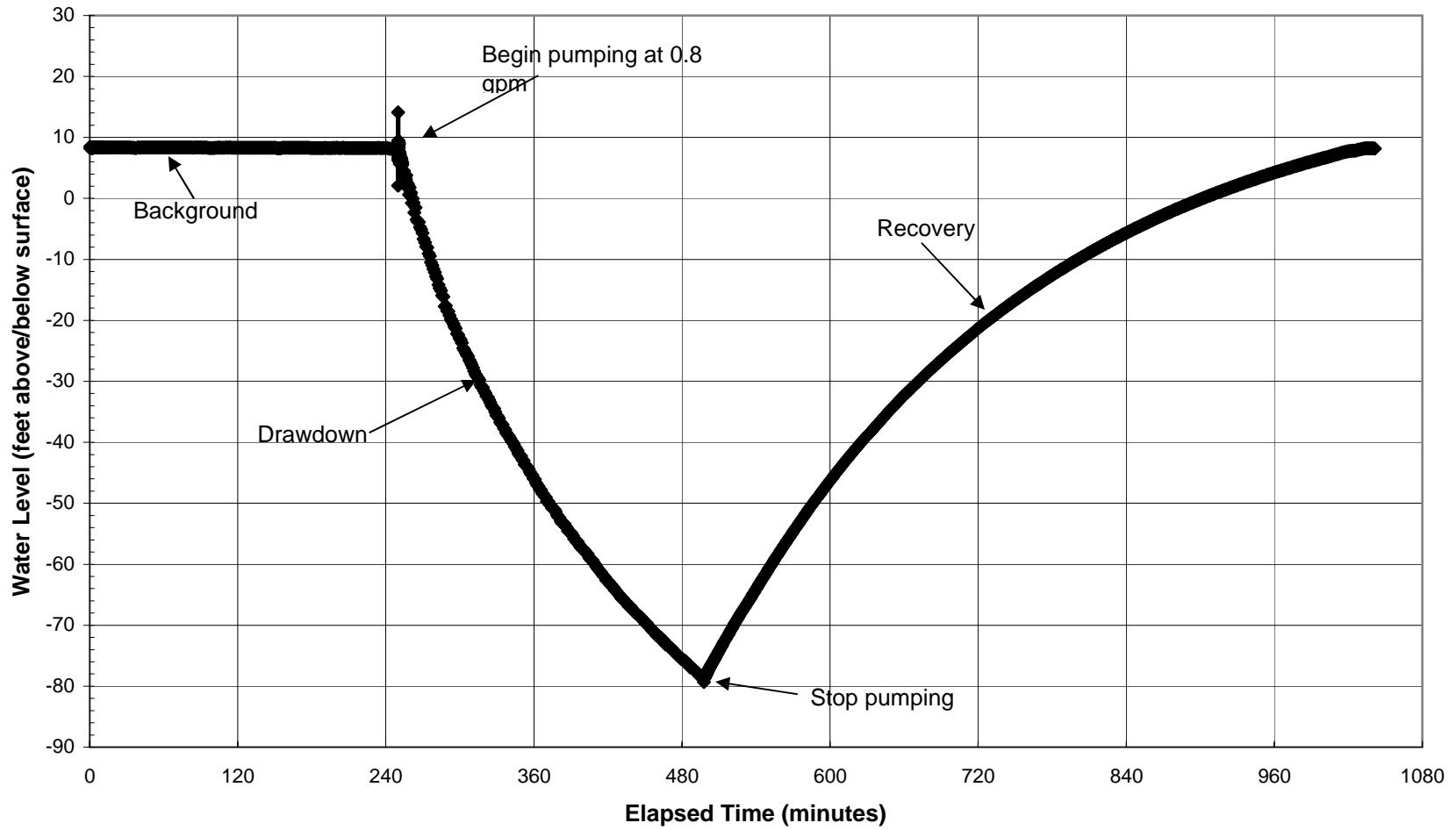
$T = 61.14 \text{ ft}^2/\text{day}$

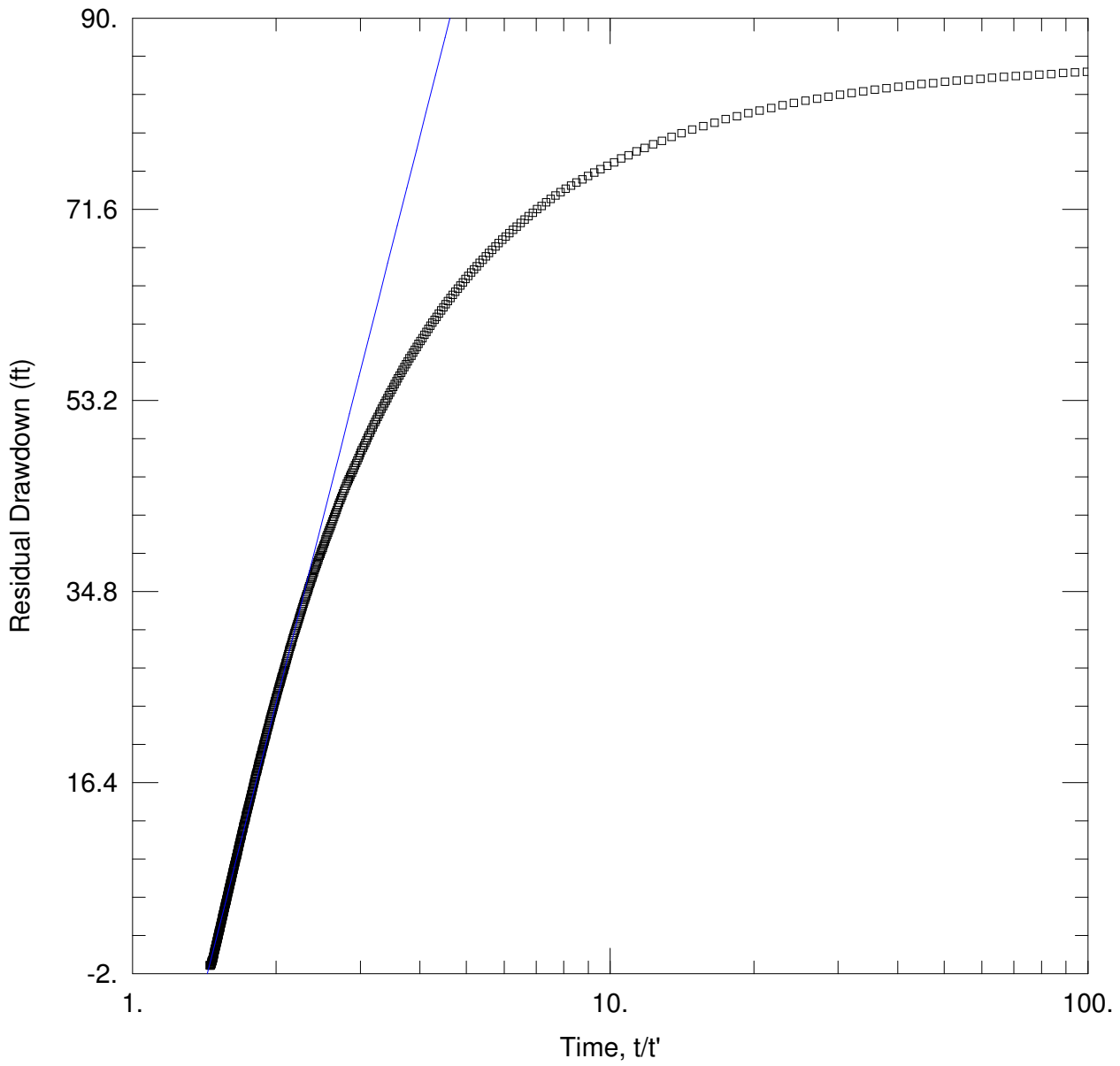
$S/S' = 122.3$

Monitor Well DZMW-1

Packer Test – 1,439 to 1,457 feet bls

City of Cape Coral North RO WTP
Monitor Well DZMW-1
Packer Test 1,439 to 1,457 feet bls
Background, Drawdown & Recovery





NORTH CAPE DZMW-1 PACKER TEST 3 (1,439 TO 1,457 FEET BLS)

AQUIFER DATA

Saturated Thickness: 18. ft

Anisotropy Ratio (K_z/K_r): 1.

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.1558$ ft²/day

$S/S' = 1.472$

Appendix J

Packer Testing Water Quality Laboratory Results

Injection Well IW-2

Packer Test - 1,165 to 1,205 feet bls

Client Project: Cape Coral
 Lab Project: N0702299
 Report Date: 02/22/07



Laboratory Results

Youngquist Brothers, Inc.
 15465 Pine Ridge Road
 Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0702299-01	NCCIW-2 Packer Test#1 (1165-1205) grab	Ground Water	2/19/07 13:50	2/15/07 19:45

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.44		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500Cl-B	1350		1	mg/L	2/20/07 8:22	AK	E84380
Nitrogen, Total	351.2/353.2	0.99		0.10	mg/L as N	2/20/07 17:11	SJ	E84380
Nitrogen, Total Kjeldahl	351.2	0.99		0.10	mg/L as N	2/20/07 11:24	BY	E84380
pH	150.1	7.45	Q	0.01	std units	2/19/07 16:20	BB	E84380
Specific Conductivity	120.1	4540		0.5	umhos/cm	2/20/07 9:05	AK	E84380
Sulfate	375.4	313		2	mg/L	2/19/07 16:20	BB	E84380
Total Dissolved Solids	160.1	2640		10	mg/L	2/20/07 9:30	WC	E84380

Approved by:

Kathrine Bartkiewicz/Lab Manager Fort Myers
 Andrew Konopacki/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # N070 2299

Page ____ of ____

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 P.O. # _____
 Project Name _____
 Project Location: Cape Coral

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # _____
 REQUESTED DUE DATE: 2/27/07

Sampler Signature		Sample			PRESERVATIVES					ANALYSES REQUEST								Sample ID #	
					ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	TPS	CL	SDA	Cond.	pH	AlH ₃	TN		TKN
Bottle #	SAMPLE DESCRIPTION	DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	TPS	CL	SDA	Cond.	pH	AlH ₃	TN	TKN	Sample ID #
1	NCCIW-2 Packer Test #1 (116S-120S)	2/15/07	19:45	GW		✓				6	✓	✓							-01A
1	NCCIW-2 Packer Test #1 (116S-120S)	2/15/07	19:45	GW			✓			2						✓	✓		-01B
Bottle Lot #		RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME									
0600401L		<i>[Signature]</i>			2-19-07	10:35	<i>[Signature]</i>		2/19	10:35									
COMMENTS: 24hr. on Chloride Cond. <i>Rush</i>		OKAY TO RUN AS IS...			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME									
		CLIENT INITIAL:			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME									
		SAMPLES ON ICE			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME									
		Yes No			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME									

Injection Well IW-2

Packer Test - 1,245 to 1,265 feet bls

Client Project: Cape Coral
 Lab Project: N0702300
 Report Date: 02/22/07



Laboratory Results

Youngquist Brothers, Inc.
 15465 Pine Ridge Road
 Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Status	Received Date/Time	Sample Date/Time
N0702300-01	NCCIW-2 Packer Test #2 (1245-1265) grab	Ground Water	2/19/07 13:50	2/17/07 2:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.68		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500Cl-B	9200		1	mg/L	2/20/07 8:22	AK	E84380
Nitrogen, Total	351.2/353.2	0.59		0.10	mg/L as N	2/20/07 17:11	SJ	E84380
Nitrogen, Total Kjeldahl	351.2	0.59		0.10	mg/L as N	2/20/07 11:24	BY	E84380
pH	150.1	7.12	Q	0.01	std units	2/19/07 16:20	BB	E84380
Specific Conductivity	120.1	22000		0.5	umhos/cm	2/20/07 9:05	AK	E84380
Sulfate	375.4	994		2	mg/L	2/19/07 16:20	BB	E84380
Total Dissolved Solids	160.1	17000		10	mg/L	2/20/07 9:30	WC	E84380

Approved by:

Kathrine Bartkiewicz/Lab Manager Fort Myers
 Andrew Konopacki/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # N0702300

Page _____ of _____

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 PO. # _____
 Project Name _____
 Project Location: Cape Coral

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # _____
 REQUESTED DUE DATE: 2/28/07

Sampled By (PRINT)		Sample			PRESERVATIVES					ANALYSES REQUEST										Sample ID #				
Sampler Signature		DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	<div style="display: flex; justify-content: space-between;"> NO₃-CLSD₄ COND. PH ALL IN TKN </div>										Sample ID #			
2	NCCIW-2 Packer Test #2 (1245-1265)	2/17/07	02:00	GW			✓			6	✓	✓											-01A	
2	NCCIW-2 Packer Test #2 (1245-1265)	2/17/07	00:00	GW			✓			2			✓	✓										-01B
Bottle Lot #		RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION			DATE	TIME													
6600401L		<i>[Signature]</i>			2/19	10:35	<i>[Signature]</i>			2/19	10:35													
COMMENTS: 24 hr. on Chloride, Cond. Result 5 ⁰		OKAY TO RUN AS IS...			<i>[Signature]</i>			<i>[Signature]</i>			<i>[Signature]</i>													
		CLIENT INITIAL:																						
		SAMPLES ON ICE <input checked="" type="radio"/> Yes <input type="radio"/> No																						

Injection Well IW-2

Packer Test - 1,270 to 1,310 feet bls

Client Project: Cape Coral

Lab Project: N0702301

Report Date: 02/22/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0702301-01	NCCIW-2 Packer Test #3 (1270-1310) grab	Ground Water	2/19/07 13:50	2/18/07 18:31				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.35		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500Cl-B	14600		1	mg/L	2/20/07 8:22	AK	E84380
Nitrogen, Total	351.2/353.2	0.58		0.10	mg/L as N	2/20/07 17:11	SI	E84380
Nitrogen, Total Kjeldahl	351.2	0.58		0.10	mg/L as N	2/20/07 11:24	BY	E84380
pH	150.1	7.25	Q	0.01	std units	2/19/07 16:20	BB	E84380
Specific Conductivity	120.1	34700		0.5	umhos/cm	2/20/07 9:05	AK	E84380
Sulfate	375.4	2400		2	mg/L	2/19/07 16:20	BB	E84380
Total Dissolved Solids	160.1	26200		10	mg/L	2/20/07 9:30	WC	E84380

Approved by:

Kathrine Bartkiewicz/Lab Manager Fort Myers
Andrew Kordonack/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # N0702301

Page _____ of _____

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 P.O. # _____
 Project Name _____
 Project Location: Cape Coral

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit #: _____
 REQUESTED DUE DATE: 2/28/07

Sampled By (PRINT)					PRESERVATIVES					ANALYSES REQUEST										Sample ID #					
Sampler Signature					Sample					/															
Bottle #	SAMPLE DESCRIPTION	DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ O ₂	HNO ₃	HCL	TDS, CL, SO ₄ , COND, PH, NH ₄ , TN, TKN															
3	NCC IW-2 Ricker Test #3(1270-1310)	2/18/07	18:31	GW		✓			6	✓	✓													-01A	
3	NCC IW-2 Packer Test #3(1270-1310)	2/18/07	18:31	GW			✓		2			✓	✓												-01B
" 72 hr on everything else "																									
Bottle Lot #	RELINQUISHED BY / AFFILIATION				DATE	TIME	ACCEPTED BY / AFFILIATION				DATE	TIME													
000401	 OKAY TO RUN AS IS... CLIENT INITIAL: _____ SAMPLES ONCE Yes No				2-19-07	7:05	 R. J.				2/19	10:55													
					2/19	1350					2/19/7	1350													
COMMENTS: 24hr. Turn on Chloride, Cond, Rush 5																									

Injection Well IW-2

Packer Test - 2,010 to 2,030 feet bls



Laboratory Results

Youngquist Brothers, Inc.
 15465 Pine Ridge Road
 Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0704490-01	NCWTP IW-2 Packer Test 4 grab	Ground Water	4/27/07 14:15	4/26/07 21:15

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.14	I	0.05	mg/L as N	4/30/07 11:30	HB	E84380
Chloride	4500Cl-B	22000		1	mg/L	4/30/07 14:15	AK	E84380
Nitrogen, Total	351.2/353.2	18.5		0.10	mg/L as N	5/1/07 10:23	BY/SJ	E84380
Nitrogen, Total Kjeldahl	351.2	18.5		0.10	mg/L as N	5/1/07 10:23	BY	E84380
pH	150.1	7.08	Q	0.01	std units	4/27/07 15:21	AK	E84380
Specific Conductivity	120.1	51800		0.5	umhos/cm	4/30/07 12:00	AK	E84380
Sulfate	375.4	2590		2	mg/L	5/2/07 11:31	BB	E84380
Total Dissolved Solids	160.1	33500		10	mg/L	5/1/07 15:30	WC	E84380

Approved by:

Kathrine Bartkiewicz/Lab Manager Fort Myers
 Andrew Konopacki/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # NO704490

Page ___ of ___

Client Youngquist
Address _____
Phone _____ Fax _____

Report To: _____
Bill To: _____
P.O. # _____
Project Name Cape Coral
Project Location: _____

Sample Supply: GW
Customer Type: _____
Field Report #: _____
Kit #: _____
REQUESTED DUE DATE: 5/2/07

Sampled By (PRINT)			PRESERVATIVES					ANALYSES REQUEST										Sample ID #																		
Sampler Signature			Sample			ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	Ac	IDS	CL	SO ₄	Cond.	PH	NH ₃	IW	TKN																
Bottle #	SAMPLE DESCRIPTION		DATE	TIME	TYPE																															
1	NCWTP IW-2 Packer test 4		4-26-07	21:15	GW		✓				6		✓	✓																						-01A
2	NCWTP IW-2 Packer test 4		4-26-07	21:15	GW			✓			2						✓	✓																		-01B
Bottle Lot #			RELINQUISHED BY / AFFILIATION							DATE	TIME	ACCEPTED BY / AFFILIATION							DATE	TIME																
6-262-001			Client									Helen Crook							4/27/07	12:57																
6-111-015			Helena Crook							4/27/07	14:15	Alreaga							4/27/07	14:15																
COMMENTS: CR, Cond 24 hr rush 12 hr everything else			OKAY TO RUN AS IS...			CLIENT INITIAL:			SAMPLES ON ICE																											
						Yes			No																											

Injection Well IW-2

Packer Test - 2,030 to 2,050 feet bls

Client Project: Cape Coral

Lab Project: N0705024

Report Date: 05/10/07



Laboratory Results

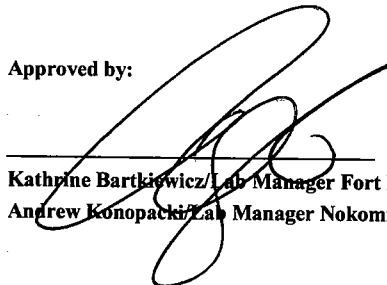
Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0705024-01	IW #2 Straddle Packer 2030'-2050' grab	Ground Water	5/1/07 15:15	4/29/07 15:15

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.05	U	0.05	mg/L as N	5/7/07 13:00	HB	E84380
Chloride	4500Cl-B	18000		1	mg/L	5/2/07 16:00	BB	E84380
Nitrogen, Total	351.2/353.2	0.76		0.10	mg/L as N	5/9/07 10:50	BY/SJ	E84380
Nitrogen, Total Kjeldahl	351.2	0.76		0.10	mg/L as N	5/9/07 10:50	BY	E84380
pH	150.1	6.65	Q	0.01	std units	5/2/07 15:30	BB	E84380
Specific Conductivity	120.1	51100		0.5	umhos/cm	5/2/07 14:30	BB	E84380
Sulfate	375.4	3030		2	mg/L	5/2/07 15:53	BB	E84380
Total Dissolved Solids	160.1	33000		10	mg/L	5/3/07 13:15	WC	E84380

Approved by:

Comments:


Kathrine Bartkiewicz/Lab Manager Fort Myers
Andrew Konopacki/Lab Manager Nokomis

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # NO705024

Page ____ of ____

Client UBI
 Address on file
 Phone _____ Fax _____

Report To: Mary Beth
 Bill To: _____
 P.O. # _____
 Project Name ROIW# DZMW
 Project Location: Cape Coral

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # _____
 REQUESTED DUE DATE: 5/9/07

Sampled By (PRINT)		Sample			PRESERVATIVES						ANALYSES REQUEST						Sample ID #					
Iny Swartzentruber		DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PHAC	105, clean	Ca, so4, PH	NO ₃ , TRU	TRU								
Bottle #	SAMPLE DESCRIPTION																					
1	IW#2 Straddle Packer 2030'-2050'	4-29	15:15	G		✓				6	✓	✓	✓								-01A	
2	IW#2 Straddle Packer 2030-2050	4-29	15:15	↓			✓			2			✓	✓							-01B	
Bottle Lot #	RELINQUISHED BY / AFFILIATION		DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME														
C600401L	Iny Swartzentruber		5-1	12:50 PM	S. Oaj		5/1/07	1515	S. Oaj													
	COMMENTS:	OKAY TO RUN AS IS...																				
	24hr. Rush coord., CI	CLIENT INITIAL:																				
		SAMPLES ON/ICE																				
		Yes No																				

Monitor Well DZMW-1

Packer Test – 1,090 to 1,150 feet bls

Client Project: Cape Coral

Lab Project: N0705025

Report Date: 05/10/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0705025-01	DZMW Straddle Packer 1090'-1150' grab	Ground Water	5/1/07 15:15	4/29/07 21:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia-N	350.3	0.05	U	0.05	mg/L as N	5/7/07 13:00	HB	E84380
Chloride	4500Cl-B	700		1	mg/L	5/2/07 16:00	BB	E84380
Nitrogen, Total	351.2/353.2	0.57		0.10	mg/L as N	5/9/07 10:50	BY/SJ	E84380
Nitrogen, Total Kjeldahl	351.2	0.57		0.10	mg/L as N	5/9/07 10:50	BY	E84380
pH	150.1	7.66	Q	0.01	std units	5/2/07 15:30	BB	E84380
Specific Conductivity	120.1	3470		0.5	umhos/cm	5/2/07 14:30	BB	E84380
Sulfate	375.4	278		2	mg/L	5/2/07 15:53	BB	E84380
Total Dissolved Solids	160.1	1860		10	mg/L	5/3/07 13:15	WC	E84380

Approved by:

Kathrine Bartkiewicz/Lab Manager Fort Myers
Andrew Konopacki/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # N0705025

Page _____ of _____

Client 413 I
 Address ac file
 Phone _____ Fax _____

Report To: MAY Beth
 Bill To: _____
 P.O. # _____
 Project Name ROTW + DZMW
 Project Location: Cape Coral

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit #: _____
 REQUESTED DUE DATE: 5/9/07

Sampled By (PRINT)		Sample			PRESERVATIVES					ANALYSES REQUEST										Sample ID #				
Sampler Signature		DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;">TDS, SO₄</div> <div style="width: 15%;">CL, COND, PH</div> <div style="width: 15%;">NH₃</div> <div style="width: 15%;">TR, TRD</div> </div>										Sample ID #			
1	DZMW Straddle Packer 1090'-1150'	4-29	2100	G		✓				6											<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;">TDS, SO₄</div> <div style="width: 15%;">CL, COND, PH</div> <div style="width: 15%;">NH₃</div> <div style="width: 15%;">TR, TRD</div> </div>			
2	DZMW Straddle Packer 1090'-1150'	4-29	2100	↓			✓			2														
Bottle Lot #		RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME														
C600401L		Greg Kester			5-1	12:50 PM	S. Oog		5/1/07	1250														
COMMENTS: 24 hr Reshion Cond. Cl go		OKAY TO RUN AS IS...			5/1/07		1818		Alreaga		5/1/07		1515											
		CLIENT INITIAL:			SAMPLES ON ICE																			
			Yes No																					

Monitor Well DZMW-1

Packer Test – 1,302 to 1,350 feet bls

Client Project: Cape Coral

Lab Project: N0710421

Report Date: 10/25/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0710421-01	DZ-MW-1 Packer 1302-1350' Grab	Ground Water	10/22/07 16:20	10/22/07 14:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia	SM4500-NH3-D	0.25		0.05	mg/L as N	10/24/07 14:15	AG	E84380
Chloride	SM4500CI-B	17400		1	mg/L	10/23/07 8:30	BB	E84380
Nitrogen, Total Kjeldahl	351.2	0.46		0.10	mg/L as N	10/24/07 8:55	AG	E84380
pH	SM4500H-B	7.00	Q	0.01	std units	10/22/07 16:30	AS	E84380
Specific Conductivity	SM2510B	51300		0.1	µmhos/cm	10/24/07 11:30	BB	E84380
Sulfate	ASTM-D516-90	2360		2	mg/L	10/23/07 10:13	AG	E84380
Total Dissolved Solids	SM2540C	31000		20	mg/L	10/23/07 13:15	AS	E84380

Approved by:


Kathrine Bartkiewicz/Lab Manager Fort Myers
Andrew Kongacki/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # N0710421

Page 1 of 1

Client Youngquist Brothers Inc
 Address 15465 Pine Ridge Rd
Fort Myers FL 33908
 Phone 239-488-4444 Fax 489-4545

E-MAIL (marybeth@youngquistbrothers.com)

Report To: Mike Wilson
 Bill To: YOUNGQUIST BROTHERS
 P.O. # 4527 or Job # 278002
 Project Name 278002 DZMW-1

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit #: _____

Project Location: N.C.C. NORTH CAPE CORAL
1200 KISMET PARKWAY WEST
 REQUESTED DUE DATE: ASAP 10/31/07

Sampled By (PRINT)		Sample			PRESERVATIVES					ANALYSES REQUEST					Sample ID #		
Client		DATE	TIME	TYPE	4°C	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	Chloride	Sp. Conductance	Sulfate	TDS	PH		Ammonia	TKN
Bottle #	SAMPLE DESCRIPTION																
1	DZMW-1 Packer 1302-1350	10/22	1400	GW						x	x	x	x				-01A
2	DZMW-1 Packer 1302-1350	10/22	1400	GW										x	x		↓ B
Bottle Lot #		SHIPMENT METHOD OUT / DATE	RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION			DATE	TIME			
					Mike Wilson			10/22/07	1620	T. Britt			10/22/07	1620			
COMMENTS		COOLER #		COOLER SEAL INTACT		Yes No											
Please Rush																	

Monitor Well DZMW-1

Packer Test – 1,439 to 1,457 feet bls

SANDERS LABORATORIES, INC.
Laboratory Test Report

Lab Project #: N0710497
Client: Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908
Phone: 239-489-4444
Fax: 239-489-4545
E-mail:
Client Project Name: Cape Coral
Laboratory Contact: Andy Konopacki

Page 1 of 3

All subsequent pages are identified by: N0710497 . These pages may include, but are not limited to: Analytical Data, Chains of Custodys, Subcontracted Data and Case Narratives.

QUALIFIER DEFINITIONS

- B: Results based upon colony counts outside the acceptable range.
- I: The reported value is between the laboratory MDL and the laboratory PQL.
- J3: The reported value failed to meet the established quality control criteria.
- J4: The sample matrix interfered with the ability to make an accurate determination.
- J5: The data is questionable because of improper lab or field protocols.
- K: Off scale low, actual value is less than the value given.
- L: Off scale high, actual value is known to be greater than the value given.
- Q: Sample held beyond acceptable holding time.
- U: The compound was analyzed for, but not detected.
- V: The analyte was detected in both the sample and the associated method blank.
- Y: The sample was unpreserved or improperly preserved.
- Z: Too many colonies present (TNTC).
- ** This result does not meet NELAC standards.
- HACH results may not meet NELAC standards.

A statement of estimated uncertainty of results is available upon request.

Analytical results provided relate only to the samples received for this project.

Laboratory report shall not be reproduced except in full, without the written approval of Sanders Laboratories.

Sanders Laboratories follows DEP standard operating procedures for field sampling.

Laboratory PQL's are available upon request.

Reports are archived for a minimum of 5 years. Copies of reports which are less than 1 year old are available for a fee of \$25.00 per report. Reports older than 1 year are available for a fee of \$50.00 per report. Copies will be provided within 1 week of the time of the request.

Client Project: Cape Coral

Lab Project: N0710497

Report Date: 10/30/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0710497-01	Packer #2 1438.7-1456.8 grab	Ground Water	10/26/07 10:30	10/26/07 8:00				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ammonia	SM4500-NH3-D	0.08	I	0.05	mg/L as N	10/26/07 14:15	AG	E84380
Chloride	SM4500Cl-B	17000		1	mg/L	10/29/07 8:00	BB	E84380
Nitrogen, Total Kjeldahl	351.2	1.14		0.10	mg/L as N	10/30/07 9:02	BY	E84380
pH	SM4500H-B	7.36	Q	0.01	std units	10/26/07 10:50	AS	E84380
Specific Conductivity	SM2510B	49300		0.1	µmhos/cm	10/29/07 11:00	BB	E84380
Sulfate	ASTM-D516-90	2910		2	mg/L	10/29/07 15:07	BB	E84380
Total Dissolved Solids	SM2540C	32700		20	mg/L	10/26/07 13:50	AS	E84380

Approved by:

Kathrine Baytkiewicz/Lab Manager Fort Myers

Andrew Konopack/Lab Manager Nokomis

Comments:

Test Results meet all the requirements of the NELAC standards.



CHAIN-OF-CUSTODY RECORD

PROJECT # NO710497

Page 1 of 1

EMAIL TO: marybeth@youngquistbrothers.com

Client Youngquist Brothers Inc
 Address 15465 PINE RIDGE RD
FT MYERS FL 33908
 Phone 239-489-4444 Fax 489-4545

Report To: Mike Wilson / Marybeth Rios
 Bill To: YOUNGQUIST BROTHERS
 P.O. # JOB 278002
 Project Name 278002 DZMW-1 NCC

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # 10/30/07

Project Location: NCC (NORTH CAPE CORAL)
1200 KISMET PKWY - N. DZMW-1
 REQUESTED DUE DATE: ASAP

Sampled By (PRINT)		Sample			PRESERVATIVES					ANALYSES REQUEST								Sample ID #							
<u>William B Steed</u>		DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	Chloride	SP. Conduct	Sulfate	IDS	PH	Ammonia	TKN									
Bottle #	SAMPLE DESCRIPTION																								
1	Packer #2 1438.7 - 1456.8	10/26	0800	G	X					X	X	X	X												-01A
2	Packer #2 1438.7 - 1456.8	10/26	0800	L	X	X									X	X									L B
Bottle Lot #		RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME															
6-171-005		<u>Mike Wilson</u>			10/26/07	1030	<u>Greagh</u>		10/26/07	1030															
6-111-015		OKAY TO RUN AS IS...																							
COMMENTS:		CLIENT INITIAL:																							
<u>Please Rush</u>		SAMPLES ON ICE																							
		Yes No																							

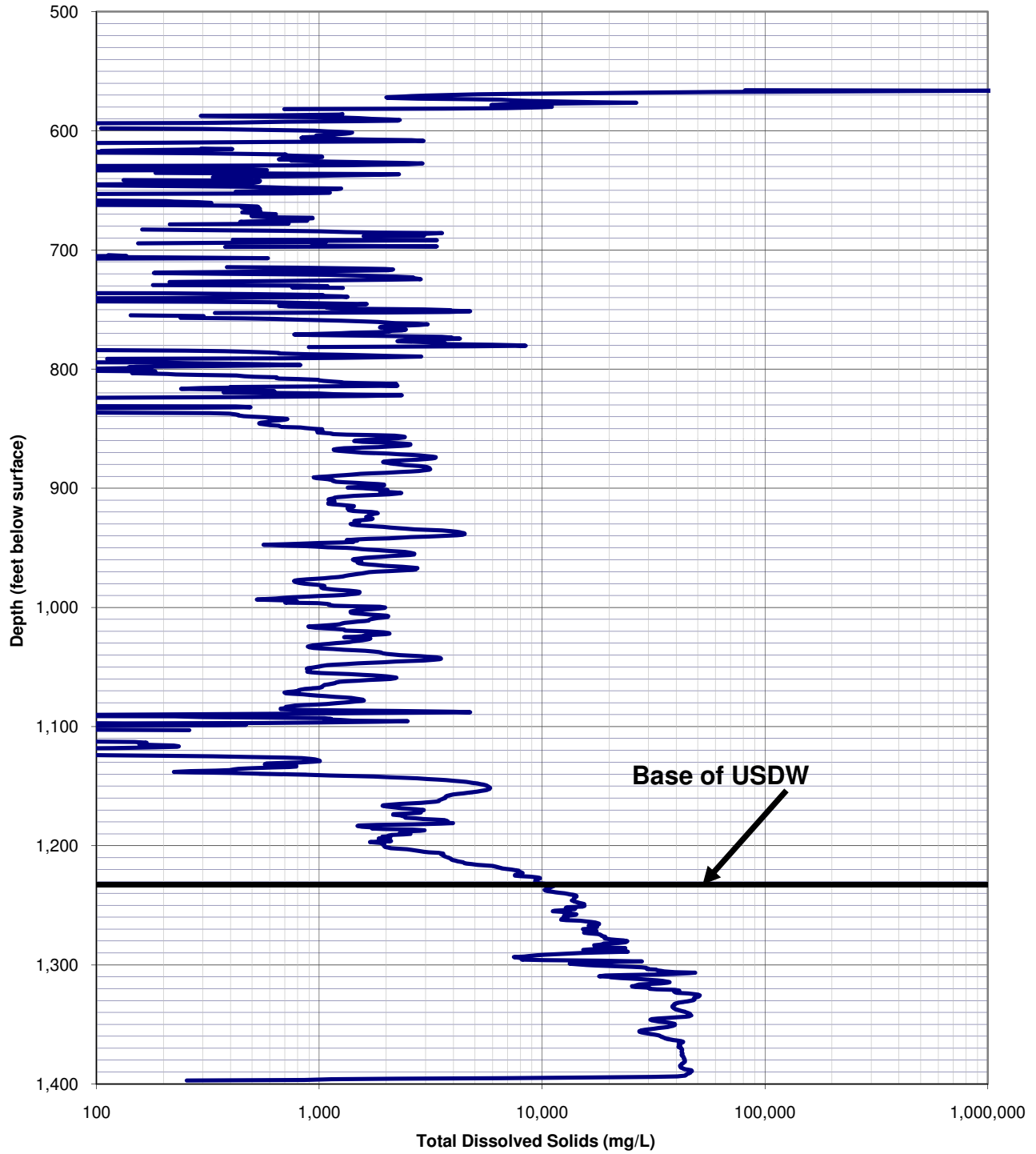
Appendix K

Log Derived Water Quality

Injection Well IW-2

Log Derived Water Quality

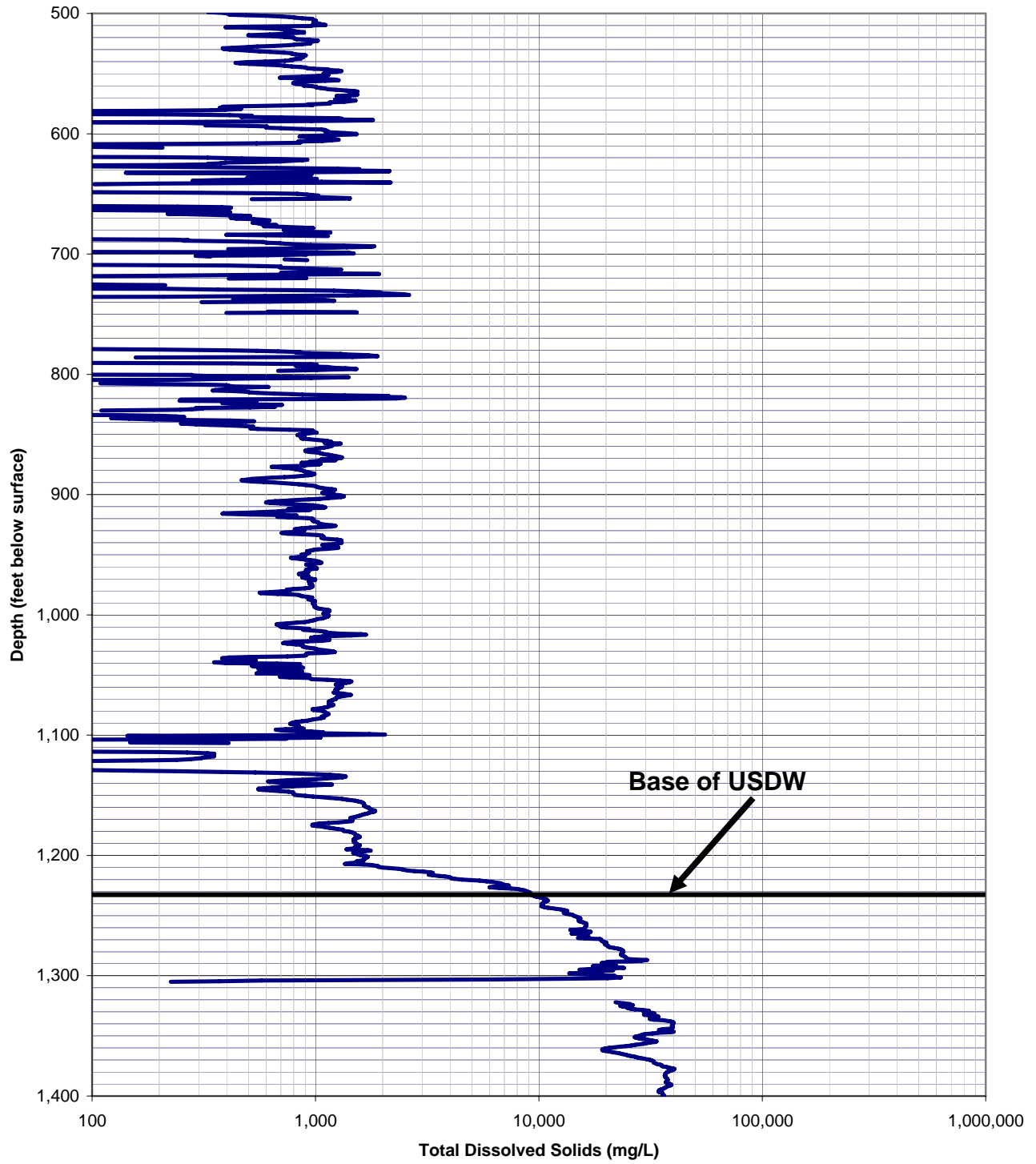
APPENDIX K
North Cape RO WTP IW-2
Log Derived TDS Plot



Monitor Well DZMW-1

Log Derived Water Quality

APPENDIX K
North Cape RO WTP DZMW-1
Log Derived TDS Plot



Appendix L

Casing Mill Certificates

Injection Well IW-2

Casing and Tubing

Injection Well IW-2

54-inch Pit Pipe



MWH

IW-2 CASING TALLY

Casing Diameter: 54 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	22.00
Floor + Elevator (feet bls)	0
Casing Seat (feet bls)	22.00

Joint No. (run)	Length (feet)	Cumulative Length (feet)	Heat Number	Run Depth (feet bls)	Weld Start Time	Weld End Time	Weld Date
1	22.00	22.00	E6B320	22.00			
			E6B321				

YOUNGQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing/Submittal

YBI/Section No. # 02633-016-A

Transmittal No. # _____ Date: 1/29/07

Signature [Signature]

STANDARD CERTIFIED TEST REPORT
 GEORGIA TUBULAR PRODUCTS



Customer Name: **Edgen Carbon Products Group, LLC**
 Customer Address: **18444 Highland Road
 Baton Rouge, LA 70809**

Date: **January 24, 2007**
 Customer Order No. **62414**

City, State, Zip

G.T.P. Sales Order No. **204882**

Specification **ASTM A139 GR. B SPIRALWELD STEEL PIPE MELTED & MANUFACTURED IN THE U.S.A.**

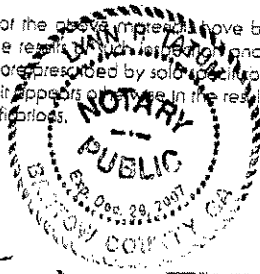
Heat No.	Size O.D.	Wt./ft. or Wall Thick	Min. Hydro Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong in 2" %	C	Mn	P	S	SI
J4096	30"	.375	525	56,400	78,100	32	.19	.77	.012	.006	.02
1618966	34"	.375	463	51,500	77,400	31	.23	.83	.005	.005	.01
1700311	34"	.375	463	65,800	87,300	28	.23	.87	.009	.001	.02
1700313	34"	.375	463	64,200	76,000	29	.23	.93	.008	.004	.02
2618968	34"	.375	463	48,900	75,300	34	.23	.81	.011	.006	.02
1610462	42"	.375	375	46,100	78,400	33	.23	.80	.011	.007	.01
E6B320	54"	.375	292	67,000	86,000	26	.22	.57	.014	.008	.20
E6B321	54"	.375	292	61,000	80,000	27	.20	.58	.012	.005	.21

The undersigned hereby certifies that the above material have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of inspecting or testing are prescribed by said specifications, the standard mill inspection and testing practices of Georgia Tubular Products have been applied. Unless it appears otherwise in the results of such inspection and tests shown above, the undersigned believes that said materials conform to said specifications.

Subscribed and sworn to before me

This 24th day of Jan, 2007

[Signature]
 Notary Public



[Signature]
R. SCOTT PANTER PLANT MGR. Name & Title



Georgia Tubular Products
 109 Dent Drive, Cartersville, GA 30121
 (770) 386-2553

Injection Well IW-2

42-inch Casing



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
 Suite 430
 Cape Coral, Florida 33904
 (239) 573-5959

Project: W-7C North Cape RO WTP
 Deep Injection Wells

MWHA File Number: 3220246.19.9.1.1

Owner: City of Cape Coral

Submittal No.: SUL-YOUBRO-02633-013-A-0

MWH	
NO EXCEPTIONS TAKEN	<input checked="" type="checkbox"/> AMEND - RESUBMIT
MAKE CORRECTIONS NOTED	<input type="checkbox"/> REJECTED - RESUBMIT

Description: IW-2 42 Mill Cert - 2

REVIEWED BY: <i>Neil Johnson</i>	DATE: 2/8/07
RECOMMENDED BY: <i>[Signature]</i>	DATE: 2-26-07

Spec. Section: 02633

Submitting Company: Youngquist Brothers, Inc.

CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATING WORK WITH OTHER TRADES, AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK

Reviewer: Neil Johnson

Comments: The eastern well is IW-2 not IW-1

S.C. ISPAT SIDEX S.A. GALATI - ROMANIA

INSPECTION CERTIFICATE No.577004
ACC.TO EN 10204/3.1.B.

ORDER : 40816

CUSTOMER :

PRODUCT : LONGITUDINALLY SUBMERGED WELDED PIPES

SPECIFICATION : API 5L 42 EDITION GRADE X52 / X42 PSL1, API 2B FOR DIMENSIONAL TOLERANCES.

DELIVERY STATE : EXPANDATED, CLEAR LAQUERED OUTSIDE

BEVELLED ENDS AT 30° (+5° / -0°)

WELD FACTOR : V = 1.0

STRAIGHTNESS : max. 0.55 inch.

DATE:18.11.2003

PIPE No.	HEAT	DIMENSION inchxinchxft	WEIGHT lbs.	* * *			TENSILE TEST				DIM. OF SPECIMENS inch.	HARDNES HV10	GUIDED-BEND TEST	* 4	IMPACT TEST NOTCH :					
				1	2	3	YS PSI	TS %	EL %	YS/TS					BM			W		
															1	2	3	1	2	3
150474	929494	0.375X42X38.65	6452.71	L	B	T	53204	79456	42	0.669	1.51x0.42	170	-	E	-	-	-	-	-	-
150480	"	0.375X42X38.68	6457.72	W	T			83446			1.50x0.41		SUITABLE							
150482	"	0.375X42X38.65	6452.71																	
153448	918845	0.375X42X38.65	6452.71	L	B	T	53166	76914	40	0.691	1.53x0.41	156	-	E	-	-	-	-	-	-
				W	T			76257			1.53x0.39		SUITABLE							

TO BE CONTINUED

VASS PIPE

N. 22. 2003 5:10 PM

HEAT	*	CHEMICAL ANALYSIS												
		x 100			x 1000				x 100					
	5	C	Mn	Si	P	S	Al	Nb	Ti	Cr	Ni	Cu	MO	V
929494	H	14	132	33	20	10	65	-	-	-	-	-	-	3.0
918845	H	11	133	32	18	8.0	60	-	-	-	-	-	-	3.0

END OF CERTIFICATE

DEFINITIONS:

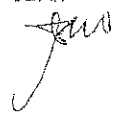
- * 1 TYPE OF TEST
 - L = LOT
 - H = HEAT
- * 2 LOCATION
 - B = BASE MATERIAL
 - W = WELD
- * 3 DIRECTION
 - L = LONGITUDINAL
 - T = TRANSVERSE
- * 4 IMPACT TEST
 - E = ENERGY
- * 5 CHEMICAL ANALYSIS
 - H = HEAT
 - P = PRODUCT

OBSERVATIONS:

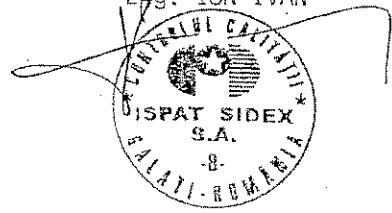
1. SURFACE & DIMENSION TEST : ACCEPTED
2. HYDROSTATIC TEST : ACCEPTED 840 PSI / 10"
3. X RAY INVESTIGATION 100 % : ACCEPTED ACC. TO ISO WIRE 4% PENETRAMETER

This document certifies that the materials above indicated have been inspected in accordance with the specifications mentioned herewith and NACE MR 0175 Specifications.

