HAZEN AND SAWYER
Environmental Engineers & Scientists

Collier County

Mechanical Integrity Testing Report of the Deep Injection Wells at the South County Regional Water Treatment Plant

April 2008

Collier County Government

Contract # 05-3785
Work Order # HS-FT-3785-08-01
H&S Project No. 41010-025

Mechanical Integrity Testing Report of the Deep Injection Wells at the South County Regional Water Treatment Plant

Prepared for:

Public Utilities Engineering Department
3301 E. Tamiami Trail, Bldg. H
Naples, Florida 34112

April 2008

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Hazen and Sawyer, P.C.
2101 Corporate Boulevard
Boca Raton, FL 33431
561 997-8070
Fax: 561 997-8159

April 7, 2008

Vincent Mele, P.G.
Water Facilities
Florida Department of Environmental Protection
Groundwater Section – Underground Injection Control
2295 Victoria Avenue
Suite 364-W
Fort Myers, FL 33901-3811

Collier County Government
UIC – Class I Injection Wells
Permit Nos. 173528-003 (IW-1) & 004 (IW-2) - UO
Mechanical Integrity Testing Report

Dear Mr. Mele:

Enclosed please find a copy of the Mechanical Integrity Testing (MIT) Report for the referenced injection well system.

As always, please feel free to call should you have any questions.

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 on 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.

Paul Mattausch, ~~P.E.~~ 04/07/08
Director, Water Department
Collier County Public Utilities Division

Albert Muniz, P.E.
No. 35587
4/7/08

Very truly yours,

HAZEN AND SAWYER, P.C.

Albert Muniz, P.E.
Project Manager

c: Richard Deuerling / FDEP
Ron Reese / USGS
Steve Anderson / SFWMD
Nancy Marsh / USEPA
H&S – 41010-025
Steve Messner / Collier County
Steve Lang / Collier County
Mike Wengrenovich / H&S
Jim Wheatley/H&S-WTA

O:41010-025L001

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EXECUTIVE SUMMARY

The injection well system at the South County Regional Water Treatment Plant (SCRWTP) has successfully met the requirements for mechanical integrity in accordance with Chapter 62-528 of the Florida Administrative Code (F.A.C.). Test results show that there is no evidence that the Collier County injection wells lack mechanical integrity at this time based on the results of the television survey, hydrostatic pressure test, temperature log, and radioactive tracer survey conducted on each well. The injection wells at the SCRWTP were successfully tested within the five-year window stipulated by the Florida Department of Environmental Protection (FDEP) per Chapter 62-528 of the F.A.C. Thus, these injection wells have now successfully passed the mechanical integrity requirements of FDEP. Mechanical integrity testing will be required again within five years of the casing pressure test dates of January 29, 2008 for Injection Well No. 1 (IW-1) and January 30, 2008 for Injection Well No. 2 (IW-2), respectively.

The following recommendations are provided to assist the Collier County with their injection wells system:

- The County should continue to operate the injection well system in accordance with the permit conditions specified in FDEP Permit No. 173528-003-UO and 173528-004-UO
- The County should commence renewal of the current operating permit prior to January 2011. The current operating permit expires on July 16, 2011
- The County should commence the permitting process for the next Mechanical Integrity Testing by April 2012
    - ✓ Mechanical integrity of Injection Well No. 1 (IW-1 which is reported as IW-2) must be completed prior to January 29, 2013
    - ✓ Mechanical integrity of Injection Well No. 2 (IW-2 which is reported as IW-1) must be completed prior to January 30, 2013

INTRODUCTION

The South County Regional Water Treatment Plant (SCRWTP) consists of a 12 million gallons per day (mgd) lime softening WTP and a 20-mgd reverse osmosis (RO) WTP. The facility is located in Collier County, Florida at the northeast corner of Alligator Alley (I-75) and State Road 951 as shown on Figure 1. This facility is one of two major water production facilities used by Collier County to provide potable water to customers.

Concentrate produced from the RO WTP is disposed of via two injection wells located on site as shown on Figure 2. Collier County constructed two 20-inch diameter injection wells for disposal of concentrate and one dual-zone monitor well. The injection wells were originally constructed and labeled IW-1 and IW-2 as shown in Figure 2. Reporting by Collier County was inadvertently reversed and data for IW-1 is reported as IW-2, while data labeled IW-2 is reported as IW-1. References will be included throughout this report for clarifications purposes.

The Florida Department of Environmental Protection (FDEP) issued operating permits (UIC Permit No. 173528-003-OU and 173528-004-UO) for the injection wells on July 17, 2006. This permit expires on July 16, 2011. A copy of the operating permit is included in Appendix A.

Construction details of the injection wells (IW-1 and IW-2) consist of a 24-inch diameter steel casing with a wall thickness of 0.500 inches and 20-inch steel liner (0.500 inch wall thickness) with a fluid filled annulus. The final 24-inch diameter casing depth for IW-1 (originally reported as IW-2) is 2,278 feet below land surface. The 20-inch diameter tubing at this well is set at 2,146 feet below land surface. Injection well no. 2 (originally reported as IW-1) has a final 24-inch diameter casing set to a depth of 2,550 feet below land surface with a 20-inch diameter tubing set at 2,549 feet below land surface. Both injection wells are completed to a depth of approximately 2,800 feet below land surface. A profile of the injection wells IW-1 (reported as IW-2) and IW-2 (reported as IW-1) are presented in Figures 3 and 4, respectively. The injection wells are completed with a nominal 24-inch diameter borehole to 2,800 feet below pad level.

One dual-zone monitor well (MW-1) was also constructed as part of the concentrate disposal system. The monitor well is located between the two injection wells and within 150 feet of each injection well. The upper monitor zone monitors a horizon between 1,125 to 1,194 feet, while the lower zone monitors a horizon between 1,500 to 1,600 feet. A profile of MW-1 is shown in Figure 5.

In fulfillment of 62-528, of the Florida Administrative Code (F.A.C.), each injection well at the SCRWTP must be tested for mechanical integrity once every five years (see copy of operating permit included in Appendix A). The injection wells were successfully tested for mechanical integrity during construction in 2003. For this mechanical integrity test, a state licensed well drilling company; Youngquist Brothers, Inc. was retained to perform the required geophysical logging and testing. Mechanical integrity testing was successfully completed by the end of January 2008.

This report describes the testing methods that were performed, the results of the testing, and provides interpretation of the data collected during the 5-year mechanical integrity tests. As specified in 62-528 of the F.A.C., the mechanical integrity test consisted of a television survey, a hydrostatic pressure test of the injection casing, a temperature log, and a radioactive tracer survey on each well. Hazen and Sawyer, on behalf of Collier County, submitted a plan for mechanical integrity to FDEP on November 5, 2007 and received approval of the plan on December 31, 2007.

TESTING OF INJECTION WELLS

Testing of the injection wells was conducted as described in the MIT plan, and results are presented in the following sequence:

- Television survey
- Hydrostatic pressure test
- Temperature logging
- Radioactive tracer survey

A summary of key dates is presented in Table 1. Appendix B contains a copy of the hydrostatic pressure test results. Calibration certificates are included in Appendix C, while geophysical logs can be found in Appendix D.

Television Survey

Television survey of both injection wells were conducted on January 28, 2008. Both surveys were success and did not show indication of tubing deterioration. A brief summary of the testing results is presented below:

<u>Television Survey IW-1 (originally reported as IW-2)</u>

Youngquist Brothers, Inc., Geophysical Logging Division performed a television survey of IW-1 (originally reported as IW-2) on January 28, 2008. The television survey was performed from land surface to a depth of 2,798 feet below land surface. Water clarity was generally good, enabling the camera to capture clear images of the casing interior, casing seat, and open-hole section. No deterioration of the 20-inch diameter tubing was observed during review of the television survey. The television survey did not reveal any anomalies or indications of any leaks or holes at IW-1 (originally reported as IW-2). The observation of good casing integrity from the television survey was confirmed by the casing passing the pressure test described in this report. Copies of the television survey are included in Appendix D.

<u>Television Survey IW-2 (originally reported as IW-1)</u>

Youngquist Brothers, Inc., Geophysical Logging Division also performed the television survey of IW-2 (originally reported as IW-1) on January 28, 2007. The television survey was performed from land surface to a depth of 2,363 feet below land surface. As with the first well, water clarity was generally good, enabling the camera to capture clear images of the casing interior, casing seat, and open-hole section. The television survey did not reveal any deterioration of the casing. As witnessed during testing of the first injection well, the television survey for IW-2 (originally reported as IW-1) did not reveal any anomalies or indications of any leaks or holes. The observation of good casing integrity from the television survey was confirmed by the casing passing the pressure test described in this report.

Hydrostatic Pressure Testing

Hydrostatic pressure testing was successfully performed on both injection wells. This test consisted of pressurizing the annulus between the final casing and tubing to approximately 150 psi and recording pressure losses. A summary of the testing results for each well is presented below:

<u>Hydrostatic Pressure Testing IW-1 (originally reported as IW-2)</u>

On January 29, 2008 a tubing pressure test was conducted on IW-1 (originally reported as IW-2) to evaluate the internal integrity of the injection well tubing. This test was conducted by pressuring the annulus between the 24-inch diameter casing and the 20-inch diameter tubing to 153 psi. A calibrated pressure gauge was used to measure the pressure. The maximum pressure decline permitted by FDEP is 5 percent to the starting pressure during a 60-minute test period. Hence, a pressure decrease of less than 7.65 psi at a pressure of 153 was required to successfully pass the hydrostatic pressure test. Measurements were recorded in 10 minute increments and no pressure decline was observed during the 60-minute test period. Mr. David Rhodes, P.G., from FDEP, and Mr. James Wheatley, P.G. witnessed the test. A copy of the calibration certificate for the pressure gauge and results of the hydrostatic pressure test for IW-1 (originally reported as IW-2) are included in Appendix B.

<u>Hydrostatic Pressure Testing IW-2 (originally reported as IW-1)</u>

The pressure test for IW-2 (originally reported as IW-1) was conducted on January 30, 2008, to evaluate the internal integrity of the injection well casing. As with the previous test, the test was conducted by pressuring up the annulus between the 24-inch casing and the 20-inch liner to 154 psi. A calibrated pressure gauge was used to measure the pressure. The maximum pressure decline permitted by FDEP for this test was 7.70 psi at a pressure of 154. Measurements were recorded in 10 minute increments and no pressure decline was observed during the 60-minute test period. Mr. David Rhodes, P.G., from FDEP, and Mr. James Wheatley, P.G. witnessed the test. A copy of the calibration certificate for the pressure gauge and results of the hydrostatic pressure test for IW-2 (originally reported as IW-1) are included in Appendix B.

Temperature Logging

Temperature logging was successfully performed at each injection well. This test consisted of running a temperature probe down each well and recording temperatures. A summary of the results are presented below:

<u>Temperature Logging IW-1 (originally reported as IW-2)</u>

On January 29, 2008, Youngquist Brothers, Inc., Geophysical Logging Division conducted a temperature log on IW-1 (originally reported as IW-2) from land surface to a depth of approximately 2,320 feet below land surface. The temperature was a constant between 85 and 88 degrees from surface to 1,350 feet below land surface. The temperature was a constant between 88 and 89 degrees from 1,350 feet below land surface to the bottom of the open hole (approximately 2,320 feet). James Wheatley, P.G., witnessed the temperature logging. A copy of the temperature log for IW-1 (originally reported as IW-2) is included in Appendix D.

