## 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





**APPENDIX A – FDEP Construction Permit** 

**APPENDIX B – Deviation Surveys** 

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**FDEP Construction Permit** 



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: <u>cpavlos@capecoral.net</u> <u>Lee County – UIC</u> 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.

Region C. Dick <u>12/11/2006</u> Clerk <u>Date</u>

JMI/DR/rcd

Enclosure

Copies furnished to:

Philip L. Waller, P.E. (philip.waller@mwhglobal.com) сс 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 P.O. Box 2549 Fort Myers, Florida 33902-2549 Ph. (239) 332-6975 / Fax (239) 332-6969 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. <u>GENERAL CRITERIA</u>

- 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.
- 1. 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. <u>SITE REQUIREMENTS</u>

- 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. <u>CONSTRUCTION AND TESTING REQUIREMENTS</u>

- 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.
- 1. 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. <u>QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS</u>

- 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. <u>REPORTING REQUIREMENTS</u>

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

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 36<sup>th</sup> 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

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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:

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

Parameters	Reporting Frequency
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

#### **Injectate Water Quality**

#### WRF Effluent Water Quality

Parameters	Reporting Frequency
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:

Well Number	Casing Dia. (OD)	Depth (bls) Cased/Total
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

Parameters	Reporting Frequency
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

Parameters	Reporting Frequency
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. <u>ABNORMAL EVENTS</u>

- 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  $11^{\text{th}}$  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

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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

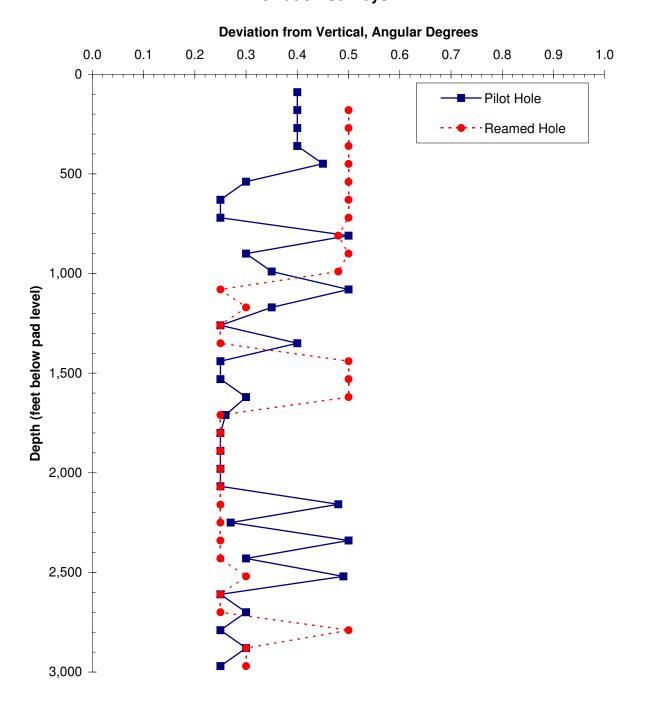
# Appendix B

**Deviation Surveys** 

# **Injection Well IW-2**

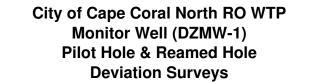
**Deviation Surveys** 

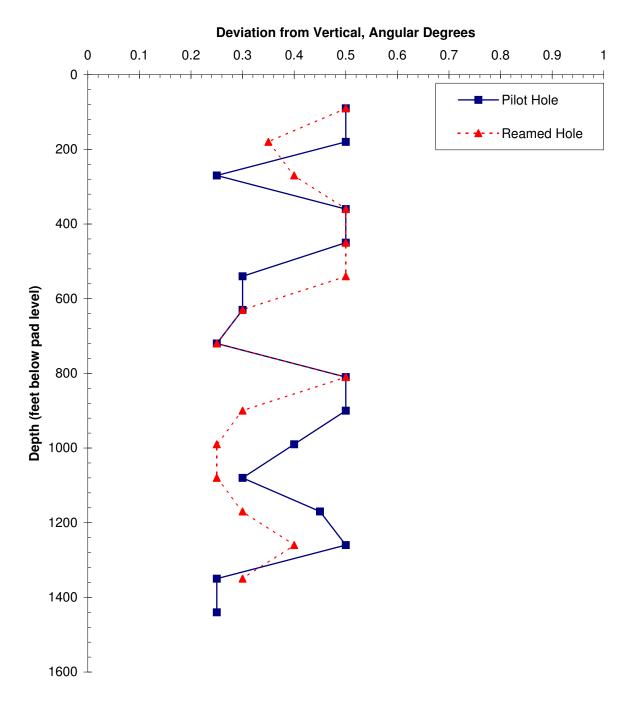
City of Cape Coral North RO WTP Injection Well (IW-2) Pilot Hole & Reamed Hole Deviation Surveys



# **Monitor Well DZMW-1**

**Deviation Surveys** 





# 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

- 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%), unfossilliferous
- 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%0, 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
- 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, stickey, 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, stickey, 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, stickey, 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, intergranual 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%)

- 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

- 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%)
- 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

- 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.*), milliolids, echinoids, mollusks, echinoid spines
- 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</li>
   sparry calcite and micrite cements, benthonic foraminifer
- 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%)
- 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, milliolids
- 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, milliolids, 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, milliolids, 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 (<u>Dictyoconus</u> <u>cookei</u>, <u>Rotalia sp.</u>, and <u>Operculinoides sp.</u>), 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, milliolids, 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, molderate induration with sparry calcite and micrite cements, benthonic foraminifera, mollusks, milliolids
- 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, milliolids
- 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, milliolids, 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, <u>*Dictyoconus cookei*</u>

#### 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, milliolids
- 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

#### 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

DEPTH

- 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
- 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
- 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%), unfossilliferous

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%)
- 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%0, phosphate (5%), sand (10%), limestone fragments (15%)
- 360 400As above, with calcareous clay and limestone fragments, 25% phosphatic<br/>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 inducation 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%)
- 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%)
- 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.

- 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.
- 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.
- 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.
- 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

amd 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.

- 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%)
- Bolostone (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
- 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.
- 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.
- 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.
- 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 sucrocis 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.
- 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, moderatre 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, moderatre alteration, 25% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, castes 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, moderatre 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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

 DRILLER:
 Wayne Fargo
 START/ FINISH TIME CORING:
 8:28
 TO:
 17:20

 TYPE OF BIT USED:
 Diamond
 CORED INTERVAL:
 1630 ft bls
 TO:
 1639.5 ft bls

 CORE NUMBER:
 1
 LENGTH OF CORED INTERVAL:
 9.5 feet
 1639.5 ft bls

 DIAMETER:
 4-inches
 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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

 DRILLER:
 Wayne Fargo/Phillip Shand
 START/ FINISH TIME CORING:
 15:00
 TO:
 0:36

 TYPE OF BIT USED:
 Diamond
 CORED INTERVAL:
 1810 ft bls
 TO:
 1816.3 ft bls

 CORE NUMBER:
 2
 LENGTH OF CORED INTERVAL:
 6.3 feet
 1810.5 ft bls

 DIAMETER:
 4-inches
 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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER:<br/>TYPE OF BIT USED:Doug DrayerSTART/ FINISH TIME CORING:<br/>CORED INTERVAL:7:10<br/>1978'TO:<br/>198616:45CORE NUMBER:<br/>DIAMETER:3LENGTH OF CORED INTERVAL:8 ft1986LENGTH OF CORE SAMPLE RECOVERED:<br/>5 ft5 ft5 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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER:<br/>TYPE OF BIT USED:<br/>CORE NUMBER:Wayne FargoSTART/ FINISH TIME CORING:<br/>CORED INTERVAL:20:46<br/>2,068 ft blsTO:<br/>2:54ADiamondCORED INTERVAL:2,068 ft blsTO:<br/>2,079 ft blsDIAMETER:4LENGTH OF CORED INTERVAL:11 feetLENGTH 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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER: TYPE OF BIT USED: CORE NUMBER: DIAMETER:

Diamond \_\_\_\_\_ 5 4-inches

 
 START/ FINISH TIME CORING:
 22:58
 TO:
 11:20

 CORED INTERVAL:
 2,215 ft. bls
 TO:
 2,226 ft bls
 Doug Drayer/Wayne Fargo START/ FINISH TIME CORING: 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



DEPTH

## **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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER:	Phillip Shand/Wayne Fargo	START/ FINISH TIME CORING:	1:5	50	TO:	9:33
TYPE OF BIT USED:	Diamond	CORED INTERVAL: 2,32	3 ft bls	TO:		2,334 ft bls
CORE NUMBER:	6	LENGTH OF CORED INTERVAL:	11 ft			
DIAMETER:	4-inches	LENGTH OF CORE SAMPLE REC	OVERE	D:	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%

DEP	тн
(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 loe 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
 START/ FINISH TIME CORING:
 2:25
 TO:
 10:20

 TYPE OF BIT USED:
 Diamond
 CORED INTERVAL:
 2,356 ft bls
 TO:
 2,366.8 ft bls

 CORE NUMBER:
 7
 LENGTH OF CORED INTERVAL:
 10.8 ft
 ENGTH 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%

DEP	ТΗ
(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 START/ FINISH TIME CORING: 12:21 **TO:** 13:09 CORED INTERVAL: 1308 ft bls TO: 1318 ft bls TYPE OF BIT USED: Diamond CORE NUMBER: 1 LENGTH OF CORED INTERVAL: 9.5 feet DIAMETER: 4-inches 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	CORE DESCRIPTION	30	1	3	45
1310		30	1	3	45
1310		30	1	4	45
1312		30	3	4	45
1312		30	9	4-6	45
1313		30	11	4-0 5	55-100
1315		30	9	5	60
1315		30	8	5-6	240
1317		30	4	3-6	100
1317		30	2	4-6	100
1010			2	+-0	100
				<b> </b>	
				<b> </b>	
				<b> </b>	



## **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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

OWNER: City of Cape Coral

DRILLER:	Bill Steele	START/ FINISH TIME CORING:	9:58	<b>TO:</b> 12:24
TYPE OF BIT USED:	Diamond	CORED INTERVAL: 1410 ft bls	TO:	1,420 ft bls
CORE NUMBER:	2	LENGTH OF CORED INTERVAL:	10 feet	
DIAMETER:	4-inches	LENGTH OF CORE SAMPLE RECOV	ERED:	0 feet

#### PERCENT OF SAMPLED LENGTH RECOVERED: 0 %

		RPM	PENETRATION		PUMP
DEPTH	CORE DESCRIPTION	of Drill String	TIME (minutes)	ON BIT x1000 (lbs)	PRESSURE (psi)
1411	No Recovery	6	12.4	7-4	25
1412		6	10.8	3	25
1412		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 20
1417		6	15	2	20
1418		6	14.3	2	20
1419		6	14.9	2	20
1420		6	17.3	2	20
1120		Ű	11.0	_	20
-					



## **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 Cored Interval (feet): 10.0 Bit Type: Diamond Recovered Core (feet): 0.0 Date: 10/16/2007 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 START/ FINISH TIME CORING: 16:52 \_ TO: 18:45 1,487 ft bls TYPE OF BIT USED: Diamond CORED INTERVAL: 1475 ft bls TO: CORE NUMBER: 3 LENGTH OF CORED INTERVAL: 12 feet DIAMETER: 4-inches LENGTH OF CORE SAMPLE RECOVERED: 8 feet

#### PERCENT OF SAMPLED LENGTH RECOVERED: 67 %

		RPM	PENETRATION TIME	WEIGHT ON BIT	PUMP PRESSURE
DEPTH	CORE DESCRIPTION	of Drill String		x1000 (lbs)	
1476	DOLOMITIC LIMESTONE-yellowish gray (5Y 7/2)	•	14.2	1-2	20-22
1477	massive, fine to medium grained, soft, very well		14.1	1-2	22
1478	indurated fossiliferous wackestone with abundant,		14.4	1-2	22-40
1479	fine grained euhedral 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, moderatre 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, moderatre alteration, 25% allochems with micrite and dolomitic cements, calcite spars and dolomite rhombs present in matrix, castes 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, moderatre 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 Ft. Myers, I	Ridge RoadPhone: 239FL 33908	-489-4444
PROJEC	CT: 278002 North Cape Coral Inj. Well	<b>DATE:</b> 9/13/2007
то:	Mont. Watson Harza Constructors, Inc 1200 Kismet Parkway West Cape Coral, FL. 33993	<b>REF:</b> Rock Core Testing Report
ATTN:	Christine Stuckey	

WE ARE SENDING:	SUBMITTED FOR:	ACTION TAKEN:
Shop Drawings	Approval	Approved as Submitted
Letter	Your Use	Approved as Noted
Prints	As Requested	Returned After Loan
Change Order	Review and Comment	🔲 Resubmit
Plans		🖵 Submit
Samples	SENT VIA: the attraction of the description of	Returned
Specifications	Mattached	Returned for Corrections
Other: Rock Core Testing Report	Separate Cover Via:	Due Date:

REV. ITEM NO. COPIES DATE DESCRIPTION ITEM PACKAGE SUBMITTAL DRAWING **STATUS** 

1

9/13/2007 Ardaman & Associates, Inc. Rock Core Testing Report Date: Sep. 07, 07 File No.: 07-087

NEW

**Remarks:** 

Signed:	Ww	Fa'	
	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 1 1	1310.75-1311.8 1313.8-1314.35 1314.8-1315.3 1633.5-1634.0
2	1811.6-1812.1
3	1980.3-1981.2
4	2073.0-2073.5
5 5 5	2216.7-2217.2 2222.6-2223.5 2223.3-2224.1
6 6 6	2323.6-2324.0 2325.9-2326.4 2326.4-2326.9
7 7 7	2358.5-2359.25 2359.25-2359.5 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.

Youngquist Brothers, Inc. File Number 07-087

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.

NONA Thomas S. Ingra, PE

Laboratory Director Florida License No. 31987

TSI/ed

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CLIENT: Youngquist Brothers, Inc. PROJECT: North Cape Coral Punta Gorda

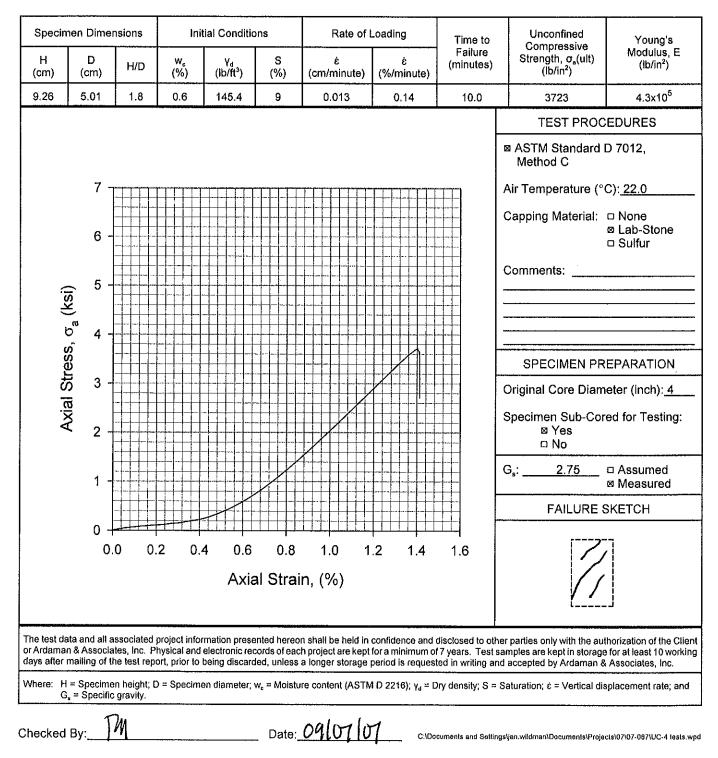
FILE NO.: 07-087

DATE SAMPLE RECEIVED: 05/03/07

DATE TEST SET-UP: 08/23/07

DATE REPORTED: 09/07/07

INCOMING SAMPLE NO.: <u>Core 1, 1310.75'</u> BORIN<u>G Core 1</u> SAMPLE -DEPTH <u>1310.75</u> Øft; □ m LABORATORY IDENTIFICATION NO.: <u>07087/C1</u> SAMPLE DESCRIPTION: Light Brown Limestone



DEPTH 2223.3

#### CLIENT: Youngquist Brothers, Inc.

PROJECT: <u>North Cape Coral Punta Gorda</u> FILE NO.: 07-087

DATE SAMPLE RECEIVED: 05/03/07

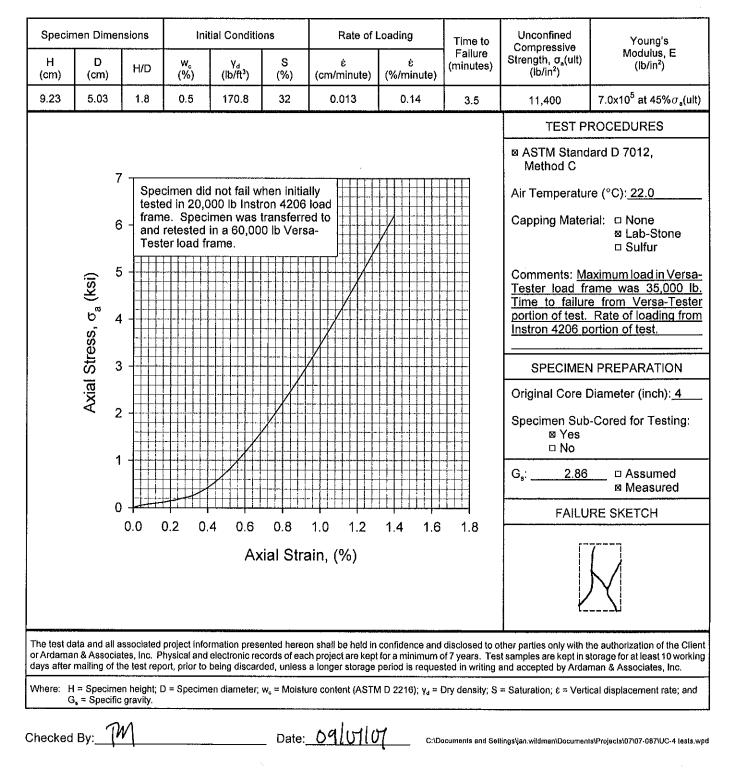
DATE TEST SET-UP: 08/23/07

DATE REPORTED: 09/07/07

INCOMING SAMPLE NO.: Core 5, 2223.3' BORING Core 5 SAMPLE -

⊠ft: □ m

LABORATORY IDENTIFICATION NO.: 07087/C5 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

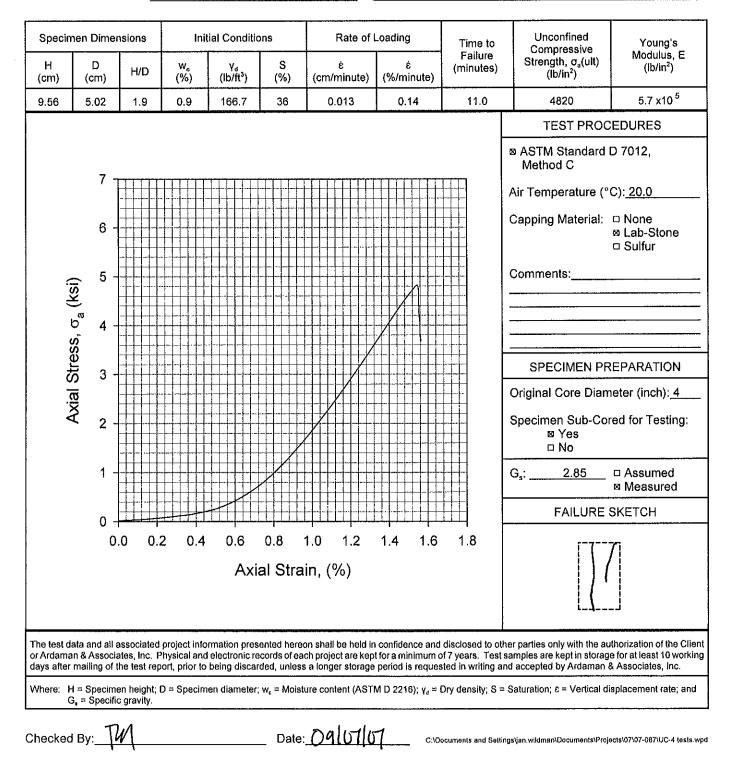


CLIENT: <u>Youngquist Brothers, Inc.</u> PROJECT: <u>North Cape Coral Punta Gorda</u> FILE NO.: 07-087

INCOMING SAMPLE NO.: Core 6, 2326.4'

DATE SAMPLE RECEIVED: 05/03/07 DATE TEST SET-UP: 08/23/07 DATE REPORTED: 09/07/07 LABORATORY IDENTIFICATION NO.: 07087/C6 SAMPLE DESCRIPTION: Brown Dolomitic Limestone with vugs

⊠ft:⊡m



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** 

LABORATORY IDENTIFICATION NO .: 07087/C7 SAMPLE DESCRIPTION: Brown Dolomitic Limestone

⊠ ft; □ m

Specimen Dimensions Initial Conditions Unconfined Rate of Loading Time to Young's Compressive Modulus, E Failure Strength,  $\sigma_a(ult)$ Н D w, (%) S Ė. έ γ<sub>d</sub> (lb/ft³) (lb/in<sup>2</sup>) (minutes) H/D (lb/in<sup>2</sup>) (cm) (cm) (%)(cm/minute) (%/minute) 10.07 5.03 7.1x10<sup>5</sup> at 45% $\sigma_{a}$ (ult) 2.0 0.4 171.3 32 0.013 0.14 5.0 11,500 **TEST PROCEDURES** ASTM Standard D 7012, 7 Method C Specimen did not fail when initially tested in 20,000 lb Instron 4206 load Air Temperature (°C): 22.0 frame. Specimen was transferred to 6 and retested in a 60,000 lb Versa-Capping Material: 

None Tester load frame. D Sulfur 5 Axial Stress, σ<sub>a</sub> (ksi) Comments: Maximum load in Versa-Tester load frame was 35,500 lb. Time to failure from Versa-Tester 4 portion of test. Rate of loading from Instron 4206 portion of test. 3 SPECIMEN PREPARATION Original Core Diameter (inch): 4 2 Specimen Sub-Cored for Testing: ⊠ Yes 1 2.85 G.: Assumed Measured 0 FAILURE SKETCH 0.0 0.2 1.2 0.4 0.6 0.8 1.0 1.4 1.6 1.8 Axial Strain, (%) 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<sub>e</sub> = Moisture content (ASTM D 2216); y<sub>d</sub> = Dry density; S = Saturation;  $\dot{\epsilon}$  = Vertical displacement rate; and G. = Specific gravity.

Date: 09/07/01

Checked By:

C:\Documents and Settings\jan.wildman\Documents\Projects\07\07-087\UC-4 tests.wpd

CLIENT: Youngquist Brothers, Inc	<u>.</u>	INCOMING LABORATORY SAMPLE NO.: 1-1310.75								
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/11310.75V							
FILE NO.: 07-087		SAMPLE DESCRIPTION: Light Brown Limestone								
DATE SAMPLE RECEIVED: 05/03	3/07 SET UP: 06/26/07									
DATE REPORTED: 08/22/07										
□ C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): 4 As-Received Length (inch): 13.1 TEST SPECIMEN ORIENTATION:	Diameter Trimmed: Length Trimmed: Ø Vertical	□ Yes ⊠ No ⊠ Yes □ No □ Horizontal						
B-FACTOR: 90 (stable) %	□ Beginning of Test; ⊠ End of Test	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.75</u>	□ Assumed I Measured (ASTM	D 854)						
	Δσ <sub>c</sub> (psi): <u>4; 7; 9</u>	PERMEANT:  © Deaired Tap Water	□ Other							

	Initial Conditions							Test Conditions					Final Conditions								
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₀ (pcf)	ก	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)							
9.37	9.71	692.38	10.6	132.7	0.227	99	30	160	24	1.2	1	1473.5	10.6	99	5.0x10-8						
The test of & Associa the test re Where: H	ates, Inc. P eport, prior f	associated hysical and to being disc en height; D ess; $u_b = Ba$	project info electronic carded, unl = Specime uck-pressur	prmation pre records of e ess a longe n diameter;	esented he each projec er storage p V = Volum	ereon shall ot are kept period is re	be held in for a minim equested in	writing and	ars. Test s accepted t re content (	amples are by Ardaman (ASTM D 22	kept in stora & Associate 216); γ <sub>d</sub> = Dr	age for at lea es, Inc. y density; S :	ast 10 work 	n; ō <sub>c</sub> = lso	ent or Ardaman after mailing of ptropic effective Total porosity;						
Checke	d By: 2B: Rev. 0	M				Date	e: 08/22	407				G:\Projects\	2007\07-087\07	-087 Form SR	-28 Rev. 0 tsi 001.wpd						

CLIENT: Youngquist Brothers, Inc	2	INCOMING LABORATORY SAMPLE NO.: 1-1310.75								
PROJECT: North Cape Coral Pur	ta 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										
	t Head lead; Constant Tailwater lead; Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>13.1</u>	Diameter Trimmed: ⊠Yes □ No Length Trimmed: ⊠Yes □ No							
	t Volume; Falling Head - Rising Tailwater	TEST SPECIMEN ORIENTATION:	Vertical     Morizontal							
B-FACTOR: <u>74 (stable)</u> %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.75</u>	□ Assumed ⊠ Measured (ASTM D 854)							
	Δσ <sub>c</sub> (psi): <u>3; 6; 9; 11</u>	PERMEANT:  © Deaired Tap Water	© Other							

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity					
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	Î <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)					
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					
& Associa	ates, Inc. F		electronic	records of e	each projec	t are kept	for a minim	ium of 7 yea	ars. Test s	amples are	kept in stora	age for at lea			ent or Ardaman after mailing of					
-																				

Form SR-2B: Rev. 0

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CLIENT: Youngquist Brothers, Inc	2	INCOMING LABORATORY SAMPLE NO.: 1-1314.8								
PROJECT: North Cape Coral Pur	ita Gorda	LABORATORY IDENTIFICATION NO.: 07087/11314.8V								
FILE NO.: 07-087		SAMPLE DESCRIPTION: Light Brown Limestone								
DATE SAMPLE RECEIVED: 05/03	3/07 SET UP: 66/26/07	·								
DATE REPORTED: 08/22/07										
□ C - Falling I	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): 4 As-Received Length (inch): 5.9 TEST SPECIMEN ORIENTATION:	Diameter Trimmed: □ Yes ⊠ No Length Trimmed: ⊠ Yes □ No ⊠ Vertical □ Horizontal							
B-FACTOR: <u>96</u> %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.74</u>	□ Assumed ⊠ Measured (ASTM D 854)							
	Δσ <sub>c</sub> (psi): <u>4; 7; 9</u>	PERMEANT:	□ Other							

Initial Conditions							Test Conditions					Final Conditions			Hydraulic Conductivity			
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₀ (pcf)	n	S (%)	ο <sub>ς</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S k <sub>20</sub> (%) (cm/sec)				
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			
& Associa	ates, Inc. P	hysical and	electronic	records of e	each projec	rt are kept	for a minim	um of 7 ye	ars. Test s	amples are		age for at lea			ent or Ardaman after mailing of			
the test re Where: H	eport, prior i	to being dis en height; D	carded, unl	ess a longe n diameter;	r storage p V = Volum	period is re	equested in Dry mass;	writing and w <sub>c</sub> = Moistu	accepted t	Ardaman	& Associate (16); γ <sub>d</sub> = Dry	es, Inc. y density; S :	= Saturatio	n; ō <sub>e</sub> = lso	otropic effective Total porosity;			
		ecific gravit		e, i <sub>avg</sub> – Ave	sage nyura	unc yraun		w volume,	r – restuur	auon, ĸ <sub>20</sub>		yurauncconc		20 0, 11 -				
Checke	d By:	TM				Date	e: <u>08/2</u>	457										
	2B: Rev. (							<del></del>	_			G:\Projects\2	2007\07-087\07-	087 Form SR	-28 Rev. 0 tsi 001.wpd			

CLIENT: Youngquist Brothers, In	С	INCOMING LABORATORY SAMPLE	NO.: 1-1314.8						
PROJECT: North Cape Coral Pu	nta Gorda	LABORATORY IDENTIFICATION NO .: 07087/11314.8H							
FILE NO.:_07-087		SAMPLE DESCRIPTION: Light Brown Limestone							
DATE SAMPLE RECEIVED: 05/0	3/07 SET UP: 07/16/07								
DATE REPORTED: 08/22/07		· · · · · · · · · · · · · · · · · · ·							
□ C - Falling	nt Head Head; Constant Tailwater Head; Rising Tailwater nt Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>5.9</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: Length Trimmed: □ Vertical	⊠ Yes □ No ⊠ Yes □ No ⊠ Horizontal					
B-FACTOR: <u>92 (stable)</u> %	□ Beginning of Test; ⊠ End of Test	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.74</u>	□ Assumed Measured (ASTM	D 854)					
	Δσ <sub>c</sub> (psi): <u>3; 7; 11</u>	PERMEANT: Ø Deaired Tap Water	Other						

	Initial Conditions							Test Conditions					Final Conditions							
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	V₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)						
7.60	5.01	149.76	13.3	125.3	0.267	100	30	160	33	2.6	1	300.78	13.3	100	2.4x10-6					
	ITS: Horizo	ontal perme	ability test	specimen c	ored from	vertical tes	st specimer				•		· · · · · · · · · · · · · · · · · · ·	•						
& Associa the test re	ates, Inc. P eport, prior i	hysical and to being dis	electronic carded, unl	records of e ess a longe	each projec er storage p	t are kept period is re	for a minim equested in	um of 7 yea writing and	ars. Test sa accepted b	amples are by Ardaman	kept in stora & Associate	age for at lea es, inc.	est 10 work	ing days	after mailing of					
c	confining str	en height; D ess; u <sub>b</sub> = Ba ecific gravit	ack-pressur	n diameter; e; i <sub>avg</sub> = Ave	V = Volum erage hydra	ne; WDS = aulic gradie	Dry mass; ent; Q = Flo	w <sub>c</sub> = Moistu w volume; t	re content ( : = Test dur	ASTM D 22 ation; k <sub>20</sub> =	t16); γ <sub>d</sub> = Dr <u>y</u> Saturated h	/ density; S : ydraulicconc	= Saturation luctivity at 2	n; ō <sub>c</sub> = lso 20°C; n =	tropic effective Total porosity;					
hecked	d By: 2B: Rev. 0	TM				Date	: D8/2	207												
orm SR-3	2B: Rev. 0	)						• [				G:\Projects\2	2007\07-087\07-	087 Form SR-	2B Rev, 0 tsi 001,wpd					

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:	SPECIMEN DATA:       As-Received Diameter (inch):_4       Diameter Trimmed: □ Yes INO         As-Received Length (inch):_6.7       Length Trimmed: INF       Yes INO         TEST SPECIMEN ORIENTATION:       IN Vertical       INO
B-FACTOR:%	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.83</u> □ Assumed <sup>III</sup> Measured (ASTM D 854)
Δσ <sub>c</sub> (psi):	PERMEANT:  IN Deaired Tap Water  □ Other

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 Cli & 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
7.63       10.01       600.49       0.7       165.9       0.061       30       40       150       190       0.1       10       1595.4       0.8       35         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 Cli & 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 the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.
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 Cli & 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
Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w <sub>c</sub> = Moisture content (ASTM D 2216); y <sub>d</sub> = Dry density; S = Saturation; σ <sub>c</sub> = Is confining stress; u <sub>b</sub> = Back-pressure; i <sub>avg</sub> = Average hydraulic gradient; Q = Flow volume; t = Test duration; k <sub>20</sub> = Saturated hydraulicconductivity at 20°C; n = and G <sub>s</sub> = Specific gravity.

