ENGINEERING REPORT on the

MECHANICAL INTEGRITY DEMONSTRATION of the GASPARILLA ISLAND WATER ASSOCIATION CLASS I REVERSE OSMOSIS INJECTION WELL RO IW-1

Prepared for
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List of Acronyms and Abbreviations

^{131}I	Iodine-131
API	American Petroleum Institute
bls	below land surface
CCL	Casing Collar Locator
EPA	U.S. Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FGL	Florida Geophysical Logging
fpm	feet per minute
GIWA	Gasparilla Island Water Association
gpm	gallons per minute
GRB	Bottom Gamma Radiation Detector
GRM	Middle Gamma Radiation Detector
GRT	Top Gamma Radiation Detector
mCi	millicurie
MI	Mechanical Integrity
MIT	Mechanical Integrity Testing
psi	Pounds per square inch
RTS	Radioactive Tracer Survey
USDW	Underground Source of Drinking Water
WWTP	Wastewater Treatment Plant
RO	Reverse Osmosis

PROFESSIONAL ENGINEER

The engineering evaluation and interpretations contained in the *Engineering Report on the Internal and External Mechanical Integrity Demonstration of the Gasparilla Island Water Association Class I Injection Well RO IW-1, September 2006,* were prepared by, or reviewed by, a Licensed Professional Engineer in the State of Florida.

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9/12/06

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The geological evaluation and interpretations contained in the *Engineering Report on the Internal and External Mechanical Integrity Demonstration of the Gasparilla Island Water Association Class I Injection Well RO IW-1, September 2006,* were prepared by, or reviewed by, a Licensed Professional Geologist in the State of Florida.

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SECTION 1

Introduction

1.1 Project Background

The Gasparilla Island Water Association, Inc. (GIWA) operates a 0.50-mgd conventional color removal facility and a 0.75-mgd reverse osmosis (RO) water treatment plant (WTP) to provide potable water to the surrounding community. The RO WTP treats brackish groundwater extracted from a well field located near the existing facility. GIWA operates a Class I injection well for disposal of the brine concentrate produced at the RO WTP. This injection well, referred to as RO Injection Well 1 (RO IW-1) operates under the conditions of the FDEP Operating Permit No. 43980-012-UO. Figure 1-1 shows the location of the RO WTP and the location of the injection well RO IW-1.

The injection well was installed in 2001 and was constructed with a 30-inch diameter steel surface casing set to a depth of 375 feet below land surface (bls), a 20-inch diameter steel intermediate casing set to a depth of 650 feet bls, a 12-inch diameter steel final casing, set to a depth of 1,491 feet bls and a 6-inch diameter fiberglass reinforced plastic (FRP) tube installed to 1486 feet bls. The open borehole of the well was drilled to a total depth of 1,700 feet bls. A completion diagram of RO IW-1 is included as Figure 1-2.

Injection of brine concentrate occurs through the nominal 6-inch diameter FRP injection tubing. The FRP injection tubing is seated with a positive seal packer (PSP) system manufactured by Younquist Brothers, Inc (YBI). The PSP is located five feet above the base of the steel 12-inch diameter final casing, at a depth of 1,486 feet bls. The sealed annular space between the 12-inch diameter casing and the 6-inch diameter FRP tubing is filled with a corrosion inhibiting fluid. During injection, the annular fluid pressure is maintained 5 to 10 pounds per square inch (psi) above the injection pressure. The annular monitoring system continuously records the annular fluid pressure in accordance with the operating permit to confirm the absence of leaks in the casing or the injection tubing.

The Florida Department of Environmental Protection (FDEP) requires Class I injection wells to demonstrate mechanical integrity (MI) as specified in the Florida Administrative Code (FAC) Chapters 62-528.300(6) and 62-528.425(1). Mechanical integrity testing is completed every five years and is demonstrated by the absence of any leaks through the injection well casing, tubing, or packer (internal MI) and the absence of vertical fluid movement through channels adjacent to the injection well casing (external MI).

The first demonstration of mechanical integrity was performed on this well in 2001 as part of construction. Internal mechanical integrity was demonstrated on June 6th, 2001 with an annular pressure test. External mechanical integrity was demonstrated on September 18th, 2001 with a radioactive tracer survey.