INSPECTOR
GABRIELA PRODAN



QUALITY DIRECTOR
Eng. ION IVAN



YOUNQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02033-007-B
Transmittal No. # _____ Date: 2/1
Signature C. Paul D.

N. 22. 2005 5:01 PM VASS PIPE


YOUNGQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing/Submittal

YBI/Section No. *02633-007-B*

Transmittal No. #
Signature *[Signature]* **ISCO INC.**

TEST CERTIFICATE — REGINA MILLS

CERTIFICATE NUMBER **000505** 

CUSTOMER

70-3460

DATE

SPECIFICATION *✓* AWWA C200, ASTM A139 Grade B Modified

MILL ORDER NO.

4016

✓ O.D.

1067.

mm

WALL 9.5

mm *✓*

CUSTOMER ORDER NO.

HEAT NO.	PIPE NO.	BODY TEST/TWT				BENDS		HEAT (LABLE) CHEMISTRY/PRODUCE (CHECK) CHEMISTRY															
		TEST WIDTH mm	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELONG % OF 50 mm	Y/T	WELD BREAK	C	Mn	S	P	Si	Ca	N	Cr	V	Cb	Mo	So	Al	BORON	TI	CE
425170	37.9	527	615	37	86	P	.05	1.39	.004	.015	.21	.36	.16	.09	.006	.065	.193	.022	.055	.0002	.041	.001	.23
5416	37.9		627	22		26	.06	1.42	.005	.014	.21	.37	.16	.09	.003	.064	.196	.021	.053	.0000	.041	.001	.25
519373	39.0	529	621	37	85	P	.05	1.48	.004	.016	.20	.32	.19	.08	.005	.069	.202	.020	.040	.0003	.036	.001	.24
601	38.9		632	28		28	.05	1.53	.005	.015	.20	.34	.19	.08	.004	.069	.199	.020	.040	.0000	.035	.001	.24
519204	38.7	506	604	37	84	P	.05	1.63	.009	.015	.17	.33	.14	.06	.005	.067	.202	.021	.039	.0004	.026	.001	.25
632	38.7		616	28		49	.05	1.65	.008	.015	.17	.35	.13	.06	.003	.067	.201	.021	.036	.0000	.027	.002	.25
519389	38.5	503	585	36	86	P	.05	1.48	.007	.015	.17	.33	.13	.08	.002	.075	.195	.021	.034	.0003	.032	.002	.24
5455	38.5		610	25		25	.05	1.47	.007	.014	.17	.33	.12	.08	.003	.068	.194	.020	.034	.0000	.030	.001	.24
425182	38.4	537	601	39	89	P	.05	1.48	.007	.015	.17	.31	.14	.08	.001	.075	.199	.019	.039	.0003	.042	.003	.24
636	38.4		620	28		35	.05	1.44	.008	.013	.16	.30	.14	.08	.004	.070	.195	.018	.042	.0000	.041	.001	.23
519395	38.4	541	615	34	88	P	.05	1.39	.006	.017	.13	.31	.15	.07	.001	.060	.190	.021	.050	.0002	.044	.000	.23
640	38.4		650	27		30	.05	1.45	.006	.017	.14	.36	.15	.09	.002	.059	.191	.021	.058	.0000	.045	.001	.23
519394	37.6	544	610	29	89	P	.04	1.39	.005	.019	.19	.33	.15	.12	.004	.060	.190	.022	.054	.0003	.037	.001	.22
5469	37.6		640	29		40	.05	1.42	.006	.019	.19	.36	.14	.11	.006	.060	.192	.021	.049	.0000	.039	.002	.24
519382	39.0	527	592	37	89	P	.04	1.43	.006	.012	.18	.38	.14	.09	.004	.072	.197	.019	.033	.0002	.044	.003	.23
5482	39.0		608	30		58	.05	1.45	.006	.012	.18	.36	.13	.08	.005	.073	.197	.020	.040	.0000	.042	.002	.24
425175	38.5	514	601	37	85	P	.05	1.39	.006	.017	.18	.39	.13	.11	.002	.052	.199	.021	.043	.0002	.041	.003	.23
5495	38.6		627	26		20	.05	1.40	.006	.015	.19	.37	.13	.10	.005	.050	.198	.020	.042	.0000	.038	.001	.23
425176	38.6	532	605	36	88	P	.05	1.50	.005	.015	.18	.34	.13	.11	.006	.074	.195	.018	.044	.0002	.043	.003	.24
666	38.6		629	26		24	.05	1.49	.006	.015	.18	.36	.13	.11	.004	.074	.202	.019	.047	.0000	.041	.002	.24
425181	39.3	526	622	39	85	P	.06	1.47	.007	.018	.20	.29	.20	.12	.001	.062	.194	.019	.040	.0003	.042	.002	.25
5520	39.3		628	28		29	.06	1.44	.007	.019	.20	.32	.20	.12	.005	.060	.190	.019	.038	.0000	.040	.002	.25
425197	37.5	508	593	37	85	P	.05	1.47	.007	.015	.13	.34	.17	.12	.004	.068	.198	.026	.023	.0003	.033	.001	.24
5540	37.4		587	30		34	.06	1.50	.007	.015	.14	.35	.16	.11	.006	.070	.199	.025	.021	.0000	.031	.002	.26
519407	37.5	517	583	38	89	P	.05	1.39	.004	.019	.18	.29	.15	.12	.004	.062	.199	.024	.068	.0004	.032	.000	.23
5544	37.7		593	30		35	.05	1.43	.005	.016	.18	.32	.14	.09	.005	.063	.196	.021	.049	.0000	.035	.002	.23
519417	38.5	536	629	36	86	P	.05	1.49	.005	.018	.19	.30	.24	.12	.005	.073	.203	.016	.044	.0002	.044	.002	.25
5548	38.4		635	28		32	.05	1.44	.006	.019	.19	.30	.24	.12	.005	.076	.205	.017	.045	.0000	.045	.002	.25
425202	38.1	512	595	38	85	P	.05	1.53	.004	.014	.13	.28	.22	.11	.005	.069	.196	.016	.031	.0002	.030	.001	.25
55580	38.1		603	34		33	.05	1.54	.004	.017	.15	.32	.19	.11	.005	.074	.199	.017	.034	.0000	.032	.002	.25
519408	37.4	529	605	35	88	P	.05	1.50	.005	.020	.13	.33	.18	.12	.004	.067	.190	.023	.032	.0003	.033	.001	.24
7050	37.3		605	29		29	.05	1.62	.006	.018	.13	.34	.17	.11	.005	.068	.191	.022	.033	.0000	.033	.002	.24
425203	37.3	527	608	37	87	P	.05	1.48	.005	.012	.17	.31	.12	.07	.005	.073	.193	.017	.046	.0002	.038	.001	.24
5567	37.4		621	38		32	.05	1.50	.007	.012	.18	.32	.13	.08	.005	.076	.195	.016	.047	.0000	.038	.002	.24

HYDROTEST 90% PRESSURE: 7300 KPa TIME: 10 SEC.

WE HEREBY CERTIFY THAT THE PRODUCT DESCRIBED ABOVE PASSED ALL OF THE TESTS REQUIRED BY THE SPECIFICATIONS

[Signature] *[Signature]*

12-24-2008



Premium Spiral-Weld Pipe

Skyline Steel, LLC - Pipe Group

GEORGIA TUBULAR PRODUCTS
109 Dent Drive - Cartersville, GA 30121
(770) 386-2553 Fax (770) 386-2609

Ship Date 29Dec06 at 14:05 From BFG
No: EBT 84687
Probill
Via CH ROBINSON
FDB SHIPPING PT
Frt COLLECT
Route 0-0 Manifest
Vhcle Trailer
Slp STOCK
Sold To: (941)

Consigned to: (010)
EDGEN CARBON PRODUCTS GROUP, LLC
100 YOUNGQUIST BROTHERS
12000 E SMITH PARKWAY W
CAPE CORRAL, FL 33993
JAY SMARTZENTRUBER P59 560-4607
Tel: 225-756-9868 Fax: 225-756-5887

EDGEN CARBON PRODUCTS GROUP, LLC
18444 HIGHLAND RD
BATON ROUGE, LA 70809

BILL OF LADING

1) Our Order PGT-204882- 3 Your PO # 62414
42" OD SPIRALWELD PIPE 139 GRADE B F+2
.375 WALL X 40' W/ HYDRO

Table with columns: Heat Number, Tag No, Quantity, PCS, Wt LBS. Rows include individual heat numbers (1610462) and a Total row.

TOTAL: 4 Tags, 4 Pcs, 26672 Wt LBS

Heat Number: 1610462

*** Chemical Analysis ***
C=<.63> Mn=<.80> P=<.011> S=<.007> Si=<.01> TEN=<78400>
YLD=<46100> ELONG=<33>

Page: 1 of 1

FREIGHT CHARGES [] PREPAID [X] COLLECT

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

\$ _____ per _____

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(SIGNATURE OF CONSIGNOR)

C.O.D. AMOUNT: \$
C.O.D. FEE: [] PPD [] COLL
TOTAL CHARGES: \$

RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any portion of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

SHIPPER PER [Signature] CARRIER PER [Signature] DATE 12/29/06

Mark with "X" to designate Hazardous Material as defined in Title 49 of the Code of Federal Regulations.



Premium Spiral-Weld Pipe

Skyline Steel, LLC - Pipe Group

GEORGIA TUBULAR PRODUCTS

109 Dent Drive - Cartersville, GA 30121
(770) 386-2553 Fax (770) 386-2609

Ship Date 29Dec06 at 10:14 From BPG
Probill =
Via VOLUME TRANS
FOB SHIPPING PT
Frt COLLECT
Route 0-0 Manifest
Vhicle Trailer
Slp STOCK

Sold To: (94)
EDGEN CARBON PRODUCTS GROUP, LLC
18444 HIGHLAND RD
BATON ROUGE, LA 70809

EDGEN CARBON PRODUCTS GROUP, LLC
11001 TUMBLE PARKWAY W
CANE LOUIS, LA 70548
JAY SUMRZELTNER 254-760-4607
Tel: 225-756-9868 Fax: 225-756-5887

BILL OF LADING

1) Our Order PBT-204882- 1 Your PO # 62414
54" OD SPIRALWELD PIPE 139 GRADE B brkd
-.375 WALL X 50' W/ HYDRO

Heat Number	Tag No	Quantity	PCS	WT LBS
	2630	50 FT	1	10739

2) Our Order PBT-204882- 3 Your PO # 62414
42" OD SPIRALWELD PIPE 139 GRADE B Prd2
-.375 WALL X 40' W/ HYDRO

Heat Number	Tag No	Quantity	PCS	WT LBS
1610462	29735A	40 FT	1	6568
1610462	29735D	40 FT	1	6568
Total:		80 FT	2	13336

Tags	Pcs	WT LBS
TOTAL: 3	3	24075

Heat Number
1610462

*** Chemical Analysis ***
C=<.29> Mn=<.80> P=<.011> S=<.007> Si=<.01> TEN=<78400>
YLD=<48.100> ELONG=<33>

P. WALKER
TRK# 5065
TL# 5094
TRP#

Page: 1 of 1

FREIGHT CHARGES PREPAID COLLECT

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

C.O.D. AMOUNT: \$
C.O.D. FEE: \$ PPD. COLL.

(SIGNATURE OF CONSIGNOR)

TOTAL CHARGES: \$

RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described below, in apparent good order, except as noted, (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.
Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER PER: [Signature] CARRIER PER: [Signature] DATE: 12/29/06

Mark with "X" to designate Hazardous Material as defined in Title 49 of the Code of Federal Regulations



Premium Spiral-Weld Pipe

Skyline Steel, LLC - Pipe Group

GEORGIA TUBULAR PRODUCTS

109 Dent Drive - Cartersville, GA 30121
(770) 386-2553 Fax (770) 386-2609

No: PGT 84686

Ship Date 29Dec06 at 11:18 From GFG
Probill

Via VOLUME TRANS

FOB SHIPPING PT

Frnt COLLECT

Route 0- 0 Manifest

Vehicle Trailer

Slp STOCK

Sold To: (941)

EDGEN CARBON PRODUCTS GROUP, LLC

18444 HIGHLAND RD

BATON ROUGE, LA 70809

Consigned To: (000)

EDGEN CARBON PRODUCTS GROUP, LLC

C/O YOUNGQUIST BROTHERS

12400 FLORIDA PARKWAY W

CLEARWATER, FL 33993

TEL: 813-756-9868 FAX: 813-756-5887

TEL: 225-756-9868 FAX: 225-756-5887

B I L L O F L A D I N G

1) Our Order PGT-204882- 3 Your PO # 62414

42" OD SPIRALWELD PIPE 139 GRADE B Prd2

.375 WALL X 40' W/ HYDRO

Heat Number	Tag No	Quantity	PCS	Wt LBS
1610462	29733A	40 FT	1	6668
1610462	29733B	40 FT	1	6668
Total:		80 FT	2	13336

2) Our Order PGT-204882- 1 Your PO # 62414

42" OD SPIRALWELD PIPE 139 GRADE B Prd2

.375 WALL X 20' W/ HYDRO

Heat Number	Tag No	Quantity	PCS	Wt LBS
1610462	297340B	20 FT	1	3334

Tags	PCS	Wt LBS
TOTAL: 3	2	16670

Heat Number
1610462

*** Chemical Analysis ***

C=<0.23> Mn=<0.80> P=<0.011> S=<0.007> Si=<0.01> TEN=<78400>
YLD=<46100> ELONG=<33>

Dy Ryan

FREIGHT CHARGES PREPAID COLLECT

NOTE- Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

\$ _____ per _____

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

Return
(SIGNATURE OF CONSIGNOR)

C.O.D. AMOUNT: \$

C.O.D. FEE: \$ PPD COL

TOTAL CHARGES: \$

RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER PER *Gene Turner* CARRIER PER *Willie Hensell* DATE *12/27/06*

Mark with "X" to designate Hazardous Material as defined in Title 49 of the Code of Federal Regulations

YOUNGQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing/Submittal

YBI/Section No. # 02633-016-A

Transmittal No. # _____ Date: 1/29/07

Signature [Signature]

STANDARD CERTIFIED TEST REPORT
 GEORGIA TUBULAR PRODUCTS



Customer Name: **Edgen Carbon Products Group, LLC**
 Customer Address: **18444 Highland Road
 Baton Rouge, LA 70809**

Date: **January 24, 2007**
 Customer Order No. **62414**

City, State, Zip

G.T.P. Sales Order No. **204882**

Specification **ASTM A139 GR. B SPIRALWELD STEEL PIPE MELTED & MANUFACTURED IN THE U.S.A.**

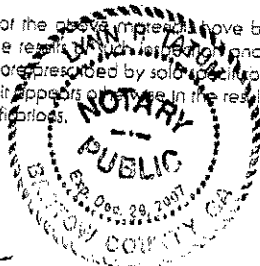
Heat No.	Size O.D.	Wt./ft. or Wall Thick	Min. Hydro Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong in 2" %	C	Mn	P	S	SI
J4096	30"	.375	525	56,400	78,100	32	.19	.77	.012	.006	.02
1618966	34"	.375	463	51,500	77,400	31	.23	.83	.005	.005	.01
1700311	34"	.375	463	65,800	87,300	28	.23	.87	.009	.001	.02
1700313	34"	.375	463	64,200	76,000	29	.23	.93	.008	.004	.02
2618968	34"	.375	463	48,900	75,300	34	.23	.81	.011	.006	.02
1610462	42"	.375	375	46,100	78,400	33	.23	.80	.011	.007	.01
E6B320	54"	.375	292	67,000	86,000	26	.22	.57	.014	.008	.20
E6B321	54"	.375	292	61,000	80,000	27	.20	.58	.012	.005	.21

The undersigned hereby certifies that the above material have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of inspecting or testing are prescribed by said specifications, the standard mill inspection and testing practices of Georgia Tubular Products have been applied. Unless it appears otherwise in the results of such inspection and tests shown above, the undersigned believes that said materials conform to said specifications.

Subscribed and sworn to before me

This 24th day of Jan, 2007

[Signature]
 Notary Public



[Signature]
 R. SCOTT PANTER PLANT MGR. Name & Title



Georgia Tubular Products
 109 Dent Drive, Cartersville, GA 30121
 (770) 386-2553

Injection Well IW-2

34-inch Casing



MWH

CASING LOG

City of Cape Coral
North Cape Deep Injection Well System

Date: 3/4/2007
Job No.: 3220246.77010102
Well: IW - 2

Casing Diameters (inches): O.D. 34.00 I.D. 33.25

Wall Thickness (inches): .375

Page 1 of 1

Pipe No. and Install Order	Heat Number	Length (feet)	Run Depth (feet below land surface)
28	2618968	52.00	46.25
27	1618966	49.99	96.24
26	2618968	49.98	146.22
25	1700313	50.04	196.26
24	2618968	50.02	246.28
23	1700313	49.97	296.25
22	1700313	49.97	346.22
21	1700313	49.97	396.19
20	1618966	49.99	446.18
19	2618968	50.03	496.21
18	1700313	49.96	546.17
17	1618966	50.00	596.17
16	1700311	49.90	646.07
15	2618968	49.96	696.03
14	2618968	50.02	746.05
13	1700311	49.97	796.02
12	2618968	49.95	845.97
11	2618968	49.95	895.92
10	1700311	50.02	945.94
9	2618968	49.97	995.91
8	1700313	50.00	1045.91
7	1700313	49.98	1095.89
6	2618968	49.99	1145.88
5	2618968	50.02	1195.90
4	2618969	50.02	1245.92
3	2618968	50.03	1295.95
2	2618968	49.99	1345.94
1	2618968	49.99	1395.93
	Total length	1401.68	
	Floor and elevators	-5.75	
	34-inch Casing Seat	1395.93	



Premium Spiral-Weld Pipe

Skyline Steel, LLC - Pipe Group

GEORGIA TUBULAR PRODUCTS
109 Dent Drive - Cartersville, GA 30121
(770) 386-2553 Fax (770) 386-2609

Ship Date 23Jan07 at 11:43 From GFB
Probili
Via VOLUME
FOB SHIPPING PT
Frt COLLECT
Route 0- 0 Manifest
Vhcle Trailer
Slp STOCK
Sold To: (941)
EDGEN CARBON PRODUCTS GROUP, LLC
18444 HIGHLAND RD
BATON ROUGE, LA 70809

Consigned To: (000)
EDGEN CARBON PRODUCTS GROUP, LLC
C/O YOUNGQUIST BROTHERS
1200 KISMET PARKWAY W
CAPE CORAL, FL 33993
JAY SWARTZENTRUBER 259- 560-4607
Tel: 225-756-9868 Fax: 225-756-5887

BILL OF LADING

1) Our Order FGT-204882- 6 Your PO # 62414
34" OD SPIRALWELD PIPE 139 GRADE B Prd2
.375 WALL X 50' W/ HYDRD

Table with columns: Heat Number, Tag No, Quantity, PCS, Wt LBS. Rows include 1700313, 1700319, 1618966, 2618968-1, and a Total row.

TOTAL: Tags 4, PCS 5, Wt LBS 33668

Heat Number: 1618966, 1700313, 2618968-1
*** Chemical Analysis ***
C=<.23> Mn=<.83> P=<.005> S=<.005> Si=<.01> TEN=<77400>
YLD=<S1500> ELONG=<31>
C=<.23> Mn=<.93> P=<.008> S=<.004> Si=<.02> TEN=<76000>
YLD=<64200> ELONG=<29>
C=<.23> Mn=<.81> P=<.011> S=<.006> Si=<.02> TEN=<75300>
YLD=<48900> ELONG=<34>

Freight Charges form with PREPAID, COLLECT, and C.O.D. AMOUNT sections. Includes signature of Eli Roberts and date 1/23/07.

YOUNGQUIST BROTHERS, INC.

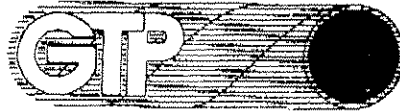
Has Reviewed this Shop Drawing/Submittal

YBI/Section No. # 02633-016-A

Transmittal No. # _____ Date: 1/29/07

Signature [Signature]

STANDARD CERTIFIED TEST REPORT
 GEORGIA TUBULAR PRODUCTS



Customer Name: Edgen Carbon Products Group, LLC
 Customer Address: 18444 Highland Road
 Address: Baton Rouge, LA 70809

Date: January 24, 2007
 Customer Order No. 62414

City, State, Zip

G.T.P. Sales Order No. 204882

Specification: ASTM A139 GR. B SPIRALWELD STEEL PIPE MELTED & MANUFACTURED IN THE U.S.A.

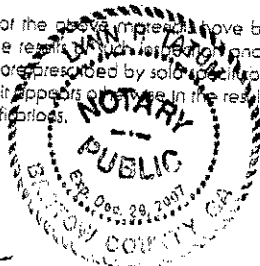
Heat No.	Size O.D.	Wt./ft. or Wall Thick	Min. Hydro Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong in 2" %	C	Mn	P	S	SI
J4096	30"	.375	525	56,400	78,100	32	.19	.77	.012	.006	.02
1618966	34"	.375	463	51,500	77,400	31	.23	.83	.005	.005	.01
1700311	34"	.375	463	65,800	87,300	28	.23	.87	.009	.001	.02
1700313	34"	.375	463	64,200	76,000	29	.23	.93	.008	.004	.02
2618968	34"	.375	463	48,900	75,300	34	.23	.81	.011	.006	.02
1610462	42"	.375	375	46,100	78,400	33	.23	.80	.011	.007	.01
E6B320	54"	.375	292	67,000	86,000	26	.22	.57	.014	.008	.20
E6B321	54"	.375	292	61,000	80,000	27	.20	.58	.012	.005	.21

The undersigned hereby certifies that the above material have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of inspecting or testing are prescribed by said specifications, the standard mill inspection and testing practices of Georgia Tubular Products have been applied. Unless it appears otherwise in the results of such inspection and tests shown above, the undersigned believes that said materials conform to said specifications.

Subscribed and sworn to before me

This 24th day of Jan, 2007

[Signature]
 Notary Public



[Signature]
 R. SCOTT PANTER PLANT MGR. Name & Title



Georgia Tubular Products
 109 Dent Drive, Cartersville, GA 30121
 (770) 386-2553

Injection Well IW-2

22-inch Casing



MWH

CASING LOG

City of Cape Coral
North Cape Deep Injection Well System

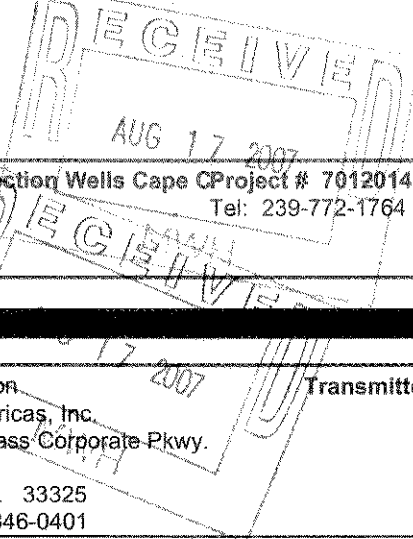
Date: 8/3-4/2007
Job No.: 3220246.77010102
Well: IW - 2

Casing Diameters (inches): O.D. 22.00 I.D. 21.00

Wall Thickness (inches): .500

Page 1 of 2

Pipe No. and Install Order	Heat Number	Length (feet)	Run Depth (feet below land surface)
39	HT070410/HT070410	43.73	37.93
38	HT070410/HT070410	57.35	95.28
37	HT070410/HT070410	55.20	150.48
36	HT070410/HT070410	52.22	202.70
35	HT070410/HT070410	49.74	252.44
34	HT070410/HT070410	52.59	305.03
33	HT070410/HT070410	49.53	354.56
32	HT070410/HT070410	58.80	413.36
31	HT070410/HT070410	55.45	468.81
30	HT070410/HT070410	54.85	523.66
29	HT070410/HT070410	56.13	579.79
28	HT070410/HT070410	49.25	629.04
27	HT070410/HT070410	53.12	682.16
26	HT070410/HT070410	50.91	733.07
25	HT070410/HT070410	50.62	783.69
24	HT070451/HT070410	57.39	841.08
23	HT070410/HT070410	54.20	895.28
22	HT070410/HT070410	56.26	951.54
21	HT070410/HT070410	54.42	1005.96
20	HT070451/HT070410	51.25	1057.21
19	HT070451/HT070410	48.43	1105.64
18	HT070451/HT070451	49.82	1155.46
17	HT070451/HT070451	50.88	1206.34
16	HT070410/HT070451	49.30	1255.64
15	HT070451/HT070451	49.63	1305.27
14	HT070451/HT070451	53.10	1358.37
13	HT070451/HT070451	57.23	1415.60
12	HT070451/HT070451	48.85	1464.45
11	HT070452/HT070452	61.20	1525.65
10	HT070451/HT070451	56.96	1582.61
9	HT070451/HT070451	57.99	1640.60
8	HT070451/HT070451	56.75	1697.35
7	HT070451/HT070451	53.56	1750.91
6	HT070410/HT070410	59.27	1810.18
5	HT070451/HT070451	43.22	1853.40
4	HT070410/HT070410	49.94	1903.34



CC W-7C North Cape Deep Injection Wells Cape C Project # 7012014 MWH Constructors
 CAP-5 Tel: 239-772-1764 Fax: 239-574-6453
 1200 Kismet Parkway West
 Cape Coral, FL 33993

Date: 7/12/2007 Reference Number: 0042

Transmitted To: Neil Johnson
 MWH Americas, Inc.
 490 Sawgrass Corporate Pkwy.
 Suite 300
 Sunrise, FL 33325
 Tel: (954) 846-0401

Transmitted By: Todd Tubbert
 MWH Constructors
 1200 Kismet Parkway West
 CAP-5
 Cape Coral, FL 33993
 Tel: 239-772-1764

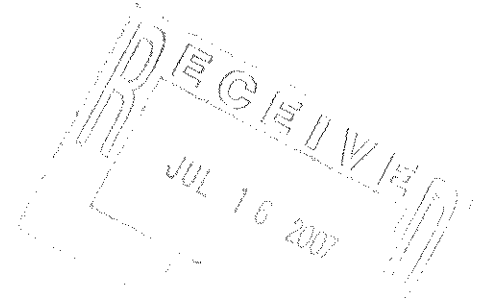
Qty	Submittal Package No	Description	Due Date	Package Action
001	SUL-YOUBRO-02633-0018- IW #2 22 MIL Certification A - - 0			

Transmitted For: Approval
 Delivered Via: Federal Express
 Tracking Number: 19.09

Items	Qty	Description	Notes	Item Action
001	8	IW #2 22 MIL Certification		

Cc:	Company Name	Contact Name	Copies	Notes
	MWH Constructors	File Copy	1	
	MWH Americas, Inc.	Kelly Bremer	1	Transmittal Only

Remarks: Please find attached the submittal for IW #2 22" MIL Certification for your review, approval, and return. Thank you.



CAPE CORAL MWA PROGRAM SERVICES
 DOCUMENT CONTROL STAMP

INCOMING OUTGOING

DATE: 8/10/07

ORIGINAL FILE: 3290246.A9.L1

FILE ADDITIONAL COPY:

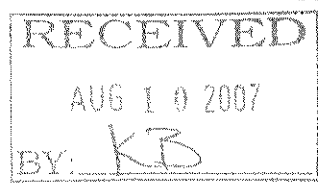
SECTION	DISTRIBUTION			
	PERSON	ACTION	FYI	REVIEW COMMENT
	Todd		3	
	Neil		1	
	Neil		1	
	Steve		1	

SCALE: YES NO

ADVANCE COPY TO ADDRESSEE: YES NO

Signature

7-12-07
 Signed Date



TRANSMITTAL



MWH



MWH Americas Inc.
 2503 Del Prado Blvd. S., Suite 430
 Cape Coral, Florida 33904
 Tel: (239) 573-5959
 Fax: (239) 573-6007

To: City of Cape Coral
 1015 Cultural Park
 Cape Coral, FL 33990

Date: August 10, 2007
Subject: Submittal – Transmittal –
 IW #2 22 MIL Certification

Attn: Bill Peak

Project: W-7C North Cape Injection Well ESDC

From: Kelly Bremer

Job No: 3220246

The following items are:

These data are submitted:

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> Requested | <input type="checkbox"/> Enclosed | <input type="checkbox"/> Cost Estimate | <input type="checkbox"/> At your request |
| <input type="checkbox"/> Report | <input type="checkbox"/> Specifications | <input type="checkbox"/> Shop Drawings | <input type="checkbox"/> For your approval |
| <input type="checkbox"/> Letter | <input type="checkbox"/> Prints | <input type="checkbox"/> Submittal | <input type="checkbox"/> For your review |
| <input type="checkbox"/> Test Result | <input type="checkbox"/> Test Sample | <input type="checkbox"/> Change Order | <input type="checkbox"/> For your action |
| <input type="checkbox"/> Other: _____ | | | <input checked="" type="checkbox"/> For your files |
| <input type="checkbox"/> Sent Separately Via: _____ | | | <input type="checkbox"/> For your information |

Transmittal Items		
Item No.	Copies	Description
1	1	Submittal – Transmittal –IW #2 22 MIL Ceritfication – SUL-YOUBRO-02633-0018-A-0--“No Exceptions Taken”

General Remarks:

"This transmittal is for equipment or materials which meet the specifications and will be incorporated into the work. Please advise within 14 days of any objections the City has. Without comment, we assume there are no objections."

Copies to: Neil Johnson-MWHA
 File:3220246.19.9.1.1



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
 Suite 430
 Cape Coral, Florida 33904
 (239) 573-5959

Project: W-7C North Cape RO WTP
 Deep Injection Wells **MWHA File Number:** 3220246.19.9.1.1

Owner: City of Cape Coral

Submittal No.: SUL-YOUBRO-02633-021-A-0	MWH		
	NO EXCEPTIONS TAKEN	X	AMEND - RESUBMIT
	MAKE CORRECTIONS NOTED		REJECTED - RESUBMIT

Description: IW-2 22-inch, 0.5-in wall thickness, final casing

REVIEWED BY: N. JOHNSON		DATE: JULY 27, 2007
RECOMMENDED BY:		DATE:

Spec. Section: 02633

Submitting Company: Youngquist Brothers, Inc.

CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATING WORK WITH OTHER TRADES, AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK.

Reviewer: Neil Johnson

Comments: None.

**Submittal Data
FROM
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545**

Project
**North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014**

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: July 9, 2007 Number of Copies: 9
Submittal Number: 02633-009-A
Specification Section Number: 02633-009-A
Item Submitted: 22" Mill Certificates
New Submittal: X Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:


Shaun Skinner

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

By: _____
Firm: _____
Date: _____

INSPECTION CERTIFICATE

订货单位: OZONE INDUSTRIES/YOUNGQUIST BROTHERS
PURCHASER:

合同号: WXDX-20070110
Order No:

签发日期: 2007年5月15日
Date Of Issue: No: 48676

Page:1/1

产品名称 Product		无缝钢管 Seamless steel tubes						钢号(级) Steel Gr.		GR.B PSL 1			标准 Specification		API5L-2000			制造方法 Making Method		热轧 Hot Rolled	
总捆数 Total		总支数 Total Pieces		102		总重量 (Short Ton) Total Weight		163.466			交货状态 Delivery		正火 Normalize		热处理温度 Heat Temp						
序号 No.	规格 Size (IN)	长度 Length (FT)	调度 卡号 Production No.	冶炼号 Heat No.	批号 Lot No.	捆数 Bundles	支数 Pieces	重量 Weight (ShortTon)	力学性能 Tensile Test												
									冲击试验 (AKV) Impact Test (J)			屈服 Y.S MPa	抗拉 T.S MPa	伸长率 E.L %	常温		℃低温		压扁 Flattening	扩口 Expansion	冷弯 Bending
1	22" *0.5"	1332.38		070451	4840		50	78.692	330 335	430 435	31.5 31.0										
2	22 " *0.5"	1447.57		070451	4841		52	84.774	330 335	430 435	31.5 31.0								合格 Good		合格 Good
序号 No.	金相 Metallography												硬度 Hardness	外观& 尺寸 Visual& Dimension	涡流探伤 Eddy	超声波探伤 U.T	静水试验 Hydrostatic Test				
	显微组织 Microstructure		晶粒度 GrainSize (级)		总脱碳层 (mm) 外壁 OutSide 内壁 InSide		魏氏组织 Weiststructure (级)		带状组织 Zonalstructure (级)		非金属夹杂物 (级) Non-mepallic Inclusion							低倍检验 Macro-structure			
									A粗	A细	B粗	B细	C粗	C细	D粗	D细		合格 Good		合格 Good	合格 Good
序号 No.	熔炼成分 % Chemical Composition																				
	C	Mn	Si	S	P	Cr	Ni	Cu	Mo	Al	V	Ti	Nb	W	As	Sn	Pb	B	Sb	Bi	
1	0.21	0.54	0.16	0.01	0.009	0.05	0.02	0.03													
复验																					
2	0.21	0.54	0.16	0.01	0.009	0.05	0.02	0.03													
复验																					
备注 Note	许可证号 License																				
	5L-0369																				

签发人: 周维青
Signed by:

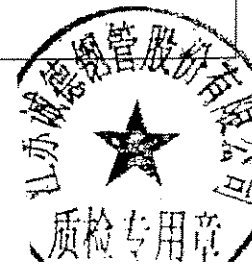
审核人:
Previewed by:

质量负责人:
Chief of Previewed by:



盖章:
Seal:

YOUNGQUIST BROTHERS, INC.
Has Received This Shop Drawing/Submittal
YBV/Section No: 02633-009-A
Date: 7/9/07
Signature: [Signature]





江苏诚德钢管股份有限公司
JIANGSU CHENGDE STEEL TUBE SHARE CO., LTD

产品质量证明书
INSPECTION CERTIFICATE

江苏省江都市诚德路1号
1 CHENGDE ROAD,JIANGDU CITY JIANGSU PROVINCE
TEL: 0514-6529011, 6529012 FAX: 0514-6520240

订货单位: OZONE INDUSTRIES/YOUNGQUIST BROTHERS
PURCHASER:

合同号: WXDX-20070110
Order No:

签发日期: 2007年5月25日
Date Of Issue: 编号: 48693

Page:1/1

产品名称 Product		无缝钢管 Seamless steel tubes						钢号(级) Steel Gr.		GR. B PSL 1			标准 Specification		API5L-2000			制造方法 Making Method		热轧 Hot Rolled	
总捆数 Total		总支数 Total Pieces		30		总重量 (Short Ton) Total Weight		44.130			交货状态 Delivery		正火 Normalize		热处理温度 Heat Temp						
序号 No.	规格 Size (IN)	长度 Length (FT)	调度 卡号 Producti on No.	冶炼号 Heat No.	批号 Lot No.	捆 数 Bundl es	支数 Pieces	重量 Weight (ShortT on)	力学性能 Tensile Test												
									屈服 Y. S MPa	抗拉 T. S MPa	伸长率 E. L %	冲击试验 (AKV) Impact Test (J)		压扁 Flattening	扩口 Expansion	冷弯 Bending	环圈拉伸 Ring Tensile Test				
1	22" #0.5"	746.59		070542	4887		30	44.130	330 325	430 440	30.0 31.0	常温						℃低温		合格 Good	
序号 No.	金相 Metallography														硬度 Hard- ness	外观& 尺寸 Visual& Dimension	涡流探伤 Eddy	超声波探伤 U. T	静水试验 Hydrostatic Test		
	显微组织 Microstructure	晶粒度 GrainSize (级)	总脱碳层 (mm) 外壁 OutSide 内壁 InSide		魏氏组织 Weiststructure (级)	带状组织 Zonalstructure (级)	非金属夹杂物(级) Non-mepallic Inclusion						低倍检验 Macro- structure								
									A粗	A细	B粗	B细	C粗	C细	D粗	D细		合格 Good	合格 Good	合格 Good	
序号 No.	熔炼成分 % Chemical Composition																				
	C	Mn	Si	S	P	Cr	Ni	Cu	Mo	Al	V	Ti	Nb	W	As	Sn	Pb	B	Sb	Bi	
1 复验	0.21	0.55	0.16	0.01	0.01	0.04	0.02	0.03													
备注 Note	许可证号 License																				
	5L-0369																				

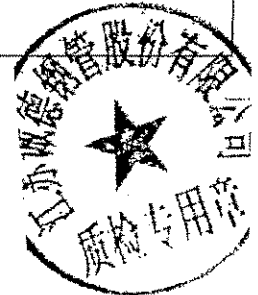
签发人: 周维青
Signed by:

审核人:
Previewed by:

质量负责人:
Chief of Previewed by:



盖章:
Seal:





江苏诚德钢管股份有限公司
JIANGSU CHENGDE STEEL TUBE SHARE CO., LTD

产品质量证明书

INSPECTION CERTIFICATE

江苏省江都市诚德路1号
1 CHENGDE ROAD,JIANGDU CITY JIANGSU PROVINCE
TEL: 0514-6529011, 6529012 FAX: 0514-6520240

订货单位: OZONE INDUSTRIES/YOUNGQUIST BROTHERS
PURCHASER:

合同号: WXDX-20070110
Order No:

签发日期: 2007年5月10日
Date Of Issue: No: 48670

Page:1/1

产品名称 Product		无缝钢管 Seamless steel tubes							钢号(级) Steel Gr.		GR. B PSL 1			标准 Specification		API5L-2000			制造方法 Making Method		热轧 Hot Rolled	
总捆数 Total		总支数 Total Pieces		44		总重量 (Short Ton) Total Weight		69.119		交货状态 Delivery		正火 Normalize		热处理温度 Heat Temp								
序号 No.	规格 Size (IN)	长度 Length (FT)	调度 卡号 Producti on No.	冶炼号 Heat No.	批号 Lot No.	捆数 Bundles	支数 Pieces	重量 Weight (Short Ton)	力学性能 Tensile Test													
									屈服 Y.S MPa	抗拉 T.S MPa	伸长率 E.L %	冲击试验 (AKV) Impact Test(J)		压扁 Flattening	扩口 Expansion	冷弯 Bending	环圈拉伸 Ring Tensile Test					
1	22" *0.5"	1185.04		070410	4725		44	69.119	330 325	430 440	30.0 31.0											合格 Good
序号 No.	金相 Metallography													硬度 Hard- ness	外观& 尺寸 Visual& Dimension	涡流探伤 Eddy	超声波探伤 U.T	静水压试验 Hydrostatic Test				
	显微组织 Microstructure	晶粒度 GrainSize (级)	总脱碳层 (mm) Weiststructure		魏氏组织 (级)	带状组织 (级)	非金属夹杂物(级) Non-mepallic Inclusion						低倍检验 Macro- structure									
			外壁 OutSide	内壁 InSide					A粗	A细	B粗	B细	C粗	C细	D粗	D细		合格 Good		合格 Good	合格 Good	
序号 No.	熔炼成分 % Chemical Composition																					
	C	Mn	Si	S	P	Cr	Ni	Cu	Mo	Al	V	Ti	Nb	W	As	Sn	Pb	B	Sb	Bi		
1	0.21	0.55	0.16	0.01	0.01	0.04	0.02	0.03														
复验																						
备注 Note	许可证号 License																					
	5L-0369																					

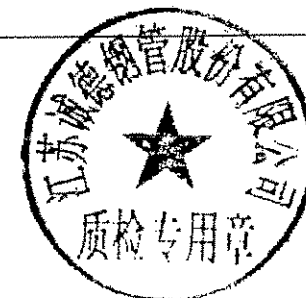
签发人: 周维青
Signed by:

审核人:
Previewed by:

质量负责人:
Chief of Previewed by:



盖章:
Seal:



Injection Well IW-2

16-inch Injection Tubing



MWH

IW-2 TUBING TALLY

Tubing Diameter: inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length	Corrected Length	Corrected Cumulative Length	Field Torque (Ft Lbs)	Time of Threading Completion	Date
-	-	packer inner mandrel	3.09	3.09	2.76	2.76	-	-	9/9/07
1	110000065	300000281	29.56	32.65	29.23	31.98	2,020	09:52	9/9/07
2	110000065	300000281	29.34	61.99	29.01	60.99	2,014	10:18	9/9/07
3	110000065	300000281	29.34	91.33	29.01	90.00	2,050	10:35	9/9/07
4	110000065	300000281	29.41	120.74	29.08	119.07	2,004	10:46	9/9/07
5	110000065	300000281	29.14	149.88	28.81	147.88	2,044	10:57	9/9/07
6	110000065	300000281	29.66	179.54	29.33	177.21	2,054	11:20	9/9/07
7	110000065	300000281	29.57	209.11	29.24	206.44	2,068	11:31	9/9/07
8	110000065	300000281	29.58	238.69	29.25	235.69	2,074	11:50	9/9/07
9	110000065	300000281	29.57	268.26	29.24	264.93	2,074	11:59	9/9/07
10	110000065	300000281	29.19	297.45	28.86	293.78	2,040	12:08	9/9/07
11	110000065	300000281	29.53	326.98	29.20	322.98	2,078	12:17	9/9/07
12	110000065	300000281	29.53	356.51	29.20	352.18	2,065	12:53	9/9/07
13	110000065	300000281	29.45	385.96	29.12	381.29	2,074	13:00	9/9/07
14	110000065	300000281	29.39	415.35	29.06	410.35	2,000	13:09	9/9/07
15	110000065	300000281	29.40	444.75	29.07	439.42	2,040	13:19	9/9/07
16	110000065	300000281	29.56	474.31	29.23	468.64	2,046	13:29	9/9/07
17	110000065	300000281	29.50	503.81	29.17	497.81	2,064	13:36	9/9/07
18	110000065	300000281	29.61	533.42	29.28	527.09	2,070	13:44	9/9/07
19	110000065	300000281	29.14	562.56	28.81	555.89	2,092	14:12	9/9/07
20	110000065	300000281	29.33	591.89	29.00	584.89	2,086	14:20	9/9/07
21	110000065	300000281	29.61	621.50	29.28	614.17	2,096	14:27	9/9/07
22	110000065	300000281	29.58	651.08	29.25	643.41	2,058	14:34	9/9/07
23	110000065	300000281	29.32	680.40	28.99	672.40	2,030	14:41	9/9/07



MWH

IW-2 TUBING TALLY

Tubing Diameter: inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length	Corrected Length	Corrected Cumulative Length	Field Torque (Ft Lbs)	Time of Threading Completion	Date
24	11000065	30000281	29.31	709.71	28.98	701.38	2,022	14:48	9/9/07
25	11000065	30000281	29.24	738.95	28.91	730.28	2,046	14:55	9/9/07
26	11000065	30000281	29.50	768.45	29.17	759.45	2,080	15:02	9/9/07
27	11000065	30000281	29.49	797.94	29.16	788.61	2,034	15:09	9/9/07
28	11000065	30000281	29.35	827.29	29.02	817.62	2,062	15:16	9/9/07
29	11000065	30000281	29.09	856.38	28.76	846.38	2,010	15:23	9/9/07
30	11000065	30000281	29.65	886.03	29.32	875.70	2,032	15:29	9/9/07
31	11000065	30000281	29.63	915.66	29.30	904.99	2,026	15:35	9/9/07
32	11000065	30000281	29.63	945.29	29.30	934.29	2,096	15:42	9/9/07
33	11000065	30000281	29.52	974.81	29.19	963.48	2,085	15:50	9/9/07
34	11000065	30000281	29.59	1,004.40	29.26	992.73	2,002	15:56	9/9/07
35	11000065	30000281	29.49	1,033.89	29.16	1,021.89	2,096	16:03	9/9/07
36	11000065	30000281	29.54	1,063.43	29.21	1,051.10	2,038	16:12	9/9/07
37	11000065	30000281	29.55	1,092.98	29.22	1,080.31	2,004	16:18	9/9/07
38	11000065	30000281	29.55	1,122.53	29.22	1,109.53	2,030	16:24	9/9/07
39	11000065	30000281	29.59	1,152.12	29.26	1,138.79	2,060	16:30	9/9/07
40	11000065	30000281	29.18	1,181.30	28.85	1,167.63	2,070	16:37	9/9/07
41	11000065	30000281	29.56	1,210.86	29.23	1,196.86	2,100	16:43	9/9/07
42	11000065	30000281	29.60	1,240.46	29.27	1,226.13	2,099	16:50	9/9/07
43	11000065	30000281	29.59	1,270.05	29.26	1,255.38	2,055	16:58	9/9/07
44	11000065	30000281	29.45	1,299.50	29.12	1,284.50	2,060	17:06	9/9/07
45	11000065	30000281	29.55	1,329.05	29.22	1,313.72	1,774	7:29	9/10/07
46	11000065	30000281	29.55	1,358.60	29.22	1,342.93	2,064	07:36	9/10/07
47	11000065	30000281	29.64	1,388.24	29.31	1,372.24	2,072	07:45	9/10/07



MWH

IW-2 TUBING TALLY

Tubing Diameter: inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length	Corrected Length	Corrected Cumulative Length	Field Torque (Ft Lbs)	Time of Threading Completion	Date
48	11000065	30000281	29.53	1,417.77	29.20	1,401.44	2,170	07:53	9/10/07
49	11000065	30000281	29.64	1,447.41	29.31	1,430.74	2,074	08:00	9/10/07
50	11000065	30000281	29.56	1,476.97	29.23	1,459.97	2,094	09:59	9/10/07
51	11000065	30000281	29.44	1,506.41	29.11	1,489.08	2,042	10:06	9/10/07
52	11000065	30000281	29.53	1,535.94	29.20	1,518.27	2,054	10:12	9/10/07
53	11000065	30000281	29.54	1,565.48	29.21	1,547.48	2,094	10:20	9/10/07
54	11000065	30000281	29.64	1,595.12	29.31	1,576.79	2,004	10:27	9/10/07
55	11000065	30000281	29.64	1,624.76	29.31	1,606.09	2,096	10:39	9/10/07
56	11000065	30000281	29.43	1,654.19	29.10	1,635.19	2,052	10:45	9/10/07
57	11000065	30000281	29.64	1,683.83	29.31	1,664.50	2,040	10:52	9/10/07
58	11000065	30000281	29.62	1,713.45	29.29	1,693.78	2,002	10:58	9/10/07
59	11000065	30000281	29.58	1,743.03	29.25	1,723.03	2,098	11:06	9/10/07
60	11000065	30000281	29.62	1,772.65	29.29	1,752.32	2,046	11:11	9/10/07
61	11000065	30000281	29.48	1,802.13	29.15	1,781.46	2,060	13:08	9/10/07
62	11000065	30000281	29.53	1,831.66	29.20	1,810.66	2,058	13:19	9/10/07
63	11000065	30000281	29.60	1,861.26	29.27	1,839.93	2,027	13:26	9/10/07
64	11000065	30000281	29.60	1,890.86	29.27	1,869.19	2,015	13:34	9/10/07
65	11000065	30000281	29.60	1,920.46	29.27	1,898.46	2,056	13:42	9/10/07
66	11000065	30000281	29.58	1,950.04	29.25	1,927.71	1,960	13:51	9/10/07
67	11000065	30000281	29.28	1,979.32	28.95	1,956.65	2,046	13:59	9/10/07
68	11000065	30000281	29.40	2,008.72	29.07	1,985.72	2,016	14:06	9/10/07
69	11000065	30000281	29.59	2,038.31	29.26	2,014.98	2,022	14:13	9/10/07
70	11000065	30000281	29.53	2,067.84	29.20	2,044.17	2,036	14:21	9/10/07
Landing Joint	-	-	23.94	2,091.78	12.67	2,056.84	2,172	14:41	9/10/07

Submittal Data
from
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
Tel.: 239-489-4444 Fax: 239-489-4545

Project

North Cape Water Treatment Plant Deep Injection
Wells MWHC Job#7012014

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: September 10, 2007 Number of Copies: 10
Submittal Number: 02633-015-C
Specification Section Number: 02633-015-C
Item Submitted: 16' Red Box 1250 FRP Casing Certificate
New Submittal: _____ Resubmitted: X

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc.