Temperature Logging IW-2 (originally reported as IW-1)

On January 30, 2008, Youngquist Brothers, Inc., Geophysical Logging Division conducted a temperature log on IW-2 (originally reported as IW-1) from the land surface to a depth of approximately 2,800 feet below land surface. The temperature was a constant between 82 and 86 degrees from land surface to 1,600 feet below land surface. The temperature was a constant between 86 and 93 degrees from 1,600 feet below land surface and the bottom of the open hole at approximately 2,800 feet. James Wheatley, P.G., witnessed the temperature logging. A copy of the temperature log for IW-2 (originally reported as IW-1) is included in Appendix D.

Radioactive Tracer Survey

The final test performed to complete mechanical integrity was conducting radioactive tracer survey for each injection well. The first step consists of a background gamma ray log and casing collar locator. A series of radioactive slugs are then injected and traced to evaluate possible upward migration. Both wells passed the radioactive tracer test. A description of the testing conducted along with results is presented below::

Radioactive Tracer Survey IW-1 (originally reported as IW-2)

A radioactive tracer survey was conducted on IW-1 (originally reported as IW-2) on January 29, 2008. The test began with Youngquist Brothers, Inc., Geophysical Logging Division conducting a background gamma ray log (GRL) and a casing collar locator (CCL). The background GRL, which was "memorized", was reprinted on each "out of position" logging run to serve as a means of comparison. A schematic diagram of the logging tool is represented at the top of the radioactive tracer survey log and in Figure 6. Each logging run is identified at the top of the log run. After the completion of the background GRL the logging tool ejector was calibrated to 0.43 millicuries (MCI) per second discharge, and the reservoir was loaded with 10 MCI of radioactive Iodine-131. The radioactive tracer survey was witnessed by David Rhodes, P.G., from FDEP, and by James Wheatley, P.G. A copy of the radioactive tracer survey data is included in Appendix D.

> Test # 1 – The first test conducted (TEST #1) injected at a rate of 74 gpm using potable water. The test was conducted by positioning the tracer ejector five feet above the bottom of the casing, setting the recorder in the time drive mode, and ejecting a 1 MCI slug of tracer material. The readings from the middle gamma ray detector began to increase from background within seconds of ejection. The readings from the bottom detector increased from background approximately two minutes after ejection. No increase in gamma detection by the top gamma ray detector was seen during the 60-minute monitoring period. The tools were then logged out of position (LOP #1) to a depth of 2,000 feet below pad level. The results of the log out of position showed no indication of tracer material movement up hole. The injection casing was then flushed with an excess of 15,000 gallons of water. Following the flushing an out of position log was conducted (LAF #1) from below the casing to 2,050 feet below pad level. This log shows that no tracer material had moved up behind the casing. These results are interpreted as providing evidence that the casing integrity is sound and there are no channels behind the casing.

Test # 2 – A second test (TEST #2) was then conducted at an injection rate of 74 gpm. This test also used potable water as the injection fluid. The tracer ejector was positioned 5 feet above the bottom of the casing and the recorder was placed in the time drive mode. A 1 MCI slug of tracer material was then ejected. The readings from the middle gamma ray detector began to increase from background within seconds of ejection. The readings from the bottom detector increased from background approximately 2 minutes after ejection. No increase in gamma detection by the top gamma ray detector was seen during the 30-minute monitoring period. The tools were then logged out of position (LOP #2) to a depth of 2,050 feet below pad level. The results of the log out of position showed no indication of tracer material movement up hole. The injection casing was then flushed with approximately 15,000 gallons of water (i.e., plant effluent). Following the flushing, a final background and log after flush log was conducted (FINAL GAMMA RAY) on the well to a depth of 2,320 feet below pad level. This log shows that all tracer material had been flushed out of the casing because the gamma ray levels on all three detectors returned to background levels. These results are interpreted as providing evidence that the casing integrity is sound. The background logs were recorded over traces of the initial background log and showed excellent repeatability on all detectors. Copies of the flow meter calibration certificate and tracer assay are included in Appendix C. This log indicates that no tracer material had moved up behind the casing. These results are interpreted as providing evidence that the casing integrity is sound and there are no channels behind the casing

Radioactive Tracer Survey IW-2 (originally reported as IW-1)

A radioactive tracer survey was conducted on IW-2 (originally reported as IW-1) on January 30, 2008. The test began with Youngquist Brothers, Inc., Geophysical Logging Division conducting a background gamma ray log (GRL) and a casing collar locator (CCL). The background GRL, which was "memorized", was reprinted on each "out of position" logging run to serve as a means of comparison. Each logging run is identified at the top of the log run. After the completion of the background GRL the logging tool ejector was calibrated to 0.43 MCI per second discharge, and the reservoir was loaded with 10 MCI of radioactive Iodine-131. The radioactive tracer survey was witnessed by David Rhodes, P.G., from FDEP, and by James Wheatley, P.G. A copy of the radioactive tracer survey data is included in Appendix D.

Test # 1 – The first test conducted (TEST #1) injected at a rate of 72 gpm using potable water. The test was conducted by positioning the tracer ejector five feet above the bottom of the casing, setting the recorder in the time drive mode, and ejecting a 1 MCI slug of tracer material. The readings from the middle gamma ray detector began to increase from background within seconds of ejection. The readings from the bottom detector increased from background approximately two minutes after ejection. No increase in gamma detection by the top gamma ray detector was seen during the 60-minute monitoring period. The tools were then logged out of position (LOP #1) to a depth of 2,350 feet below pad level. The results of the log out of position showed no indication of tracer material movement up hole. The injection casing was then flushed with an excess of 15,000 gallons of water. Following the flushing an out of position log was conducted (LAF #1) from below the casing to 2,350 feet below pad level. This log shows that no tracer material had moved up behind the casing. These results are interpreted as providing evidence that the casing integrity is sound and there are no channels behind the casing.

Test # 2 – A second test (TEST #2) was then conducted at an injection rate of 73 gpm. This test also used potable water as the injection fluid. The tracer ejector was positioned 5 feet above the bottom of the casing and the recorder was placed in the time drive mode. A 1 MCI slug of tracer material was then ejected. The readings from the middle gamma ray detector began to increase from background within seconds of ejection. The readings from the bottom detector increased from background approximately 2 minutes after ejection. No increase in gamma detection by the top gamma ray detector was seen during the 30-minute monitoring period. The tools were then logged out of position (LOP #2) to a depth of 2,050 feet below pad level. The results of the log out of position showed no indication of tracer material movement up hole. The injection casing was then flushed with approximately 15,000 gallons of water (i.e., plant effluent). Following the flushing, a final background and log after flush log was conducted (FINAL GAMMA RAY) on the well to a depth of 2,350 feet below pad level. This log shows that all tracer material had been flushed out of the casing because the gamma ray levels on all three detectors returned to background levels. These results are interpreted as providing evidence that the casing integrity is sound. The background logs were recorded over traces of the initial background log and showed excellent repeatability on all detectors. Copies of the flow meter calibration certificate and tracer assay are included in Appendix C. This log indicates that no tracer material had moved up behind the casing. These results are interpreted as providing evidence that the casing integrity is sound and there are no channels behind the casing.

CONCLUSIONS and RECOMMENDATIONS

Conclusions

The following summarizes the conclusions observed during the January 2008 mechanical integrity testing of injection wells at the South County Regional Water Treatment Plant:

Injection Well No. 1 (IW-1; originally reported as IW-2)

- A television survey was successfully run on January 28, 2008 and indicated no abnormalities
- A casing pressure test was successfully performed on January 29, 2008. The casing pressure test was conducted prior to the 5-year window allowed by FDEP.
- A temperature log was successfully run on January 29, 2008 and indicated no abnormalities
- A radioactive tracer survey was successfully conducted on January 29, 2008. Results of the radioactive tracer survey indicated no upward migration of injected fluids

Injection Well No. 2 (IW-2; originally reported as IW-1)

- A television survey was successfully run on January 28, 2008 and indicated no abnormalities

- A casing pressure test was successfully performed on January 30, 2008. The casing pressure test was conducted prior to the 5-year window allowed by FDEP.
- A temperature log was successfully run on January 30, 2008 and indicated no abnormalities
- A radioactive tracer survey was successfully conducted on January 30, 2008. Results of the radioactive tracer survey indicated no upward migration of injected fluids

Recommendations

The following recommendations are provided to assist the Collier County with their injection wells system:

- The County should continue to operate the injection well system in accordance with the permit conditions specified in FDEP Permit No. 173528-003-UO and 173528-004-UO
- The County should commence renewal of the current operating permit prior to January 2011. The current operating permit expires on July 16, 2011
- The County should commence the permitting process for the next Mechanical Integrity Testing by April 2012
  - ✓ Mechanical integrity of Injection Well No. 1 (IW-1 which is reported as IW-2) must be completed prior to January 29, 2013
  - ✓ Mechanical integrity of Injection Well No. 2 (IW-2 which is reported as IW-1) must be completed prior to January 30, 2013

TABLES

TABLE 1 - Summary of Test Dates

DESCRIPTION	DATE
Injection Well No. 1 (IW-1 but is reported as IW-2)	
Television Survey	January 28, 2008
Pressure Test	January 29, 2008
Temperature Log	January 29, 2008
Radioactive Tracer Survey	January 29, 2008
NEXT MIT DUE BEFORE	**January 29, 2013**
Injection Well No. 2 (IW-2 but is reported as IW-1)	
Television Survey	January 28, 2008
Pressure Test	January 30, 2008
Temperature Log	January 30, 2008
Radioactive Tracer Survey	January 30, 2008
NEXT MIT DUE BEFORE	**January 30, 2013**
Operating Permit	
Issued	July 17, 2006
Expires	July 16, 2011
Commence Renewal	**October 1, 2010**

TABLE 2 - Purge Volumes

DESCRIPTION	VOLUME
Injection Well No. 1 (IW-1)	
24-inch casing	
One (1) well volume	62,200 gallons
Injection Well No. 2 (IW-2)	
24-inch casing	
One (1) well volume	62,200 gallons
Monitor Well No. 1 (MW-1)	
Upper Zone	
One (1) well volume	10,000 gallons
Monitor Well No. 1 (MW-1)	
Lower Zone	
One (1) well volume	2,200 gallons