CLIENT: Youngquist Brothers, Inc	·	INCOMING LABORATORY SAMPLE	NO.: <u>1-1633.5</u>
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/11633.5H
FILE NO.: 07-087		SAMPLE DESCRIPTION: Brown Dol	lomitic Limestone
DATE SAMPLE RECEIVED: 05/03	/07 SET UP:08/09/07		
DATE REPORTED: 09/07/07			
C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>6.7</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal
B-FACTOR: <u>74 (stable)</u> %	□ Beginning of Test;	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.83</u>	□ Assumed ⊠ Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi): <u>3; 5; 8</u>	PERMEANT:	D Other

		Initia	al Conditio	ns				Т	est Conditio	ons		Fina	al Condition	ns	Hydraulic Conductivity
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₀ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	(cm/sec)
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
		to being dis												ung days	after mailing of
c	onfining str		ick-pressu												otropic effective Total porosity;
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orm SR-2	2B: Rev. (						··	<u>+</u>				G:\Projects\2	007\07-087\07-	-087 Form SR	-28 Rev, 0 tsi 002.wp

CLIENT: Youngquist Brothers, Inc.	INCOMING LABORATORY SAMPLE NO.: 2-1811.6
PROJECT: North Cape Coral Punta Gorda	LABORATORY IDENTIFICATION NO .: 07087/21811.6V
FILE NO.:07-087	SAMPLE DESCRIPTION: Brown Dolomitic Limestone
DATE SAMPLE RECEIVED: 05/03/07 SET UP: 06/22/07	
DATE REPORTED: 08/22/07	
ASTM D 5084 TEST METHOD:	SPECIMEN DATA:         As-Received Diameter (inch):       4         Diameter Trimmed:       Yes         As-Received Length (inch):       6.0         Length Trimmed:       Yes         No         TEST SPECIMEN ORIENTATION:       Vertical         SPECIFIC GRAVITY, G.:       2.90
B-FACTOR: 99	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.90</u> □ Assumed
Δσ <sub>c</sub> (psi): <u>4; 8; 12</u>	PERMEANT:  I Deaired Tap Water  □ Other

		Initia	al Condition	าร				Т	est Conditio	ONS		Fina	al Condition	าร	Hydraulic Conductivity
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	γ <sub>d</sub> (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	İ <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	(cm/sec)
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
& Associ	ates, Inc. P	associated hysical and to being disc	electronic	records of e	each projec	t are kept	for a minim	ium of 7 yea	ars. Test s	amples are	kept in stor	age for at lea	horization ist 10 work	of the Clie ing days	ent or Ardaman after mailing of
Where: I	H = Specime	en height; D	= Specime ck-pressur	n diameter;	V = Volum	ie; WDS =	Dry mass;	w <sub>c</sub> = Moistu	re content (	ASTM D 22	:16); y <sub>a</sub> = Dr	density; S =	= Saturatio luctivity at :	n; ō <sub>c</sub> = lso 20°C; n =	otropic effective Total porosity;
	<u> a F</u>														

CLIENT: Youngquist Brothers, Inc	·	INCOMING LABORATORY SAMPLE	NO.: 2-1811.6
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: <u>07087/21811.6H</u>
FILE NO.: 07-087		SAMPLE DESCRIPTION: Brown Dol	omitic Limestone
DATE SAMPLE RECEIVED: 05/03	/07 SET UP: 07/13/07		
DATE REPORTED: 08/22/07			
D C - Falling H	lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>6.0</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal
B-FACTOR: 73 (stable) %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.90</u>	□ Assumed Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi): <u>3; 6; 9</u>	PERMEANT:	Other

		Initi	al Condition	าร				Т	est Conditio	ons		Fina	al Condition	าร	Hydraulic Conductivity
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	Î <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
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
& Associa		hysical and	electronic	records of e	each projec	t are kept	for a minim	num of 7 ye	ars. Test s	amples are	kept in stor	age for at lea			ent or Ardaman after mailing of
(		ess; u <sub>b</sub> = Ba	ack-pressur												otropic effective Total porosity;
	d By:					Date	: <u>00</u> [2	2/07				G:\Projects\2	2007\07-087\07-	087 Form SR	-28 Rev. 0 tsi 001.wpd

CLIENT: Youngquist Brothers, Inc	•	INCOMING LABORATORY SAMPLE	NO.: <u>3-1980.3</u>
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/31980.3V
FILE NO.: 07-087		SAMPLE DESCRIPTION: Brown Dol	omitic Limestone
DATE SAMPLE RECEIVED: 05/03	/07SET UP:06/29/07		
DATE REPORTED: 08/22/07			
D C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>10.6</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: □ Yes ⊠ No Length Trimmed: ⊠ Yes □ No ⊠ Vertical □ Horizontal
B-FACTOR: <u>85 (stable)</u> %	□ Beginning of Test; ⊠ End of Test	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.83</u>	□ Assumed ◎ Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi): <u>4; 7; 10</u>	PERMEANT:	Other

		Initia	al Condition	าร				Т	est Conditio	ons		Fina	I Conditior	is	Hydraulic Conductivity
H (cm)	D (cm)	∨ (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	ō <sub>c</sub> (psi)	u <sub>s</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
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
& Associa	ates, Inc. P	hysical and	electronic	records of e	ach projec	t are kept	for a minim	um of 7 ye	ars. Test s	amples are	• •	age for at lea			ent or Ardaman after mailing of
the test re Where: H	eport, prior f	to being dise	carded, unl = Specime	ess a longe n diameter;	r storage p V = Volum	period is re ne; WDS =	equested in Dry mass;	writing and	accepted t	oy Ardaman ASTM D 22	& Associate (16); $\gamma_d = Dr_d$	es, Inc. y density; S =	= Saturatio	n; ō <sub>c</sub> = isc	tropic effective
		ecific gravit		e, I <sub>avg</sub> = Ave	age nyora	unc grade	ent; Q = Fic	w volume;	t = Test dur	аноп; к <sub>20</sub> = -	Saturated n	yarauliccono	uctivity at .	20°C; n =	Total porosity;
Checked	d By:	TM				Date	: <u>00/7</u>	2/07							
orm SR-	2B: Rev. 0	) 1					E					G:\Projects\2	007\07-087\07-	087 Form SR-	2B Rev. 0 tsi 001.wpd

CLIENT: Youngquist Brothers, Inc.	· · ·	INCOMING LABORATORY SAMPLE	NO.: 3-1980.3
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	: 07087/31980.3H
FILE NO.: 07-087		SAMPLE DESCRIPTION: Brown Dol	omitic Limestone
DATE SAMPLE RECEIVED: 05/03	/07SET UP:08/09/07		
DATE REPORTED: 08/22/07			
□ C - Falling F	t Head lead; Constant Tailwater lead; Rising Tailwater : Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>10.6</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal
B-FACTOR: 90 (stable) %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.83</u>	□ Assumed
	Δσ <sub>c</sub> (psi): <u>3; 5; 8; 11</u>	PERMEANT: ∞ Deaired Tap Water	D Other

		Initia	al Conditio	ns				т	est Conditi	ons		Fina	I Condition	าร	Hydraulic Conductivity
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₀ (pcf)	n	S (%)	ō <sub>c</sub> (psi)	u <sub>b</sub> (psi)	j <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	(cm/sec)
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
the test n	eport, prior	to being disc	carded, un	less a longe	er storage p	period is re	equested in	writing and	accepted	by Ardaman	& Associat	es, Inc.			after mailing c
c	confining st	en height; D ress; u <sub>b</sub> = Ba recific gravity	ick-pressu	en diameter re; i <sub>avg</sub> = Ave	; V = Volum erage hydra	ne; WDS = aulic gradi	: Dry mass; ent; Q = Fl	; w <sub>c</sub> = Moistu ow volume;	ire content t = Test du	(ASTM D 22 ration; k <sub>20</sub> =	216); γ <sub>d</sub> = Dr Saturated h	y density; S : ydraulicconc	= Saturatio luctivity at	n; ō <sub>c</sub> = Iso 20°C; n =	tropic effectiv Total porosity
hecke	d By:	TM				Date	e: 08(:	72/157							

CLIENT: Youngqui	st Brothers, Inc	2	INCOMING LABORATORY SAMPLE	NO.: <u>4-2073.0</u>	
PROJECT: North (	Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/42073.0V	
FILE NO.: 07-087			SAMPLE DESCRIPTION: Light Brow	n Limestone	
DATE SAMPLE REC	CEIVED: 05/03	0/07SET UP:06/28/07			
DATE REPORTED:	08/22/07				
ASTM D 5084 TEST	⊠ A - Constan □ B - Falling H □ C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): 4 As-Received Length (inch): 7.5 TEST SPECIMEN ORIENTATION:	Diameter Trimmed: Length Trimmed: Ø Vertical	□ Yes  ⊠ No ⊠ Yes  □ No □ Horizontal
B-FACTOR:95	%	□ Beginning of Test; ¤ End of Test	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.87</u>	□ Assumed Measured (ASTM	D 854)
		Δσ <sub>c</sub> (psi): <u>3; 6; 9</u>	PERMEANT:	□ Other	

	Initial Conditions							T	est Conditi	ons		Fina	is	Hydraulic Conductivity	
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	ս <sub>ե</sub> (psi)	İ <sub>avg</sub>	Q (cm <sup>3</sup> )	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	(cm/sec)
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
1 1		eceived total													
& Associa	ates, Inc. F	l associated Physical and to being dis	electronic	records of e	each projec	ct are kept	for a minim	num of 7 yea	ars. Test s	amples are	kept in stor	age for at le	thorization ast 10 work	of the Clie ing days	ent or Ardaman after mailing of
c	confining st	en height; D ress; u <sub>b</sub> = Ba pecific gravit	ack-pressu	en diameter re; i <sub>avg</sub> = Ave	; V = Volum erage hydra	ne; WDS = aulic gradi	Dry mass; ent; Q = Flo	w <sub>c</sub> = Moistu ow volume; t	re content t = Test du	(ASTM D 22 ration; k <sub>20</sub> =	216); γ <sub>d</sub> = Dr Saturated h	y density; S ydrauliccono	= Saturatio Juctivity at	n; ō <sub>c</sub> = lso 20°C; n =	tropic effective Total porosity;
	d By:	14				Date	e:00[	22/07				G:\Projects\	2007\07-087\07-	087 Form SR	28 Rev. 0 tsi 001.wpd

Form SR-2B: Rev. 0

CLIENT: Youngquist Brothers.	nc.	INCOMING LABORATORY SAMPLE	NO.: 4-2073.0
PROJECT: North Cape Coral F	unta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/42073.0H
FILE NO.:07-087		SAMPLE DESCRIPTION: Brown Dol	omitic Limestone
DATE SAMPLE RECEIVED: 05	/03/07 SET UP: 07/13/07		
DATE REPORTED: 08/22/07			
□ C - Fallin	ant Head g Head; Constant Tailwater g Head; Rising Tailwater ant Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>7.5</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertica! ⊠ Horizontal
B-FACTOR:%	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.87</u>	□ Assumed થ Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi):	PERMEANT:	Other

			al Condition	IS				Т	est Conditio	ons		Final Conditions			Hydraulic Conductivity
H (cm)	D (cm)	V (cm <sup>3</sup> )	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
6.78	5.02	133.98	1.6	162.1	0.095	43	30	160	71	1.6	10	348.03	1.8	49	1.3x10-9
& Associat	tes, Inc. P	hysical and	electronic i	records of e	each projec	t are kept	for a minim	um of 7 yea	ars. Test s	amples are by Ardaman	kept in stora	age for at lea	ast 10 work	ing days	ent or Ardaman after mailing of
Where: H	= Specime	en height; D	= Specime	n diameter;	V = Volum	ne; WDS =	Dry mass;	w <sub>c</sub> = Moistu	re content (	(ASTM D 22	216); γ <sub>d</sub> = Dr	y density; S =	= Saturatio	n; ō <sub>c</sub> = lso 20°C; n =	tropic effective Total porosity;
		ecific gravity				****						<u></u>			
hecked	I By:	TM				Date	e: 08/2	201							

CLIENT: Youngquist Brothers, Inc	2	INCOMING LABORATORY SAMPLE	NO.: 5-2216.7
PROJECT: North Cape Coral Pur	nta Gorda	LABORATORY IDENTIFICATION NO	.:07087/52216.7V
FILE NO.: 07-087		SAMPLE DESCRIPTION: Brown Vug	ggy Dolomitic Limestone
DATE SAMPLE RECEIVED: 05/03	3/07 SET UP: 06/24/07		
DATE REPORTED: 08/22/07			
⊠ C - Falling I	It Head Head; Constant Tailwater Head; Rising Tailwater t Volume; Falling Head - Rising Tailwater □ Beginning of Test; ⊠ End of Test	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>7.4</u> TEST SPECIMEN ORIENTATION: SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.85</u>	Diameter Trimmed: □ Yes ⊠ No Length Trimmed: ⊠ Yes □ No ⊠ Vertical □ Horizontal □ Assumed ⊠ Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi): <u>3; 6; 8</u>	PERMEANT:	Other

		Initia	al Conditior	າຣ				Ť	est Conditio	ons		Fina	Hydraulic Conductivity		
H (cm)	D (cm)	V (cm <sup>3</sup> )	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
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
& Associa		hysical and	electronic	records of e	ach projec	t are kept	for a minim	ium of 7 yea	ars. Test s	amples are	kept in stora	age for at lea			ent or Ardaman after mailing of
c	H = Specime confining str and G <sub>s</sub> = Spe	ess; u <sub>b</sub> = Ba	ck-pressur	n diameter; e; i <sub>avg</sub> = Ave	V = Volum rage hydra	ne; WDS = aulic gradie	Dry mass; ent; Q = Flo	w <sub>e</sub> = Moistu w volume; t	re content ( t = Test dur	ASTM D 22 ation; k <sub>20</sub> =	216); γ <sub>d</sub> = Dry Saturated h	y density; S : ydrauliccono	= Saturation luctivity at 2	n; ō <sub>c</sub> = lso 20°C; n =	tropic effective Total porosity;
	d By:	ΤM				Date	e: _08(2	22/07					2007\07-087\07-		

CLIENT: Youngqui	st Brothers, Inc		INCOMING LABORATORY SAMPLE	NO.: 5-2216.7
PROJECT: North (	Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.:07087/52216.7H
FILE NO.: 07-087			SAMPLE DESCRIPTION: Brown Vue	gy Dolomitic Limestone
DATE SAMPLE RE	CEIVED: 05/03	/07 SET UP:07/16/07		
DATE REPORTED:	08/22/07			
ASTM D 5084 TEST		t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>7.4</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal
B-FACTOR:	<u>100</u> %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.85</u>	□ Assumed Measured (ASTM D 854)
		Δσ <sub>c</sub> (psi): <u>3; 6; 9; 11</u>	PERMEANT: <sup>III</sup> Deaired Tap Water	Other

	Initial Conditions							Т	ons		Fina	าร	Hydraulic Conductivity		
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>b</sub> (psi)	İ <sub>avg</sub>	Q (cm <sup>3</sup> )	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	(cm/sec)
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
he test repor		-						-		•	•	•		ang days	after mailing o
	fining stre		ck-pressur												tropic effective Total porosity

Form SR-2B: Rev. 0

CLIENT: Youngquist Brothers, Inc		INCOMING LABORATORY SAMPLE NO.: <u>5-2222.3</u>							
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/52222.3V						
FILE NO.: 07-087	··	SAMPLE DESCRIPTION: Brown Dol	omitic Limestone with	Fissures					
DATE SAMPLE RECEIVED: 05/03	/07 SET UP:06/26/07								
DATE REPORTED: 08/22/07									
D C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>10.9</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: Length Trimmed: vertical						
B-FACTOR: <u>92 (stable)</u> %	□ Beginning of Test; ⊠ End of Test	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.86</u>	□ Assumed Measured (ASTM I	D 854)					
	Δσ <sub>c</sub> (psi): <u>3;6;9</u>	PERMEANT:	Other						

н р	1 1		າຣ				Т	ons		Final Conditions			Hydraulic Conductivity	
(cm) (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>⊳</sub> (psi)	İ <sub>avç</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
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
& Associates, Inc.	•		ess a longe		•				•	•	•	ISL TO WOLK	ung days	

· · · · · · · · · · · · · · · · · · ·		
CLIENT: Youngquist Brothers, Inc.	INCOMING LABORATORY SAMPLE	NO.: <u>5-2222.3</u>
PROJECT: North Cape Coral Punta Gorda	LABORATORY IDENTIFICATION NO	.: 07087/52222.3H
FILE NO.: 07-087	SAMPLE DESCRIPTION: Brown Dol	Iomitic Limestone
DATE SAMPLE RECEIVED: 05/03/07 SET UP: 07/16/07		
DATE REPORTED: 08/22/07		
ASTM D 5084 TEST METHOD:	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>10.9</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal
B-FACTOR: <u>85 (stable)</u> % □ Beginning of Test;	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.86</u>	□ Assumed ⊠ Measured (ASTM D 854)
Δσ <sub>c</sub> (psi) <u>: 3; 7; 10</u>	PERMEANT: <sup>®</sup> Deaired Tap Water	Other

	Initial Conditions							Т	est Conditio	ons		Fina	Hydraulic Conductivity		
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₀ (pcf)	n -	S (%)	ō <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm <sup>3</sup> )	t (days)	WDS (g)	W <sub>c</sub> (%)	S (%)	k <sub>20</sub> (cm/sec)
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
COMMEN	ITS: Horiz	ontal perme	ability test	specimen c	ored from	vertical tes	st specimer	ì.							
& Associa	ates, Inc. P	hysical and	electronic	records of e	each projec	t are kept	for a minim	um of 7 ye	ars. Test s	amples are		age for at lea			ent or Ardaman after mailing of
c	confining str	en height; D ess; u <sub>b</sub> = Ba ecific gravit	ck-pressur	n diameter; e; i <sub>avg</sub> = Ave	V = Volum rage hydra	ne; WDS = aulic gradie	Dry mass; ent; Q = Flo	w <sub>c</sub> = Moistu w volume; :	re content ( t = Test dur	ASTM D 22 ation; k <sub>20</sub> =	216); γ <sub>d</sub> = Drj Saturated h	y density; S ydrauliccond	= Saturatio luctivity at	n; ō <sub>c</sub> = lso 20°C; n =	otropic effective Total porosity;
	d By: 2B: Rev. (					Date	:_DB[7	207				G:\Projects\	2007\07-087\07-	087 Form SR	-28 Rev. 0 tsi 001.wpd

CLIENT: Youngquist E	Brothers, Inc.		INCOMING LABORATORY SAMPLE NO.: 6-2325.9						
PROJECT: North Cap	e Coral Pun	a Gorda	LABORATORY IDENTIFICATION NO .: 07087/62325.9V						
FILE NO.: 07-087			SAMPLE DESCRIPTION: Brown Dolomitic Limestone						
DATE SAMPLE RECEI	VED: 05/03	/07SET UP:06/29/07							
DATE REPORTED: 08	8/22/07								
	A - Constant B - Falling H C - Falling H	Head ead; Constant Tailwater ead; Rising Tailwater Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): 4 As-Received Length (inch): 5.9 TEST SPECIMEN ORIENTATION:	Diameter Trimmed: Length Trimmed: Ø Vertical	□ Yes  ⊠ No ⊠ Yes □ No □ Horizontal				
B-FACTOR: <u>97</u>		<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.86</u>	<ul> <li>□ Assumed</li> <li>∞ Measured (ASTM I</li> </ul>	D 854)				
		Δσ <sub>c</sub> (psi): <u>4;8;10</u>	PERMEANT:  I Deaired Tap Water	Other					

		Initia	al Conditior	าร			Test Conditions					Final Conditions			Hydraulic Conductivity
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	$ \begin{array}{c ccccc} \tilde{\sigma}_c & u_b & & & Q & t & WDS & w_c & S \\ (psi) & (psi) & & (qsi) & & (cm^3) & (days) & (g) & (\%) & (\%) \end{array} $								k <sub>20</sub> (cm/sec)
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
& Associa	ates, Inc. P		electronic	records of e	ach projec	t are kept	for a minim	ium of 7 yea	ars. Test s	amples are	kept in stor	age for at lea			ent or Ardaman after mailing of
Where: H	H = Specime	en height; D ess; u <sub>b</sub> = Ba	= Specime ack-pressur	n diameter;	V = Volurr	ie; WDS =	Dry mass;	w <sub>e</sub> = Moistu	re content (	(ASTM D 22	216); γ <sub>d</sub> = Dr	density; S	= Saturatio luctivity at	n; ō <sub>c</sub> = lso 20°C; n =	tropic effective Total porosity;
		ecific gravity	/		·		. 6 1-								
Checked Form SR-	d By: 2B: Rev. 0	)				Date	: <u>08[2</u>	थण	_			G-\Projects\2	2007\07-087\07-	087 Form SR	-28 Rev. 0 tsi 001.wpd

CLIENT: Youngquist Brothers, Inc.	INCOMING LABORATORY SAMPLE NO.: 6-2325.9						
PROJECT: North Cape Coral Punta Gorda	LABORATORY IDENTIFICATION NO.: 07087/62325.9H						
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:	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>5.9</u> TEST SPECIMEN ORIENTATION: SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.86</u> PERMEANT: ∞ Deaired Tap Water	Diameter Trimmed:   Yes No Length Trimmed:  Yes No Vertical Assumed Measured (ASTM D 854) Other					

	Initial Conditions							Test Conditions					Final Conditions		
H (cm)	D (cm)	V (cm <sup>3</sup> )	w <sub>c</sub> (%)	Y₀ (pcf)	n	S (%)	ō <sub>c</sub> (psi)	u <sub>b</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	w <sub>c</sub> (%)	S (%)	Conductivity k <sub>20</sub> (cm/sec)
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
& Associa	ates, Inc. P	associated hysical and to being disc	electronic	records of e	each projec	t are kept	for a minim	um of 7 ye	ars. Test s	amples are	kept in stora	age for at lea	thorization ast 10 work	of the Clie	ent or Ardaman after mailing of
Where: H	H = Specime	en height; D	= Specime ck-pressur	n diameter;	V = Volum	ie; WDS =	Dry mass;	w <sub>c</sub> = Moistu	re content (	ASTM D 22	:16); γ <sub>d</sub> = Dry	/ density; S :	= Saturation	n; ō <sub>c</sub> = Isc 20°C; n =	tropic effective Total porosity;

CLIENT: Youngquist Brothers, Inc		INCOMING LABORATORY SAMPLE	NO.: 7-2360.4
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO	: 07087/72360.4V
FILE NO.:07-087		SAMPLE DESCRIPTION: Brown Dol	omitic Limestone
DATE SAMPLE RECEIVED: 05/03	/07SET UP:06/29/07		
DATE REPORTED: 08/22/07			
□ C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): 4 As-Received Length (inch): 17.3 TEST SPECIMEN ORIENTATION:	Diameter Trimmed: □ Yes ⊠ No Length Trimmed: ⊠ Yes □ No ⊠ Vertical □ Horizontal
B-FACTOR: <u>96</u> %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.85</u>	□ Assumed Measured (ASTM D 854)
	Δσ <sub>c</sub> (psi): <u>3; 6; 9</u>	PERMEANT:	□ Other

<ul> <li>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 Ardamar &amp; 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 &amp; Associates, Inc.</li> <li>Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w<sub>c</sub> = Moisture content (ASTM D 2216); y<sub>d</sub> = Dry density; S = Saturation; ö<sub>c</sub> = Isotropic effective confining stress; u<sub>b</sub> = Back-pressure; i<sub>avg</sub> = Average hydraulic gradient; Q = Flow volume; t = Test duration; k<sub>20</sub> = Saturated hydraulicconductivity at 20°C; n = Total porosity and G<sub>s</sub> = Specific gravity.</li> </ul>		Initial Conditions							Test Conditions					Final Conditions		
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 Ardamar & 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 o 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 <sub>c</sub> = Moisture content (ASTM D 2216); $\gamma_d$ = Dry density; S = Saturation; $\overline{\sigma}_c$ = Isotropic effective confining stress; $u_b$ = Back-pressure; $i_{avg}$ = Average hydraulic gradient; Q = Flow volume; t = Test duration; $k_{20}$ = Saturated hydraulicconductivity at 20°C; n = Total porosity and $G_s$ = Specific gravity.		1	V (cm³)			n	-	S $\overline{\sigma}_c$ $u_b$ Q t WDS $w_c$ S								
<ul> <li>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 Ardamar &amp; 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 &amp; Associates, Inc.</li> <li>Where: H = Specimen height; D = Specimen diameter; V = Volume; WDS = Dry mass; w<sub>c</sub> = Moisture content (ASTM D 2216); y<sub>d</sub> = Dry density; S = Saturation; ö<sub>c</sub> = Isotropic effective confining stress; u<sub>b</sub> = Back-pressure; i<sub>avg</sub> = Average hydraulic gradient; Q = Flow volume; t = Test duration; k<sub>20</sub> = Saturated hydraulicconductivity at 20°C; n = Total porosity and G<sub>s</sub> = Specific gravity.</li> </ul>	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
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 <sub>c</sub> = Moisture content (ASTM D 2216); y <sub>d</sub> = Dry density; S = Saturation; σ <sub>c</sub> = Isotropic effective confining stress; u <sub>b</sub> = Back-pressure; i <sub>avg</sub> = Average hydraulic gradient; Q = Flow volume; t = Test duration; k <sub>20</sub> = Saturated hydraulicconductivity at 20°C; n = Total porosity and G <sub>s</sub> = Specific gravity.	The test	data and all	associated	project info	mation pre	esented he	reon shall	be held in	confidence	and disclos	ed to other	parties only kept in stor	with the aut	horization	of the Clie	ent or Ardaman after mailing of
confining stress; u <sub>b</sub> = Back-pressure; i <sub>avg</sub> = Average hydraulic gradient; Q = Flow volume; t = Test duration; k <sub>20</sub> = Saturated hydraulicconductivity at 20°C; n = Total porosity and G <sub>s</sub> = Specific gravity.	the test re	eport, prior	to being disc	carded, unl	ess a longe	r storage p	period is re	equested in	writing and	accepted t	by Ardaman	& Associate	s, inc.			
Checked By: 14 Date: 08/22/07	c	confining str	ess; u <sub>b</sub> = Ba	ck-pressur	n diameter; e; i <sub>avg</sub> = Ave	V = Volum rage hydra	ie; WDS = iulic gradie	Dry mass; ent; Q = Flo	w <sub>c</sub> = Moistu w volume; t	re content ( t = Test dur	(ASTM D 22 ation; k <sub>20</sub> =	t16); γ <sub>d</sub> = Dry Saturated hy	/density; S = /drauliccond	= Saturation luctivity at 3	n; ð <sub>e</sub> = lso 20°C; n =	tropic effective Total porosity;

CLIENT: Youngquist Brothers, Inc		INCOMING LABORATORY SAMPLE NO.: 7-2360.4						
PROJECT: North Cape Coral Pun	ta Gorda	LABORATORY IDENTIFICATION NO .: 07087/72360.4H						
FILE NO.: <u>07-087</u>		SAMPLE DESCRIPTION: Brown Do	lomitic Limestone					
DATE SAMPLE RECEIVED: 05/03	/07 SET UP: 08/09/07							
DATE REPORTED: 09/07/07								
C - Falling H	t Head lead; Constant Tailwater lead; Rising Tailwater t Volume; Falling Head - Rising Tailwater	SPECIMEN DATA: As-Received Diameter (inch): <u>4</u> As-Received Length (inch): <u>17.3</u> TEST SPECIMEN ORIENTATION:	Diameter Trimmed: ⊠ Yes □ No Length Trimmed: ⊠ Yes □ No □ Vertical ⊠ Horizontal					
B-FACTOR: <u>88 (stable)</u> %	<ul> <li>Beginning of Test;</li> <li>End of Test</li> </ul>	SPECIFIC GRAVITY, G <sub>s</sub> : <u>2.85</u>	□ Assumed ⊠ Measured (ASTM D 854)					
	Δσ <sub>c</sub> (psi): <u>4;7;11</u>	PERMEANT:	Other					

	Initial Conditions							Т	ons		Final Conditions			Hydraulic Conductivity	
H (cm)	D (cm)	V (cm³)	w <sub>c</sub> (%)	Y₄ (pcf)	n	S (%)	σ <sub>c</sub> (psi)	u <sub>s</sub> (psi)	i <sub>avg</sub>	Q (cm³)	t (days)	WDS (g)	(cm/sec)		
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
COMMEN	ITS: Horizo	ontal permea	bility test s	pecimen ca	ored from v	ertical tes	t specimen								
the test re Where: H	eport, prior : H = Specime	to being disc en height; D	arded, unl	ess a longe n diameter;	r storage p V = Volum	period is re	equested in Dry mass;	writing and	accepted t	Ardaman	& Associate 16); γ <sub>d</sub> = Dry	density; S =	= Saturatio	n; ō, = lsc	after mailing of
		ecific gravity						www.colume.		auon, k <sub>20</sub> -	Saturated hy			20°C; n =	Total porosity;

# **Appendix E**

**Geophysical Logs** 



**Pilot Hole Water Quality** 

## **Injection Well IW-2**

**Pilot Hole Water Quality** 

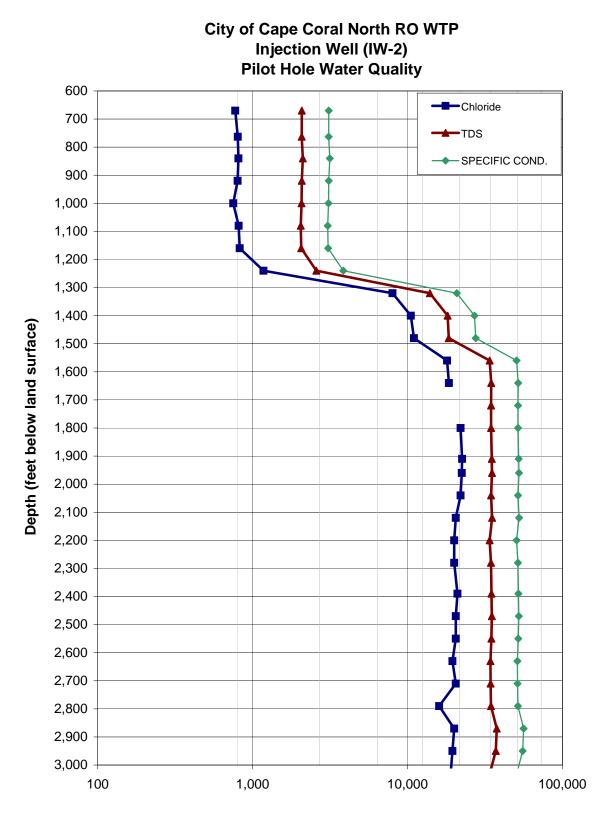
#### NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER:3220246.77010102CONTRACTOR:Youngquist Brothers, Inc.PROJECT MANAGER:Neil Johnson

OWNER: City of Cape Coral

DATE	TIME	DEPTH (feet)	TEMP. (°C)	рН	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		МК
2/12/2007	1:40	1,000	27.1	5.66	3,089	2,070	750		МК
2/12/2007	6:12	1,080	26.8	5.60	3,052	2,045	813		МК
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		МК
2/13/2007	4:28	1,320	28.8	5.08	20,800	13,936	8,000		МК
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			МК
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, analyze	d 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



Concentration (mg/L)

## **Monitor Well DZMW-1**

**Pilot Hole Water Quality** 

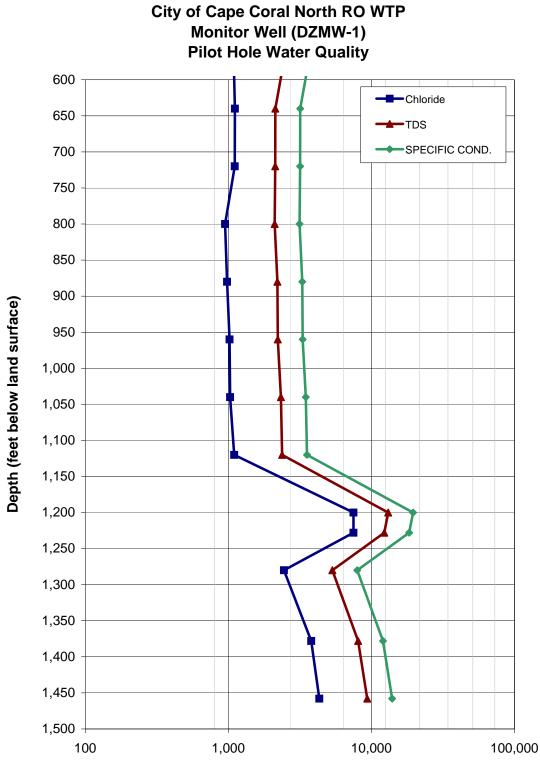


### DZMW-1 WATER QUALITY DATA FROM PILOT HOLE DRILLING

#### 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)	рН	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	МК
4/11/2007	5:45	720	27.3	8.18	3,177	2,129	1,110	Entered by RAW	МК
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



Concentration (mg/L)

# 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 breciated
2062.0	2068.0	Limestone and dolostone beds, vuggy, fractures, gauge hole, small cavitites, 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 soltion 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, slighly 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 fraturing, 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

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.

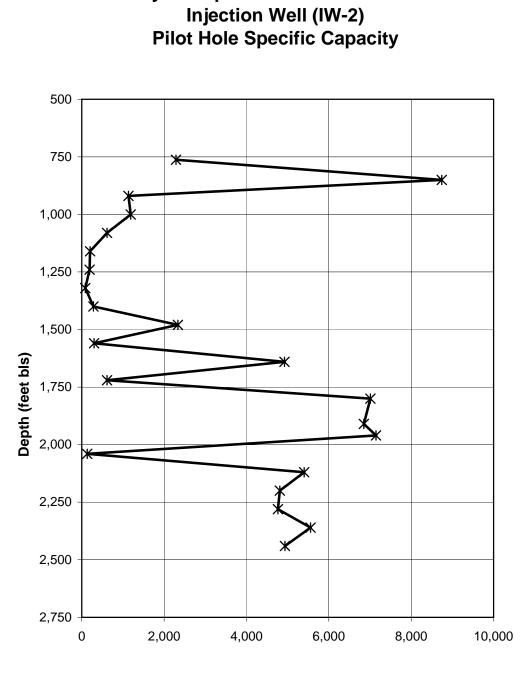
Depth (feet bls)	Description
898.3	Casing threaded connection. 360° rotation side-view. Integrity of casing and connection appears good.
901.1	Logging tool centralizer marks visible in upper right quadrant extending to 924 feet bpl.
927.7	Casing threaded connection.
957.6	Casing threaded connection.
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** 

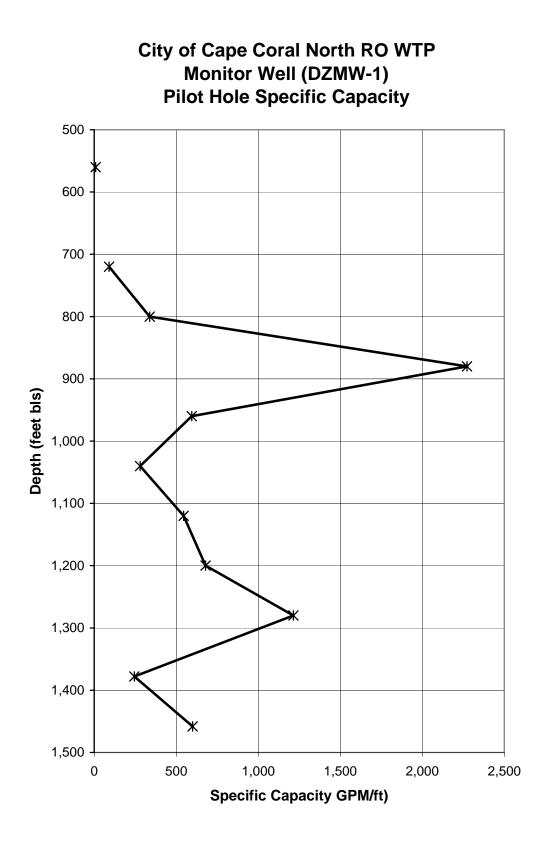
**Pilot Hole Specific Capacity** 



City of Cape Coral North RO WTP

Specific Capacity (GPM/ft)

**Pilot Hole Specific Capacity** 

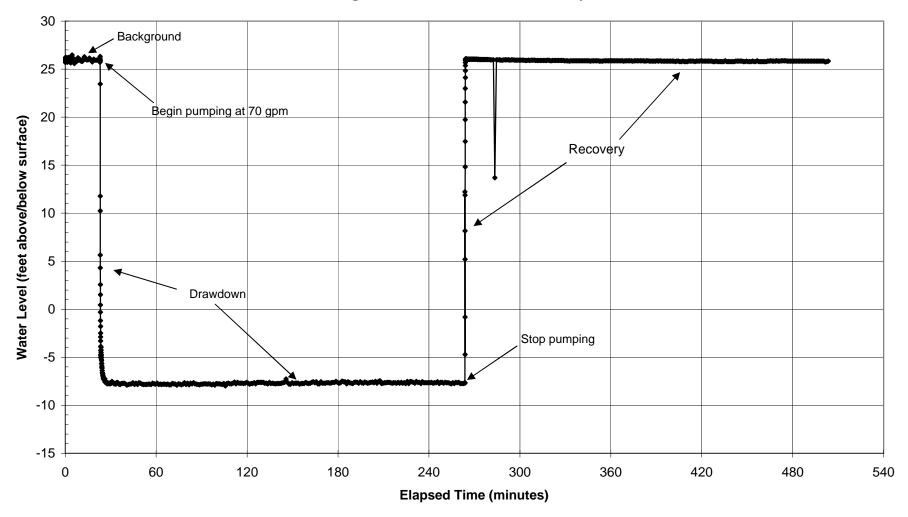


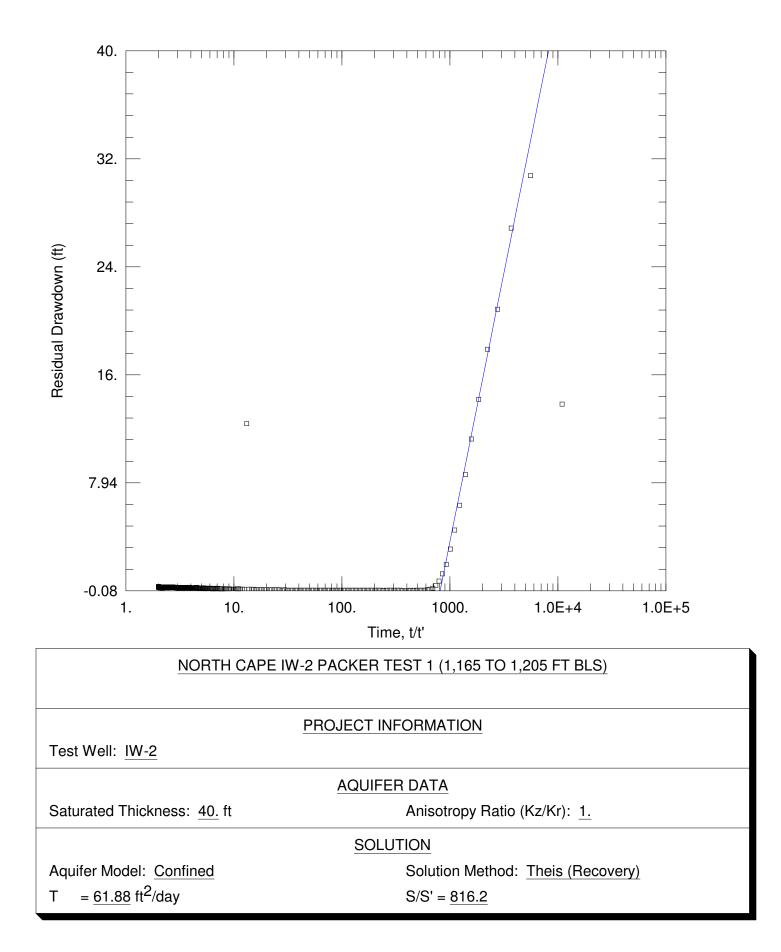


Packer Testing Data and Graphs

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

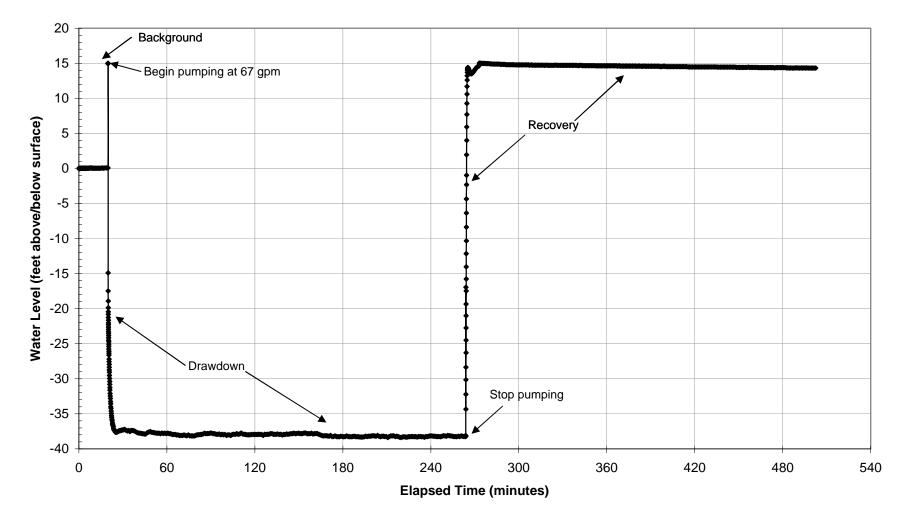
City of Cape Coral North RO WTP Injection Well IW-2 Packer Test - 1,165 to 1,205 ft bls Background, Drawdown & Recovery