Representative:



MWHC Constructors
MONTGOMERY WATSON HARRIS

CERTIFICATION STATEMENT

By this submittal, we hereby represent that we have determined, verified, reviewed and/or approved applicable field measurements, field construction criteria, materials, products, dimensions, catalog numbers and similar data and have checked and coordinated relevant information for conformance with other applicable approved shop drawings and Contract Requirements.

Project Name & Number: NC DEW 7012014
Submittal Number: SU-YouBRO-02633-00043-A
Specification Section: 02633
Submitted by: [Signature] Date: 9-17-07

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

By: _____

Firm: _____

Date: _____



FUTURE PIPE INDUSTRIES

Inspection Certificate

Pro No: 110000065

September 7, 2007

Purchaser: Youngquist

SO #: 62L000380

Destination: Florida

Terms: 30 Days

Product: 16" RB 1250

Quantity: 2477.95Ft

We hereby certify that the materials described above have been reworked, tested and comply with the terms and conditions of the original purchase order.

Raymond Jones

QA Manager

Material Certificate

Material: 16" RB 1250

Test pressure: 1550

Certificate Number: FPI-2007-25

Customer: Youngquist

Purchase Order: North Cape Corral

Produced By: Future Pipe Industries, Inc. - Houston, TX

FPI Order Number: 110000065

Pipe System: Aromatic Amine heat cured epoxy

YOUNGQUIST BROTHERS, INC.
Has Received This Shop Drawing/Submital
YBI/Section No# 02623-015-C
Date: SEP. 10, 2007
Signature: [Signature]

Raw Material Specifications:

Resin type- Epoxy (Hexion Products)
Curing Agent- Aromatic Amine (Air Products)
Glass Fiber- E-Type (Jushi)

Non Destructive Tests:

Dimensional Exam - ASTM D 3567
Visual Exam- ASTM D 2563

We hereby certify that the materials described above have been tested and comply with the terms and conditions of the original purchase order.

Raymond Jones

QA Manager

Quality Department

Laboratory Test Results:	Minimum	Maximum
Glass Content: ASTM D 2584 % Glass-	72	78

Actual Glass Content-76% DSC Results: 150.73

Joints were randomly tested for glass content and DSC (glass transition) through out the entire manufacturing process

Certificate of conformity Statement:

All items delivered under this certificate number were manufactured in accordance with the following specifications:

- a. FPI- Yellow Box inspection program
- b. FPI-Quality Assurance manual

We hereby certify that the materials described above have been tested and comply with the terms and conditions of the original purchase order.

Raymond Jones

QA Manager

Future Pipe Industries

11811 Proctor Rd Houston TX, 77038

Monitor Well DZMW-1

Casing

Monitor Well DZMW-1

30-inch Casing



Premium Spiral-Weld Pipe

Skyline Steel, LLC - Pipe Group

GEORGIA TUBULAR PRODUCTS
109 Dent Drive - Cartersville, GA 30121
(770) 386-2553 Fax (770) 386-2609

Ship Date 19 Jan 07 No: PBT 84763
Probill
Via MAGNATRAN
FOB SHIPPING Pt
Frt COLLECT
Route 0-0 Manifest
Vhicle Trailer
Slp STOCK
Sole To: (1941)
EDGEN CARBON PRODUCTS GROUP, LLC
18444 HIGHLAND RD
BATON ROUGE, LA 70809

Edgen Carbon Products Group, LLC
18444 Highland Rd
Baton Rouge, LA 70809
Phone: (225) 386-2553 Fax: (225) 386-2609

BILL OF LADING

1) Our Order PBT-204882-5 Your PO # 62414
30" OD SPIRALWELD PIPE 139 GRADE B brkd
.375 WALL X 50' W/ HYDRO

Heat Number Tag No Quantity PCS Wt LBS
261896B-1 30087A 50 FT 1 5939

2) Our Order PBT-204882-5 Your PO # 62414
34" OD SPIRALWELD PIPE 139 GRADE B Prd2
.375 WALL X 50' W/ HYDRO

Heat Number Tag No Quantity PCS Wt LBS
261896B-1 30087A 150 FT 3 20201

TOTAL: Tags 2 Pcs 4 Wt LBS 26134

Heat Number: 261896B-1
*** Chemical Analysis ***
C=<.23> Mn=<.01> P=<.011> S=<.006> Si=<.02> TEN=<25300>
YLD=<48900> ELONG=<34>

Handwritten signature

Page: 1 of 1

FREIGHT CHARGES PREPAID COLLECT

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

\$ per

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

Handwritten signature of consignor

(SIGNATURE OF CONSIGNOR)

C.O.D. AMOUNT: \$

C.O.D. FEE: \$ PPD COLL

TOTAL CHARGES: \$

RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under this contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

SHIPPER PER: Handwritten signature

CARRIER PER: Handwritten signature DATE: 1/19/07

YOUNGQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing/Submittal

YBI/Section No. # 02633-016-A

Transmittal No. # _____ Date: 1/29/07

Signature [Signature]

STANDARD CERTIFIED TEST REPORT
 GEORGIA TUBULAR PRODUCTS



Customer Name: **Edgen Carbon Products Group, LLC**
 Customer Address: **18444 Highland Road
 Baton Rouge, LA 70809**

Date: **January 24, 2007**
 Customer Order No. **62414**

City, State, Zip

G.T.P. Sales Order No. **204882**

Specification **ASTM A139 GR. B SPIRALWELD STEEL PIPE MELTED & MANUFACTURED IN THE U.S.A.**

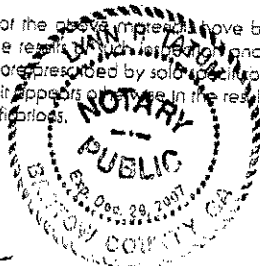
Heat No.	Size O.D.	Wt./ft. or Wall Thick	Min. Hydro Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong in 2" %	C	Mn	P	S	SI
J4096	30"	.375	525	56,400	78,100	32	.19	.77	.012	.006	.02
1618966	34"	.375	463	51,500	77,400	31	.23	.83	.005	.005	.01
1700311	34"	.375	463	65,800	87,300	28	.23	.87	.009	.001	.02
1700313	34"	.375	463	64,200	76,000	29	.23	.93	.008	.004	.02
2618968	34"	.375	463	48,900	75,300	34	.23	.81	.011	.006	.02
1610462	42"	.375	375	46,100	78,400	33	.23	.80	.011	.007	.01
E6B320	54"	.375	292	67,000	86,000	26	.22	.57	.014	.008	.20
E6B321	54"	.375	292	61,000	80,000	27	.20	.58	.012	.005	.21

The undersigned hereby certifies that the above material have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of inspecting or testing are prescribed by said specifications, the standard mill inspection and testing practices of Georgia Tubular Products have been applied. Unless it appears otherwise in the results of such inspection and tests shown above, the undersigned believes that said materials conform to said specifications.

Subscribed and sworn to before me

This 24th day of Jan, 2007

[Signature]
 Notary Public



[Signature]
 R. SCOTT PANTER PLANT MGR. Name & Title



Georgia Tubular Products
 109 Dent Drive, Camersville, GA 30121
 (770) 386-2553

Monitor Well DZMW-1

24-inch Casing



MWH

DZMW-1 CASING TALLY

Casing Diameter: 24 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	483.08
Floor + Elevators (feet bls)	-9
Casing Seat (feet bls)	474.08

Joint No. (run)	Length (feet)	Cumulative Length (feet)	Heat Numbers	Run Depth (feet)	Weld Start Time	Weld End Time	Weld Date
1	41.89	41.89	C623603	32.89	/	/	/
2	42.13	84.02	C633017	75.02	0800	0810	3/15/2007
3	42.15	126.17	C623603	117.17	0820	0830	3/15/2007
4	42.13	168.30	C623603	159.30	0835	0844	3/15/2007
5	39.04	207.34	C623603	198.34	0851	0858	3/15/2007
6	41.93	249.27	C623603	240.27	0915	0923	3/15/2007
7	41.96	291.23	C623603	282.23	0948	0955	3/15/2007
8	42.00	333.23	C623603	324.23	1015	1022	3/15/2007
9	41.98	375.21	C623603	366.21	1038	1045	3/15/2007
10	42.00	417.21	A37279	408.21	1055	1103	3/15/2007
11	20.89	438.10	C33078	429.10	1212	1220	3/15/2007
12	44.98	483.08	A37298	474.08	1235	1243	3/15/2007



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
 Suite 430
 Cape Coral, Florida 33904
 (239) 573-5959

Project: W-7C North Cape RO WTP
 Deep Injection Wells

MWHA File Number: 3220246.19.9.1.1

Owner: City of Cape Coral

Submittal No.: SUL-YOUBRO-02633-015-A--0

MWH	
NO EXCEPTIONS TAKEN	✓
MAKE CORRECTIONS NOTED	
	AMEND – RESUBMIT
	REJECTED – RESUBMIT

Description: DZMW-1 24" Mill Cert

REVIEWED BY: <i>Neil Johnson</i>	DATE: 3/12/07
RECOMMENDED BY:	DATE:

Spec. Section: 02633

Submitting Company: Youngquist Brothers, Inc.

CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFROMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATING WORK WITH OTHER TRADES. AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK

Reviewer: Neil Johnson

Comments: None.

Submittal Data
FROM
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545

Project
North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: March 5, 2007 Number of Copies: 8

Submittal Number: 02633-017-A

Specification Section Number: 02633-017-A

Item Submitted: 24" Mill Certs

New Submittal: X Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:

Crystal A. Sturgis
Crystal Sturgis

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

By: _____

Firm: _____

Date: _____

계약서번호 : SH980317JK
 L/C No. : 13716N/J
 발행일자 : 2005. 06. 18
 제품명 : E.B.W. STEEL PIPE
 규격 : API 5L X42 PSL1/API 5LB
 /ASTM A53B/ASME SA 53B

INSPECTION CERTIFICATE

HUSTEEL CO., LTD.

HEAD OFFICE : Shinan 8/D 16F, 943-19, Daechil-dong
 Karyong-ku, Seoul 135-845, KOREA
 DANJIN PLANT : 569-1, BUDOK-RI, SONGKAK-MYEON, DANJIN-GUN,
 CHUNGCHONGNAM-DO, KOREA
 DAEJIL PLANT : 11 BLOCK, DAEJIL NATIONAL INDUSTRIAL COMPLEX,
 HANUL-RI, SAEM-DO-MYEON, YONGWAM-KUN, CHOLLAM-DO, KOREA

증명서번호 : 0050618 - 149
 제조번호 : 04-11-207
 공급자 : HUSTEEL CO., LTD.
 수요자 : CUSTOMER :

ITEM NO.	HEAT NO. (LOT)	관공 TYPE	수량 QUANTITY (PIECES)	표칭경 NOMINAL SIZE (in)	주문치수 ORDER SIZE			중량 WEIGHT (lb/ft)	인장시험 TENSILE TEST			화합성분 CHEMICAL COMPOSITION(%)										
					바깥지름 O.D. (mm)	두께 W.T. (in)	길이 LENGTH (ft)		인장강도 TENSILE STRENGTH (psi)	항복강도 YIELD STRENGTH (psi)	연신율 ELONGATION (%)	C	SI	Mn	P	S	Cu	Cr	Ni	Mo	V	
					②	③			1	2	3	2	3	2	3	2	3	2	3	2	3	2
1	C33079	BPEB	5	24	610.0	0.375	42'	94.71	75126	47860	34	15	17	108	14	9	2	2	3	2	TR	TR
2	A37296	BPEB	2	24	610.0	0.375	42'	94.71	72081	47860	39	15	18	110	13	6	2	3	2	3	1	1
3	Z33085	BPEB	6	24	610.0	0.375	42'	94.71	73096	46700	38	16	20	98	12	5	2	2	3	2	1	TR
4	C33081	BPEB	12	24	610.0	0.375	42'	94.71	75416	58013	33	16	19	110	14	9	2	3	2	2	1	1
5	B36533	BPEB	10	24	610.0	0.375	42'	94.71	76142	59463	32	14	16	110	15	11	2	3	2	2	1	1
6	B36534	BPEB	23	24	610.0	0.375	42'	94.71	72806	44525	34	15	19	110	12	11	2	2	2	2	1	TR
7	B36536	BPEB	13	24	610.0	0.375	42'	94.71	74256	56562	37	16	15	102	10	9	3	2	2	2	1	TR
8	B36537	BPEB	13	24	610.0	0.375	42'	94.71	76967	59753	32	16	14	108	10	8	2	3	2	2	1	TR
9	C33075	BPEB	15	24	610.0	0.375	42'	94.71	73676	55112	36	16	15	106	10	9	3	2	2	2	1	TR
10	A37284	BPEB	1	24	610.0	0.375	42'	94.71	74981	56562	36	16	15	94	13	9	2	2	3	2	1	TR

ITEM NO.	수입시험 HYDROSTATIC TEST		관공처리 온도 HEAT TREATMENT (°C)	비파괴 시험 NDT (U.T)	경도시험 HARDNESS TEST (HrB)	외주장 CIRCUMFERENCE (mm)		용접부인장강도 TENSILE STRENGTH OF WELDS (psi)	아연도금시험 ZINC COATING TEST		VISUAL & DIMENSION	FLATTENING (BEND) TEST	W D T	R T	F T	C T	R F T	S.T (%)	충격시험 IMPACT TEST		잔류 자기 Res. Mag.	REMARKS
	TP (PSI)	RE-SULT				END	BODY		WZ	CST (TIMES)									ENE-RGY (J)	SHEAR AREA (%)		
	④								⑤													
1	1180	GOOD	920	ACCEPT				79187			ACCEPT	GOOD	GOOD	GOOD				0.1				①HARDNESS MAX. 22HRC ②Latest edition per API 5L X42 & B(42nd, 2002) /ASTM A53B (2000) /ASME SA 53B (2000)
2	1180	GOOD	920	ACCEPT				78142			ACCEPT	GOOD	GOOD	GOOD				0.1				
3	1180	GOOD	920	ACCEPT				77157			ACCEPT	GOOD	GOOD	GOOD				0.1				
4	1180	GOOD	920	ACCEPT				79477			ACCEPT	GOOD	GOOD	GOOD				0.1				
5	1180	GOOD	920	ACCEPT				80202			ACCEPT	GOOD	GOOD	GOOD				0.1				
6	1180	GOOD	920	ACCEPT				78867			ACCEPT	GOOD	GOOD	GOOD				0.1				
7	1180	GOOD	920	ACCEPT				78317			ACCEPT	GOOD	GOOD	GOOD				0.1				
8	1180	GOOD	920	ACCEPT				80928			ACCEPT	GOOD	GOOD	GOOD				0.1				
9	1180	GOOD	920	ACCEPT				77737			ACCEPT	GOOD	GOOD	GOOD				0.1				
10	1180	GOOD	920	ACCEPT				79042			ACCEPT	GOOD	GOOD	GOOD				0.1				

①TYPE BPE BLACK PLAIN ENDS BPEB BPE BEVELLED BTE BLACK THREADED ENDS BTO BLACK THREADED & COUPLED BPE GALVANIZED PLAIN ENDS BTE GALVANIZED THREADED ENDS BTO GALVANIZED THREAD & COUPLED
 ②O.D. OUTSIDE DIAMETER ③W.T. WALL THICKNESS ④CHEMICAL COMPOSITION CHECK ANALYSIS 2:~100 3:~1000 TR TRACE ⑤TP TESTING PRESSURE ⑥NDT NONDESTRUCTIVE TEST
 E.C.T EDDY CURRENT TEST U.T ULTRASONIC TEST ⑦WZ WEIGHT OF ZINC COATING CST COPPER SULPHATE TEST ⑧WTD WELD DUCTILITY TEST RGT RING RAGE TEST FRT FRAME TEST ⑨RES.MAG. : RESIDUAL MAGNETISM
 CRT CRUSH TEST RFT REVERSE FLATTENING TEST S.T STRAIGHTNESS

SIGNATURE: _____
 본 제품은 관련 규격이 정한 시험 및 검사에 합격하였음을 증명합니다.
 WE HEREBY CERTIFY THAT THE PRODUCTS HEREIN HAVE BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR THE ORDER.
 SIGNATURE: _____
 MANAGER OF QUALITY ASSURANCE TEAM

7007-04

계약서 번호 SH980317JK
 L/C No. 15352NJ
 발행 일자 ISSUED DATE : 2005. 08. 20
 제품명 E.R.W. STEEL PIPE
 제품규격 SPECIFICATION : API 5L X42 PSL1/API 5LR /ASTM A53B/ASME SA 53B

INSPECTION CERTIFICATE

HUSTEEL CO., LTD.

HEAD OFFICE : Shinan B/D 15F, 843-19, Daechi-dong, Kangnam-ku, SEUL 135-845, KOREA
 DANGJIN PLANT: 509-1, BUCK-R1, SONNAK-MYEON, DANGJIN-GUN, CHUNGCHONGNAM-DO, KOREA
 DAEJUL PLANT: 11 BLOCK, DAEJUL NATIONAL INDUSTRIAL COMPLEX, NAEJUL-R1, SANGU-MYEON, YOUNGSAU-GUN, CHULLANAM-DO, KOREA

당행서번호 CERTIFICATE No. : 0050620 - 155
 제조번호 MANUFACTURED No.: 05-05-201
 주문자 HUSTEEL CO., LTD.
 수뢰가 CUSTOMER :

ITEM NO.	HEAT NO. (LOT)	관종 TYPE	수량 QUANTITY (PIECES)	표칭경 NOMINAL SIZE (in)	주문치수 ORDER SIZE			중량 WEIGHT (lb/ft)	인장시험 TENSILE TEST			화학성분 CHEMICAL COMPOSITION(%)										
					바깥지름 O.D. (mm)	두께 W.T. (in)	길이 LENGTH (ft)		인장강도 TENSILE STRENGTH (psi)	항복강도 YIELD STRENGTH (psi)	연신율 ELONGATION (%)	C	SI	Mn	P	S	Cu	Cr	Ni	Mo	V	
												2	9	2	3	2	2	2	3	3		
21	C33075	BPEB	2	24	610.0	0.375	42'	94.71	73676	55112	36	16	15	106	10	9	3	2	2	TR	TR	
22	C33076	BPEB	13	24	610.0	0.375	42'	94.71	75416	54532	33	15	13	98	14	10	2	3	2	TR	TR	
23	C33077	BPEB	7	24	610.0	0.375	42'	94.71	73676	55112	37	16	15	102	15	10	2	3	2	TR	TR	
24	C33078	BPEB	10	24	610.0	0.375	42'	94.71	73676	55112	37	16	15	102	15	10	2	3	2	TR	TR	
25	C33079	BPEB	28	24	610.0	0.375	42'	94.71	75126	47860	34	15	17	108	14	9	2	3	2	TR	TR	
26	C33081	BPEB	33	24	610.0	0.375	42'	94.71	75416	58013	33	16	19	110	14	9	2	3	2	TR	TR	
27	C33082	BPEB	15	24	610.0	0.375	42'	94.71	71501	46410	34	14	16	98	15	9	2	3	2	TR	TR	
28	C33083	BPEB	54	24	610.0	0.375	42'	94.71	68165	47860	40	16	18	108	14	10	2	2	3	1	TR	
29	C33086	BPEB	25	24	610.0	0.375	42'	94.71	73096	49311	36	16	20	120	13	7	3	2	2	1	TR	
30	C33087	BPEB	12	24	610.0	0.375	42'	94.71	75851	58448	34	16	15	105	11	9	3	2	2	1	TR	

ITEM NO.	수압시험 HYDROSTATIC TEST		열처리 온도 HEAT TREATMENT (°C)	비파괴 시험 (U.T)	경도 시험 HARDNESS TEST (HrB)	외주장 CIRCUMFERENCE (mm)		용접부의 인장강도 TENSILE STRENGTH OF WELDS (psi)	아연도금 시험 ZINC COATING TEST		VISUAL & DIMENSION	FLATTENING (BEND) TEST	W	R	F	C	R	F	S.T (%)	충격 시험 IMPACT TEST		관류 자기 Res. Mag.	REMARKS
	TP (PSI)	RE-SULT				END	BODY		WZC (g/m²)	CST (TIMES)										ENE-RGY (J)	SHEAR AREA (%)		
	①	②				③	④		⑤	⑥										⑦	⑧		
21	1180	GOOD	920	ACCEPT				77737			ACCEPT	GOOD	GOOD	GOOD					0.1				
22	1180	GOOD	920	ACCEPT				79477			ACCEPT	GOOD	GOOD	GOOD					0.1				
23	1180	GOOD	920	ACCEPT				77737			ACCEPT	GOOD	GOOD	GOOD					0.1				
24	1180	GOOD	920	ACCEPT				77737			ACCEPT	GOOD	GOOD	GOOD					0.1				
25	1180	GOOD	920	ACCEPT				79187			ACCEPT	GOOD	GOOD	GOOD					0.1				
26	1180	GOOD	920	ACCEPT				79477			ACCEPT	GOOD	GOOD	GOOD					0.1				
27	1180	GOOD	920	ACCEPT				75561			ACCEPT	GOOD	GOOD	GOOD					0.1				
28	1180	GOOD	920	ACCEPT				72226			ACCEPT	GOOD	GOOD	GOOD					0.1				
29	1180	GOOD	920	ACCEPT				77157			ACCEPT	GOOD	GOOD	GOOD					0.1				
30	1180	GOOD	920	ACCEPT				79912			ACCEPT	GOOD	GOOD	GOOD					0.1				

①TYPE BPE BLACK PLAIN ENDS BPEB BPE BEVELLED BTE BLACK THREADED ENDS BTC BLACK THREADED & COUPLED GPE GALVANIZED PLAIN ENDS GTE GALVANIZED THREADED ENDS GTC GALVANIZED THREAD & COUPLED
 ②O.D. OUTSIDE DIAMETER ③W.T. WALL THICKNESS ④CHEMICAL COMPOSITION CHECK ANALYSIS 2:×100 3:×1000 TR TRACE ⑤TP TESTING PRESSURE ⑥NDT NONDESTRUCTIVE TEST
 E.T EDDY CURRENT TEST U.T ULTRASONIC TEST ⑦WZC WEIGHT OF ZINC COATING CST COPPER SULPHATE TEST ⑧WDT WELD DUCTILITY TEST RGT RING GAGE TEST FRT FRANGE TEST ⑨RES.MAG. : RESIDUAL MAGNETISM
 CRT CRUSH TEST RFT REVERSE FLATTENING TEST S.T STRAIGHTNESS

SIGNATURE _____
 SURVEYOR TO: _____
 HMS C-30-05-(21)

본 제품은 관련 규격이 정한 시험 및 검사에 합격하였음을 증명합니다.
 WE HEREBY CERTIFY THAT THE PRODUCTS HEREIN HAVE BEEN MADE AND TESTED IN ACCORDANCE WITH THE ABOVE SPECIFICATION AND ALSO WITH THE REQUIREMENTS CALLED FOR THE ORDER.

SIGNATURE _____
 MANAGER OF QUALITY ASSURANCE TEAM

성적서 번호
 CERTIFICATE NO. : 8700656
 발행일자
 DATE OF ISSUE. : 2006/08/30
 계약번호
 CONTRACT (P/O) NO. : 58699
 품명
 COMMODITY : E.R.W. STEEL PIPE
 제품규격
 SPECIFICATION : API 5L X42/API 5L B PSL1/ASTM A598/ASME SA538

페이지
 PAGE : 2 of 2
 2006082548

검사증명서(A)

MILL INSPECTION CERTIFICATE

EN10204 TYPE 3.1 B-1991

고객사
 CUSTOMER : 현대중공업사



현대하이스코주식회사
 HYUNDAI HYSCO

울산·공장 (ULSAN PLANT) : 울산광역시 북구 영포동 265번지 683-049
 : #265 YUMPO-DONG, BUK-KU, ULSAN, KOREA
 TEL:82-52-280-014, FAX:82-52-287-8918
 서울사무소 (SEOUL OFFICE) : 서울시 강남구 역삼동 837-36번지 랜드마크타워 133-080
 : LANDMARK TOWER #37-36, YEOKSAM-DONG, GANGNAM-KU, SEOUL, KOREA
 TEL:82-2-2112-8114, FAX:82-2-775-7095

공종 TYPE OF PIPE END	관수 DIMENSION (OUT DIA × THICK × LENGHTH)				수량 QUAN- TITY	중량 WEIGHT	수입시험 HYDRO- STATIC TEST		재질번호 HEAT NO.	인장시험 TENSILE TEST (Gage Length : 2 INCH)				화학성분(%) CHEMICAL COMPOSITION														충격시험 IMPACT TEST (°C)		도막시험 COATING TEST		비고 REM- ARK																								
	#1	#2	#3	#4			PSI	KSI		항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH	연신율 E.L.	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Ti	Nb	Al	CEQ #9	경도 HARD- NESS	충격 에너지 ABSOR- BED ENERGY	평균 단면적 SHEAR AREA	무연 무게중 량 OF 200G COAT	균열성 DIP TEST																									
																																	#5	Mpa/PSI	%	#6	×100	×1000	×100	×1000	HV	JOULE	%	D/μ	TI- MES	#5										
TOTAL --				287	514.784	1,180	G	C633935	45,000	16,000	19,700	215	460	493	26	17	1	70	14	10	2	2	1	1	TR	TR	TR																													
#10	HEAT TREATMENT		#11	VISUAL & DIMENSION TEST		#12	FLATTENING, BEND, GUIDED BEND TEST		#13	R-FLATTENING TEST		#14	FLARING TEST		#15	NONDESTRUCTIVE TEST (N.D.T)				#16	R.M.T		#17	CRUSH TEST		#18	DRIFT TEST		#19	FLANGE TEST																										
GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD		GOOD																										
NOTE 1 #1 Type of pipe End 지정			RE:SAW용(일반)			TC:Thread Coupling			RE:SAW용(일반)			RC:Roll Grooving			RE:SAW용(일반)			VG:V-Grooving			RE:SAW용(일반)			PC:Plain End			PB:Plain End + Coupled			RE:SAW용(일반)			BE:Bevel End			TB:Plain End + Bevel End			RE:SAW용(일반)			TC:Thread End			BD:Butt End											
NOTE 2 * SPEC YEAR- API 2604/ASTM 2604/ASME 2604			*2 NS:Internal Bare 용칭, OD:Outside Diameter			*3 G:GOOD			*4 Unit 단위(M:Meter, F:Feet, L:inch)			*5 H:Heat(Anne) Analysis 용연분석, P:Product Analysis 제품분석, WP:Weld Product Analysis 용접부 제품분석			*6 L:Longitudinal(만곡시험), T:Transverse(원주시험)			*7 B:Base Metal(모재), W:Weld Part(용접부)			*8 Heat Treatment(열처리)			*9 CEQ=C+Mn/6+(Ni+Cu)/15+(Cr+Mo+V)/5 용가당소량			*10 Reverse Flattening Test(전곡시험)			*11 Visual & Dimension Test(외관 및 치수검사)			*12 Flattening/Band/Guided Bend Test(편평/밴드/도막시험)			*13 Flaring Test(확개시험)			*14 Flange Test(플랜지시험)			*15 Nondestructive Test(비파괴검사)			*16 Fluidal Magnetism Test(유체자성시험)			*17 Crush Test(충격시험)			*18 DRH Test(과열시험)			*19:Flange Test(플랜지시험)		
SURVEYOR			본 제품은 관련 규격에 합격되었음을 증명합니다. WE HEREBY CERTIFY THAT MATERIAL DESCRIBED HEREIN HAS BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER * 본 공시 증명서에 용가량 규격용도와 사용처 안전에 문제가 발생할 수 있으며, 검사결과에 따라, 연조시 시공시 원조로 불이익될 수 있습니다.														H. J. KIM INSPECTION MANAGER																																							

증명서 번호
 CERTIFICATE NO. : 6800346
 발행일
 DATE OF ISSUE : 2006/12/08
 계약번호
 CONTRACT(P/O) NO. : F2806000
 품명
 COMMODITY : E.R.W. STEEL PIPE
 제품규격
 SPECIFICATION : API 5L X42/API 5LB PSL1/ASTM A53B/ASME SA53B

페이지
 PAGE 1 of 1

200002519

검사증명서(A)

MILL INSPECTION CERTIFICATE

EN10204 TYPE 3.1 B-1991

고객사
 CUSTOMER : 현대중공업사



현대하이스코주식회사
 HYUNDAI HYSKO

울산공장
 (ULSAN PLANT)

 서울사무소
 (SEOUL OFFICE)

울산광역시 북구 영포동 265번지 683-040
 : #265 YUMPO-DOONG, BUK-KU, ULSAN, KOREA
 TEL:82-52-280-014, FAX:82-52-287-8916
 서울특별시 강남구 역삼동 637-36번지 현대비즈니스타워 135-080
 LANDMARK TOWER 637-36, YEOKSAM DONG,
 GANGNAM-KU, SEOUL, KOREA
 TEL:82-2-2112-8114, FAX:82-2-775-7095

관종 TYPE OF PIPE END	장수 DIMENSION (OUTDIA * THICK * LENGTH)				수량 QUAN- TITY	중량 WEIGHT	수령시험 HYDRO- STATIC TEST	시험번호 HEAT NO.	인장시험 TENSILE TEST (Gage Length : 2 INCH)				합금성분(%) CHEMICAL COMPOSITION														경도 HARD- NESS	충격시험 IMPACT TEST (℃)		도막시험 COATING TEST		비고 REM- ARK																					
	*1	*2	*3	*4					PSI	*5	항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH		연신 율 E.L	C	SI	Mn	P	S	Cu	Ni	Cr	Mo	V	Ti	Nb		Al	CEQ *9	HV	흡수 에너지 ABSOR- BED ENERGY		전단 피연폭 SHEAR AREA	이연 부식량 WEIGHT OF ZINC COAT	균질성 DIP TEST																		
												*7 B	*7 W																						*6	*8	*1000	*100										*1000	Joule	%	g/m ²	TI- MES	*5
												Mpa/PSI																										%	*6	*100	*1000	*100	*1000	*1000	*1000	*1000							
EB BE	NB	24" X .375" X 42.000'		124	223.319	1.180	G	C623603	310	445	460	37		16	1	84	16	10	2	2	1	1	TR	TR	TR																												
						1.180	G	C633013	45.500	64.800	68.300			16	2	78	14	4	2	2	1	1	TR	TR	TR																												
						1.180	G	C633042	41.000	69.200	71.100			16	1	75	14	9	2	2	1	1	TR	TR	TR																												
						1.180	G	C633018	44.900	64.400	69.200			16	2	78	15	7	2	2	1	1	TR	TR	TR																												
TOTAL --				124	223.319				51.200	69.700	73.900																																										
*10	HEAT TREATMENT	*11	VISUAL & DIMENSION TEST	*12	FLATTENING, BEND, GUIDED BEND TEST	*13	R-FLATTENING TEST	*14	FLARING TEST	*15	NONDESTRUCTIVE TEST (U.T)				*16	R.M.T	*17	CRUSH TEST	*18	DRIFT TEST	*19	FLANGE TEST																															
	GOOD		GOOD		GOOD						GOOD					GOOD																																					
NOTE 1 *1 Type of Pipe End 관종		*2 NB:Nominal Bore 公稱徑, OD:Outside Diameter		*3 Unit 단위 (M:Meter, F:Feet, Inch)		*4 Unit 단위 (M:Meter, F:Feet, Inch)		*5 G:GOOD		*6 L:Longitudinal 縱向형, T:Transverse 橫向형		*7 B:Base Metal 母材, W:Weld Part 溶接부		*8 H:Heat(Ladle) Analysis 열연분석, P:Product Analysis 제품분석, WP:Weld Product Analysis 용접부 제품분석		*9 CEQ=C+Mn/6+(Ni+Cu)/15+(Cr+Mo+V)/5 용가탄소량		*10 Heat Treatment 열처리		*11 Visual & Dimension Test 육안 및 치수검사		*12 Flattening/Bend/Guided Bend Test 편평/벤드/굴형시험		*13 Reverse Flattening Test 전개시험		*14 Flaring Test 압확시험		*15 Nondestructive Test 비파괴검사		*16 Residual Magnetism Test 잔류자력시험		*17 Crush Test 충격시험		*18 Diff Test 균열시험		*19 Flange Test 용접시험																	
*9 ERW:ERW 公稱種		*10 RS:SAW 公稱種 (일반)		*11 RG:Roll Grooving		*12 RS:SAW 公稱種 (일반)		*13 RG:Roll Grooving		*14 VG:Volutic Grooving		*15 PE:Plain End		*16 PC:Plain End + Coupled		*17 BE:Bevel End		*18 PB:Plain End + Bevel End		*19 ED:ERW 公稱種		*20 BE:Bevel End		*21 PB:Plain End + Bevel End		*22 ED:ERW 公稱種		*23 BE:Bevel End		*24 PB:Plain End + Bevel End		*25 ED:ERW 公稱種		*26 BE:Bevel End		*27 PB:Plain End + Bevel End																	
*28 ERW 公稱種		*29 RS:SAW 公稱種 (일반)		*30 RG:Roll Grooving		*31 RS:SAW 公稱種 (일반)		*32 RG:Roll Grooving		*33 VG:Volutic Grooving		*34 PE:Plain End		*35 PC:Plain End + Coupled		*36 BE:Bevel End		*37 PB:Plain End + Bevel End		*38 ED:ERW 公稱種		*39 BE:Bevel End		*40 PB:Plain End + Bevel End		*41 ED:ERW 公稱種		*42 BE:Bevel End		*43 PB:Plain End + Bevel End		*44 ED:ERW 公稱種		*45 BE:Bevel End		*46 PB:Plain End + Bevel End																	
*47 ERW 公稱種		*48 RS:SAW 公稱種 (일반)		*49 RG:Roll Grooving		*50 RS:SAW 公稱種 (일반)		*51 RG:Roll Grooving		*52 VG:Volutic Grooving		*53 PE:Plain End		*54 PC:Plain End + Coupled		*55 BE:Bevel End		*56 PB:Plain End + Bevel End		*57 ED:ERW 公稱種		*58 BE:Bevel End		*59 PB:Plain End + Bevel End		*60 ED:ERW 公稱種		*61 BE:Bevel End		*62 PB:Plain End + Bevel End		*63 ED:ERW 公稱種		*64 BE:Bevel End		*65 PB:Plain End + Bevel End																	
*66 ERW 公稱種		*67 RS:SAW 公稱種 (일반)		*68 RG:Roll Grooving		*69 RS:SAW 公稱種 (일반)		*70 RG:Roll Grooving		*71 VG:Volutic Grooving		*72 PE:Plain End		*73 PC:Plain End + Coupled		*74 BE:Bevel End		*75 PB:Plain End + Bevel End		*76 ED:ERW 公稱種		*77 BE:Bevel End		*78 PB:Plain End + Bevel End		*79 ED:ERW 公稱種		*80 BE:Bevel End		*81 PB:Plain End + Bevel End		*82 ED:ERW 公稱種		*83 BE:Bevel End		*84 PB:Plain End + Bevel End																	
*85 ERW 公稱種		*86 RS:SAW 公稱種 (일반)		*87 RG:Roll Grooving		*88 RS:SAW 公稱種 (일반)		*89 RG:Roll Grooving		*90 VG:Volutic Grooving		*91 PE:Plain End		*92 PC:Plain End + Coupled		*93 BE:Bevel End		*94 PB:Plain End + Bevel End		*95 ED:ERW 公稱種		*96 BE:Bevel End		*97 PB:Plain End + Bevel End		*98 ED:ERW 公稱種		*99 BE:Bevel End		*100 PB:Plain End + Bevel End		*101 ED:ERW 公稱種		*102 BE:Bevel End		*103 PB:Plain End + Bevel End																	
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Monitor Well DZMW-1

16-inch Casing



MWH

DZMW-1 CASING TALLY

Casing Diameter: 16 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	1096.07
Floor + Elevators (feet bls)	-9.00
Casing Seat (feet bls)	1087.07

Joint No. (run)	Length (feet)	Cumulative Length (feet)	Heat Numbers	Run Depth (feet)	Weld Start Time	Weld End Time	Weld Date
1	18.00	18.00	263308	9.00			
2	39.47	57.47	263308	48.47			
3	38.30	95.77	263297	86.77	0848	0912	5/16/2007
4	40.60	136.37	263308	127.37	0923	0941	5/16/2007
5	40.12	176.49	263308	167.49	1011	1028	5/16/2007
6	38.57	215.06	263333	206.06	1038	1051	5/16/2007
7	40.15	255.21	263308	246.21	1106	1119	5/16/2007
8	39.44	294.65	263308	285.65	1130	1144	5/16/2007
9	40.55	335.20	263308	326.20	1154	1209	5/16/2007
10	38.22	373.42	263297	364.42	1219	1232	5/16/2007
11	38.15	411.57	263333	402.57	1241	1256	5/16/2007
12	40.55	452.12	263333	443.12	1303	1317	5/16/2007
13	40.57	492.69	263333	483.69	1328	1342	5/16/2007
14	40.60	533.29	263308	524.29	1353	1407	5/16/2007
15	40.20	573.49	263308	564.49	1416	1430	5/16/2007
16	40.32	613.81	263308	604.81	1438	1454	5/16/2007
17	40.52	654.33	263315	645.33	1503	1517	5/16/2007
18	40.25	694.58	263315	685.58	1527	1541	5/16/2007

Observer's Initials: MS/CLM



MWH

DZMW-1 CASING TALLY

Casing Diameter: 16 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	1096.07
Floor + Elevators (feet bls)	-9.00
Casing Seat (feet bls)	1087.07

Joint No. (run)	Length (feet)	Cumulative Length (feet)	Heat Numbers	Run Depth (feet)	Weld Start Time	Weld End Time	Weld Date
19	40.55	735.13	263308	726.13	1550	1606	5/16/2007
20	40.12	775.25	263315	766.25	1617	1633	5/16/2007
21	40.92	816.17	263318	807.17	1644	0428	5/16-17/07
22	39.51	855.68	263297	846.68	0439	0458	5/17/2007
23	40.17	895.85	263297	886.85	0506	0522	5/17/2007
24	39.02	934.87	263297	925.87	0530	0552	5/17/2007
25	40.77	975.64	263297	966.64	0601	0616	5/17/2007
26	40.17	1,015.81	263297	1,006.81	0624	0638	5/17/2007
27	39.90	1,055.71	263308	1,046.71	0649	0705	5/17/2007
28	40.36	1,096.07	263308	1,087.07	0717	0732	5/17/2007



MWH



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
Suite 430
Cape Coral, Florida 33904
(239) 573-5959

Project: W-7C North Cape RO WTP
Deep Injection Wells

MWHA File Number: 3220246.19.9.1.1

Owner: City of Cape Coral

Submittal No.: SUL-YOUBRO-02633-016-B--0

MWH		
NO EXCEPTIONS TAKEN	X	AMEND - RESUBMIT
MAKE CORRECTIONS NOTED		REJECTED - RESUBMIT

Description: DZMW-1 16" Mill Cert

REVIEWED BY: N.JOHNSON *[Signature]* DATE: APRIL 2, 2007

Spec. Section: 02633

RECOMMENDED BY: DATE:

Submitting Company: Youngquist Brothers, Inc.

CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFROMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATNG WORK WITH OTHER TRADES, AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK

Reviewer: Neil Johnson

Comments: None.

**Submittal Data
FROM
Youngquist Brothers, Inc.**

**15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545**

Project
**North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014**

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: March 16, 2007

Number of Copies: 9

Submittal Number: 02633-018-B

Specification Section Number: 02633-018-B

Item Submitted: 16" Mill Certification

New Submittal: X

Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:


Shaun Skinner

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

By: _____

Firm: _____

Date: _____

CHEMICAL COMPOSITION, 3

Element	Unit	Value	Limit	Unit	Value	Limit
C	%	100	100			
Mn	%	0.43	0.25			
P	%	0.015	0.01			
S	%	0.006	0.005			
Si	%	0.03	0.03			
Fe	%	0.0005	0.0005			
Al	%	0.0005	0.0005			
Ni	%	0.0005	0.0005			
Cu	%	0.0005	0.0005			
Cr	%	0.0005	0.0005			
Mo	%	0.0005	0.0005			
Se	%	0.0005	0.0005			
Co	%	0.0005	0.0005			
As	%	0.0005	0.0005			
Sb	%	0.0005	0.0005			
Bi	%	0.0005	0.0005			
Pb	%	0.0005	0.0005			
Sn	%	0.0005	0.0005			
Zn	%	0.0005	0.0005			
Al	%	0.0005	0.0005			
Ca	%	0.0005	0.0005			
Mg	%	0.0005	0.0005			
Na	%	0.0005	0.0005			
K	%	0.0005	0.0005			
Cl	%	0.0005	0.0005			
F	%	0.0005	0.0005			
O	%	0.0005	0.0005			
H	%	0.0005	0.0005			

ENDORSEMENT BY
THIRD PARTY INSPECTION
AGENCY

(STAMP)

NAME
SIGNATURE
DATE

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.