FIGURES

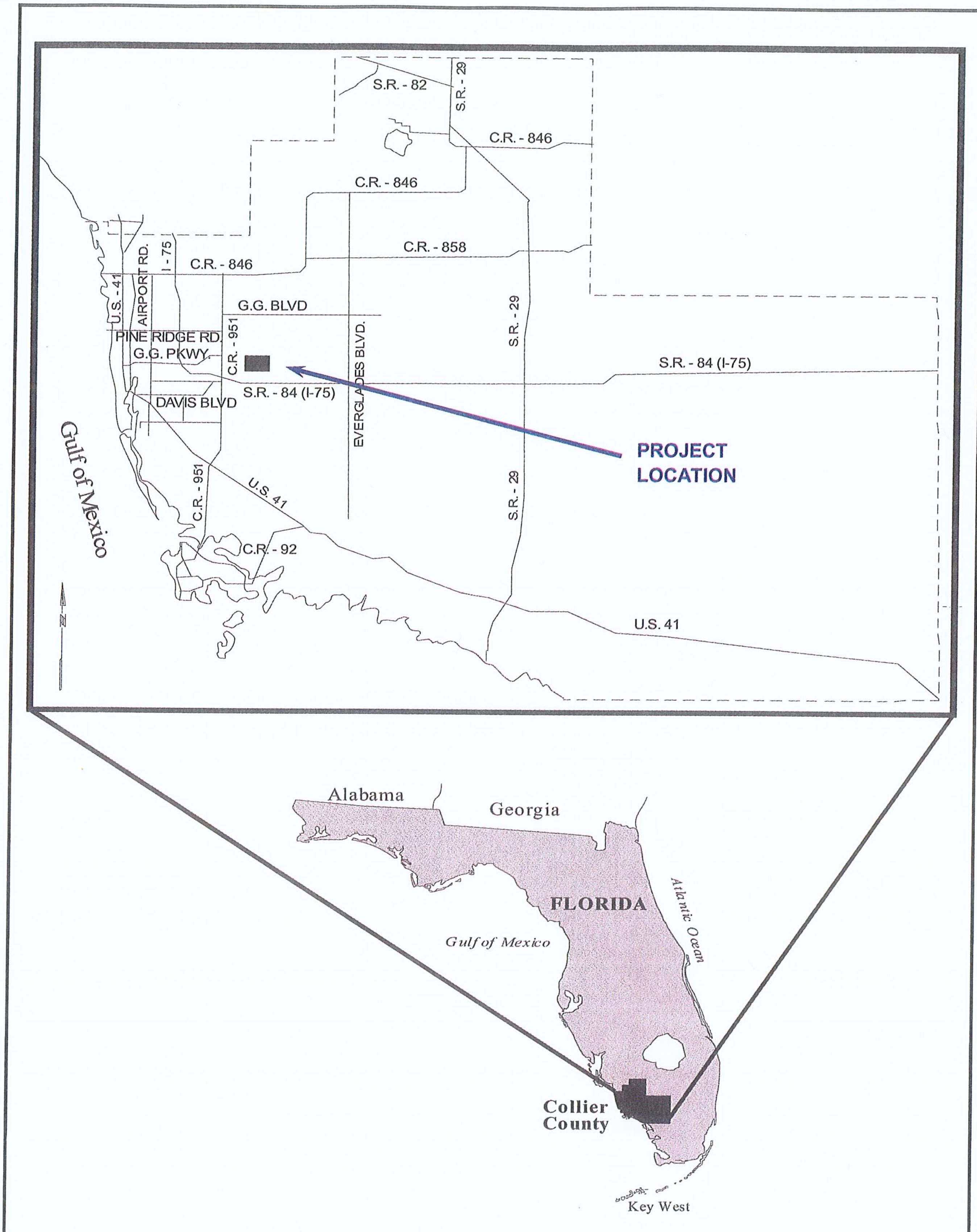

Figure 1
Project Location Map

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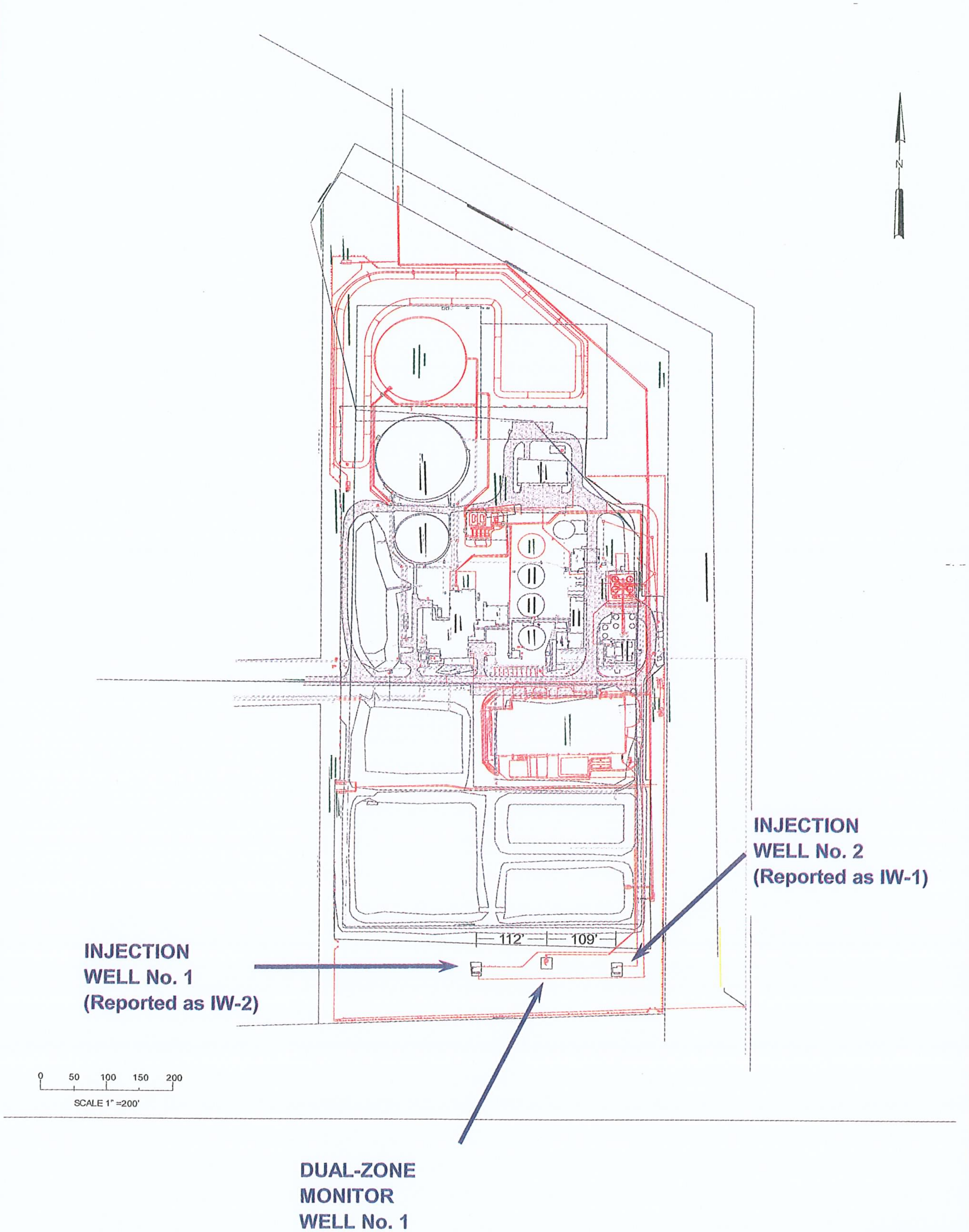

Figure 2
Site Plan

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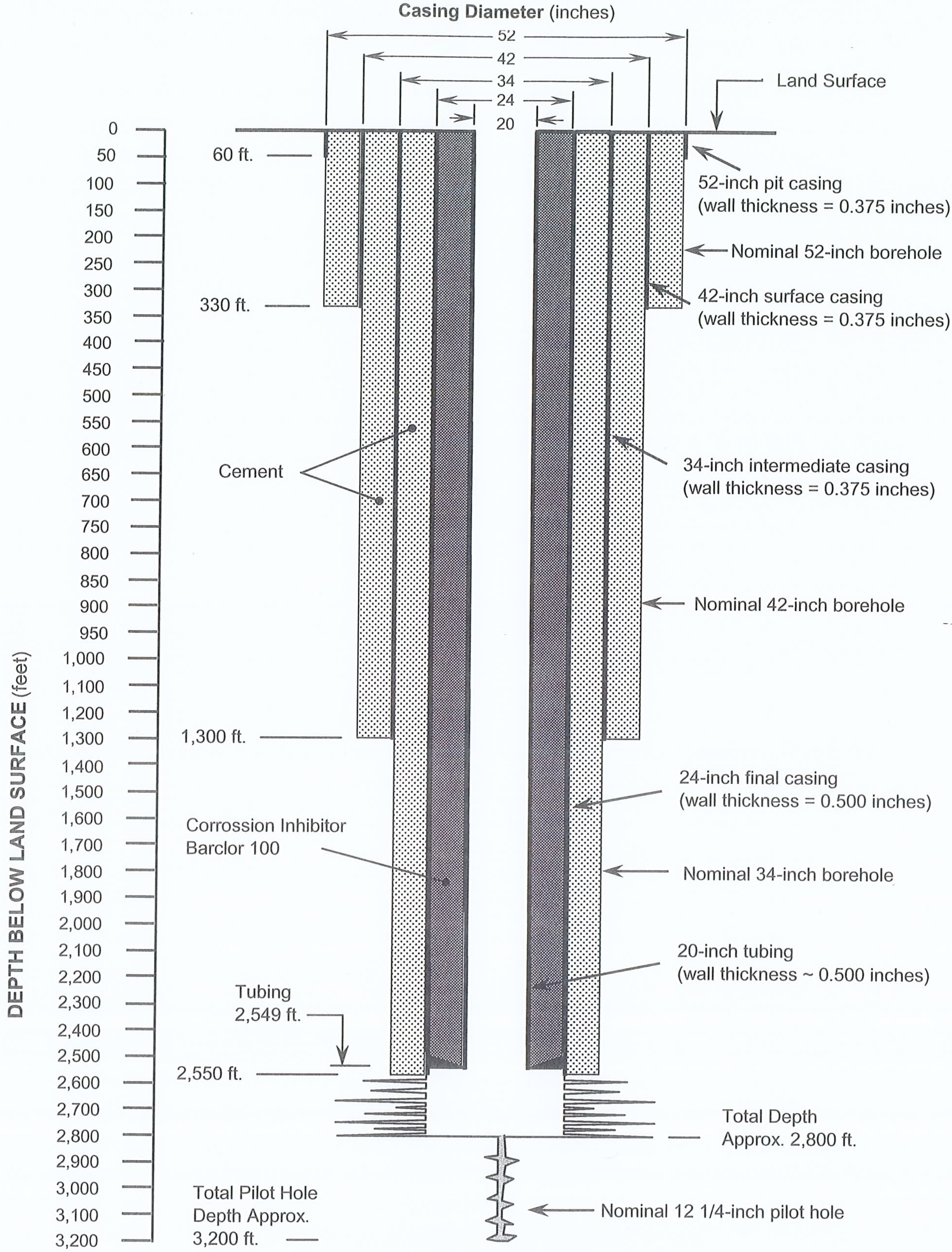

Collier County - South County Regional WTP
INJECTION WELL No. 1 (IW-1)