The second demonstration of mechanical integrity was required in 2006. CH2M HILL was retained by GIWA to develop and conduct the 2006 mechanical integrity test procedures. The work included developing an approved testing program, assisting GIWA in obtaining contractors to perform the necessary testing, coordinating each testing event with the FDEP, supervising the testing activities, interpreting data, and preparing this engineering report.

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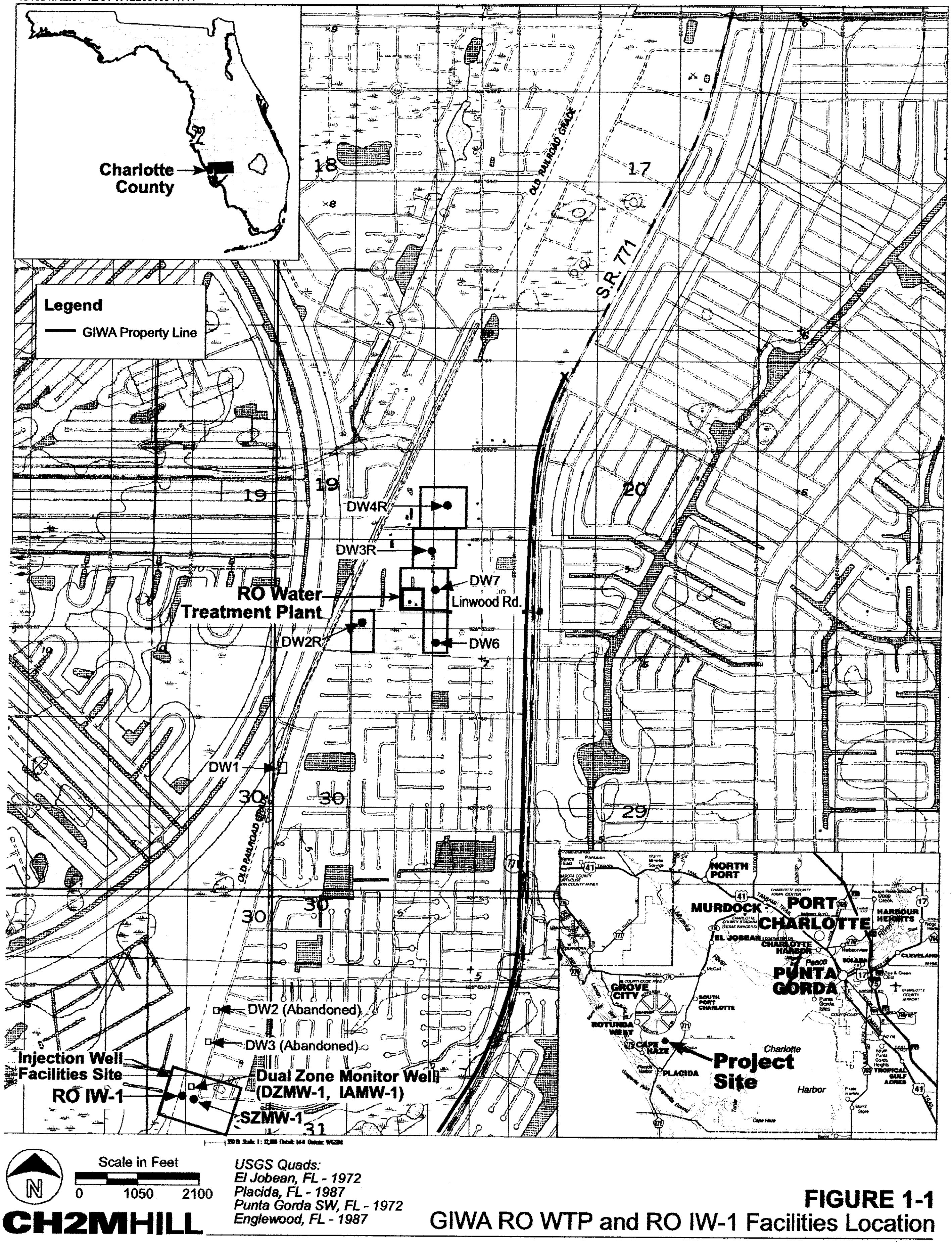