MANAGER - INSPECTION
VOLZHSKY PIPE PLANT
DATE: 08.08.06

[Signature]

Volzhsky Pipe Plant (PJ) GmbH

[Signature]
08.08.06



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
 Suite 430
 Cape Coral, Florida 33904
 (239) 573-5959

Project:	W-7C North Cape RO WTP Deep Injection Wells	MWHA File Number: 3220246.19.9.1.1				
Owner:	City of Cape Coral					
Submittal No.:	SUL-YOUBRO-02633-016-A--0	MWH				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">NO EXCEPTIONS TAKEN</td> <td style="width: 10%; text-align: center;">X</td> <td style="width: 30%;">AMEND - RESUBMIT</td> </tr> <tr> <td>MAKE CORRECTIONS NOTED</td> <td></td> <td>REJECTED - RESUBMIT</td> </tr> </table>	NO EXCEPTIONS TAKEN	X	AMEND - RESUBMIT	MAKE CORRECTIONS NOTED
NO EXCEPTIONS TAKEN	X	AMEND - RESUBMIT				
MAKE CORRECTIONS NOTED		REJECTED - RESUBMIT				
Description:	DZMW-1 16" Mill Cert	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">REVIEWED BY: N.JOHNSON </td> <td style="width: 30%;">DATE: APRIL 2, 2007</td> </tr> <tr> <td>RECOMMENDED BY:</td> <td>DATE:</td> </tr> </table>	REVIEWED BY: N.JOHNSON	DATE: APRIL 2, 2007	RECOMMENDED BY:	DATE:
REVIEWED BY: N.JOHNSON	DATE: APRIL 2, 2007					
RECOMMENDED BY:	DATE:					
Spec. Section:	02633	CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFROMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATING WORK WITH OTHER TRADES, AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK				
Submitting Company:	Youngquist Brothers, Inc.					
Reviewer:	Neil Johnson					

Comments: None.

Submittal Data
FROM
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545

Project
North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: March 16, 2007 Number of Copies: 9
Submittal Number: 02633-018-A
Specification Section Number: 02633-018-A
Item Submitted: 16" Mill Certification
New Submittal: X Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:


Shaun Skinner

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

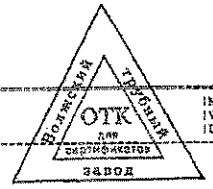
By: _____
Firm: _____
Date: _____

CHEMICAL COMPOSITION

C	Mn	P	S	Si	Al	Fe	Cr	Mo	Ni	W	VCe	VCu	VCb	VCr
11100	10000	100	100	100	100	100	100	100	100	100	100	100	100	100
15	6	100	43	25										
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	4	3	3	46	1	30	1	1	1	1	1	1	1	1
1	4	3	3	43	1	30	1	1	1	1	1	1	1	1
1	4	3	3	43	1	31	1	1	1	1	1	1	1	1

ENDORSEMENT BY
THIRD PARTY INSPECTION AGENCY (STAMP)
NAME
SIGNATURE
DATE

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.



MANAGER - INSPECTION
VOLSKREY PIPE PLANT
DATE: 12.05.06


[Signature]

MANAGER OF VASS (Di Gmbh)
12.05.06
[Signature]
12.05.06

MAR. 15 2007 2:21PM

VASS PIPE

NO. 5280 P. 7/11



"VOLZHSKY PIPE PLANT"
OJSC

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02
E-mail: VIZ @ SPRINT-V.com.ru

MILL TEST CERTIFICATE

MANUFACTURER:
VOLZHSKY PIPE PLANT OJSC
404119, VOLZHSKY
VOLGOGRAD REGION
RUSSIA

SPEC 981/72-01/PO 06-252/PO 41037

DESCRIPTION OF GOODS:
CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L PS12 (43RD EDITION/
YEAR 2004) & 2, B/ASTM A106 (2002 EDITION) GR. B/C/ASTM A53 (2002 EDITION)
GR. B/C/ASME SA 106 (1998 EDITION)/ASME SA53 (1998 EDITION).
BEVELLED ENDS.
16" x 0.500" (406.4 x 12.7 MM)

CERTIFICATE # 2013 DATE OF ISSUE 21.08.2006

SIZE	HEAT No. TREAT- MENT LOT No.	LOT No.	QUAN- TITY, PIPES/FEET	LENGTH, FEET	NET WEIGHT TONS	CHEMICAL COMPOSITION, %													MILL CONT- ROL		PENILE TEST			IMPACT TEST							HEAT T TREAT- MENT		HYDROSTATIC TEST		NOTE			
						C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	As	Fe	RELA TIVE FRAC.	OR- GAIN	YS MPA	UTS MPa	EL. RRC	ORI- GINATION	INO- TCHISE	ISI- TEMP.	IMPACT VALUE	FRAC- TURE	AT- TEMP.	DURA- TION (COND)	FRES- SURE (MPa)							
						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
GRADE B/C/ (X42 16" x 0.500" (406.4 x 12.7 MM) API 5L PS12 ASTM A106 ASTM A53 ASME SA-106 ASME SA-53	263318	3-1376	76	3048.81	114.996	0.024	0.018	0.010	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002

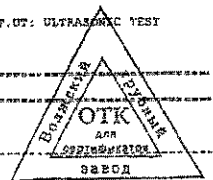
DESCRIPTION OF TESTS	VISUAL AND DIMENSIONS	BEVELING INSPECTION	END'S PROTECTORS	NONDESTRUCTIVE INSPECTION	CORROSION	FLATTENING TEST	HARKING: STENCILING	STEEL MAKING PROCESS - ELECTRIC FURNACE
	G	G	G	G	G	G	G	

NOTES:
 1: G: GOOD
 2: H: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS
 3: L: LONGITUDINAL, T: TRANSVERSE
 4: STRIP G: 1/2 IN. H: 3/4 IN. M: 1 IN. K: 1 1/2 IN. S: 12 MM.
 5: V: 2mm V, U: 2mm U, B: 3mm B, C: 4mm C, E: 2mm U FASH NOTCH, F: 2mm V FACE NOTCH
 6: F: 10x10mm, T: 3x7.5mm, G: 10x7.5mm, S: 10x10mm, Z: 10x3.5mm, 2: 10x2.5mm
 7: E - EACH VALUE, A - AVERAGE VALUE
 8: H: HEAT TREATMENT, OQT: QUENCHED & TEMPERED
 9: M: WET FLOUORESCENT MAGNETIC PARTICLE TEST, EMI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST
 10: S: PIPE BODY WT FOR LAMINATION, UPE: PIPE ENDS WT FOR LAMINATION
 11: TWT: PIPE WALL THICKNESS UT
 12: S - NOTCH 5A, 12 - NOTCH 12.5A

TOTAL: QUANTITY OF PIPES 76 PCS NET WEIGHT 114.996 T LENGTH 3048.81

ENDORSEMENT BY: [Signature] NAME: [Name] (WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATIONS.)
 THIRD PARTY INSPECTOR: [Signature] AGENCY: [Agency] SIGNATURE: [Signature] DATE: [Date]

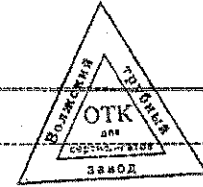
MANAGER - INSPECTION: [Signature] VOLZHSKY PIPE PLANT DATE: 21.08.06


 OJTK
 ASSOCIATION
 SBERB

CHEMICAL COMPOSITION, %


Element	Symbol	Value	Symbol	Value	Symbol	Value	Symbol	Value
C	11100	110000	100	100	100	100	100	100
H	11100	110000	100	100	100	100	100	100
Mn	11100	110000	100	100	100	100	100	100
P	11100	110000	100	100	100	100	100	100
S	11100	110000	100	100	100	100	100	100
Si	11100	110000	100	100	100	100	100	100
Fe	11100	110000	100	100	100	100	100	100
Al	11100	110000	100	100	100	100	100	100
Cr	11100	110000	100	100	100	100	100	100
Ni	11100	110000	100	100	100	100	100	100
Mo	11100	110000	100	100	100	100	100	100
Cu	11100	110000	100	100	100	100	100	100
Pb	11100	110000	100	100	100	100	100	100
As	11100	110000	100	100	100	100	100	100
Sb	11100	110000	100	100	100	100	100	100
Bi	11100	110000	100	100	100	100	100	100
Se	11100	110000	100	100	100	100	100	100
Te	11100	110000	100	100	100	100	100	100
Sn	11100	110000	100	100	100	100	100	100
Zn	11100	110000	100	100	100	100	100	100
Co	11100	110000	100	100	100	100	100	100
Nb	11100	110000	100	100	100	100	100	100
Bi	11100	110000	100	100	100	100	100	100
Ca	11100	110000	100	100	100	100	100	100
Mg	11100	110000	100	100	100	100	100	100
B	11100	110000	100	100	100	100	100	100
Pt	11100	110000	100	100	100	100	100	100
Au	11100	110000	100	100	100	100	100	100
Ag	11100	110000	100	100	100	100	100	100
Cd	11100	110000	100	100	100	100	100	100
Hg	11100	110000	100	100	100	100	100	100
Tl	11100	110000	100	100	100	100	100	100
Pb	11100	110000	100	100	100	100	100	100
Bi	11100	110000	100	100	100	100	100	100
Po	11100	110000	100	100	100	100	100	100
At	11100	110000	100	100	100	100	100	100
Rn	11100	110000	100	100	100	100	100	100
Fr	11100	110000	100	100	100	100	100	100
Ra	11100	110000	100	100	100	100	100	100
Ac	11100	110000	100	100	100	100	100	100
Th	11100	110000	100	100	100	100	100	100
Pa	11100	110000	100	100	100	100	100	100
U	11100	110000	100	100	100	100	100	100
Np	11100	110000	100	100	100	100	100	100
Pu	11100	110000	100	100	100	100	100	100
Am	11100	110000	100	100	100	100	100	100
Cm	11100	110000	100	100	100	100	100	100
Bk	11100	110000	100	100	100	100	100	100
Cf	11100	110000	100	100	100	100	100	100
Es	11100	110000	100	100	100	100	100	100
Fm	11100	110000	100	100	100	100	100	100
Md	11100	110000	100	100	100	100	100	100
Ds	11100	110000	100	100	100	100	100	100
Rg	11100	110000	100	100	100	100	100	100
Uu	11100	110000	100	100	100	100	100	100
Uub	11100	110000	100	100	100	100	100	100
Uuc	11100	110000	100	100	100	100	100	100
Uud	11100	110000	100	100	100	100	100	100
Uue	11100	110000	100	100	100	100	100	100
Uuf	11100	110000	100	100	100	100	100	100
Uug	11100	110000	100	100	100	100	100	100
Uuh	11100	110000	100	100	100	100	100	100
Uui	11100	110000	100	100	100	100	100	100
Uuj	11100	110000	100	100	100	100	100	100
Uuk	11100	110000	100	100	100	100	100	100
Uul	11100	110000	100	100	100	100	100	100
Uum	11100	110000	100	100	100	100	100	100
Uun	11100	110000	100	100	100	100	100	100
Uuo	11100	110000	100	100	100	100	100	100
Uup	11100	110000	100	100	100	100	100	100
Uuq	11100	110000	100	100	100	100	100	100
Uur	11100	110000	100	100	100	100	100	100
Uus	11100	110000	100	100	100	100	100	100
Uut	11100	110000	100	100	100	100	100	100
Uuu	11100	110000	100	100	100	100	100	100
Uuv	11100	110000	100	100	100	100	100	100
Uuw	11100	110000	100	100	100	100	100	100
Uux	11100	110000	100	100	100	100	100	100
Uuy	11100	110000	100	100	100	100	100	100
Uuz	11100	110000	100	100	100	100	100	100

ENDORSEMENT BY	NAME	WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
THIRD PARTY INSPECTION	SIGNATURE	TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.
AGENCY	DATE	



MANAGER - INSPECTION
VOLZNSKY PIPE PLANT
DATE: 22.08.07

Thomson & Masch (D) GmbH
Vertrieb
Rue de la Paix
1000 Bruxelles
Belgium
22.08.07



**"VOLZHSKY PIPE PLANT"
OJSC**

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02
E-mail: VIZ @ SPRINT-V.com.ru

MANUFACTURER:		MILL TEST CERTIFICATE																																				
VOLZHSKY PIPE PLANT OJSC 404119, VOLZHSKY VOLGOGRAD REGION RUSSIA		SPEC 981/72-01/PO 06-251/PO 41037																																				
		DESCRIPTION OF GOODS: CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L P6L2 (43RD EDITION/ YEAR 2004); X42.B/ASTM A106 (2002 EDITION); GR.B/C/ASTM A53 (2002 EDITION); GR.B/C/ASME SA 106 (1998 EDITION)/ASME SA53 (1998 EDITION); BEVELLED ENDS 16" x 0.500" (406.4 x 12.7 MM)																																				
		CERTIFICATE # 2010 DATE OF ISSUE 21.08.2006																																				
SIZE	HEAT No	LOT No	COOR. No	LENGTH FEET	NET WEIGHT TONS	CHEMICAL COMPOSITION, %														MILL	TENSILE TEST				IMPACT TEST				HYDROSTATIC TEST	NOTE								
						C	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	ROL	YIELD STRENGTH MPa	TENSILE STRENGTH MPa	ELONGATION %		ELONGATION AT BREAK %	TEMP °C	CHARPY VALUE J	TEMP °C	TEMP °C	TEMP °C	TEMP °C	TEMP °C			TEMP °C							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	
GRADE B/C/ X42 (16") X 0.500" (406.4 x 12.7 MM)	263315	3-1357	64	2532.67	95.635	1118	126	145	9	4	11	13	17	2	0	0																						
ASTM A106						1117	124	144	8	3	10	12	16	2	0	0	16292																					
API 5L P6L2						1118	124	144	8	3	10	12	16	2	0	0	16292																					
ASTM A53																	15796	L																				
ASME SA-106																																						
ASME SA-53																																						

DESCRIPTION OF TESTS	VISUAL AND DIMENSIONS	BEVELING INSPECTION	END'S PROTECTORS	NONDESTRUCTIVE INSPECTION	COATING	FLATTENING TEST	MARKING: STENCILING	STEEL MAKING PROCESS - ELECTRIC FURNACE
	G	G	G	G	G	G	G	

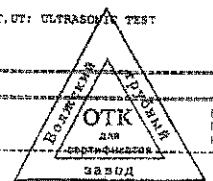
NOTES: G: GOOD
 *1: H: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS
 *2: L: LOT TEST, H: HEAT CONTROL TEST, A: ADDITION TEST, R: RECHECK TEST
 *3: L: LONGITUDINAL, T: TRANSVERSE
 *4: STRIP G: 1/2 IN. H: 3/4 IN. N: 1 IN. R: 1 1/2 IN. S: 2 IN.
 *5: V: 2mm V, U: 2mm U, B: 3mm B, C: 4mm C, E: 2mm D FASE NOTCH, F: 2mm V FASE NOTCH
 *6: F: 10x10mm, 7: 10x7.5mm, G: 10x6.7mm, S: 10x3.3mm, Z: 10x2.5mm
 *7: E - EACH VALUE, A - AVERAGE VALUE
 *8: HEAT TREATMENT, Q&T: QUENCHED & TEMPERED
 *9: M: WET FLOWMETER MAGNETIC PARTICLE TEST, EM: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST
 UTS: PIPE BODY UT FOR LAMINATION, UTE: PIPE ENDS UT FOR LAMINATION
 UTS: PIPE WALL THICKNESS UT
 *10: 5 - NOTCH 5%, 12 - NOTCH 12.5%

TOTAL: QUANTITY OF PIPES 64 PCS NET WEIGHT 95.635 T LENGTH 2532.67 FT

ENDORSEMENT BY: [Signature] NAME: [Name] WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.

THIRD PARTY INSPECTION: [Signature] AGENCY: [Agency] DATE: [Date]

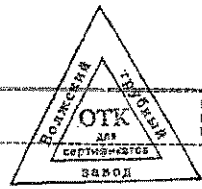
MANAGER - INSPECTION: [Signature] VOLZHSKY PIPE PLANT DATE: 15.03.06



CHEMICAL COMPOSITION, %

Element	Min	Max	Element	Min	Max
C	100	100	Si	0	0.05
Mn	0	0.05	P	0	0.01
S	0	0.01	Fe	0	100
Al	0	0.01			
N	0	0.01			
O	0	0.01			
H	0	0.01			
As	0	0.01			
Se	0	0.01			
Te	0	0.01			
Pb	0	0.01			
Bi	0	0.01			
Mo	0	0.01			
Cr	0	0.01			
Co	0	0.01			
Ni	0	0.01			
Cu	0	0.01			
Zn	0	0.01			
Ag	0	0.01			
Au	0	0.01			
Ca	0	0.01			
Mg	0	0.01			
Ba	0	0.01			
Sr	0	0.01			
K	0	0.01			
Na	0	0.01			
Li	0	0.01			
Rb	0	0.01			
Cs	0	0.01			
Br	0	0.01			
I	0	0.01			
Sn	0	0.01			
Pb	0	0.01			
B	0	0.01			
F	0	0.01			
Cl	0	0.01			
Ar	0	0.01			
Kr	0	0.01			
Xe	0	0.01			
Ne	0	0.01			
He	0	0.01			

ENDORSEMENT BY: (THIRD PARTY INSPECTION) AGENCY: (STAMP) NAME: SIGNATURE: DATE: (WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED, TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.)



INSPECTOR - INSPECTION: (VOLENSKY PIPE PLANT) DATE: 03.08.06

Inspected by: (D) Grahm
 Date: 03.08.06
 Signature: [Handwritten Signature]



MWH



SUBMITTAL REVIEW

2503 Del Prado Blvd. S.
Suite 430
Cape Coral, Florida 33904
(239) 573-5959

Project: W-7C North Cape RO WTP
Deep Injection Wells


MWHA File Number: 3220246.19.9.1.1

Owner: City of Cape Coral

Submittal No.: SUL-YOUBRO-02633-016-C--0

MWH		
NO EXCEPTIONS TAKEN	X	AMEND - RESUBMIT
MAKE CORRECTIONS NOTED		REJECTED - RESUBMIT

Description: DZMW-1 16" Mill Cert

REVIEWED BY: N. JOHNSON 	DATE: APRIL 2, 2007
RECOMMENDED BY:	DATE:

Spec. Section: 02633

Submitting Company: Youngquist Brothers, Inc.

CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. THIS SHOP DRAWING HAS BEEN REVIEWED FOR CONFORMANCE WITH DESIGN CONCEPT AND GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS ONLY. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, FABRICATION PROCESSES AND TECHNIQUES, COORDINATING WORK WITH OTHER TRADES, AND SATISFACTORY AND SAFE PERFORMANCE OF THE WORK.

Reviewer: Neil Johnson

Comments: None.

**Submittal Data
FROM
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545**

Project
**North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014**

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: March 16, 2007

Number of Copies: 9

Submittal Number: 02633-018-C

Specification Section Number: 02633-018-C

Item Submitted: 16" Mill Certification

New Submittal: X

Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:



Shaun Skinner

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed

By: _____

Firm: _____

Date: _____

	<p>"VOLZHNSKY PIPE PLANT" OJSC</p>	<p>404119, Volzhsky, Volgograd region, Russia</p> <p>Fax: (78443) 25-69-02 E-mail: VTZ @ SPRINT-V.com.ru</p>
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MILL TEST CERTIFICATE

<p>MANUFACTURER: VOLZHNSKY PIPE PLANT OJSC 404119, VOLZHNSKY VOLGOGRAD REGION RUSSIA</p>	<p>SPEC 981/72-01/PO 06-252/PO 41037</p> <p>DESCRIPTION OF GOODS: CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L PSL2 (4TH EDITION/ YER. 2004)X42.B/ASTM A106(2002 EDITION)GR. B/C/ASTM A53 (2002 EDITION) GR. B/C/ASME SA 106(1998 EDITION)/ASME SA53 (1998 EDITION), BEVELLED ENDS, 116" x 0.500" (406.4 x 12.7 MM)</p>	<p>CERTIFICATE # 2007 DATE OF ISSUE 21.08.2006</p>
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SIZE	HEAT No: TREATMENT HEAT No: LOT No:	LOT No	QUAN- TITY, PIPES/FEET	LENGTH, FEET	NET WEIGHT, TONS	CHEMICAL COMPOSITION, %														MILL CONT-				TENSILE TEST				HARD- NESS				IMPACT TEST						HYDROSTATIC TEST		NOTE
						C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	ROL	TA	TEST	GL, °C	EL.	TEST	HORI- ENTR- TION	NO- ISE	TEST	IMPACT VALUE	FRAC- TURE	AT- MENT	DURA- TION ISO- CONDS	PRES- SURE KG/CM2 (MPa)										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38			
GRADE B/C/ X42 16"x 0.500"(406.4 x 12.7 MM)	253297A13-1386	28	1124.97	42.756	0.18	0.28	0.44	0.08	0.07	0.08	0.13	0.18	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
API 5L PSL2 ASTM A106 ASTM A53 ASME SA-106 ASME SA-53	111					P118 P119	28 28	44 43	8 8	7 7	8 8	13 13	18 17	2 2	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0			
																																						<p>LENGTH: MIN 80"-38-41 FT MAX 204"-36-38 FT</p> <p>MINIMUM HYDROSTATIC PRESSURE P= 2230 PSI HARDNESS TEST MAX. 22 HRC IS IN ACCORDANCE WITH NACE MR0175.</p>		

DESCRIPTION OF TESTS	VISUAL AND DIMENSIONS	BEVELLING INSPECTION	END'S PROTECTORS	(NONDESTRUCTIVE) INSPECTION	COATING	FLATTENING TEST	MARKING: STENCILING	STEEL MAKING PROCESS -
	G	G	G	G	G	G	G	ELECTRIC FURNACE


NOTES: G: GOOD

*1: R: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS
 *2: L: LOT TEST, H: HEAT CONTROL TEST, A: ADDITION TEST, R: RECHECK TEST
 *3: L: LONGITUDINAL, T: TRANSVERSE
 *4: STRIP G: 1/2 IN, H: 3/4 IN, N: 1 IN, S: 1 1/2 IN, S: 12 MM.
 *5: V: 2mm V, U: 2mm U, B: 2mm B, C: 9mm C, E: 2mm D FASE NOTCH, F: 2mm V FASE NOTCH
 *6: F: 10x10mm, 7: 10x7.5mm, 8: 10x6.7mm, 9: 10x5mm, 3: 10x3.5mm, 2: 10x2.5mm
 *7: E - EACH VALUE, A - AVERAGE VALUE
 *8: S: HEAT TREATMENT, O&T: OVERHEATED & TEMPERED
 *9: M: WET FLOURESCENT MAGNETIC PARTICLE TEST, EMI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST
 USE: PIPE BODY UT FOR LAMINATION, UTE: PIPE ENDS UT FOR LAMINATION
 UTS: PIPE WALL THICKNESS UT
 *10: 5 - NOTCH 5x, 12 - NOTCH 12.5x

TOTAL: QUANTITY OF PIPES 28 PCS NET WEIGHT 42.756 T LENGTH 1124.97 ft

ENDORSEMENT BY: TUGOSKAYA VEZHA (O) GROUP
 THIRD PARTY INSPECTION: AGENCY: *VTZ*
 NAME: *[Signature]* DATE: 21.08.06
 I WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.





"VOLZHSKY PIPE PLANT"
OJSC

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02
E-mail: VIZ@SPRINT-V.com.ru

MAR-15. 2007 8:31AM

VASS PIPE

MILL TEST CERTIFICATE

MANUFACTURER: VOLZHNSKY PIPE PLANT OJSC
404119, VOLZHNSKY
VOLGOGRAD REGION
RUSSIA

DESCRIPTION OF GOODS:
CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L PSL2 (43RD EDITION/
YEAR 2004)X42, S/ASTM A106(2002 EDITION)GR. B/C/ASTM A53 (2002 EDITION)
GR. B/C/ASME SA 106(1998 EDITION)/ASME SA53 (1998 EDITION).
BEVELLED ENDS.
16" x 0.500" (406.4 x 12.7 MM)

CERTIFICATE # 2009 DATE OF ISSUE 21.08.2006

SIZE	HEAT No1	LOT No	QUAN- TITY, PIPES	LENGTH, FEET	NET WEIGHT, TONS	CHEMICAL COMPOSITION, %														TENSILE TEST				IMPACT TEST				HYDROSTATIC TEST		NOTE							
						C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	Al	Fe	TA	TI	YS	UTS	REB	ORI- ENTA- TION	NO-TCH	SI-TEMP	IMPACT VALUE	FRAC- TURE	HEAT TREATMENT		MIN	MAX					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
GRADE B/C/ X42 16"x 0.500" (406.4 x 12.7 MM) API 5L PSL2 ASTM A106 ASTM A53 ASME SA-106 ASME SA-53	263310	13-1384	5	199.90	7.520	0.018	0.025	0.010	0.008	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	
						<p>MIN 290.00 485.00 30.01 22.00</p> <p>MAX 448.00 758.00</p>																															

CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L (2004) ASTM A106(2002) ASTM A53(2002) ASME SA-106(1998) ASME SA-53(1998)

LENGTH:
MIN 80+38-41 FT
MAX 20+36-38 FT

MINIMUM HYDROSTATIC PRESSURE
P= 2230 PSI
HARDNESS TEST
MAX. 22 HRC IS IN ACCORDANCE WITH NACE MR0175.

DESCRIPTION OF TESTS	VISUAL AND DIMENSIONS	BEVELING INSPECTION	END'S PROTECTORS	NONDESTRUCTIVE INSPECTION	COATING	FLATTENING TEST	MARKING: STENCILING	STEEL MAKING PROCESS - ELECTRIC FURNACE
	G	G	G	G	G	G	G	

NOTES: G: GOOD

*1: R: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS

*2: L: LOT TEST, N: HEAT TREATMENT, A: ADDITION TEST, R: RECHECK TEST

*3: L: LONGITUDINAL, T: TRANSVERSE

*4: STRIP G: 1/2 in. H: 3/4 in. N: 1 in. K: 1 1/2 in. S: 12 mm.

*5: V: 2mm V, H: 2mm U, B: 3mm U, C: 4mm U, E: 2mm V FASE NOTCH, F: 2mm V FASE NOTCH

*6: F: 10x10mm, 7: 10x7.5mm, 8: 10x6.7mm, 9: 10x5mm, 10: 10x3.5mm, 11: 10x2.5mm

*7: S - EACH VALUE, A - AVERAGE VALUE

*8: HEAT TREATMENT, Q&T: QUENCHED & TEMPERED

*9: M: WET FLUORESCENT MAGNETIC PARTICLE TEST, ENI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST

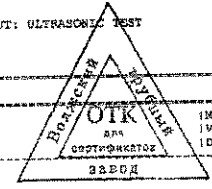
UTS: PIPE BODY UT FOR LAMINATION, UTE: PIPE ENDS UT FOR LAMINATION

UTS: PIPE WALL THICKNESS UT

*10: 5 - NOTCH 5, 12 - NOTCH 12.5


TOTAL: QUANTITY OF PIPES 5 PCS NET WEIGHT 7.520 T LENGTH 199.90 FT

ENDORSEMENT BY: *[Signature]* NAME: *[Name]* I WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
THIRD PARTY INSPECTION: *[Signature]* SIGNATURE: *[Signature]* TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.
AGENCY: *[Signature]* DATE: *[Date]*



MANAGER - INSPECTION
VOLZHNSKY PIPE PLANT
DATE: 21.08.06 *[Signature]*

NO. 5158 P. 7



"VOLZHSKY PIPE PLANT"
OJSC

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02
E-mail: VTZ@SPRINT-V.com.ru

MAR. 15. 2007 8:33AM

VASS PIPE

NO. 5158 P. 9

SIZE		HEAT No	LOT No	COUN- TRY	LENGTH (FEET)	NET WEIGHT (TONS)	CHEMICAL COMPOSITION, %													VESICLE TEST				IMPACT TEST							HYDROSTATIC TEST		NOTE						
							C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	Al	RD	GL	UTS	EL	TEST	ORIENTA- TION	NO-TCH	SIZE	TEMP	IMPACT VALUE	FRAC- TURE	HEAT- T	DURA- TION (SE- CONDS)	PRES- SURE (MPa)							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38		
GRADE B/C/		10.500		12.7		263315		13-1357		64		2532.67		95.635																								CARBON STEEL SEAMLESS PIPES (ACCORDING TO API 5L (2004) ASTM A106 (2002) ASTM A53 (2002) ASME SA-106 (1998) ASME SA-53 (1998)	
HEAT TREATMENT		111																																		LENGTH: MIN 30'-38'-41 FT MAX 20'-36'-38 FT			
DESCRIPTION OF TESTS		VISUAL AND DIMENSIONS		BEVELING INSPECTION		END'S PROTECTORS		NONDESTRUCTIVE INSPECTION		COATING																										MINIMUM HYDROSTATIC PRESSURE P= 2230 PSI HARDNESS TEST MAX. 22 HRC 15 IN ACCORDANCE WITH NACE MR0175.			
G		G		G		G		G		G																										FLATTENING TEST: G MARKING: STENCILING: G			

NOTES: G: GOOD

*1: R: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS

*2: L: LOT TEST, H: HEAT CONTROL TEST, A: ADDITION TEST, R: RECHECK TEST

*3: L: LONGITUDINAL, T: TRANSVERSE

*4: STRIP G: 1/2 in. H: 3/4 in. N: 1 in. E: 1 1/2 in. S: 12 mm.

*5: V: 2mm V, U: 2mm U, B: 3mm U, C: 4mm U, E: 2mm U FASE NOTCH, F: 2mm V FASE NOTCH

*6: P: 10x10mm, 7: 10x7.5mm, 8: 10x6.7mm, 9: 10x5mm, 10: 10x3.5mm, 11: 10x2.5mm

*7: E - EACH VALUE, A - AVERAGE VALUE

*8: HEAT TREATMENT, QTT: QUENCHED & TEMPERED

*9: M: MET FLUORESCENT MAGNETIC PARTICLE TEST, EMI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST

UTE: PIPE BODY UT FOR LAMINATION, UTE: PIPE ENDS UT FOR LAMINATION

UTS: PIPE WALL THICKNESS UT

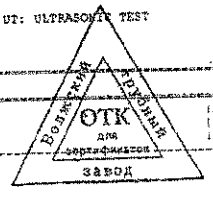
*10: 5 - NOTCH 5%, 12 - NOTCH 12.5%

TOTAL QUANTITY OF PIPES: 64 PCS NET WEIGHT: 95.635 T LENGTH: 1332.57 ft

ENDORSEMENT BY: [Signature] NAME: [Name] WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED

THIRD PARTY INSPECTION: [Signature] SIGNATURE: [Signature] TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.

AGENCY: [Signature] DATE: [Date]



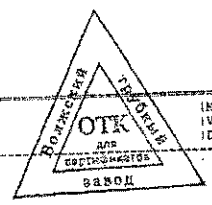
MANAGER - INSPECTION
VOLZHSKY PIPE PLANT
DATE: 15.03.07 [Signature]

CHEMICAL COMPOSITION

C		Mn		S		P		Si		Fe	
MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
0.010	0.020	0.005	0.015	0.005	0.015	0.005	0.015	0.005	0.015	0.005	0.015
0.010	0.020	0.005	0.015	0.005	0.015	0.005	0.015	0.005	0.015	0.005	0.015

ENDORSEMENT BY _____ NAME _____
 THIRD PARTY INSPECTION _____ (STAMP) SIGNATURE _____
 AGENCY _____ DATE _____

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
 TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.



MANAGER - INSPECTION
 VOLANSKY PIPS PLANT
 DATE: 04.08.06 *[Signature]*

[Handwritten signature]
 04.08.06

MAR 15 2007 8:34AM

VASS PIPE

NO. 5158 P. 10



"VOLZHSKY PIPE PLANT" OJSC

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02 E-mail: VTZ @ SPRINT-V.com.ru

MILL TEST CERTIFICATE

MANUFACTURER: VOLZHSKY PIPE PLANT OJSC 404119, VOLZHSKY VOLGOGRAD REGION RUSSIA

SPEC 981/72-01/PO 06-252/PO 41037 DESCRIPTION OF GOODS: CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L PSL2 (43RD EDITION)/ YEAR 2004/X42.B/ASTM A106(2002 EDITION)/GR.B/C/ASTM A53 (2002 EDITION)/ GR.B/C/ASME SA 106(1998 EDITION)/ASME SA53 (1998 EDITION), BEVELED ENDS, 116" x 0.500" (406,4 x 12,7 MM)

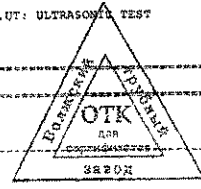
CERTIFICATE NO 2011 DATE OF ISSUE 21.08.2006

Main data table with columns for SIZE, HEAT No, LOT, QUANTITY, NET WEIGHT, CHEMICAL COMPOSITION (C, Si, Mn, P, S, Cr, Ni, Cu, Mo, Ti, Nb, N), TENSILE TEST (Yield, UTS, Elongation), IMPACT TEST (Charpy), and HYDROSTATIC TEST (Pressure, Duration). Includes specific values for heat 116 and lot 063316.

Summary table with columns: DESCRIPTION OF TESTS, VISUAL AND DIMENSIONS, BEVELING INSPECTION, ENO'S PROTECTORS, NONDESTRUCTIVE INSPECTION, COATING, FLATTENING TEST, MARKING: STENCILING, STEEL MAKING PROCESS - ELECTRIC FURNACE.

NOTES: G: GOOD *1: H: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS *7: S - EACH VALUE, A - AVERAGE VALUE *2: L: LOT TEST, H: HEAT CONTROL TEST, A: ADDITION TEST, R: RECHECK TEST *8: HEAT TREATMENT, OQT: OVENHEAT & TEMPERED *3: L: LONGITUDINAL, T: TRANSVERSE *9: M: WET FLUORESCENT MAGNETIC PARTICLE TEST, EMI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST *4: STRIP G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 mm, UTS: PIPE BODY UT FOR LAMINATION, UTE: PIPE ENDS UT FOR LAMINATION *5: V: 2mm V, U: 2mm U, B: 3mm B, C: 4mm C, E: 2mm E, FASE NOTCH, F: 2mm V FASE NOTCH *6: C: F: 10x7.5mm, T: 10x7.5mm, S: 10x3.5mm, B: 10x3.5mm, U: 10x2.5mm *10: 5 - NOTCH 5A, 12 - NOTCH 12.5A

TOTAL: QUANTITY OF PIPES 83 PCS NET WEIGHT 127.444 T LENGTH 3301.97 ft ENDORSEMENT BY: THIRD PARTY INSPECTION AGENCY: SIGNATURE: DATE: WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION. (MANAGER - INSPECTION VOLZHSKY PIPE PLANT) DATE: 21.08.06



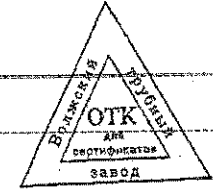
MAR 15, 2007 8:34AM NO. 5158 P. 11

CHEMICAL COMPOSITION

Element	Symbol	Unit	Value	Symbol	Unit	Value	Symbol	Unit	Value
C	%		100	C	%	100	C	%	100
Mn	%		15	Mn	%	16	Mn	%	25
P	%		0.03	P	%	0.03	P	%	0.03
S	%		0.01	S	%	0.01	S	%	0.01
Si	%		0.3	Si	%	0.3	Si	%	0.3
Fe	%		100	Fe	%	100	Fe	%	100

ENDORSEMENT BY: _____
 THIRD PARTY INSPECTION: _____
 AGENCY: _____

WE CERTIFY THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
 TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.



MANAGER - INSPECTION
 VOLERSKY PIPE PLANT
 DATE: 16.08.05

Inspection Made (C) GmbH
 Director
 Signature: *[Handwritten Signature]*
 Date: 16.08.05

MAR-15-2007 8:35AM

VASS PIPE

NO. 5158 P. 12

MAR. 15. 2007 8:37AM

VASS PIPE

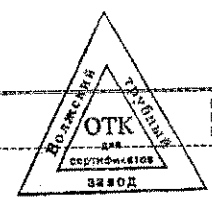
NO. 5158 P. 14

CHEMICAL COMPOSITION

C		Mn		P		S		Cu		Ni		Nb		V		Ti		Al		Fe	
min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0


ENDORSEMENT BY _____ NAME _____
 THIRD PARTY INSPECTION _____ (STAMP) SIGNATURE _____
 AGENCY _____ DATE _____

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
 TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.



MANAGER - INSPECTION _____
 VOLZHSKY PIPE PLANT
 DATE: 22.03.06

Produced by (P) GmbH
 APPROVED SIGNATURE _____
 DATE: 22.03.06



"VOLZHSKY PIPE PLANT"

OJSC

404119, Volzhsky, Volgograd region, Russia

Fax: (78443) 25-69-02

E-mail: VTZ @ SPRINT-V.com.ru

MILL TEST CERTIFICATE

MANUFACTURER: VOLZHSKY PIPE PLANT OJSC
404119, VOLZHSKY
VOLGOGRAD REGION
RUSSIA

SPEC 981/72-01/PO 05-252/PO 41037

DESCRIPTION OF GOODS:
CARBON STEEL SEAMLESS PIPES ACCORDING TO API 5L PSL2 (4RD EDITION/
YEAR 2004)X42.B/ASTM A106(2002 EDITION)GR.B/C/ASTM A53 (2002 EDITION)
GR.B/C/ASME SA 106(1998 EDITION)/ASME SA53 (1998 EDITION).
BEVELLED ENDS.
16" x 0.500" 1406.4 x 12.7 MM

CERTIFICATE # 2013 DATE OF ISSUE 21.08.2006

SIZE	HEAT TREATMENT LOT No	QUANTITY LOT No	LENGTH FEET	NET WEIGHT TONS	CHEMICAL COMPOSITION, %											TENSILE TEST				IMPACT TEST				HYDROSTATIC TEST	NOTE												
					C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Ti	Nb	Al	RES	EL	YIELD	UTS	HRC	TEMP	VALUE			TURE	MENT	DURA-TION	PRES-SURE								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
GRADE B/C/ X42 16" 0.500" (406.4 x 12.7 MM)	263318	13-1376	76	3046.81	114.996																																
API 5L PSL2 ASTM A106 ASTM A53 ASME SA-106 ASME SA-53																																					
<p>FLATTENING TEST: G</p> <p>MARKING: G</p> <p>STEEL MAKING PROCESS - ELECTRIC FURNACE</p>																																					

DESCRIPTION OF TESTS: VISUAL AND DIMENSIONS: G, BEVELING INSPECTION: G, END'S PROTECTORS: G, NONDESTRUCTIVE INSPECTION: G, COATING: G, FLATTENING TEST: G, MARKING: G, STEEL MAKING PROCESS - ELECTRIC FURNACE

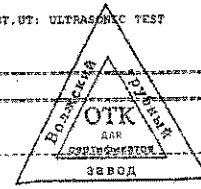
NOTES:
1: H: HEAT ANALYSIS, P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS
2: L: LOT TEST, H: HEAT TREATMENT TEST, A: ADDITION TEST, R: RECHECK TEST
3: L: LONGITUDINAL, T: TRANSVERSE
4: STRIP G: 1/2 IN. H: 3/4 IN. N: 1 IN. K: 1 1/2 IN. S: 2 IN.
5: V: 2MM V, U: 2MM U, B: 3MM B, C: 4MM C, E: 2MM E FACE NOTCH, F: 2MM F FACE NOTCH
6: F: 10x10mm, 7: 10x15mm, 8: 10x20mm, 9: 10x25mm, 10: 10x30mm, 11: 10x35mm, 12: 10x40mm
13: 5 - NOTCH 5A, 14 - NOTCH 12.5A

TOTAL: QUANTITY OF PIPES 76 PCS NET WEIGHT 114.996 T LENGTH 3046.81 T

ENDORSEMENT BY: [Signature] NAME: [Name] (THE COMPANY) TEST PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED AND TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.

THIRD PARTY INSPECTOR: [Signature] SIGNATURE: [Signature] DATE: [Date]

AGENCY: [Signature] NAME: [Name]



MANAGER - INSPECTION
VOLZHSKY PIPE PLANT
DATE: 21.08.06

MAR 15 2007 8:37AM VASS PIPE NO. 5158 P. 15

CHEMICAL COMPOSITION, %

Element	Min	Max	Element	Min	Max	Element	Min	Max
C	100	100	Si	0	0.35	P	0	0.015
Mn	0	0.035	S	0	0.008	Fe	0	0.008
N	0	0.008	Al	0	0.01			
As	0	0.005						
Sb	0	0.005						
Bi	0	0.005						
Pb	0	0.005						
Sn	0	0.005						
Cu	0	0.005						
Zn	0	0.005						
Co	0	0.005						
Ni	0	0.005						
Mo	0	0.005						
W	0	0.005						
B	0	0.005						
Se	0	0.005						
Te	0	0.005						
Pb	0	0.005						
Bi	0	0.005						
Sb	0	0.005						
As	0	0.005						
Sn	0	0.005						
Cu	0	0.005						
Zn	0	0.005						
Co	0	0.005						
Ni	0	0.005						
Mo	0	0.005						
W	0	0.005						
B	0	0.005						
Se	0	0.005						
Te	0	0.005						

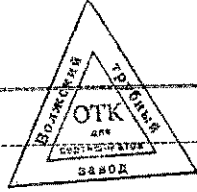
ENDORSEMENT BY
THIRD PARTY INSPECTION AGENCY

(STAMP)

NAME
SIGNATURE
DATE

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.

Industrielle Werke (D) GmbH
 REG. NO. 12345
 REG. DATE 15.08.06
 SIGNATURE
 DATE



MANAGER - INSPECTION
VOLZHSKY PIPE PLANT
DATE: 22.08.06

[Handwritten Signature]

MAR 15 2007 8:38AM VASS PIPE

NO. 5158 P. 16

MAR. 15. 2007 8:41AM

VASS PIPE

NO. 5158 P. 20

CHEMICAL COMPOSITION

Element	Symbol	Value	Unit	Symbol	Value	Unit	Symbol	Value	Unit
Carbon	C	100	%	Carbon	C	100	%	Carbon	C
Manganese	Mn	15	%	Manganese	Mn	15	%	Manganese	Mn
Phosphorus	P	0.010	%	Phosphorus	P	0.010	%	Phosphorus	P
Sulfur	S	0.010	%	Sulfur	S	0.010	%	Sulfur	S
Iron	Fe	100	%	Iron	Fe	100	%	Iron	Fe

ENDORSEMENT BY _____
 THIRD PARTY INSPECTION (STAMP) _____
 AGENCY _____

WE CONFIRM THAT PIPES COVERED BY THIS CERTIFICATE ARE MANUFACTURED
 TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION.

SIGNATURE _____
 DATE _____



MANAGER - INSPECTION
 VOLERSKY PIPE PLANT
 DATE: 11.01.06. *[Signature]*

Inspection Value (D) Grid

[Signature]
 11.01.06

Monitor Well DZMW-1

6.625-inch Casing



MWH

DZMW-1 CASING TALLY

Casing Diameter: 6.625 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	1,314.32
Floor + Elevators (feet bls)	-4.20
Casing Seat (feet bls)	1310.12

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length (feet)	Run Depth (feet)	Time of Threading Completion	Date
1	110000065	300000281	29.45	29.45	25.25	10:45	11/4/2007
2	110000065	300000281	29.47	58.92	54.72	10:48	11/4/2007
3	110000065	300000281	29.47	88.39	84.19	10:51	11/4/2007
4	110000065	300000281	29.45	117.84	113.64	10:53	11/4/2007
5	110000065	300000281	29.48	147.32	143.12	10:57	11/4/2007
6	110000065	300000281	29.47	176.79	172.59	10:59	11/4/2007
7	110000065	300000281	29.47	206.26	202.06	11:02	11/4/2007
8	110000065	300000281	29.47	235.73	231.53	11:05	11/4/2007
9	110000065	300000281	29.47	265.20	261.00	11:09	11/4/2007
10	110000065	300000281	29.49	294.69	290.49	11:12	11/4/2007
11	110000065	300000281	29.49	324.18	319.98	11:16	11/4/2007
12	110000065	300000281	29.48	353.66	349.46	11:19	11/4/2007
13	110000065	300000281	29.50	383.16	378.96	11:23	11/4/2007
14	110000065	300000281	29.50	412.66	408.46	11:26	11/4/2007
15	110000065	300000281	29.47	442.13	437.93	11:30	11/4/2007
16	110000065	300000281	29.47	471.60	467.40	11:33	11/4/2007
17	110000065	300000281	29.47	501.07	496.87	11:37	11/4/2007
18	110000065	300000281	29.50	530.57	526.37	11:40	11/4/2007
19	110000065	300000281	29.50	560.07	555.87	11:44	11/4/2007



MWH

DZMW-1 CASING TALLY

Casing Diameter: 6.625 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	1,314.32
Floor + Elevators (feet bls)	-4.20
Casing Seat (feet bls)	1310.12

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length (feet)	Run Depth (feet)	Time of Threading Completion	Date
20	110000065	300000281	29.50	589.57	585.37	11:47	11/4/2007
21	110000065	300000281	29.50	619.07	614.87	11:51	11/4/2007
22	110000065	300000281	29.47	648.54	644.34	11:54	11/4/2007
23	110000065	300000281	29.48	678.02	673.82	11:58	11/4/2007
24	110000065	300000281	29.47	707.49	703.29	12:00	11/4/2007
25	110000065	300000281	29.47	736.96	732.76	12:03	11/4/2007
26	110000065	300000281	29.48	766.44	762.24	12:07	11/4/2007
27	110000065	300000281	29.47	795.91	791.71	12:10	11/4/2007
28	110000065	300000281	29.48	825.39	821.19	12:14	11/4/2007
29	110000065	300000281	29.47	854.86	850.66	12:17	11/4/2007
30	110000065	300000281	29.50	884.36	880.16	12:21	11/4/2007
31	110000065	300000281	29.47	913.83	909.63	12:24	11/4/2007
32	110000065	300000281	29.47	943.30	939.10	12:28	11/4/2007
33	110000065	300000281	29.50	972.80	968.60	12:31	11/4/2007
34	110000065	300000281	29.51	1,002.31	998.11	12:35	11/4/2007
35	110000065	300000281	29.51	1,031.82	1,027.62	12:38	11/4/2007
36	110000065	300000281	29.51	1,061.33	1,057.13	12:42	11/4/2007
37	110000065	300000281	29.51	1,090.84	1,086.64	12:45	11/4/2007
38	110000065	300000281	29.51	1,120.35	1,116.15	12:49	11/4/2007



MWH

DZMW-1 CASING TALLY

Casing Diameter: 6.625 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

Total Length (feet)	1,314.32
Floor + Elevators (feet bls)	-4.20
Casing Seat (feet bls)	1310.12

FRP Run Number	FRP Serial Number	Coupling Number	Length (feet)	Cumulative Length (feet)	Run Depth (feet)	Time of Threading Completion	Date
39	110000065	300000281	29.51	1,149.86	1,145.66	12:52	11/4/2007
40	110000065	300000281	29.50	1,179.36	1,175.16	12:56	11/4/2007
41	110000065	300000281	29.50	1,208.86	1,204.66	12:59	11/4/2007
42	110000065	300000281	29.50	1,238.36	1,234.16	13:03	11/4/2007
43	110000065	300000281	29.50	1,267.86	1,263.66	13:06	11/4/2007
44	110000065	300000281	29.50	1,297.36	1,293.16	13:10	11/4/2007
45		stainless steel	16.96	1,314.32	1,310.12	13:13	11/4/2007



FUTURE PIPE INDUSTRIES, INC.