Figure 3
Injection Well No. 1 As-Built Well Profile

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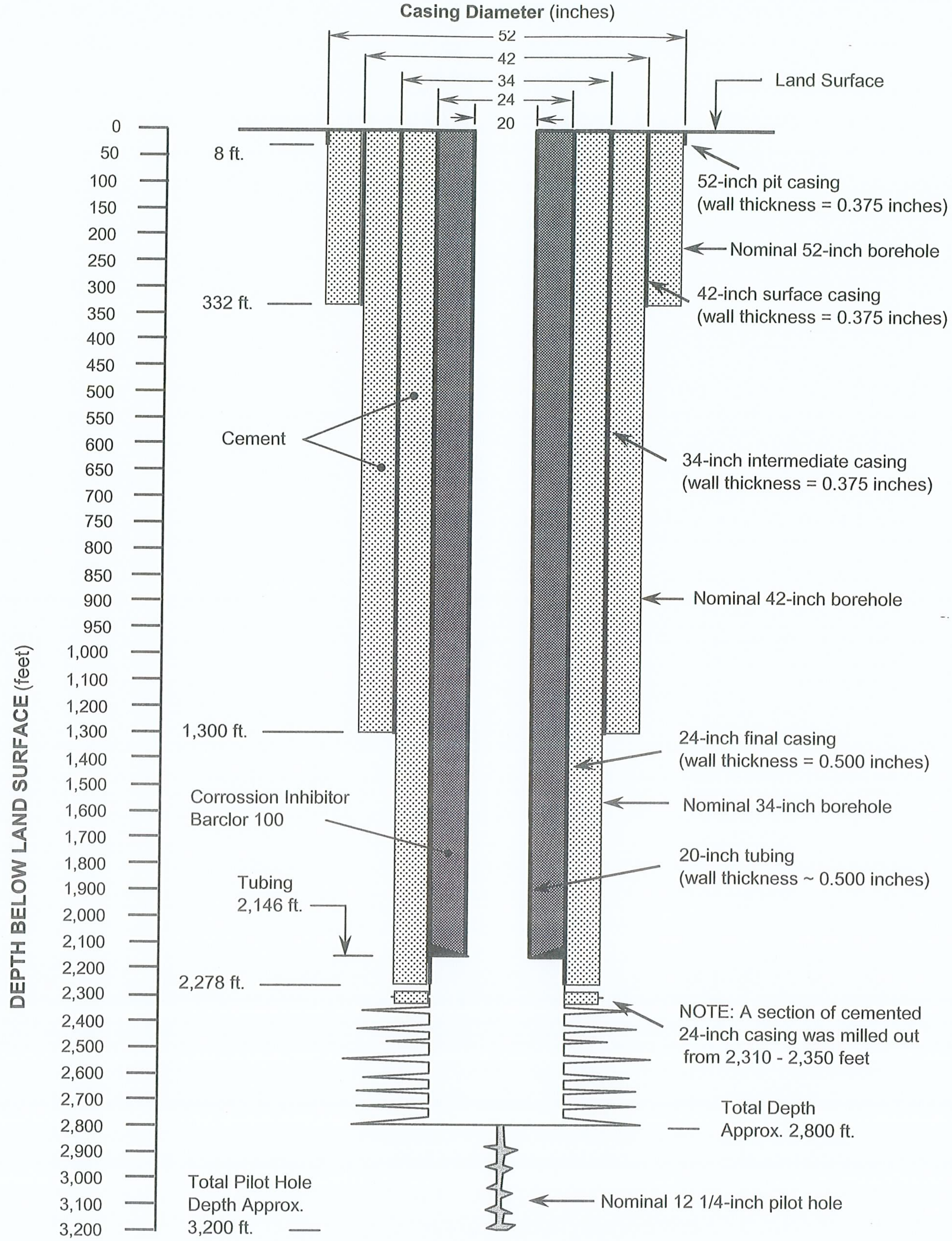

Collier County - South County Regional WTP
INJECTION WELL No. 2 (IW-2)

Figure 4
Injection Well No. 2 As-Built Well Profile

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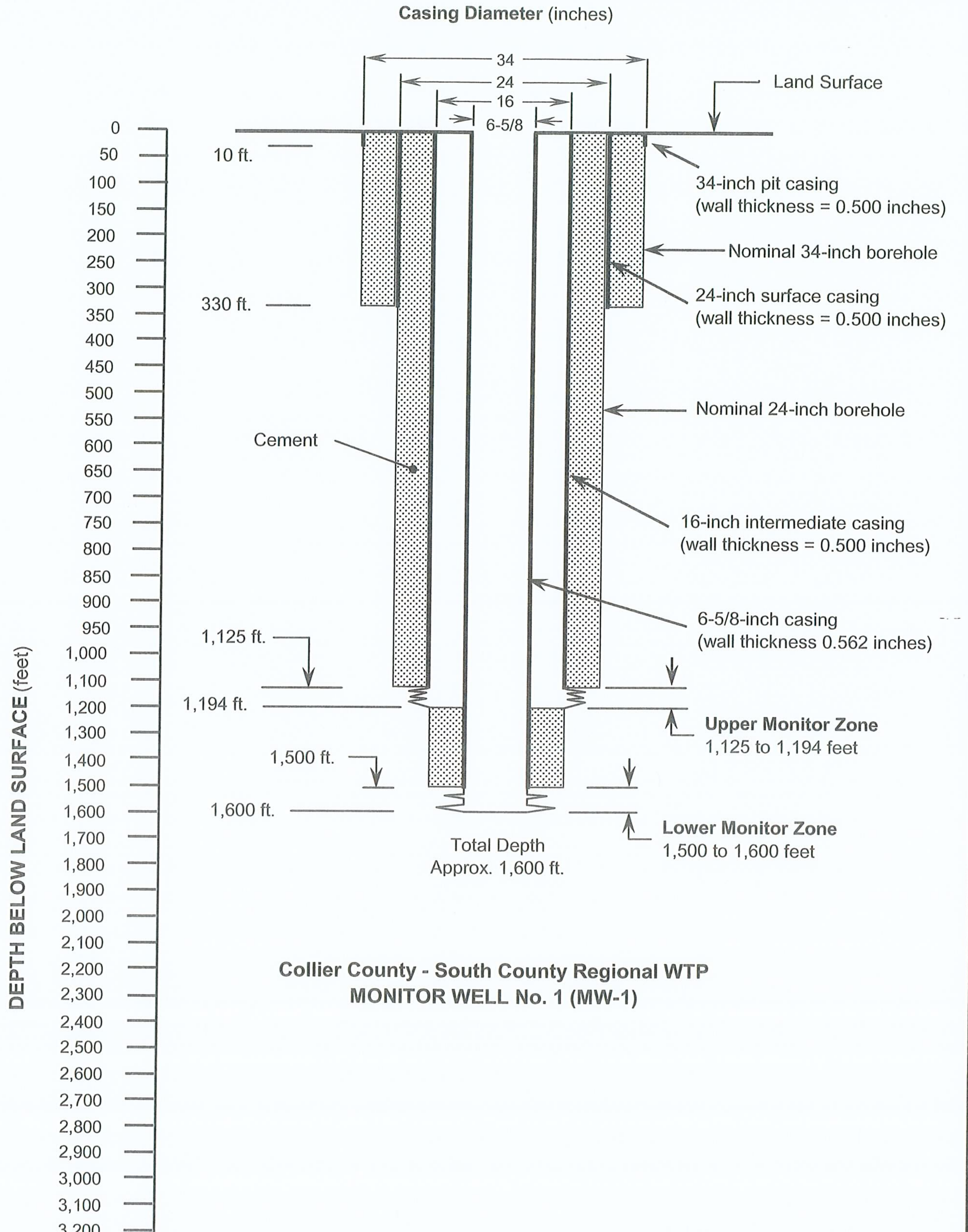

Figure 5
Monitor Well No. 1 As-Built Well Profile

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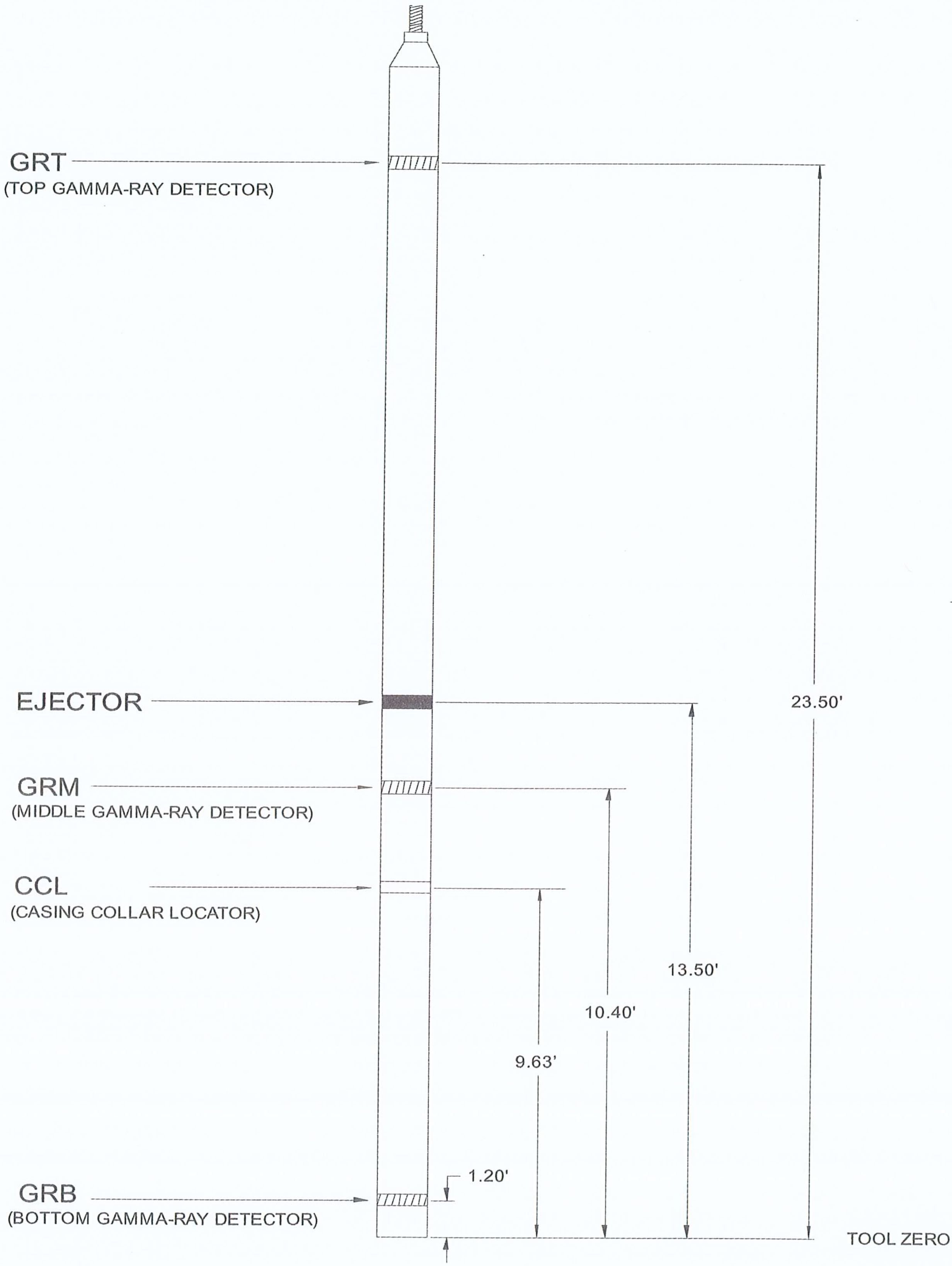

Figure 6

Radioactive Tracer Tool

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Collier County

Appendix A - PERMIT

Permit Nos.: 173528-003 & 004 -UO

Department of Environmental Protection

Jeb Bush
Governor

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549

Colleen M. Castille
Secretary

BY ELECTRONIC MAIL:

July 17, 2006

In the Matter of an
Application for Permit by:

Paul Mattausch, Water Director
Collier County
3301 Tamiami Trail East, Bldg. D
Naples, Florida 34112-0000
paulmattausch@colliergov.net

Collier County – UIC/IW
FDEP File Nos: 173528-003-UO and 173528-004-UO
South Collier County WTP Reverse Osmosis IW-1 & IW-2 Class I Injection Wells

NOTICE OF PERMIT ISSUANCE

Enclosed is Permit Number 173528-003-UO and 173528-004-UO to operate 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 Lee County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Gordon Romeis for

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 July 17, 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.