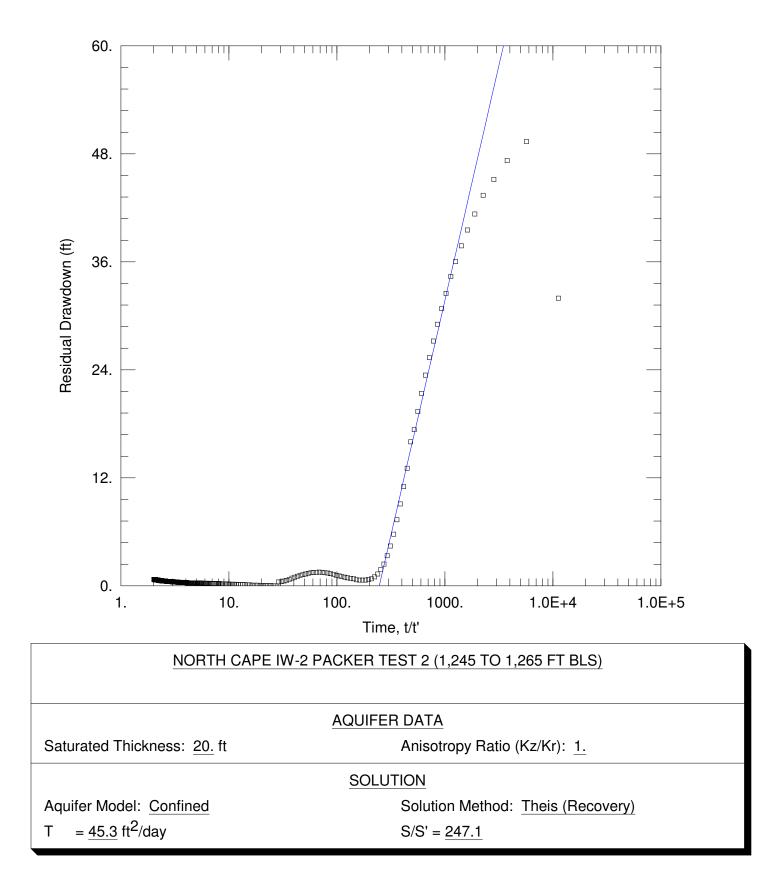




Packer Test - 1,245 to 1,265 feet bls

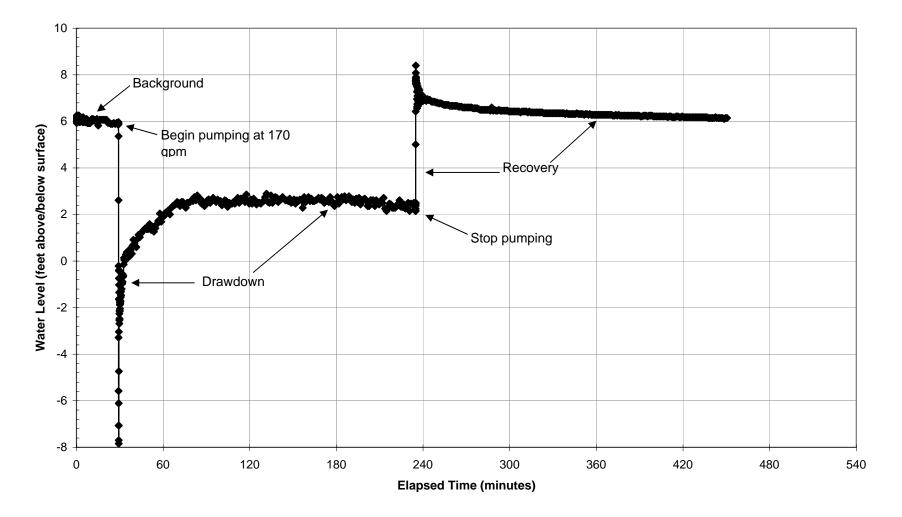
City of Cape Coral North RO WTP Injection Well IW-2 Packer Test - 1,245 to 1,265 ft bls Background, Drawdown & Recovery

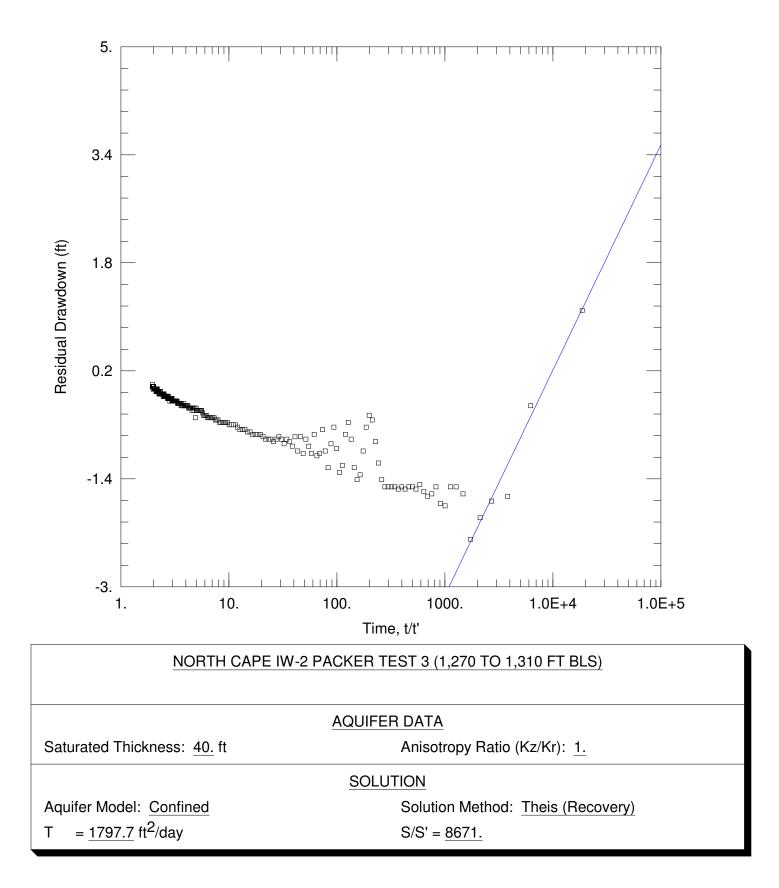




Packer Test - 1,270 to 1,310 feet bls

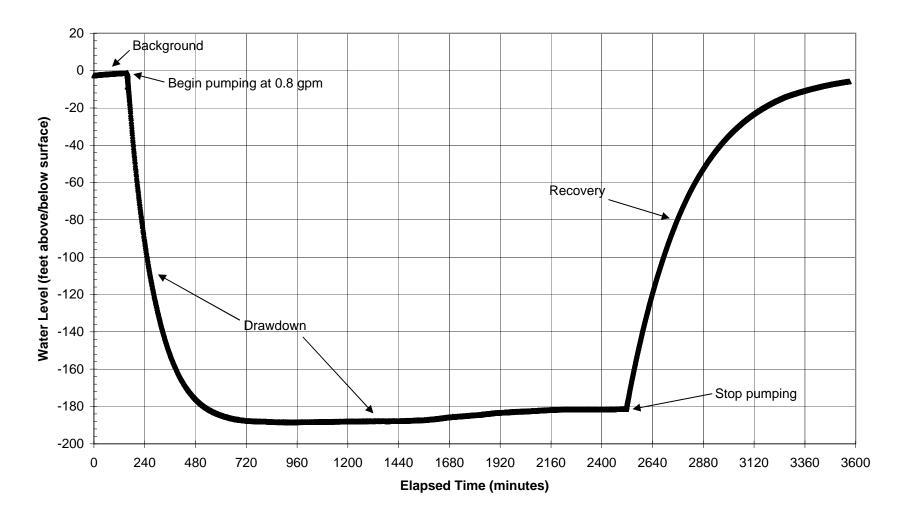
City of Cape Coral North RO WTP Injection Well IW-2 Packer Test - 1,270 to 1,310 ft bls Background, Drawdown & Recovery

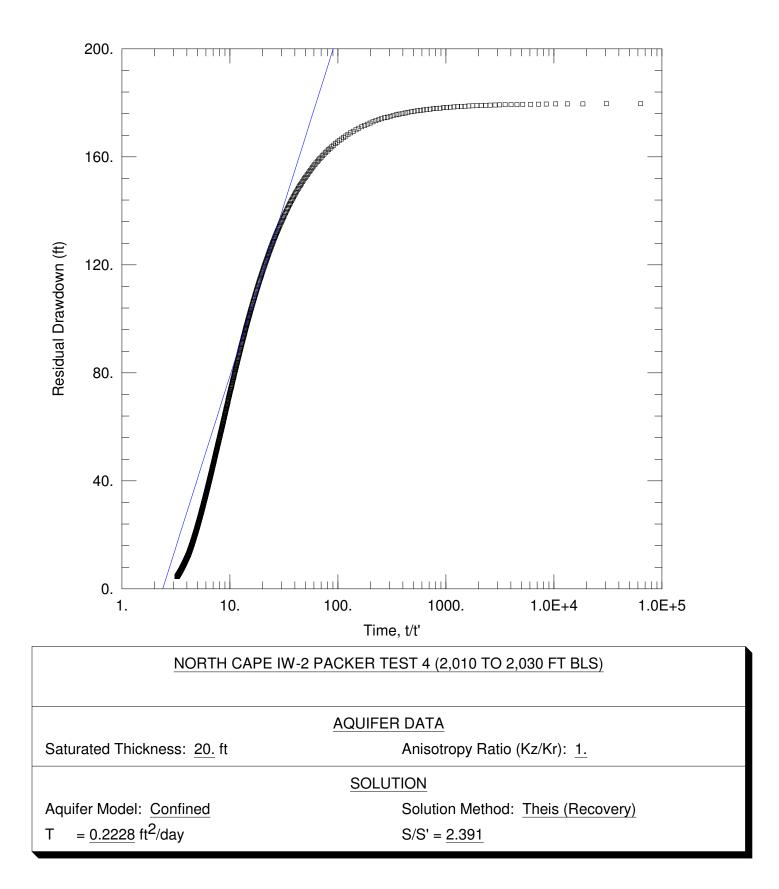




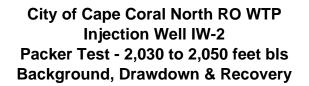
Packer Test - 2,010 to 2,030 feet bls

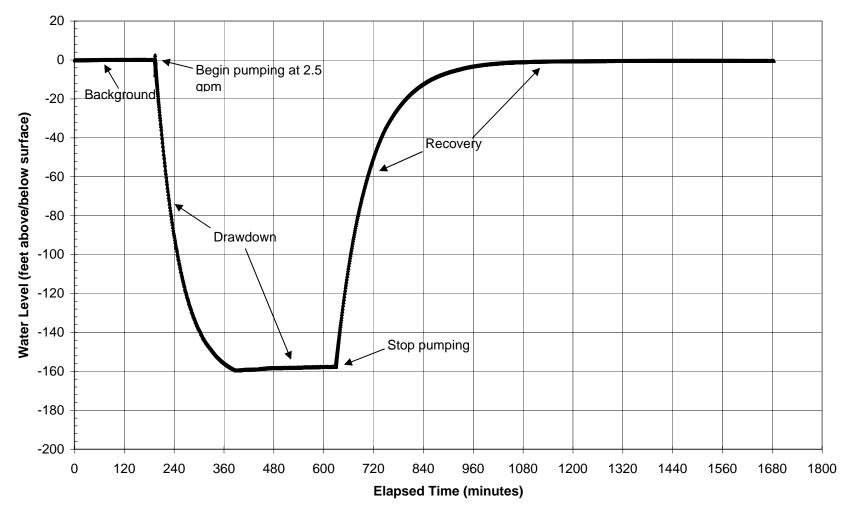
City of Cape Coral North RO WTP Injection Well IW-2 Packer Test - 2,010 to 2,030 feet bls Background, Drawdown & Recovery

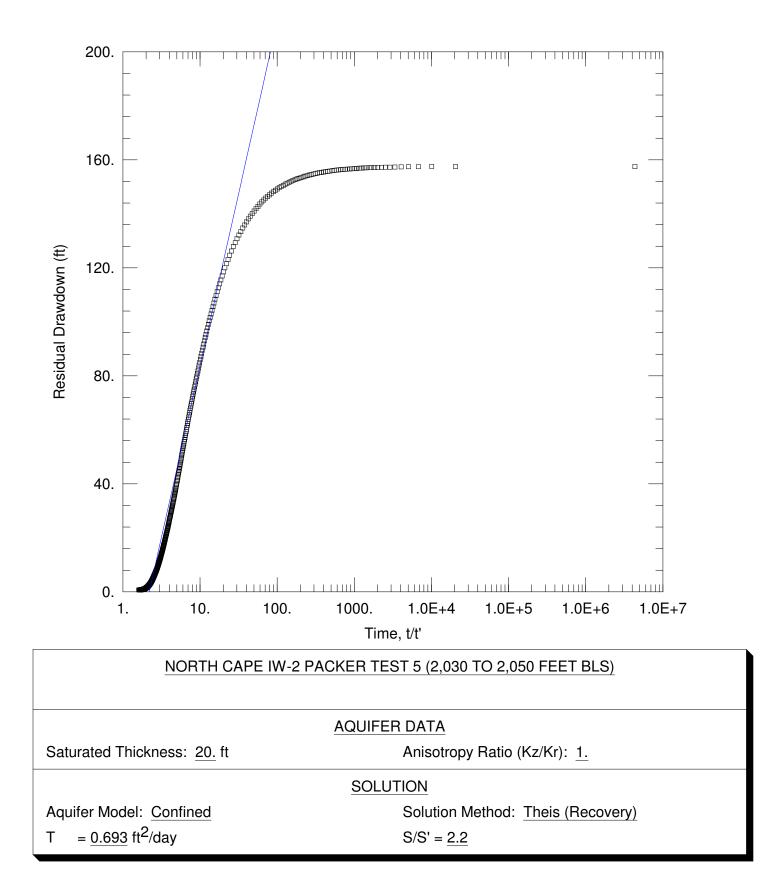




Packer Test - 2,030 to 2,050 feet bls

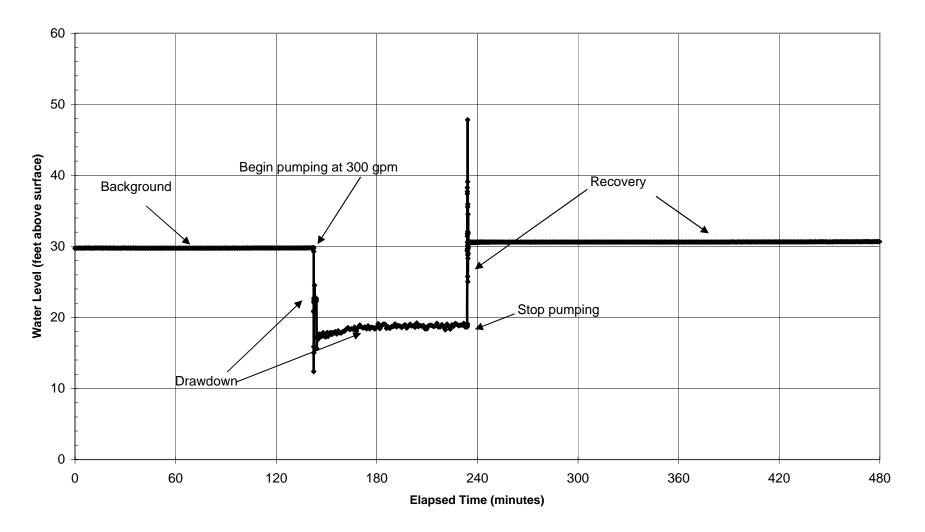


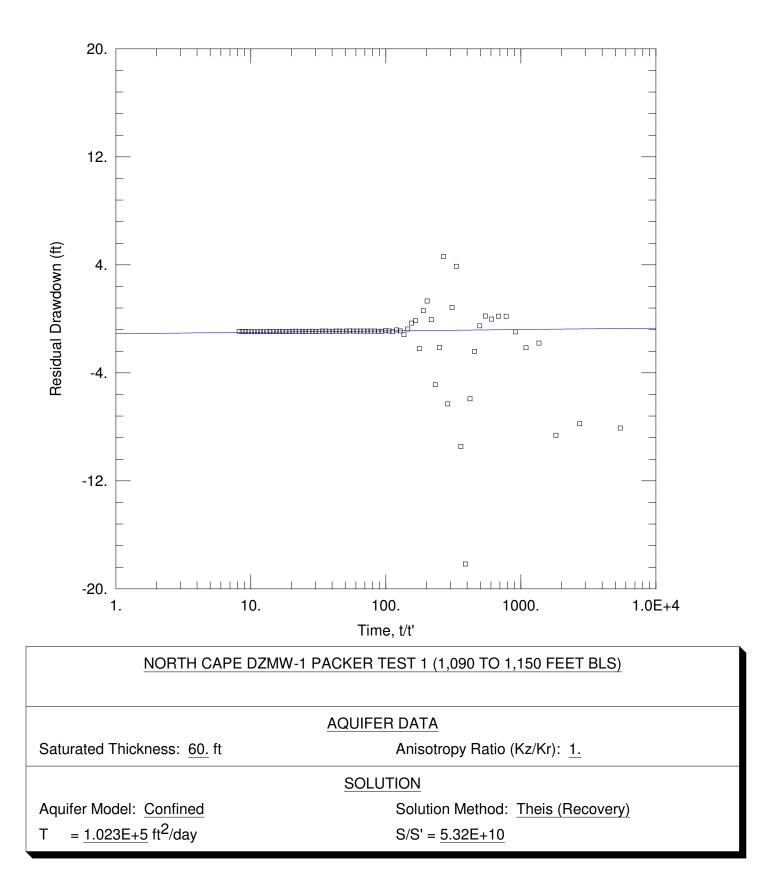




Packer Test – 1,090 to 1,150 feet bls

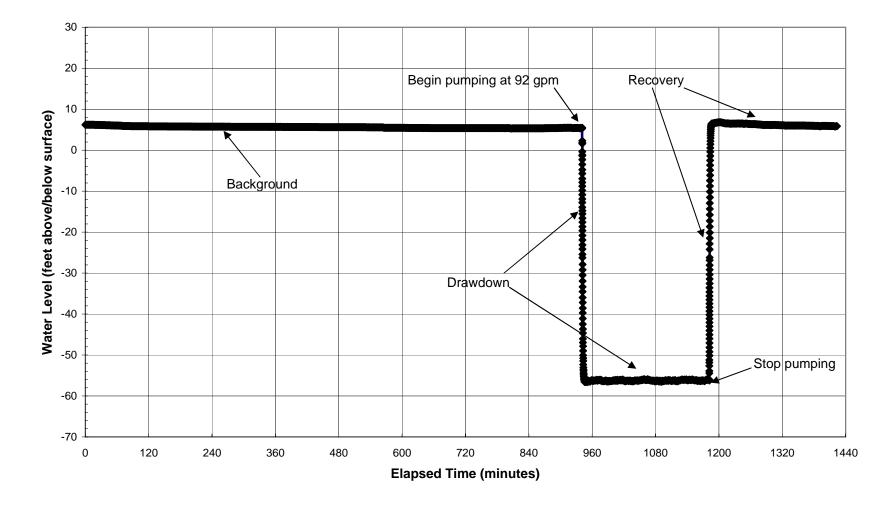
City of Cape Coral North RO WTP Monitor Well DZMW-1 Packer Test 1,090 to 1,150 feet bls Background, Drawdown & Recovery

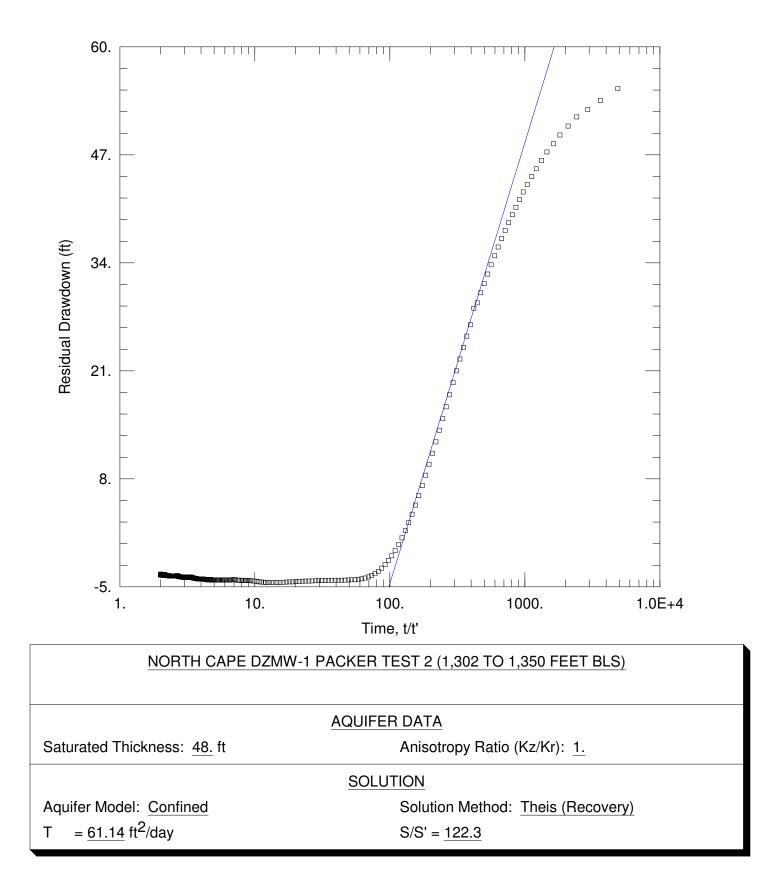




Packer Test – 1,302 to 1,350 feet bls

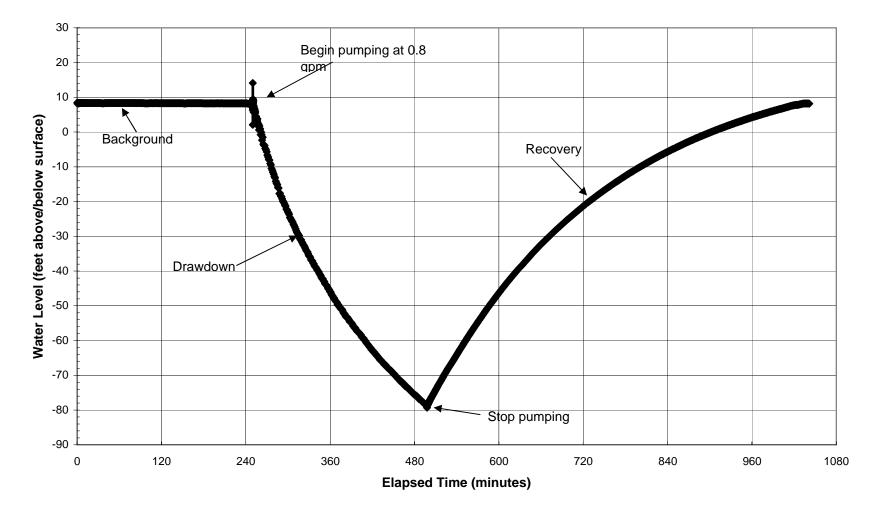
City of Cape Coral North RO WTP Monitor Well DZMW-1 Packer Test 1,302 to 1,350 feet bls Background, Drawdown & Recovery

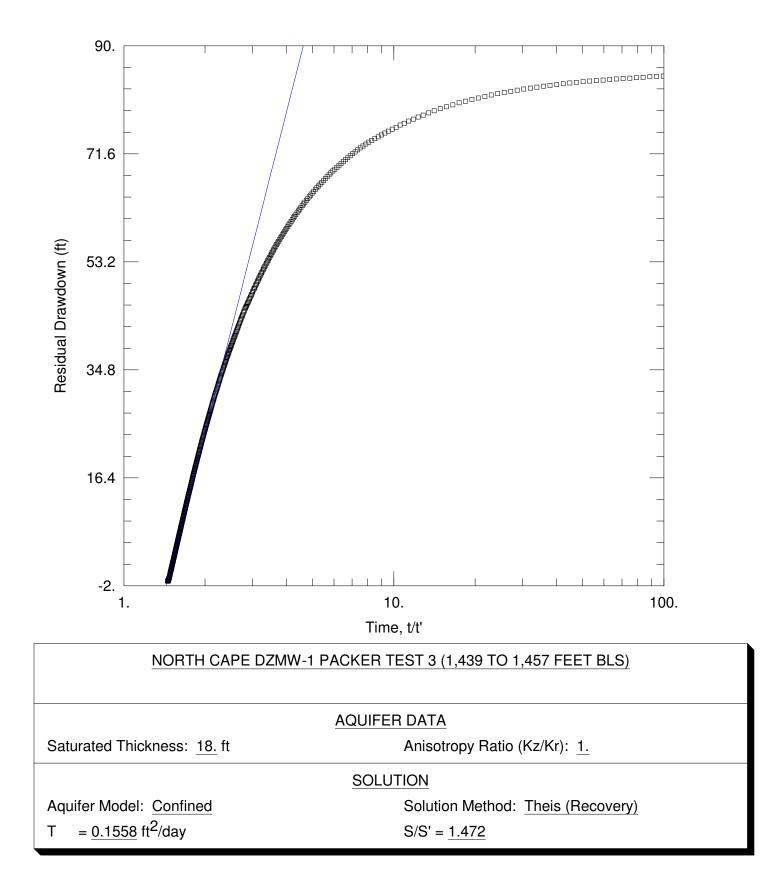




Packer Test – 1,439 to 1,457 feet bls

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





# Appendix J

### Packer Testing Water Quality Laboratory Results

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

Page: 1 of 1

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

	nnje: Desorm CIW-2 Packer Te		05)	<u>Simple Sour</u> Ground Water		Reve veti () 51991 (me 2/19/07 13:50		1013-11-17711-1110-157 2/15/07 19:45
Analysis	Method	<u>Results</u>	<u>Qual</u>	<u>Detection Limit</u>	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>
Ammonia-N	350.3	0.44		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500C1-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
рН	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 Bartkieviez/	Laboranager Fo	Dort Myers		Comments:				

Test Results meet all the requirements of the NELAC standards.

Andrew Konopacku Lab Manager Nokomis

Sanders	CHAIN-OF-CUSTODY RECORD	PROJECT N0702299
Laboratories INC.		Page of
Client Young Guist Address	Report To: Bill To: P.O. # Project Name	Sample Supply:
Phone Fax	Project Name Project Location:	Kit # REQUESTED DUE DATE:707
Sampled By (PRINT)	PRESERVATIVES ANALYSES	X// X/////////////////////////////////
Sampler Signature	Sampla	Sample
Bottle SAMPLE DESCRIPTION		
1 NCCIW-2 Packer Test #1 (1165-1205	) 21 ISIOT MALS CW 1 6 1	-01A
1 NCCIW-2 Pactor Test #1(1165-1205)	2)115107 19:45 GW 7 2	11 -OIB
		+ + + + + + + + + + + + + + + + + + +
Bottle Lot		
Cla004014	RELINGUISHED BY / AFFILIATION DATE TIME	ACCEPTED BY / AFFILIATION DATE TIME
24hr. on Chloride Client		
24 hr. on Chloride CLIENT INITIAL: Cond. Rug G Yes No		

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

Page: 1 of 1

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

N0702300-01	Sinnij (vi Destrani) NCCIW-2 Packer Tea mab		265)	StanDie Spink Ground Water		iRevenzet (12.119/1000) 2/19/07 13:50		0.0.0010000000 2/17/07 2:00
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	Detection Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Ammonia-N	350.3	0.68		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500CI-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
эΗ	150.1	7.12	Q	0.01	std units	2/19/07 16:20	BB	E84380
Specific Conductivity	<b>120.</b> 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
Fotal Dissolved Solids	160.1	17000		10	mg/L	2/20/07 9:30	WC	E84380

Approved by:

**Comments:** 

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

Sanders Laboratories INC. Environmental Testing Services	CHAIN-OF-CUSTODY RECORD	PROJECT N0702300 # Page of
Client <u>Young Guist</u> Address <u>Fax</u>	Report To: Bill To: PO. # Project Name Project Location: Carpe Cora	Customer Type:
Sampled By (PRINT) Sampler Signature Bottle SAMPLE DESCRIPTION	PRESERVATIVES     AN       Sample     Image: State of the state o	ALYSES QUEST SQUEST Sample ID #
2 NCCIW-2 Packer Test#2(1245-1265) 2 NCCIW-2 Packer Test#2(1245-1265)	alno osio Gw 16	V01A V01B
Bottle Lot		
COMMENTS: 24 hr. on Chloride, Cond. Rush S Chient Ves No		ATE         TIME         ACCEPTED BY / AFFILIATION         DATE         TIME           19-07/03         359         379         379         355         379         355

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

Page: 1 of 1

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

N0702301-01	Samuile Lesento. NCCIW-2 Packer Ter grab		310)	Simult Simu Ground Water		Reversed Dente Time 2/19/07 13:50	· · · · · · · · · · · · · · · · · · ·	nteria <i>ta da finita</i> 2/18/07 18:31
Analysis	<u>Method</u>	<u>Results</u>	<u>Qual</u>	Detection Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Ammonia-N	350.3	0.35		0.05	mg/L as N	2/20/07 10:30	BY	E84380
Chloride	4500C1-B	14600		1	mg/L	2/20/07 8:22	AK	E84380
Nitrogen, Total	351.2/353.2	<del>0.58</del>		0.10	mg/L as N	2/20/07 17:11	SJ	E84380
Nitrogen, Total Kjeldahl	351.2	0.58		0.10	mg/L∙as N	2/20/07 11:24	BY	E84380
рН	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/Fab Manager Fort Myers Andrew Konopachinab Manager Nokomis

Comments:

Sanders Laboratories INC. Environmental Testing Services	CHAIN-OF-CUSTODY RECORD	PROJECT N0702301 # Page of
Client Young Quist Address Phone Fax	Report To: Bill To: P:O. # Project Name Project Location: Саре Сога	Sample Supply:
Sampled By (PRINT) Sampler Signature Bottle SAMPLE DESCRIPTION	PRESERVATIVES     ANALYSES       Bill     Bill     Bill       Sample     Bill     Bill       DATE     TIME     TYPE	Z / / / / / / / / / / / / / / / / / / /
3 NCCIW-2 Acker Test #3(1270-1310) 3 NCCIW-2 Packer Test #3(1270-1310)	2118107 18:31 600 1 00 1	-01A -01B
172 hn on everything Else "		
Bottle Lot # #	RELINQUISHED BY / AFFILIATION DATE TIM 2-19-0 7/ 2/9 BS	
COMMENTS: 24hr. Turn on Chloride, Cond, Rush Chloride, Cond, Yes No		

٠

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16880 Gator Road, Fort Myers, FL 33912 • (239) 590-0337 • FAX (239) 590-0536

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

Page: 1 of 1

Client Project: Cape Coral Lab Project: N0704490 Report Date: 05/03/07



Laboratory Results

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

Lab ID	Sample Descrip			Sample Sour	<u>ce</u>	Received Date/Time	Sam	ple Date/Time
N0704490-01	NCWTP IW-2 Packe grab	r lest 4		Ground Water		4/27/07 14:15		4/26/07 21:15
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Ammonia-N	350.3	0.14	Ι	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
рН	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	s 160.1	33500		10	mg/L	5/1/07 15:30	WC	E84380

Approved by: Kathrine Bortkiewicz/Lab Manager Fort Myers Andrew Konopacki/Lab Manager Nokomis

**Comments:** 

Sanders Laboratories INC.	CHAIN-OF-CUSTODY RECORD	PROJECT N0704490 # Page of
Client Young quist Address Fax	Report To: Bill To: P:O. # Project Name Project Location:	Sample Supply:       GW         Customer Type:
Sampled By (PRINT) Sampler Signature	PRESERVATIVES     ANALYSES       Sample     Barbarder       DATE     TIME       TYPE     Transform	YY /X/ / / / / / / /
Bottle SAMPLE DESCRIPTION # 1 NCWTP IW-2 Packer fest 4 2 NCWTP IW-2 Packer fest 4	Sample $H_{3}$ $\sigma_{1}$ $\sigma_{2}$ $\sigma_{1}$ DATE     TIME     TYPE $U$ $\sigma_{1}$ $\sigma_{1}$ $\sigma_{2}$ $U-2b-\sigma$ $2Inix$ $L-U$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $2Inix$ $L-U$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $2Inix$ $L-U$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $2Inix$ $C-U$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $I$ $I$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $I$ $I$ $I$ $I$ $I$ $I$ $U-2b-\sigma$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ $I$ <t< td=""><td><math display="block">\frac{1}{\sqrt{1}} = \frac{1}{\sqrt{1}} = 1</math></td></t<>	$\frac{1}{\sqrt{1}} = \frac{1}{\sqrt{1}} = 1$
Bottle Lot # 0-262-001   0 0-(11-015 COMMENTS:   0 CI, Cand 24 hi rush 12 hr everything 12 hr everything else Yes No	RELINQUISHED BY/AFFILIATION DATE TH Client Holzog Crock 42707 IN	Hebery CRUCK 427021257
12 hr everything VICE 12 hr everything VICE Yes No		

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

Page: 1 of 1

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

N0705024-01 I	Sample Descript W #2 Straddle Packe grab			Sample Sour Ground Water	<b>ce</b>	Received Date/Time 5/1/07 15:15		uple Date/Time
Analysis	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>
Ammonia-N	350.3	0.05	U	0.05	mg/L as N	5/7/07 13:00	НВ	E84380
Chloride	4500C1-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
рН	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: Kathpine Bartkiewicz/ ab Manager Fort Myers

Andrew Konopacki/La Manager Nokomis

**Comments:** 

Sanders Laboratories INC. Environmental Testing Services Client	Report To:       Mary Beth         Bill To:	PROJECT       #       NOTO 5024         Page of         Sample Supply:
Sampled By (PRINT) DAY Swertcentruber Sampler Signature Bottle Bottle Bottle Bottle Bottle Lot Bottle Lot Bottle Lot Bottle Lot	PRESERVATIVES       ANALYSES         Sample       Image: state	ACCEPTED BY / AFFILIATION DATE TIME
COMMENTS: 24 hr. Kush Coord., Cl Good., Cl SAMPLES ORICE Yes No		

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1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774

16880 Gator Road, Fort Myers, FL 33912 • (239) 590-0337 • FAX (239) 590-0536

## **Monitor Well DZMW-1**

Packer Test – 1,090 to 1,150 feet bls

Page: 1 of 1

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 N0705025-01	Sample Descrip DZMW Straddle Pac grab		50'	Sample Sour Ground Water	200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200	Received Date/Time 5/1/07 15:15		ple Date/Time 4/29/07 21:00
Analysis	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
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
рН	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 Solid	s 160.1	1860		10	mg/L	5/3/07 13:15	WC	E84380

Approved by: Kathrine Bartkjewicz/Lab Manager Fort Myers Andrew Konopacki/Lab Manager Nokomis

**Comments:** 

Sanders	CHAIN-OF-CUSTODY RECORD	PROJECT N0705025 # Page of
Client File Address File Phone Fax	Report To: MAY Beth Bill To: P.O. # Project Name ROTW + D2MW Project Location: Cape Cora (	Sample Supply:         GW           Customer Type:
Sampled By (PRINT) JH Swartzentonber Sampler Signature Bottle # SAMPLE DESCRIPTION 211, 211, 211, 211, 211, 211, 211, 211,	PRESERVATIVES     ANALYSES       Sample     H       DATE     TIME       TYPE     H       Y-19     21 VP	8//////////////////////////////////////
1 DZMW Straddle Packer 1090-1150 2 DZMW Straddle Reckon 1090-1150	4-29 2100 G V 6 1 1 54-29 2100 J V 9	-01A -01B
Bottle Lot # COMMENTS: 24 hr russion CLIENT INITIAL: Cond. Cl 90 SAMPLES ONICE Yes No	RELINGUISHED BY / AFFILIATION DATE TIME Arg Afor S-1 (2:50 PM S-1 (2:5	ACCEPTED BY / AFFILIATION DATE TIME NSOSJ SII/07 1250 SII/07 1575

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## **Monitor Well DZMW-1**

Packer Test – 1,302 to 1,350 feet bls

Page: Page 1 of 1

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

<u>Lab ID</u> N0710421-01	Sample Descript DZ-MW-1 Packer 130 Grab	tanda a state	Sample Source Ground Water			Received Date/Time 10/22/07 16:20	Sample Date/Time 10/22/07 14:00		
<u>Analysis</u>	Method	<u>Results</u>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>	
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	
litrogen, Total	351.2	0.46		0.10	mg/L as N	10/24/07 8:55	AG	E84380	
jeldahl H	SM4500H-B	7.00	Q	0.01	std units	10/22/07 16:30	AS	E84380	
pecific Conductivity	SM2510B	51300		0.1	µmhos/cm	10/24/07 11:30	BB	E84380	
ulfate	ASTM-D516-90	2360		2	mg/L	10/23/07 10:13	AG	E84380	
otal Dissolved Solids	SM2540C	) 31000		20	mg/L	10/23/07 13:15	AS	E84380	

Approved by:

**Comments:** 

Kathrine Bartkiewicz Lay Manager Port Myers Andrew Kongracki/Lap Manager Nokomis

Sanders	CHAIN-OF-CUSTODY RECORD	PROJECT N07/0421					
Client Youngquist Brokhers Inc. Address 15465 P: n= R: dye Rol Fort Myers FL 33908 Phone 239-489-4444 Fax 439-4545 Sampled By (RRINT) MUN Sampler Signature	E. MAIL (Maryberh & Youngpuis Report To: Mike Wilson Bill To: Youngouist Brothers PO. # 4527 or Job # 278002 Project Name 278002 DZMN-1 Project Location: N. CC NORTH CAPE PRESERVATIVES ANALYSES REQUEST Sample DATE TIME TYPE ST FF F F F F F F F F F F F F F F F F F	Field Report #:					
Bottle         SAMPLE DESCRIPTION           1         DZmw.il         lacker         1302-1350           2         DZmw-il         lacker         1302-1350	DATE     TIME     TYPE     3+     05     01     1       10/22     1400     GU     1     1     1     1       10/22     1400     GU     1     1     1     1	$\begin{array}{c c c c c c c c c c c c c c c c c c c $					
Bottle Lot # OUT / DATE RETURNED: DATE VIA COMMENT Please Rush COOLER # COOLER SEAL INTACT Yes No	RELINQUISHED BY / AFFILIATION DATE TIME Mille Filser 10/2/07 110/						

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## **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:239-489-4444Fax:239-489-4545E-mail:Cape CoralClient Project Name:Cape CoralLaboratory Contact:Andy Konopacki

Page 1 of <u>3</u> 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.