RED BOX 1250

FIBERGLASS TUBING, CASING, AND LINERS
AROMATIC AMINE CURED EPOXY RESIN

Maximum service temperature is 212° F (100 ° C) **

DIMENSIONAL SPECIFICATIONS

February 2005

Nominal Size (inches)	Nominal I.D. (inches)	Minimum Drift Dia (inches)	Nominal O.D. (inches)	Nominal Wall (inches)	Pin Upset O.D. (inches)	Max Box OD* (inches)	Nominal Weight		Connection Type API 5B, Table 14*, 7** .6*** Fourteenth Edition August 96
							(lbs/ft)	(lbs/ft)	
2-3/8	2.00	1.91	2.21	0.10	2.69	3.45	0.7	21	2-3/8" 8Rd EUE Long*IJ
2-7/8	2.47	2.37	2.73	0.13	3.19	3.95	1.0	31	2-7/8" 8Rd EUE Long*IJ
3-1/2	3.00	2.90	3.30	0.15	3.85	4.84	1.5	44	3-1/2" 8Rd EUE Long*IJ
4	3.33	3.24	3.68	0.17	4.35	5.17	2.0	61	4" 8Rd EUE Long* TC
4-1/2	3.98	3.89	4.40	0.21	4.85	5.77	2.5	76	4-1/2" 8Rd EUE Long*IJ
5-1/2	4.42	4.33	4.87	0.23	5.60	6.70	3.2	97	5-1/2" 8Rd Csg Long**IJ
6-5/8	5.43	5.33	5.97	0.27	6.73	7.98	4.8	144	6-5/8" 8Rd Csg Long**IJ
7	6.21	6.11	6.83	0.31	7.10	8.61	5.8	173	7" 8Rd Csg Long**IJ
7-5/8	6.21	6.11	6.83	0.31	7.73	9.35	6.4	192	7-5/8" 8Rd Csg Long**IJ
9-5/8	7.84	7.75	8.63	0.40	9.73	11.81	10.3	309	9-5/8" 8Rd Csg*** IJ
10-3/4	8.85	8.76	9.76	0.45	10.85	13.12	13.1	394	10-3/4" 8Rd Csg***IJ
11-3/4	10.72	10.62	11.70	0.49	11.93	14.00	16.4	491	11-3/4" 8/6Rd Csg***TC
13-3/8	11.97	11.87	13.06	0.55	13.55	15.20	20.7	621	13-3/8" 8/6Rd Csg***TC
16	14.48	14.39	15.80	0.66	16.23	18.65	30.0	900	16" 6Rd Csg TC
18	16.60	16.50	18.11	0.76	18.74	22.30	40.8	1,223	18" 6Rd Csg TC
20	17.98	17.89	19.62	0.82	20.10	24.00	46.9	1,406	20" 6Rd Csg TC

*Depending on the application, smaller maximum box diameters are available.

Thread lengths may exceed API L4

PERFORMANCE AND RATINGS (-60 deg F to +150 deg F **)

30 ft Standard Joint Length

Nominal Size	Internal Pressure Rating (psi)	Mill Test Pressure (psi)	Collapse Rating (psi)	Axial Tension Rating (lbs)	Stretch vs Tension-Over-Pipe-Wt Stretch (ft) = Coeff. x P x L
2-3/8	1,250	1,570	640	10,500	0.467
2-7/8	1,250	1,570	670	16,000	0.295
3-1/2	1,250	1,570	600	22,500	0.221
4	1,250	1,570	640	29,000	0.169
4-1/2	1,250	1,570	640	41,000	0.118
5-1/2	1,250	1,570	600	49,500	0.101
6-5/8	1,250	1,570	590	72,500	0.069
7	1,250	1,570	590	76,500	0.052
7-5/8	1,250	1,570	590	86,500	0.052
9-5/8	1,250	1,570	580	140,500	0.033
10-3/4	1,250	1,570	600	161,500	0.025
11-3/4	1,250	1,570	450	103,500	0.029
13-3/8	1,250	1,570	450	129,000	0.023
16	1,250	1,570	450	167,000	0.016
18	1,250	1,570	450	194,000	0.012
20	1,250	1,570	450	208,000	0.010

Where: P = Tensile Load (1,000 lbs)

L = String Length (1,000 ft)

MECHANICAL & PHYSICAL PROPERTIES

TUBING/CASING BODY PROPERTIES	UNIT	VALUE		TEST METHOD
		2-3/8 - 10-3/4	11-3/4 - 20	
Tensile Strength, Hoop	psi	31,300	31,300	ASTM D1599
Tensile Strength, Axial	psi	30,000	12,000	ASTM D2105
Modulus of Elasticity, Axial	10E+06 psi	3.0	2.0	ASTM D2105
Specific Gravity	---	1.9	1.9	ASTM D792
Density	lbs/in ³	0.07	0.07	ASTM D792
Thermal Conductivity	Btu/hr/ft ² /in/degF	2.4	2.4	ASTM C177
Thermal Expansion Coefficient (Linear)	10E-05in/in/degF	1.1	1.2	ASTM D696
Flow Factor	---	150	150	Hazen Williams

** De-rating required for service temperatures above 150° F (65 ° C) - Maximum service temperature is 212° F (100 ° C)



RED BOX CASING & TUBING SYSTEM



YELLOW BOX LINE PIPE SYSTEM

Appendix M

Cement Reports

Injection Well IW-2

42-inch Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL IW-2

Surface Casing

Casing Diameter: 42-inches
Casing Depth: 584 feet below pad level
Bit Size: Nominal 52-inch diameter
Cement Specification: ASTM C 150 Type II
Number of Stages: 1
Cement Blend: Neat
 6% Bentonite

Cement Density: Neat – 15.6 lb/gal
 6% Bentonite – 13.6

Theoretical Fill From Caliper Log: 3,545 cubic feet
Volume Pumped: Neat – 1,778 cubic feet
 6% Bentonite – 1,391

 Total – 3,169 cubic feet

Percent Difference: -10.4%

The 52-inch casing was cemented in one stage. The cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to small barrel counter inconsistency, mathematical inaccuracy and small irregularities in the borehole wall.



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 42-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED		THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					(barrels)	(FT ³)	INTERVAL	FOOTAGE		INTERVAL	FOOTAGE					
2/7/07	1A	none	6%		317	1,778.4	590 to 294	296							1,778.4	RAW
2/7/07	1B	none	Neat		248	1,391.3	294 to 0	294	0.0	294 to 0	590	100%	3169.7	100.0%	3,169.7	RAW

Injection Well IW-2

34-inch Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL IW-2

Intermediate Casing

Casing Diameter: 34-inches
Casing Depth: 1,395 feet below pad level
Bit Size: Nominal 40.5-inch diameter
Cement Specification: ASTM C 150 Type II
Number of Stages: 10
Cement Blend: Neat
 6% Bentonite

Cement Density: Neat – 15.6 lb/gal
 6% Bentonite – 13.6 lb/gal

Theoretical Fill From Caliper Log: 4,300 cubic feet

Volume Pumped: Neat – 645 cubic feet
 6% Bentonite – 4,763 cubic feet
 Total – 5,408 cubic feet

Percent Difference: +26%

The 34-inch casing was cemented in ten stages. After each stage a temperature log was conducted and the cement physically tagged to determine the actual fill. On the final stage the cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to caliper tool's limitations, permeable horizons, and small irregularities in the borehole wall.



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 34-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					INTERVAL	FOOTAGE		INTERVAL	FOOTAGE			
3/5/07	1	Neat	1.18	645.2	1,410 to 1,180	230	1,318.0	1,410 to 1,318	92	40%	645.2	RAW
3/6/07	2	Neat	1.18	252.5	1,318 to 1,235	83	1,285.0	1,318 to 1,285	33	40%	897.7	MS
3/6/07	3	Neat	1.18	420.8	1,285 to 1,147	138	1,170	1,285 to 1,170	115	83%	1,318.5	MS
3/7/07	4	6% Gel	2.2	398.3	1,170 to 1,035	135	1,019	1,170 to 1,019	151	112%	1,716.8	RAW
3/7/07	5	6% Gel	2.2	785.4	1,019 to 750	269	790	1,019 to 790	229	85%	2,502.2	CLM
3/8/07	6	6% Gel	2.2	437.6	790 to 670	120	646	790 to 646	144	120%	2,939.7	MK
3/8/07	7	6% Gel	2.2	701.3	646 to 534	112	602	646 to 602	44	39%	3,641.0	CLM



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 34-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					INTERVAL	FOOTAGE		INTERVAL	FOOTAGE			
3/8/07	8	6% Gel	2.2	420.8	602 to 556	46	512.0	602 to 512	90	196%	4,061.7	MK
3/9/07	9	6% Gel	2.2	1,065.9	512 to 138	374	90	512 to 90	422	113%	5,127.6	CLM
3/10/07	10	6% Gel	2.2	280.5	138 to 0	138	2	90 to 2	88	64%	5,408.1	CLM

Injection Well IW-2

22-inch Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL IW-2

Final Casing

Casing Diameter: 22-inches
Casing Depth: 2,063 feet below pad level
Bit Size: Nominal 32-inch diameter
Cement Specification: ASTM C 150 Type II
Number of Stages: 43

Cement Blend: Neat
 12% Bentonite

Cement Density: Neat – 15.6 lb/gal
 12% Bentonite – 12.7 lb/gal

Theoretical Fill From Caliper Log: 10,631 cubic feet

Volume Pumped: Neat – 2,132 cubic feet
 12% Bentonite – 13,431 cubic feet
 Gravel (not included in total) – 40,660 cubic feet

Total – 15,563 cubic feet

Percent Difference: +46%

The 22-inch casing was cemented in forty three stages. After each stage a temperature log was conducted and the cement physically tagged to determine the actual fill. Gravel was placed over the intervals of 1,847 to 1,816, 1,815 to 1,794, 1,756 to 1,749, 1,748 to 1,732, 1,638 to 1,610 and 1,597 to 1,579 feet below land surface. On the final stage the cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to caliper tool's limitations, permeable horizons, and small irregularities in the borehole wall.



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 22-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED		THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					(barrels)	(FT ³)	INTERVAL	FOOTAGE		INTERVAL	FOOTAGE					
8/4/07	1		Neat	1.18	20	112.2	2,065 to 2,045	20	2,065.0	2,065 to 2,065	0	0%			112.2	MSK
8/5/07	2	1	Neat	1.18	20	112.2	2,065 to 2,045	20	2,069.0	2,055 to 2,055	0	0%	0.0	0.0%	224.4	RAW
Picked up and reset 22" casing (Cumulative total of cement of previous stages not included in total)																
8/8/07	3	2	Neat	1.18	15	84.2	2,056 to 2,045	11	2,040	2,056 to 2,040	16	145%	145.9	173%	84.2	MSK
8/8/07	4	3	Neat	1.18	15	84.2	2,040 to 2,020	20	2,019	2,040 to 2,019	21	105%	87.5	104%	168.4	RAW
8/8/07	5	4	Neat	1.18	60	336.6	2,019 to 1,961	58	1,970	2,019 to 1,970	49	84%	215.4	64%	505.0	RAW
8/8/07	6	5	Neat	1.18	60	336.6	1,970 to 1,922	48	1,895*	1,970 to 1,895	75	156%	426.4	127%	841.6	CLM
8/9/07	7	6	Neat	1.18	120	673.2	1,895 to 1,840	55	1,895	1,895 to 1,895	0	0%	0.0	0%	1,514.8	RAW
8/9/07	8	7	Neat	1.18	50	280.5	1,895 to 1,869	26	1,882	1895 to 1882	13	50%	117.8	42%	1,795.3	CLM
8/10/07	9	8	Neat	1.18	60	336.6	1,882 to 1,856	26	1,855	1,882 to 1,855	27	104%	345.0	103%	2,131.9	RAW
8/10/07	10	9	12%	2.2	55	308.6	1,855 to 1,833	22	1,847	1,855 to 1,847	8	36%	207.6	67%	2,440.5	RAW
8/11/07 - 8/13/07	11		Gravel**		569	3192.8	1,847 to 1,526	321	1,816	1,847 to 1,816	31	10%	333.8	10%	Not included in total	RAW/CLM



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 22-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (barrels) (FT ³)		THEORETICAL FILL INTERVAL FOOTAGE		TAG DEPTH PAD LEVEL	ACTUAL FILL INTERVAL FOOTAGE		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
8/13/07	12	10	Neat	1.18	20	112.2	1,816 to 1,808	8	1,815	1,816 to 1,815	1	13%	14.0	13%	2,552.7	RAW
8/13/07 to 8/14/07	13		Gravel**		79	445.5	1,815 to 1,782	33	1,794	1,815 to 1,794	21	64%	279.9	63%	Not included in total	CLM
8/14/07	14	11	12%	2.2	50	280.5	1,794 to 1,774	20	1,777	1,794 to 1,777	17	85%	234.5	84%	2,833.2	RAW
8/14/07	15	12	12%	2.2	100	561.0	1,777 to 1,737	40	1,776	1,777 to 1,776	1	3%	13.5	2%	3,394.2	RAW
8/15/07	16	13	12%	2.2	40	224.4	1,776 to 1,760	16	1,763	1,776 to 1,763	13	81%	179.0	80%	3,618.6	ABF
8/15/07	17	14	12%	2.2	50	280.5	1,763 to 1,741	22	1,758	1,763 to 1,758	5	23%	70.1	25%	3,899.1	ABF
8/16/07	18	15	12%	2.2	50	280.5	1,758 to 1,738	20	1,756	1,758 to 1,756	2	10%	28.1	10%	4,179.6	ABF
8/16/07 - 8/19/07			Gravel**		1337	7,499.3	1,756 to 1,175	581	1,749	1756 to 1749	7	1%	98.2	1%	Not included in total	MK/ABF
8/19/07	19	16	12%	2.2	50	280.5	1,749 to 1,731	18	1,748	1749 to 1748	1	6%	14.0	5%	4,460.1	MSK
8/19/07 to 8/20/07			Gravel**		46	259.9	1,748 to 1,729	19	1,732	1748 to 1732	16	84%	224.4	86%	4,720.0	MSK
8/20/07	20	17	12%	2.2	50	280.5	1,732 to 1,693	39	1,719	1732 to 1719	13	33%	124.5	44%	5,000.5	MSK



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 22-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (barrels) (FT ³)		THEORETICAL FILL INTERVAL FOOTAGE		TAG DEPTH PAD LEVEL	ACTUAL FILL INTERVAL FOOTAGE		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
8/20/07	21	18	12%	2.2	50	280.5	1,719 to 1,674	45	1,699	1,719 to 1,699	20	44%	112.2	40%	5,281.0	MSK
8/20/07	22	19	12%	2.2	50	280.5	1,699 to 1,662	37	1,680	1,699 to 1,680	19	51%	116.7	42%	5,561.5	DK
8/21/07	23	20	12%	2.2	75	420.8	1,680 to 1,624	56	1,667	1,680 to 1,667	13	23%	111.1	26%	5,982.2	MSK
8/21/07	24	21	12%	2.2	50	280.5	1,667 to 1,629	38	1,650	1,667 to 1,650	17	45%	158.2	56%	6,262.7	MSK
8/21/07	25	22	12%	2.2	50	280.5	1,650 to 1,598	52	1,650	1,650 to 1,650	0	0%	0	0%	6,543.2	DK
8/22/07	26	23	12%	2.2	50	280.5	1,650 to 1,598	52	1,650	1,650 to 1,650	0	0%	0	0%	6,823.7	DK
8/22/07	27	24	12%	2.2	50	280.5	1,650 to 1,598	52	1,638	1,650 to 1,638	12	23%	81.9	29%	7,104.2	CLM
8/22/07			Gravel**		53	297.0	1,638 to 1,588	50	1,610	1,638 to 1,610	28	56%	198.6	67%	Not included in total	CLM
8/23/07	28	24	12%	2.2	50	280.5	1,610 to 1,575	35	1,598	1,610 to 1,598	12	34%	50.5	18%	7,384.7	MSK
8/23/07	29	25	12%	2.2	50	280.5	1,598 to 1,563	35	1,597	1,598 to 1,597	1	3%	8.4	3%	7,665.2	CLM
8/23/07			Gravel***		31	174.2	1,597 to 1,581	16	1,579	1,597 to 1,579	18	113%	199.2	114%	Not included in total	CLM



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 22-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (barrels) (FT ³)		THEORETICAL FILL INTERVAL FOOTAGE		TAG DEPTH PAD LEVEL	ACTUAL FILL INTERVAL FOOTAGE		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
8/23/07	30	26	12%	2.2	50	280.5	1,579 to 1,540	39	1,578	1579 to 1578	1	3%	5.6	2%	7,945.7	MSK
8/24/07	31	27	12%	2.2	50	280.5	1,578 to 1,538	40	1,558	1,578 to 1,558	20	50%	103.2	37%	8,226.2	MSK
8/24/07	32	28	12%	2.2	50	280.5	1,558 to 1,532	26	1,547	1,558 to 1,547	11	42%	115.6	41%	8,506.7	CLM
8/24/07	33	29	12%	2.2	50	280.5	1,547 to 1,517	30	1,523	1,547 to 1,523	24	80%	222.2	79%	8,787.2	CLM
8/25/07	34	30	12%	2.2	100	561.0	1,523 to 1,470	53	1,493	1,523 to 1,493	30	57%	355.7	63%	9,348.2	ABF
8/25/07	35	31	12%	2.2	100	561.0	1,493 to 1,440	53	1,415	1,493 to 1,415	78	147%	788.2	141%	9,909.2	CLM
8/25/07	36	32	12%	2.2	80	448.8	1,415 to 1,320	95	1,349	1,415 to 1,349	66	69%	348.9	78%	10,358.0	ABF
8/26/07	37	33	12%	2.2	150	841.5	1,349 to 1,102	247	1,110	1,349 to 1,110	239	97%	812.6	97%	11,199.5	CLM

Injection Well IW-2

16-inch casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL IW-2

FRP Tubing

Casing Diameter: 16-inches

Casing Depth: 2,094 feet below pad level

Final Casing I.D. 21 inches

Cement Specification: ASTM C 150 Type II

Number of Stages: 6

Cement Blend: Neat with Adava-140M
 6% Bentonite with Adava-140M

Cement Density: Neat with Adava-140M – 15.6 lb/gal
 12% Bentonite with Adava-140M – 12.3 lb.gal

Theoretical Fill From Calculations: 2,052 cubic feet

Volume Pumped: Neat with Adava-140M – 264 cubic feet
 12% Bentonite with Adava-140M – 1,722 cubic feet
 Total – 1,986 cubic feet

Percent Difference: -3%

The 16-inch FRP tubing was cemented in six stages. After each stage a temperature log was conducted and the cement physically tagged to determine the actual fill. The cement was circulated to surface and was visually confirmed. On the final stage the cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to irregular diameters of the FRP tubing and connecting collars..



IW-2 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 16-inch FRP tubing

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	M	N	O	P		
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED		THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT ³)	PERCENT FILLED (VOLUMETRIC) (FT ³)	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					(barrels)	(FT ³)	INTERVAL	FOOTAGE		INTERVAL	FOOTAGE					
9/11/07	0	1	Neat w/ 3 gallons of Adva-140M		3	16.8	2,053 to 2,036	17	2,042.0	2,053 to 2,042	11	65%	11.1	65.9%	16.8	CLM
9/12/07	1	2	Neat w/ 40 gallons of Adva-140M		44	246.8	2,042 to 1,801	241	1,815.0	2,042 to 1,815	227	94%	229.0	92.8%	263.7	RAW
9/12/07	2	3	6% w/ 50 gallons of Adva-140M		71	398.3	1,815 to 1,426	389	1,455	1,815 to 1,455	360	93%	363.2	91.2%	398.3	RAW
9/13/07	3	4	6% w/ 62 gallons of Adva-140M		89	499.3	1,455 to 969	486	998	1,455 to 998	457	94%	461.1	92.4%	897.6	RAW
9/13/07	4	5	6% w/ 62 gallons of Adva-140M		89	499.3	998 to 512	486	534	998 to 534	464	95%	468.2	94%	1,396.9	RAW
9/14/07	5		6% w/ 62 gallons of Adva-140M		105	589.1	534 to 0	534	0	534 to 0	534	100%	538.8	91%	1,985.9	RAW



DZMW-1 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 24-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					INTERVAL	FOOTAGE		INTERVAL	FOOTAGE			
3/15/07	1	66 barrels 6% 26 barrels neat	1.18/2.2	516.1	480 to 330	150	295.0	480 to 295	185	123%	516.1	RAW
3/15/07	2	6%	2.2	504.9	295 to 95	200	0.0	295 to 0	295	148%	1,021.0	MS

Monitor Well DZMW-1

24-inch Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL DZMW-1

Surface Casing

Casing Diameter: 24-inches

Casing Depth: 474 feet below pad level

Bit Size: Nominal 28.5-inch diameter

Cement Specification: ASTM C 150 Type II

Number of Stages: 2

Cement Blend: Neat
 6% Bentonite

Cement Density: Neat – 15.6 lb/gal
 6% Bentonite – 13.6 lb/gal

Theoretical Fill From Caliper Log: 1,100 cubic feet

Volume Pumped: Neat – 145 cubic feet
 6% Bentonite – 876 cubic feet
 Total – 1,021 cubic feet

Percent Difference: -7%

The 4-inch casing was cemented in two stages. After the first stage a temperature log was conducted and the cement physically tagged to determine the actual fill. On the final stage the cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to caliper tool's limitations and small irregularities in the borehole wall.



DZMW-1 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 24-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL INTERVAL FOOTAGE		TAG DEPTH PAD LEVEL	ACTUAL FILL INTERVAL FOOTAGE		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
3/15/07	1	66 barrels 6% 26 barrels neat	1.18/2.2	516.1	480 to 330	150	295.0	480 to 295	185	123%	516.1	RAW
3/15/07	2	6%	2.2	504.9	295 to 95	200	0.0	295 to 0	295	148%	1,021.0	MS

Monitor Well DZMW-1

16-inch Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL DZMW-1

Intermediate Casing

Casing Diameter: 16-inches

Casing Depth: 1,090 feet below pad level

Bit Size: Nominal 22.5-inch diameter

Cement Specification: ASTM C 150 Type II

Number of Stages: 10

Cement Blend: Neat
 6% Bentonite
 12% Bentonite

Cement Density: Neat – 15.6 lb./gal
 6% Bentonite – 13.7 lb./gal
 12% Bentonite – 12.7 lb./gal

Theoretical Fill From Caliper Log: 1,986 cubic feet

Volume Pumped: Neat – 1,352 cubic feet
 6% Bentonite – 734 cubic feet
 12% Bentonite – 589 cubic feet
 Total – 2,675 cubic feet

Percent Difference: +26%

The 16-inch casing was cemented in six stages. After each stage a temperature log was conducted and the cement physically tagged to determine the actual fill. On the final stage the cement was circulated to surface and was visually confirmed. The difference in the theoretical and actual volume pumped is due to caliper tool's limitations, permeable horizons and small irregularities in the borehole wall.



DZMW-1 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 16-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					INTERVAL	FOOTAGE		INTERVAL	FOOTAGE			
5/17/07	1	Neat	1.18	448.8	825 to 1,090	265	926.0	926 to 1,090	164	62%	448.8	CLM
5/18/07	2	Neat	1.18	168.3	825 to 926	101	826.0	826 to 926	100	99%	617.1	CLM
5/18/07	3	Neat	1.18	168.3	750 to 825	75	772	772 to 826	54	72%	785.4	CLM
5/18/07	4	Neat	1.18	173.9	680 to 772	92	687	687 to 772	85	92%	959.3	CLM
5/18/07	5	Neat	1.18	168.3	618 to 687	69	658	658 to 687	29	42%	1,127.6	CLM
5/19/07	6	Neat	1.18	224.4	560 to 658	98	614	614 to 658	44	45%	1,352.0	CLM
5/19/07	7	Neat	1.18	168.3	560 to 614	54	595	595 to 614	19	35%	1,520.3	CLM



MWH

DZMW-1 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 16-inch

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL INTERVAL FOOTAGE		TAG DEPTH PAD LEVEL	ACTUAL FILL INTERVAL FOOTAGE		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
5/19/07	8	6% Gel		342.2	475 to 595	120	537.0	537 to 595	58	48%	1,862.5	CLM
5/20/07	9	6% Gel		224.4	420 to 537	117	466	466 to 537	71	61%	2,086.9	CLM
5/20/07	10	12% Gel		589.1	surface to 466	466	8	8 to 466	458	98%	2,676.0	CLM

Monitor Well DZMW-1

6⁵/₈-inch FRP Casing

APPENDIX M
CEMENT REPORTS
CITY OF CAPE CORAL
NORTH ROWTP & WRF
INJECTION WELL DZMW-1

FRP Tubing

Casing Diameter: 6.625-inches
Casing Depth: 1,317 feet below pad level
Bit Size: Nominal 14.75-inch diameter
Cement Specification: ASTM C 150 Type II
Number of Stages: 3
Cement Blend: Neat

Cement Density: Neat – 15.7 lb/gal

Theoretical Fill From Caliper Log: 415 cubic feet

Volume Pumped: Neat – 450 cubic feet
Total – 450 cubic feet

Percent Difference: +8%

The 6.625-inch FRP tubing was cemented in three stages. After each stage a temperature log was performed and the cement physically tagged to determine the actual fill. The difference in the theoretical and actual volume pumped is due to caliper tool's limitations and small irregularities in the borehole wall.



DZMW-1 CEMENTING RECORD

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 6.625-inch FRP

ATTACH ALL CALCULATION SHEETS

A	B	C	D	E	F	G	H	I	J	K	L	M
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT ³ /SK)	QUANTITY PUMPED (FT ³)	THEORETICAL FILL		TAG DEPTH PAD LEVEL	ACTUAL FILL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT ³)	INSPECTOR'S INITIALS
					INTERVAL	FOOTAGE		INTERVAL	FOOTAGE			
11/4/07	S-1	Neat	1.18	8.4	1,308 to 1,317	9	1,317	1,317 to 1,317	0	0%	8.4	CLM
11/5/07	S-2	Neat	1.18	9.0	1,307 to 1,317	10	1,277	1,277 to 1,300	23	230%	17.4	JL
11/5/07	1	Neat	1.18	258.1	1,170 to 1,277	107	1,193	1,193 to 1,277	84	79%	275.5	JL
11/5/07	2	Neat	1.18	140.3	1,150 to 1,193	43	1,167	1,167 to 1,193	26	60%	415.8	JL
11/6/07	3	Neat	1.18	33.7	1,150 to 1,167	17	1,153	1,153 to 1,167	14	82%	449.5	JL

Appendix N

Casing and Tubing Pressure Tests

Injection Well IW-2

**Casing and Tubing Pressure Tests and Test Gauge
Calibration Certifications**

Injection Well IW-2

22-inch Casing Pressure Test



MWH

IW-2 PRESSURE TEST DATA

DATE(S): 9/7/2007**NORTH CAPE DEEP INJECTION WELL SYSTEM**JOB NUMBER: 3220246.77010102CONTRACTOR: Youngquist Brothers, Inc.PROJECT MGR: Neil JohnsonOWNER: City of Cape Coral**DESCRIPTION OF OPERATIONS:**Pressure test 22-inch steel casing
CL set at 2,039' bpl. (brothers)START TIME: 1255

INITIAL PRESSURE:

152.2 psiFINISH TIME: 1355

GAGE SERIAL NUMBER:

021604-01CASING SIZE: 22-inch

CALCULATED WATER VOLUME:

26.1 GALLONS

OBSERVED WATER VOLUME:

TIME	TOTAL MINUTES	Pressure (psi)	COMMENTS
1255	0	152.2	Witnessed by FDEP
1256	1	152.2	Terry Thomas (MWH)
1257	2	152.2	also witnessed test.
1258	3	152.2	
1259	4	152.2	
1300	5	152.2	
1301	6	152.2	
1302	7	152.2	
1303	8	152.2	
1304	9	152.2	
1305	10	152.0	
1306	11	152.0	
1307	12	152.0	
1308	13	152.0	
1309	14	152.0	
1310	15	152.0	
1311	16	152.0	
1312	17	152.0	
1313	18	152.0	
1314	19	152.0	
1315	20	152.0	
1316	21	152.0	
1317	22	152.0	
1318	23	152.0	
1319	24	152.0	
1320	25	152.0	
1321	26	152.0	
1322	27	152.0	



MWH

IW-2 PRESSURE TEST DATA

DATE(S): 9/7/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF OPERATIONS:

Pressure test 22-inch steel casing
CL set at 2,039' bpl.

START TIME: 12:55

FINISH TIME: 13:55

CASING SIZE: 22-inch

INITIAL PRESSURE:

152.2 psi

GAGE SERIAL NUMBER:

021604-01

CALCULATED WATER VOLUME:

26.1 GALLONS

OBSERVED WATER VOLUME:

TIME	TOTAL MINUTES	Pressure (psi)	COMMENTS
1323	28	152.0	
1324	29	152.0	
1325	30	152.0	
1326	31	152.0	
1327	32	152.0	
1328	33	152.0	
1329	34	152.0	
1330	35	152.0	
1331	36	152.0	
1332	37	152.0	
1333	38	152.0	
1334	39	152.0	
1335	40	151.8	
1336	41	151.8	
1337	42	151.8	
1338	43	151.8	
1339	44	151.8	
1340	45	151.8	
1341	46	151.8	
1342	47	151.8	
1343	48	151.8	
1344	49	151.8	
1345	50	151.8	
1346	51	151.8	
1347	52	151.8	
1348	53	151.8	
1349	54	151.8	
1350	55	151.8	



MWH

IW-2 PRESSURE TEST DATA

DATE(S): 9/7/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102
 CONTRACTOR: Youngquist Brothers, Inc.
 PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF OPERATIONS: Pressure test 22-inch steel casing
CL set at 2,039' bpl.

START TIME: 12:55
 FINISH TIME: 13:50
 CASING SIZE: 22-inch

INITIAL PRESSURE: 152.2 psi
 GAGE SERIAL NUMBER: 021604-01
 CALCULATED WATER VOLUME: 26.1 GALLONS
 OBSERVED WATER VOLUME:

TIME	TOTAL MINUTES	Pressure (psi)	COMMENTS
1351	56	151.8	
1352	57	151.8	
1353	58	151.8	
1354	59	151.7	
1355	60	151.7	

PRESSURE BLEED-OFF			
TIME	PRESSURE	VOLUME OF WATER COLLECTED (GAL)	CUMULATIVE VOLUME (GAL)
1357	151.7	0	0
1358	122.0	5	5
1400	92	5	10
1401	64	5	15
1403	35	5	20
1408	0.0	5.5	25.5

Witnessed By: David Rhodes
 FDEP Representative

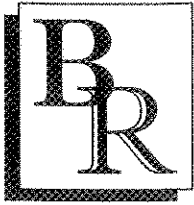
Neil Johnson
 MWH Representative

Clay Ferguson
 YBI Representative

David Rhodes 9/7/07

Neil Johnson 9/7/07

Clay Ferguson



**BLUE
RIBBON**

Blue Ribbon Sales & Services
1940 Howell Branch Rd.
Winter Park, FL 32792

Phone: (877) 677-8899
Fax: (407) 657-6622
www.blueribboncorp.com

CALIBRATION CERTIFICATE

8/06/07

Youngquist Brothers, Inc
15465 Pine Ridge Rd.
Fort Myers, FL 33908

P.O. 25330

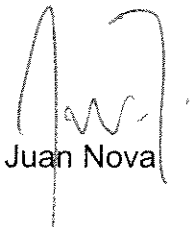
S/N: 021604-01

This certificate will certify that your gauge authorized for calibration on your Purchase Order 25330, tested this date, and is in calibration. The gauge tested is identified as a 6", McDaniel gauge 0-200 PSI.

This gauge was tested on a Mansfield & Green Deadweight Tester model T-100 Serial Number 11353, certified by QUALITY SYSTEMS LAB, INC., on August 24, 2006 to be accurate to within +/-0.25%, traceable to NIST standards.

The subject gauge performed to within +/-1.5% accuracy.

Sincerely,

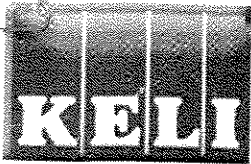


Juan Nova

Certificate of Calibration

KELC-24858

Kimball Electronic Laboratory, Inc.
Precision Measurement Equipment Specialists



Calibration Performed By:

KIMBALL ELECTRONIC LABORATORY, INC
8081 W 21 LANE
HIALEAH, FL. 33016

Purchase Order # N/A

For: **YOU410**

YOUNGQUIST BROTHERS, INC.
15465 PINE RIDGE ROAD

FT MYERS

FL 33908

Equipment Information KELI I.D.: KEL-117823

Description: MC DANIEL 200 PSI PRESSURE GAUGE
Manufacturer: MC DANIEL
Model Number: 200 PSI
Part Number: N/A
Range: 0-200 PSI
Serial Number: N/A
Customer I.D.: 021604-01
Cust. Barcode: N/A
Cust. Location: N/A
Specifications: +/- 0.25% FS

Cal Date: 23-Apr-07
Cal. Due Date: 23-Apr-08
Cal. Interval: 12 MONTHS
Received: IN TOLERANCE
Calibration Result: PASS
Temp / RH: 72 F / 40 %
Performed By: GUSTAVO
CASTRILLON
Procedure: SYN54

This is to certify that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure at the points tested (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration is in accordance with Kimball Electronic Laboratory, Inc Quality Assurance Manual. KELI's Quality system is A2LA-Accredited to ISO/IEC-17025 and compliant with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. TURs when applicable are greater than or equal to 4:1; with expanded uncertainty used to calculate the Test Uncertainty Ratio, with a coverage factor of K=2 at a confidence level of approximately 95%, unless otherwise noted. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

Calibration Remarks

THIS UNIT WAS FOUND TO BE IN TOLERANCE AT THE TIME OF CALIBRATION.
PERFORMED ROUTINE CAL. NO ADJUSTMENTS REQUIRED

Standards Used To Calibrate Equipment

Company	I.D.	Description	Last Cal.	Cal. Due Date
KIM001	391	EATON UPS 3000BAA PRESSURE INDICATOR	05-Jul-05	31-Jul-07

Signatures:

Certified by:

GUSTAVO
CASTRILLON

23-Apr-07

9:12:29 AM

Approved By:

JAVIER
BALCEIRO

23-Apr-07

9:13:14 AM

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Kimball Electronic Laboratory, Inc. - 8081 W. 21st Lane - Hialeah, FL. 33016
Tel: 305-822-5792 - Toll Free: 800-393-1094 - Fax: 305-362-3125 - Web: www.kelilabs.com

Date of issue: 23-Apr-07

Page 1 of 1



8081 W. 21 LANE
HIALEAH, FL. 33016
PH # 305-822-5792
FAX # 305-362-3125

CONTROL # : KEL-117823

CUSTOMER : YOU410

CALIBRATION DATA FORM

MFR:	MC DANIEL	DESCRIPTION :	PRESSURE GAUGE
MODEL # :	200 PSI .25%	TECHNICIAN :	127
SERIAL # :	N/A	CAL DATE :	23-APR-07
CUST ID #:	021604-01	DUE DATE :	23-APR-08

* IF NO "AS LEFT" READING IS SHOWN ON THIS CHART, IT MEANS THE UNIT WAS IN TOLERANCE AND THERE WERE NO ADJUSTMENTS MADE TO IT.

RANGE	NOMINAL	AS FOUND	AS LEFT *	LOW LIMIT	HIGH LIMIT
0 - 200 PSI					
	40	40.0		39.5	40.5
	80	80.2		79.5	80.5
	120	119.8		119.5	120.5
	160	159.8		159.5	160.5
	200	199.8		199.5	200.5

Injection Well IW-2

16-inch Tubing Pressure Test



MWH

IW-2 PRESSURE TEST DATA

DATE: September 21, 2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF OPERATIONS: Pressure test 16-inch FRP Tubing
CL set at 2,045 feet bpl Packer @ 405 PSI

START TIME: 1005

FINISH TIME: 1105

CASING SIZE: 16-inch FRP

INITIAL PRESSURE: 152.5

GAGE SERIAL NUMBER: 021604-01

CALCULATED WATER VOLUME: 10.2 gallons

OBSERVED WATER VOLUME: 12.5 gal

TIME	MINUTES	PRESSURE (psi)	COMMENTS
1005	0	152.5	John Petrous MWHC
1006	1	152.5	Dennis Collins MWHC
1007	2	152.5	Doug Drayer YB
1008	3	152.5	James Harcourt FDEP
1009	4	152.5	David Rhodes FDEP
1010	5	152.5	
1011	6	152.5	
1012	7	152.5	
1013	8	152.4	
1014	9	152.4	
1015	10	152.4	
1016	11	152.4	
1017	12	152.4	
1018	13	152.2	
1019	14	152.2	
1020	15	152.2	
1021	16	152.2	
1022	17	152.2	
1023	18	152.2	
1024	19	152.2	
1025	20	152.0	
1026	21	152.0	
1027	22	152.0	
1028	23	152.0	
1029	24	152.0	
1030	25	152.0	
1031	26	152.0	
1032	27	152.0	
1033	28	152.0	
1034	29	152.0	
1035	30	151.8	
1036	31	151.8	
1037	32	151.8	
1038	33	151.8	
1039	34	151.8	
1040	35	151.8	
1041	36	151.8	
1042	37	151.8	
1043	38	151.8	
1044	39	151.6	
1045	40	151.6	
1046	41	151.6	
1047	42	151.6	
1048	43	151.4	



MWH

IW-2 PRESSURE TEST DATA

DATE: September 21, 2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF OPERATIONS: Pressure test 16-inch FRP Tubing
CL set at 2,045 feet bpl

START TIME: _____

FINISH TIME: _____

CASING SIZE: 16-inch FRP

INITIAL PRESSURE: _____

GAGE SERIAL NUMBER: 021604-01

CALCULATED WATER VOLUME: 10.2 gallons

OBSERVED WATER VOLUME: _____

TIME	MINUTES	PRESSURE (psi)	COMMENTS
1049	44	151.4	
1050	45	151.4	
1051	46	151.4	
1052	47	151.4	
1053	48	151.2	
1054	49	151.2	
1055	50	151.2	
1056	51	151.2	
1057	52	151.2	
1058	53	151.0	
1059	54	151.0	
1100	55	151.0	
1101	56	151.0	
1102	57	151.0	
1103	58	151.0	
1104	59	151.0	
1105	60	151.0	A 1.5 psi 1% decrease

PRESSURE BLEED-OFF			
TIME	PRESSURE	VOLUME OF WATER COLLECTED (GAL)	CUMULATIVE VOLUME (GAL)
1105	151.0	0	0
1112	32.5	10	10
1113	0.0	2.5	12.5

Witnessed By: David Rhodes
FDEP Representative

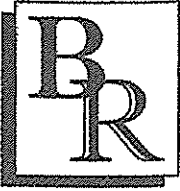
David Rhodes 9/21/07

Neil Johnson
MWH Representative

Neil Johnson 9/21/07

Clay Ferguson
YBI Representative

Clay Ferguson 9/21/07



**BLUE
RIBBON**

Blue Ribbon Sales & Services
1940 Howell Branch Rd.
Winter Park, FL 32792

Phone: (877) 677-8899
Fax: (407) 657-6622
www.blueribboncorp.com

**CALIBRATION CERTIFICATE
8/06/07**

Youngquist Brothers, Inc
15465 Pine Ridge Rd.
Fort Myers, FL 33908

P.O. 25330


S/N: 021604-01

This certificate will certify that your gauge authorized for calibration on your Purchase Order 25330, tested this date, and is in calibration. The gauge tested is identified as a 6", McDaniel gauge 0-200 PSI.

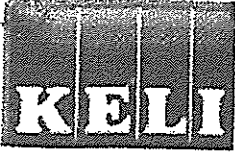
This gauge was tested on a Mansfield & Green Deadweight Tester model T-100 Serial Number 11353, certified by QUALITY SYSTEMS LAB, INC., on August 24, 2006 to be accurate to within +/-0.25%, traceable to NIST standards.

The subject gauge performed to within +/-1.5% accuracy.

Sincerely,



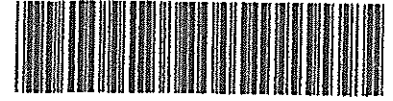
Juan Nova



Certificate of Calibration

KELC-24858

Kimball Electronic Laboratory, Inc.
Precision Measurement Equipment Specialists



Calibration Performed By:

KIMBALL ELECTRONIC LABORATORY, INC
8081 W 21 LANE
HIALEAH, FL. 33016

Purchase Order # N/A

For: YOU410

YOUNGQUIST BROTHERS, INC.
15465 PINE RIDGE ROAD

Equipment Information KELI I.D.: KEL-117823

Description: MC DANIEL 200 PSI PRESSURE GAUGE

Manufacturer: MC DANIEL
Model Number: 200 PSI
Part Number: N/A
Range: 0-200 PSI

Serial Number: N/A
Customer I.D.: 021604-01
Cust. Barcode: N/A
Cust. Location: N/A

Specifications: +/- 0.25% FS

FT MYERS

FL 33908

Cal Date: 23-Apr-07

Cal. Due Date: 23-Apr-08

Cal. Interval: 12 MONTHS

Received: IN TOLERANCE

Calibration Result: PASS

Temp / RH: 72 F / 40 %

Performed By: GUSTAVO

CASTRILLON

Procedure: SYN54

This is to certify that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure at the points tested (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration is in accordance with Kimball Electronic Laboratory, Inc Quality Assurance Manual. KEL's Quality system is A2LA-Accredited to ISO/IEC-17025 and compliant with MIL-STD-45662A and ANSI/NC SL Z 390-3-1994 TURS when applicable are greater than or equal to 4:1; with expanded uncertainty used to calculate the Test Uncertainty Ratio, with a coverage factor of K=2 at a confidence level of approximately 95%, unless otherwise noted. Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

Calibration Remarks

THIS UNIT WAS FOUND TO BE IN TOLERANCE AT THE TIME OF CALIBRATION.
PERFORMED ROUTINE CAL. NO ADJUSTMENTS REQUIRED

Standards Used To Calibrate Equipment

Company	I.D.	Description	Last Cal.	Cal. Due Date
KIM001	391	EATON UPS 3000BAA PRESSURE INDICATOR	05-Jul-05	31-Jul-07

Signatures:

Certified by:

GUSTAVO
CASTRILLON

Gustavo A. Castrillon

23-Apr-07

9:12:29 AM

Approved By:

JAVIER
BALCEIRO

Javier Balceiro

23-Apr-07

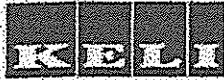
9:13:14 AM

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Date of Issue: 23-Apr-07

Page 1 of 1



8081 W. 21 LANE
 HIALEAH, FL. 33016
 PH # 305-822-5792
 FAX # 305-362-3125

CONTROL # : KEL-117823

CUSTOMER : YOU410

CALIBRATION DATA FORM

MFR:	MC DANIEL	DESCRIPTION :	PRESSURE GAUGE
MODEL # :	200 PSI .25%	TECHNICIAN :	127
SERIAL # :	N/A	CAL DATE :	23-APR-07
CUST ID #:	021604-01	DUE DATE :	23-APR-08

* IF NO "AS LEFT" READING IS SHOWN ON THIS CHART, IT MEANS THE UNIT WAS IN TOLERANCE AND THERE WERE NO ADJUSTMENTS MADE TO IT.