Regina C. Dick
Clerk

7/17/2006
Date

JMI/JBM/rcd

Enclosure

Copies furnished to:

Albert Muniz amuniz@hazenandsawyer.com
Charles Davault charles.davault@dep.state.fl.us
Nancy Marsh marsh.nancy@epa.gov
Steve Anderson sanderso@sfwmd.gov
Ron Reese rsreese@usgs.gov
Joe Haberfeld joe.haberfeld@dep.state.fl.us

Department of Environmental Protection

Jeb Bush
Governor

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549

Colleen M. Castille
Secretary

PERMIT

PERMITTEE:

Collier County
3301 Tamiami Trail East, Building D
Naples, FL 34112-0000
paulmattausch@colliergov.net

Permit/Certification
Number: 173528-003 & 004-UO
Date of Issue: **July 17, 2006**
Expiration Date: **July 16, 2011**
County: Collier
Latitude: 26° 09' 52" N
Longitude: 81° 40' 58" W
Section/Town/Range: 35/T49S/R26E
Project: South County Regional WTP
IW-1 & IW-2 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, and 62-660. 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:

Operate two nominal 20-inch diameter Class I injection wells (IW-1 and IW-2), with cemented 24-inch steel casing to 2,550 and 2,278 feet below land surface (bls) respectively, and a total depth of 3,200 feet bls. Injection is into the Oldsmar Formation for the primary means of disposal of non-hazardous, reverse osmosis concentrate from the South County Regional Water Treatment Plant (SCRWTP), for a maximum disposal into each injection well of 12.78 million gallons per day (MGD). The maximum injection rate shall not exceed 8875 gpm and the maximum injection pressure shall not exceed 103 (IW-1) pounds per square inch (psi) and 101 psi (IW-2). The existing dual zone monitoring well (DZMW-1) is completed from 1125 to 1194 feet bls and 1500 to 1600 feet bls.

The Application to Construct/Operate/Abandon Class I, III, or V Injection well System, DEP Form 62-528.900(1), was received on September 16, 2005, with supporting documents and additional information last received on December 14, 2005. The demonstration of Financial Responsibility was complete as of October 31, 2005. The Project is located at 3851 Utilities Drive, Naples, Collier County, Florida.

Subject to Specific Conditions 1-8.

SPECIFIC CONDITIONS:

1. **GENERAL CRITERIA**

a. Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

b. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

c. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

d. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.

e. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

f. When requested by the Department, the permittee shall furnish, within the time specified, any information needed to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.

g. Signatories and Certification Requirements

(1) All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.

(2) In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

h. The permittee shall notify the Department and obtain approval or 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 which 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 that 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 five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not

been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

k. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water.

l. The permittee shall retain all records concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment 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.

2. OPERATING REQUIREMENTS

a. Injection of fluids other than those permitted into the disposal wells(s) will constitute a violation of this permit and shall constitute cause for permit revocation and possible enforcement action for water quality violations.

b. Injection into each well shall not exceed 8875 gallons per minute (12.78 MGD) and injection pressure as measured at the wellhead shall not exceed 103 psi (IW-1) and 101 psi (IW-2).

c. In the event the permittee is temporarily unable to comply with any of the conditions of a permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee of the facility shall notify the Department.

(1) Notification shall be made in person or by telephone or email within 24 hours of breakdown or malfunction to the South District office.

(2) A written report of any noncompliance referenced in Specific Condition 2.c.1) above shall be submitted to the South District and Tallahassee offices 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.

d. The permittee shall calibrate all pressure gauges, flow meters, chart recorders, and other related equipment associated with the injection well system on a semiannual 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 gauges, flow meters, and chart recorders shall be calibrated using standard engineering methods. Calibration records shall be kept by the permittee at the permitted facility and be available for inspection by Department personnel upon request.

e. In the event a well must be plugged or abandoned, the permittee shall obtain a permit from the Department as required by Chapter 62-528, Florida Administrative Code. When no longer used for their intended purpose, these wells shall be properly plugged and abandoned. Within 180 days of well abandonment, the permittee shall submit to the Department and the TAC the proposed plugging method, pursuant to Rule 62-528.460, F.A.C.

3. TESTING AND REPORTING REQUIREMENTS

a. A specific injectivity test shall be performed quarterly on the injection well as required by Rule 62-528.430(2)(b)1.b., F.A.C. Pursuant to Rule 62-528.430(2)(d), F.A.C., the specific injectivity test shall be performed with the pumping rate to the well set at a predetermined level and reported as the specific injectivity index (gallons per minute/specific pressure). The pumping rate to be used shall be based on the expected flow, the design of the pump types, and the type of pump control used. As part of this test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off. The specific injectivity test and pressure fall-off data shall be submitted along with the monitoring results of the injection and monitoring well data.

SPECIFIC CONDITIONS

b. The permittee shall demonstrate the mechanical integrity pursuant to Rules 62-528.300(6)(b) and (c), Florida Administrative Code (F.A.C.), at least once every five (5) years during the life of the well. As part of the mechanical integrity survey a video television survey shall be conducted from the surface to the bottom of the injection zone or more frequently if deemed necessary by the Department, pursuant to Rule 62-528.425(1)(d), F.A.C. The last mechanical integrity test for injection wells IW-1 and IW-2 was conducted on February 13, 2003. Therefore, the next mechanical integrity test on the injection well shall be completed on or before February 12, 2008.

c. The Department must be notified seventy-two (72) hours prior to all testing for mechanical integrity on the injection wells. The Department must approve the testing procedure before testing begins. All testing must be initiated during daylight hours, Monday through Friday. An evaluation of all test results must be submitted with all test data.

d. The injection system shall be monitored in accordance with Rules 62-528.425(1)(g) and 62-528.430(2), F.A.C. The following injection well performance and monitor zone data shall be recorded and reported 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 specifications for the injection wells are as follows:

INJECTION WELL IW-1

Casing Diameter (OD)	Depth (bls) Cased/Total	Open Hole (bls)
52" Steel	60'	
42" Steel	330'	
34" Steel	1300'	
24" Steel	2550'	
20" Steel Tbg	2549'	2550' – 3200'

INJECTION WELL IW-2

Casing Diameter (OD)	Depth (bls) Cased/Total	Open Hole (bls)
52" Steel	8'	
42" Steel	332'	
34" Steel	1300'	
24" Steel	2278'	
20" Steel Tbg	2146'	2278' – 3200'

The injection well shall be monitored in accordance with the parameters and frequencies listed below. The permittee shall submit monthly a summary of the monthly monitoring data developed from the injection well instrumentation. All samples shall be collected and analyzed in accordance with the quality assurance requirements of Chapter 62-160, F.A.C. The injection pressure, injection flow rate, and annular pressure shall be recorded continuously and reported at the frequency indicated below. The report shall include the following data:

Parameters	Reporting Frequency
Injection Pressure (p.s.i.)	Daily/Monthly
Maximum Injection Pressure	Daily/Monthly
Minimum Injection Pressure	Daily/Monthly
Average Injection Pressure	Daily/Monthly
Flow Rate (g.p.m.)	Daily/Monthly

SPECIFIC CONDITIONS

Maximum Flow Rate	Daily/Monthly
Average Flow Rate	Daily/Monthly
Minimum Flow Rate	Daily/Monthly
Annular Pressure (p.s.i.)	Daily/Monthly
Maximum Annular Pressure	Daily/Monthly
Minimum Annular Pressure	Daily/Monthly
Average Annular Pressure	Daily/Monthly
Annular Fluid added/removed (gallons)	Daily/Monthly
Annular Pressure added/removed (p.s.i.)	Daily/Monthly
Total Volume WTP Concentrate Injected (gallons)	Daily
Total Volume WTP Concentrate Injected (gallons)	Monthly

Injectate Water Quality

WTP Concentrate	
TKN (mg/L)	Monthly
pH (std. units)	Monthly
Specific Conductivity (μmhos/cm)	Monthly
Chloride (mg/L)	Monthly
Sulfate (mg/L)	Monthly
Field Temperature (°C)	Monthly
Total Dissolved Solids (mg/L)	Monthly
Sodium (mg/L)	Quarterly
Calcium (mg/L)	Quarterly
Potassium (mg/L)	Quarterly
Magnesium (mg/L)	Quarterly
Iron (mg/L)	Quarterly
Bicarbonate (mg/L)	Quarterly
Gross Alpha	Quarterly
Radium 226	Quarterly
Radium 228	Quarterly

MONITOR WELL SYSTEM

The monitor well system consists of one dual zone monitor well as described below:

Well Number	Casing Dia. (OD)	Depth (bls) Cased/Total
DZMW-1	34" Steel	10'
	24" Steel	330'
	16" Steel	1125'/1194'
	6 5/8" Steel	1500'/1600'

All monitor wells shall be monitored in accordance with Rule 62-528.615, F.A.C. The following monitor well performance data shall be recorded and reported at the frequency indicted 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 pressure 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 or 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)	Daily/Monthly
Water Quality	
TKN (mg/L)	Monthly
Specific Conductivity (μmhos/cm)	Monthly
Total Dissolved Solids (mg/L)	Monthly
pH (std. units)	Monthly
Chloride (mg/L)	Monthly
Sulfate (mg/L)	Monthly
Field Temperature (°C)	Monthly
Sodium (mg/L)	Quarterly
Calcium (mg/L)	Quarterly
Potassium (mg/L)	Quarterly
Magnesium (mg/L)	Quarterly
Iron (mg/L)	Quarterly
Bicarbonate mg/L)	Quarterly
Gross Alpha (**Deep Zone Only**)	Quarterly
Radium 226 (**Deep Zone Only**)	Quarterly
Radium 228 (**Deep Zone Only**)	Quarterly

e. The permittee shall submit to the Department the results of all monitoring data collected no later than the last day of the month immediately following the end of the month of record. The results shall be sent to the Department of Environmental Protection, South District Office, P.O. Box 2549, Fort Myers, Florida 33902-2549. Copies of the results shall also be sent to the Underground Injection Control Program, Bureau of Water Facilities Regulations, Department of Environmental Protection, 2600 Blair Stone Road, Mail Station #3530, Tallahassee, FL 32399-2400.

f. Per Rules 62-4.090(1) and 62-528.455(3)(a), F.A.C., the permittee shall submit an application for renewal of the existing operating permit (a minimum of 5 copies) with the applicable fee at least sixty (60) days prior to the expiration of this operation permit. The application for renewal shall include the items listed in Rule 62-528.455(3)(b), F.A.C.