Nokomis Lab ~ 1050 Endeavor Ct. ~ Nokomis, FL 34275-3623 ~ Phone: 941-488-8103 ~ Fax: 941-484-6774 ~ HRS Certification # E84380 Fort Myers Lab ~ 16880 Gator Road ~ Fort Myers, FL 33912 ~ Phone: 239-590-0337 ~ Fax: 239-590-0536 ~ HRS Certification # E85457

Page: Page 1 of 1

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 N0710497-01	Sample Descripti Packer #2 1438.7-145 grab		al-juł	Sample Source Ground Water		Received Date/Time 10/26/07 10:30		ple Date/Time
<u>Analysis</u>	Method	<b>Results</b>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	Analyst	<u>Cert ID</u>
Ammonia	SM4500-NH3-D	0.08	Ι	0.05	mg/L as N	10/26/07 14:15	AG	E84380
Chloride	SM4500CI-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
		2~						

Approved by:

**Comments:** 

Kathrine Bartkiewicz/Kab Manager Ført Myers Andrew Kono<del>paekt/L</del>ab Manager Nokomis

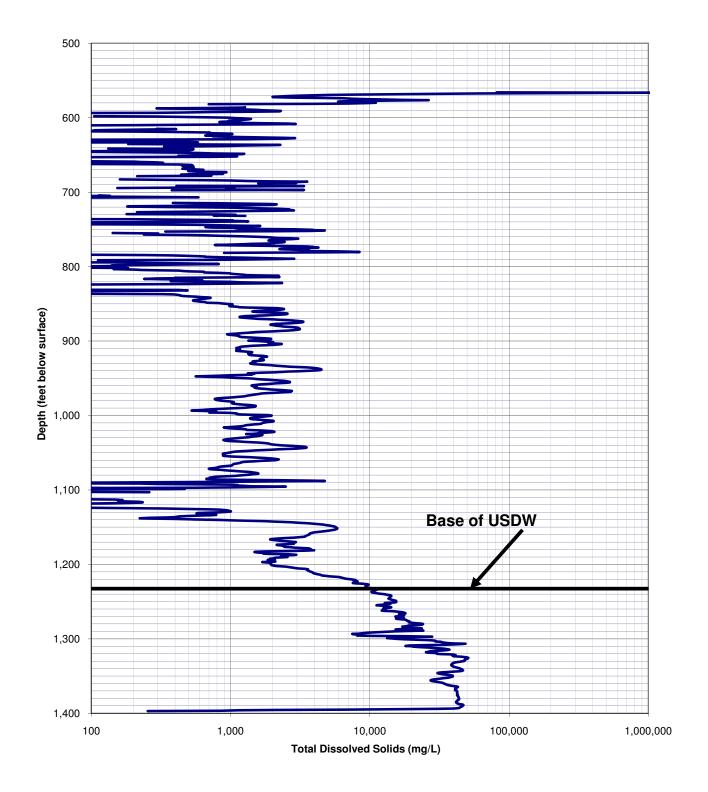
Sanders	CHAIN-OF-CUSTODY RECORD PROJECT N0710497
Laboratories INC. Environmental Testing Services	EMAIL TO : Marybeth Gyoungouist brothers . Com
Client Van a stift Boald an -	Report To:       M:k. W:Son Marybeth RIOS       Sample Supply:       GU         Bill To:       VOUNGRUIST BROTHERS       Customer Type:
Address 15465 PINE RIDGE RD	Bill To:         YOUNGADUIST         BROTHERS         Customer Type:           P.O. #         JOB 278002         Field Report #:
	Project Name 278002 DZMW-1 NCC Kit.# 10/30/07
Phone 239-489-4444 Fax 489-4545	Project Location: NCC (NORTH CAPE CORAL) 
Sampled By (PRINT)	Project Name 278002 DZMW-I NCC Kit.# 10/30/07 Project Location: NCC (NORTH CAPE COLAZ) PRESERVATIVES ANALYSES PRESERVATIVES ANALYSES
Bottle SAMPLE DESCRIPTION	Sample     Herein Street     Sample     Sample     Sample     Sample       DATE     TIME     TYPE     Signation     Sample     Sample     Sample       DATE     TIME     TYPE     Sample     Sample     Sample     Sample
1 Packor#2 14387-1456.8	10/260800 G N XXXXX -01A
2 Pack # 2 1438.7-1456.8	10/260800 L X X LB
Bottle Lot	RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION DATE TIME
-171-005 	X milesteleon 10/24071030 greath 1926/07 1030
11-111-1015 ASIS	
Planse CLIENT INITIAL: Rush SAMPLES	
MUSH (Yes) No	

# **Appendix K**

Log Derived Water Quality

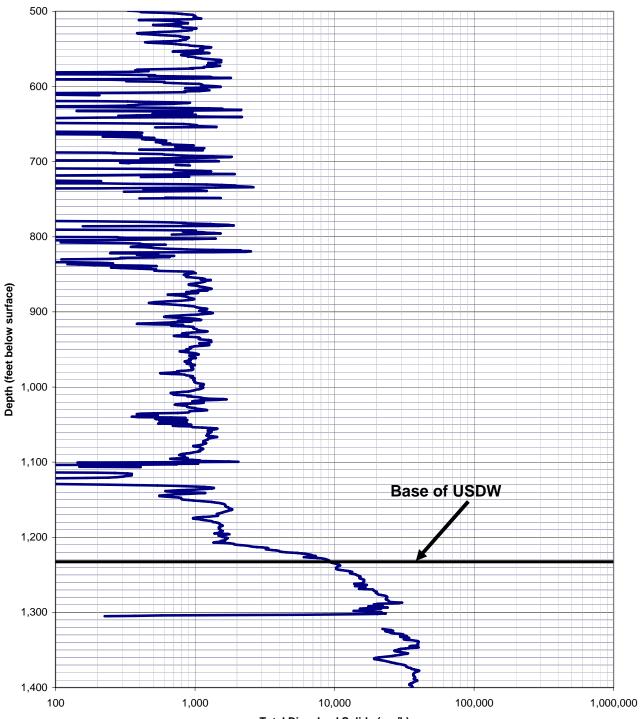
Log Derived Water Quality

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

Total Dissolved Solids (mg/L)

# Appendix L

**Casing Mill Certificates** 

**Casing and Tubing** 

54-inch Pit Pipe



### **IW-2 CASING TALLY**

Casing Diameter: 54 inches

#### NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER:3220246.77010102CONTRACTOR:Youngquist Brothers, Inc.PROJECT MANAGER:Neil Johnson

OWNER:

City of Cape Coral

Total Length (feet)22.00Floor + Elevator (feet bls)0Casing 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/Submittel YBI/Section No. #02633-016-A Transmittal No./8 Date: ねんりつ Signature //

18444 Highland Road

Baton Rouge, LA

STANDARD CERTIFIED TEST REPORT **GEORGIA TUBULAR PRODUCTS** 



Customer Name Customer Add/ess

Edgen Carbon Products Group, LLC January 24, 2007 Dare: Customer Order No. 62414 G.T.P. 204882 Sales Order No.

City, Store, Zip,

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

70809

Hear		N /1 1 1	Min.	MECHANICAL PROPERTIES				CHEMICAL ANALYSIS (%)				
No, Size	Size O,D,	Wt./Ft, or Wall Thick	Hydro Test Pres. P.S.1.	Yleid Strength P.S.I. Point	Tenstie Strength P.S.I.	Elong in <u>2''</u>	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	
			-									
	TETTET & Annual Annual Annual Annual Annual Annual Annual Annual Annual Annual Annual Annual Annual Annual Annu									Arres movedar and		
				<b>1</b>								

The undersigned hereby certifies that the above ingreads have been inspected and rested in accordance with the methods prescribed in the applicable specifications and the restrict which inderstands shawn above. In determining properties or characteristics for which no methods of Inspecting or resting oreginations of by sold specifications, the standard mill inspection and resting process of Georgia Tubular Froducts have been opplied. Unless it appea results of such inspection and resis shown above, the undersigned believes that sold marerials conform to sold specificat

Subscribed and swarn to before me SCOTT PLANT R. PANTER MGR. Jar 01 Name & Tirle ol Georgia Tubular Products 109 Dent Drive, Contersville, GA 30121 Notary Public (770) 386-2553

# **Injection Well IW-2**

42-inch Casing



### CASING LOG

City of Cape Coral
North Cape Deep Injection Well System

Date: 2/6/2007 Job No.: 3220246.77010102 Well: IW - 2

Casing Diameters (inches): <u>O.D. 42.00</u> <u>I.D. 41.25</u> Wall Thickness (inches): <u>.375</u>

Pipe No.			Page <u>1</u> of <u>1</u>
and Install	Heat Number	Length	Run Depth
Order		(feet)	(feet below land surface)
15	1610462	41.96	36.21
14	1610462	39.90	76.11
13	1610462	39.90	116.01
12	1610462	40.00	156.01
11	1610462	39.97	195.98
10	1610462	39.97	235.95
9	1610462	39.98	275.93
8	1610462	39.98	315.91
7	1610462	39.98	355.89
6	1610462	39.98	395.87
5	1610462	39.97	435.84
4	1610462	39.99	475.83
3	150482	38.62	514.45
2	425181	39.67	554.12
1	1610462	29.96	584.08
	Total length	589.83	
	Floor and elevators	-5.75	
	42-inch Casing Seat	584.08	



### 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		
			MWH
Submittal No.:	SUL-YOUBRO-02633-013-	NO EXCEPTIONS TAKEN	AMEND - RESUBMIT
	A0	MAKE CORRECTIONS NOTED	REJECTED - RESUBMIT
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Description:	IW-2 42 Mill Cert - 2	REVIEWED BY:	Mutal DATE: 2/8/07
nen en en en en en en en en en en en en	an na gananan sang Branka ang berduan na sang yen katalakan jana katala dara na yang na sang na sang yang na ya	RECOMMENDED BY:	DATE: 2 - 26-07
Spec. Section:	02633	CORRECTIONS OR COMMENTS	MADE ON CONTRACTORS SHOP DRAWINGS
Submitting Company:	Youngquist Brothers, Inc.	WITH CONTRACT DRAWINGS AN BEEN REVIEWED FOR CONFROM COMPLIANCE WITH THE CONT RESPONSIBLE FOR CONFIRMINN DIMENSIONS, FABRICATION PR	ELIEVE THE CONTRACTOR FROM COMPLIANCE VD SPECIFICATIONS. THIS SHOP DRAWING HAS AANCE WITH DESIGN CONCEPT AND GENERAL RACT DOCUMENTS ONLY. CONTRACTOR IS G AND CORRELATING ALL QUANTITIES AND ROCESSES AND TECHNIQUES, COORDINATING
Reviewer:	Neil Johnson	WORK WITH OTHER TRADES, AN THE WORK	ID SATISFACTORY AND SAFE PERFORMANCE OF

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.

CL PF	IST( Rodi	)mer JCT	<ul> <li>LONC</li> </ul>	GITUDINALLY SUBME : API 5L 42 EDIT : EXPANDATED, CLE BEVELLED ENDS A WELD FACTOR : N STRAIGHTNESS :	LUN GRADE EAR LAQUER AT.30° (+5 / = 1.0	X5 RED S°	12 / 1 OUT 1 -0	X42 PSL SIDE P)	1, API	2B FI	OR DIMEN	NSIONAL TOL	ERANCES	· .		DATE	:18.1	1.20(	)3		
	PIF NO.		HEAT	DIMENSION inchxinchxft	WEIGHT <sup>·</sup> lbs.	*	* * 2 3	YS PS		E TE EL %	ST YS/TS	DIM. OF SPECIMENS inch.	HARDNES HV10	GUIDED-BEND TEST	) *	1	IMPA BM 2	CT TI	EST NO	DTCH W 2	े: 3
/	1504	474 480 482	91	0.375X42X38.65 0.375X42X38.68 0.375X42X38.65	6452.71 6457.72 6452.71	L	B T W T	53204	79456 83446	42	0.669	1.51x0.42 1.50x0.41	170	SUITABLE	E			-	-		·
	153	448	918845	0.375X42X38.65	6452.71	1	B T W T	53166	76914 76257	40	0.691	1.53x0.41 1.53x0.39	156	SUITABLE	E	~	-				
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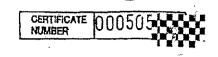
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#### TEST CERTIFICATE - REGINA MILLS



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CUSTOMER

70-3460

MILL ORDER NO. SPECIFICATION AWWA C200, ASTM A139 Grade B Nodified

4016

CUSTOMER ORDER NO.

1067. OD.

DATE

WALL 9.5

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	HEAT			BOOY TEXT	TINT .		BENDS	۲				•												
	79%	TEAT WIDTH	TELD ATTRINUTH	TENGLE	ELONG	1/1	WELD						HE	AT (LADL	) CHEWR	TAY/PROD	UCE (CHE	K) CHEM	STRY					
	NO.	37.9	527	NP4	50 PH		BREAK	<u> </u>	Mn	3	P	8	Car	M	Ğ	V	Cb	14b	\$0	A.	BORON	TI	CE	CEQ.
	425170	37.9	527	615	37	86	P	.05	1.39	.004	.015	.21	.35	.16	.09	.006	.065	.193	.022	.055	.0002	.041	.001	.23
	5416 519373	39,0	529	627	22	+	26	06	1.42	.005		21	.37	,16	.09	.003	.064	.195	.021	.053	1.0000	1.041	.001	_25
	601	38.9	929	621	37	85	P P	.05	1.48	.004	.016	,20	.32	. 19	.08	.005	.069	.202	.020	.040	0003	.036	.001	.24
	519204	38.7	506	632	28	+	28	.05	1.53	.005	.015	20	.34	.19	.08	.004	.069	.199	.020	.040	1.0000	.035	100.	.24
	632	38.7	ava .	004 616	37	84	ρ.,	.05	1,63	.009	.015	.17	.33	.14	.06	.005	.067	.202	.021	.039	. 0004	.026	.001	.25
	519389	38.5	503	585	28 36	00	49 P	.05	1.65	800.	.015	.17	35	13	.06	.003	.067	.201	.021	1036	. 0000	.027	002	25
	5455	38.5	903	610	25	86	P 25	.05	1.48	.007	.015	.17	.33	.13	.08	.002	,075	.195	.021	.034	.0003	.032	.002	.24
	425182	38,4	537	601	39	89	<u></u> р	.05	the set	.007	.014	17		12	.08	.003	.068	. 194	.020	.034	1.0000	.030	.001	
	\$36	38.4		628	28	05	5 35	.05 .05	1,48	,037	.015	.17	.31	.14	.08	.001	.075	.199	.019	.039	1	.042	.003	.24
. /	\$19395	38.4	541	615	34	88	2 <u>7</u> D	.05	1,39	,008	.013	<u>,16</u> ,13	.30	14	.08	.004	.070	.195	.018	.042	.0000	041	100.	-23
bear	640	38.4	- / -	650	27		30	05	1.45	.006	.017	.13	.31 .36	,15	.07	.001	.060	.190	.021	.050	0002	.044	.000	.23
	519394	37.6	544	610	29	89	P	.04	1.39	,005	,019	.19	.33	_,15 _,15	<u>.09</u> .12	.002	.059	.191	.021	.058	1.0000	.045	001_	23
	5469	37.6	ł	640	29		40	.05	1.42	.005	.019	.19	.35	.15	.11	.004	.060 .060	.190	,022	.054	.0003	.037	.001	.22
	519382	39.0	527	592	37	89	Р	.04	1,43	.006	.012	.18	.38	.14	.09	.004	.072	,197	.019		.0000 <u>\</u> .0002	.039	.002	.23
	5482	39.0		608	30		58	.05	1.45.	.006	.012	.18	.36	.13	.08	.005	.073	.197	.020	.033	.0002	.044 .042	.003	-25
-	425175	38.5	514	501	37	85	P	.05	1.39	.006	.017	.18	. 39	.13	.11	.002	.052	.199	.021	.043	.0002	.042	.003	.23
	5495	38.6	·	627	26	· ·	20	.05	1.40	.006	.015	,19	.37	.13	.10	.005	.050	.198	.020	.042	00002	.038	.005	23
	425176	38.6	532	605	36	88	P.	.05	1,50	.005	.015	.18	, 34	.13	.11	.005	.074	.195	,018	.044	.0002	.043	.003	.24
	666	38.6			26		24	.05	1.49	.006	.015	.18	.36	.13	.11	.004	.074	.202	:019	.047	.0000	.041	.002	24
	425181	39.3	526		39	85	P	.06	1.47	,007	.018	,20	.29	.20	.12	.001	,062	.194	.019	.040	.0003	.042	.002	.25
1	5520	39.3			28		29	.06	1.44	_007	.019	_20	32	20	12	C05	.050	.190	.019	.038	0000	.040	.002	.25
1	125197	7 ¥			37	85		.05	1,47	,007	.015	,13	.34	.17	.12	.004	.068	,198	.026	.023	.0003	.033	.001	.24
	540	37_4			30		_34	_06	1.50	.007	015	.14	35	16	_11	006	.070	199	.025	.021	.0000	.031	.002	.26
	519407	1 7 1	1			89	Р	.05	1.39	,004	.019	.18	.29	15	.12	.004	.062	.199	.024	.068	.0004	,032	.000	.23
	544 19417	37.7			30		35	.05	1.43	.005	016	18	.32		.09		.063	.196	.021	.049	0000	.035	.002	_23
	548			1	1	86			1,49	,005	,018 [	. 19	.30	.24	.12	.005	.073	.203	.016	.044	.0002	.044	.002	.25
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	558B					85			1,53	.004	.014	.13	.28	.22	.11	.005	.069	. 196	.016	.031	.0002	,030	.001	.25
		38.1			31		33	.05	1.54	<u>,004  </u>	.017		.32	.19	_11	.005	.074	.199	017	.034	0000	.032	.002	.25
	050	37.3				88			1.50	.005	.020	.13	.33	31.	.12	.004	.067	.190	.023		.0003	.033	.001	.24
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15	567	37.6	f		37	87			1.48	.005	.012	.17	.31	.12	.07	.005	.073	.193	.017		0002	.038	.001	.24
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P	remium Spiral-Weld Pipe		Ship Data 290acos 4	12:14:58 FFT 8#48FG
			Probill	<i>.</i>
Skyline Steel, LLC - F	•	- uu	Via CH ROBINSON	, ,
GEORGIA TUBULAR 109 Dent Drive - Carte			FOR SHIPPING PT Frt COLLECT	,
	x (770) 386-2609		Route 0- 0 Manife	
$\succ$				Frailar
exercise a constant of the	S. S. CAMARAN		Sip STOCK Sold To: ( 941)	
	L PRODUCTS GROOP		EDGEN CARBON PRODUCT	IS BROUP, LLC
LENE FORMAUN	ST BRITHERS		18444 HIGHLAND RD	
1.2000年1月4日期代手。 1999年1月1日日本1月1日日			BATON ROUGE, LA 701	309
1111日(11日)(11日) 11日本(11日)(11日) 11日本(11日)(11日)(11日)	EL 33793 ITRUBER 259 - 57	na i ma da dal i Ti		P
	- 9868 Fax: 205			
42" OD SFIRAL 1375 WALL X 4	WELD PIPE 139 ( 0' W/ H' Heat Number	Your PD # 624 SRADE B Prd2 /DRO Tag No	Guantity f	°CS Wt LBS
	1610462	29735A	40 FT	4668
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		D UL		
Page: 1.				C.O.D. AMOUNT:
FREIGHT PREPAID	COLLECT	delivered	to Section 7 of the conditions, if this shipment is to be to the consignee without recourse on the consignor,	\$
NOTE- Where the rate is dependent on value, a	shippers are required to state specifically	in writing the agreed The car	norshall sign the following statement: rigt shall not make delivery of this shipment without Reight and all other lawlui charges.	
or declared value of the property. The agreed or declared value of the property	: is hereby specifically stated by the shippe		Totine	\$
\$	per	<u> </u>	(SIGNATURE OF CONSIGNOR)	\$
consigned, and destined as indicated above, which sail	t carrier (the word carrier being understood thro	ughout this contract as meaning any persi	I below, in apparent good order, except as noted (contents and in or corporation in possession of the property under this contra	ct) agrees to carry to its usual place of delivery at said
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 class	y of said property over all or, any portion of said route to destinati silication on the date of shipment. ditions are hereby agreed to by the shipper and accepted for him	
SHIPPER		CARRIER		DATE DATE
PER 441	Tallin	PER.	<u>Ach</u>	10/27/06
'Mark with "X" to designate Hazardous	миления вз оеннео п ние 49 ог	me code di rederal kegulari	1 SE 179.	

29Decos Ne 10: FETER 84 615 Ship Date Premium Spiral-Weld Pipe Frobill Server, and a Skyline Steel, LLC - Pipe Group Via. VOLUME TRANS FOR SHIPPING PT: **GEORGIA TUBULAR PRODUCTS** 109 Dent Drive - Cartersville, GA 30121 Frt COLLECT Route O- O Manifest (770) 386-2553 Fax (770) 386-2609 Vncie Trailer 81p SIDCK 【不过的变态的知道:"这个是一定的现象。" Sold for ( 9411 LOLEN CAREDA PRODUCTS CARDERS LET EDGEN CARDON PRODUCTS GROUP, LLC C. Q. SHUBBORD ST. BPG114 198. 19444 HIGHLAND RD FORM I TOME FARENAY W BAIDN ROUGE, LA 70804 心静性 计间接编制 计算机 计接触分配 JAY SUBRITZELIYALIKER ROW - MAD-GOOD Tal: 284-756-9868 Fal: 225-756-5887 0 FLADING RILL 1) Uni Order PST-204882- 1 Your PD # 62414 54" UD SPIRALWELD FIFE 139 GRADE D brikd 1375 MALL & SOL MY HYDRO Heat Number Tad No FCS Street Quantity WE LES: 2630 · £. SOET 10739 2) Gur Doder PGT-204882- 3 Your PO # 62414 42" OD SPIRALWELD PIPE 139 GRADE B Prd2 .375 WALL X 401 W/ HYDRO \*\*\* WEALBS Heat Humber Tao No Quantity 124750 29733A 1610462 charge 49 ET 1 10003 40 67 1 6668 Total: 80° FT 12336 lags Pes Wt LBS TOTAL: 3 2 24075 Heat Number \*\*\* Chemical Analysis \*\*\* 1610462 C=<.23/ Mn=<.80> P=<.011> S=<.007> Si=<.01/7TEN=<78400> YED=:46100> ELONG=(33> PUAlKER TRK445065 -17450514 بالمبكية Paget FREIGHT C.O.D. AMOUNT Subject to Section 7 of the conditions, if this shipment is to be PREPAID COLLECT CHARGES delivered to the consigner without recourse on the consignor, \$ the consignor shall sign the following statement: NOTE- Where the rate is dependent on value, shippers are required to state specifically in writing the agreed The carrier shall not make delivery of this shipment without payment overeight and all other lawful charges. COD FEE: PPD: or declared value of the property. \$ 7 C COLL The agreed or declated value of the property is hereby specifically stated by the shipper to be not exceeding TOTAL CHARGES **\$** and lariffs in effect of the date of the issue of this Bill of Lading, the property described below, in apparent good ord consigned, and de destination 2 and condition of contents of packages unknown), marked, word carrier being understood throughout this contra ct as meaning any person or corporation in po nici destination. It is mu r 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 any of said property s in the governing class fication on the date of shomen Shipper here ditions in the governing classification and the said terms and conditions are hereby agreed to by the shippe SHIPPER CARRIER PER PER ... NN

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

Premium Spiral-Weld Pipe		Ship	Date 2 <u>9</u> De	COA at 121	GT 84686 8 From 6F6
Skyline Steel, LLC - Pipe Group		Probi	U VOLUME TR		
GEORGIA TUBULAR PRODUCTS			SHIPPING	and the second second second second second second second second second second second second second second second	
109 Dent Drive - Cartersville, GA 30121			COLLECT	ب مبر	
(770) 386-2553 Fax (770) 386-2609		- Route Vhcle	0- 0 M	anifest . Trailer	
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TAN TWANT PLATENT RUBER 209 56	0-4607		a <sup>1</sup>	· · ·	
let: 221-756-9968 (a): 225-	9754 - 5887 -	f		(17)	· **
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8 1 L L 1) Our Order Pb1-2048824 3					
42" UD SPIRALWELD PIPE 139 G	RADE B Prda			ac d	с. До 11.
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21 Our Dider POT-204802- 4 42" UD SFIRALWELD PIPE 199 G .375 WPLE X 20' W/ MYD	RADE B Prda				
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Concur - Lest	V	which the Postian 7 - 11		ant is to be C.O.D. AMOU	AFF
	deliv	ered to the consigne	the conditions, if this shipm e without recourse on the e following statement:		
NOTE- Where the rate is dependent on value, shippers are required to state specifically in or declared value of the property.	writing the agreed page		ake delivery of this shipm	ent without C.O.D. FEE:	
The agreed or declared value of the property is hereby specifically stated by the shipper	to be not exceeding	. The	Elun	TOTAL CHAR	
RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue of	this Bill of Lading, the property de	escribed below, in annam	URE OF CONSIGNOR) nl good order, except as noted (	contents and condition of contents	s of packages unknown); marked
consigned, and destined as indicated above, which said carrier (the word carrier being understood throug destination, if on its route, otherwise to deliver to another carrier on the route to said destination, it is mutu any of said property, that every service to be performed personder shall be subject to all the bill of lading to	ally agreed, as to each carrier of a mms and conditions in the governa	lif or any of said property ( ng classification on the da	over all or any portion of said rou te of shomeol.	te to destination, and as to each p	its usual place of delivery at said arty at any time interested in all or
Shipper hereby certifies that be is familiar with all the bill of lading terms and conditions in the governing SHIPPER	classification and the said terms a	and conditions are hereby	agreed to by the shipper and acc	cepted for himself and his assigns.	PATE /
PER Fin Tellin	PER	10 All	1 Hent	1  12	127 106

1 .....

YOUNGQUIST BROTHERS, INC. Has Reviewed this Shop Drawing/Submittel YBI/Section No. #02633-016-A Transmittal No./8 Date: ねんりつ Signature //

18444 Highland Road

Baton Rouge, LA

STANDARD CERTIFIED TEST REPORT **GEORGIA TUBULAR PRODUCTS** 



Customer Name Customer Add/ess

Edgen Carbon Products Group, LLC January 24, 2007 Dare: Customer Order No. 62414 G.T.P. 204882 Sales Order No.

City, Store, Zip,

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

70809

0.0, J4096 30'' 1618966 34''		B4. 5%	Min.		MECHANICAL PROPERTIES				CHEMICAL ANALYSIS (%)					
	Size O,D,	Wr./Fr, or Wall Thick	Hydro Test Pres. P.S.1.	Yleid Strength P.S.I. Point	Tenstie Strength P.S.I.	Elong in <u>2''</u>	c	Mn	p	s	51			
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			
		<b>4 4 4 4 4 4 4 4 4 4</b>												
				т т										

The undersigned hereby certifies that the above ingreads have been inspected and rested in accordance with the methods prescribed in the applicable specifications and the restrict which inderstands shawn above. In determining properties or characteristics for which no methods of Inspecting or resting oreginations of by sold specifications, the standard mill inspection and resting process of Georgia Tubular Froducts have been opplied. Unless it appea results of such inspection and resis shown above, the undersigned believes that sold marerials conform to sold specificat

Subscribed and swarn to before me SCOTT PLANT R. PANTER MGR. Jar 01 Name & Tirle ol Georgia Tubular Products 109 Dent Drive, Contersville, GA 30121 Notary Public (770) 386-2553

# **Injection Well IW-2**

34-inch Casing





## 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): <u>O.D. 34.00</u> <u>I.D. 33.25</u> Wall Thickness (inches): 375

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	

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14 10	Premium Spiral-Weld Pipe		Ship Date 2	3Jan07 at 11:43	T 84770
Skyline Steel, LLC -	Pine Crown		Frobill	Haran Mariya (Ari Ari Ariyan) National Ariyan	erom ges
	•		Via VOLUME		:
GEORGIA TUBULAR 109 Dent Drive - Carte	PRODUCTS ersville GA 30121		FOB SHIPPI Frt Collec		
	ax (770) 386-2609			0 Manifest	
>			Vhcle	- Trailer	· · · · ·
Consigned Tr	a si di sanan si		Slp STOCK		
	Y PRODUCTS GRO		Sold To: (		
C/O YOUNGOU;	IST BROTHERS	19473 of Karlen, San	18444 HIGHLA	PRODUCTS GROUP	s La La
1200 KISMET	PAREWAY W		BATON ROUGE,		
CAME CORAL,				nender: d Vielbert S	
Tel: 225-754	6-9868 Fax: 22	560-4607	a second and the		
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1) Our Drder 34" OD SFIRAL	PG1-204882- WELD PIPE 137	6 Your PO # 62	to I to		
. 375 WALL X S	0' W/ HYDR	ONANE B HUGS			
	Heat Number	Tag No	Guanti	ty PCS	A Sa Me Marine
	1700313	302438	100		Wt/LBS 13467
	1700313 1618966	302434	50		6733
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KOTE- Where the rate is dependent on value, shi r declared value of the property.		y in writing the agreed The cam	for shall sign the following statement: iec.shall not make delivery of this s Treight and all other lawful charges.		PPD
The agreed or declared value of the property is t	hereby specifically stated by the shipp	er to be not exceeding	non-gin and an other lawful charges.	- <u>s</u>	
		Yt~	(SIGNATURE OF CONSIGNOR)	TOTAL CHARGES	
RECEIVED, subject to the lawfully filed classifications a onsigned, and destined as indicated above, which said ca ssiftmation, if on its route, otherwise to deliver to another ci v of said another, that users excited to be more than the	and tariffs in effect on the date of the issue artier (the word carrier being understood th	of this Bill of Lading, the property described roughout this contract as meaning any news	below, in apparent good order, except as a	noted (contents and condition of contents of pact	ages unknown), marked,
TY Of Sald property that many pointing to be performed by	ameron the route to said destination. It is n	utually agreed, as to each carrier of all or any	of said property over all or any portion of ea	if make to down act agrees to carry to its usua	I place of delivery at said ty lime interested in all or
Shipper hereby certifies that he is tanifar with all the bill WOPER	recurry terms and conditions in the govern	ing classification and the said terms and cond	litions are hereby agreed to by the shipper a	nd accepted for himself and his assigns.	
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YOUNGQUIST BROTHERS, INC. Has Reviewed this Shop Drawing/Submittel YBI/Section No. #02633-016-A Transmittal No./8 Date: ねんりつ Signature //

18444 Highland Road

Baton Rouge, LA

STANDARD CERTIFIED TEST REPORT **GEORGIA TUBULAR PRODUCTS** 



Customer Name Customer Add/ess

Edgen Carbon Products Group, LLC January 24, 2007 Dare: Customer Order No. 62414 G.T.P. 204882 Sales Order No.

City, Store, Zip,

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

70809

0.0, J4096 30'' 1618966 34''		B4. 5%	Min.		MECHANICAL PROPERTIES				CHEMICAL ANALYSIS (%)					
	Size O,D,	Wr./Fr, or Wall Thick	Hydro Test Pres. P.S.1.	Yleid Strength P.S.I. Point	Tenstie Strength P.S.I.	Elong in <u>2''</u>	c	Mn	p	s	51			
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			
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The undersigned hereby certifies that the above ingreads have been inspected and rested in accordance with the methods prescribed in the applicable specifications and the restrict which inderstands shawn above. In determining properties or characteristics for which no methods of Inspecting or resting oreginations of by sold specifications, the standard mill inspection and resting process of Georgia Tubular Froducts have been opplied. Unless it appea results of such inspection and resis shown above, the undersigned believes that sold marerials conform to sold specificat

Subscribed and swarn to before me SCOTT PLANT R. PANTER MGR. Jar 01 Name & Tirle ol Georgia Tubular Products 109 Dent Drive, Contersville, GA 30121 Notary Public (770) 386-2553

# **Injection Well IW-2**

22-inch Casing





## 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): <u>O.D. 22.00</u> <u>I.D. 21.00</u> Wall Thickness (inches): .500

Pipe No.			
and Install	Heat Number	Length	Run Depth
Order		(feet)	(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





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): <u>O.D. 22.00</u> <u>I.D. 21.00</u> Wall Thickness (inches): .500

Pipe No.			
and Install	Heat Number	Length	Run Depth
Order		(feet)	(feet below land surface 1959.77
3	HT070451/HT070451	56.43	1959.77
2	HT070451/HT070410	48.85	2008.62
1	HT070451/HT070451	54.95	2063.57
	Total length	2069.37	
	Floor and elevators	-5.80	
	22-inch Casing Seat	2063.57	

		ECEL	VEM		
CC W-7C North Ca CAP-5 1200 Kismet Parkwa Cape Coral, FL 339	pe Deep Injection W ay West			39-574-6453	MWH Constructors
Date: 7/12/2007		N. W. T.S.		Pa	ference Number: 0042
Date. 7/12/2001				Ne.	terence indirider. 004%
Transmitted To:	Meil Johnson MWH Americas, Inc 490 Sawgrass Corp Suite 300 Sunrise, FL 33325 Tel: (954) 846-0401		//Transmitted By:	Todd Tubbert MWH Construct 1200 Kismet P CAP-5 Cape Coral, FL Tel: 239-772-1	arkway West 33993
1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	I Package No Do IBRO-02633-0018- IW	scription / #2 22 MIL Certifi	cation	Due Date	Package Action
Transmitted For Approval			red Via al Express		Tracking Number 19.09
Items Oty 001 8	Descript IW #2 22	ion MIL Certification	Notes		Item Action
Cc: Company Na MWH Constru MWH Americ	uctors	Contact Name File Copy Kelly Bremer	Coples Notes 1 1 Transn	nittal Only	
	d the submittal for IW		DATE: 8/1 ORIGINAL FILE: 3220,345 FILE ADDITIONAL C	ROGRAM SERVICES ROI. STAAP OUTGOING X	ırn. Thank you.
	M		ADVANCE CON T	ALCRESSEE	- Jos my
	т. Цт. III 	Signature	And the second second		<u>7-12-57</u> Signed Date
Acct.Period:31 Printed on: 7/12/2007		MWH Si	ubmittal Transmittal Suped by Each Number		Prolog_US_Integrated Page 1
	AUG 1 0 20 BY: KB	ED			-

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### TRANSMITTAL



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

То:	1015 (	f Cape Coral Cultural Park Coral, FL 33990	D Subj	)ate: ject:		0, 2007 l – Transmittal – 2 MIL Certification				
Attn: From:	Bill Po		-	ject:		rth Cape Injection Well ESDC				
	Kelly	Bremer		<b>Job No:</b> 3220246						
The foll	owing ite	ems are:	The	se data	are submit	ted:				
🗌 Requ	iested	Enclosed		Cost Es	timate	At your request				
🗌 Repo	ort	Specifications		Shop D	rawings	For your approval				
Lette	r	Prints		Submitt	tal	For your review				
Test	Result	Test Sample		Change	Order	For your action				
Othe	r:					For your files				
Sent	Separatel	y Via:				For your information				
Transmitta	l Items									
Item No.	Copies	Description								
1	1	Submittal – Transmittal –IW # Exceptions Taken"	<sup>1</sup> 2 22 N	AIL Ce	ritfication –	SUL-YOUBRO-02633-0018-A-0"No				
		·······			****					

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:	3220246.1	9.9.1.1
Owner:	City of Cape Coral			
			MWH	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛
Submittal No.:	SUL-YOUBRO-02633-021-	NO EXCEPTIONS TAKEN	XAM	END – RESUBMIT
	A0	MAKE CORRECTIONS NOTED	REI	ECTED - RESUBMIT
			AV-	
Description:	IW-2 22-inch, 0.5-in wall	REVIEWED BY: NJOHNSON	12th	DATE: JULY 27, 2007
-	thickness, final casing	RECOMMENDED BY:	J	DATE:
Spec. Section:	02633	CORRECTIONS OR COMMENTS	MADE ON CO	NTRACTORS SHOP DRAWINGS
Submitting Company:	Youngquist Brothers, Inc.	<ul> <li>DURING THIS REVIEW DO NOT R</li> <li>WITH CONTRACT DRAWINGS AN BEEN REVIEWED FOR CONFROM COMPLIANCE WITH THE CONT</li> <li>RESPONSIBLE FOR CONFIRMING DIMENSIONS, FABRICATION PR</li> <li>WORK WITH OTHER TRADES, AN THE WORF</li> </ul>	ND SPECIFICATIC MANCE WITH DE RACT DOCUME G AND CORREL COCESSES AND	DNS. THIS SHOP DRAWING HAS SIGN CONCEPT AND GENERAL NTS ONLY. CONTRACTOR IS ATING ALL QUANTITIES AND TECHNIQUES, COORDINATING
<b>Reviewer:</b>	Neil Johnson	THE WORK		anda a mba'an wana in da 1006 da 1006 da 1006 a da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 Na 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100 da 100

Comments: None.