RANGE	NOMINAL	AS FOUND	AS LEFT *	LOW LIMIT	HIGH LIMIT
0 - 200 PSI					
	40	40.0		39.5	40.5
	80	80.2		79.5	80.5
	120	119.8		119.5	120.5
	160	159.8		159.5	160.5
	200	199.8		199.5	200.5

Monitor Well DZMW-1

**Casing Pressure Tests and Test Gauge Calibration
Certifications**

Monitor Well DZMW-1

16-inch Casing Pressure Test



MWH

DZMW-1 PRESSURE TEST DATA

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF Pressure test 16-inch upper monitor zone steel casing

START TIME: 15:05

INITIAL PRESSURE: _____

FINISH TIME: 16:05

GAGE SERIAL NUMBER: _____

CASING SIZE: 16-inch

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1505	0	50.50	Witnessed by FDEP (James Harcourt), MWHC (Todd Tubbert and Martin Waggoneer)
1506	1	50.50	
1507	2	50.40	
1508	3	50.40	
1509	4	50.40	
1510	5	50.40	
1511	6	50.30	
1512	7	50.30	
1513	8	50.25	
1514	9	50.25	
1515	10	50.25	
1516	11	50.25	
1517	12	50.25	
1518	13	50.20	
1519	14	50.20	
1520	15	50.20	
1521	16	50.20	
1522	17	50.20	
1523	18	50.10	
1524	19	50.10	
1525	20	50.10	
1526	21	50.10	
1527	22	50.00	
1528	23	50.00	
1529	24	50.00	
1530	25	50.00	
1531	26	50.00	
1532	27	50.00	



MWH

DZMW-1 PRESSURE TEST DATA

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF Pressure test 16-inch upper monitor zone steel casing

START TIME: 15:05

INITIAL PRESSURE: _____

FINISH TIME: 16:05

GAGE SERIAL NUMBER: _____

CASING SIZE: 16-inch

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1533	28	50.00	
1534	29	50.00	
1535	30	50.00	
1536	31	50.00	
1537	32	50.00	
1538	33	50.00	
1539	34	50.00	
1540	35	49.85	
1541	36	49.85	
1542	37	49.85	
1543	38	49.85	
1544	39	49.80	
1545	40	49.75	
1546	41	49.75	
1547	42	49.75	
1548	43	49.75	
1549	44	49.75	
1550	45	49.60	
1551	46	49.60	
1552	47	49.60	
1553	48	49.60	
1554	49	49.60	
1555	50	49.50	
1556	51	49.50	
1557	52	49.50	
1558	53	49.50	
1559	54	49.50	
1600	55	49.50	



MWH

DZMW-1 PRESSURE TEST DATA

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MGR: Neil Johnson

OWNER: City of Cape Coral

DESCRIPTION OF Pressure test 16-inch upper monitor zone steel casing

START TIME: 15:05

INITIAL PRESSURE: _____

FINISH TIME: 16:05

GAGE SERIAL NUMBER: _____

CASING SIZE: 16-inch

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1601	56	49.50	
1602	57	49.50	
1603	58	49.50	
1604	59	49.50	
1605	60	49.50	

Witnessed By: James Harcourt
FDEP Representative

Richard Walther
MWH Representative

Eric
Youngquist Brothers Representative

DURO UNITED

Manufactured by
 Thuemling Industrial Products
 1225 Pearl Street
 Waukesha, WI 53186
 Phone: 262-547-1789
 Fax: 262-547-6493

PRESSURE GAUGE CERTIFIED CALIBRATION RECORD

TRACEABLE TO N.I.S.T.

Customer/Distributor:
User:

Installation Date: <i>Important: Date recalibration time period begins*</i>
Purchase Order Number: PC-66234060
Invoice Number: I-32412-0
Calibration Date: 03-20-07 <i>Date the certified calibration was performed</i>
Calibration Due Date: <i>User specified re-certification date based on installation date & the user's quality program procedures</i>
Serial Number: 31907-1

Pressure Gauge Part Number	42070533		
Serial Number	31907-1	ANSI Grade	2A

Calibration Standard: Dead Weight Tester	
Certification Number	S/N
1000358653	8215

Note: The aforementioned calibration standard is at least four times as accurate as the instrument being tested

INCREASING PRESSURE			DECREASING PRESSURE		
CALIBRATION STANDARD	PRESSURE GAUGE	DEVIATION	CALIBRATION STANDARD	PRESSURE GAUGE	DEVIATION
20	20	—	20	20	—
50	50	—	50	50	—
100	100	—	—	—	—

CERTIFIED BY: _____

Monitor Well DZMW-1

6.625-inch Casing Pressure Test



MWH

DZMW-1 PRESSURE TEST DATA

DATE(S): 11/8/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102
 CONTRACTOR: Youngquist Brothers, Inc.
 PROJECT MGR: Neil Johnson
 OWNER: City of Cape Coral

DESCRIPTION OF OPERATIONS: Pressure test 6.625-inch lower monitor zone FRP casing

START TIME: 1515
 FINISH TIME: 1615
 CASING SIZE: 6.625-inch

INITIAL PRESSURE: 51.50
 GAGE SERIAL NUMBER: 071307-2

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1515	0	51.50	Witnessed by FDEP (Jdavid Rhodes), MWHA (John Largey), YBI (Mike Wilson)
1516	1	51.50	
1517	2	51.50	
1518	3	51.50	
1519	4	51.50	
1520	5	51.50	
1521	6	51.25	
1522	7	51.25	
1523	8	51.25	
1524	9	51.25	
1525	10	51.25	
1526	11	51.25	
1527	12	51.25	
1528	13	51.25	
1529	14	51.25	
1530	15	51.25	
1531	16	51.25	
1532	17	51.25	
1533	18	51.25	
1534	19	51.25	
1535	20	51.25	
1536	21	51.25	
1537	22	51.25	
1538	23	51.25	
1539	24	51.25	
1540	25	51.25	
1541	26	51.25	
1542	27	51.00	
1543	28	51.00	
1544	29	51.00	
1545	30	51.00	
1546	31	51.00	
1547	32	51.00	
1548	33	51.00	
1549	34	51.00	
1550	35	51.00	
1551	36	51.00	
1552	37	51.00	
1553	38	50.75	
1554	39	50.75	
1555	40	50.75	
1556	41	50.75	



MWH

DZMW-1 PRESSURE TEST DATA

DATE(S): 11/8/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102
 CONTRACTOR: Youngquist Brothers, Inc.
 PROJECT MGR: Neil Johnson
 OWNER: City of Cape Coral

START TIME: 1515
 FINISH TIME: 1615
 CASING SIZE: 6.625-inch

DESCRIPTION OF OPERATIONS: Pressure test 6.625-inch lower monitor zone FRP casing

INITIAL PRESSURE: 51.50
 GAGE SERIAL NUMBER: 071307-2

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1557	42	50.25	
1558	43	50.25	
1559	44	50.25	
1600	45	50.25	
1601	46	50.25	
1602	47	50.25	
1603	48	50.25	
1604	49	50.25	
1605	50	50.25	
1606	51	50.25	
1607	52	50.25	
1608	53	50.25	
1609	54	50.25	
1610	55	50.25	
1611	56	50.00	
1612	57	50.00	
1613	58	50.00	2 1/2 g allows bleed off
1614	59	50.00	
1615	60	50.00	Total change = 1.5 psi ← 5% change

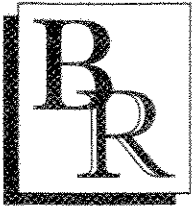
Witnessed By:

David Rhodes
FDEP Representative

John Largey
MWH Representative

Mike Wilson
Youngquist Brothers Representative





**BLUE
RIBBON**

Blue Ribbon Sales & Services
1940 Howell Branch Rd.
Winter Park, FL 32792

Phone: (877) 677-8899
Fax: (407) 657-6622
www.blueribboncorp.com

CALIBRATION CERTIFICATE

7/13/07

Youngquist Brothers, Inc
15465 Pine Ridge Rd.
Fort Myers, FL 33908

P.O. 25113

S/N: 071307-2

This certificate will certify that your gauge authorized for calibration on your Purchase Order 25113, tested this date, and is in calibration. The gauge tested is identified as a 6", Blue Ribbon Corp gauge 0-160 PSI.

This gauge was tested on a Mansfield & Green Deadweight Tester model T-100 Serial Number 11353, certified by QUALITY SYSTEMS LAB, INC., on August 24, 2006 to be accurate to within +/- .25%, traceable to NIST standards.

The subject gauge performed to within +/- 1.5% accuracy.

Sincerely,



Juan Nova

Appendix O

Positive Seal Packer

Submittal Data
FROM
Youngquist Brothers, Inc.
15465 Pine Ridge Rd.
Ft. Myers, FL. 33908
239-489-4444 Fax: 239-489-4545

Project
North Cape
Water Treatment Plant
Deep Injection Wells
MWHC Job # 7012014

I have reviewed this submittal for general conformance with the design concepts and contract documents. Generally no conflict with materials or dimensions will arise from the approval of this shop drawing submittal.

Date: February 8, 2007 Number of Copies: 5
Submittal Number: 02633-029-A
Specification Section Number: 02633-029-A
Item Submitted: YBI PACKERS
New Submittal: X Resubmitted: _____

Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Youngquist Brothers, Inc. Representative:

Crystal Sturgis
Crystal Sturgis

- Approved
- Approved with changes
- Rejected
- Revise & Resubmit
- Not Reviewed.

By: _____

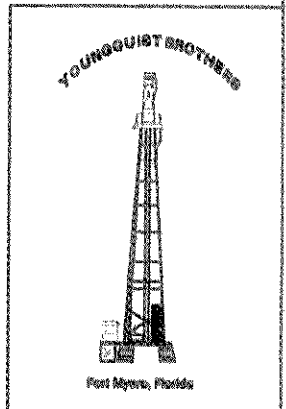
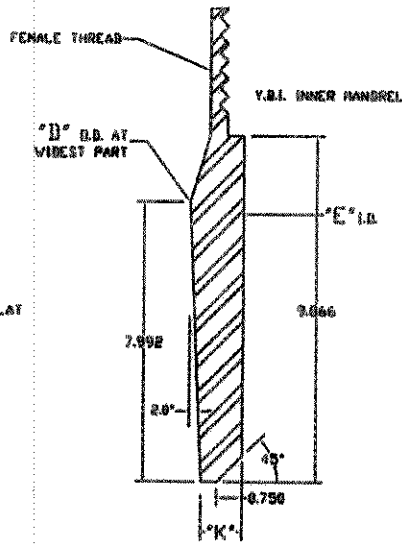
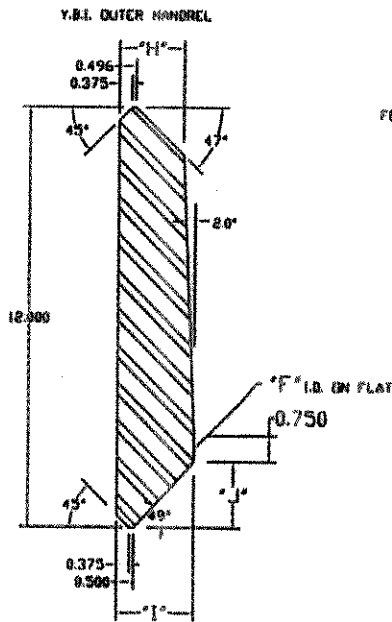
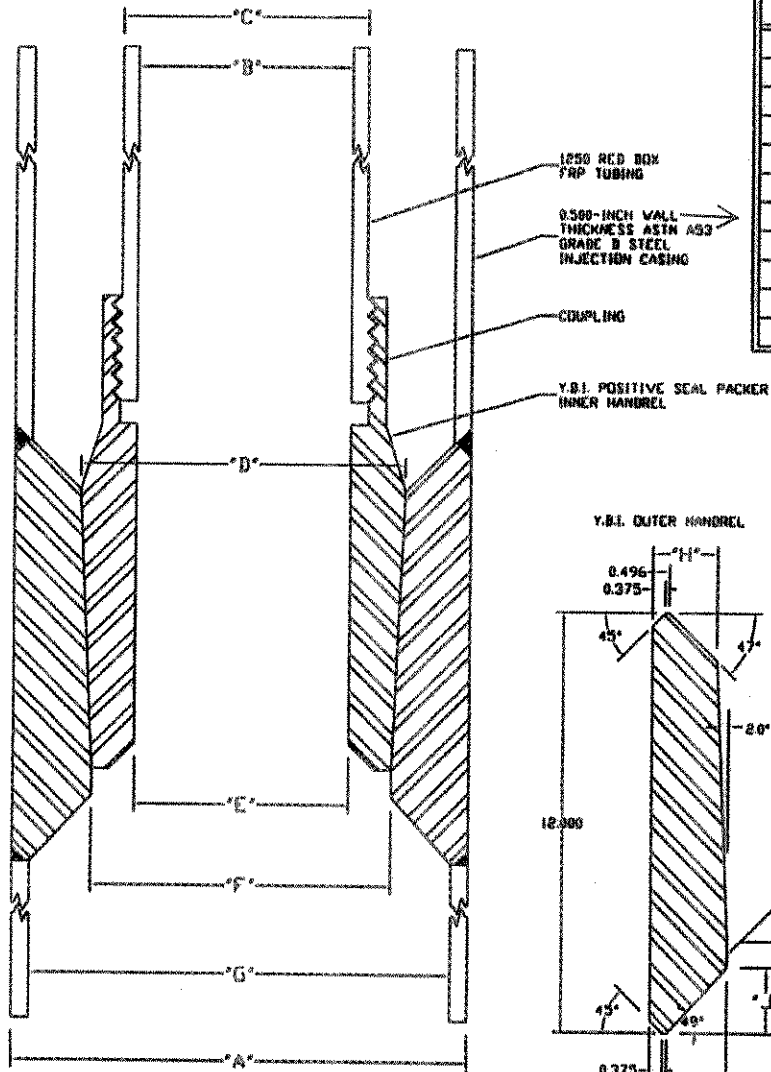
Firm: _____

Date: _____

YOUNGQUIST BROTHERS, INC.

Has Reviewed this Shop Drawing, Submitted
 Y.B. Section No. # 02633-009-A
 Transmittal No. # _____ Date 2/8
 Signature C. Paul

PACKER SIZE	CASING NOMINAL O.D. "A"	FRP NOMINAL I.D. "B"	FRP O.D. "C"	INNER HANDBREL O.D. "D"	INNER HANDBREL I.D. "E"	OUTER HANDBREL I.D. "F"	CASING I.D. "G"	"H"	"I"	"J"	"K"
7-5/8	12	6.21	7.21	9.75	6.21	9.192	11	1.069	1.404	1.040	1.491
9-5/8	14	7.84	8.84	11.27	7.84	10.712	13	1.328	1.644	1.316	1.436
10-3/4	16	8.85	9.85	13.27	8.85	12.712	15	1.328	1.644	1.316	1.931
11-3/4	18	10.72	11.72	13.75	10.72	13.192	17	2.150	2.404	2.190	1.236
13-3/8	18	11.97	12.97	14.896	11.97	14.338	17	1.530	1.831	1.531	1.184
16	20	14.48	15.48	17.25	14.48	16.692	19	1.339	1.654	1.328	1.106
16A	22	14.48	15.48	18.25	14.48	17.692	21	1.839	2.154	1.903	1.605
18	24	16.50	17.50	21.618	16.50	21.060	23	1.140	1.470	1.116	2.280
21	26	17.98	18.98	22.242	17.98	21.684	25	1.884	2.158	1.907	1.852



Y.B.I. POSITIVE SEAL PACKER	
North Cape Coral	
JOB # 278002	
Drawn by PMA INCILLERS	Issue on DECEMBER 28, 2011 Updated JANUARY 6, 2012 RJ
SCALE: NONE	SHEET 1 of 1
ALL DIMENSIONS ARE IN INCHES	

NOTE: ABOVE DIMENSIONS ARE NOT TO SCALE

Appendix P

Background Water Quality Test Results

Injection Well IW-2

**Injection Zone Background Water Quality
(2,060 to 3,000)**

SANDERS LABORATORIES, INC.
Laboratory Test Report

Lab Project #: N0709377
Client: Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908
Phone: 239-489-4444
Fax: 239-489-4545
E-mail:
Client Project Name: Cape Coral
Laboratory Contact: Andy Konopacki

Page 1 of 9
All subsequent pages are identified by: N0709377 .
These pages may include, but are not limited to: Analytical Data, Chains of Custody, Subcontracted Data and Case Narratives.

QUALIFIER DEFINITIONS

B: Results based upon colony counts outside the acceptable range.
I: The reported value is between the laboratory MDL and the laboratory PQL.
J3: The reported value failed to meet the established quality control criteria.
J4: The sample matrix interfered with the ability to make an accurate determination.
J5: The data is questionable because of improper lab or field protocols.
K: Off scale low, actual value is less than the value given.
L: Off scale high, actual value is known to be greater than the value given.
Q: Sample held beyond acceptable holding time.
U: The compound was analyzed for, but not detected.
V: The analyte was detected in both the sample and the associated method blank.
Y: The sample was unpreserved or improperly preserved.
Z: Too many colonies present (TNTC).
** This result does not meet NELAC standards.
HACH results may not meet NELAC standards.

A statement of estimated uncertainty of results is available upon request.

Analytical results provided relate only to the samples received for this project.

Laboratory report shall not be reproduced except in full, without the written approval of Sanders Laboratories.

Sanders Laboratories follows DEP standard operating procedures for field sampling.

Laboratory PQL's are available upon request.

Reports are archived for a minimum of 5 years. Copies of reports which are less than 1 year old are available for a fee of \$25.00 per report. Reports older than 1 year are available for a fee of \$50.00 per report. Copies will be provided within 1 week of the time of the request.



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0709377-01	Inj. Well grab	Ground Water	9/24/07 12:00	9/24/07 10:05				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Air Temperature-field	170.1	26.7		0.1	C	9/24/07 10:05	HC	E84380
Alkalinity	SM2320B	106		3	mg/l CaCO3	9/27/07 10:00	BB	E84380
Aluminum	200.7	0.009	U,J3	0.009	mg/L	10/1/07 17:41	JPW	E84380
Ammonia	SM4500-NH3-D	0.05	U	0.05	mg/L as N	9/25/07 14:00	AG	E84380
Antimony	200.7	0.002	U	0.002	mg/L	10/1/07 17:41	JPW	E84380
Arsenic	200.7	0.002	U	0.002	mg/L	10/1/07 17:41	JPW	E84380
Barium	200.7	0.351		0.001	mg/L	10/8/07 14:27	JPW	E84380
Beryllium	200.7	0.0001	U	0.0001	mg/L	10/1/07 17:41	JPW	E84380
BOD	SM5210B	2	U	2	mg/L	9/25/07 10:45	AS	E84380
Cadmium	200.7	0.001	U	0.001	mg/L	10/1/07 17:41	JPW	E84380
Chemical Oxygen Demand	410.4	1460		8	mg/L	10/5/07 8:30	BY	E84380
Chloride	SM4500Cl-B	19200		1	mg/L	10/1/07 10:00	BB	E84380
Chromium	200.7	0.003	I	0.001	mg/L	10/16/07 12:23	JPW	E84380
Color-True	SM2120B	20		1	PtCo units	9/24/07 16:30	AG	E84380
Copper	200.7	0.006		0.001	mg/L	10/8/07 14:27	JPW	E84380
Dissolved Oxygen-field	360.1	1.83		0.01	mg/L	9/24/07 10:05	HC	E84380
Iron	200.7	0.367		0.015	mg/L	10/16/07 12:23	JPW	E84380
Langelier Saturation Index	LSI	0.27		0.01	NONE	10/1/07 0:00	AK	E84380
Lead	200.7	0.020		0.001	mg/L	10/16/07 12:23	JPW	E84380
Manganese	200.7	0.013		0.001	mg/L	10/8/07 14:27	JPW	E84380
Mercury	245.1	0.001	U	0.001	mg/L	10/3/07 12:57	JPW	E84380
Nickel	200.7	0.007		0.001	mg/L	10/8/07 14:27	JPW	E84380
Nitrate+Nitrite-N	353.2	0.01	U	0.01	mg/L as N	9/24/07 13:45	SJ	E84380
Nitrate-N	353.2	0.01	U	0.01	mg/L as N	9/24/07 13:45	SJ	E84380
Nitrite-N	353.2	0.01	U	0.01	mg/L as N	9/24/07 13:34	SJ	E84380
Nitrogen, Organic	351.2/350.3	0.68		0.10	mg/L as N	10/3/07 13:51	SJ	E84380

Client Project: Cape Coral

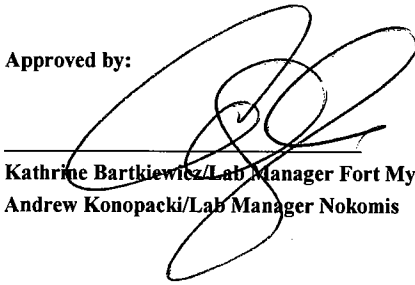
Lab Project: N0709377

Report Date: 10/25/07

Laboratory Results

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time	Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
N0709377-01	Inj. Well grab	Ground Water	9/24/07 12:00	9/24/07 10:05	Nitrogen, Total Kjeldahl	351.2	0.68		0.10	mg/L as N	10/3/07 13:51	BB/AG	E84380
					Odor @ 35 Deg C	SM2150B	3		1	TON	9/24/07 13:40	AS/AK	E84380
					Ortho Phosphate	SM4500P-E	0.069		0.015	mg/L as P	9/24/07 15:30	AG	E84380
					pH - field	150.1	6.97		0.01	std units	9/24/07 10:05	HC	E84380
					Phosphorus, Total	365.4	0.025	U	0.025	mg/L as P	10/3/07 15:44	BB/AG	E84380
	See attached results	Subcontract									9/26/07 8:03	SUB	
					Selenium	200.7	0.002	U	0.002	mg/L	10/8/07 14:27	JPW	E84380
					Silver	200.7	0.001	U	0.001	mg/L	10/1/07 17:41	JPW	E84380
					Sodium	200.7	12000		0.400	mg/L	10/1/07 17:41	JPW	E84380
					Specific Conductance-field	120.1	38200		0.1	µmhos/cm	9/24/07 10:05	HC	E84380
					Sulfate	ASTM-D516-90	2940		2	mg/L	9/25/07 12:24	AG	E84380
					Total Coliform, MF	SM9222B	1	U	1	CFU/100ml	9/24/07 14:10	RF	E84380
					Total Dissolved Solids	SM2540C	29400		20	mg/L	9/24/07 15:45	AS	E84380
					Turbidity - field	180.1	10.6		0.1	NTU	9/24/07 10:05	HC	E84380
					Water Temperature-field	170.1	33.1		0.1	C	9/24/07 10:05	HC	E84380
					Weather-field	DEPSOP	p. cloudy		n/a	none	9/24/07 10:05	HC	E84380
					Zinc	200.7	0.041		0.001	mg/L	10/8/07 14:27	JPW	E84380

Approved by:


 Kathrine Bartkiewitz/Lab Manager Fort Myers
 Andrew Konopacki/Lab Manager Nokomis

Comments: Total & Ortho Phosphorus results confirmed with second aliquots of sample.

Test Results meet all the requirements of the NELAC standards.



EMSL Analytical, Inc.

19501 NE 10th Ave. Bay A, N. Miami Beach, FL 33179

Phone: (305) 650-0577 Fax: (305) 650-0578 Email: miamilab@emsl.com

Attn: T. Bright
Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

Customer ID: SAND53
Customer PO: N0709377
Received: 09/25/07 11:20 AM
EMSL Order: 170705839

Fax: (941) 484-6774 Phone: (941) 488-8103
Project: N0709377

EMSL Proj:
Analysis Date: 9/27/2007
Report Date: 9/27/2007

Determination of Asbestos Structures over 10um in Length in Waste Water Performed by the EPA 100.2 Method

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
N0709377-01 170705839-0001	9/26/2007 11:30	0			7.40	0.00-27.00	<7.40	Collection Date 9/24/2007 10:05

Contact Kim Wallace at (305) 650-0577 with any questions.

Analyst(s)

Kim Wallace (1)

Kimberly Wallace, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as $\leq 0.01\text{MFL} > 10\mu\text{m}$. ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.

ACCREDITATIONS: NVLAP 200204-0, FL Lab ID: E86795

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

November 1, 2007
Project No: 75441

Laboratory Report

Project Name N0709377
Sample Description N0709377-01
Matrix Groundwater
SAL Sample Number 75441.01
Date/Time Collected 09/24/07 10:05
Date/Time Received 09/24/07 15:45

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Group II Unregulated)							
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Volatile Organic Compounds (Primary DW)							
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	09/27/07 20:51		JRW
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	09/27/07 20:51		JRW
1,1-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
1,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	09/27/07 20:51		JRW
Benzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2	0.3	09/27/07 20:51		JRW
cis-1,2-Dichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Dichloromethane	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Ethylbenzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Monochlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
o-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
para-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Styrene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Tetrachloroethylene	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Toluene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
trans-1,2-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Trichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Vinyl chloride	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Xylenes (Total)	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
m/p-xylenes	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
o-xylene	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Trihalomethane Analyses							
Bromodichloromethane	ug/l	0.3 U	EPA 502.2	0.3	09/27/07 20:51		JRW
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Chlorinated Pesticides							
Date Extracted		09/27/07	EPA 508.1			09/27/07 09:00	ARM
Aldrin	ug/l	0.01 U	EPA 508.1	0.01	10/03/07 15:35	09/27/07 09:00	DB
Dieldrin	ug/l	0.01 U	EPA 508.1	0.01	10/03/07 15:35	09/27/07 09:00	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

November 1, 2007
Project No: 75441

Laboratory Report

Project Name **N0709377**
 Sample Description **N0709377-01**
 Matrix **Groundwater**
 SAL Sample Number **75441.01**
 Date/Time Collected **09/24/07 10:05**
 Date/Time Received **09/24/07 15:45**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Pesticides (Primary DW)							
Date Extracted		09/27/07	EPA 508.1			09/27/07 09:00	ARM
Chlordane	ug/l	0.05 U	EPA 508.1	0.05	10/03/07 15:35	09/27/07 09:00	DB
Toxaphene	ug/l	0.5 U	EPA 508.1	0.5	10/03/07 15:35	09/27/07 09:00	DB
Polychlorinated biphenyls (PCBs)	ug/l	0.2 U	EPA 508.1	0.2	10/03/07 15:35	09/27/07 09:00	DB
Chlorinated Herbicides (Primary DW)							
Date Extracted		09/28/07	EPA 515.3			09/28/07 09:00	EMF
Dalapon	ug/l	1 U	EPA 515.3	1	10/01/07 18:08	09/28/07 09:00	BTJ
2,4-D	ug/l	1 U	EPA 515.3	1	10/01/07 18:08	09/28/07 09:00	BTJ
Pentachlorophenol	ug/l	0.1 U	EPA 515.3	0.1	10/01/07 18:08	09/28/07 09:00	BTJ
2,4,5-TP (Silvex)	ug/l	0.25 U	EPA 515.3	0.25	10/01/07 18:08	09/28/07 09:00	BTJ
Dinoseb	ug/l	0.5 U	EPA 515.3	0.5	10/01/07 18:08	09/28/07 09:00	BTJ
Picloram	ug/l	0.75 U	EPA 515.3	0.75	10/01/07 18:08	09/28/07 09:00	BTJ
Semivolatile Analyses (Primary DW)							
Date Extracted		09/27/07	EPA 525.2			09/27/07 09:00	ARM
Alachlor	ug/l	0.2 U	EPA 525.2	0.2	09/27/07 18:20	09/27/07 09:00	BTJ
Atrazine	ug/l	0.06 U	EPA 525.2	0.06	09/27/07 18:20	09/27/07 09:00	BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	09/27/07 18:20	09/27/07 09:00	BTJ
Di(2-ethylhexyl)adipate	ug/l	0.3 U	EPA 525.2	0.3	09/27/07 18:20	09/27/07 09:00	BTJ
Di(2-ethylhexyl)phthalate	ug/l	3.7 I	EPA 525.2	1.0	09/27/07 18:20	09/27/07 09:00	BTJ
Endrin	ug/l	0.1 U	EPA 525.2	0.1	09/27/07 18:20	09/27/07 09:00	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2	0.08	09/27/07 18:20	09/27/07 09:00	BTJ
Heptachlor Epoxide	ug/l	0.1 U	EPA 525.2	0.1	09/27/07 18:20	09/27/07 09:00	BTJ
Hexachlorobenzene	ug/l	0.05 U	EPA 525.2	0.05	09/27/07 18:20	09/27/07 09:00	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U	EPA 525.2	0.2	09/27/07 18:20	09/27/07 09:00	BTJ
Lindane	ug/l	0.06 U	EPA 525.2	0.06	09/27/07 18:20	09/27/07 09:00	BTJ
Methoxychlor	ug/l	0.05 U	EPA 525.2	0.05	09/27/07 18:20	09/27/07 09:00	BTJ
Simazine	ug/l	0.07 U	EPA 525.2	0.07	09/27/07 18:20	09/27/07 09:00	BTJ
Pesticide Analyses (Primary DW)							
Date Extracted		09/28/07	EPA 549.2			09/28/07 08:30	JLR
Diquat	ug/l	1 U	EPA 549.2	1	10/02/07 09:37	09/28/07 08:30	JKS
Total Haloacetic Acids Analyses							
Date Extracted		09/28/07	EPA 552.2			09/28/07 09:00	ARM
Monochloroacetic Acid	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Monobromoacetic Acid	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ

FDOH Laboratory No. E84129
 NELAP Accredited

Francis I. Daniels, Laboratory Director
 Leslie C. Boardman, Q. A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

November 1, 2007
Project No: 75441

Laboratory Report

Project Name **N0709377**
Sample Description **N0709377-01**
Matrix **Groundwater**
SAL Sample Number **75441.01**
Date/Time Collected **09/24/07 10:05**
Date/Time Received **09/24/07 15:45**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Total Haloacetic Acids Analyses							
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Semivolatile Analyses							
2,4,6-Trichlorophenol	ug/l	2 U	EPA 625	2	10/02/07 19:10	09/25/07 09:00	BTJ
2-Chlorophenol	ug/l	1 U	EPA 625	1	10/02/07 19:10	09/25/07 09:00	BTJ
Anthracene	ug/l	1 U	EPA 625	1	10/02/07 19:10	09/25/07 09:00	BTJ
Butylbenzylphthalate	ug/l	3 U	EPA 625	3	10/02/07 19:10	09/25/07 09:00	BTJ
Dimethylphthalate	ug/l	5 U	EPA 625	5	10/02/07 19:10	09/25/07 09:00	BTJ
Naphthalene	ug/l	1 U	EPA 625	1	10/02/07 19:10	09/25/07 09:00	BTJ
Phenathrene	ug/l	1 U	EPA 625	1	10/02/07 19:10	09/25/07 09:00	BTJ
Phenol	ug/l	1 U	EPA 625	1	10/02/07 19:10	09/25/07 09:00	BTJ
Pesticide Analyses (Primary DW)							
Date Extracted		09/26/07	EPA 504.1			09/26/07 13:00	ARM
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	09/27/07 03:26	09/26/07 13:00	BTJ
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005	09/27/07 03:26	09/26/07 13:00	BTJ
Carbamate Pesticides (Primary DW)							
Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	10/02/07 04:55		JKS
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	10/02/07 04:55		JKS
Pesticide Analyses (Primary DW)							
Glyphosate	ug/l	10 U	EPA 547	10	09/26/07 00:25		JKS
Pesticide Analyses (Primary DW)							
Date Extracted		09/25/07	EPA 548.1			09/25/07 08:30	EMF
Endothall	ug/l	20 U	EPA 548.1	20	09/27/07 00:29	09/25/07 08:30	DB
Inorganics							
Cyanide	mg/l	0.005 U	SM 4500 CN	0.005	09/28/07 14:30	09/27/07 14:00	MCD
Fluoride	mg/l	0.80	EPA 300.0	0.01	10/05/07 07:23		MLH
Foaming Agents	mg/l	0.44	SM 5540 C	0.05	09/26/07 09:45		JLS
Metals							
Thallium	mg/l	0.001 U	EPA 279.2	0.001	10/17/07 16:29		AMP
Radiochemistry							
Gross Alpha (Incl. Uranium)	pCi/l	120±6.2	EPA 00-02	2.9	10/17/07 09:03	10/15/07 09:45	MJS
Radium-226	pCi/l	29±0.5	EPA 903.1	0.07	10/17/07 14:15	10/11/07 16:00	DF
Radium-228	pCi/l	1.0±0.5 U1	EPA RA-05	1.0	10/30/07 18:13	10/27/07 16:00	DF

FDOH Laboratory No. E84129
NELAP Accredited

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q. A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

November 1, 2007
Project No: 75441

Laboratory Report

Footnotes

- * Test results presented in this report meet all the requirements of the NELAC standards.
- ** A statement of estimated uncertainty of test results is available upon request.
- | The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- U Analyte was undetected. Indicated concentration is method detection limit.
- U1 Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and matrix dependent.

A handwritten signature in black ink, appearing to read "Francis I. Daniels".



CHAIN-OF-CUSTODY RECORD

PROJECT # N0709377

Page _____ of _____

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 P.O. # _____
 Project Name Cape Coral
 Project Location: _____

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # 07-152
 REQUESTED DUE DATE: 10/2/07

Sampled By (PRINT) <u>HILARY CROOK</u>					PRESERVATIVES					ANALYSES REQUEST										Sample ID #																						
Sampler Signature <u>Hilary Crook</u>					Sample					ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	ST	Bod. Col.	TDS	Cl-804		LSF	AIL	Odor	NO ₂	NO ₃	NOx	NH ₃	TP	Col.	OP	Metals *	Total C	CH-MBAS	F-625	WV-TM	HARS	Gross A	Part 5	226/228	SOCS	Asbestos	
Bottle #	SAMPLE DESCRIPTION				DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	PH	ST	Bod. Col.	TDS	Cl-804	LSF	AIL	Odor	NO ₂	NO ₃	NOx	NH ₃	TP	Col.	OP	Metals *	Total C	CH-MBAS	F-625	WV-TM	HARS	Gross A	Part 5	226/228	SOCS	Asbestos				
	<u>Inj. Well</u>				<u>9/24/07</u>	<u>1005</u>	<u>G</u>	X					6	X	X																								<u>-01A</u>			
	↓							X					6		X																								<u>B</u>			
											X					6			X																							<u>C</u>
												X				2				X																						<u>D</u>
											X					6					X																					<u>E</u>
													X			2																										<u>F</u>
																																X									<u>G</u>	
																																	X	X	X	X						<u>H</u>
Bottle Lot #									RELINQUISHED BY / AFFILIATION				DATE	TIME	ACCEPTED BY / AFFILIATION				DATE	TIME																						
<u>A320</u> <u>C334</u> <u>6016</u> <u>6-171-</u> <u>004</u> <u>7-124</u> <u>001</u>	COMMENTS: *As, Ba, Cd, Cr, Pb, Hg, Be, Ni, Se Na, Sb, Al, Cu, Fe, Mn, Ag, Zn, Ca 10				<u>Hilary Crook</u>				<u>9/24/07</u>	<u>1200</u>	<u>JT Young</u>				<u>9-24</u>	<u>1200</u>																										
OKAY TO RUN AS IS...																																										
CLIENT INITIAL:																																										
SAMPLES ON ICE																																										
Yes No																																										

Monitor Well DZMW-1

**Upper Monitor Zone Background Water Quality
(1,090 to 1,150)**

Client Project: Cape Coral

Lab Project: N0711190

Report Date: 12/10/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0711190-01	UZMW-1 grab	Ground Water	11/20/07 13:15	11/20/07 9:45				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Alkalinity	SM2320B	110		3	mg/l CaCO3	11/26/07 13:00	BB	E84380
Aluminum	200.7	0.032	I	0.009	mg/L	11/28/07 12:31	JPW	E84380
Ammonia	SM4500-NH3-D	0.45		0.05	mg/L as N	11/28/07 10:00	AG	E84380
Antimony	200.7	0.004	I	0.002	mg/L	11/28/07 12:31	JPW	E84380
Arsenic	200.7	0.002	U	0.002	mg/L	11/28/07 12:31	JPW	E84380
Barium	200.7	0.351		0.001	mg/L	11/28/07 12:31	JPW	E84380
Beryllium	200.7	0.0001	U	0.0001	mg/L	11/28/07 12:31	JPW	E84380
BOD	SM5210B	2	U	2	mg/L	11/21/07 10:00	RB	E84380
Cadmium	200.7	0.001	U	0.001	mg/L	11/28/07 12:31	JPW	E84380
Chemical Oxygen Demand	410.4	146		8	mg/L	11/21/07 8:00	BY	E84380
Chloride	SM4500Cl-B	980		1	mg/L	11/27/07 8:30	BB	E84380
Chromium	200.7	0.001	U	0.001	mg/L	11/28/07 12:31	JPW	E84380
Color-True	SM2120B	5		1	C.U.	11/21/07 9:15	AG	E84380
Copper	200.7	0.001	U	0.001	mg/L	11/28/07 12:31	JPW	E84380
Iron	200.7	0.115		0.015	mg/L	11/28/07 12:31	JPW	E84380
Langelier Saturation Index	LSI	0.08		0.01	NONE	11/27/07 0:00	AK	E84380
Lead	200.7	0.002	I	0.001	mg/L	11/28/07 12:31	JPW	E84380
Manganese	200.7	0.077		0.001	mg/L	11/28/07 12:31	JPW	E84380
Mercury	245.1	0.001	U	0.001	mg/L	12/7/07 11:32	JPW	E84380
Nickel	200.7	0.001	U	0.001	mg/L	11/28/07 12:31	JPW	E84380
Nitrate+Nitrite-N	353.2	0.01	U	0.01	mg/L as N	11/20/07 14:01	SJ	E84380
Nitrate-N	353.2	0.01	U	0.01	mg/L as N	11/20/07 14:01	SJ	E84380
Nitrite-N	353.2	0.01	U	0.01	mg/L as N	11/20/07 13:38	SJ	E84380
Nitrogen, Organic	351.2/350.3	0.15		0.10	mg/L as N	11/29/07 18:00	BB	E84380
Nitrogen, Total Kjeldahl	351.2	0.60		0.10	mg/L as N	11/29/07 18:00	BB	E84380
Odor @ 21 deg C	SM2150B	1	U	1	TON	11/20/07 15:05	AS	E84380

Client Project: Cape Coral

Lab Project: N0711190

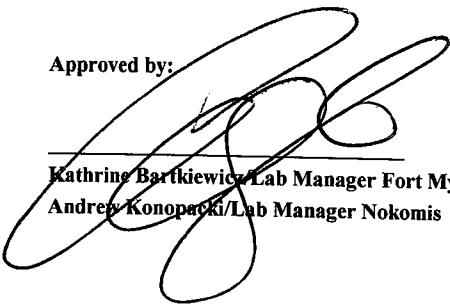
Report Date: 12/10/07

Laboratory Results

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0711190-01	UZMW-1 grab	Ground Water	11/20/07 13:15	11/20/07 9:45				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Ortho Phosphate	SM4500P-E	0.015	U	0.015	mg/L as P	11/21/07 9:45	AG	E84380
pH	SM4500H-B	7.57	Q	0.01	std units	11/20/07 17:10	AS	E84380
Phosphorus, Total	365.4	0.025	U	0.025	mg/L as P	11/29/07 19:57	BB	E84380
See attached results	Subcontract					11/26/07 8:55	SUB	
Selenium	200.7	0.002	U	0.002	mg/L	11/28/07 12:31	JPW	E84380
Silver	200.7	0.001	U	0.001	mg/L	11/28/07 12:31	JPW	E84380
Sodium	200.7	477		0.400	mg/L	11/28/07 12:31	JPW	E84380
Specific Conductivity	SM2510B	3320		0.1	µmhos/cm	11/21/07 12:00	BB	E84380
Sulfate	ASTM-D516-90	262		2	mg/L	11/20/07 18:42	AG	E84380
Total Coliform, MF	SM9222B	1	U	1	CFU/100ml	11/20/07 15:30	RF	E84380
Total Dissolved Solids	SM2540C	2040	J3	20	mg/L	11/23/07 11:15	AG/AS	E84380
Turbidity	180.1	2.0		0.1	NTU	11/21/07 10:30	BB	E84380
Zinc	200.7	0.035		0.001	mg/L	11/28/07 12:31	JPW	E84380

Approved by:

Comments:


 Kathrine Bartkiewicz/Lab Manager Fort Myers
 Andrew Konopacki/Lab Manager Nokomis

Test Results meet all the requirements of the NELAC standards.



EMSL Analytical, Inc.

19501 NE 10th Ave. Bay A, N. Miami Beach, FL 33179

Phone: (305) 650-0577 Fax: (305) 650-0578 Email: miamilab@emsl.com

Attn: **T. Bright**
Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

Customer ID: SAND53
Customer PO: N0711190
Received: 11/21/07 9:25 AM
EMSL Order: 170706906

Fax: (941) 484-6774 Phone: (941) 488-8103
Project: U2MWT

EMSL Proj:
Analysis Date: 12/5/2007
Report Date: 12/5/2007

Determination of Asbestos Structures over 10um in Length in Waste Water Performed by the EPA 100.2 Method

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
N0711190-01 170706906-0001	11/21/2007 10:00	0			0.18	0.00-0.68	<0.18	Collection Date 11/20/2007 09:45

Contact Kim Wallace at (305) 650-0577 with any questions.

Analyst(s) _____

Joe McOscar (1)

Kimberly Wallace, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as <=0.01MFL>10um. ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.