4. 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) review and Department approval.

c. The permittee shall notify the local office of the Department within 24 hours in the event the emergency discharge has been used. The notification should include the reason for using the emergency discharge, the duration of the discharge, and the volume discharged. Written notification shall be provided within 5 days after its occurrence.

SPECIFIC CONDITIONS

5. 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. An increase of 10 percent or more over the cost estimate upon which the financial responsibility demonstration is based shall require the permittee to submit documentation to obtain an updated Certificate of Demonstration of Financial Responsibility.

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 then 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.

6. MECHANICAL INTEGRITY

a. The permittee shall maintain the mechanical integrity of the injection 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 immediate cessation of injection, within 48 hours of receiving written notice 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 has made a satisfactory demonstration that fluid movement into or between underground sources of drinking water is not occurring.

7. 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 are 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.

8. The permittee shall be aware of and operate under the General Conditions of F.A.C. Rules 62-528.307(1)(a) through (x), and 62-528.307(3)(a) through (e). These General Conditions are binding upon the permittee and enforceable pursuant to Chapter 403 of the Florida Statutes.

Issued this 17th day of July 2006.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Gordon Romeis for

Jon M. Iglehart
Director of
District Management

JMI/JBM/rcd

Collier County

Appendix B – HYDROSTATIC PRESSURE TEST

Permit Nos.: 173528-003 & 004 -UO

Casing Hydrostatic Pressure Test

Injection Well No. 1 (IW-1 originally reported as IW-2)

Collier County – South County Regional Water Treatment Plant

Delta Time (minutes)	Pressure (psi)
0	153.00
5	153.00
10	153.00
15	153.00
20	153.00
25	153.00
30	153.00
35	153.00
40	153.00
45	153.00
50	153.00
55	153.00
60	153.00

Date of Test	January 29, 2008	
Witnesses	James Wheatley, PG David Rhodes, P.G. James Harcourt	
Gage Serial No.	5704-1	
Gage Certified On	January 8, 2008	
Allowable Pressure Change	5% (psi)	7.65 psi
Actual Pressure Change	0 psi	
Test Result	PRESSURE TEST PASSED	

Casing Hydrostatic Pressure Test
Injection Well No. 2 (IW-2 originally reported as IW-1)

Collier County – South County Regional Water Treatment Plant

Delta Time (minutes)	Pressure (psi)
0	154.00
5	154.00
10	154.00
15	154.00
20	154.00
25	154.00
30	154.00
35	154.00
40	154.00
45	154.00
50	154.00
55	154.00
60	154.00

Date of Test	January 30, 2008	
Witnesses	James Wheatley, PG David Rhodes, P.G. James Harcourt	
Gage Serial No.	5704-1	
Gage Certified On	January 8, 2008	
Allowable Pressure Change	5% (psi)	7.70 psi
Actual Pressure Change	0 psi	
Test Result	PRESSURE TEST PASSED	

Certificate of Calibration

KELC-40855

Kimball Electronic Laboratory, Inc.
Precision Measurement Equipment Specialists

Purchase Order # N/A

Calibration Performed By:

KIMBALL ELECTRONIC LABORATORY, INC
8081 W 21 LANE
HIALEAH, FL. 33016

For: YOU410

YOUNGQUIST BROTHERS, INC.
15465 PINE RIDGE ROAD

FT MYERS FL 33908

Equipment Information KELI I.D.: KEL-120998

Description: UNKNOWN 200 PSI PRESSURE GAUGE
Manufacturer: UNKNOWN
Model Number: 200 PSI
Part Number: N/A
Range: 0-200 PSI
Serial Number: 5704-1
Customer I.D.: 040305-1
Cust. Barcode: N/A
Cust. Location: N/A
Specifications: +/- 0.25% FULL SCALE

Cal Date: 22-Jan-08
Cal. Due Date: 22-Apr-08
Cal. Interval: 3 MONTHS
Received: IN TOLERANCE
Calibration Result: PASS
Environmental Conditions: 74 DEG F / 50 % RH
Performed By: BRUCE CABOT
Procedure: SYN54

This is to certify that the above listed instrument meets or exceeds all specifications as stated in the referenced procedure at the points tested (unless otherwise noted). It has been calibrated using measurement standards traceable to the National Institute of Standards and Technology (NIST), or to NIST accepted intrinsic standards of measurement, or derived by the ratio type of self-calibration techniques. This calibration is in accordance with Kimball Electonic Laboratory, Inc Quality Assurance Manual. KELI's Quality system is Accredited to ISO/IEC-17025 and compliant with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. TURS when applicable are greater than or equal to 4:1; with expanded uncertainty used to calculate the Test Uncertainty Ratio, with a coverage factor of K=2 at a confidence level of approximately 95%, unless otherwise noted.
Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

Calibration Remarks

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

Standards Used To Calibrate Equipment

Company	I.D.	Description	Last Cal.	Cal. Due Date
KIM001	391	EATON UPS 3000BAA PRESSURE INDICATOR	20-Nov-07	30-Nov-09

Signatures:

Certified by: BRUCE CABOT — Bruce M Cabot — 22-Jan-08 2:17:02 PM

Approved By: JAVIER BALCEIRO — 22-Jan-08 2:17:38 PM

Collier County

Appendix C – RADIOACTIVE TRACER TEST

Permit Nos.: 173528-003 & 004 -UO

WATER METER
ACCURACY TEST REPORT

10/15/2007

#	MAKE	SERIAL#	LOW FLOW	INT. FLOW	HIGH FLOW
1	2"	5528959	102.0	101.3	101.0
2	USG	5528960	100.2	100.0	100.4
3	MJ	4739630	102.0	99.9	101.7
4	METER	5528961	98.0	99.5	100.5
5					
6					
7			2 GPM	8 GPM	65 GPM
8		USAGE			
9		3304000			
10		800			
11		2117200			
12		1484600			
13					
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47					
48					

MASTER METER

101 Regency Parkway
Mansfield ,Texas
817 -842-8000
(800) 765-6518
FAX# 817-842-8100

RMA# 18522

CUSTOMER: YOUNGQUIST BROTHERS
TEST DATE: 10/15/2007
TESTER: STEVE WHITE

NOTE:
Accuracy limits according to AWWA C708-96

*** 97% - 103% for Low Flows**

*** 98.5% - 101.5% for Intermediate and High Flows**

***Accuracy limits for meters removed from service according to M-6 Manual Table 5-1**

***80% - 104.0% for Low Flows**

***96% - 102.0% for Intermediate and High Flows**

MEDTECH
DIAGNOSTIC SERVICES
NUCLEAR PROVIDERS

1840 BOY SCOUT DRIVE • FORT MYERS, FL 33907

MedTech Diagnostic Services
1840 Boy Scout Drive, Unit A
Fort Myers, FL 33907
(239) 277-0990 (800) 690-9098

Packing Slip

CustomerID: 00057 **Delivery Date:** 01/28/2008 **Delivery Time:** 12:00 **Container:** 1

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

Phone: (239) 489-4444

Container: 1

RECEIPT SECTION

Type of Package Received: ___ NONE ___ WHITE I ___ YELLOW II ___ YELLOW III

Survey Meter Serial #: ______________________
Background (mR/hr): ______________________
Surface Reading (mR/hr): ______________________
Trans. Index at 1 Meter: ______________________
Condition of Container: ______________________

Wipe Test Instrument Serial #: ______________________
Background (CPM): ______________________
Surface (CPM): ______________________
Surface (DPM): ______________________
Area (cm^2): ______________________

Received By: ______________________ **Date:** ____________ **Time:** ____________

RX #:	Product	Inj. Time	Cal. D/T	Qty	Amount Units	Inj. Amount	Patient	Returned
☐ **167400**	I-131 Liquid	[ ]	01/29/2008 10:00	1	10.00 mCi	[ ]	MEDICINAL GRADE	☐

Item Count: 1

RX#167400
I – 131 Liquid
10 mCi
Cal Date 01/29/2008
Cal Time 10:00
MEDICINAL GRADE

MedTech Diagnostic Services (239) 277 – 0990 (800) 690 – 9098
1840 Boy Scout Drive, Unit A Fort Myers, FL 33907
RX#167400

Account Name: Youngquist Brothers Inc.

Delivery D/T: 01/28/2008 12:00 Container:001

Patient ———: MEDICINAL GRADE
Product———: I – 131 Liquid
Procedure ——: Pipe Leak Test
Physician ——:
Ordered Amount: 10 mCi Quantity: 1 Inj. Amt: ______ mCi
Cal Date/Time –: 01/29/2008 10:00
Actual Amount–: 10.952 mCi Quantity: 1 Volume: 10.00 ml (1.10 mCi/ml)
Exp Date/Time –: 02/23/2008 10:00
Filled By: John Sackett BCNP / Salim Shaikh
Lot #(s): 1011208E 0.017
NOTES: BLUE, NA THIO. FINAL 10CC, MEDICINAL GRADE

CAUTION: TO BE USED UNDER THE DIRECT SUPERVISION OF A PHYSICIAN

RX#167400
I – 131 Liquid
Youngquist Brothers Inc.
10 mCi **10:00**
MEDICINAL GRADE
01/29/2008 10:00
Box: 12:00 – 001

CAUTION
RADIOACTIVE MATERIALS

RX#167400
I – 131 Liquid
10 mCi
Cal Date 01/29/2008
Cal Time 10:00
MEDICINAL GRADE

MedTech Diagnostic Services (239) 277 – 0990 (800) 690 – 9098
1840 Boy Scout Drive, Unit A Fort Myers, FL 33907
RX#167400

Account Name: Youngquist Brothers Inc.

Delivery D/T: 01/28/2008 12:00 Container:001

Patient ———: MEDICINAL GRADE
Product———: I – 131 Liquid
Procedure ——: Pipe Leak Test
Physician ——:
Ordered Amount: 10 mCi Quantity: 1 Inj. Amt: ______ mCi
Cal Date/Time –: 01/29/2008 10:00
Actual Amount–: 10.952 mCi Quantity: 1 Volume: 10.00 ml (1.10 mCi/ml)
Exp Date/Time –: 02/23/2008 10:00
Filled By: John Sackett BCNP / Salim Shaikh
Lot #(s): 1011208E 0.017
NOTES: BLUE, NA THIO. FINAL 10CC, MEDICINAL GRADE

CAUTION: TO BE USED UNDER THE DIRECT SUPERVISION OF A PHYSICIAN

Collier County

Appendix D – GEOPHYSICAL LOGS

Permit Nos.: 173528-003 & 004 -UO

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

RADIOACTIVE TRACER SURVEY LOG

Company	HAZEN & SAWYER
Well	INJECTION WELL #1
Field	SOUTH COUNTY REGIONAL W.T.P
County	COLLIER
State	FLORIDA

Company HAZEN & SAWYER
Well INJECTION WELL #1
Field SOUTH COUNTY REGIONAL W.T.P
County COLLIER State FLORIDA
Location
Other Services SEE COMMENTS

Permanent Datum PAD
Log Measured From PAD
Drilling Measured From PAD
Elevation
K.B.
D.F.
G.L.