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USGS Quads:
El Jobean, FL - 1972
Placida, FL - 1987
Punta Gorda SW, FL - 1972
Englewood, FL - 1987

FIGURE 1-1
GIWA RO WTP and RO IW-1 Facilities Location

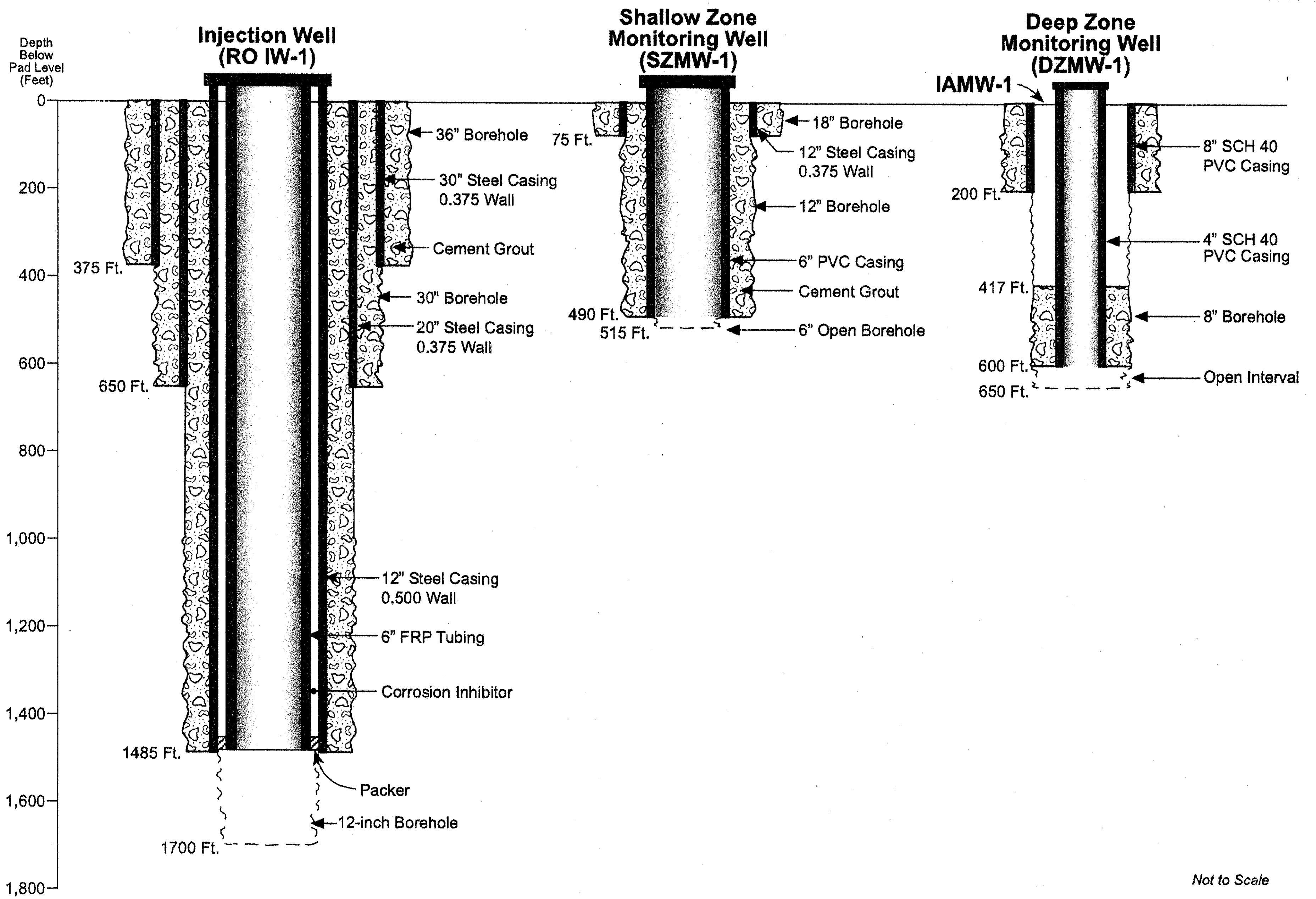

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FIGURE 1-2
Injection Well and Monitoring Well Completion Details

1.2 Summary of Current Testing

The MI testing plan was developed following FDEP-approved methodologies and guidelines. The plan was submitted to FDEP on May 10, 2006 for review and FDEP approval. Appendix A contains a copy of the testing plan.