ACCREDITATIONS: NVLAP 200204-0, FL Lab ID: E86795

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 17, 2007
Project No: 77346

Laboratory Report

Project Name N0711190
Sample Description N0711190-01
Matrix Groundwater
SAL Sample Number 77346.01
Date/Time Collected 11/20/07 09:45
Date/Time Received 11/21/07 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Volatile Organic Compounds (Group II Unregulated)</u>							
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 19:43		JRW
<u>Volatile Organic Compounds (Primary DW)</u>							
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	12/03/07 18:46		JRW
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	12/03/07 18:46		JRW
1,1-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
1,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	12/03/07 18:46		JRW
Benzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2	0.3	12/03/07 18:46		JRW
cis-1,2-Dichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
Dichloromethane	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Ethylbenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Monochlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
o-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
para-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Styrene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Tetrachloroethylene	ug/l	0.97	EPA 502.2	0.2	12/03/07 18:46		JRW
Toluene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
trans-1,2-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Trichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
Vinyl chloride	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Xylenes (Total)	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
m/p-xylenes	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
o-xylene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
<u>Trihalomethane Analyses</u>							
Bromodichloromethane	ug/l	0.3 U	EPA 502.2	0.3	12/03/07 18:46		JRW
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
<u>Chlorinated Pesticides (Primary DW)</u>							
Date Extracted		12/03/07	EPA 508.1			12/03/07 09:30	CDD
Chlordane	ug/l	0.05 U	EPA 508.1	0.05	12/05/07 07:32	12/03/07 09:30	DB
Toxaphene	ug/l	0.5 U	EPA 508.1	0.5	12/05/07 07:32	12/03/07 09:30	DB
Polychlorinated biphenyls (PCBs)	ug/l	0.2 U	EPA 508.1	0.2	12/05/07 07:32	12/03/07 09:30	DB



Sanders Laboratories
 1050 Endeavor Court
 Nokomis, FL 34275-3623

December 17, 2007
Project No: 77346

Laboratory Report

Project Name	N0711190		
Sample Description	N0711190-01		
Matrix	Groundwater		
SAL Sample Number	77346.01		
Date/Time Collected	11/20/07	09:45	
Date/Time Received	11/21/07	15:30	

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides (Primary DW)							
Date Extracted		11/27/07	EPA 515.3			11/27/07 09:30	SMD
Dalapon	ug/l	1 U	EPA 515.3	1	11/29/07 12:44	11/27/07 09:30	BTJ
2,4-D	ug/l	1 U	EPA 515.3	1	11/29/07 12:44	11/27/07 09:30	BTJ
Pentachlorophenol	ug/l	0.1 U	EPA 515.3	0.1	11/29/07 12:44	11/27/07 09:30	BTJ
2,4,5-TP (Silvex)	ug/l	0.25 U	EPA 515.3	0.25	11/29/07 12:44	11/27/07 09:30	BTJ
Dinoseb	ug/l	0.5 U	EPA 515.3	0.5	11/29/07 12:44	11/27/07 09:30	BTJ
Picloram	ug/l	0.75 U	EPA 515.3	0.75	11/29/07 12:44	11/27/07 09:30	BTJ
Semivolatile Analyses (Group I Unreg.)							
Date Extracted		12/03/07	EPA 525.2			12/03/07 09:30	CDD
Aldrin	ug/l	0.08 U	EPA 525.2	0.08	12/03/07 19:26	12/03/07 09:30	BTJ
Dieldrin	ug/l	0.06 U	EPA 525.2	0.06	12/03/07 19:26	12/03/07 09:30	BTJ
Semivolatile Analyses (Primary DW)							
Date Extracted		12/03/07	EPA 525.2			12/03/07 09:30	CDD
Alachlor	ug/l	0.2 U	EPA 525.2	0.2	12/03/07 19:26	12/03/07 09:30	BTJ
Atrazine	ug/l	0.06 U	EPA 525.2	0.06	12/03/07 19:26	12/03/07 09:30	BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	12/03/07 19:26	12/03/07 09:30	BTJ
Di(2-ethylhexyl)adipate	ug/l	0.3 U	EPA 525.2	0.3	12/03/07 19:26	12/03/07 09:30	BTJ
Di(2-ethylhexyl)phthalate	ug/l	1.0 U	EPA 525.2	1.0	12/03/07 19:26	12/03/07 09:30	BTJ
Endrin	ug/l	0.1 U	EPA 525.2	0.1	12/03/07 19:26	12/03/07 09:30	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2	0.08	12/03/07 19:26	12/03/07 09:30	BTJ
Heptachlor Epoxide	ug/l	0.1 U	EPA 525.2	0.1	12/03/07 19:26	12/03/07 09:30	BTJ
Hexachlorobenzene	ug/l	0.05 U	EPA 525.2	0.05	12/03/07 19:26	12/03/07 09:30	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U	EPA 525.2	0.2	12/03/07 19:26	12/03/07 09:30	BTJ
Lindane	ug/l	0.06 U	EPA 525.2	0.06	12/03/07 19:26	12/03/07 09:30	BTJ
Methoxychlor	ug/l	0.05 U	EPA 525.2	0.05	12/03/07 19:26	12/03/07 09:30	BTJ
Simazine	ug/l	0.07 U	EPA 525.2	0.07	12/03/07 19:26	12/03/07 09:30	BTJ
Pesticide Analyses (Primary DW)							
Date Extracted		11/26/07	EPA 549.2			11/26/07 08:30	CAA
Diquat	ug/l	1 U	EPA 549.2	1	11/27/07 21:30	11/26/07 08:30	JKS
Total Haloacetic Acids Analyses							
Date Extracted		11/29/07	EPA 552.2			11/29/07 09:00	JLR
Monochloroacetic Acid	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ
Monobromoacetic Acid	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1	12/01/07 01:03	11/29/07 09:00	BTJ

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 17, 2007
Project No: 77346

Laboratory Report

Project Name	N0711190		
Sample Description	N0711190-01		
Matrix	Groundwater		
SAL Sample Number	77346.01		
Date/Time Collected	11/20/07	09:45	
Date/Time Received	11/21/07	15:30	

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Semivolatile Analyses (Group III Unreg.)

Date Extracted	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
11/26/07			EPA 625			11/26/07 09:00	SMD
2,4,6-Trichlorophenol	ug/l	2 U	EPA 625	2	12/05/07 22:57	11/26/07 09:00	BTJ
2,4-Dinitrotoluene	ug/l	1 U	EPA 625	1	12/05/07 22:57	11/26/07 09:00	BTJ
2-Chlorophenol	ug/l	1 U	EPA 625	1	12/05/07 22:57	11/26/07 09:00	BTJ
4,6-Dinitro-o-cresol	ug/l	3 U	EPA 625	3	12/05/07 22:57	11/26/07 09:00	BTJ
Butylbenzylphthalate	ug/l	3 U	EPA 625	3	12/05/07 22:57	11/26/07 09:00	BTJ
Diethylphthalate	ug/l	1 U	EPA 625	1	12/05/07 22:57	11/26/07 09:00	BTJ
Dimethylphthalate	ug/l	5 U	EPA 625	5	12/05/07 22:57	11/26/07 09:00	BTJ
Di-n-butylphthalate	ug/l	5 U	EPA 625	5	12/05/07 22:57	11/26/07 09:00	BTJ
Di-n-octylphthalate	ug/l	1 U	EPA 625	1	12/05/07 22:57	11/26/07 09:00	BTJ
Isophorone	ug/l	2 U	EPA 625	2	12/05/07 22:57	11/26/07 09:00	BTJ
Phenol	ug/l	1 U	EPA 625	1	12/05/07 22:57	11/26/07 09:00	BTJ

Pesticide Analyses (Primary DW)

Date Extracted	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
11/29/07			EPA 504.1			11/29/07 15:45	CAA
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	11/30/07 03:49	11/29/07 15:45	BTJ
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005	11/30/07 03:49	11/29/07 15:45	BTJ

Carbamate Pesticides (Group I Unreg.)

Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS

Carbamate Pesticides (Primary DW)

Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS

Pesticide Analyses (Primary DW)

Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
ug/l	10 U	EPA 547	10	11/27/07 01:21		JKS

Pesticide Analyses (Primary DW)

Date Extracted	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
11/24/07			EPA 548.1			11/24/07 09:30	CAA
Endothal	ug/l	20 U	EPA 548.1	20	12/03/07 18:06	11/24/07 09:30	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 17, 2007
Project No: 77346

Laboratory Report

Project Name N0711190
Sample Description N0711190-01
Matrix Groundwater
SAL Sample Number 77346.01
Date/Time Collected 11/20/07 09:45
Date/Time Received 11/21/07 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Inorganics</u>							
Cyanide, Total	mg/l	0.005 U	EPA 335.2	0.005	11/30/07 15:25	11/27/07 13:00	MCD
Fluoride	mg/l	0.68	EPA 300.0	0.01	12/04/07 01:20		MLH
Surfactants-MBAS as LAS, mol wt 342	mg/l	0.053 I	SM 5540 C	0.05	11/21/07 17:05		MEJ
<u>Metals</u>							
Thallium	mg/l	0.001 U	EPA 279.2	0.001	11/26/07 17:17	11/23/07 09:40	LCB
<u>Radiochemistry</u>							
Gross Alpha (Incl. Uranium)	pCi/l	20±2.7	EPA 00-02	2.9	12/07/07 21:06	12/05/07 10:00	MJS
Radium-226	pCi/l	4.8±0.4	EPA 903.1	0.07	12/07/07 14:00	11/30/07 11:00	AWW
Radium-228	pCi/l	0.5±0.3 U1	EPA RA-05	0.5	12/14/07 17:45	12/11/07 14:15	AWW

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 17, 2007
Project No: 77346

Laboratory Report

Footnotes

- * Test results presented in this report meet all the requirements of the NELAC standards.
- ** A statement of estimated uncertainty of test results is available upon request.
- *** For methods marked with ***, all QC criteria have been met for this method which is equivalent to a SAL certified method.
- I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- U Analyte was undetected. Indicated concentration is method detection limit.
- U1 Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and matrix dependent.

A handwritten signature in black ink, appearing to read "Francis I. Daniels".



CHAIN-OF-CUSTODY RECORD

PROJECT # NO711190

Page 1 of 2

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 P.O. # _____
 Project Name North Cape Coral
 Project Location: _____

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # 07-182
 REQUESTED DUE DATE: 11/28/07

Sampled By (PRINT)					PRESERVATIVES					ANALYSES REQUEST										Sample ID #									
Sampler Signature					ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	THID	PH	Conduct	Color	LST	Odor	NO ₂ -NO ₃ -NO _x	NH ₃ -DANIT-TAN	TP, Cad	OP		Metals*	Total C.	CN-	MBAS, F-					
Bottle #	SAMPLE DESCRIPTION																			DATE					TIME	TYPE			
	U2MW-1				11/20	9:45	G	X							X	X									-01A				
	↓							X							X									B					
								X										X										C	
											X								X	X								D	
								X												X								E	
												X									X							F	
													X										X						G
														X											X	X			H
Bottle Lot #	RELINQUISHED BY / AFFILIATION				DATE	TIME	ACCEPTED BY / AFFILIATION		DATE	TIME																			
4300	[Signature]				11-20	1315	[Signature]		11-20	1315																			
COMMENTS: E-00301L 7-124001 6-171004 As, Ba, Cd, Cr, Pb, Hg Be, Ni, Se, Nq, Sb, Al Cu, Fe, Mn, Ag, Zn, Co					OKAY TO RUN AS IS... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No																								
CLIENT INITIAL:					SAMPLES ON ICE																								
					<input checked="" type="radio"/> Yes <input type="radio"/> No																								

Monitor Well DZMW-1

**Lower Monitor Zone Background Water Quality
(1,310 to 1,348)**

Client Project: Cape Coral

Lab Project: N0711172

Report Date: 12/05/07



Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0711172-01	LZMW-1 grab	Ground Water	11/14/07 14:20	11/14/07 12:50				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Air Temperature-field	170.1	26.7		0.1	C	11/14/07 12:50	HC	E84380
Alkalinity	SM2320B	120		3	mg/l CaCO3	11/26/07 13:00	BB	E84380
Aluminum	200.7	0.034	I	0.009	mg/L	11/27/07 16:48	JPW	E84380
Ammonia	SM4500-NH3-D	0.14	I	0.05	mg/L as N	11/15/07 14:15	AG	E84380
Antimony	200.7	0.002	U	0.002	mg/L	11/27/07 16:48	JPW	E84380
Arsenic	200.7	0.002	U	0.002	mg/L	11/27/07 16:48	JPW	E84380
Barium	200.7	0.734		0.001	mg/L	11/27/07 16:48	JPW	E84380
Beryllium	200.7	0.0001	U	0.0001	mg/L	11/27/07 16:48	JPW	E84380
BOD	SM5210B	2	U	2	mg/L	11/16/07 9:00	BB	E84380
Cadmium	200.7	0.001	U	0.001	mg/L	11/27/07 16:48	JPW	E84380
Chemical Oxygen Demand	410.4	1880		8	mg/L	11/21/07 8:00	BY	E84380
Chloride	SM4500Cl-B	18400		1	mg/L	11/19/07 9:00	BB	E84380
Chromium	200.7	0.002	I	0.001	mg/L	11/27/07 16:48	JPW	E84380
Color-True	SM2120B	5		1	PtCo units	11/15/07 13:00	AG	E84380
Copper	200.7	0.013		0.001	mg/L	11/27/07 16:48	JPW	E84380
Dissolved Oxygen-field	360.1	2.71		0.01	mg/L	11/14/07 12:50	HC	E84380
Iron	200.7	0.304		0.015	mg/L	11/27/07 16:48	JPW	E84380
Langelier Saturation Index	LSI	1.11		0.01	NONE	11/27/07 0:00	AK	E84380
Lead	200.7	0.006		0.001	mg/L	11/27/07 16:48	JPW	E84380
Manganese	200.7	0.010		0.001	mg/L	11/27/07 16:48	JPW	E84380
Mercury	245.1	0.001	U	0.001	mg/L	11/15/07 14:21	JPW	E84380
Nickel	200.7	0.003	I	0.001	mg/L	11/27/07 16:48	JPW	E84380
Nitrate+Nitrite-N	353.2	0.01	U	0.01	mg/L as N	11/14/07 16:01	SJ	E84380
Nitrate-N	353.2	0.01	U	0.01	mg/L as N	11/14/07 16:01	SJ	E84380
Nitrite-N	353.2	0.01	U	0.01	mg/L as N	11/14/07 15:39	SJ	E84380
Nitrogen, Organic	351.2/350.3	0.38		0.10	mg/L as N	11/29/07 18:00	BB	E84380

Client Project: Cape Coral

Lab Project: N0711172

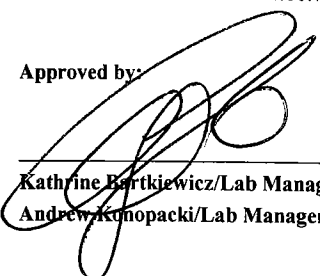
Report Date: 12/05/07

Laboratory Results

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time				
N0711172-01	LZMW-1 grab	Ground Water	11/14/07 14:20	11/14/07 12:50				
Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Nitrogen, Total Kjeldahl	EPA351.2	0.52		0.10	mg/L as N	11/29/07 18:00	BB	E84380
Odor @ 23 deg C	SM2150B	1	U	1	TON	11/14/07 15:30	AS	E84380
Ortho Phosphate	SM4500P-E	0.018	I	0.015	mg/L as P	11/14/07 15:00	AG	E84380
pH - field	150.1	7.78		0.01	std units	11/14/07 12:50	HC	E84380
Phosphorus, Total	EPA365.4	0.053	I	0.025	mg/L as P	11/29/07 19:57	BB	E84380
See attached results	Subcontract					11/15/07 10:58	SUB	
Selenium	200.7	0.005	I	0.002	mg/L	11/27/07 16:48	JPW	E84380
Silver	200.7	0.004	J3	0.001	mg/L	11/27/07 16:48	JPW	E84380
Sodium	200.7	11000		0.400	mg/L	11/27/07 16:48	JPW	E84380
Specific Conductance-field	120.1	44200		0.1	µmhos/cm	11/14/07 12:50	HC	E84380
Sulfate	ASTM-D516-90	2690		2	mg/L	11/20/07 18:42	AG	E84380
Total Coliform, MF	SM9222B	1	U	1	CFU/100ml	11/14/07 15:10	RF	E84380
Total Dissolved Solids	SM2540C	31400		20	mg/L	11/15/07 15:35	AS	E84380
Turbidity - field	EPA180.1	9.1		0.1	NTU	11/14/07 12:50	HC	E84380
Water Temperature-field	170.1	32.4		0.1	C	11/14/07 12:50	HC	E84380
Weather-field	DEPSOP	p. cloudy		n/a	none	11/14/07 12:50	HC	E84380
Zinc	200.7	0.037		0.001	mg/L	11/27/07 16:48	JPW	E84380

Approved by:

Comments:



Kathrine Bartkiewicz/Lab Manager Fort Myers
Andrew Konopacki/Lab Manager Nokomis

Test Results meet all the requirements of the NELAC standards.



EMSL Analytical, Inc.

19501 NE 10th Ave. Bay A, N. Miami Beach, FL 33179

Phone: (305) 650-0577 Fax: (305) 650-0578 Email: miamilab@emsl.com

Attn: **T. Bright**
Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

Fax: (941) 484-6774 Phone: (941) 488-8103
Project: **L2MW-1**

Customer ID: SAND53
Customer PO: N0711172
Received: 11/16/07 9:52 AM
EMSL Order: 170706817
EMSL Proj:
Analysis Date: 11/19/2007
Report Date: 11/29/2007

**Determination of Asbestos Structures in Water Performed by the 100.2 Method
(EPA/600/R-94/134)**

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
N0711172-01 170706817-0001	11/16/2007 11:00	0			0.18	0.00-0.68	<0.18	Collection Date 11/14/2007 12:50

Contact Kim Wallace at (305) 650-0577 with any questions.

Analyst(s)

Joe McOscar (1)

Kimberly Wallace, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as $\leq 0.01\text{MFL} > 10\mu\text{m}$. ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to the samples reported above. Samples received in good condition unless otherwise noted.

ACCREDITATIONS: NVLAP C200204-0, FL Lab ID: DOH E86795

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 18, 2007
Project No: 77127

Laboratory Report

Project Name N0711172
Sample Description N0711172-01
Matrix Groundwater
SAL Sample Number 77127.01
Date/Time Collected 11/14/07 12:50
Date/Time Received 11/15/07 10:03

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Volatile Organic Compounds (Group II Unregulated)</u>							
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
<u>Volatile Organic Compounds (Primary DW)</u>							
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	11/21/07 05:36		JRW
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	11/21/07 05:36		JRW
1,1-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
1,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	11/21/07 05:36		JRW
Benzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2	0.3	11/21/07 05:36		JRW
cis-1,2-Dichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
Dichloromethane	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Ethylbenzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Monochlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
o-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
para-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Styrene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Tetrachloroethylene	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
Toluene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
trans-1,2-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Trichloroethylene	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
Vinyl chloride	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Xylenes (Total)	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
m/p-xylenes	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
o-xylene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
<u>Trihalomethane Analyses</u>							
Bromodichloromethane	ug/l	0.3 U	EPA 502.2	0.3	11/21/07 05:36		JRW
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 502.2	0.2	11/21/07 05:36		JRW
<u>Chlorinated Pesticides (Primary DW)</u>							
Date Extracted		11/16/07	EPA 508.1			11/16/07 09:00	ARM
Chlordane	ug/l	0.05 U	EPA 508.1	0.05	11/21/07 11:40	11/16/07 09:00	DB
Toxaphene	ug/l	0.5 U	EPA 508.1	0.5	11/21/07 11:40	11/16/07 09:00	DB
Polychlorinated biphenyls (PCBs)	ug/l	0.2 U	EPA 508.1	0.2	11/21/07 11:40	11/16/07 09:00	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 18, 2007
Project No: 77127

Laboratory Report

Project Name **N0711172**
 Sample Description **N0711172-01**
 Matrix **Groundwater**
 SAL Sample Number **77127.01**
 Date/Time Collected **11/14/07 12:50**
 Date/Time Received **11/15/07 10:03**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides (Primary DW)							
Date Extracted		11/16/07	EPA 515.3			11/16/07 09:00	SMD
Dalapon	ug/l	1 U	EPA 515.3	1	11/18/07 02:44	11/16/07 09:00	BTJ
2,4-D	ug/l	1 U	EPA 515.3	1	11/18/07 02:44	11/16/07 09:00	BTJ
Pentachlorophenol	ug/l	0.1 U	EPA 515.3	0.1	11/18/07 02:44	11/16/07 09:00	BTJ
2,4,5-TP (Silvex)	ug/l	0.25 U	EPA 515.3	0.25	11/18/07 02:44	11/16/07 09:00	BTJ
Dinoseb	ug/l	0.5 U	EPA 515.3	0.5	11/18/07 02:44	11/16/07 09:00	BTJ
Picloram	ug/l	0.75 U	EPA 515.3	0.75	11/18/07 02:44	11/16/07 09:00	BTJ
Semivolatile Analyses (Group I Unreq.)							
Date Extracted		11/20/07	EPA 525.2			11/20/07 09:00	SMD
Aldrin	ug/l	0.08 U	EPA 525.2	0.08	11/20/07 18:59	11/20/07 09:00	BTJ
Dieldrin	ug/l	0.06 U	EPA 525.2	0.06	11/20/07 18:59	11/20/07 09:00	BTJ
Semivolatile Analyses (Primary DW)							
Date Extracted		11/20/07	EPA 525.2			11/20/07 09:00	SMD
Alachlor	ug/l	0.2 U	EPA 525.2	0.2	11/20/07 18:59	11/20/07 09:00	BTJ
Atrazine	ug/l	0.06 U	EPA 525.2	0.06	11/20/07 18:59	11/20/07 09:00	BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	11/20/07 18:59	11/20/07 09:00	BTJ
Di(2-ethylhexyl)adipate	ug/l	0.86 C2,I	EPA 525.2	0.3	11/20/07 18:59	11/20/07 09:00	BTJ
Di(2-ethylhexyl)phthalate	ug/l	1.0 U	EPA 525.2	1.0	11/20/07 18:59	11/20/07 09:00	BTJ
Endrin	ug/l	0.1 U	EPA 525.2	0.1	11/20/07 18:59	11/20/07 09:00	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2	0.08	11/20/07 18:59	11/20/07 09:00	BTJ
Heptachlor Epoxide	ug/l	0.1 U	EPA 525.2	0.1	11/20/07 18:59	11/20/07 09:00	BTJ
Hexachlorobenzene	ug/l	0.05 U	EPA 525.2	0.05	11/20/07 18:59	11/20/07 09:00	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U	EPA 525.2	0.2	11/20/07 18:59	11/20/07 09:00	BTJ
Lindane	ug/l	0.06 U	EPA 525.2	0.06	11/20/07 18:59	11/20/07 09:00	BTJ
Methoxychlor	ug/l	0.05 U	EPA 525.2	0.05	11/20/07 18:59	11/20/07 09:00	BTJ
Simazine	ug/l	0.07 U	EPA 525.2	0.07	11/20/07 18:59	11/20/07 09:00	BTJ
Pesticide Analyses (Primary DW)							
Date Extracted		11/19/07	EPA 549.2			11/19/07 10:00	CAA
Diquat	ug/l	1 U	EPA 549.2	1	11/20/07 16:15	11/19/07 10:00	JKS
Total Haloacetic Acids Analyses							
Date Extracted		11/27/07	EPA 552.2			11/27/07 09:00	CDD
Monochloroacetic Acid	ug/l	66 Note3	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ
Monobromoacetic Acid	ug/l	1 U	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ
Total Haloacetic Acids	ug/l	66	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 18, 2007
Project No: 77127

Laboratory Report

Project Name N0711172
Sample Description N0711172-01
Matrix Groundwater
SAL Sample Number 77127.01
Date/Time Collected 11/14/07 12:50
Date/Time Received 11/15/07 10:03

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses (Group III Unreg.)							
Date Extracted		11/19/07	EPA 625			11/19/07 09:00	SMD
2,4,6-Trichlorophenol	ug/l	2 U	EPA 625	2	11/30/07 21:48	11/19/07 09:00	BTJ
2,4-Dinitrotoluene	ug/l	1 U	EPA 625	1	11/30/07 21:48	11/19/07 09:00	BTJ
2-Chlorophenol	ug/l	1 U	EPA 625	1	11/30/07 21:48	11/19/07 09:00	BTJ
4,6-Dinitro-o-cresol	ug/l	3 U	EPA 625	3	11/30/07 21:48	11/19/07 09:00	BTJ
Butylbenzylphthalate	ug/l	3 U	EPA 625	3	11/30/07 21:48	11/19/07 09:00	BTJ
Diethylphthalate	ug/l	1 U	EPA 625	1	11/30/07 21:48	11/19/07 09:00	BTJ
Dimethylphthalate	ug/l	5 U	EPA 625	5	11/30/07 21:48	11/19/07 09:00	BTJ
Di-n-butylphthalate	ug/l	5 U	EPA 625	5	11/30/07 21:48	11/19/07 09:00	BTJ
Di-n-octylphthalate	ug/l	1 U	EPA 625	1	11/30/07 21:48	11/19/07 09:00	BTJ
Isophorone	ug/l	2 U	EPA 625	2	11/30/07 21:48	11/19/07 09:00	BTJ
Phenol	ug/l	1 U	EPA 625	1	11/30/07 21:48	11/19/07 09:00	BTJ
Pesticide Analyses (Primary DW)							
Date Extracted		11/15/07	EPA 504.1			11/15/07 17:30	ARM
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	11/16/07 11:32	11/15/07 17:30	DB
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005	11/16/07 11:32	11/15/07 17:30	DB
Carbamate Pesticides (Group I Unreg.)							
Aldicarb	ug/l	0.5 U	EPA 531.1	0.5	11/24/07 08:33		JKS
Aldicarb sulfone	ug/l	0.5 U	EPA 531.1	0.5	11/24/07 08:33		JKS
Aldicarb sulfoxide	ug/l	0.5 U	EPA 531.1	0.5	11/24/07 08:33		JKS
Carbamate Pesticides (Primary DW)							
Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	11/24/07 08:33		JKS
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	11/24/07 08:33		JKS
Pesticide Analyses (Primary DW)							
Glyphosate	ug/l	10 U	EPA 547	10	11/19/07 18:32		JKS
Pesticide Analyses (Primary DW)							
Date Extracted		11/17/07	EPA 548.1			11/16/07 08:30	EMF
Endothall	ug/l	20 U	EPA 548.1	20	11/26/07 18:38	11/16/07 08:30	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 18, 2007
Project No: 77127

Laboratory Report

Project Name	N0711172		
Sample Description	N0711172-01		
Matrix	Groundwater		
SAL Sample Number	77127.01		
Date/Time Collected	11/14/07	12:50	
Date/Time Received	11/15/07	10:03	

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Inorganics</u>							
Cyanide	mg/l	0.005 U	SM 4500 CN	0.005	11/17/07 14:45	11/16/07 10:00	MCD
Fluoride	mg/l	1.2	EPA 300.0	0.01	11/23/07 21:33		MLH
Foaming Agents	mg/l	0.21	SM 5540 C	0.05	11/15/07 16:32		MCD
<u>Metals</u>							
Thallium	mg/l	0.001 U	EPA 279.2	0.001	11/26/07 17:17	11/17/07 12:30	LCB
<u>Radiochemistry</u>							
Gross Alpha (Incl. Uranium)	pCi/l	29±3.1	EPA 00-02	2.9	11/20/07 15:02	11/19/07 11:00	MJS
Radium-226	pCi/l	9.8±0.3	EPA 903.1	0.03	12/04/07 14:00	11/28/07 11:00	AWW
Radium-228	pCi/l	0.6±0.3 U1	EPA RA-05	0.6	12/11/07 12:46	12/05/07 12:00	AWW

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

December 18, 2007
Project No: 77127

Laboratory Report

Footnotes

- * Test results presented in this report meet all the requirements of the NELAC standards.
- ** A statement of estimated uncertainty of test results is available upon request.
- *** For methods marked with ***, all QC criteria have been met for this method which is equivalent to a SAL certified method.
- C2,1 Analyte confirmed by analysis of a second aliquot of sample. The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- Note3 Reanalysis of a second aliquot of sample beyond the accepted holding time did not confirm the presence of the compound. Laboratory contamination is suspected.
- U Analyte was undetected. Indicated concentration is method detection limit.
- U1 Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and matrix dependent.

A handwritten signature in black ink, appearing to read "Francis I. Daniels".



CHAIN-OF-CUSTODY RECORD

PROJECT # NO711172

Page 1 of 2

Client Youngquist
 Address _____
 Phone _____ Fax _____

Report To: _____
 Bill To: _____
 P.O. # _____
 Project Name North Cape Coral
 Project Location: _____

Sample Supply: GW
 Customer Type: _____
 Field Report #: _____
 Kit # 07-181
 REQUESTED DUE DATE: 11/22/07

Sampled By (PRINT)		Sample			PRESERVATIVES						ANALYSES REQUEST										Sample ID #								
SAMPLER SIGNATURE		DATE	TIME	TYPE	ICE	UNPRESERVED	H ₂ SO ₄	HNO ₃	HCL	THIO	Bod	Tol	Cl ₂	Sb	As	Ai	Odor	Nb ₂	Nb ₃	Nb ₄	TP	Cod	OP	Metals *	Total C.	Cu-	MISAS, F-	Sample ID #	
SAMPLED BY (PRINT)																													
SAMPLER SIGNATURE																													
Bottle #	SAMPLE DESCRIPTION																												
	LZMW-1	11/14/07	1420	G		X					X	X																-01A	
	↓					X							X															B	
						X								X															C
								X																					D
							X																						E
									X																				F
										X																			G
											X																		H
Bottle Lot #		RELINQUISHED BY / AFFILIATION			DATE	TIME	ACCEPTED BY / AFFILIATION			DATE	TIME																		
		HILARY CROOK			11/14/07	1420	Ureaga			11/14/07	1420																		
COMMENTS:		OKAY TO RUN AS IS...																											
* As, Ba, Cd, Cr, Pb, Hg Be, Ni, Se, Na, Sb, Al Cu, Fe, Mn, Ag, Zn, Ca		CLIENT INITIAL:																											
		SAMPLES ON ICE																											
		Yes <input checked="" type="radio"/> No <input type="radio"/>																											

Injection Test Source

North Cape Production Well No. 17

Lab Project Summary

Lab Project #: N0607116
Client: Diversified Drilling Corp.
5620 Lee Street

Total Pages: 12

Phone: Lehigh Acres FL 33971
239-368-6404
Fax: 239-368-6716
E-mail:
Client Project Name: Cape Coral
Laboratory Contact: Tami Bright

17 N

QUALIFIER DEFINITIONS

- B: Results based upon colony counts outside the acceptable range.
 - I: The reported value is between the laboratory MDL and the laboratory PQL.
 - J3: The reported value failed to meet the established quality control criteria.
 - J4: The sample matrix interfered with the ability to make an accurate determination.
 - J5: The data is questionable because of improper lab or field protocols.
 - K: Off scale low, actual value is less than the value given.
 - L: Off scale high, actual value is known to be greater than the value given.
 - Q: Sample held beyond acceptable holding time.
 - U: The compound was analyzed for, but not detected.
 - V: The analyte was detected in both the sample and the associated method blank.
 - Y: The sample was unpreserved or improperly preserved.
 - Z: Too many colonies present (TNTC).
- * Exceeds acceptable drinking water limits, per FAC 62-550.
** This is an uncertified result.
HACH results are uncertified.

A statement of estimated uncertainty of results is available upon request.

Laboratory report shall not be reproduced except in full, without the written approval of Sanders Laboratories.

Sanders Laboratories follows DEP standard operating procedures for field sampling.

Laboratory PQL's are set at 4 times the laboratory MDL's.

Reports are archived for a minimum of 5 years. Copies of reports which are less than 1 year old are available for a fee of \$25.00 per report. Reports older than 1 year are available for a fee of \$50.00 per report. Copies will be provided within 1 week of the time of the request.

Client Project: Cape Coral

Lab Project: N0607116

Report Date: 08/03/06



Laboratory Results

Diversified Drilling Corp.
5620 Lee Street
Lehigh Acres, FL 33971

<u>Lab ID</u>	<u>Sample Description</u>		<u>Sample Source</u>	<u>Received Date/Time</u>	<u>Sample Date/Time</u>			
N0607116-01	Well NW-17N grab		Ground Water	7/12/06 13:30	7/12/06 8:20			
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<u>Detection Limit</u>	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Air Temperature-field	170.1	27.2		0.1	C	7/12/06 8:20	NO	E84380
Aluminum	200.7	0.005	U	0.005	mg/L	7/24/06 10:46	JPW	E84380
Ammonium-N	350.3	0.32		0.05	mg/L as N	7/20/06 13:00	BY	E84380
Antimony	200.7	0.002	U	0.002	mg/L	7/24/06 10:46	JPW	E84380
Arsenic	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Barium	200.7	0.034		0.001	mg/L	7/24/06 10:46	JPW	E84380
Beryllium	200.7	0.0001	I	0.0001	mg/L	7/24/06 10:46	JPW	E84380
Bicarbonate Alkalinity	4500CO2-D	123		3	mg/l CaCO3	7/18/06 11:30	EE	E84380
Cadmium	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Calcium	200.7	108		0.004	mg/L	7/24/06 10:46	JPW	E84380
Carbon Dioxide-Total	4500CO2-D	109		0.10	mg/L	7/18/06 11:30	EE	E84380
Carbonate Alkalinity	4500CO2-D	0.80		0.01	mg/l CaCO3	7/18/06 11:30	EE	E84380
Chloride	4500Cl-B	810		1	mg/L	7/20/06 10:30	EE	E84380
Chromium	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Color-True	2120B	1	U	1	PtCo C.U.	7/13/06 9:15	EE	E84380
Copper	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Dissolved Oxygen-field	360.1	3.53		0.01	mg/L	7/12/06 8:20	NO	E84380
Iron	200.7	0.009	U	0.009	mg/L	7/24/06 10:46	JPW	E84380

Client Project: Cape Coral

Lab Project: N0607116

Report Date: 08/03/06

Laboratory Results

<u>Lab ID</u>	<u>Sample Description</u>	<u>Sample Source</u>	<u>Received Date/Time</u>	<u>Sample Date/Time</u>				
N0607116-01	Well NW-17N grab	Ground Water	7/12/06 13:30	7/12/06 8:20				
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<u>Detection Limit</u>	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Lead	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Magnesium	200.7	89.2		0.005	mg/L	7/24/06 10:46	JPW	E84380
Manganese	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Mercury	245.1	0.001	U	0.001	mg/L	8/2/06 10:47	JPW	E84380
Nickel	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Nitrate-N	353.2	0.01	U	0.01	mg/L as N	7/12/06 15:21	SJ	E84380
Nitrite-N	353.2	0.01	U	0.01	mg/L as N	7/12/06 14:55	SJ	E84380
Odor	SM2150B	8		1	TON	7/12/06 14:30	EE	E84380
pH	150.1	7.36	Q	0.01	S.U.	7/12/06 14:30	EE	E84380
pH - field	150.1	6.85		0.01	S.U.	7/12/06 8:20	NO	E84380
Potassium	200.7	12.0		0.030	mg/L	7/24/06 10:46	JPW	E84380
See attached results	Subcontract					7/17/06 12:19	SUB	
Selenium	200.7	0.003	U	0.003	mg/L	7/24/06 10:46	JPW	E84380
Silica	370.1	14.0	J3	1	mg/L	7/18/06 9:30	BY	E84380
Silver	200.7	0.001	U	0.001	mg/L	7/24/06 10:46	JPW	E84380
Sodium	200.7	297		0.300	mg/L	7/24/06 10:46	JPW	E84380
Specific Conductance-field	120.1	1680		0.1	us/cm	7/12/06 8:20	NO	E84380
Sulfate	375.4	265		1	mg/L	7/14/06 10:00	EE	E84380
Thallium	200.7	0.002	U	0.002	mg/L	7/24/06 10:46	JPW	E84380
Total Coliform, MF	9222B	1	U	1	CFU/100ml	7/12/06 13:50	RG	E84380
Total Dissolved Solids	160.1	1800		10	mg/L	7/14/06 9:40	BB	E84380

Client Project: Cape Coral
 Lab Project: N0607116
 Report Date: 08/03/06

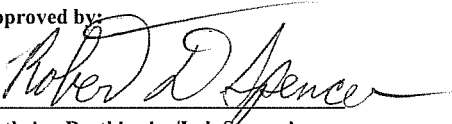
Laboratory Results

<u>Lab ID</u>	<u>Sample Description</u>	<u>Sample Source</u>	<u>Received Date/Time</u>	<u>Sample Date/Time</u>
N0607116-01	Well NW-17N grab	Ground Water	7/12/06 13:30	7/12/06 8:20

<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<u>Detection Limit</u>	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Total Suspended Solids	160.2	0.6	U	0.6	mg/L	7/13/06 11:25	BB	E84380
Turbidity	180.1	0.1	U	0.1	NTU	7/13/06 8:15	EE	E84380
Water Temperature-field	170.1	28.2		0.1	C	7/12/06 8:20	NO	E84380
Weather-field	DEPSOP	clear		n/a	none	7/12/06 8:20	NO	E84380
Zinc	200.7	0.001	I	0.001	mg/L	7/24/06 10:46	JPW	E84380

Approved by:

Comments:



Kathrine Bartkiewicz/Lab Supervisor
 Robert Spencer/Lab Manager

Test Results meet all the requirements of the NELAC standards.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name N0607116
Sample Description N0607116-01
Matrix Wastewater
SAL Sample Number 61392.01
Date/Time Collected 07/12/06 08:20
Date/Time Received 07/12/06 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Semivolatile Analyses (Primary DW)

Date Extracted		07/19/06	EPA 525.2			07/19/06 09:30	ARM
Alachlor	ug/l	0.2 U	EPA 525.2	0.2	07/20/06 14:38	07/19/06 09:30	BTJ
Atrazine	ug/l	0.06 U	EPA 525.2	0.06	07/20/06 14:38	07/19/06 09:30	BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Di(2-ethylhexyl)adipate	ug/l	0.3 U	EPA 525.2	0.3	07/20/06 14:38	07/19/06 09:30	BTJ
Di(2-ethylhexyl)phthalate	ug/l	1.0 U	EPA 525.2	1.0	07/20/06 14:38	07/19/06 09:30	BTJ
Endrin	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2	0.08	07/20/06 14:38	07/19/06 09:30	BTJ
Heptachlor Epoxide	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Hexachlorobenzene	ug/l	0.05 U	EPA 525.2	0.05	07/20/06 14:38	07/19/06 09:30	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U	EPA 525.2	0.2	07/20/06 14:38	07/19/06 09:30	BTJ
Lindane	ug/l	0.06 U	EPA 525.2	0.06	07/20/06 14:38	07/19/06 09:30	BTJ
Methoxychlor	ug/l	0.05 U	EPA 525.2	0.05	07/20/06 14:38	07/19/06 09:30	BTJ
Simazine	ug/l	0.07 U	EPA 525.2	0.07	07/20/06 14:38	07/19/06 09:30	BTJ

Pesticide Analyses (Primary DW)

Date Extracted		07/14/06	EPA 549.2			07/14/06 13:00	ARM
Diquat	ug/l	1 U	EPA 549.2	1	07/21/06 14:11	07/14/06 13:00	JKS

Total Trihalomethane Analyses

Bromodichloromethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Bromoform	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Chloroform	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW

Organochlorine Pesticides and PCBs

Aldrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
alpha-BHC	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
beta-BHC	ug/l	0.02 U	EPA 608	0.02	07/20/06 22:16	07/19/06 10:00	DB
delta-BHC	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Lindane	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Chlordane	ug/l	0.05 U	EPA 608	0.05	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDD	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDE	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDT	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Dieldrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan I	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan II	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan sulfate	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name N0607116
Sample Description N0607116-01
Matrix Wastewater
SAL Sample Number 61392.01
Date/Time Collected 07/12/06 08:20
Date/Time Received 07/12/06 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Organochlorine Pesticides and PCBs

Endrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endrin aldehyde	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Heptachlor	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Heptachlor epoxide	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Methoxychlor	ug/l	0.02 U	EPA 608	0.02	07/20/06 22:16	07/19/06 10:00	DB
Toxaphene	ug/l	0.5 U	EPA 608	0.5	07/20/06 22:16	07/19/06 10:00	DB
PCB-1016	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1221	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
Propachlor	ug/l	0.5 U	EPA 608	0.5	07/20/06 22:16	07/19/06 10:00	DB
PCB-1232	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1242	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1248	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1254	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1260	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB

Chlorinated Herbicides

2,4,5-T	ug/l	0.4 U	SM 6640 B	0.4	07/19/06 10:34	07/18/06 09:00	BTJ
2,4,5-TP (Silvex)	ug/l	0.25 U	SM 6640 B	0.25	07/19/06 10:34	07/18/06 09:00	BTJ
2,4-D	ug/l	1.0 U	SM 6640 B	1.0	07/19/06 10:34	07/18/06 09:00	BTJ
2,4-DB	ug/l	2.5 U	SM 6640 B	2.5	07/19/06 10:34	07/18/06 09:00	BTJ
Acifluorfen	ug/l	0.75 U	SM 6640 B	0.75	07/19/06 10:34	07/18/06 09:00	BTJ
Dalapon	ug/l	1 U	SM 6640 B	1	07/19/06 10:34	07/18/06 09:00	BTJ
DCPA	ug/l	0.5 U	SM 6640 B	0.5	07/19/06 10:34	07/18/06 09:00	BTJ
Dicamba	ug/l	0.25 U	SM 6640 B	0.25	07/19/06 10:34	07/18/06 09:00	BTJ
Dichlorprop	ug/l	1 U	SM 6640 B	1	07/19/06 10:34	07/18/06 09:00	BTJ
Dinoseb	ug/l	0.5 U	SM 6640 B	0.5	07/19/06 10:34	07/18/06 09:00	BTJ
Pentachlorophenol	ug/l	0.10 U	SM 6640 B	0.10	07/19/06 10:34	07/18/06 09:00	BTJ
Picloram	ug/l	0.75 U	SM 6640 B	0.75	07/19/06 10:34	07/18/06 09:00	BTJ

Total Haloacetic Acids Analyses

Date Extracted		07/21/06	EPA 552.2			07/21/06 09:00	ARM
Monochloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Monobromoacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ

Pesticide Analyses (Primary DW)

Date Extracted		07/17/06	EPA 504.1			07/17/06 10:45	SDO
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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name N0607116
Sample Description N0607116-01
Matrix Wastewater
SAL Sample Number 61392.01
Date/Time Collected 07/12/06 08:20
Date/Time Received 07/12/06 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Pesticide Analyses (Primary DW)</u>							
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	07/17/06 21:20	07/17/06 10:45	BTJ
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005	07/17/06 21:20	07/17/06 10:45	BTJ
<u>Carbamate Pesticides (Primary DW)</u>							
Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	07/19/06 16:56		JKS
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	07/19/06 16:56		JKS
<u>Pesticide Analyses (Primary DW)</u>							
Glyphosate	ug/l	10 U	EPA 547	10	07/20/06 14:56		JKS
<u>Pesticide Analyses (Primary DW)</u>							
Date Extracted		07/17/06	EPA 548.1			07/17/06 11:30	SDO
Endothall	ug/l	20 U	EPA 548.1	20	07/19/06 19:32	07/17/06 11:30	DB
<u>Purgeable Halocarbons</u>							
Bromodichloromethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Bromoform	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Bromomethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Chlorobenzene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Chloroethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
2-Chloroethyl vinyl ether	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Chloroform	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Chloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,2-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,3-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,4-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Dichlorodifluoromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,1-Dichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
1,1-Dichloroethene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
cis-1,2-Dichloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
trans-1,2-Dichloroethene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,2-Dichloropropane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
cis-1,3-Dichloropropene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
trans-1,3-Dichloropropene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Methylene chloride	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,1,2,2-Tetrachloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Tetrachloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name **N0607116**
 Sample Description **N0607116-01**
 Matrix **Wastewater**
 SAL Sample Number **61392.01**
 Date/Time Collected **07/12/06 08:20**
 Date/Time Received **07/12/06 15:30**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Purgeable Halocarbons</u>							
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Trichloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Trichlorofluoromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Vinyl chloride	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
<u>Purgeable Aromatics</u>							
Benzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Chlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,2-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,3-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,4-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Ethylbenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Toluene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Xylenes (Total)	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Methyl-t-butyl ether	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
<u>Volatile Organic Compounds (Primary DW)</u>							
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 8021	0.5	07/13/06 11:28		JRW
Styrene	ug/l	0.5 U	EPA 8021	0.5	07/13/06 11:28		JRW
<u>Inorganics</u>							
Cyanide, Total	mg/l	0.005 U	EPA 335.2	0.005	07/18/06 15:36	07/18/06 09:39	DP
Fluoride	mg/l	0.95	EPA 300.0	0.003	07/22/06 01:44		APB
Hydrogen Sulfide (Unionized)	mg/l	0.28	EPA 376.1	0.1	07/13/06 10:00		RKB
Surfactants(MBAS as LAS, mol wt 342)	mg/l	0.05 U	SM 5540 C	0.05	07/13/06 10:02	07/13/06 09:00	SDO
<u>Metals</u>							
Strontium	mg/l	25	EPA 6010	0.01	07/24/06 09:29	07/21/06 14:30	MJW
<u>Radiochemistry</u>							
Gross Alpha	pCi/l	35±3.4	EPA 00-02	2.0	08/04/06 06:45	08/03/06 14:30	DF
Radium-226	pCi/l	18±0.6	EPA 903.1	0.06	08/04/06 14:55	07/27/06 08:40	AWW
Radium-228	pCi/l	0.5±0.2 U1	EPA RA-05	0.5	08/09/06 13:25	08/07/06 14:45	AWW

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Footnotes

- * Test results presented in this report meet all the requirements of the NELAC standards.
- ** A statement of estimated uncertainty of test results is available upon request.
- D1 Measurement was made in the field. Data supplied by client.
- U Analyte was undetected. Indicated concentration is method detection limit.
- U1 Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and matrix dependent.

A handwritten signature in black ink, appearing to read "Francis I. Daniels".

EMSL Analytical, Inc.