Date	29-JAN-2008	
Run Number	MIT '08	
Depth Driller	3200'	
Depth Logger	2320'	
Bottom Logged Interval	2320'	
Top Log Interval	SURFACE	
Open Hole Size	NA	
Type Fluid	WATER	
Density / Viscosity	NA	
Max. Recorded Temp.	89.5 DEGF.	
Estimated Cement Top	NA	
Time Well Ready	0000	
Time Logger on Bottom	0000	
Equipment Number	102	
Location	FT.MYERS	
Recorded By	LEE	MOREE
Witnessed By	J. WHEATLY	

Borehole Record				Borehole Record		
Run Number	Bit	From	To	Run No.	Bit	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	24"	.500 W.T.	SURFACE	2278'
Prot. String				
Production String				
Liner				

<<< Fold Here >>>

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

EJECTOR
13.5' FROM TOOL BOTTOM.

HRT
DHTVS

GR#3 24.00 ft

GR #3 -RTST (952T)
30.00 lb 1.69 in OD 11.50 ft

TREJCT-A (952)
10.00 lb 1.69 in OD 1.00 ft

GR #2 -RTSM (952M)
10.00 lb 1.69 in OD 3.00 ft

GR#2 10.50 ft

CCL 9.60 ft

CCL-1.68GRRTS (952)
10.00 lb 1.69 in OD 0.75 ft

YOUNGQUIST BROTHERS, Inc

FINAL GAMMA RAY

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000

Casing Bottom
Dumped Tool

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

FINAL GAMMA RAY

Database File: scolrts2.db
Dataset Pathname: RTS7
Presentation Format: rtsfinbk
Dataset Creation: Wed Jan 30 07:12:29 2008
Charted by: Depth in Feet scaled 1:240

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000

Casing Bottom
Dumped Tool

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

LOP #2

Database File: scolrts2.db
Dataset Pathname: RTS5
Presentation Format: rtslop
Dataset Creation: Wed Jan 30 07:12:23 2008
Charted by: Depth in Feet scaled 1:240

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000

Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

TEST #2 (74 GPM)

Database File: scolrts2.db
Dataset Pathname: RTS4
Presentation Format: rtstime
Dataset Creation: Wed Jan 30 07:12:20 2008
Charted by: Depth in Feet scaled 1:600

GRT (GAPI) 0–100 | EJECT 0–2 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000
Minutes 0–10

30 Mins
15 Mins
Eject 1 Mci I-131 @ 2273' (5'In Casing)
Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

LAF #1 (15,000 GALS)

Database File: scolrts2.db
Dataset Pathname: RTS3
Presentation Format: rtslaf
Dataset Creation: Wed Jan 30 07:12:16 2008
Charted by: Depth in Feet scaled 1:240

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000

Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

LOP #1

Database File: scolrts2.db
Dataset Pathname: RTS2
Presentation Format: rtslop
Dataset Creation: Wed Jan 30 07:12:03 2008
Charted by: Depth in Feet scaled 1:240

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000

Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

TEST #1 (74 GPM)

Database File: scolrts2.db
Dataset Pathname: RTS1
Presentation Format: rtstime
Dataset Creation: Wed Jan 30 07:11:57 2008
Charted by: Depth in Feet scaled 1:600

GRT (GAPI) 0–100 | EJECT 0–2 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000
Minutes 0–10

60 Mins
15 Mins
Eject 1 Mci I-131 @ 2273' (5'In Casing)
Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

CASING TIE-IN

Database File: scolrts2.db
Dataset Pathname: TIE
Presentation Format: rtstie
Dataset Creation: Wed Jan 30 07:12:58 2008
Charted by: Depth in Feet scaled 1:240

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000
GRT-BACKGRD (GAPI) 0–100 | GRB-BACKGRD (GAPI) 0–100 | GRM-BACKGRD (GAPI) 0–1000
CCL 0.9 – -0.1

Casing Bottom

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

BACKGROUND GAMMA RAY

Database File: scolrts2.db
Dataset Pathname: RTSBK2
Presentation Format: rts
Dataset Creation: Wed Jan 30 07:12:51 2008
Charted by: Depth in Feet scaled 1:600

GRT (GAPI) 0–100 | GRB (GAPI) 0–100 | GRM (GAPI) 0–1000
CCL 0.9 – -0.1

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

HIGH RESOLUTION TEMPERATURE LOG

Company	HAZEN & SAWYER
Well	INJECTION WELL #1
Field	SOUTH COUNTY REGIONAL W.T.P
County	COLLIER
State	FLORIDA

Company HAZEN & SAWYER
Well INJECTION WELL #1
Field SOUTH COUNTY REGIONAL W.T.P
County COLLIER State FLORIDA
Location
Other Services SEE COMMENTS

		Elevation	Elevation
Permanent Datum	PAD		K.B.
Log Measured From	PAD		D.F.
Drilling Measured From	PAD		G.L.

Date	29-JAN-2008	
Run Number	MIT '08	
Depth Driller	3200'	
Depth Logger	2320'	
Bottom Logged Interval	2320'	
Top Log Interval	SURFACE	
Open Hole Size	NA	
Type Fluid	WATER	
Density / Viscosity	NA	
Max. Recorded Temp.	89.5 DEGF.	
Estimated Cement Top	NA	
Time Well Ready	0000	
Time Logger on Bottom	0000	
Equipment Number	102	
Location	FT.MYERS	
Recorded By	LEE	
Witnessed By	J. WHEATLY	MOREE

Borehole Record				Borehole Record			
Run Number	Bit	From	To	Run No.	Bit	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	24"	.500 W.T.	SURFACE	2278'
Prot. String				
Production String				
Liner				

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Comments

RTS
HRT
DHTVS

YOUNGQUIST BROTHERS, Inc
GEOPHYSICAL LOGGING DIVISION

TEMPERATURE

Database File: scolrts2.db
Dataset Pathname: TEMP
Presentation Format: temp
Dataset Creation: Wed Jan 30 07:12:53 2008
Charted by: Depth in Feet scaled 1:240

Temperature Calibration Report

Serial Number: 17
Tool Model: MLS
Performed: Sun Jul 08 13:08:06 2007

Point #	Reading		Reference	
1	320	cps	32	degF
2	700	cps	70	degF
3	2000	cps	200	degF

TEMP 0.25 ft

TEMP-MLS (17)
30.00 lb 1.62 in OD 2.45 ft

Dataset: run1/TEMP
Total Length: 2.45 ft
Total Weight: 30.00 lb
O.D. 1.62 in

YOUNGQUIST BROTHERS, Inc — GEOPHYSICAL LOGGING DIVISION

RADIOACTIVE TRACER SURVEY LOG

Company	HAZEN & SAWYER
Well	INJECTION WELL #2
Field	SOUTH COUNTY REGIONAL W.T.P
County	COLLIER
State	FLORIDA

Location: | Other Services: SEE COMMENTS

Permanent Datum: PAD | Elevation | Elevation: K.B. / D.F. / G.L.
Log Measured From: PAD
Drilling Measured From: PAD

Date	30-JAN-2008
Run Number	MIT '08
Depth Driller	3200'
Depth Logger	2600'
Bottom Logged Interval	2600'
Top Log Interval	SURFACE
Open Hole Size	NA
Type Fluid	WATER
Density / Viscosity	NA
Max. Recorded Temp.	89.5 DEGF.
Estimated Cement Top	NA
Time Well Ready	0000
Time Logger on Bottom	0000
Equipment Number	102
Location	FT.MYERS
Recorded By	LEE
Witnessed By	J. WHEATLY / MOREE

Borehole Record						
Run Number	Bit	From	To	Run No.	Bit	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	24"	.500 W.T.	SURFACE	2550'
Prot. String				
Production String				
Liner				

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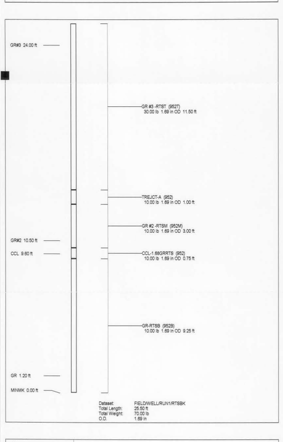
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

EJECTOR
13.5' FROM TOOL BOTTOM.

HRT
DHTVS

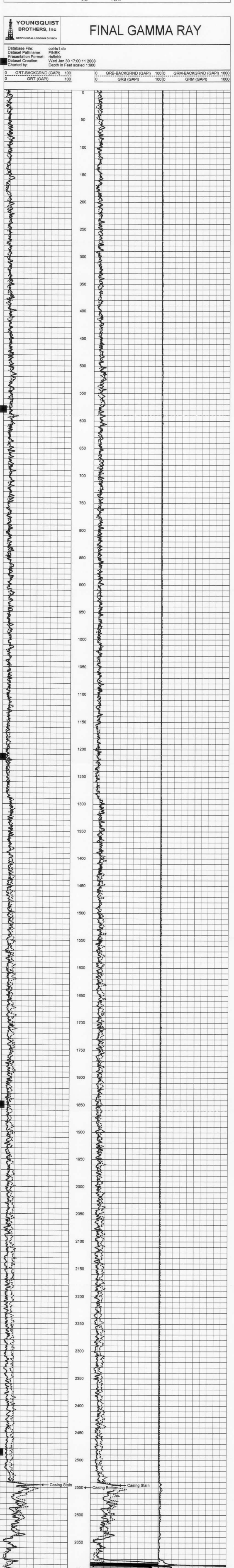


Dataset: FIELD/WELL/RUN1/RTSBK
Total Length: 25.50 ft
Total Weight: 70.00 lb
O.D. 1.69 in

YOUNGQUIST BROTHERS, Inc

FINAL GAMMA RAY

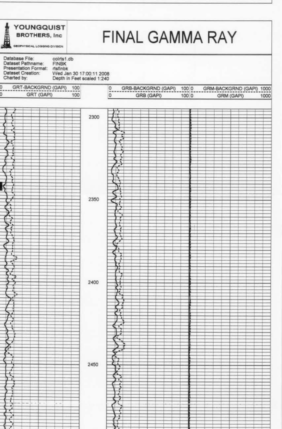
Database File: colrts1.db
Dataset Pathname: FINBK
Presentation Format: rtsfinbk
Dataset Creation: Wed Jan 30 17:00:11 2008
Charted by: Depth in Feet scaled 1:600



YOUNGQUIST BROTHERS, Inc

FINAL GAMMA RAY

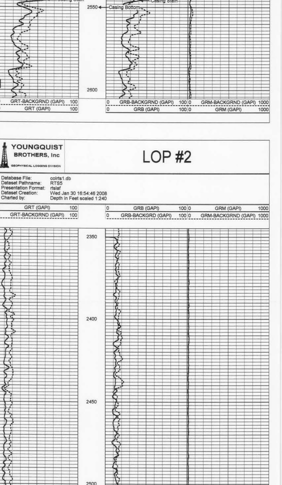
Database File: colrts1.db
Dataset Pathname: FINBK
Presentation Format: rtsfinbk
Dataset Creation: Wed Jan 30 17:00:11 2008
Charted by: Depth in Feet scaled 1:240