://PW\_US1/Documents/Clients/City of Cape Coral/Cape Coral Program/~Projects Forms/CCC Submittal Review Form

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

Project <u>North Cape</u> <u>Water Treatment Plant</u> <u>Deep Injection Wells</u> <u>MWHC Job # 7012014</u>

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: <u>July 9, 2007</u>	Number of Copies:9
Submittal Number:	2633-009-A
Specification Section Number:	02633-009-A
Item Submitted: 22" Mill Certifi	
New Submittal: X	Resubmitted:
	represent that I have determined and verified all field measurements, field numbers and similar date and I have checked and coordinated each item with ntract requirements.
Youngquist Brothers, Inc. Representat	/e: Approved
Youngquist Brothers, Inc. Representati	/e: Approved □ Approved □ Approved with changes
Maunthinnon	/o.*
Youngquist Brothers, Inc. Representation	Approved with changes
Maunthinnon	<ul> <li>Approved with changes</li> <li>Rejected</li> </ul>
Maunthinnon	<ul> <li>Approved with changes</li> <li>Rejected</li> <li>Revise &amp; Resubmit</li> </ul>
Maunthinnon	<ul> <li>Approved with changes</li> <li>Rejected</li> <li>Revise &amp; Resubmit</li> <li>Not Reviewed</li> </ul>



### 产品质量证明书

#### 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

### INSPECTION CERTIFICATE

	单位: IARSER:	0Z0]	NE INDUS	STRIES/Y	OUNGQUI	ST BROTH	ERS			合 同 Order		WXD:	X-20070	110	签 发 Date Of	日 期 Issue:	2007年5	5月15日	编号: No:	4	8676	l	Page:1/	1
产品; Proc				Sear	无缝钢 nless ste					钢号 (纫 Steel G		GR. I	B PSL 1		标 Specif	准 ication		AP15L-200	)0			告 方 法 ig Meth		热轧 t Rolled
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2	22 "*0.	5"	1447.57		070451	4841		52	84. 774	330 335	430 435	31. ( 31. (	1					合格 Good					计格 ood	
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序号										熔炊	东成分		Cł		Compos:	ition								
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I									/															管股份、

签 发 人: 周维膏 Signed by:

审核人: Previewed by:

质量负责人; **居相归** Chief of Previewed by:



YOUNGQUIST BROTHERS, INC. Has Received This Shop Drawing Submitted YBI/Section No. 802633-009-A Date: 7/9/97

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、质检



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: 合同号 签 发 日 期: 2007 年 5 月 25 日 Date Of Issue: 编号: OZONE INDUSTRIES/YOUNGOUIST BROTHERS WXDX-20070110 48693 Page:1/1 PURCHARSER: No: Order No: 产品名称 无缝钢管 钢号 (级) 标 准 制造方法 热轧 GR.B PSL 1 API5L-2000 Product Seamless steel tubes Steel Gr. Specification Making Method Hot Rolled 总重量 总捆数 息 支 数 交货状态 正火 热处理温度 30 (Short Ton) 44.130 Total Total Pieces Deliverv Normalize Heat Temp Total Weight 力学性能 Tensile Test 长度 捆 冲击试验 ( AKV ) 调度 数 重量 Impact Test(J) 冶炼号 规 格 批号 支数 Length 序号 卡号 Weight 屈服 抗拉 伸长率 环圈拉伸 Size No. Lot 压扁 打口 冷奪 Y.S T.S (ShortT E.L **Ring Tensile** Bund Producti Heat No. Pieces (IN)No. (FT) Flattening Expansion Bending MPa MPa % 常温 Test on) ℃低温 on No. es 330 430 30.0 合格 合格 22" \*0.5" 746.59 1 070542 4887 30 44.130325 440 31.0 Good Good 숲 相 Metallography 硬 度 外观& 序号 显微组织 晶粒度 总脱碳层 魏氏组织 静水压试验 (mm)带状组织 非金属夹杂物(级) 低倍检验 涡流探伤 超声波探伤 尺寸 Microstructure GrainSize Hard-No. Weistructure Zonalstructure 外壁 内壁 Hydrostatic Non-mepallic Inclusion Macro-**Visual** Eddy U. T (级) (级) ness OutSide InSide (级) Test A粗 A 细 | B 相 | B 细 | C 相 | C 细 D 相 D 细 structure Dimension 合格 合格 合格 Good Good Good 序号 熔炼成分 % Chemical Composition No. С Mn Si Ρ S Cr Ni Çu Mo AI V Ti Nb W Sn в As Pb Sb Bi 0.21 0.55 1 0.16 0.01 0.01 0.04 0.02 0.03 复驗 许可证号 备注 License Note 5L-0369

签 发 人: 周维膏 Signed by:

审核人: Previewed by:

质量负责人: Chief of Previewed by:

信高四

盖章: Seal:





## 产品质量证明书

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

### INSPECTION CERTIFICATE

	登 单 亻 CHARSE		OZONE IND	USTRIES/	YOUNGQU	IST BRO	THERS				同 号 derNo:	WX	DX-200'	70110	签 Date	发日期 Of Issue	<sup>朔</sup> • 2007 年 •:	5月10	日 编 <sup>4</sup> No		48670	I	Page	1/1
1 .	h名称 oduct			Sean	无缝钢管 less stee	-				科号(级 Steel Gi		GR. B	BPSL 1		标 Spec	准 ification		AP15L-200	0		制 造 Making		Но	热轧 t Rolled
10	捆 数 Total	<u>-</u>		总 支 Total P	数 ieces	44	ŧ	总重 (Short T fotal We	on)	6	9.119		交 D	货 状 )elivery			正火 Normalize	1	熱处理温 leat Tei					
			长度	चर्यव स्वर											冲击试	验	力学性能 ( AKV )	Tensile	Test					
序 号 No.	规 Siz (IN	e	Length (FT)	调度 卡号 Producti on No.	冶 炼 号 Heat No.	Lot	捆数 Bundles	支 数 Pieces	重量 Weight (Short Ton)	屈服 Y.S MPa	抗拉 T.S MPa	伸长 <sup>3</sup> E.L %		Im 常福	pact Te		低温	压扁 Flatten	1	∄ Expar	· 1	冷型 Bendi		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				合格 Good	1	
. 序 号 No.	显微结 Microstr	且织 ructure	GrainSize	外壁	内壁W	金 魏氏组织 eistructur (级)	带状 e Zonalst	tructure			Non-1	金属夹杂 nepallic	Inclus	sion			低倍检验 Macro-	noce	尺 Visu	寸 181&	涡流探 Eddy		F波探伤 U.T	静水压试验 Hydrostatic Test
			(级)	OutSide	InSide	(90.)	(5	a)	<u>A粗</u> .	<u>A 细</u>	<u>B粗</u>	B 细	C粗	C 细	D粗	<u>D细</u>	structure		Dimen 合 <sup>に</sup> Goo	格		1	合格 Good	合格 Good
序号			<u></u> _				1	1		熔恆	 K成分	%	I Ch	emical	Compos	ition	<u></u>	<u> </u>	1 00					
No.	с	M	n Si	s	P	Cr	Ni	Cu	Ma	1	AI	V	TI	4	Nb	W	As	Sn	Pb	E	3	Sb	Bi	
1	0.21	0.8	55 0.16	0.01	0.01	0.04	0.02	0.03	5															
复验						<u> </u>	<u> </u>	<u> </u>		<u> </u>			ļ											
备注		可证号 ense																						
Note	5L-	0369																						
<u>,</u>																							Rt. 2	

签发人: 周维青 Signed by:

审核人: Previewed by:

质量负责人:

Chief of Previewed by:

蓋 章: Seal:



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## **Injection Well IW-2**

**16-inch Injection Tubing** 



### **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



### **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	110000065	300000281	29.31	709.71	28.98	701.38	2,022	14:48	9/9/07
25	110000065	300000281	29.24	738.95	28.91	730.28	2,046	14:55	9/9/07
26	110000065	300000281	29.50	768.45	29.17	759.45	2,080	15:02	9/9/07
27	110000065	300000281	29.49	797.94	29.16	788.61	2,034	15:09	9/9/07
28	110000065	300000281	29.35	827.29	29.02	817.62	2,062	15:16	9/9/07
29	110000065	300000281	29.09	856.38	28.76	846.38	2,010	15:23	9/9/07
30	110000065	300000281	29.65	886.03	29.32	875.70	2,032	15:29	9/9/07
31	110000065	300000281	29.63	915.66	29.30	904.99	2,026	15:35	9/9/07
32	110000065	300000281	29.63	945.29	29.30	934.29	2,096	15:42	9/9/07
33	110000065	300000281	29.52	974.81	29.19	963.48	2,085	15:50	9/9/07
34	110000065	300000281	29.59	1,004.40	29.26	992.73	2,002	15:56	9/9/07
35	110000065	300000281	29.49	1,033.89	29.16	1,021.89	2,096	16:03	9/9/07
36	110000065	300000281	29.54	1,063.43	29.21	1,051.10	2,038	16:12	9/9/07
37	110000065	300000281	29.55	1,092.98	29.22	1,080.31	2,004	16:18	9/9/07
38	110000065	300000281	29.55	1,122.53	29.22	1,109.53	2,030	16:24	9/9/07
39	110000065	300000281	29.59	1,152.12	29.26	1,138.79	2,060	16:30	9/9/07
40	110000065	300000281	29.18	1,181.30	28.85	1,167.63	2,070	16:37	9/9/07
41	110000065	300000281	29.56	1,210.86	29.23	1,196.86	2,100	16:43	9/9/07
42	110000065	300000281	29.60	1,240.46	29.27	1,226.13	2,099	16:50	9/9/07
43	110000065	300000281	29.59	1,270.05	29.26	1,255.38	2,055	16:58	9/9/07
44	110000065	300000281	29.45	1,299.50	29.12	1,284.50	2,060	17:06	9/9/07
45	110000065	300000281	29.55	1,329.05	29.22	1,313.72	1,774	7:29	9/10/07
46	110000065	300000281	29.55	1,358.60	29.22	1,342.93	2,064	07:36	9/10/07
47	110000065	300000281	29.64	1,388.24	29.31	1,372.24	2,072	07:45	9/10/07



### **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	110000065	300000281	29.53	1,417.77	29.20	9.20 1,401.44		07:53	9/10/07
49	110000065	300000281	29.64	1,447.41	29.31	1,430.74	2,074	08:00	9/10/07
50	110000065	300000281	29.56	1,476.97	29.23	1,459.97	2,094	09:59	9/10/07
51	110000065	300000281	29.44	1,506.41	29.11	1,489.08	2,042	10:06	9/10/07
52	110000065	300000281	29.53	1,535.94	29.20	1,518.27	2,054	10:12	9/10/07
53	110000065	300000281	29.54	1,565.48	29.21	1,547.48	2,094	10:20	9/10/07
54	110000065	300000281	29.64	1,595.12	29.31	1,576.79	2,004	10:27	9/10/07
55	110000065	300000281	29.64	1,624.76	29.31	1,606.09	2,096	10:39	9/10/07
56	110000065	300000281	29.43	1,654.19	29.10	1,635.19	2,052	10:45	9/10/07
57	110000065	300000281	29.64	1,683.83	29.31	1,664.50	2,040	10:52	9/10/07
58	110000065	300000281	29.62	1,713.45	29.29	1,693.78	2,002	10:58	9/10/07
59	110000065	300000281	29.58	1,743.03	29.25	1,723.03	2,098	11:06	9/10/07
60	110000065	300000281	29.62	1,772.65	29.29	1,752.32	2,046	11:11	9/10/07
61	110000065	300000281	29.48	1,802.13	29.15	1,781.46	2,060	13:08	9/10/07
62	110000065	300000281	29.53	1,831.66	29.20	1,810.66	2,058	13:19	9/10/07
63	110000065	300000281	29.60	1,861.26	29.27	1,839.93	2,027	13:26	9/10/07
64	110000065	300000281	29.60	1,890.86	29.27	1,869.19	2,015	13:34	9/10/07
65	110000065	300000281	29.60	1,920.46	29.27	1,898.46	2,056	13:42	9/10/07
66	110000065	300000281	29.58	1,950.04	29.25	1,927.71	1,960	13:51	9/10/07
67	110000065	300000281	29.28	1,979.32	28.95	1,956.65	2,046	13:59	9/10/07
68	110000065	300000281	29.40	2,008.72	29.07	1,985.72	2,016	14:06	9/10/07
69	110000065	300000281	29.59	2,038.31	29.26	2,014.98	2,022	14:13	9/10/07
70	110000065	300000281	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.

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### 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: <u>10</u>
Submittal Number:	02633-015-C
Specification Section Number:	02633-015-C
Item Submitted:16' Red Box ?	1250 FRP Casing Certificate
New Submittal:	Resubmitted: <u>X</u>
field measurements, field construction of	al, I hereby represent that I have determined and verified all criteria, materials, dimensions, catalog numbers and similar ed each item with other applicable approved shop drawings
Youngquist Brothers, Inc.         Representative:         Access         Access <td><ul> <li>Approved</li> <li>Approved with changes</li> <li>Rejected</li> <li>Revise &amp; Resubmit</li> <li>Not Reviewed</li> <li>By:</li></ul></td>	<ul> <li>Approved</li> <li>Approved with changes</li> <li>Rejected</li> <li>Revise &amp; Resubmit</li> <li>Not Reviewed</li> <li>By:</li></ul>
Better by the Color	



#### **Inspection Certificate**

Pro No: 110000065

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Purchaser: Youngquist

**Destination:** Florida

Product: 16" RB 1250

September 7, 2007

S<u>O #</u>: 62L000380

Terms: 30 Days

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.

<u>Raymond Jones</u> 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

VOUNGQUIST BROTHERS, INC. Has Received This Shop Drawing/Submitter VBI/Section No# 02632-015-C Date: 20.10, 2007 Signature: No. Te,' Raw Material Specifications:

< 24

4 a

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.

<u>Raymond Jones</u> QA Manager

Quality DepartmentMinimumMaximumLaboratory Test Results:MinimumMaximumGlass Content: ASTM D 2584% Glass-7278

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.

#### <u>Raymond Jones</u>

QA Manager Future Pipe Industries 11811 Proctor Rd Houston TX, 77038

## Monitor Well DZMW-1

Casing

## **Monitor Well DZMW-1**

**30-inch Casing** 





## **CASING LOG**

#### City of Cape Coral North Cape Deep Injection Well System

Date:	3/6/2007
Job No.:	3220246.77010102
Well:	DZMW-1

Page <u>1</u> of <u>1</u>

Casing Diameters (inches): <u>O.D. 30.00</u> <u>I.D. 29.25</u> Wall Thickness (inches): <u>.375</u>

Pipe No. and Install Order	Heat Number	Length (feet)	Run Depth (feet below land surface)
1	J4096	50.00	50.00
		······	
	30-inch Pit Pipe Seat	50.00	
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L	<u> </u>		

Premium Spiral-Weld Pipe		hip Date 191007 Cobill	Ne:14.597p-84766
Skyline Steel, LLC - Pipe Group GEORGIA TUBULAR PRODUCTS 109 Dent Drive - Cartersville, GA 30121 (770) 386-2553 Fax (770) 386-2609		ia MAGNATRAN OB SHIPPING P1 rt COLLECT oute 0- 0 Manit hcle	Trailer
Lenner der Solle (1930) Elter for Caabbert PROBLETS DROU 1933 - October Er and Heirs 1934 - Const. Er 30093/23 1934 - Const. Er 30093/23 1935 - The Mark 200-35 1935 - The Mark 200-35	9. LEC 8. 1 1 60-960	ip STOCK aid To: (* 941) DGEN CARBON PRODUC S494 HIGHLAND RD STON ROUGE, LA, 70	TS GROUP, LLC
	GRADE 8 brkd		೧೯೨೫ ನಗ ಹೆಳೆಗೆ ಸದ ಸಹ ನಡ ಅನೆ ನನ ೭ನ, ೮೫ ರು ಡು ಡು ಡು ನನ ನನ ಸಹ ಕಳ ಕೆಟಿಸಿ ನಗ ಡು
iber hunber		Quantity 50°FT	PCS
2. UGE ORDER POT 204882. 4 34" OF SATRALWELD FIRE 139 1375 HALL ( SOM - WY HYDRO - Heat Mumber - 2618968.1	SRADE & Prd2	4 Guantity 150 FT	PC3 Ut L83 3 20201
	ical Analysis * 31> P=<.011> S=	Tagz OTAL: 2 ** <.006> Si=<.02> YE	Pc≠ Wt.LBS + 26134 N≠<25300>
tore.	ţ		• • •
	Cobiert to C	Section 7 of the conditions, if this shipment is to t	
PREPAID     COLLECT     Ordeclared value of the property.     The agreed or declared value of the property is hereby specifically stated by the shipper     per	r in writing the agreed payheent of pre- payheent of pre- payheent of pre-	Section 7 of the contailors, it this shipment is to the consignee without recourse on the consignee shall sign the following statement: shall not make delivery of this shipment without and all other lawful charges.	ж. <b>\$</b>
RECEIVED, subject to the lawfully filed classifications and tariffs in effect on the date of the issue consigned, and destined as indicated above, which said carrier (the word carrier being understood that destination, if on its more, otherwise to deliver to another carrier and prove to said destination. It is m any of said property, that every service to be performed hardunder shall be subject to all the bill of ladim. Shipper fereby derifies that he is familiar with all the bill of lading terms and conditions in the govern	oughout this contract as meaning any person or utually agreed, as to each carrier of all or any of g terms and conditions in the governing classific;	iow, in apparent good order, except as noted (contents a corporation in possession of the property under this con said property over all or any portion of said noute to desti- ation on the date of shipment.	Limit condition of contents of packages unknown), marked, indicondition of contents of packages unknown), marked, inact) agrees to carry to its usual place of delivery at said ration, and as to each party at any time interested in all or build of the same same same same same same same sam
SHIPPER FILM PLANT	CARRIER PER PER	s 14/	DATE 107

YOUNGQUIST BROTHERS, INC. Has Reviewed this Shop Drawing/Submittel YBI/Section No. #02633-016-A Transmittal No./8 Date: ねんりつ Signature //

18444 Highland Road

Baton Rouge, LA

STANDARD CERTIFIED TEST REPORT **GEORGIA TUBULAR PRODUCTS** 



Customer Name Customer Add/ess

Edgen Carbon Products Group, LLC January 24, 2007 Dare: Customer Order No. 62414 G.T.P. 204882 Sales Order No.

City, Store, Zip,

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

70809

Hear		N /1	Min.		MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
No, <u>Size</u> , O,D, W	Wt./Ft, or Wall Thick	Hydro Test Pres. P.S.1.	Yleid Strength P.S.I. Point	Tenstie Strength P.S.I.	Elong in <u>2''</u>	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	
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				<b>1</b>								

The undersigned hereby certifies that the above ingreads have been inspected and rested in accordance with the methods prescribed in the applicable specifications and the restrict which inderstands shawn above. In determining properties or characteristics for which no methods of Inspecting or resting oreginations of by sold specifications, the standard mill inspection and resting process of Georgia Tubular Froducts have been opplied. Unless it appea results of such inspection and resis shown above, the undersigned believes that sold marerials conform to sold specificat

Subscribed and swarn to before me SCOTT PLANT R. PANTER MGR. Jar 01 Name & Tirle ol Georgia Tubular Products 109 Dent Drive, Contersville, GA 30121 Notary Public (770) 386-2553

# **Monitor Well DZMW-1**

24-inch Casing



## **DZMW-1 CASING TALLY**

Casing Diameter: 24 inches

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER:

<u>3220246.77010102</u> Youngquist Brothers, Inc.

CONTRACTOR:

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	
		MWH
Submittal No.:	SUL-YOUBRO-02633-015-	NO EXCEPTIONS TAKEN
	A0	MAKE CORRECTIONS NOTED REJECTED - RESUBMIT
Description:	DZMW-1 24" Mill Cert	REVIEWED BY: DATE: 3/12/07 RECOMMENDED BY: DATE:
Spec. Section:	02633	CORRECTIONS OR COMMENTS MADE ON CONTRACTORS SHOP DRAWINGS
Submitting Company:	Youngquist Brothers, Inc.	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
<b>Reviewer:</b>	Neil Johnson	THE WORK

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 he construction criteria, materials, dimensions, cat other applicable approved shop drawings and a	alog numbers and similar d	etermined and verified all field measurements, field ate and I have checked and coordinated each item with
Youngquist Brothers, Inc. Represen	tative:	Approved
Land Rod Dunas	·	Approved with changes
Crystal Sturgis		Rejected
		Revise & Resubmit
		Not Reviewed
	By	
•	Firm:	

M-x--

YOUNGOUIIST BROTHERS, INC. Has Reviewed this Shop Drawing/Submittel YBI/Section No. **\* 09633-017-A** Transmittel No. **\* Date: <u>3/S</u> Signature <u>Composed A</u>** 

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NOTE 1 (ype of pipe End 20       X2 NBNontminal Bore 호향3.00:00tslide Diameter       X3 Unit 단위(M:mm, Hinch)       X4 Unit 단위(M:Meter, F:Feet, Einch)         EDERENV 행실(20)       RG:SAW 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       X6 Star 92         EA:ERN % A SEB       RG:SAW 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       X6 Star 92         ECCERN % 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       X6 Star 92         ECCERN % 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       X6 Star 92       X7 Bisase Malai 92 M2         ECCERN % 92(20)       RG:SAW 92(20)       RG:SAW 92(20)       X6 Star 92       X7 Bisase Malai 92 M2         ECCERN % 92(20)       RG:SAW 92(20)       X6 Star 92       X7 Bisase Malai 92 M2       X7 Bisase Malai 92 M2         ECCERN % 92(1)       PG:Plain End PD:Plain End Coupled       X1 Visual 2 Diemension Test 82 92 M2       X1 Visual 2 Diemension Test 82 92	1			GOOD		1			.140 (631						TEST														۲		· ca ·		079	ri ical	****	FL.An		
전 개량은 강한 규격에 입격되었음을 보증합니다. WE REREBY CERTIFY THAT MATERIAL DESCRIBED HEREIN HAS BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER · 문 감사용형서에 망기된 규칙용도망 사용사 인전실 문제가 방생할 수 있으며, 감사용명서 위조로 물미역을 당하실 수 있습니다. HYS - B301 - 631 - 1 - OLT	EB-EF EA:ER EG:EF EC:EF	W違、 W違、 W啤 W啤L WպL	생(말면) 5 문 진 만(말만) 나사관 다사관	RG:SAW 특근 (일반 RG:SAW백관 (일반 RS:SAW 스마이 등 2 PE:Plain End BE:Bevel End	) RG: VG: PO: P8:	Roll Groov Victaulic ( Plain End Plain End Bell End	ring Froovin + Caur + Bove	iled I End	#5 G: #8 H: #10:h #10:h #13:F #16:F	GOOD Heat(Lac teat Trea teversa P tesidual	die) An stment Natieni Megnei	elysis 정원 영처리 Ing Test 원 (lam Test 8	분석, P M AI 원	Produ	ct Ana	iysiş J				% Prod **	6 L:Lo Iuci Ar 11 Vis 14 Fla	ngitu valysh vat & ring T	dinal i 미운전 Diem Test 및	연영방 위 和물 ansion 와사임	h) 왕, Tri 문석 Test	lansvi	_		ŝ	底7 就會 ※1 ※1	8:8ase CEQ=C 2 Flatter 5 Nonde	Metat S +Mn/S+ ing/Ber structiv	2 M ₽, (Ni+C nd/Gu e Tast	, W:Wold P Su)/15+(Cr sided Band t 비파고리	'arl 宮裔두 •Mo+V)/5 Teal 世语	동가란		<u></u>
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AND IN A 201	HYS -	B30				L																				0						L		NSPEC	ION MAR		(210)	× 297)

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Attn: Marybeth

i.

# **Monitor Well DZMW-1**

**16-inch Casing** 



# **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



# **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



## 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			
			MWH	
Submittal No.:	SUL-YOUBRO-02633-016-	NO EXCEPTIONS TAKEN	X AMEND-RESUBMIT	
	B0	MAKE CORRECTIONS NOTED	REJECTED - RESUBMIT	
		ֈֈֈֈֈֈֈֈ ֈֈֈֈֈֈֈ	- Mit-	
Description:	DZMW-1 16" Mill Cert	REVIEWED BY: NJOHNSON	DATE: APRIL 2, 20	07
		RECOMMENDED BY:	DATE:	
Spec. Section:	02633	CORRECTIONS OR COMMENTS	MADE ON CONTRACTORS SHOP DR	AWINGS
Submitting Company:	Youngquist Brothers, Inc.	WITH CONTRACT DRAWINGS AN BEEN REVIEWED FOR CONFROM COMPLIANCE WITH THE CONT RESPONSIBLE FOR CONFIRMIN DIMENSIONS, FABRICATION PR	G AND CORRELATING ALL QUANTIT. OCESSES AND TECHNIQUES, COORD	ING HAS ENERAL CTOR IS IES AND INATING
Reviewer:	Neil Johnson	WORK WITH OTHER TRADES, AN THE WORK	ID SATISFACTORY AND SAFE PERFORM	ANCE OF

Comments: None.

#### Submittal Data FROM Youngquist Brothers, Inc. 15465 Pine Ridge Rd.

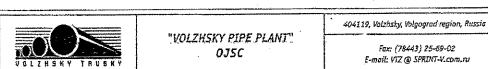
Ft. Myers, FL. 33908 239-489-4444 Fax: 239-489-4545

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: <u>March 16, 2007</u>	Number of Copies:9
Submittal Number:	02633-018-B
Specification Section Number:	02633-018-B
Item Submitted:16" Mill Cert	ification
New Submittal: X	Resubmitted:
	eby represent that I have determined and verified all field measurements, field log numbers and similar date and I have checked and coordinated each item with Contract requirements.
Youngquist Brothers, Inc. Represent	ative: Approved
11	Approved with changes
Shaun Skinner	
Shaun Skinner	Revise & Resubmit
	Not Reviewed
	By:
	Firm:

Date:



PAGE 1 OF 2

VOL23 4041	NOFACTU SKY FIFI 9. VOLZI KIRAD REA A	e plant Sevy	032C	<	SPEC 98 IDESCRIP ICARBON ITTAR 20 IGB.A/C/I BEVELLE IL6" X 0	TION C STEEL GGIX43 ASME J D ENDS	NF GC SEAM 2, B/A SA 10	0005: 11555 1574 1 16(19)	52/% FIPE 106(1 98 ED)	ACCO 2002 1 171001	T T T T T T T T T T T T T	3 70 i XF) GR	NEI 51 .B/C//	STH A	53 (2	2002	ITION, EDITIC	1 (98) 1 1 1	-ERTI	FICAT	2008 * 2008			<b>JE 21.0</b>	1.2006												
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## 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:	32202	46.19	.9.1.1	
Owner:	City of Cape Coral					
			MWI	H		**************************************
Submittal No.:	SUL-YOUBRO-02633-016-	NO EXCEPTIONS TAKEN	X	AME	ND - RESUBMIT	Ť
	A0	MAKE CORRECTIONS NOTED	,	REF	CTED - RESUBMIT	-
			/ AK	$\Lambda /$	~~	k
Description:	DZMW-1 16" Mill Cert	REVIEWED BY: N.JOHNSON	Thele	4M	DATE: APRIL 2, 2007	
		RECOMMENDED BY:		£	DATE:	
Spec. Section:	02633	CORRECTIONS OR COMMENTS				
Submitting Company:	Youngquist Brothers, Inc.	<ul> <li>DURING THIS REVIEW DO NOT F</li> <li>WITH CONTRACT DRAWINGS AI</li> <li>BEEN REVIEWED FOR CONFRON</li> <li>COMPLIANCE WITH THE CONT</li> <li>RESPONSIBLE FOR CONFIRMIN</li> <li>DIMENSIONS, FABRICATION PF</li> <li>WORK WITH OTHER TRADES, AN</li> <li>THE WORK</li> </ul>	ND SPECIE MANCE W TRACT DC G AND C ROCESSES	ICATION ITH DES CUMEN ORRELA AND T	NS. THIS SHOP DRAWING HGN CONCEPT AND GEN ITS ONLY. CONTRACTI ATING ALL QUANTITIES TECHNIQUES, COORDIN/	D HAS ERAL OR IS AND ATING
<b>Reviewer:</b>	Neil Johnson	LUE WURK			***************************************	
·····		Number				

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: <u>March 16, 2007</u>	Num	ber of Co	opies:9
Submittal Number:		2	
Specification Section Nu	mber:026	<u>33-018-</u>	Α
Item Submitted: New Submittal:	16" Mill Certification		Resubmitted:
monotration criteria materials	s submittal, I hereby represent tha dimensions, catalog numbers and drawings and all Contract require	Singia dan	ermined and verified all field measurements, field e and I have checked and coordinated each item with
Youngquist Brothers, In	- Popresentative	i î î	Approved
			Approved with changes
Man Min	ur		Rejected
Shaun Skinner			Revise & Resubmit
			Not Reviewed
	By:		
	Firr	n:	
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## SUBMITTAL REVIEW

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

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Project:	W-7C North Cape RO WTP Deep Injection Wells	MWHA File Number:	3220246.1	9.9.1.1	
Owner:	City of Cape Coral				
			MWH		
Submittal No.:	SUL-YOUBRO-02633-016-	NO EXCEPTIONS TAKEN	X AM	IPND - RESUBMIT	
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<b>Description:</b>	DZMW-1 16" Mill Cert	REVIEWED BY: NJOHNSON	We 1	DATE: APRIL 2, 2007	
		RECOMMENDED BY:	and a second second second second second second second second second second second second second second second	DATE:	
Spec. Section:	02633	CORRECTIONS OR COMMENTS			
Submitting Company:	Youngquist Brothers, Inc.	<ul> <li>DURING THIS REVIEW DO NOT R WITH CONTRACT DRAWINGS AN BEEN REVIEWED FOR CONFROM COMPLIANCE WITH THE CONT RESPONSIBLE FOR CONFIRMING DIMENSIONS, FABRICATION PR WORK WITH OTHER TRADES, AN</li> </ul>	VD SPECIFICATIO MANCE WITH DI RACT DOCUME G AND CORREI COCESSES AND	ONS. THIS SHOP DRAWING ESIGN CONCEPT AND GENE ENTS ONLY. CONTRACTO LATING ALL QUANTITIES TECHNIQUES, COORDINAT	HAS RAL RIS AND TING
Reviewer:	Neil Johnson	THE WORK			

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 C	
New Submittal: X	Resubmitted:
Certification Statements: By this submittal, construction criteria, materials, dimensions, other applicable approved shop drawings an	hereby represent that I have determined and verified all field measurements, field catalog numbers and similar date and I have checked and coordinated each item with d all Contract requirements.
Youngquist Brothers, Inc. Repres	entative: Approved
	Approved with changes
Shaun Alimon	Rejected
Shaun Skinner	Revise & Resubmit
	Not Reviewed
	By:
	Firm

Date:

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MANAGER - INSPECTION VOL3ESKY PIPE PLANT DATE: 11.06.06

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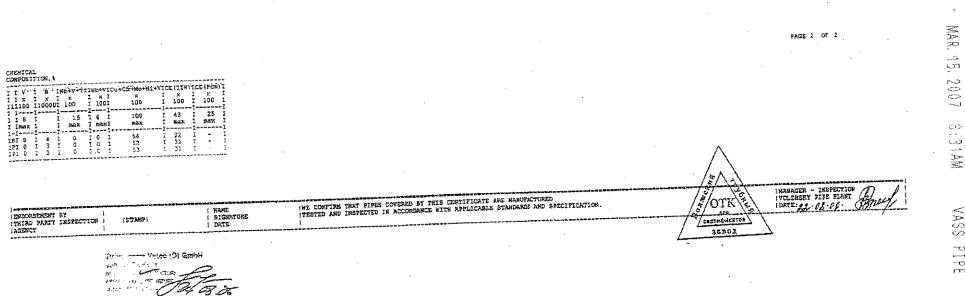
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MILL TEST CERTIFICATE \_\_\_\_\_..... MANUFACTURER: ISPEC 981/72-01/PO 06-252/PO 41037 VOLZHSKY PIPE FLANI OJSC 404119. VOLZHSKY DESCRIPTION OF GOODS: CARBON STEEL SEMMLESS FIPES ACCORDING TO API 51 PSL2 (43RD EDITION) (CARBON STEEL SEMMLESS FIPES ACCORDING TO API 51 PSL2 (43RD EDITION) (FER. 20041X42. B/ASTM A106(2002 EDITION)GR.B/C/ASTM A53 (2002 EDITION) (RE.B/C/ASTM SA 106(1998 EDITION)/ASTME SA53 (1998 EDITION). VOLGOGRAD REGION RUSSIA BEVELLED ENDS. (16" x 0,500" (406.4 x 12,7 MH) CERTIFICATE # 2009 DATE OF ISSUE 21.08.2006 \*\*\*\*\*\*\*\*\* INYDROSTATIC TEST! IMPACT TEST HEAT! N TENSILE TEST ISBRD-INTLL | 1081-1 TRS-I D CHEMICAL COMPOSITION, 1 NESS \_\_\_\_ HEAT NO! EN-ROTE DORA-PRES-ICONT-IORI- INO-ISI-ITESTI IMPACTIFBAC-IAT- I T IEL. ITEST In management GL. '0' TA- TEST LOT LOUAN- ( | NET No ITITY, LENGTH, (MELGET ) IC ISI IMD I P I S I Cr I NI | Cu | MO | TI | NO (ROL IVALUE ITURE IMENTI 7108 SURE ENTA-ITCHIZE ITEMPI SIZE HEAT -----1 KG/CM2 PROT. ISE-x | x | X | YS I UTS TION I TREAT-ON ICT- I NO (MPa) 1 °C I 3 ۹ CONDS | | MPA 1 & HRC MENT MEN MPA -----MPA | MPA | C I MAC min | min | min | max | + | + | + | + | min | min | + | + | 220.00| 485.00|30.0| 22.00| 3 | 5 | 6 | 0 | 7 | 27.00| 20. | 8 | 9 4 LOT NO min 157.10 -I wmmn Imia \* \* 1 \* 5 2 1 3 14 1 15.401 limax minimini maxi maxi maxi maxi maxi maxi maxi max max. 11 1 11061 1 1 1 448,001 758.001 imaxi 38 25 1 26 27 128 29 30 31 32 33 34 35 36 57 \*\*\*\*\* 24 17 8 9 10 11 12 13 14 1 15 16 17 1B 19 20 21 22 23 3 5 £ 1 Z ( 4 G G CARBON STEEL QETI N vi F T SEAMLESS PIPES 
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 1 1 i K Ď i 2 GRADE B/C/ 6318 ENI DACCORDING TO 1 X42 15"x1 0.500" (405.4) API 51 (2004) 0 6315 (12) ASTN A106(2002) 7.5201 1x 12.7 MMI 126331 API 5L.PSL2 5 1199,90 1263310A13-13841 D A (270.5 | 100) | E | 287.9 | 100 | 254.8 | 100 ASTM A53 (2002) 405 525 149.21 1.0 ASNE SA-106(1998) 3844 I L (ASHE SA-53(1998) 1557M 553 268.71 100 ASME SA-106 ASME SA-53 I DREATH NIN 901=38-41 FT 18AX 201=36-36 FT NIBINUM EXPROSTATIC PRESSURE HARDNESS TEST IN ACCORDANCE IFLATTENING MARKING: STEEL MAKING PROCESS -INONDESTRUCTIVE COATING BEVELING END'S TEST DESCRIPTION | VISUAL AND | STENCILING PROTECTORS | INSPECTION INSPECTION DIMENSIONS ÓF ELECTRIC FURNACE TESTS G G s G G G Ģ MOTES: G: COOD 11: R: MEAT ANALYSIS. P: PRODUCT ANALYSIS, C: CONTROL ANALYSIS, R: RECHECK ANALYSIS 12: L: LOT TEST, N: HEAR CONTROL TEST, A: ADDITION TEST, R: RECHECK TEST 13: L: LONGITUDINAL, T: TRANSVERSE 13: L: LONGITUDINAL, T: TRANSVERSE 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 1/2 in, S: 12 nm. 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 in, K: 1 1/2 in, S: 10 NTCH, F: 2 NTF 14: STRIF G: 1/2 in, H: 3/4 in, N: 1 in, K: 1 \*7: E - SACN VALUE. A - AVERAGE VALUE \*8: HEAT TERATHERT, OF: OURNCHED & TEMPERED \*9: N: WET FLUURBSCENT NAGNETIC PARTICLE TEST, ENI: ELECTROMAGNETIC TEST, UT: ULTRASONIC TEST UT: FIE BODY OF FOR LAMINATION. UTE: PIPE ENDS UT FOR LAMINATION UTS: PIPE WALL THICKNESS UT 10: 5 - NOTCH 51, 12 - NOTCH 12.5% Ϋ́ટ. 10.00 man OUANTITY OF PIPES 5 PCS NET WEIGHT 7.520 T LENGTH 199.90 It \*/otk 70721 INANAGER - INSPECTION IVOLINSKY FIPE PLANT An INE CONFIRM THAT PIPES COVERED BY THIS CENTIFICATE ARE MENUFACTURED -ITESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SPECIFICATION. 20 ENDORSEMENT BI INDOUCTOR VICTOR (D) GODH I NAME 579 IDATE: 24:08.06 SIGNATURE CODTINDAKATOZ DATE BABDA 

#### "VOLZHSKY PIPE PLANT" OJSC

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404119, Volzhsky, Volgograd region, Russia en l'incluer phoneners de

Fax: (78443) 25-69-02

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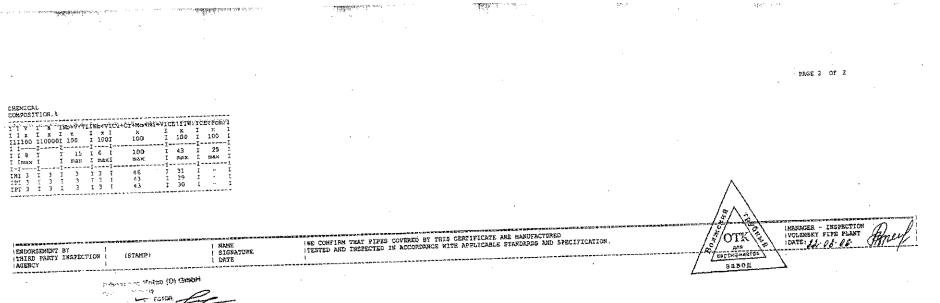
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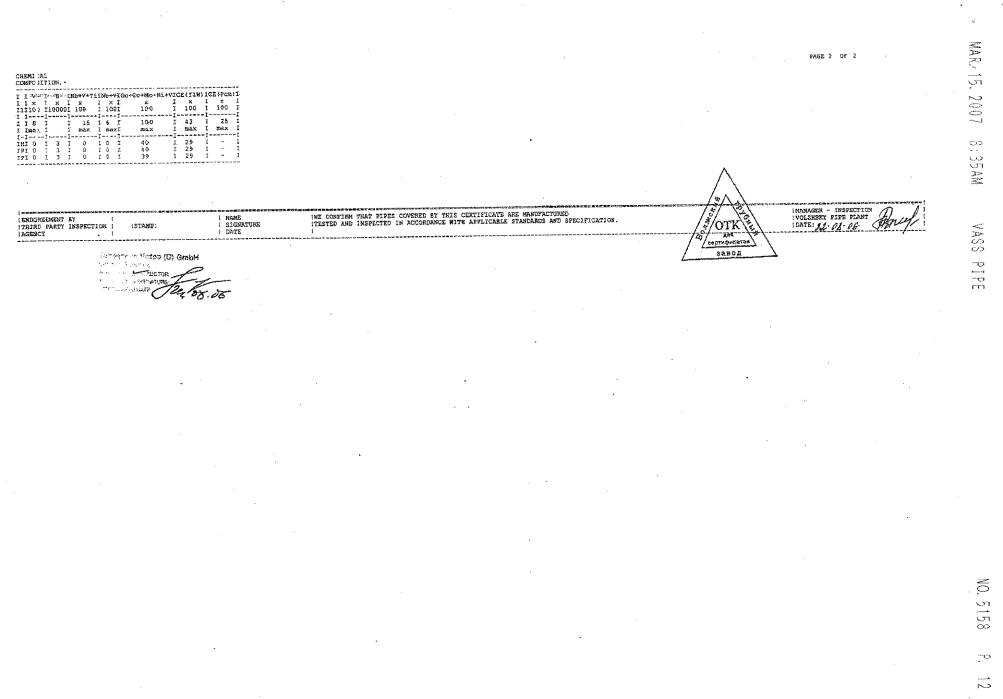
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TES: : H: HEAT : L: LONGT : STRIF G: : Y: JUNN : F: 10x100 TOT LUARSEMENT IND PARTY	TODINAL, 1/2 in. . U: 280 Non. 7: 1 None EXECT AL: OU	/ P: P: HEAT C: T: TR 5: 3/ 0. 5: 0:7.5m AFTITY	ANSVERE 4 in, 1 Just 1, 22, 5: 1 OF F11	SE 1 in, , C: 4mm 102t, 7mm PEL 7d	K: 1 1, 0. E: 2 5: 10) FCS 1	/2 in. 2mm U x5mm, NET WE	5: FASL 31 J	12 mm NOTC 9x3.3 114.	Nn. 2: 996 T	2555 ) : 10%	y Fasi 2.5ma Noth 195	801 3046	CN .91 J'		PES 0	+9: C -10	: R: ¥ JTB: P JTS: P D: 5 -	et f IPE IFE NOT	LUORES BODY 1 NALL S CH 51	SCENT UT FOI PHISKI 12 -	- AVERAGE T: QUEECF HAGNETIC A LAMINAN HESS UT - HOTCH I TE ARE BI	PARTI PI/M, U 12.54 NUFACT	CLE TF TE: FI	T, END SE ENDS		TROMAG	NETI NATI	: 7887 ;;;	.UT: 1					NANA	SER - INS (SF PIPE	PLART ( ht see

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MAR: 15. 2007 8: 37AM VASS PIPE

123:01 2510 MAR: 15. PAGE 2 OF 2 CHEMICAL COMPOSITION, 1  $\begin{array}{c} \text{COMPERITION, I} \\ \text{I} & \text{I} & \text{V} & \text{I} & \text{S} & \text{IMS-IV-FIIMS-VICO-CTIME/ICETIME/ICETERN} \\ \text{I} & \text{I} & \text{V} & \text{I} & \text{S} & \text{IMS-IV-FIIMS-VICO-CTIME/ICETERN} \\ \text{I} & \text{I} & \text{X} & \text{I} & \text{X} & \text{I} & \text{X} & \text{I} & \text{X} \\ \text{I} & \text{I} & \text{X} & \text{I} & \text{X} & \text{I} & \text{X} & \text{I} & \text{X} \\ \text{I} & \text{II IOO I 1000 I 100 I 100 I 100 I 100 I 100 I 100 I 100 } \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} & \text{I} \\ \\ \text{I} & \text{I}$ 2007 8:38AM A OTK MANAGER - INSPECTION VOLZESKY PIPE PLANT IDATE: 12.08.06. INS CONFIRM THAT FIRES COVERED BY THIS CENTIFICATE ARE MANUFACTURED ITESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE STANDARUS AND SPECIFICATION. IENDORSEMENT BY I ITHIRD PARTY INSPECTION I INSENCY I t anno NAME BIGNATURE SSVA (STAMP) DATE AORES -----Tubosovice Valos (D) GmbH Section 1 threes  $\neg c_{2}$ AND CONTRACTOR 124.08 Maria La Date £~1~F OF <u>o</u>N 5158  $\overline{\phantom{a}}$ ......  $\sim$ 

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VQL2H 40411	NUFACTUR SKY PIE S. VOLZE GRAD RES A	) plant Isky	OJSC		SPEC 98 DESCRIP CARBON YEAR 20 GR.B/C/ BEVELLE (15° x 0	TION STEEL 04)X4 (ASME 10 END	01/P OF G SEA 2, 5/ SA 1	0 06- 00DS: MLBSS NLBSS	252/F PIPF A106 96 EF	O 410 IS ACC IZO62	37 ORDIN	5 TO ON 1 GR	API SI	L PSU ASIM 3 98 ED	2 (43) A53 (1 ITION	RD ED 2002	UTIO EDIT	1	\$ 1		ÇATE	¥ 2014	DATE OF	. 1320	E 21.0	.2006											
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DESCRIPTION OF TESTS NOTES: 1: 8: HEAT 7: 1: LON T 73: L: LON T 74: STRIP G: 75: V: ZMM V	G: C ANALYSIS	IONS                                     	RODUCT	G ANALYSI TEST. /	A: ADDITI	NTROL	ASP.	RI RE	TICN , R: CRECI	RECRE		                                   				• 8 • 9	8   HE 9 : MT	at th Ret	reat Flu	MENT	CENT	- AVERAGI T: OVENCI MAGNETIO R LAMINA	HEC 4 TE C PARTIC	MPERE LS TE E: PI	D ST. EM	: SLE s or F		TEST G	•••••      	STER	G	- [ E3	ectri	(C FU	5 PROCE		5 5 
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VOTES: 1: A: HEAT A 2: L: LOT TE 3: L: LONGIT 3: L: LONGIT 3: L: LONGIT 5: F: 10x10a TOTE EMDORSEMENT : FUIRD PARTY J AGENCY	257. N: 1 PUDINAL, 1/2 in. 0: 2nm ms. 7: 10 AL: QUA	P: PF HEAT CC T: TRA H: J/4 U, B: Dx7.5m ANT1TY V/2000	WTROL INSVERS IN, 5 3mm 0. . 6: 1 OF PII OF PII .(SIA)	ANALYS TEST. E I: 1 in C: 4 C: 4 C: 4 C: 5 C C C C C C C C C C C C C C C C C C C	A: ADDI a U, E: a, 5: 1 5 PCS 5 PCS 5 PCS	1/2 2008 10×50 10×50 NE7	TEST IN, S D FA M. 3: WEIG I NAM	F. R: 12 45E N : 107 38T 45 3NATO	REC 7 nm. 10TCH 13.3m 42.7	HECK , F: H. 2: 75 T	TEST	FASE 5mm HGTH :WE	NOT 1126	CH .41 ft 1RM TH	AT PI	PES C	-10  OVERS	: 5 ~ ===== 2 BY 1	NOTO MERRO MERRO HES	28 58. HARDER LEANNER CERTI	1 	AVERAGE : OUSNCH MAGNETIC LAMINAT ESS UT NOTCH 1 NOTCH 1 E ARE MA UL STAND	L.31 Entration NUFACTU	****** ******	riikide Tablicen ( Filled Tablicen (	*****		****	C TEST ON		Contraction of the				IVOL2	SER – INSI HERY PIPE	PLANT (2)

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## **Monitor Well DZMW-1**

6.625-inch Casing



## **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 (f Floor + Elevato Casing Seat (fe	ors (feet bls)	1,314.32 -4.20 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



## **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 (f Floor + Elevato Casing Seat (fe	ors (feet bls)	1,314.32 -4.20 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



## **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 (f Floor + Elevato Casing Seat (fe	ors (feet bls)	1,314.32 -4.20 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



### **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 Nominal Minimum Nomina Nominal Pin Upsel Max Box Connection Type Nominal Weight Size 1.D Drift Dia O.D. API 5B, Table 14\*, 7\*\*, 6\*\*\* Wali 0.0 OD\* (inches linches (inches) (inches) (inches) (inches (inches (lbs/ft) (lbs/jt) Fourteenth Edition August 96 2-3/8 2.00 1.91 2.21 0.10 3.45 2.69 0.7 21 2-3/8" 8Rd EUE Long\*IJ 2 - 7/82 47 2.37 2.73 0.13 3.19 3.95 1.0 31 2-7/8" 8Rd EUE Long\*IJ 3 - 1/23.00 2.90 0.15 3.30 3.85 1.5 4.84 44 3-1/2" 8Rd EUE Long\*IJ 4 3.33 3.24 3.68 0.17 4.35 2.0 5.17 61 4" 8Rd EUE Long\* TC 4-1/2 3.98 3.89 4.40 0.21 4.85 2.5 5.77 76 4-1/2" 8Rd EUE Long\*IJ 4.42 4.33 5-1/2 4.87 0.23 5.60 3.2 6.70 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 6-5/8" 8Rd Csg Long\*\*IJ 144 6.21 6.11 7 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 7-5/8" 8Rd Csg Long\*\*IJ 192 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 13.1 13.12 394 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 16.60 18 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 46.9 20.10 24.00 1,406 20" 6Rd Csg TC

Depending on the application, smaller maximum box diameters are available.

PERFORMANCE AND RATINGS (-60 deg F to +150 deg F ")

Internal Pressure Nominal Mill Test Axial Tension Collaose Stretch vs Tension-Over-Pipe-Wt Pressure (psi) Rating (psł) Rating (psi) Size Rating (lbs) Stretch (ft) = Coeff. x P x 2 - 3/81,250 1,570 640 10.500 0.4672 - 7/81,250 1,570 670 16.000 0.295 3-1/2 1,250 1,570 600 22.500 0.221 1,250 1,570 640 4 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 1.2501,570 590 72,500 0.069 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

#### **MECHANICAL & PHYSICAL PROPERTIES**

Where: P = Tensile Load (1,000 lbs) I =String Length (1.000

Thread lengths may exceed API L4

30 ft Standard Joint Length

	<u> </u>			r - sund rendu (i'nnni)
TUBING/CASING BODY PROPERTIES	UNIT	VALUE	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 <sup>3</sup>	0.07	0.07	ASTM D792
Thermal Conductivity	Btu/hr/ft <sup>2</sup> /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

11811 Proctor Road, Houston, Texas 77038 Tel: 281-847-2987 Fax: 281-847-1931 sales@Future-Pipe.com

# **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- Casing Depth: 584 fer Bit Size: Nominal 52-i Cement Specification	et below pad level nch diameter
Number of Stages: 1	
Cement Blend:	Neat
	6% Bentonite
Cement Density:	Neat – 15.6 lb/gal
	6% Bentonite – 13.6
Theoretical Fill From Volume Pumped:	Caliper Log: 3,545 cubic feet 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

Α		В	C	D		E	F	G	Н	I	J	K	М	N	0	Р
DATE	STAGE		CEMENT	YIELD	PUN	NTITY IPED	FI		TAG DEPTH		LL	PERCENT FILLED (LINEAR FEET)	ACTUAL FILL	PERCENT FILLED (VOLUMETRIC)	CUMULATIVE TOTAL	INSPECTOR'S
	NO.	LOG NO.	(ADDITIVES, BLENDS, MIXTURES)	(FT <sup>3</sup> /SK)	(barrels)	(FT3)	INTERVAL	FOOTAGE	PAD LEVEL	INTERVAL	FOOTAGE	J/G x 100	(FT3)	(FT3)	(FT3)	
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- Casing Depth: 1,395 Bit Size: Nominal 40.8 Cement Specification Number of Stages: 10	feet below pad level 5-inch diameter : ASTM C 150 Type II
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	CALCUL	ATION S	SHEETS

Α	В	С	D	E	F	G	Н	ł	J	K	L	Μ
DATE	STAGE	CEMENT	YIELD	QUANTITY PUMPED	_	THEORETICAL FILL		ACT	-	PERCENT FILLED	CUMULATIVE TOTAL	INSPECTOR'S
	NO.	(ADDITIVES, BLENDS, MIXTURES)	(FT³/SK)	(FT <sup>3</sup> )	INTERVAL	INTERVAL FOOTAGE		INTERVAL	INTERVAL FOOTAGE		(FT³)	
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	МК
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	CALCUL	ATION	SHEETS

Α	В	С	D	E	F	G	Н	ł	J	K	L	Μ
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT³/SK)	QUANTITY PUMPED (FT3)	-	THEORETICAL FILL INTERVAL FOOTAGE		ACT FI	UAL LL FOOTAGE	PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT <sup>3</sup> )	INSPECTOR'S
3/8/07	8	6% Gel	2.2	420.8	602 to 556	46	512.0	602 to 512	90	196%	4,061.7	МК
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 to1,732, 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															
Α		В	С	D		E	F	G	н	I	J	К	М	Ν	0	Р
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)			THEOR Fl	-	TAG DEPTH PAD LEVEL	-		PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT <sup>3</sup> )	PERCENT FILLED (VOLUMETRIC)	CUMULATIVE TOTAL (FT3)	INSPECTOR'S
8/4/07	1	LOG NO.	Neat	1.18	20	112.2	2,065 to 2,045	20	2,065.0	2,065 to 2,065	0	0%	(F19)	(FT <sup>3</sup> )	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
			Picl	ked up a	nd reset	22" casir	ng (Cumula	tive total of	f cement of	previous s	tages not ir	ncluded 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

ATTAOU ALL OALOUL ATION OUFFTO



### **IW-2 CEMENTING RECORD**

0

CUMULATIVE

TOTAL

(FT3)

2,552.7

Not included

in total

2,833.2

3,394.2

3,618.6

3,899.1

4,179.6

Not included

in total

4,460.1

4,720.0

5,000.5

Ρ

INSPECTOR'S

INITIALS

RAW

CLM

RAW

RAW

ABF

ABF

ABF

MK/ABF

MSK

MSK

MSK

NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: 3220246.77010102

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 22-inch

					ATT	ACH ALL	CALCUL	ATION SHE	EETS					
Α		В	С	D		E	F	G	Н	I	J	K	Μ	Ν
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)		NTITY MPED (FT3)	-	ETICAL LL FOOTAGE	TAG DEPTH PAD LEVEL	-	UAL LL FOOTAGE	PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT <sup>3</sup> )	PERCENT FILLED (VOLUMETRIC) (FT3)
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%
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%



## **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

					ATT	ACH ALL	CALCULA	TION SHE	EETS							
Α		В	С	D		E	F	G	Н	I	J	K	М	Ν	0	Р
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)		NTITY MPED (FT <sup>3</sup> )	THEOR FI INTERVAL	-	TAG DEPTH PAD LEVEL	_	UAL LL FOOTAGE	PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL (FT3)	PERCENT FILLED (VOLUMETRIC) (FT3)	CUMULATIVE TOTAL (FT3)	INSPECTOR'S
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	1680 to 1667	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	1650 to 1650	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	1650 to 1650	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

Α		В	С	D		Е	F	G	Н	I	J	K	М	N	0	Р
DATE	STAGE NO.	TEMPERATURE LOG NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)					TAG DEPTH PAD LEVEL	-	UAL LL FOOTAGE	PERCENT FILLED (LINEAR FEET) J/G x 100	ACTUAL FILL	PERCENT FILLED (VOLUMETRIC) (FT <sup>3</sup> )	CUMULATIVE TOTAL (FT3)	INSPECTOR'S
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

ATTACH ALL CALCULATION SHEETS

## **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- Casing Depth: 2,094 Final Casing I.D. 21 i Cement Specification Number of Stages: 6	feet below pad level
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

Α		В	С	D		E	F	G	Н	I	J	K	М	Ν	0	Р
DATE	STAGE	TEMPERATURE	CEMENT	YIELD		NTITY MPED	THEOR	LL	TAG DEPTH	ACT FI		PERCENT FILLED (LINEAR FEET)	ACTUAL FILL	PERCENT FILLED (VOLUMETRIC)	CUMULATIVE TOTAL	INSPECTOR'S
	NO.	LOG NO.	(ADDITIVES, BLENDS, MIXTURES)	(FT <sup>3</sup> /SK)	(barrels)	(FT3)	INTERVAL	FOOTAGE	PAD LEVEL	INTERVAL	FOOTAGE	J/G x 100	(FT3)	(FT <sup>3</sup> )	(FT3)	
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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 24-inch

Α	В	C	D	E	F	G	Н	ł	J	K	L	Μ
DATE	STAGE	CEMENT	YIELD	QUANTITY PUMPED	THEORETICAL FILL		TAG DEPTH	ACTUAL FILL		PERCENT FILLED	CUMULATIVE TOTAL	INSPECTOR'S
	NO.	(ADDITIVES, BLENDS, MIXTURES)	(FT <sup>3</sup> /SK)	(FT <sup>3</sup> )	INTERVAL	FOOTAGE	PAD LEVEL	INTERVAL	FOOTAGE	J/G x 100	(FT <sup>3</sup> )	
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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 24-inch

Α	В	C	D	E	F	G	Н	ł	J	K	L	Μ
DATE	STAGE	CEMENT	YIELD	QUANTITY PUMPED	THEORETICAL FILL		TAG DEPTH	ACTUAL FILL		PERCENT FILLED	CUMULATIVE TOTAL	INSPECTOR'S
	NO.	(ADDITIVES, BLENDS, MIXTURES)	(FT <sup>3</sup> /SK)	(FT <sup>3</sup> )	INTERVAL	FOOTAGE	PAD LEVEL	INTERVAL	FOOTAGE	J/G x 100	(FT <sup>3</sup> )	
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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 16-inch

ATTACH ALL CALCULATION SHEETS

Α	В	С	D	E	F	G	Н	ł	J	K	L	Μ
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)	QUANTITY PUMPED (FT <sup>3</sup> )	THEOR FII	-	TAG DEPTH PAD LEVEL	ACT FII INTERVAL		PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT <sup>3</sup> )	INSPECTOR'S
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



## **DZMW-1 CEMENTING RECORD**

#### NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 16-inch

Α	В	С	D	E	F	G	Н	ł	J	К	L	Μ
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD	QUANTITY PUMPED (FT <sup>3</sup> )	THEOR FI	ETICAL LL FOOTAGE	TAG DEPTH PAD LEVEL	-	UAL LL FOOTAGE	PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT <sup>3</sup> )	INSPECTOR'S
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**

6<sup>5</sup>/<sub>8</sub>-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: <u>3220246.77010102</u>

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Neil Johnson

CASING SIZE: 6.625-inch FRP

ATTACH ALL	CALCULATION SHEETS

Α	В	С	D	E	F	G	Н	-	J	К	L	М
DATE	STAGE NO.	CEMENT (ADDITIVES, BLENDS, MIXTURES)	YIELD (FT <sup>3</sup> /SK)	QUANTITY PUMPED (FT <sup>3</sup> )	_	ETICAL LL FOOTAGE	TAG DEPTH PAD LEVEL		UAL LL FOOTAGE	PERCENT FILLED J/G x 100	CUMULATIVE TOTAL (FT <sup>3</sup> )	INSPECTOR'S
11/4/07	_	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



### **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:** 

START TIME: FINISH TIME: CASING SIZE:

40

12.5**5** 1353 22-inch

INITIAL PRESSURE: GAGE SERIAL NUMBER: CALCULATED WATER VOLUME: OBSERVED WATER VOLUME: Pressure test 22-inch steel casing CL set at 2,039 bpl. (provider) 15 Zo 2 pp)

021604-01 26.1 GALLONS

TIME	TOTAL MINUTES	Pressure (psi)	COMMENTS
1055	0	152.2	Witnessed by FDEP
1056	1	152:0	Terry Thanks (ANN HO)
1257	2	152.2	also witnessel test.
1258	3	152.2	
1959	4	152.2	
1300	5	152,2	******
1301	6	152.2	
1302	7	152,2	
1303	8	152.2	
1304	9	132.12	
1305	10	152.0	
1300	11	152.0	
1307	12	152.0	
1308	13	152.0	
1309	14	152.00	
1310	15	152.0	
1311	16	152,0	
1312	17	152.0	
1515	18	152.0	
1314	19	152.0	
1318	20	152.0	
15/le	21	152.0	
1317	22	152.0	
1318	23	152.0	
13/9	24	152.0	
1320	25	192.0	
1321	26	152.0	
1322	27	162.0	





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: FINISH TIME: CASING SIZE: 22-inch

INITIAL PRESSURE: GAGE SERIAL NUMBER: CALCULATED WATER VOLUME: **OBSERVED WATER VOLUME:** 

152,2 ps
021604-01
26.1 GALLONS

TIME	TOTAL MINUTES	Pressure (psi)	COMMENTS
1323	28	152.0	
1324	29	162.0	
1325	30	152.0	
1326	31	152.0	
1327	32	15200	
1328	33	152.0	
1329	34	182.0	
1320	35	152,0	
1331	36	152.0	
1332	37	152.0	
1333	38	152.0	
1334	39	152.0	
1335	40	154.0	
1336	41	191.8	
1337	42	151.8	
1338	43	151.8	
1339	44	151.8	
1340	45	161,8	
1341	46	161.8	
1342	47	151.8	
1343	48	151.8	
1344	49	151,8	
1345	<u>50</u>	151.8	
1346		151.8	
1347	52	151.8	
1348	53	151.8	
1349	54	151,8	
L/350	55	151.8	



. . M

### **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: FINISH TIME: CASING SIZE:	ム:55 13:50 22-inch	INITIAL PRESSURE: GAGE SERIAL NUMBER: CALCULATED WATER VOLUME:	152.2 pSi 021604-01 26.1 GALLONS

OBSERVED WATER VOLUME:

	TOTAL		
TIME	MINUTES	Pressure (psi)	COMMENTS
1351	56	151,8	
1352	57	151.3	
1353	58	151.8	
1354	59	131.7	
1355	60	151.7	

an management of the second second second second second second second second second second second second second	NISKEMLINEDKONDONIOTIKANI KANINGGAN DI WITATATATATATATATATATATATATATATATATATATA	PRESSSURE BLEED-OFF	
TIME	PRESSURE	VOLUME OF WATER COLLECTED (GAL)	CUMULATIVE VOLUME (GA
1357	1541.7	<u>ے</u>	0
1358	122.0	5	5
400	92	5	10
401	64	5	15
403	35	5	erren er en en en en en en en en en en en en en
408	0.0	5.5	05.5
	n a fallen en fallen an fallen fallen fallen fallen fallen af fallen af fallen fallen fallen fallen fallen fall		
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44-G) Witnessed By: David Rhodes FDEP Representative 9/7/07 Neil Johnson MWH Representative Clay Ferguson YBI Representative an.



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

BLUE

RIBBON

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 +/-.25%, traceable to NIST standards.

The subject gauge performed to within +/-1.5% accuracy.

Sincerely,

Juan Nova



## **Certificate of Calibration** # KELC-24858



Cal. Due Date

31-Jul-07

Kimball Electronic Laboratory, Inc. Precision Measurement Equipment Specialists

<b>Calibration Per</b> KIMBALL ELEC 8081 W 21 LAN HIALEAH, FL. 3	TRONIC LABORATORY, INC	Purchase Order # N/A For: YOU410 YOUNGQUIST BROTH 15465 PINE RIDGE RC	HERS, INC.
	rmation KELI I.D.: KEL-117823 MC DANIEL 200 PSI PRESSURE GAUGE	FT MYERS	FL 33908
Manufacturer: Model Number: Part Number: Range:	MC DANIEL 200 PSI	Cal Date: Cal. Due Date: Cal. Interval: Received:	12 MONTHS
Serial Number: Customer I.D.: Cust. Barcode: Cust. Location:	N/A 021604-01 N/A N/A	Calibration Result: Temp / RH: Performed By: Procedure:	PASS 72 F / 40 % GUSTAVO CASTRILLON
Specifications: This is to certify that the a been calibrated using me	+/- 0.25% FS above listed instrument meets or exceeds all specifications as stat assurement standards traceable to the National Institute of Standa		

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 Electonic 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. accepted intrinsic standards of measurement, or Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

Calibration Remarks

I MU THIS UNIT WAS FOUND TO BE IN TOLERANCE AT THE TIME OF CALIBRATION. PERFORMED ROUTINE CAL. NO ADJUSTMENTS REQUIRED

Standards I	Used To C	Calibrate Equipment	
Company	I.D.	Description	Last Cal.
KIM001	391	EATON UPS 3000BAA PRESSURE INDICATOR	05-Jul-05

Certified by: GUSTAVO	Gustavo A	Custridion	Approved By: JAVIER	a	
CASTRILLON	23-Apr-07	9:12:29 AM	BALCEIRO	23-Apr-07	9:13:14 AM
	Kimball Electroni	c Laboratory, Inc 8	blication of an approved abs 3081 W. 21st Lane - H	lialeah, FL, 330	)16
Tel: 30	5-822-5792 - Toll	Free: 800-393-1094	- Fax: 305-362-3125	- Web: www.k	elilabs.com
Iel: 30	5-822-5792 - Toll	Free: 800-393-1094	- Fax: 305-362-3125	- Web: www.k	elilabs.com

CONTROL # : <u>KEL-117823</u>

CUSTOMER : YOU410



8081 W. 21 LANE HIALEAH, FL. 33016 PH # 305-822-5792 FAX # 305-362-3125

#### **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
	***************************************				

Page 1 of 1

# **Injection Well IW-2**

**16-inch Tubing Pressure Test** 



 NORTH CAPE DEEP INJECTION WELL SYSTEM

 JOB NUMBER:
 3220246.77010102

 CONTRACTOR:
 Youngquist Brothers, Inc.

 PROJECT MGR:
 Neil Johnson

#### **IW-2 PRESSURE TEST DATA**

DATE: September 21, 2007

FROSEOT MOR.	New JOINTSON					
OWNER:	City of Cape Coral	DESCRIPTION OF OPERATIONS:	Pressure test 16-inch	FRP Tubing		ł
			CL set at 2,045 feet b		KCC@ 405	PSI
	1005		100 0			·1 ·
START TIME:		INITIAL PRESSURE:				-
FINISH TIME: CASING SIZE:	1105 16-inch FRP	GAGE SERIAL NUMBER: CALCULATED WATER VOLUME:	021604-01			-
OADING SIZE.	TO-MCHTTYF	OBSERVED WATER VOLUME:	12.5 90	- 0		-
			<u> </u>			•
TIME	MINUTES	PRESSURE (psi)	_	COMMENTS		l I
1005	0	152.5	John Pe	trous	MWHC	
;006	1	152.5	Denals	Cellins	MWHC	
1007	2	152.5		Drayer	YBI	
1008	3	15215		Harcourt	FDEP	
1009	4	152.5		Rhodes	FDEP	
1010	5	152.5	PONIE	Know()		
1011	6	(52.5				i i
1012	7	152.5				
1013						
1015	8	152.4				
1014	9	152.4	<b>K</b> 11			1
1015	10	152.4				
1010	11	152.4				
1017	12	152.4				
1018	13	152.2				
1019	14	152.2	·			
1020	15	152.2				
1021	16	15212				
Ion	17	152.2				
1023	18	152.2		· · · · · · · · · · · · · · · · · · ·		ĺ
1024	19	152.2				
10245	20	152.0		· · · · · · · · · · · · · · · · · · ·		1
10200	21	152.0				
102107	22	152.0				
10278		152,0			- ',	
10789	24	152.0				ł
1040	25	152.0				
.03	26	152.0				i
1032	27 ~	152,0			·····	l l
1033	28	152.0				i
1034	28	152.0				
1035	30	151.8				
1036	31	151.8				
1031		151.8				ļ
1036	32					
1039	33	151,8		• • • • • • • • • • • • • • • • • • • •		
1040	34	151.8 151.8				1
1040	35					
1041	36	151,8				
1043	37	151,60				
	38	151,8				
1044	39	151.6				
1045	40	151,6		+		
1046	41	151.6				
1047	42	151.6				
1048	43	151,4				

ł

,



JOB NUMBER:

NORTH CAPE DEEP INJECTION WELL SYSTEM

3220246.77010102

#### **IW-2 PRESSURE TEST DATA**

DATE: September 21, 2007

CONTRACTOR: Youngquist Brothers, Inc. PROJECT MGR: Neil Johnson OWNER: DESCRIPTION OF OPERATIONS: Pressure test 16-inch FRP Tubing City of Cape Coral CL set at 2,045 feet bpl START TIME: INITIAL PRESSURE: FINISH TIME: GAGE SERIAL NUMBER: 021604-01 CASING SIZE: 16-inch FRP CALCULATED WATER VOLUME: 10.2 gallons **OBSERVED WATER VOLUME:** TIME MINUTES PRESSURE (psi) COMMENTS 049 151.4 44 151.4 45

14. ×14		1		
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		
105B 1059	53	151.0	v.	
1059	54	151.0		
1100	55	151.0		
101	56	151.0		
102	57	151.0		
1103	58	151.0		
1104	59	151.0		
1105	60	151.0	A 1.5 AS1	1% decrease

PRESSSURE BLEED-OFF				
TIME	PRESSURE	VOLUME OF WATER COLLECTED (GAL)	CUMULATIVE VOLUME (GAL)	
1105	151.0	0	0	
1112	32.5	iO	10	
113	0,0	2.5	12,5	
			·····	

Witnessed By:

David Rhodes FDEP Representative

Neil Johnson MWH Representative

<u>Clay Forguson-</u> YBI Representative

9/21/07 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ 9/21/07 ~)T



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 +/-.25%, traceable to NIST standards.

The subject gauge performed to within +/-1.5% accuracy.