19501 NE 10th Ave. Bay A, N. Miami Beach, FL 33179

Phone: (305) 650-0577 Fax: (305) 650-0578 Email: miamilab@emsl.com



SM

Attn: **T. Bright**
Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

Customer ID: SAND53
Customer PO: N0607116
Received: 07/13/06 10:02 AM
EMSL Order: 170605371

Fax: (941) 484-6774 Phone: (941) 488-8103
Project: PO # N0607116

EMSL Proj:
Analysis Date: 7/18/2006
Report Date: 7/18/2006

**Determination of Asbestos Structures in Water Performed by the 100.2 Method
(EPA/600/R-94/134)**

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
N0607116-01 170605371-0001	7/13/06 11:00	0			0.18	0.00-0.68	<0.18	

Analyst(s)
Andreina Wallery (1)

Kimberly A. Wallace

Kimberly Wallace, Laboratory Manager
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as <=0.01MFL>10um. ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. The test results contained within this report meet the requirements of NELAC unless otherwise noted. This report relates only to those items tested. Samples received in good condition unless otherwise noted.
ACCREDITATIONS: NVLAP C200204-0, FL Lab ID: DOH E86795

Prepared for: Sanders Laboratories
Reference ID: 2006 DIOXIN WATER ANALYSIS

Project Summary 66811
Method 1613B
Concentrations shown in pg/L

BLANK N0607116-01

Analytes

2,3,7,8-TCDD	< 10.0	< 10.0
Extraction Date	7/19/2006	7/19/2006
Analysis Date	7/27/2006	7/27/2006
Primary Filename	S061989	S061991
Confirm Filename	N/A	N/A
Dilution Filename	N/A	N/A

Data Flag Descriptions:
< Not detected -1613 Minimum Levels reported
[.] EMPC Value
B Analyte detected in Blank

C Value reported from Confirmatory Analysis
D Value reported from Dilution Analysis
E Estimated Value - Above Calibration Range
J Estimated Value- Below Calibration Range

N/A Not Applicable
Q Quantitative Interference Present
S Analyte saturated
X Interference from Diphenyl Ethers

summary 1

Printed: 07/28/06 16:23



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name	N0607116		
Sample Description	N0607116-01		
Matrix	Wastewater		
SAL Sample Number	61392.01		
Date/Time Collected	07/12/06	08:20	
Date/Time Received	07/12/06	15:30	

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Semivolatile Analyses (Primary DW)

Date Extracted		07/19/06	EPA 525.2			07/19/06 09:30	ARM
Alachlor	ug/l	0.2 U	EPA 525.2	0.2	07/20/06 14:38	07/19/06 09:30	BTJ
Atrazine	ug/l	0.06 U	EPA 525.2	0.06	07/20/06 14:38	07/19/06 09:30	BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Di(2-ethylhexyl)adipate	ug/l	0.3 U	EPA 525.2	0.3	07/20/06 14:38	07/19/06 09:30	BTJ
Di(2-ethylhexyl)phthalate	ug/l	1.0 U	EPA 525.2	1.0	07/20/06 14:38	07/19/06 09:30	BTJ
Endrin	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2	0.08	07/20/06 14:38	07/19/06 09:30	BTJ
Heptachlor Epoxide	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38	07/19/06 09:30	BTJ
Hexachlorobenzene	ug/l	0.05 U	EPA 525.2	0.05	07/20/06 14:38	07/19/06 09:30	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U	EPA 525.2	0.2	07/20/06 14:38	07/19/06 09:30	BTJ
Lindane	ug/l	0.06 U	EPA 525.2	0.06	07/20/06 14:38	07/19/06 09:30	BTJ
Methoxychlor	ug/l	0.05 U	EPA 525.2	0.05	07/20/06 14:38	07/19/06 09:30	BTJ
Simazine	ug/l	0.07 U	EPA 525.2	0.07	07/20/06 14:38	07/19/06 09:30	BTJ

Pesticide Analyses (Primary DW)

Date Extracted		07/14/06	EPA 549.2			07/14/06 13:00	ARM
Diquat	ug/l	1 U	EPA 549.2	1	07/21/06 14:11	07/14/06 13:00	JKS

Total Trihalomethane Analyses

Bromodichloromethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Bromoform	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Chloroform	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW

Organochlorine Pesticides and PCBs

Aldrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
alpha-BHC	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
beta-BHC	ug/l	0.02 U	EPA 608	0.02	07/20/06 22:16	07/19/06 10:00	DB
delta-BHC	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Lindane	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Chlordane	ug/l	0.05 U	EPA 608	0.05	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDD	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDE	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
4,4'-DDT	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Dieldrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan I	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan II	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endosulfan sulfate	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name N0607116
Sample Description N0607116-01
Matrix Wastewater
SAL Sample Number 61392.01
Date/Time Collected 07/12/06 08:20
Date/Time Received 07/12/06 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Organochlorine Pesticides and PCBs

Endrin	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Endrin aldehyde	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Heptachlor	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Heptachlor epoxide	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16	07/19/06 10:00	DB
Methoxychlor	ug/l	0.02 U	EPA 608	0.02	07/20/06 22:16	07/19/06 10:00	DB
Toxaphene	ug/l	0.5 U	EPA 608	0.5	07/20/06 22:16	07/19/06 10:00	DB
PCB-1016	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1221	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
Propachlor	ug/l	0.5 U	EPA 608	0.5	07/20/06 22:16	07/19/06 10:00	DB
PCB-1232	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1242	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1248	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1254	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB
PCB-1260	ug/l	0.2 U	EPA 608	0.2	07/20/06 22:16	07/19/06 10:00	DB

Chlorinated Herbicides

2,4,5-T	ug/l	0.4 U	SM 6640 B	0.4	07/19/06 10:34	07/18/06 09:00	BTJ
2,4,5-TP (Silvex)	ug/l	0.25 U	SM 6640 B	0.25	07/19/06 10:34	07/18/06 09:00	BTJ
2,4-D	ug/l	1.0 U	SM 6640 B	1.0	07/19/06 10:34	07/18/06 09:00	BTJ
2,4-DB	ug/l	2.5 U	SM 6640 B	2.5	07/19/06 10:34	07/18/06 09:00	BTJ
Acifluorfen	ug/l	0.75 U	SM 6640 B	0.75	07/19/06 10:34	07/18/06 09:00	BTJ
Dalapon	ug/l	1 U	SM 6640 B	1	07/19/06 10:34	07/18/06 09:00	BTJ
DCPA	ug/l	0.5 U	SM 6640 B	0.5	07/19/06 10:34	07/18/06 09:00	BTJ
Dicamba	ug/l	0.25 U	SM 6640 B	0.25	07/19/06 10:34	07/18/06 09:00	BTJ
Dichlorprop	ug/l	1 U	SM 6640 B	1	07/19/06 10:34	07/18/06 09:00	BTJ
Dinoseb	ug/l	0.5 U	SM 6640 B	0.5	07/19/06 10:34	07/18/06 09:00	BTJ
Pentachlorophenol	ug/l	0.10 U	SM 6640 B	0.10	07/19/06 10:34	07/18/06 09:00	BTJ
Picloram	ug/l	0.75 U	SM 6640 B	0.75	07/19/06 10:34	07/18/06 09:00	BTJ

Total Haloacetic Acids Analyses

Date Extracted		07/21/06	EPA 552.2			07/21/06 09:00	ARM
Monochloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Monobromoacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1	07/23/06 02:23	07/21/06 09:00	BTJ

Pesticide Analyses (Primary DW)

Date Extracted		07/17/06	EPA 504.1			07/17/06 10:45	SDO
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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name N0607116
Sample Description N0607116-01
Matrix Wastewater
SAL Sample Number 61392.01
Date/Time Collected 07/12/06 08:20
Date/Time Received 07/12/06 15:30

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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Pesticide Analyses (Primary DW)

Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	07/17/06 21:20	07/17/06 10:45	BTJ
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005	07/17/06 21:20	07/17/06 10:45	BTJ

Carbamate Pesticides (Primary DW)

Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	07/19/06 16:56		JKS
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	07/19/06 16:56		JKS

Pesticide Analyses (Primary DW)

Glyphosate	ug/l	10 U	EPA 547	10	07/20/06 14:56		JKS
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Pesticide Analyses (Primary DW)

Date Extracted		07/17/06	EPA 548.1			07/17/06 11:30	SDO
Endothall	ug/l	20 U	EPA 548.1	20	07/19/06 19:32	07/17/06 11:30	DB

Purgeable Halocarbons

Bromodichloromethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Bromoform	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Bromomethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Chlorobenzene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Chloroethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
2-Chloroethyl vinyl ether	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Chloroform	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Chloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Dibromochloromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,2-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,3-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,4-Dichlorobenzene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Dichlorodifluoromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,1-Dichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
1,1-Dichloroethene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
cis-1,2-Dichloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
trans-1,2-Dichloroethene	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,2-Dichloropropane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
cis-1,3-Dichloropropene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
trans-1,3-Dichloropropene	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Methylene chloride	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,1,2,2-Tetrachloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Tetrachloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Project Name	N0607116		
Sample Description	N0607116-01		
Matrix	Wastewater		
SAL Sample Number	61392.01		
Date/Time Collected	07/12/06	08:20	
Date/Time Received	07/12/06	15:30	

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Purgeable Halocarbons							
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 601	0.3	07/13/06 11:28		JRW
Trichloroethene	ug/l	0.2 U	EPA 601	0.2	07/13/06 11:28		JRW
Trichlorofluoromethane	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Vinyl chloride	ug/l	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Purgeable Aromatics							
Benzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Chlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,2-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,3-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
1,4-Dichlorobenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Ethylbenzene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Toluene	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Xylenes (Total)	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Methyl-t-butyl ether	ug/l	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Volatile Organic Compounds (Primary DW)							
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 8021	0.5	07/13/06 11:28		JRW
Styrene	ug/l	0.5 U	EPA 8021	0.5	07/13/06 11:28		JRW
Inorganics							
Cyanide, Total	mg/l	0.005 U	EPA 335.2	0.005	07/18/06 15:36	07/18/06 09:39	DP
Fluoride	mg/l	0.95	EPA 300.0	0.003	07/22/06 01:44		APB
Hydrogen Sulfide (Unionized)	mg/l	0.28	EPA 376.1	0.1	07/13/06 10:00		RKB
Surfactants(MBAS as LAS, mol wt 342)	mg/l	0.05 U	SM 5540 C	0.05	07/13/06 10:02	07/13/06 09:00	SDO
Metals							
Strontium	mg/l	25	EPA 6010	0.01	07/24/06 09:29	07/21/06 14:30	MJW
Radiochemistry							
Gross Alpha	pCi/l	35±3.4	EPA 00-02	2.0	08/04/06 06:45	08/03/06 14:30	DF
Radium-226	pCi/l	18±0.6	EPA 903.1	0.06	08/04/06 14:55	07/27/06 08:40	AWW
Radium-228	pCi/l	0.5±0.2 U1	EPA RA-05	0.5	08/09/06 13:25	08/07/06 14:45	AWW

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

August 10, 2006
Project No: 61392

Laboratory Report

Footnotes

- * Test results presented in this report meet all the requirements of the NELAC standards.
- ** A statement of estimated uncertainty of test results is available upon request.
- D1 Measurement was made in the field. Data supplied by client.
- U Analyte was undetected. Indicated concentration is method detection limit.
- U1 Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and matrix dependent.

A handwritten signature in black ink, appearing to read "Francis I. Daniels".

Appendix Q

Injection Test Data

Calibration Certificates

In-Situ Pressure Transducer Calibration Certificates



Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the internet at www.in-situ.com!

Report Number:

Calibration Result:

Calibration Date:	2008-05-04
Model:	PXD-261
Full Scale Pressure Range:	206.8 kPa (30 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	7198

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

1. Digital Multi-Meter, HP 3457A, s/n 3114A17597
2. Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
3. Platinum RTD, Instrulab 832, s/n 12159
4. 100 PSIG/A - Pressure Controller, Ruska 7215xi, s/n 53144
5. Automated software calibration procedures used

Range of Applied Temperatures: 4.42 C to 29.60 C

Range of Applied Pressures: -0.0002 kPa (-0.0000 PSI) to 206.8444 kPa (30.0003 PSI)

Calibration Coefficients:

Linearity	0.2635
Scale	29.7828
Offset	-0.0155

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0002 kPa (-0.0000 PSI)	4.008	PASSED
Full Scale Response	206.8444 kPa (30.0003 PSI)	19.983	PASSED
	Minimum	Maximum	
Temperature Stability (%FS)	-0.081	0.029	PASSED
Repeatability at 15 C (%FS)	-0.020	0.016	PASSED
Hysteresis (%FS)	0.012		PASSED
Thermal Hysteresis (%FS)	0.007		PASSED

Test Performed By:

Test Verified By:

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Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the Internet at www.in-situ.com

Report Number: 2008022905008056

Calibration Result: **PASSED**

Calibration Date:	2008-02-29
Model:	PXD-261
Full Scale Pressure Range:	206.8 kPa (30 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	8056

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

1. Digital Multi-Meter, HP 3457A, s/n 3114A17597
2. Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
3. Platinum RTD, Instrulab 832, s/n 12159
4. 100 PSIG/A - Pressure Controller, Ruska 7215xi, s/n 53144
5. Automated software calibration procedures used

Range of Applied Temperatures: 4.38 C to 29.46 C

Range of Applied Pressures: -0.0004 kPa (-0.0001 PSI) to 206.8442 kPa (30.0002 PSI)

Calibration Coefficients:

Linearity	0.2572
Scale	29.8285
Offset	-0.0266

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0004 kPa (-0.0001 PSI)	4.014	PASSED
Full Scale Response	206.8442 kPa (30.0002 PSI)	19.969	PASSED
	Minimum	Maximum	
Temperature Stability (%FS)	-0.083	0.021	PASSED
Repeatability at 15 C (%FS)	-0.022	0.015	PASSED
Hysteresis (%FS)	0.008		PASSED
Thermal Hysteresis (%FS)	0.010		PASSED

Test Performed By: LEH

Test Verified By:

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Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the Internet at www.in-situ.com

Report Number: 2007121301006962

Calibration Result: **PASSED**

Calibration Date:	2007-12-13
Model:	PXD-261
Full Scale Pressure Range:	206.8 kPa (30 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	6962

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

- Digital Multi-Meter, HP 3457A, s/n 3114A17597
- Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
- Platinum RTD, Instrulab 832, s/n 12159
- 300/100 PSIG Pressure Controller - Ext. 30 PSIG (s/n 280485), Mensor PCS-400, s/n 180226
- Automated software calibration procedures used

Range of Applied Temperatures: 4.38 C to 29.45 C

Range of Applied Pressures: -0.0062 kPa (-0.0009 PSI) to 206.8510 kPa (30.0012 PSI)

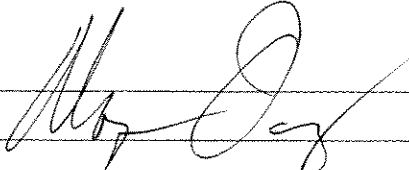
Calibration Coefficients:

Linearity	0.2991
Scale	29.4303
Offset	0.0527

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0062 kPa (-0.0009 PSI)	3.972	PASSED
Full Scale Response	206.8510 kPa (30.0012 PSI)	20.115	PASSED
	Minimum	Maximum	
Temperature Stability (%FS)	-0.129	0.075	PASSED
Repeatability at 15 C (%FS)	-0.012	0.010	PASSED
Hysteresis (%FS)	0.013		PASSED
Thermal Hysteresis (%FS)	0.022		PASSED

Test Performed By: LEH

Test Verified By: 

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Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the Internet at www.in-situ.com!

Report Number: 2008021603005392

Calibration Result: **PASSED**

Calibration Date:	2008-02-16
Model:	PXD-261
Full Scale Pressure Range:	689.5 kPa (100 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	5392

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

1. Digital Multi-Meter, HP 3457A, s/n 3114A17597
2. Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
3. Platinum RTD, Instrulab 832, s/n 12159
4. 300/100 PSIG Pressure Controller - Sensor 1, Mensor PCS-400, s/n 180226
5. Automated software calibration procedures used

Range of Applied Temperatures: 4.36 C to 29.43 C

Range of Applied Pressures: -0.0483 kPa (-0.0070 PSI) to 689.4964 kPa (100.0030 PSI)

Calibration Coefficients:

Linearity	0.2225
Scale	98.9280
Offset	0.1525

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0483 kPa (-0.0070 PSI)	3.974	PASSED
Full Scale Response	689.4964 kPa (100.0030 PSI)	20.112	PASSED
	Minimum	Maximum	
Temperature Stability (%FS)	-0.064	0.020	PASSED
Repeatability at 15 C (%FS)	-0.006	0.012	PASSED
Hysteresis (%FS)	0.010		PASSED
Thermal Hysteresis (%FS)	0.006		PASSED

Test Performed By: LEH

Test Verified By:

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Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the Internet at www.in-situ.com

Report Number: 2007121301010210

Calibration Result: PASSED

Calibration Date:	2007-12-13
Model:	PXD-261
Full Scale Pressure Range:	206.8 kPa (30 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	10210

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

1. Digital Multi-Meter, HP 3457A, s/n 3114A17597
2. Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
3. Platinum RTD, Instrulab 832, s/n 12159
4. 300/100 PSIG Pressure Controller - Ext. 30 PSIG (s/n 280485), Mensor PCS-400, s/n 180226
5. Automated software calibration procedures used

Range of Applied Temperatures: 4.38 C to 29.45 C

Range of Applied Pressures: -0.0062 kPa (-0.0009 PSI) to 206.8482 kPa (30.0008 PSI)

Calibration Coefficients:

Linearity	0.2560
Scale	29.6790
Offset	0.0370

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0062 kPa (-0.0009 PSI)	3.981	PASSED
Full Scale Response	206.8482 kPa (30.0008 PSI)	20.014	PASSED
	Minimum	Maximum	
Temperature Stability (%FS)	-0.053	0.007	PASSED
Repeatability at 15 C (%FS)	-0.009	0.012	PASSED
Hysteresis (%FS)	0.012		PASSED
Thermal Hysteresis (%FS)	0.011		PASSED

Test Performed By: LEH

Test Verified By:

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Calibration Report

221 E. Lincoln Ave, Fort Collins, CO 80524 USA, 970-498-1500, 1-800-446-7488 (Toll Free USA & Canada), FAX: 970-498-1598

Visit us on the Internet at www.in-situ.com!

Report Number:

Calibration Result:

Calibration Date:	2007-12-12
Model:	PXD-261
Full Scale Pressure Range:	689.5 kPa (100 PSI) Gauge
Manufacturer:	In-Situ
Serial Number:	10169

Calibration Procedures and Equipment Used:

Standards used in this calibration are traceable to the National Institute of Standards and Technology.

1. Digital Multi-Meter, HP 3457A, s/n 3114A17597
2. Multi-Channel Thermometer, Instrulab 4312A-15, s/n 41039
3. Platinum RTD, Instrulab 832, s/n 12159
4. 300/100 PSIG Pressure Controller - Sensor 1, Mensor PCS-400, s/n 180226
5. Automated software calibration procedures used

Range of Applied Temperatures: 4.38 C to 29.45 C

Range of Applied Pressures: -0.0483 kPa (-0.0070 PSI) to 689.4895 kPa (100.0020 PSI)

Calibration Coefficients:

Linearity	0.1754
Scale	98.9297
Offset	0.1727

PASS/FAIL Criteria:

	Applied Pressure	Current mA	
Zero Response	-0.0483 kPa (-0.0070 PSI)	3.971	PASSED
Full Scale Response	689.4895 kPa (100.0020 PSI)	20.117	PASSED

	Minimum	Maximum	
Temperature Stability (%FS)	-0.030	0.016	PASSED
Repeatability at 15 C (%FS)	-0.006	0.011	PASSED

Hysteresis (%FS)	0.009	PASSED
Thermal Hysteresis (%FS)	0.003	PASSED

Test Performed By:

Test Verified By:

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Flowmeter Calibration Certificate



CERTIFIED TEST REPORT

CUSTOMER: YOUNGQUIST BROTHERS
MODEL NO: ML04-20
METER SERIAL NO: 841404

CONFIGURATION

METER INSIDE DIAMETER: 19.22
DIAL: GAL X 0/1
GEARS: /
ACTUAL METER INDEX: _____
TEST DATE: 6/2/2008
TEST FACILITY: Volumetric

CALIBRATION DATA

	FLOW RATE GPM	% ACCURACY
1	8304.50	101.15
2	3617.33	100.44
3	989.80	101.18

CERTIFIED BY: Paul Hobbs DATE: 6/6/2008

This calibration was performed on a primary or secondary test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are:
Primary +/- 0.15% Secondary +/- 0.5%



McCROMETER

3255 WEST STETSON AVENUE
HEMET, CA 92545 USA
PHONE (951) 652-6811 / FAX (951) 652-3078
WEB SITE: <http://www.mccrometer.com> E-MAIL: info@mccrometer.com



841404

Printed by Claudia Orejel
6/6/2008 1:25:42 PM
Version 1.0 (3/9/2007)

Injection Test Field Data

**MWH****IW-2 INJECTION TEST DATA**

DATE: June 16, 2008

NORTH CAPE DEEP INJECTION WELL SYSTEMJOB NUMBER: 3220246.7i

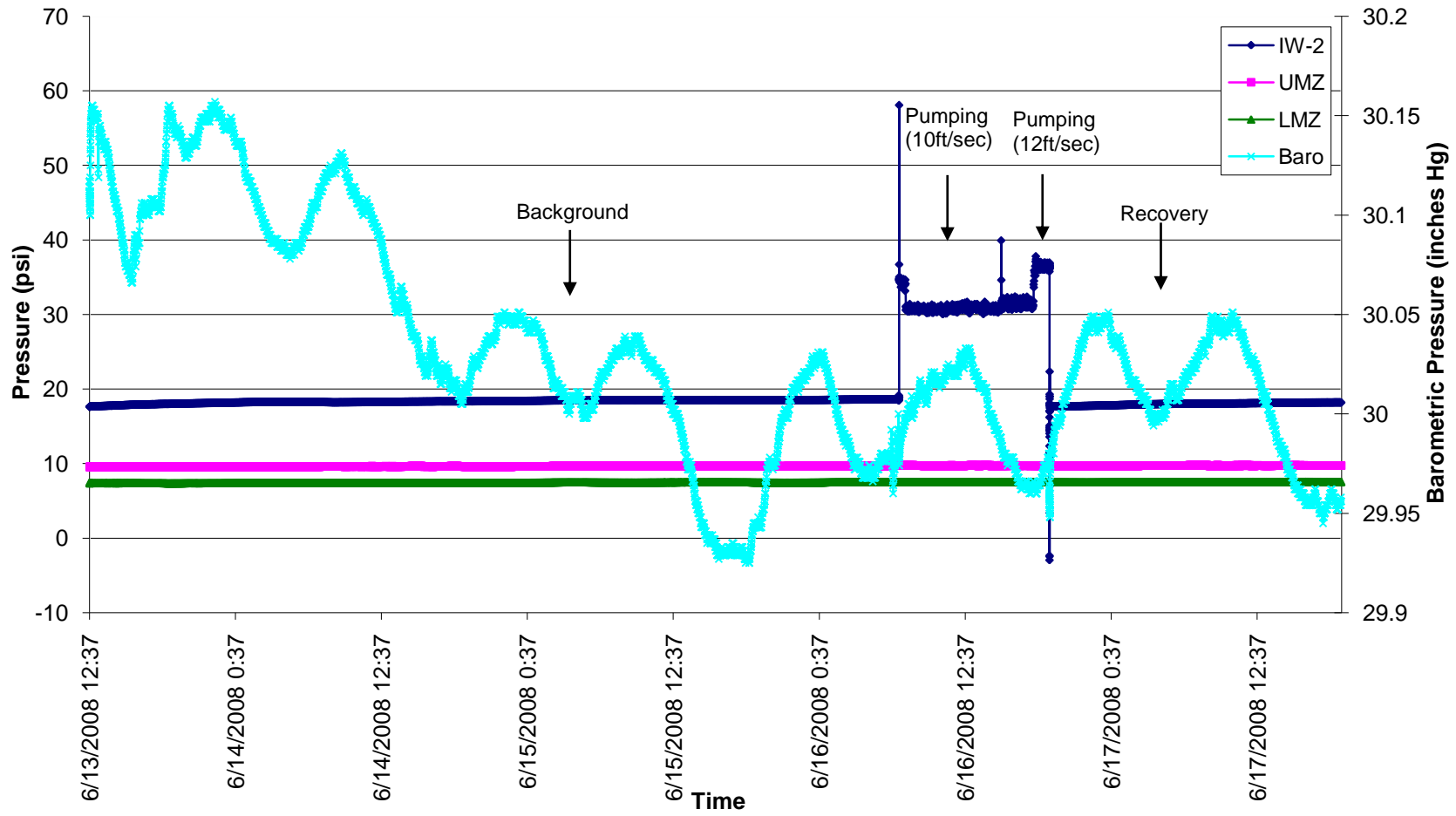
CONTRACTOR: Youngquist Brothers, Inc.

OBSERVERS: Neil Johnson, John LargeyOWNER: City of Cape Coral

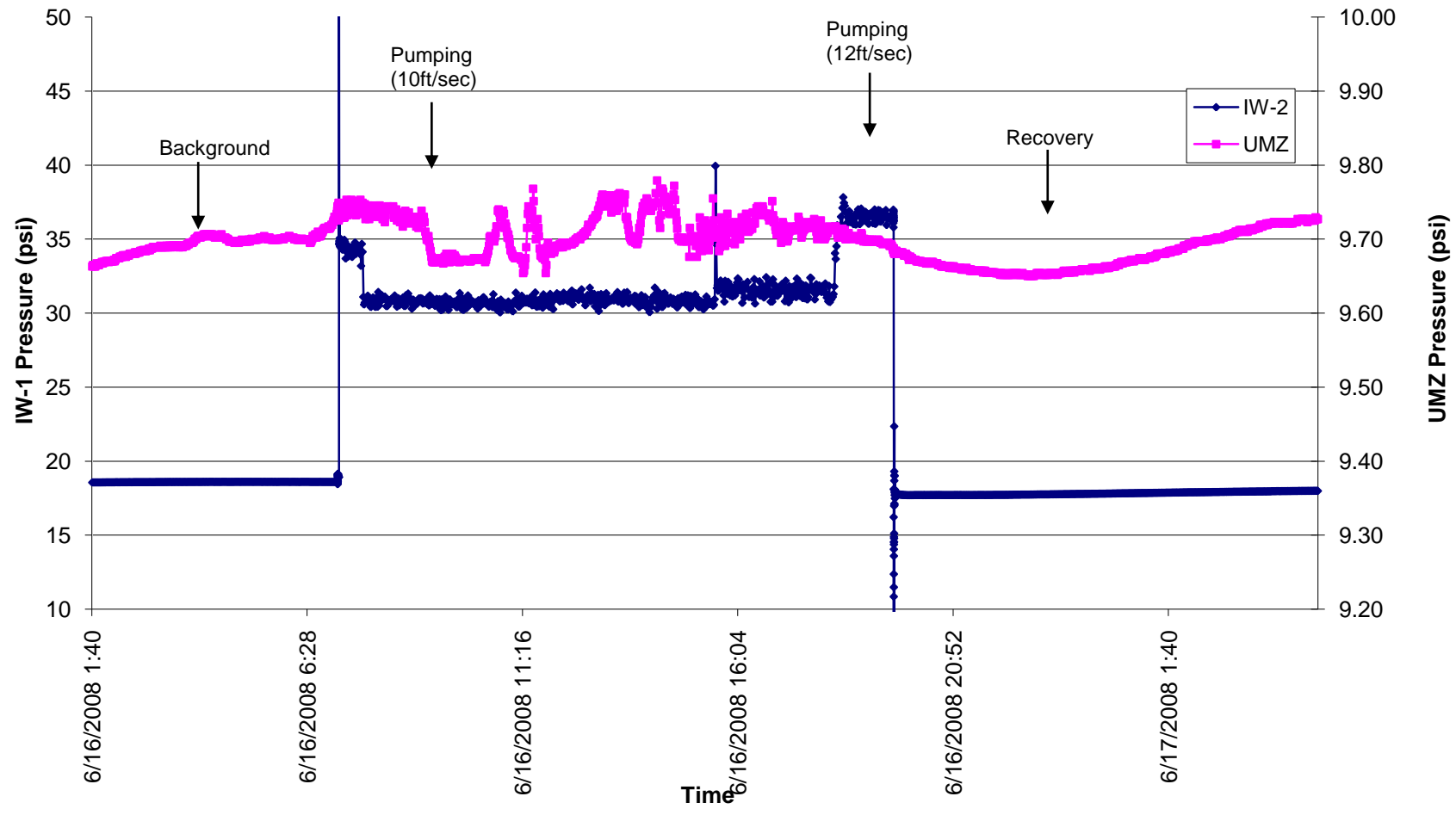
TIME	Δ Time (hr:min)	FLOW (gpm)	METER (gal. x 10,000)	FLOW TEMP (Deg F)	COMMENTS
7:14	0:00	5,882	1,495	78	Begin pumping
7:15	0:01	5,825	1,441	78	
7:25	0:11	5,820	1,446	78	
7:43	0:29	5,170	1,457	78	Reduce pump 1 notch
7:50	0:36	5,170	1,460	78	
8:05	0:51	5,170	1,468	78	
8:30	1:16	5,200	1,482	78	
8:50	1:36	5,170	1,491	78	
9:11	1:57	5,170	1,502	78	
9:46	2:32	5,170	1,520	78	
10:13	2:59	5,128	1,534	78	
10:30	3:16	5,090	1,543	78	
11:02	3:48	5,217	1,559	78	Open valve ¼ turn
11:14	4:00	5,217	1,565	78	
11:30	1:17	5,170	1,573	78	Open valve ½ turn
11:47	4:33	5,170	1,582	78	Open valve 1 turn
12:15	5:01	5,170	1,596	78	Open valve 4 turns
12:40	5:26	5,170	1,609	78	Open valve 1 turn
13:03	5:49	5,170	1,622	78	Open valve 1 turn
13:31	6:17	5,170	1,636	78	Open valve 1 turn
13:50	6:36	5,170	1,645	78	Open valve 1 turn
14:46	7:32	5,170	1,675	78	Open valve 1 turn
15:44	8:30	5,357	1,704	78	Increase pump 1 notch
16:10	8:56	5,357	1,718	78	
16:30	9:15	5,357	1,729	78	
17:00	9:46	5,333	1,745	78	
17:41	10:27	5,309	1,766	78	
18:13	10:59	5,236	1,783	78	Increase flow
18:35	11:21	6,250	1,785	78	
18:50	11:36	6,315	1,806	78	
19:03	11:49	6,250	1,714	78	
19:19	12:05	6,316	1,824	78	
19:31	12:17	6,289	1,832	78	Stop pumping

Test Data and Exhibits

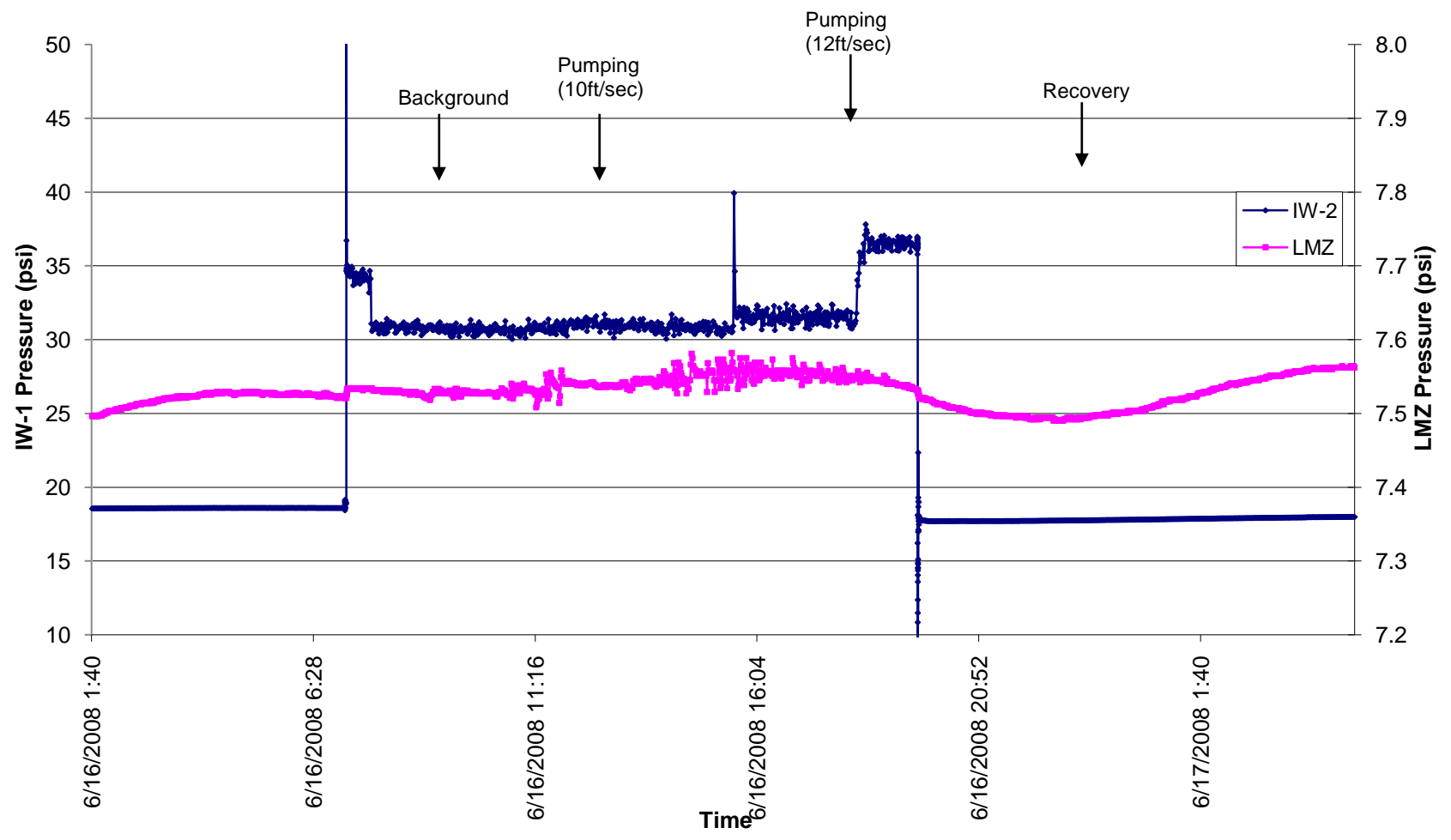
IW-2 Injection Test
Box 2
IW-2, UMZ, LMZ, Barometric



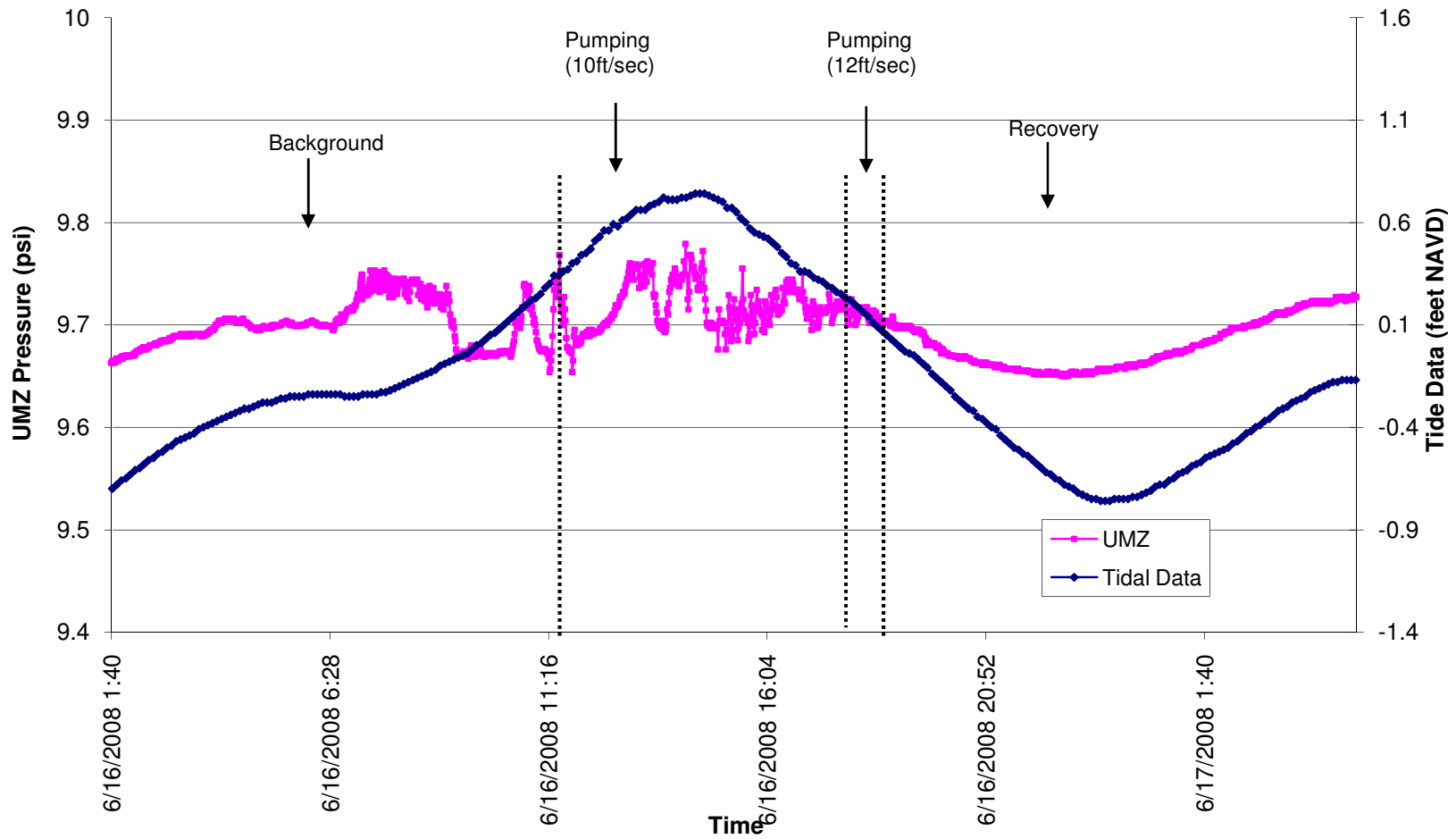
IW-2 Injection Test
Box 2
IW-2 UMZ



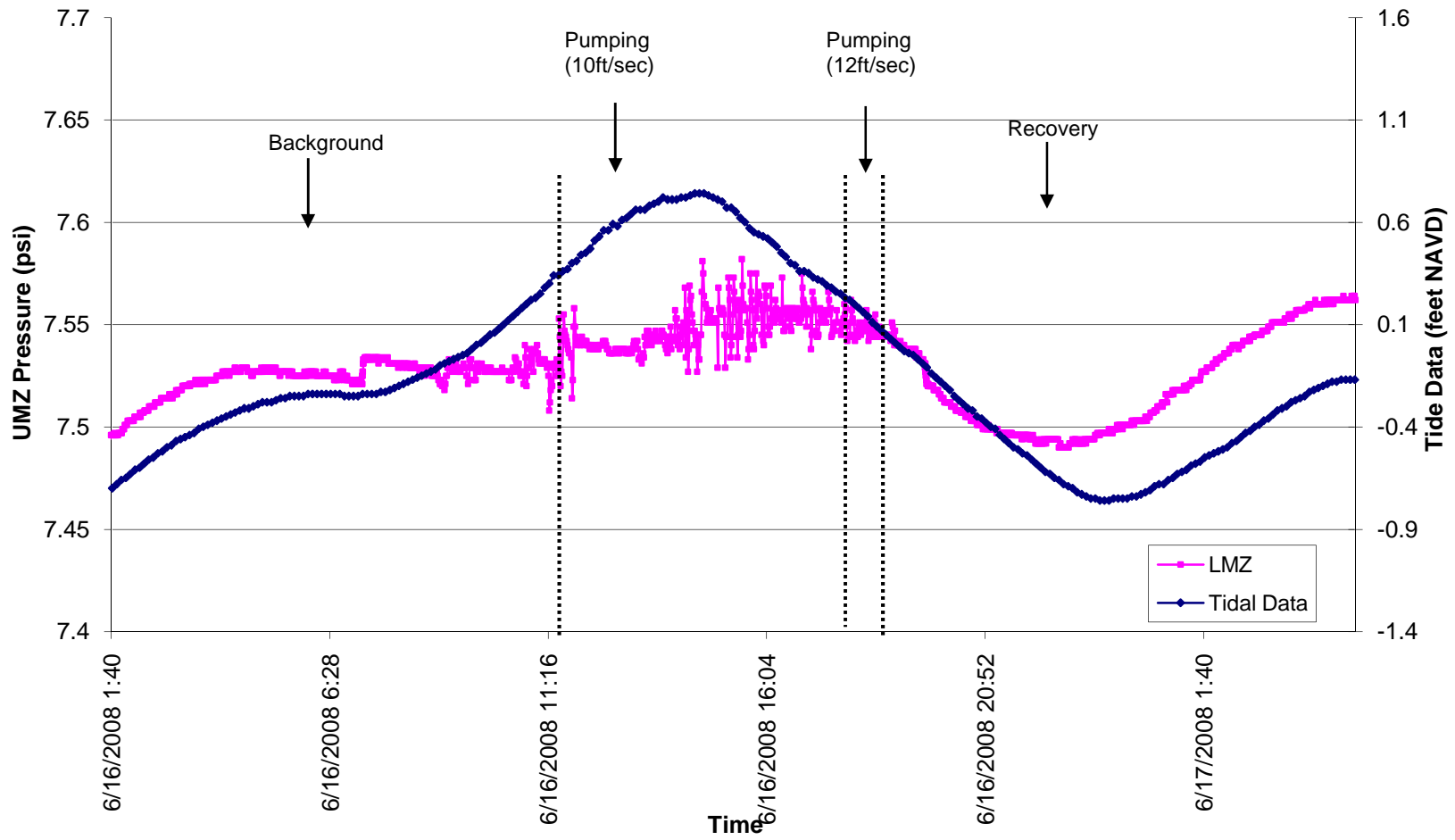
**IW-2 Injection Test
Box 2
IW-2 LMZ**



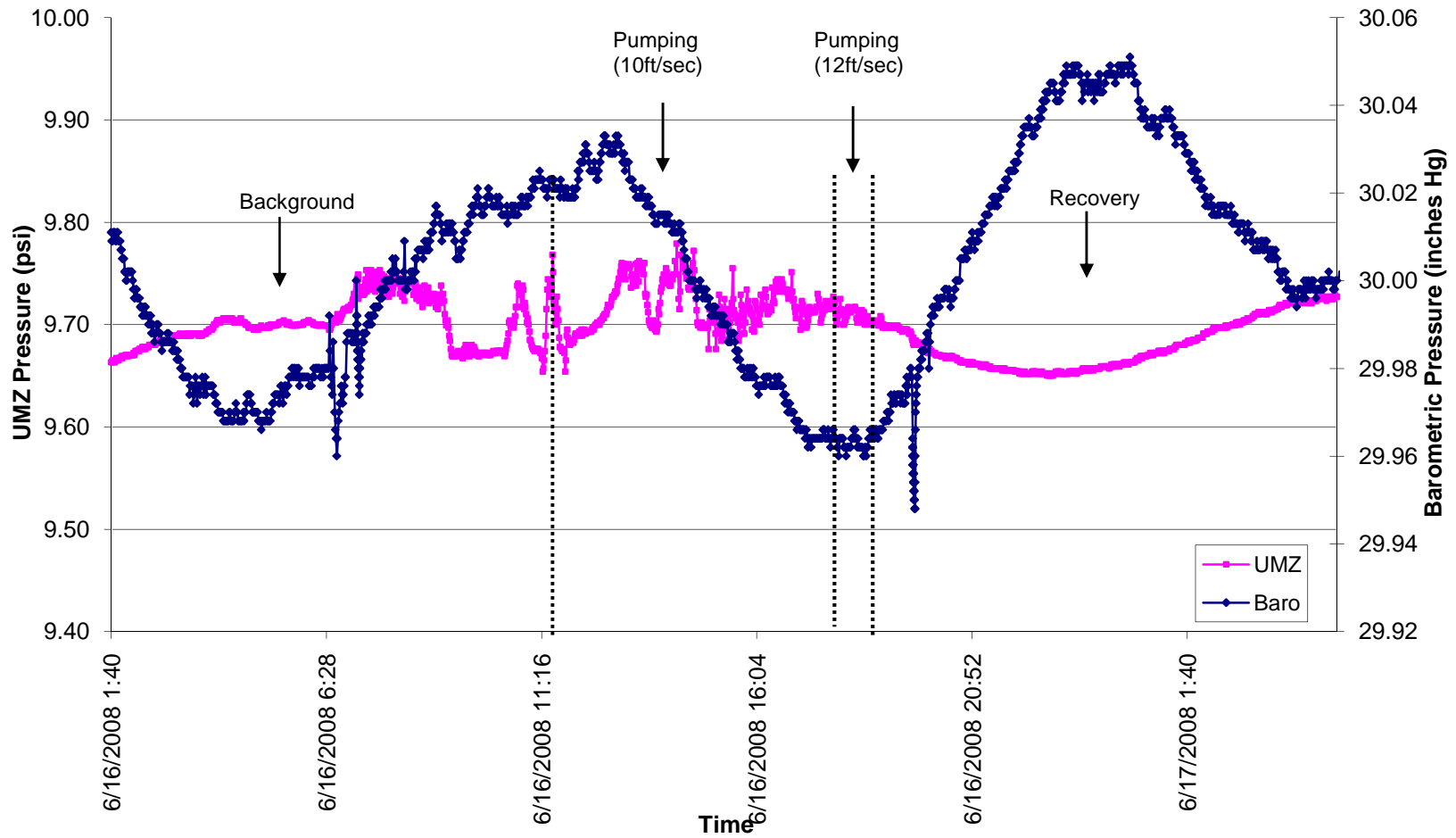
IW-2 Injection Test
Box 2
UMZ, Tide Data



IW-2 Injection Test
Box 2
LMZ, Tide Data



IW-2 Injection Test
Box 2
UMZ, Barometric Pressure



IW-2 Injection Test
Box 2
LMZ, Barometric Pressure