The five-year anniversary date of the first annular pressure test (June 6, 2006) occurs before the five-year anniversary date of the first RTS survey (September 18, 2006). Ideally, all of the required MI tests would be conducted before the earlier date. However, GIWA typically experiences their greatest water use demands during the spring dry season, and taking Well RO IW-1 offline to conduct the RTS test prior to June 6 would have created a hardship for GIWA and their customers. The proposed MI testing plan included running the annular pressure test (which does not require the well to be taken offline for an extended period of time) before the June 6 deadline as required, but waiting until water use demands had decreased during the summer (but before the September 18 deadline) before scheduling the RTS test and an additional annular pressure test. In this way, future MI testing dates would be shifted to a lower demand summer month. This shift to the MI testing schedule required a minor FDEP permit modification.

The testing program consists of video logging and annular pressure testing for internal MI, and temperature logging and RTS testing for the demonstration of external MI. Table 1-1 lists in chronological order the activities which were successfully completed to demonstrate MI of RO IW-1. Based upon the actual dates in which the testing was completed, the next demonstration of MI should be completed prior to July 6, 2011.

TABLE 1-1
Chronology of Mechanical Integrity Testing at GIWA RO IW-1

Date	Description
May, 18 2006	Annular pressure testing
July 6, 2006	Video/Background Gamma Radiation/Temperature surveys
July 6, 2006	External RTS testing
July 12, 2006	Annular pressure testing

SECTION 2

Testing Methodologies

2.1 FDEP Requirements

The FDEP and the U.S. Environmental Protection Agency (EPA) require that all injection wells demonstrate MI at least every 5 years. In Florida, Class I injection wells can demonstrate internal MI by verifying that there are no leaks in the injection well casing, tubing, or packer as specified in Chapter 62-528.300(6)(a)(1), FAC. Likewise, these wells must also demonstrate external MI by confirming that there is no upward fluid movement through channels adjacent to the injection well bore, as cited in Chapter 62-528.300(6)(a)(2), FAC. Table 2-1 presents these sections of the FAC.

The annular pressure test, in combination with a television survey of the casing, is an accepted FDEP methodology for demonstrating internal MI of Class I injection wells. While the video survey provides a visual record of the well's overall condition, the annular pressure test demonstrates the presence or absence of leaks through the well's casing, tubing, and packer.

The RTS, in combination with background gamma radiation and temperature logs, currently is the accepted methodology used for demonstrating the external MI of a Class I injection well in Florida (Chapter 62-528.300(6)(c), FAC). Both the internal and external methodologies discussed above were used at the GIWA RO injection well to demonstrate internal and external MI.

TABLE 2-1
FAC Sections Pertaining to Mechanical Integrity
Mechanical Integrity Definition (Section 62-528.300(6))

(a)	An injection well has mechanical integrity if:	
	(1)	There is no leak in the casing, tubing or packer; and
	(2)	There is no fluid movement into an underground source of drinking water through channels adjacent to the injection well bore.
(b)	One of the following tests shall be used to evaluate the absence of leaks under Subsection (a)1. of this subsection.	
	(1)	Monitoring of tubing-casing annulus pressure with sufficient frequency to be representative, as determined by the Department, while maintaining an annulus pressure different from atmospheric pressure measured at the surface, after an initial pressure test pursuant to subparagraph 2. And paragraph (e) of this subsection; or
	(2)	Pressure test of inner casing or tubing.
(c)	The following methods shall be used to determine the absence of fluid movement under Subparagraph (a)2. A temperature or noise log, and a radioactive tracer survey.	

TABLE 2-1
FAC Sections Pertaining to Mechanical Integrity
Mechanical Integrity Definition (Section 62-528.300(6))

(d) The Department shall allow the use of a test to demonstrate mechanical integrity, other than those listed in paragraphs (b) and (c) above, with the written approval of the U.S. Environmental Protection Agency. If the Environmental Protection Agency has approved an alternative mechanical integrity test method, only written Department approval shall be required before conducting alternative mechanical integrity tests to those specified in (b) and (c) above.