YOUNGQUIST BROTHERS, Inc

LOP #2

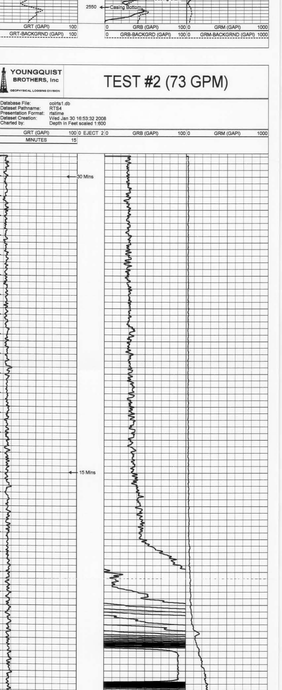
Database File: colrts1.db
Dataset Pathname: RTS5
Presentation Format: rtslaf
Dataset Creation: Wed Jan 30 16:54:46 2008
Charted by: Depth in Feet scaled 1:240



YOUNGQUIST BROTHERS, Inc

TEST #2 (73 GPM)

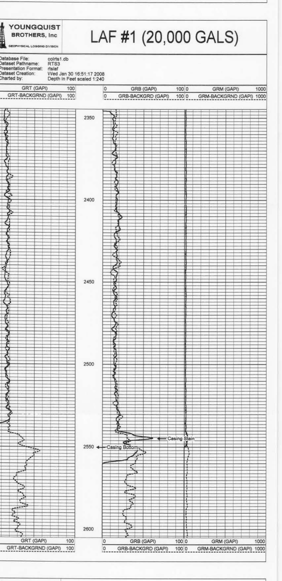
Database File: colrts1.db
Dataset Pathname: RTS4
Presentation Format: rtstime
Dataset Creation: Wed Jan 30 16:53:32 2008
Charted by: Depth in Feet scaled 1:600



YOUNGQUIST BROTHERS, Inc

LAF #1 (20,000 GALS)

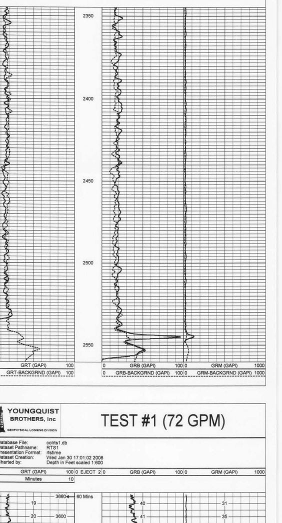
Database File: colrts1.db
Dataset Pathname: RTS3
Presentation Format: rtslaf
Dataset Creation: Wed Jan 30 16:51:17 2008
Charted by: Depth in Feet scaled 1:240



YOUNGQUIST BROTHERS, Inc

LOP #1

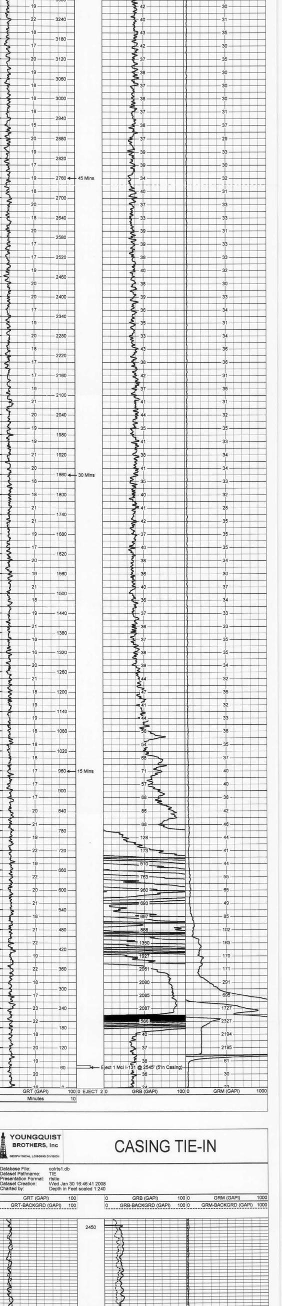
Database File: colrts1.db
Dataset Pathname: RTS2
Presentation Format: rtslop
Dataset Creation: Wed Jan 30 16:49:41 2008
Charted by: Depth in Feet scaled 1:240



YOUNGQUIST BROTHERS, Inc

TEST #1 (72 GPM)

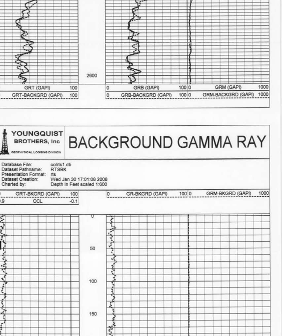
Database File: colrts1.db
Dataset Pathname: RTS1
Presentation Format: rtstime
Dataset Creation: Wed Jan 30 17:01:02 2008
Charted by: Depth in Feet scaled 1:600



YOUNGQUIST BROTHERS, Inc

CASING TIE-IN

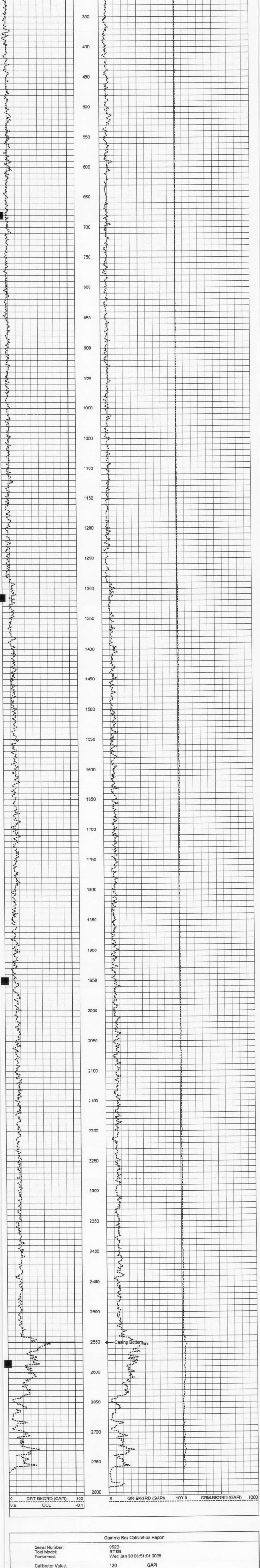
Database File: colrts1.db
Dataset Pathname: TIE
Presentation Format: rtstie
Dataset Creation: Wed Jan 30 16:46:41 2008
Charted by: Depth in Feet scaled 1:240



YOUNGQUIST BROTHERS, Inc

BACKGROUND GAMMA RAY

Database File: colrts1.db
Dataset Pathname: RTSBK
Presentation Format: rts
Dataset Creation: Wed Jan 30 17:01:08 2008
Charted by: Depth in Feet scaled 1:600



Gamma Ray Calibration Report

Serial Number:	952B	
Tool Model:	RTSB	
Performed:	Wed Jan 30 06:51:01 2008	
Calibrator Value:	120	GAPI
Background Reading:	77.8779	cps
Calibrator Reading:	262.362	cps
Sensitivity:	0.650461	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	952M	
Tool Model:	RTSM	
Performed:	Wed Jan 30 06:52:26 2008	
Calibrator Value:	120	GAPI
Background Reading:	107.608	cps
Calibrator Reading:	283.483	cps
Sensitivity:	0.682299	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	952T	
Tool Model:	RTST	
Performed:	Wed Jan 30 06:53:56 2008	
Calibrator Value:	120	GAPI
Background Reading:	94.995	cps
Calibrator Reading:	265.966	cps
Sensitivity:	0.701873	GAPI/cps

YOUNGQUIST BROTHERS, Inc

GEOPHYSICAL LOGGING DIVISION

HIGH RESOLUTION TEMPERATURE LOG

Company	HAZEN & SAWYER
Well	INJECTION WELL #2
Field	SOUTH COUNTY REGIONAL W.T.P
County	COLLIER
State	FLORIDA

Company	HAZEN & SAWYER		
Well	INJECTION WELL #2		
Field	SOUTH COUNTY REGIONAL W.T.P		
County	COLLIER	State	FLORIDA
Location		Other Services	SEE COMMENTS
Permanent Datum	PAD	Elevation	Elevation
Log Measured From	PAD		K.B.
Drilling Measured From	PAD		D.F.
			G.L.

Date	30-JAN-2008	
Run Number	MIT '08	
Depth Driller	3200'	
Depth Logger	2800'	
Bottom Logged Interval	2800'	
Top Log Interval	SURFACE	
Open Hole Size	NA	
Type Fluid	WATER	
Density / Viscosity	NA	
Max. Recorded Temp.	89.5 DEGF.	
Estimated Cement Top	NA	
Time Well Ready	0000	
Time Logger on Bottom	0000	
Equipment Number	102	
Location	FT.MYERS	
Recorded By	LEE	MOREE
Witnessed By	J. WHEATLY	

Borehole Record				Borehole Record		
Run Number	Bit	From	To	Run No.	Bit	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	24"	.500 W.T.	SURFACE	2550'
Prot. String				
Production String				
Liner				

<<< Fold Here >>>

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Comments

RTS
DHTVS

YOUNGQUIST BROTHERS, Inc

GEOPHYSICAL LOGGING DIVISION

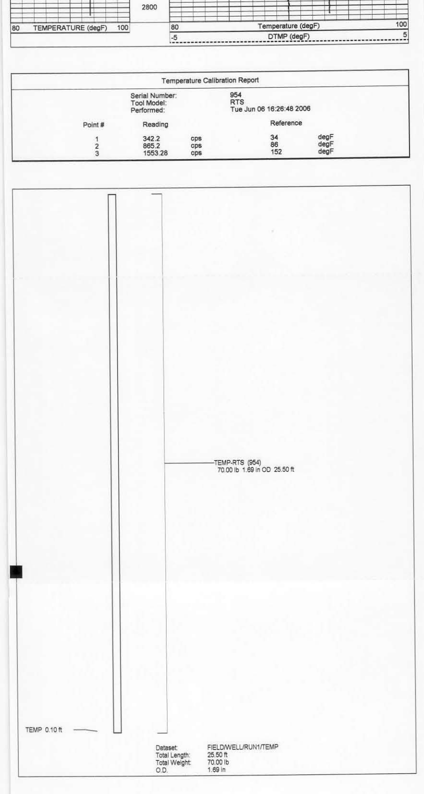
TEMPERATURE

Database File:	colrts1.db
Dataset Pathname:	TEMP
Presentation Format:	temp
Dataset Creation:	Wed Jan 30 17:01:17 2008
Charted by:	Depth in Feet scaled 1:240

Temperature Calibration Report

Serial Number:	954
Tool Model:	RTS
Performed:	Tue Jun 06 16:26:48 2006

Point #	Reading		Reference	
1	342.2	cps	34	degF
2	865.2	cps	86	degF
3	1553.28	cps	152	degF



Dataset:	FIELD/WELL/RUN1/TEMP
Total Length:	25.50 ft
Total Weight:	70.00 lb
O.D.:	1.69 in