Sincerely,

Juah Nova



### Certificate of Calibration # KELC-24858



Kimball Electronic Laboratory, Inc. Precision Measurement Equipment Specialists

Calibratii	on Portor	med By:	Purchase Order # N/A For: YOU410		2 Contraction of the second
KIMBALL	ELECTR	ONIC LABORATORY, INC	YOUNGQUIST BROT	HERS INC	le classification de la classificación de la c
8081 W 2			15465 PINE RIDGE R		
HIALEAH,	FL. 3301	16			
		ation KELLD: KEL-117823 C DANIEL 200 PSI PRESSURE GAL	FT MYERS	FL 33908	
Manufaci Model Nun Part Nun	iurer: Mi nber: 20 nber: N/	C DANIEL 00 PSI		•	
Ra	nge: 0-:	200 PSI	Received:		
Serial Nurr		••	Calibration Result:	PASS	
Customer Cust. Barc Cust. Loca	ode: N/		Temp / RH: Performed By:		ó
Specificati	ons: +/-	- 0.25% FS = listed instrument meets or exceeds all specifications ement standards traceable to the National Institute of	Procedure:		
muy number of fa	CTOIS MAY CO	In calibration techniques. This calibration is in accord 17025 and compliant with MIL-STD-45662A and ANS he Test Uncertainty Ratio, with a coverage factor of iuse the calibration item to drift out of calibration bein	LANDERS & LANDER REPORT	.,	
Calibration THIS UNIT V	Remark VAS FOUN	S ND TO BE IN TOLERANCE AT THE TU NE CAL. NO ADJUSTMENTS REQUIRED			
Calibration THIS UNIT V PERFORME Nandards (	Remark VAS FOUN D ROUTIN	S			
Calibration THIS UNIT V PERFORME	Remark VAS FOUN D ROUTIN	S ND TO BE IN TOLERANCE AT THE TU IE CAL. NO ADJUSTMENTS REQUIRED		Last Cal.	Cal. Due Date
Calibration THIS UNIT V PERFORME Standards (	Remark VAS FOUN D ROUTIN	s ND TO BE IN TOLERANCE AT THE TU IE CAL. NO ADJUSTMENTS REQUIRED Calibrate Equipment	ME OF CALIBRATION	Last Cal. 05-Jul-05	Cal. Due Date 31-Jul-07
Calibration THIS UNIT V PERFORME Standards ( Company KIM001	Remark VAS FOUN D ROUTIN Jsed To I.D. 391	s ND TO BE IN TOLERANCE AT THE THE IE CAL. NO ADJUSTMENTS REQUIRED Galibrate Equipment Description	ME OF CALIBRATION		
Calibration THIS UNIT V PERFORME Standards I Company KIM001	Remark VAS FOUN D ROUTIN Jsed To I.D. 391	S ND TO BE IN TOLERANCE AT THE TU IE CAL. NO ADJUSTMENTS REQUIRED Calibrate Equipment Description EATON UPS 3000BAA PRESSUR	ME OF CALIBRATION		
Calibration THIS UNIT V PERFORME Standards ( Company KIM001 Signature Certific	Remark VAS FOUR D ROUTIN Jsed To I.D. 391 S: S: Stavo	s ND TO BE IN TOLERANCE AT THE THE IE CAL. NO ADJUSTMENTS REQUIRED Galibrate Equipment Description	ME OF CALIBRATION		
Calibration THIS UNIT V PERFORME Standards ( Company KIM001 Signature Certific GR	Remark VAS FOUR D ROUTIN Jsed To I.D. 391 S: S: Stavo TRILLON	S ND TO BE IN TOLERANCE AT THE THE SECAL. NO ADJUSTMENTS REQUIRED Calibrate Equipment Description EATON UPS 3000BAA PRESSUR Austano A. Custrillon Guistano A. Custrillon 23-Apr-07 9:12:29 AM	ME OF CALIBRATION. RE INDICATOR Approved By: JAVIER BALCEIRO	05-Jul-05	31-Jul-07
Calibration THIS UNIT V PERFORME Standards ( Company KIM001 Signature Certific GR	Remark VAS FOUR D ROUTIN Jsed To I.D. 391 S: S: Stavo TRILLON	S ND TO BE IN TOLERANCE AT THE TU IE CAL. NO ADJUSTMENTS REQUIRED Calibrate Equipment Description EATON UPS 3000BAA PRESSUR EATON UPS 3000BAA PRESSUR Guistano A. Custrillon 23-Apr-07 9:12:29 AM oduced, except in full, unless permission for th	ME OF CALIBRATION. ME OF CALIBRATION. RE INDICATOR Approved By: JAVIER BALCEIRO The publication of an approved abstrace	05-Jul-05	31-Jul-07
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Calibration THIS UNIT V PERFORME Standards ( Company KIM001 Signature Certific GR	Remark VAS FOUND D ROUTIN Jsed Too I.D. 391 Stavo TRILLON Not be repro	S ND TO BE IN TOLERANCE AT THE THE SECAL. NO ADJUSTMENTS REQUIRED Calibrate Equipment Description EATON UPS 3000BAA PRESSUR ATON UPS 3000BAA PRESSUR 23-Apr-07 9:12:29 AM oduced, except in full, unless permission for the Kimball Electronic Laboratory, Inc.	ME OF CALIBRATION. ME OF CALIBRATION. RE INDICATOR Approved By: JAVIER BALCEIRO The publication of an approved abstract - 8081 W. 21st Lane - High	05-Jul-05	31-Jul-07

CUSTOMER : YOU410



8081 W. 21 LANE HIALEAH, FL. 33016 PH # 305-822-5792 FAX # 305-362-3125

#### 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	e	119.5	120.5
	160	159.8		159.5	160.5
	200	199.8		199.5	200.5

Page 1 of 1

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# Monitor Well DZMW-1

Casing Pressure Tests and Test Gauge Calibration Certifications

# **Monitor Well DZMW-1**

**16-inch Casing Pressure Test** 



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#### 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 O Pressure test 16-inch upper monitor zone steel casing
START TIME: FINISH TIME: CASING SIZE:	15:05 16:05 16-inch	INITIAL PRESSURE: GAGE SERIAL NUM <u>BER:</u>

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1505	0	50.50	Witnessed by FDEP (James Harcourt),
1506	1	50.50	MWHC (Todd Tubbert and Martin Waggoneer)
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	



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#### 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 O Pressure test 16-inch upper monitor zone steel casing
START TIME: FINISH TIME: CASING SIZE:	15:05 16:05 16-inch	INITIAL PRESSURE: GAGE SERIAL NUMBER:

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	



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#### 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 OPressure test 16-inch upper monitor zone steel casing
START TIME: FINISH TIME: CASING SIZE:	15:05 16:05 16-inch	INITIAL PRESSURE: GAGE SERIAL NUMBER:

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

### PRESSURE GAUGE CERTIFIED CALIBRATION RECORD

Manufactured by

Thuemling Industrial Products 1225 Pearl Street Waukesha, WI 53186 Phone: 262-547-1789 Fax: 262-547-6493

#### TRACEABLE TO N.I.S.T.

Customer/Distributor:	Installation Date: Important: Date recalibration time period begins*		
	Purchase Order Number: PC-66234060		
	Invoice Number: I-32412-0		
	Calibration Date: 03-20-07 Date the certified calibration was performed		
User:	Calibration Due Date: User specified re-certification date based on installation date & the user's guality program procedures		
	Serial Number: 31907-1		

Pressure Gauge Part Number	42070533			SHOWARD SHOW
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	
		法制度的现在分			一一 网络金属金属
100	100				

CERTIFIED BY:

# **Monitor Well DZMW-1**

6.625-inch Casing Pressure Test



DATE(S): 11/8/2007

 JOB NUMBER:
 3220246.77010102

 CONTRACTOR:
 Youngquist Brothers, Inc.

Youngquist Brothen
Neil Johnson
City of Cape Coral

DESCRIPTION OF OPERATIONS:

Pressure test 6.625-inch lower monitor zone FRP casing

START TIME:	
FINISH TIME:	
CASING SIZE:	

1515 7675 6.625-inch

INITIAL PRESSURE: GAGE SERIAL NUMBER:

RE: 51250

1.50

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	
<u>1522</u>	<u>, 7</u>	51.25	
1523	8	51.25	
1524	9	51.25	
1525		51.25	
1526	11	51.25	
1527	12	51.25	
1529	13	5125	
1530	14	51.25	
1531	15	51.25	
1532	16	51.25	
1533	. 17	51.25	
1544	<u>18</u> 19		
1595	20	51.25	
15036	20	51.25	
15987	21	5125	
15958	23	51,25	
15 39	24	51.25	
15610	25	51.25	
156	26	51.25	
1552	27	51.00	
1543	28	51.00	
1544	29	51.00	
1565	30	51.00	
15646	31	51,00	
1517	32	51.00	
1548	33	51.00	
1599	34	51.00	
1660	35	51.00	
13.57	36	51,10	
1552	37	51.00	
1553	38	50,75	
554	39	56,75	
555	40	50,25	
1554	41	56,30	

Observer's Initials:



DATE(S): 11/8/2007

NORTH CAPE DEEP INJECTION WELL SYSTEM			
JOB NUMBER:	3220246,77010102		
CONTRACTOR:	Youngquist Brothers, Inc.		
PROJECT MGR:	Neil Johnson		
ÓWNER:	City of Cape Coral	DESCRIPTION OF OPERATIONS:	Pressure test 6.625-inch lower monitor zone FRP casing
START TIME: FINISH TIME: CASING SIZE:	1515 1615 6.625-inch		150

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
1557	42	50.25	
1558	43	50.25	
13.59		50.25	
1600	45	50,25	
160	46	50,25	
1602	47	50.25	
1603	48	50.25	
1604	49	50,25	
1605	50	50,25	
1606	51	50.25	
1602	52	50.25	
160 8	53	50.25	
1609	54	50.25	
1610	55	50.25	
1611	56	50.00	
1612	57	50,00	
1613	58	50,00	2/gAllows bleed and
16.655	59	50.00	× •
1612	60	50,00	Total chruge= 1, Sps; <5% chruge
Witnessed By	r <u>y</u>	David Rhodes FDEP Representative	- David Rhund
		John Largey MWH Representative	- for from

David Rhodes FDEP Representative

John Largey MWH Representative

Mike Wilson Youngquist Brothers Representative



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: <u>5</u>
Submittal Number:	02633-029-A
Specification Section Number:	02633-029-A
Item Submitted:	YBI PACKERS
New Submittal: X	Resubmitted:

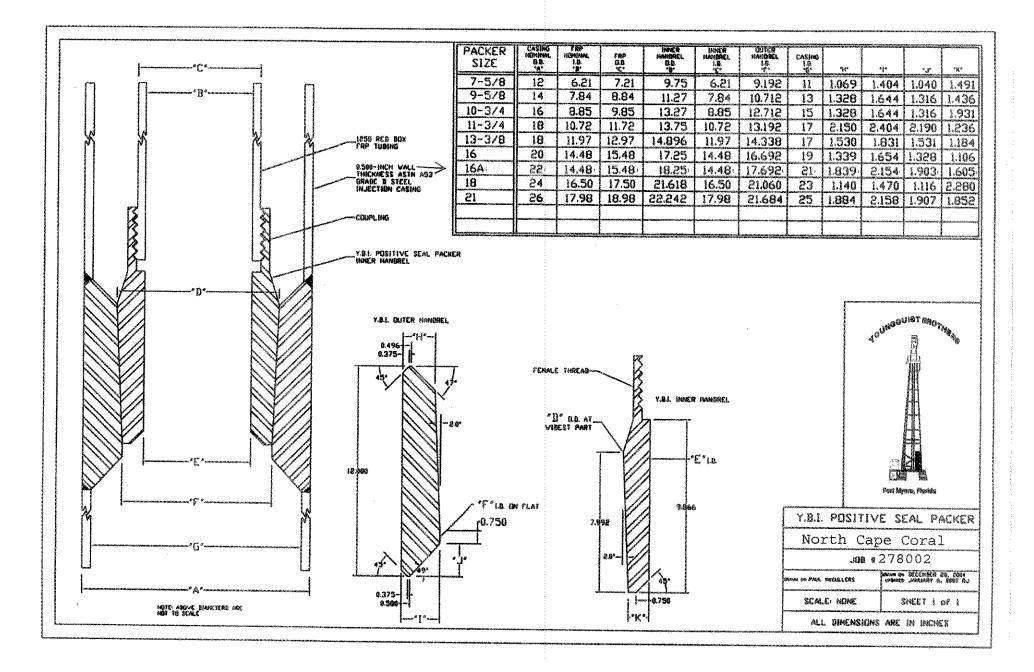
Certification Statements: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar date and I have checked and coordinated each item with other applicable approved shop drawings and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

Youngquist Brothers, Inc. Representative:

irm:		
<sub>sy:</sub> L		Not Reviewed
		Revise & Resubmit
	0	Rejected
	D	Approved with changes
		Approved

m\_4~ .

YORNOCISTATOTHERS. NO. mee Reviewed the Stelp Franking Submitted Visionalist Ro. & CACES-ON-A Transitional Ro. #\_\_\_\_\_ Date 215 Stop reduced the Company



# **Appendix P**

**Background Water Quality Test Results** 

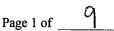
# **Injection Well IW-2**

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:239-489-4444Fax:239-489-4545E-mail:Cape CoralClient Project Name:Cape CoralLaboratory Contact:Andy Konopacki



All subsequent pages are identified by: N0709377. 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.

Nokomis Lab ~ 1050 Endeavor Ct. ~ Nokomis, FL 34275-3623 ~ Phone: 941-488-8103 ~ Fax: 941-484-6774 ~ HRS Certification # E84380 Fort Myers Lab ~ 16880 Gator Road ~ Fort Myers, FL 33912 ~ Phone: 239-590-0337 ~ Fax: 239-590-0536 ~ HRS Certification # E85457

Page: Page 1 of 2

Client Project: Cape Coral Lab Project: N0709377 Report Date: 10/25/07



Laboratory Results

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

Lab D	Sample Descripti	on		Sample Source	2	<b><u>Received Date/Time</u></b>	San	ple Date/Time
N0709377-01	Inj. Well grab			Ground Water		9/24/07 12:00		9/24/07 10:05
<u>Analysis</u>	Method	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	AnalysisDate/Time	Analyst	<u>Cert ID</u>
Air Temperature-field	170.1	26.7		0.1	C	9/24/07 10:05	НС	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	410.4	1460		8	mg/L	10/5/07 8:30	BY	E84380
Demand Chloride	SM4500CI-B	19200		I	mg/L	10/1/07 10:00	BB	E84380
Chromium	200.7	0.003	Ι	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	d 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	LSI	0.27		0.01	NONE	10/1/07 0:00	AK	E84380
Index 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 1050 Endeavor Cour	0.68 t • Nokor	mis, FL 34	0.10 275 • Phone: (941) 4	mg/L as N 188-8103 • (	10/3/07 13:51 800) 255-3108 • Fox: (	SJ 941) 484-677	F84380

Page: Page 2 of 2

Client Project: Cape Coral Lab Project: N0709377 Report Date: 10/25/07

#### Laboratory Results

.

Lab ID	ample Descript	ion		Sample Source	9	<b><u>Received</u></b> Date/Time	San	ple Date/Time
	ij. Well rab			Ground Water		9/24/07 12:00	Anna Anna Anna Anna Anna Anna Anna Anna	9/24/07 10:05
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Nitrogen, Total	351.2	0.68		0.10	mg/L as N	10/3/07 13:51	BB/AG	E84380
Kjeldahl 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	120.1	38200		0.1	µmhos/cm	9/24/07 10:05	HC	E84380
Conductance-field 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	С	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: ٦,

Comments: Total & Ortho Phosphorus results confirmed with second aliquots of sample.

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

Test Results meet all the requirements of the NELAC standards.



	T. Bright Sanders Laboratorie 1050 Endeavor Cour Nokomis, FL 34275-3	t		Customer ID: Customer PO: Received: EMSL Order:	SAND53 N0709377 09/25/07 11:20 AM 170705839	
Fax: Project:	(941) 484-6774 N0709377	Phone:	(941) 488-8103	EMSL Proj: Analysis Date: Report Date:	9/27/2007 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)

Himberty 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 the samples reported above. Samples received in good condition unless otherwise noted. ACCREDITATIONS: NVLAP 200204-0, FL Lab ID: E86795

THIS IS THE LAST PAGE OF THE REPORT.

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 Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N0709377 N0709377 Groundwa 75441.01 09/24/07 09/24/07	-01					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (G	iroup II Unregulated)				·		
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	00/07/07 00-54		
Chloroform	ug/l	0.5 U 0.2 U	EPA 502.2 EPA 502.2	0.5 0.2	09/27/07 20:51		JRW
	•	0.2 0	EFA 502.2	0.2	09/27/07 20:51		JRW
Volatile Organic Compounds (P	rimary 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/i	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		
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	09/27/07 20:51		JRW
Chloroform	ug/l	0.3 U	EPA 502.2 EPA 502.2	0.5	09/27/07 20:51		JRW
Dibromochloromethane	ug/i	0.5 U	EPA 502.2	0.2	09/27/07 20:51		JRW JRW
Total Trihalomethanes	ug/l	0.2 U	EPA 502.2	0.2	09/27/07 20:51		JRW
Chlorinated Pesticides	-			0.2	55/21/01 20.01		JIXVV
Date Extracted	0	9/27/07					
Aldrin	ug/l		EPA 508.1	0.04		09/27/07 09:00	ARM
Dieldrin	ug/l	0.01 U 0.01 U	EPA 508.1	0.01		09/27/07 09:00	DB
	ugn	0.01 0	EPA 508.1	0.01	10/03/07 15:35	09/27/07 09:00	ÐΒ

FDOH Laboratory No. E84129 NELAP Accredited

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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

November 1, 2007 Project No: 75441

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### Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N07 Gro 754 09/2	09377 09377-01 undwater 41.01 24/07 10:05 24/07 15:45					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Pesticides (Primary DV	w						
Date Extracted		09/27/07	EPA 508.1			00/07/07 00.00	4514
Chlordane	ug/l	0.05 U		0.05	40/02/07 45:25	09/27/07 09:00	ARM
Toxaphene	ug/i	0.05 U		0.05 0.5	10/03/07 15:35	09/27/07 09:00	DB
Polychlorinated biphenyls (PCBs)	ug/l	0.5 U 0.2 U		0.5	10/03/07 15:35	09/27/07 09:00 09/27/07 09:00	DB DB
Chlorinated Herbicides (Primary D)	-	0.2 0	El A 666.1	0.2	10/03/07 13:33	09/21/01 09.00	DB
Date Extracted		09/28/07	EDA 545 0			00/00/07 00.00	-
Dalapon	ug/l	09/20/07 1 U	EPA 515.3		10/04/07 10 00	09/28/07 09:00	EMF
2,4-D	ug/i	1 U		1	10/01/07 18:08	09/28/07 09:00	BTJ
Pentachlorophenol	ug/l	0.1 U		1	10/01/07 18:08	09/28/07 09:00	BTJ
2,4,5-TP (Silvex)	ug/l	0.1 U 0.25 U		0.1 0,25	10/01/07 18:08		BTJ
Dinoseb	ug/l	0.25 U		0.25	10/01/07 18:08 10/01/07 18:08		BTJ
Picloram	ug/l	0.5 U		0.75	10/01/07 18:08	09/28/07 09:00 09/28/07 09:00	BTJ BTJ
Semivolatile Analyses (Primary DW	n -				10,00,00	00,20,01 00.00	210
Date Extracted	-	09/27/07	EPA 525.2			00/07/07 00.00	
Alachlor	ug/l	0.2 U		0.2	09/27/07 18:20	09/27/07 09:00 09/27/07 09:00	ARM
Atrazine	ug/l	0.06 U		0.2	09/27/07 18:20	09/27/07 09:00	BTJ
Benzo(a)pyrene	ug/l	0.00 U		0.08	09/27/07 18:20	09/27/07 09:00	BTJ BTJ
Di(2-ethylhexyl)adipate	ug/l	0.1 U		0.3	09/27/07 18:20	09/27/07 09:00	BTJ
Di(2-ethylhexyl)phthalate	ug/l	3.7 1	EPA 525.2	0.3 1.0	09/27/07 18:20	09/27/07 09:00	BTJ
Endrin	ug/l	0.1 U		0.1	09/27/07 18:20	09/27/07 09:00	BTJ
Heptachlor	ug/l	0.08 U		0.08	09/27/07 18:20	09/27/07 09:00	BTJ
Heptachlor Epoxide	ug/i	0.1 U		0.00	09/27/07 18:20	09/27/07 09:00	BTJ
Hexachlorobenzene	ug/l	0.05 U		0.05	09/27/07 18:20	09/27/07 09:00	BTJ
Hexachlorocyclopentadiene	ug/l	0.2 U		0.2	09/27/07 18:20	09/27/07 09:00	BTJ
Lindane	ug/l	0.06 U		0.06	09/27/07 18:20	09/27/07 09:00	BTJ
Methoxychlor	ug/l	0.05 U		0.05	09/27/07 18:20	09/27/07 09:00	BTJ
Simazine	ug/l	0.07 U		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		1	10/02/07 09:37		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		1	10/02/07 10:31		BTJ
Monobromoacetic Acid	ug/l	1 U		1	10/02/07 10:31		BTJ
Dichloroacetic Acid	ug/l	1 U		1	10/02/07 10:31		BTJ
Trichloroacetic Acid	ug/l	1 U		1	10/02/07 10:31		BTJ
Dibromoacetic Acid	ug/l	1 U		1		09/28/07 09:00	BTJ

FDOH Laboratory No. E84129 NELAP Accredited

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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

November 1, 2007 Project No: 75441

### Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N07093 N07093 Ground 75441.0 09/24/0 09/24/0	77-01 water 1 7 10:05						
Parameters	Units	Results		Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Total Haloacetic Acids Analyses							· · · · · · · · · · · · · · · · · · ·	
Total Haloacetic Acids	ug/l	1 L	J I	EPA 552.2	1	10/02/07 10:31	09/28/07 09:00	BTJ
Semivolatile Analyses								2.0
2,4,6-Trichlorophenol	ug/l	2 L		EDA 625	2	40/00/07 40-40	00/05/07 00:00	DT.
2-Chlorophenol	ug/i	2 (		EPA 625 EPA 625	2 1	10/02/07 19:10	09/25/07 09:00	BTJ
Anthracene	ug/i	1 U		EPA 625 EPA 625	1	10/02/07 19:10 10/02/07 19:10		BTJ BTJ
Butylbenzylphthalate	ug/l	3 L		EPA 625	3		09/25/07 09:00	BTJ
Dimethylphthalate	ug/l	5 L		EPA 625	5		09/25/07 09:00	BTJ
Naphthalene	ug/i	1 L		EPA 625	1		09/25/07 09:00	BTJ
Phenathrene	ug/l	1 U		EPA 625	1	10/02/07 19:10		BTJ
Phenol	ug/l	1 U		EPA 625	1	10/02/07 19:10		BTJ
Pesticide Analyses (Primary DW)								
Date Extracted		09/26/07		EPA 504.1			09/26/07 13:00	ARM
Dibromochloropropane	ug/l	0.005 L		EPA 504.1	0.005	09/27/07 03:26	09/26/07 13:00	BTJ
Ethylene Dibromide (EDB)	ug/l	0.005 L		EPA 504.1	0.005	09/27/07 03:26		BTJ
Carbamate Pesticides (Primary DW)								
Carbofuran	ug/l	0.5 L	1 1	EPA 531.1	0.5	10/02/07 04-55		11/0
Oxamyl (Vydate)	ug/l	0.5 L		EPA 531.1	0.5	10/02/07 04:55 10/02/07 04:55		JKS JKS
Pesticide Analyses (Primary DW)								
Glyphosate	ug/l	10 L		EPA 547	10	09/26/07 00:25		JKS
Posticido Analysos (Primany DMA)	-3.				10	03/20/07 00.23		JNO
Pesticide Analyses (Primary DW)								
Date Extracted Endothall		09/25/07		EPA 548.1			09/25/07 08:30	EMF
Endotrair	ug/i	20 L	J	EPA 548.1	20	09/27/07 00:29	09/25/07 08:30	DB
Inorganics								
Cvanide	mg/l	0.005 L		SM 4500 CN	0.005	00/00/07 44-00	00/07/07 44:00	1100
Fluoride	mg/l	0.005 C	-	SM 4500 CN EPA 300.0	0.005 0.01		09/27/07 14:00	MCD
Foaming Agents	mg/l	0.80		SM 5540 C	0.01	10/05/07 07:23 09/26/07 09:45		MLH
Metals		<b>9</b> .11	•		0.00	03/20/07 03.40		JLS
 Thallium	mg/l	0.001 L		EPA 279.2	0.001	10/17/07 40:00		
Radiochemistry		0.001 C		-1 7 219.2	0.001	10/17/07 16:29		AMP
Gross Alpha (Incl. Uranium)	DCi/l	100/00	-					
Radium-226	pCi/l pCi/l	120±6.2		EPA 00-02	2.9	10/17/07 09:03	10/15/07 09:45	MJS
Radium-228	pCi/l	29±0.5 1.0±0.5 U		EPA 903.1	0.07	10/17/07 14:15	10/11/07 16:00	DF
	, <b>, , , ,</b>	1.010.0 0		EPA RA-05	1.0	10/30/07 18:13	10/27/07 16:00	DF

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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.
   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.

Sanders	CHAIN-OF-CUSTODY RECORD PROJECT # N0709	377
Laboratories INC. Environmental Testing Services		of
Client Youngguist Address PhoneFax	Report To:	211
Sampled By (PRINT) HIARY CROOK Sampler Signature HJZR CROOK Bottle SAMPLE DESCRIPTION	PRESERVATIVES     ANALYSES       Bample     Bample       DATE     TIME	Sample
	72407-1005 G X 6XX	-OIA
		B
		D
		E F
		6
Bottle Lot	RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION	
COMMENTS: C334 C334 C-171- C-17- C-1	HIZPY (ROOK 92407 1200 Tronger	2-24 1200

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# **Monitor Well DZMW-1**

Upper Monitor Zone Background Water Quality (1,090 to 1,150)

Page: Page 1 of 2

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 N0711190-01	Sample Descripti UZMW-1 grab	<u>ön</u> – ""	Sec.	Sample Source Ground Water	Ne set	Received Date/Time 11/20/07 13:15	1.14	ple Date/Time 11/20/07 9:45
<u>Analysis</u>	Method	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>
Alkalinity	SM2320B	110		3	mg/l CaCO3	11/26/07 13:00	BB	E84380
Aluminum	200.7	0.032	Ι	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	Ι	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	410.4	146		8	mg/L	11/21/07 8:00	BY	E84380
Demand Chloride	SM4500C1-B	<b>98</b> 0		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	LSI	0.08		0.01	NONE	11/27/07 0:00	AK	E84380
Index Lead	200.7	0.002	Ι	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	351.2	0.60		0.10	mg/L as N	11/29/07 18:00	BB	E84380
Kjeldahl Odor @ 21 deg C	SM2150B	1	U	1	TON	11/20/07 15:05	AS	E84380

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Page: Page 2 of 2

Client Project: Cape Coral Lab Project: N0711190 Report Date: 12/10/07

### Laboratory Results

Lab ID N0711190-01	Sample Descript UZMW-1	ion	1	Ground Water	9	Received Date/Time 11/20/07 13:15	San	nple Daté/Time
<u>Analysis</u>	grab <u>Method</u>	Dogulto	0					11/20/07 9:45
		<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	Cert ID
Ortho Phosphate	SM4500P-E	0.015	U	0.015	mg/L as P	11/21/07 9:45	AG	E84380
рН	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	
Specific Conductivity	SM2510B	3320		0.1	µmhos/cm			E84380
Sulfate	ASTN DELC OD				µmmos/em	11/21/07 12:00	BB	E84380
	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:		2						

**Comments:** 

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

Test Results meet all the requirements of the NELAC standards.



	F. Bright Sanders Laborator 1050 Endeavor Co Nokomis, FL 34275	urt		Customer ID: Customer PO: Received: EMSL Order:	SAND53 N0711190 11/21/07 9:25 AM 170706906
Fax: Project:	(941) 484-6774 <b>U2MWT</b>	Phone: (941	1) 488-8103	EMSL Proj: Analysis Date: Report Date:	12/5/2007 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)

Himberly 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 the samples reported above. Samples received in good condition unless otherwise noted. ACCREDITATIONS: NVLAP 200204-0, FL Lab ID: E86795

THIS IS THE LAST PAGE OF THE REPORT.

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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	0-01					
Matrix	Groundw	ater					
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
Volatile Organic Compounds (Gro	up II Unregulated)						
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 19:43		JRW
Volatile Organic Compounds (Prin	nary DW)						
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		
1,1-Dichloroethylene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW JRW
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		
1,2-Dichloroethane	ug/l	0.0 U	EPA 502.2	0.5	12/03/07 18:46		JRW
1,2-Dichloropropane	ug/l	0.2 U 0.3 U	EPA 502.2 EPA 502.2	0.2			JRW
Benzene	ug/l	0.5 U	EPA 502.2 EPA 502.2	0.5	12/03/07 18:46		JRW
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2 EPA 502.2		12/03/07 18:46		JRW
cis-1,2-Dichloroethylene	ug/l	0.3 U 0.2 U	EPA 502.2 EPA 502.2	0.3 0.2	12/03/07 18:46		JRW
Dichloromethane	ug/l	0.2 U 0.5 U			12/03/07 18:46		JRW
Ethylbenzene	ug/l	0.5 U 0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Monochlorobenzene	ug/l	0.5 U 0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
o-Dichlorobenzene	ug/l		EPA 502.2	0.5	12/03/07 18:46		JRW
para-Dichlorobenzene	•	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
Tetrachioroethylene	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Toluene	ug/l	0.97	EPA 502.2	0.2	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	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Vinyl chloride	ug/l	0.2 U	EPA 502.2	0.2	12/03/07 18:46		JRW
Xylenes (Total)	ug/i	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
m/p-xylenes	ug/i	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
o-xylene	ug/i	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
o-xylerie	ug/l	0.5 U	EPA 502.2	0.5	12/03/07 18:46		JRW
Trihalomethane Analyses							
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
Chlorinated Pesticides (Primary D	<u>w)</u>						
Date Extracted		12/03/07	EPA 508.1			12/02/07 00:00	000
Chlordane	ug/l	0.05 U	EPA 508.1	0.05	12/05/07 07:32	12/03/07 09:30	CDD
Toxaphene	ug/l	0.5 U	EPA 508.1	0.05	12/05/07 07:32	12/03/07 09:30	DB
Polychlorinated biphenyls (PCBs)	ug/l	0.2 U	EPA 508.1	0.5		12/03/07 09:30	DB
		V.2 U	CI A 300.1	0.2	12/00/07 07:32	12/03/07 09:30	DB

FDOH Laboratory No. E84129 **NELAP** Accredited

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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

December 17, 2007 Project No: 77346

## Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received		190-01 dwater 01 07 09:45					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides (Prima	אס אר. (WA אין					······································	
Date Extracted	<u>1010</u>	11/27/07					
Dalapon	ug/l	1 U	EPA 515.3			11/27/07 09:30	SMD
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	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	0.1		11/27/07 09:30	BTJ
Dinoseb	ug/l	0.25 U	EPA 515.3	0.25	11/29/07 12:44	11/27/07 09:30	BTJ
Picloram	ug/l	0.5 U	EPA 515.3 EPA 515.3	0.5 0.75		11/27/07 09:30 11/27/07 09:30	BTJ
Semivolatile Analyses (Group I	•		2171010.0	0.10	11/28/07 12.44	11/27/07 09.30	BTJ
Date Extracted	Offieg.)	40/00/07					
Aldrin	110/	12/03/07	EPA 525.2			12/03/07 09:30	CDD
Diełdrin	ug/l ug/l	0.08 U 0.06 U	EPA 525.2 EPA 525.2	0.08 0.06	12/03/07 19:26	12/03/07 09:30	BTJ
Semivolatile Analyses (Primary	Ũ	0.00 0	LFA 323.2	0.00	12/03/07 19:26	12/03/07 09:30	BTJ
Date Extracted	DVV	12/03/07					
Alachlor	ug/l	0.2 U	EPA 525.2			12/03/07 09:30	CDD
Atrazine	ug/l	0.2 U 0.06 U	EPA 525.2	0.2	12/03/07 19:26	12/03/07 09:30	BTJ
Benzo(a)pyrene	ug/l	0.08 U 0.1 U	EPA 525.2	0.06	12/03/07 19:26	12/03/07 09:30	BTJ
Di(2-ethylhexyl)adipate	ug/i	0.1 U	EPA 525.2 EPA 525.2	0.1	12/03/07 19:26	12/03/07 09:30	BTJ
Di(2-ethylhexyl)phthalate	ug/l	1.0 U	EPA 525.2 EPA 525.2	0.3	12/03/07 19:26	12/03/07 09:30	BTJ
Endrin	ug/l	0.1 U	EPA 525.2 EPA 525.2	1.0	12/03/07 19:26	12/03/07 09:30	BTJ
Heptachlor	ug/l	0.08 U	EPA 525.2 EPA 525.2	0.1 0.08	12/03/07 19:26	12/03/07 09:30	BTJ
Heptachlor Epoxide	ug/l	0.00 U 0.1 U	EPA 525.2 EPA 525.2	0.08	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	0.05	12/03/07 19:26 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 12/03/07 09:30	BTJ
Methoxychlor	ug/i	0.05 U	EPA 525.2	0.05	12/03/07 19:26	12/03/07 09:30	BTJ 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 DV	N)						510
Date Extracted		11/26/07	EPA 549.2			44/00/07 00.00	
Diquat	ug/i	1 U	EPA 549.2 EPA 549.2	1	11/27/07 21:30	11/26/07 08:30 11/26/07 08:30	KAA JKS
Total Haloacetic Acids Analyse				•		1120101 00.30	01/3
Date Extracted	<u>-</u>	11/29/07					
Monochloroacetic Acid	ug/l	1 U	EPA 552.2	4	40/04/07 04 65	11/29/07 09:00	JLR
Monobromoacetic Acid	ug/l	1 U	EPA 552.2 EPA 552.2	1		11/29/07 09:00	BTJ
Dichloroacetic Acid	ug/i	1 U	EPA 552.2 EPA 552.2	1		11/29/07 09:00	BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2 EPA 552.2	1		11/29/07 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2 EPA 552.2	1		11/29/07 09:00	BTJ
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1 1		11/29/07 09:00 11/29/07 09:00	BTJ BTJ

FDOH Laboratory No. E84129 NELAP Accredited

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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

December 17, 2007 Project No: 77346

### Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N071	0/07 09:45					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analys
Semivolatile Analyses (Group III	Unreg.)						
Date Extracted		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/i	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		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		BTJ
Pesticide Analyses (Primary DW	n						
Date Extracted		11/29/07	EPA 504.1			11/29/07 15:45	KAA
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 L	<u>Jnreg.)</u>						
Aldicarb	ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
Aldicarb sulfone	ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
Aldicarb sulfoxide	ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS
Carbamate Pesticides (Primary	DW)						
Carbofuran	 ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	11/29/07 22:52		JKS JKS
Pesticide Analyses (Primary DW	'n						
Glyphosate	⊿ ug/l	10 U	EPA 547	10	11/27/07 01:21		JKS
Pesticide Analyses (Primary DW	- Ŋ	-					0110
Date Extracted	-	11/24/07					
Endothali	uc/		EPA 548.1		10/00/07 15 5	11/24/07 09:30	KAA
	ug/l	20 U	EPA 548.1	20	12/03/07 18:06	11/24/07 09:30	DB

FDOH Laboratory No. E84129 NELAP Accredited



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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

December 17, 2007 Project No: 77346

### Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N071119 N071119 Groundw 77346.01 11/20/07 11/21/07	0-01 vater					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Inorganics							
Cyanide, Total Fluoride Surfactants-MBAS as LAS, mol wt 342	mg/l mg/l mg/l	0.005 U 0.68 0.053 I	EPA 335.2 EPA 300.0 SM 5540 C	0.005 0.01 0.05	11/30/07 15:25 12/04/07 01:20 11/21/07 17:05	11/27/07 13:00	MCD MLH 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	
Radiochemistry Gross Alpha (Incl. Uranium) Radium-226 Radium-228	pCi/l pCi/l pCi/l	20±2.7 4.8±0.4 0.5±0.3 U1	EPA 00-02 EPA 903.1 EPA RA-05	2.9 0.07 0.5	12/07/07 21:06 12/07/07 14:00 12/14/07 17:45	12/05/07 10:00 11/30/07 11:00 12/11/07 14:15	MJS AWW AWW

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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.
1	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.