(e) A pressure test required under paragraph (b) above shall be conducted with a liquid at a minimum pressure of 1.5 times the maximum pressure at which the well is to be permitted, or 50 PSI, whichever is higher, for at least one hour. Internal mechanical integrity under subparagraph (a)1. above is demonstrated if there is no more than a five-percent pressure change over the one-hour test period. The pressure used to test wells constructed using tubing and packer shall not exceed the design specifications of the tubing or packer.

(f) In conducting and evaluating the tests enumerated in this rule or others to be allowed by the Department, the permitee and the Department shall apply methods and standards generally accepted in the industry. When the permitee reports the results of mechanical integrity tests to the Department, a description of the test(s), method(s) used, and interpretation of the results shall be included. In making the evaluation, the Department shall review monitoring and other test data submitted since the previous evaluation.

(g) The Department shall require additional or alternative mechanical integrity tests unless the results presented by the permitee under (b) and (c) above provide reasonable assurance that there is no fluid movement into or between underground sources of drinking water resulting from the injection activity.

(h) A permit for any Class I or III well or injection project which lacks mechanical integrity shall include, and for any Class V well may include, a condition prohibiting injection operations until the permitee affirmatively demonstrates under Rule 62-528.300(6)(a)-(c), FAC, that the well has mechanical integrity, unless the permitee affirmatively demonstrates that there is no movement of fluid into or between underground sources of drinking water.

Class I Injection Well Monitoring Requirements (Section 62-528.425(1), FAC)

(i) A demonstration of mechanical integrity pursuant to Rule 62-528.300(6), FAC, at least once every five years during the life of the well; and

(1) As part of the baseline monitoring information, a video survey from the surface to the bottom of the injection zone shall be run prior to injection but after completion of testing, except for those wells that inject through tubing or where it is physically impossible to do so, and every five years thereafter, or more frequently if impairment of the integrity of the casing, tubing, or formation is suspected based on physical or geochemical data such as water quality, pressure changes, or mechanical integrity results.

(2) The video survey may be either black and white or color.

(3) Adequate provisions must be made to centralize the camera in the borehole.

(4) Before running the survey, adequate provisions shall be made to assure that fluid in both the casing and open borehole is of sufficient clarity to provide a baseline survey of a quality acceptable to the Department.

SECTION 3

Internal Mechanical Integrity Testing

3.1 Video Survey

On Friday, July 6, 2006, a video survey of GIWA's RO injection well (RO IW-1) was conducted. The video survey was witnessed by Michael Weatherby/CH2M HILL-Tampa and Pete Larkin/CH2M HILL-Tampa. MV Geophysical Survey, Inc. (MVGS) of Fort Myers, Florida provided the video logging services using a color video camera capable of right angle viewing and rotation.

The video log of the entire injection well was completed to a total depth of 1,681 feet bls. The bottoms of the nominal 6-inch diameter FPR tubing and 12-inch diameter steel casing were identified at depths of 1,486 feet and 1,491 feet bls, respectively, which are the same depth indicated on construction records. The tubing itself and the lowermost 5 feet of the 12-inch diameter casing were in good condition. A summary log of observations made during video logging and subsequent office review of the video tape is presented in Appendix B. The video survey is also provided in Appendix B in DVD format. A VHS tape will be provided to Jack Myers/FDEP as a backup to the digital version.

3.2 Annular Pressure Test

On May 18, 2006 and again on July 12, 2006 pressure tests were successfully conducted on the annular zone of RO IW-1. The tests were conducted by GIWA staff, overseen by Michael Weatherby/CH2M HILL, and witnessed by Jack Myers/FDEP.

The annular pressure test requires pressurizing the annulus between the injection tubing and the 12-inch diameter steel casing to at least 1.5 times the maximum permitted injection operating pressure of the well. Currently, the permitted operating pressure of the GIWA RO injection well is 70 psi. Therefore, the annular pressure required for testing is 105 psi or higher. For the well to successfully demonstrate internal MI, annulus shut-in pressure cannot change more than ±5 percent over a 1-hour testing period.