FDOH Laboratory No. E84129 NELAP Accredited

Sanders Laboratories INC.	CHAIN-OF-CUSTODY RECORD	PROJECT N 0711190 # Page 1 of 2
Client Youngguist Address Fax	Report To: Bill To: P.O. # Project Name NOV-Hh Cape (oval Project Location:	Sample Supply:
Sampled By (PRINT) Sampler Signature	PRESERVATIVES     ANALYSES       Bample     Bample     Bample       DATE     TIME     TYPE	
Bottle SAMPLE DESCRIPTION # UZMW-1	DATE       TIME       TYPE $\underline{\mathbb{U}}$ $\underline{\mathbb{V}$ $\underline{\mathbb{V}$ $\underline{\mathbb{V}}$ $\mathbb{V$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Bottle Lot # 739.9 6-171007 7-124007 7-12	RELINQUISHED BY / AFFILIATION DATE TIME	ACCEPTED BY / AFFILIATION DATE TIME

•

Sanders Laboratories INC.	CHAIN-OF-CUSTODY RECORD PROJECT # NO7/1/90 # Page 2 of 2	] \
Client <u>YOUNGQUIST</u> Address PhoneFax	Report To:	
Sampled By (PRINT) Sampler Signature Bottle SAMPLE DESCRIPTION	PRESERVATIVES     ANALYSES       Sample     Building of the second seco	
# UZMW-1	DATE       TIME       TYPE $\square$ <	
		-
Bottle Lot # # CLOG BOL COMMENTS: OKAY TO RUN AS IS	RELINQUISHED BY / AFFILIATION DATE TIME ACCEPTED BY / AFFILIATION DATE TIME	
CLIENT INITIAL: SAMPLES ON ICE Yes No		

# **Monitor Well DZMW-1**

# Lower Monitor Zone Background Water Quality (1,310 to 1,348)

Page: Page 1 of 2

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 N0711172-01	Sample Descripti LZMW-1 grab	on	4	Sample Source Ground Water	2 Alexandra	Received Date/Time 11/14/07 14:20		ple Date/Time
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>
Air Temperature-field	170.1	26.7		0.1	С	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	410.4	1880		8	mg/L	11/21/07 8:00	BY	E84380
Demand Chloride	SM4500C1-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-fiel	d 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	LSI	1.11		0.01	NONE	11/27/07 0:00	AK	E84380
Index 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	Ι	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

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Page: Page 2 of 2

Client Project: Cape Coral Lab Project: N0711172 Report Date: 12/05/07

### Laboratory Results

Lab ID	Sample Descript	ion	-	Sample Source		Received Date/Time	San	ple Date/Time
N0711172-01	LZMW-1			Ground Water		11/14/07 14:20	]	1/14/07 12:50
Analysis	grab <u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection</b> Limit	<u>Units</u>	AnalysisDate/Time	<u>Analyst</u>	<u>Cert ID</u>
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	С	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 Kynopacki/Lab Manager Nokomis

Test Results meet all the requirements of the NELAC standards.



	T. Bright Sanders Laborator 1050 Endeavor Co Nokomis, FL 34275	urt		Customer ID: Customer PO: Received: EMSL Order:	SAND53 N0711172 11/16/07 9:52 AM 170706817	
Fax: Project:	(941) 484-6774 <b>L2MW-1</b>	Phone:	(941) 488-8103	EMSL Proj: Analysis Date: Report Date:	11/19/2007 11/29/2007	

# Determination of Asbestos Structures in Water Performed by the 100.2 Method (EPA/600/R-94/134)

Sample ID	Sample Prep	# 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)

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NIA (Vallace

Kimberly Wallace, Laboratory Manager or other approved signatory

1

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 C200204-0, FL Lab ID: DOH E86795

100.2-V221

THIS IS THE LAST PAGE OF THE REPORT.

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Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

December 18, 2007 Project No: 77127

### Laboratory Report

Project Name Sample Description Matrix	N0711' N0711' Ground	172-01	• •				
SAL Sample Number	77127.	01					
Date/Time Collected	11/14/0	7 12:50					
Date/Time Received	11/15/0	10:03					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Gr	oup II Unregulated	)					
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Volatile Organic Compounds (Pri	mary DW)						
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/i	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/i	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/i	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	ÈPA 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 o-xylene	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
•	ug/l	0.5 U	EPA 502.2	0.5	11/21/07 05:36		JRW
Trihalomethane Analyses							
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/i	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
Chlorinated Pesticides (Primary I	<u>(WC</u>						
Date Extracted		11/16/07	EPA 508.1			11/16/07 09:00	ARM
Chlordane	ug/i	0.05 U	EPA 508.1	0.05	11/21/07 11:40	11/16/07 09:00	DB
Toxaphene	ug/i	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		DB

FDOH Laboratory No. E84129 NELAP Accredited

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#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

December 18, 2007 Project No: 77127

### Laboratory Report

• · · · · · · · · · · · · · · · · · · ·			упсрог	L			
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N07 Gra 771 11/*	711172 711172-01 oundwater 27.01 14/07 12:50					
	11/1	15/07 10:03					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides (Primary	<u>(DW)</u>						
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		11/16/07 09:00	BTJ
Picloram	ug/l	0.75 U	EPA 515.3	0.75		11/16/07 09:00	BTJ
Semivolatile Analyses (Group I	<u>Unreg.)</u>						
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	<u>DW)</u>						
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 C2,1	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	מ		•				
Date Extracted		11/19/07	EPA 549.2			11/19/07 10:00	KAA
Diquat	ug/l	1 U	EPA 549.2	1	11/20/07 16:15	11/19/07 10:00	JKS
Total Haloacetic Acids Analyses	<u>i</u>						
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		11/27/07 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	11/28/07 02:39		BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1		11/27/07 09:00	BTJ
Dibromoacetic Acid Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1		11/27/07 09:00	BTJ
	ug/l	66	EPA 552.2	1	11/28/07 02:39	11/27/07 09:00	BTJ

FDOH Laboratory No. E84129 NELAP Accredited

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### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

### December 18, 2007 Project No: 77127

## Laboratory Report

Project Name Sample Description Matrix	N071	1172 1172-01 Indwater					
SAL Sample Number	7712	7.01					
Date/Time Collected	11/14	1/07 12:50					
Date/Time Received	11/15	5/07 10:03					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
<u>Semivolatile Analyses (Group III</u>	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	2 U 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	מ						
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		DB
Ethylene Dibromide (EDB)	ug/l	0.005 U	EPA 504.1	0.005		11/15/07 17:30	DB
Carbamate Pesticides (Group I L	<u>Jnreg.)</u>						
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	n						
Glyphosate	ug/i	10 U	EPA 547	10	11/19/07 18:32		JKS
Pesticide Analyses (Primary DW	^						2
Date Extracted	2	11/17/07				4440107 00 00	
Endothall	ug/i	20 U	EPA 548.1 EPA 548.1	20	11/06/07 40:00	11/16/07 08:30	EMF
	ugn	20 0	EPA 346.1	20	11/26/07 18:38	11/16/07 08:30	DB

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### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

#### December 18, 2007 Project No: 77127

## Laboratory Report

Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N071117 N071117 Groundy 77127.01 11/14/07 11/15/07	2-01 vater 1 12:50	ни майла у народ се од народно де од		Beenita da y E. Unite de la companya de la companya de la companya de la companya de la companya de la companya		
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Inorganics							
Cyanide Fluoride Foaming Agents <u>Metals</u>	mg/l mg/l mg/l	0.005 U 1.2 0.21	SM 4500 CN EPA 300.0 SM 5540 C	0.005 0.01 0.05	11/17/07 14:45 11/23/07 21:33 11/15/07 16:32	11/16/07 10:00	MCD MLH MCD
Thallium <u>Radiochemistry</u>	mg/l	0.001 U	EPA 279.2	0.001	11/26/07 17:17	11/17/07 12:30	LCB
Gross Alpha (Incl. Uranium) Radium-226 Radium-228	pCi/l pCi/l pCi/l	29±3.1 9.8±0.3 0.6±0.3 U1	EPA 00-02 EPA 903.1 EPA RA-05	2.9 0.03 0.6	11/20/07 15:02 12/04/07 14:00 12/11/07 12:46	11/19/07 11:00 11/28/07 11:00 12/05/07 12:00	MJS AWW 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. Analyte confirmed by analysis of a second aliquot of sample. The reported value is between the laboratory method C2.1 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. Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and U1 matrix dependent.

FDOH Laboratory No. E84129 NELAP Accredited

Sanders	CHAIN-OF	CUST	ODY	REC	ORI	)		PROJE #		NC		72	
Environmental Testing Services											Pag	e	of <u>2</u>
Client YOUNQQUISH Address PhoneFax	Report To: Bill To: P:O. # Project Name Project Locat	Νοι	~th (	ape	Cov			Cust Fielc Kit #	tomer T I Repor	iype:_ t #: 7	3)	SW 11/22/	
Sampled By (PRINT) Sampler Signature HJ2PY CPOCK Bottle # Bottle SAMPLE DESCRIPTION	Sample DATE TIME	e TYPE				ANALYSE REQUES					*;; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	Sa Sa	nple
LZMW-1	111407-1250	G	X			XX		ĨĨ		ÍÌ		-0	~
							X						B
				$\overline{\mathbf{v}}$			<u>   </u> /	X				+ +	$\frac{C}{D}$
			X	4	+	╋╋	+	$\uparrow$	$\frac{1}{x}$				D F
				X						X			F
					X						Х		G
Rottla Lot	VV	V									XX		H
Bottle Lot # COMMENTS: As, Ba, Cd, Cr, Pb, Hg Be, Ni, Se, Na, Sb, A/ Cu, Fe, Mn, Ag, Zn, Ca Bottle Lot Bottle RELING	DISHED B				DATE	TIME	7 1 7	1		fraction Jer	DATE 11/1 ч/0-	TIME 7 /425	
Cu, Fe, Mn, AqiZn, Ca (Pes) No													

٠

Sanders Laboratories INC.	CHAIN-OF-CUSTODY RECORD	PROJECT N0711172 # Page_2 of 2
Client YOUNGGUIST Address	Report To: Bill To: PO. # Project Name Or+M Cape COra Project Location: I Z	Sample Supply:         GW           Customer Type:
Sampled By (PRINT) Sampler Signature Bottle # SAMPLE DESCRIPTION	PRESERVATIVES     ANALYSES       REQUEST     Harrison       DATE     TIME	
LZMW-1	WW2N97 6 X X 111407 1250	XXXXXX -OIH
Bottle Lot #	RELINQUISHED BY / AFFILIATION DATE T	
COMMENTS: OKAY TO RUN AS IS CLIENT INITIAL: SAMPLES ON ICE (res No	Herzey Crock 1114071	

# **Injection Test Source**

North Cape Production Well No. 17

### Lab Project Summary

Lab Project #: N06 Client: Dive

N0607116 Diversified Drilling Corp. 5620 Lee Street

Lehigh AcresFLPhone:239-368-6404Fax:239-368-6716E-mail:Cape CoralClient Project Name:Cape CoralLaboratory Contact:Tami Bright

# 17 N

Total Pages: 12

### **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.

33971

- 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.

Nokomis Lab ~ 1050 Endeavor Ct. ~ Nokomis, FL 34275-3623 ~ Phone: 941-488-8103 ~ Fax: 941-484-6774 ~ HRS Certification # E84380 Fort Myers Lab ~ 16880 Gator Road ~ Fort Myers, FL 33912 ~ Phone: 941-590-0337 ~ Fax: 941-590-0536 ~ HRS Certification # E85457

Page: 1 of 3

Client Project: Cape Coral Lab Project: N0607116 Report Date: 08/03/06



Laboratory Results

Diversified Drilling Corp. 5620 Lee Street Lehigh Acres, FL 33971

	Well NW-17N			Ground Water		7/12/06 13:30		7/12/06 8:20
ĝ	grab							
<u>Analysis</u>	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	<u>AnalysisDate/Time</u>	<u>Analyst</u>	<u>Cert ID</u>
Air Temperature-field	170.1	27.2		0.1	С	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

Page: 2 of 3

Client Project: Cape Coral Lab Project: N0607116 Report Date: 08/03/06

### Laboratory Results

N0607116-01	Sample Descript Vell NW-17N rrab	<u>ion</u>		Sample Sour Ground Water	<u>ce</u>	<u>Received Date/Time</u> 7/12/06 13:30		nple Date/Time 7/12/06 8:20
Analysis	<u>Method</u>	<u>Results</u>	<u>Qual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	<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
рН	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

#### Page: 3 of 3

Client Project: Cape Coral Lab Project: N0607116 Report Date: 08/03/06

#### Laboratory Results

Lab ID     Sample Description       N0607116-01     Well NW-17N       grab			Sample Soury Ground Water	<u>ce</u>	<u>Received Date/Time</u> 7/12/06 13:30	<u>Sample Date/Time</u> 7/12/06 8:20		
Analysis	<u>Method</u>	<u>Results</u>	<u>Oual</u>	<b>Detection Limit</b>	<u>Units</u>	AnalysisDate/Time	<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	С	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 14 n

**Comments:** 

Kathrine Bartkiewicz/Lab Supervisor Robert Spencer/Lab Manager

Test Results meet all the requirements of the NELAC standards.

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 Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N06 Was						
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
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/i	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		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	<u>n</u>						
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/i	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		07/19/06 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		07/19/06 10:00	DB
4,4'-DDT	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Dieldrin	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Endosulfan I	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Endosulfan II	ug/l	0.01 U	EPA 608	0.01		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

Francis I. Daniels, Laboratory Director Leslie C. Boardman, Q. A. Manager

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 Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N060	2/06 08:20					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Organochlorine Pesticides and	d 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		07/19/06 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/i	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 Analys	ies						
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		07/21/06 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		07/21/06 09:00	BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1		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 I	<u>(Wc</u>						
Date Extracted		07/17/06	EPA 504.1			07/17/06 10:45	SDO

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Laboratory Report



#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

		Laborate	ту кероп				
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N060	2/06 08:20					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Pesticide Analyses (Primary DW)							
Dibromochloropropane Ethylene Dibromide (EDB)	ug/l ug/l	0.005 U 0.005 U	EPA 504.1 EPA 504.1	0.005 0.005	07/17/06 21:20 07/17/06 21:20	07/17/06 10:45 07/17/06 10:45	BTJ 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
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
	ugn	20 0		20	01710/00 10.02	0111100 11.00	00
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 0.5 U	EPA 601 EPA 601	0.5 0.5	07/13/06 11:28 07/13/06 11:28		JRW JRW
Dibromochloromethane 1,2-Dichlorobenzene	ug/l	0.5 U 0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
1,3-Dichlorobenzene	ug/l 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

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Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

Laboratory	Report
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Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N0607116 N0607116 Wastewa 61392.01 07/12/06 07/12/06	6-01					
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/i	0.5 U	EPA 601	0.5	07/13/06 11:28		JRW
Purgeable Aromatics							
Benzene	ug/ł	0.5 U	EPA 602	0.5	07/13/06 11:28		JRW
Chlorobenzene	ug/i	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 (Primar	<u>y 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
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	01110/00 03.35	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)	0	0.05 U	SM 5540 C	0.05		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

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Sanders Laboratories **1050 Endeavor Court** Nokomis, FL 34275-3623

## 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.
- Measurement was made in the field. Data supplied by client. D1
- 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.

Page 5 of 6

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



1050	ght ers Laboratori Endeavor Cou mis, FL 34275	ırt			Customer ID: Customer PO: Received: EMSL Order:	SAND53 N0607116 07/13/06 10 170605371	:02 AM	
· · ·	) 484-6774 • N0607116	Phone:	(941) 488-810	)3	EMSL Proj: Analysis Date: Report Date:	7/18/2006 7/18/2006		
Deter	mination of A	Sbesto		res in Wa /600/R-94		ned by the	100.2 Me	thod
Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non- Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	-
N0607116-01 170605371-0001	7/13/06 11:00	0	<u></u>		0.18	0.00-0.68	<0.18	

Analyst(s)

Andreina Wallery (1)

Kimberly 9. 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

100.2-V221

THIS IS THE LAST PAGE OF THE REPORT.

1



#### **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

Analyte detected in Blank В

Value reported from Confirmatory Analysis С

Value reported from Dilution Analysis Estimated Value - Above Calibration Range

Estimated Value- Below Calibration Range

N/A Not Applicable

Quantitative Interference Present Q

S Analyte saturated

Interference from Diphenyl Ethers Х

summary 1

Printed: 07/28/06 16:23

2445 S. Alston Avenue, Durham NC 27713 @ 919-281-4040 @ FAX 919-281-4070 @ www.enoriverlabs.com

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Sanders	CHAIN-OF-CUSTODY RECORD	PROJECT N0607116
Caboratories INC. Environmental Testing Services		Page of
client Diversified brilling	Report To:	Sample Supply:
Address	P.O. # Project Name NW-17N	Field Report #:
Phone Fax	Project Location: <u>(afe Coron)</u>	
Sampled By (PRINT)	PRESERVATIVES ANALYSES REQUEST	
Bottle SAMPLE DESCRIPTION	Sample     Sime for the second s	
hell NW-17N	71206 3820 G 1 1 1	-0.1A
		-01B
		-0/C
		1 -01D
		1 -01E
$\square \square $		111 -01F
		-0
Bottle Lot		-016 Tot
#	RELINQUISHED BY / AFFILIATION DATE TIME	
COMMENTS: OKAY TO RUN AS IS	1006 133 1706 133	DURAGE 7/12/06/1330
For sub-out preservatives ON ICE See Kit request		

1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774 • 16880 Gator Road, Fort Muers, FL 33912 • (239) 590-0337 • FAX (239) 590-0536

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Laboratory Report



#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

		Laborate	эгу керог	ι			
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received		7116-01 ewater 2.01 //06 08:20					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses (Primary I	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		BTJ
Benzo(a)pyrene	ug/l	0.1 U	EPA 525.2	0.1	07/20/06 14:38		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		07/19/06 09:30	BTJ
Pesticide Analyses (Primary DW	n						
		07/4 4/00					
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 I	DCPa						0
		0.04.11	<b>FRA A A A</b>				
Aldrin	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
alpha-BHC	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
beta-BHC	ug/l	0.02 U	EPA 608	0.02		07/19/06 10:00	DB
delta-BHC	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Lindane Chlordane	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
4,4'-DDD	ug/l	0.05 U	EPA 608	0.05		07/19/06 10:00	DB
4,4'-DDE	ug/l	0.01 U	EPA 608	0.01	07/20/06 22:16		DB
4,4'-DDE 4,4'-DDT	ug/l ug/l	0.01 U 0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Dieldrin	-		EPA 608	0.01	07/20/06 22:16		DB
Endosulfan I	ug/l	0.01 U	EPA 608	0.01		07/19/06 10:00	DB
Endosulfan II	ug/l ug/l	0.01 U 0.01 U	EPA 608	0.01	07/20/06 22:16		DB
Endosulfan sulfate	ug/l	0.01 U 0.01 U	EPA 608 EPA 608	0.01	07/20/06 22:16		DB
	ugn	0.01 0	EFA 000	0.01	07/20/06 22:16	07/19/06 10:00	DB

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Laboratory Report



#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

		Laborate	ory Repor	L			
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received		7116-01 cewater 2.01 2/06 08:20					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Organochlorine Pesticides ar	nd 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/i	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 Analys	ses						
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		07/21/06 09:00	BTJ
Dichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23		BTJ
Trichloroacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23		BTJ
Dibromoacetic Acid	ug/l	1 U	EPA 552.2	1	07/23/06 02:23		BTJ
Total Haloacetic Acids	ug/l	1 U	EPA 552.2	1	07/23/06 02:23		BTJ
Pesticide Analyses (Primary I	DW)						
Date Extracted		07/17/06	EPA 504.1			07/17/06 10:45	SDO

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218



#### Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

		aborato	ry Report				
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N0607116 N0607116 Wastewat 61392.01 07/12/06 07/12/06	-01					
Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Pesticide Analyses (Primary DW)							
Dibromochloropropane Ethylene Dibromide (EDB)	ug/l ug/l	0.005 U 0.005 U	EPA 504.1 EPA 504.1	0.005 0.005	07/17/06 21:20 07/17/06 21:20	07/17/06 10:45 07/17/06 10:45	BTJ BTJ
Carbamate Pesticides (Primary DW) Carbofuran		0.5 U	EPA 531.1	0.5	07/10/00 10 50		
Oxamyl (Vydate)	ug/l ug/l	0.5 U	EPA 531.1 EPA 531.1	0.5 0.5	07/19/06 16:56 07/19/06 16:56		JKS JKS
Pesticide Analyses (Primary DW)							
Glyphosate	ug/l	10 U	EPA 547	10	07/20/06 14:56		JKS
Pesticide Analyses (Primary DW)							
Date Extracted Endothall	ug/l	07/17/06 20 U	EPA 548.1 EPA 548.1	20	07/19/06 19:32	07/17/06 11:30 07/17/06 11:30	SDO 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 Dichlorodifluoromethane	ug/i ug/l	0.5 U 0.5 U	EPA 601	0.5 0.5	07/13/06 11:28		JRW
1,1-Dichloroethane	ug/l	0.3 U	EPA 601 EPA 601	0.3	07/13/06 11:28		JRW
1,2-Dichloroethane	ug/l	0.2 U	EPA 601	0.3	07/13/06 11:28 07/13/06 11:28		JRW 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	úg/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

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Sanders Laboratories 1050 Endeavor Court Nokomis, FL 34275-3623

	L	aporate	ory Repor	C			
Project Name Sample Description Matrix SAL Sample Number Date/Time Collected Date/Time Received	N0607116 N0607116 Wastewa 61392.01 07/12/06 07/12/06	5-01					
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	<u>/ 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
Inorganics							
Cyanide, Total	mg/l	0.005 U	EPA 335.2	0.005	07/19/06 15:20	07/10/00 00:00	00
Fluoride	mg/l	0.005 0	EPA 335.2 EPA 300.0	0.005	07/18/06 15:36 07/22/06 01:44	07/18/06 09:39	DP
Hydrogen Sulfide (Unionized)	mg/l	0.28	EPA 376.1	0.003	07/13/06 10:00		APB
Surfactants(MBAS as LAS, mol wt 342)	mg/l	0.05 U	SM 5540 C	0.05		07/13/06 09:00	RKB SDO
Metals	J				0,,,0,000,,000	01110100 00.00	000
Strontium	mg/l	25	EPA 6010	0.01	07/24/06 09:29	07/21/06 14:30	MJW
Radiochemistry		•		0.01	5112-100 03.23	5/12/1/00 14:30	IVIJVV
Gross Alpha	pCi/l	35±3.4	EPA 00-02	2.0	09/04/06 06:45	00/02/00 14:00	05
Radium-226	pCi/l	18±0.6	EPA 00-02 EPA 903.1	2.0	08/04/06 06:45	08/03/06 14:30	DF
Radium-228	pCi/l	0.5±0.2 U1	EPA RA-05	0.08	08/04/06 14:55 08/09/06 13:25	07/27/06 08:40 08/07/06 14:45	AWW AWW
		0.020.2 01		0.5	00/00/00 10.20	00/07/00 14:45	AVVVV

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August 10, 2006

Project No: 61392

**Sanders Laboratories 1050 Endeavor Court** Nokomis, FL 34275-3623

## 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.
- Analyte was undetected. Indicated concentration is method detection limit. U
- Analyte was not detected; indicated concentration is method detection limit. Radiochemistry MDL is sample specific and U1 matrix dependent.

Approved By: Francis I. Daniels, Laboratory Director Leslie C. Boardman, Q. A. Manager



**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 'nternet at www.in-situ.com!

**Report Number:** 2008050405007198

Calibration Result:

P	A	S	S	E	D	

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

	Applied Pressure		Current mA	
Zero Response	-0.0002 kPa (-0.0000	PSI)	4.008	PASSE
Full Scale Response	206.8444 kPa (30.00	03 PSI)	19.983	PASSE
	Minimum	Maxim	um	
Temperature Stability (%FS)	-0.081	0.029		PASSE
Repeatability at 15 C (%FS)	-0.020	0.016		PASSE
Hysteresis (%FS)	0.012	*****		PASSE
Thermal Hysteresis (%FS)	0.007			PASSE

Test Performed By:

Test \

Wr'

Test Verified By:



## **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 (-0.0	001 PSI)	4.014	PASSED
Full Scale Response	206.8442 kPa (30	0.0002 PSI)	19.969	PASSED
	Minimum	Maximi	Jm and a second second	
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:

Test Verified By:

LEH



## **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:



2007-12-13
PXD-261
206.8 kPa (30 PSI) Gauge
In-Situ
6962

#### 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 CRange 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 Pressur	e	Current mA	
Zero Response	-0.0062 kPa (-0.	0009 PSI)	3.972	PASSE
Full Scale Response	206.8510 kPa (3	30.0012 PSI)	20.115	PASSE
	Minimum	Maximu	im and a second second	
Temperature Stability (%FS)	-0.129	0.075		PASSE
Repeatability at 15 C (%FS)	-0.012	0.010	******	PASSE
Hysteresis (%FS)	0.013		***	PASSE
Thermal Hysteresis (%FS)	0.022			PASSED

Test Performed By:

LEH Test Verified By:



## **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

2008-02-16
PXD-261
689.5 kPa (100 PSI) Gauge
In-Situ
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	9	Current inA	
Zero Response	-0.0483 kPa (-0.0	0070 PSI)	3.974	PASSED
Full Scale Response	689.4964 kPa (1	00.0030 PSI)	20.112	PASSED
	Minimum	Maximu	ım	
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:	Test Verified By:	Afall:

PASSED



## **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

2007-12-13
PXD-261
206.8 kPa (30 PSI) Gauge
In-Situ
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 Result:

#### **Calibration Coefficients:**

Linearity	0.2560
Scale	29.6790
Offset	0.0370

#### PASS/FAIL Criteria:

	Applied Pressure		Current mA	
Zero Response	-0.0062 kPa (-0.0	009 PSI)	3.981	PASSED
Full Scale Response	206.8482 kPa (30	.0008 PSI)	20.014	PASSED
	Minimum	Maximu	m	
Temperature Stability (%FS)	-0.053	0.007		PASSED
Repeatability at 15 C (%FS)	-0.009	0.012	e <sup>2</sup>	PASSED
Hysteresis (%FS)	0.012			PASSED
Thermal Hysteresis (%FS)	0.011			PASSED

Test Performed By:	LEH	Test Verified By:	
react chonned by:	L. L. 1	reac vermed by.	LA aun



## **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: 2007121205010169

Calibration Result:	PAS
---------------------	-----

D	Δ	C	C	5	n	
Г	A	Q	Q	L	U .	

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	1	Current mA	
Zero Response	-0.0483 kPa (-0.0	0070 PSI)	3.971	PASSED
Full Scale Response	689.4895 kPa (1	00.0020 PSI)	20.117	PASSED
	Minimum	Maximi	nm	
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

		_		$\sim$		
Test Performed By:	WR'	Test Verified By:	$ \ge $	aner	1	
				/	/	

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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	: <u>19.22</u>								
DIAL	GAL X	0/1 .							
GEARS	: <u>/</u>	· · · · · · · · · · · · · · · · · · ·	·						
ACTUAL METER INDEX									
TEST DATE:	6/2/2008	· .							
TEST FACILITY: Volumetric									
	FLOW RATE GPM	ACCURACY							
••••	8304.50	101.15 100.44							
	3617.33 989.80								
CERTIFIED BY: Paul Hobbs This calibration was performed on a primar Slandards and Technology, USA. The estim Primary +/-	aled flow mea 0.15% S	surement uncertainty Secondary +/- 0.5%	e to the National Institute of						
Se McCROMETER 3265 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									



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**Injection Test Field Data** 



## **IW-2 INJECTION TEST DATA**

DATE: June 16, 2008

#### NORTH CAPE DEEP INJECTION WELL SYSTEM

JOB NUMBER: <u>3220246.77</u>

CONTRACTOR: Youngquist Brothers, Inc.

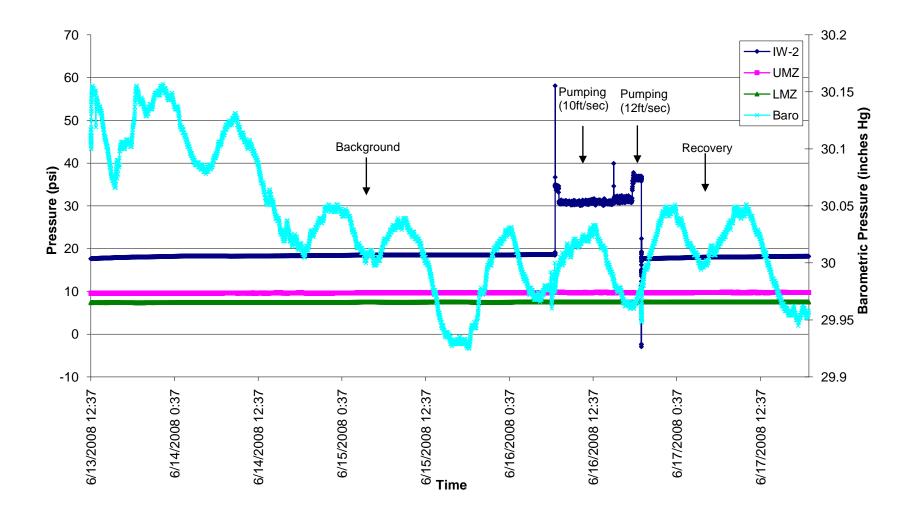
OBSERVERS: Neil Johnson, John Largey

OWNER: City of Cape Coral

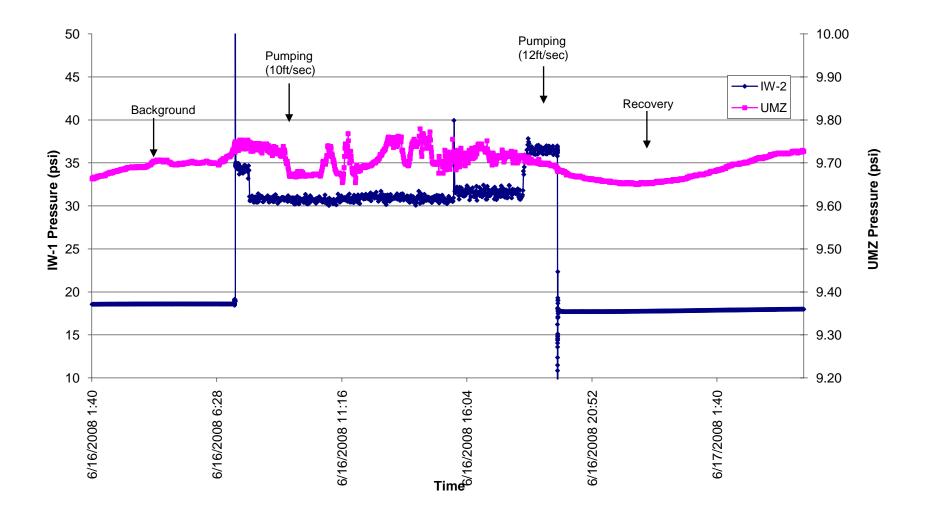
TIME	Δ Time	FLOW	METER	FLOW TEMP	COMMENTS
	(hr:min)	(gpm)	(gal. x 10,000)	(Deg F)	
7:14	0:00	5,882	1,495	78	Begin pumping
7:15	0:01	5,825	1,441	78	
7:25	0:11	5,820	1,446	78	
7:43	0:29	5,170	1,457	78	Reduce pump 1 notch
7:50	0:36	5,170	1,460	78	
8:05	0:51	5,170	1,468	78	
8:30	1:16	5,200	1,482	78	
8:50	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 1/2 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	Increse 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**

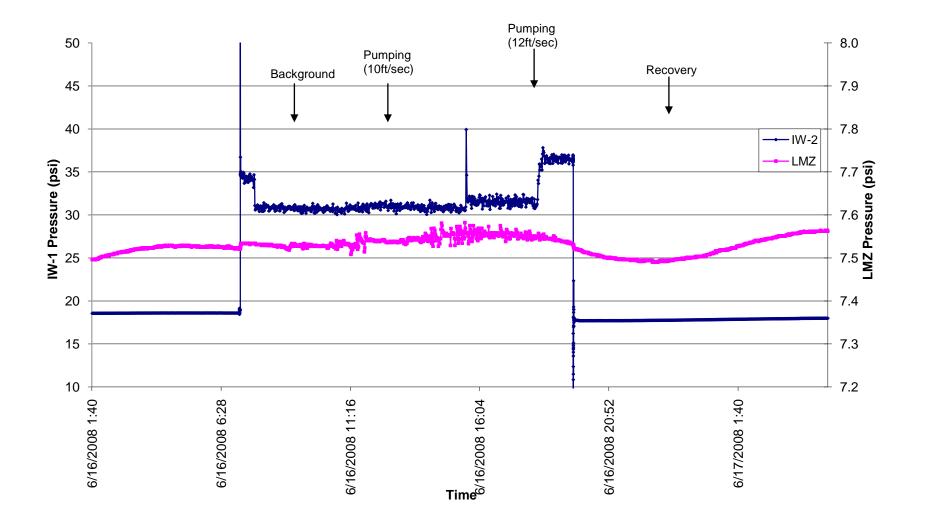
IW-2 Injection Test Box 2 IW-2, UMZ, LMZ, Barometric



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

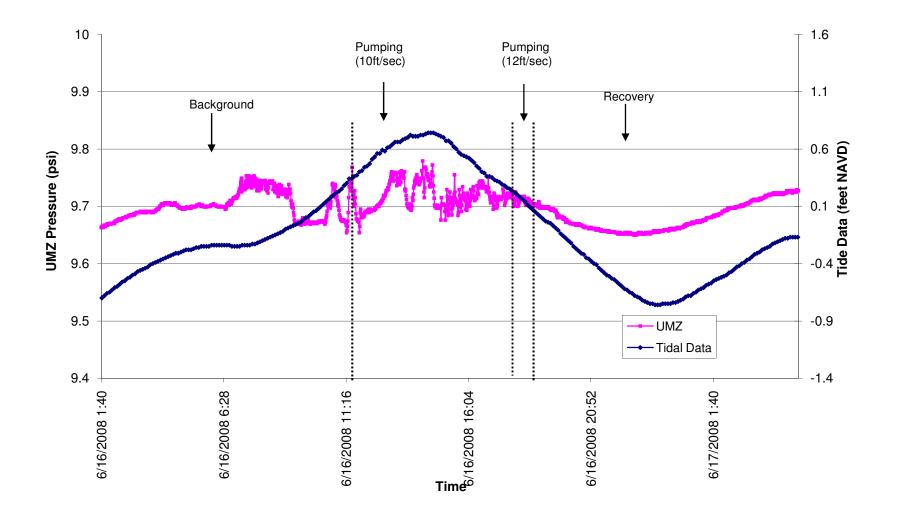
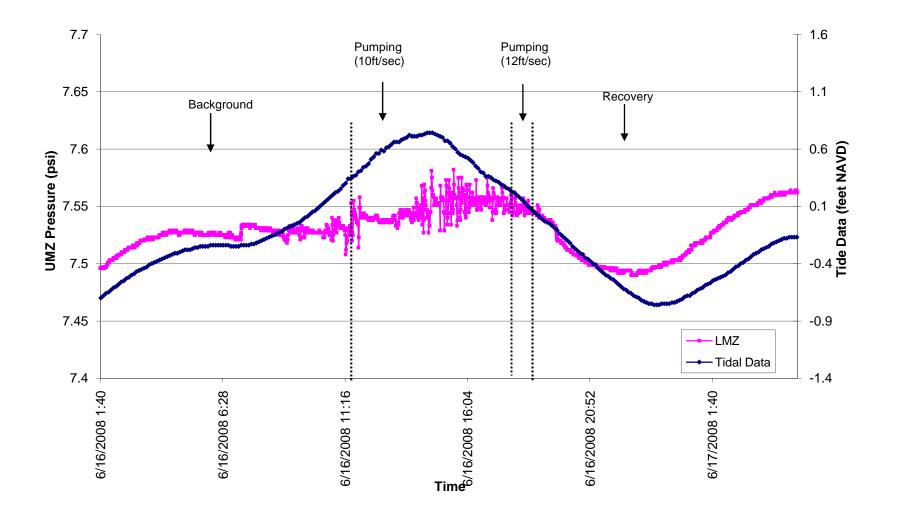
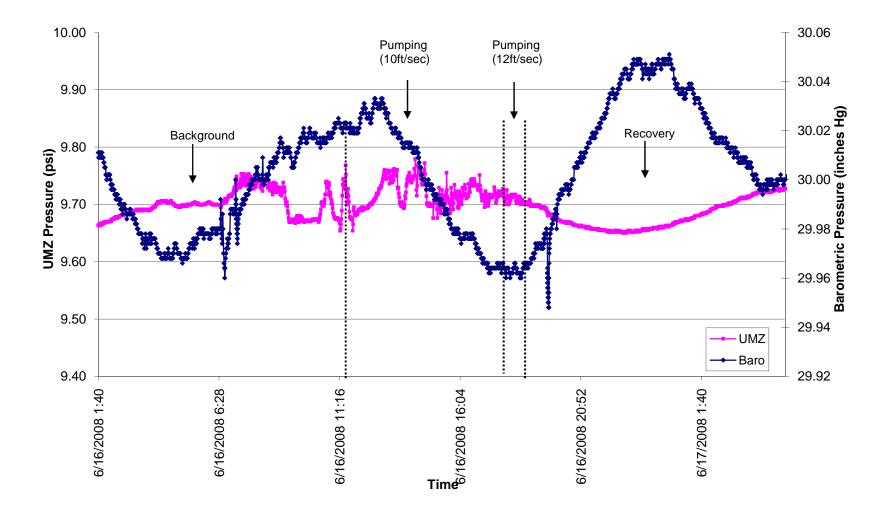


Exhibit 4

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