The pressure gauge used during the test had a range of 0-160 psi and had been calibrated on September 23, 2005. The calibration was checked on July 10, 2006 with a Fluke electronic pressure calibrator using four (4) pressures ranging between 40 psi and 160 psi. The results indicated that the average gauge reading was 100.35 percent of the actual calibrated standard, and no adjustments to the pressure gauge were required. The calibration certificate and verification results are presented in Appendix C.

3.2.1 Annular Zone Pressure Test, May 18, 2006

On the morning of May 18, 2006, the first test was conducted on the annular monitoring zone of RO IW-1. The well was taken off line at 8:00 am and the annular pressure was monitored until 8:30 am; no change in pressure was noted at 8:42 am. The annular monitoring zone was pressurized to 116.5 psi. At 9:20 am the pressure was 117 psi, and Jack Myers/FDEP was called to witness the final hour of the pressure test. When Mr. Myers arrived onsite at 10:05 am, the annular monitoring zone pressure was 118 psi. At 11:05 am the pressure was 119.5 psi. During the last one hour period of the test, the pressure increased by 1.3 percent, well within the ±5 percent allowable tolerance in accordance with 62-528.300(6). The final pressure test was completed successfully with FDEP's approval.

3.2.2 Annular Zone Pressure Test, July 12, 2006

On the morning of July 12, 2006, a second test was conducted on the annular zone of RO IW-1. The primary reason for conducting a second annular pressure test was to shift the next 5-year MI demonstration into the lower-demand month of July as described in Section 1.2.

The well was taken off line at 7:30 am while pressure testing equipment was setup by GIWA staff. At 8:13 am the annular monitoring zone was pressurized with water to 116 psi and shut in. The pressure in the annular zone was monitored at the wellhead and pressure readings were recorded. During the 40-minute initial testing period the annular pressure increased from 116 psi to 116.5 psi. Jack Myers/FDEP-Fort Myers arrived onsite at 8:54 am to witness the final hour of the test. Between 8:55 am and 9:55 am the pressure increased from 116.5 psi to 118.5 psi, a change of 1.7 percent. The test was completed successfully with FDEP's approval.

SECTION 4

External Mechanical Integrity Testing

4.1 Radioactive Tracer Survey

On July 6, 2006, the RTS was conducted to demonstrate external MI of RO IW-1. The RTS was performed by MV Geophysical Surveys, Inc. of Fort Myers, Florida, under the observation of Michael Weatherby/CH2M HILL-Tampa and Pete Larkin/ CH2M HILL-Tampa. Jack Myers /FDEP was informed of the testing schedule but declined attendance.

The radioactive isotope Iodine-131 (^{131}I) was used as a tracer for the RTS because it has a short half-life of 8.05 days, and is an excellent emitter of gamma radiation. ^{131}I is not a naturally occurring isotope. ^{131}I decays primarily by emission of beta particles, but also emits gamma radiation. The end product of ^{131}I radioactive decay is Xenon-131, which is an inert noble gas. The radioactive tracer is contained within a solution of sodium iodide. The assay date of the tracer used during testing at the GIWA injection well was less than its half-life, as required by the FDEP. MV Geophysical Surveys, Inc. has an ongoing health and safety program, and is licensed in the State of Florida to handle radioactive material.

The RTS followed procedures outlined in the FDEP-approved MI testing program presented in Appendix A. Copies of geophysical logs collected during the MIT are presented in Appendix E.

Figure 4-1 is a schematic diagram of the RTS tool configuration used during the external MI RTS. The tool has three gamma radiation detectors:

- Top Gamma Radiation Detector (GRT) located 23.78 feet above the tool bottom
- Middle Gamma Radiation Detector (GRM) located 10.37 feet above the tool bottom
- Bottom Gamma Radiation Detector (GRB) located 1.15 feet above the tool bottom

The tool is equipped with a tracer ejector port, located between the GRT and GRM detectors, 13.75 feet from the bottom of the tool. A Casing Collar Locator (CCL) is located 4.46 feet above the tool bottom, and a fluid temperature detector is located 0.1 ft from the tool bottom. The three detectors on the tool register gamma radiation in American Petroleum Institute (API) units. Operation of the RTS tool was field-verified upon mobilization to the injection well site.

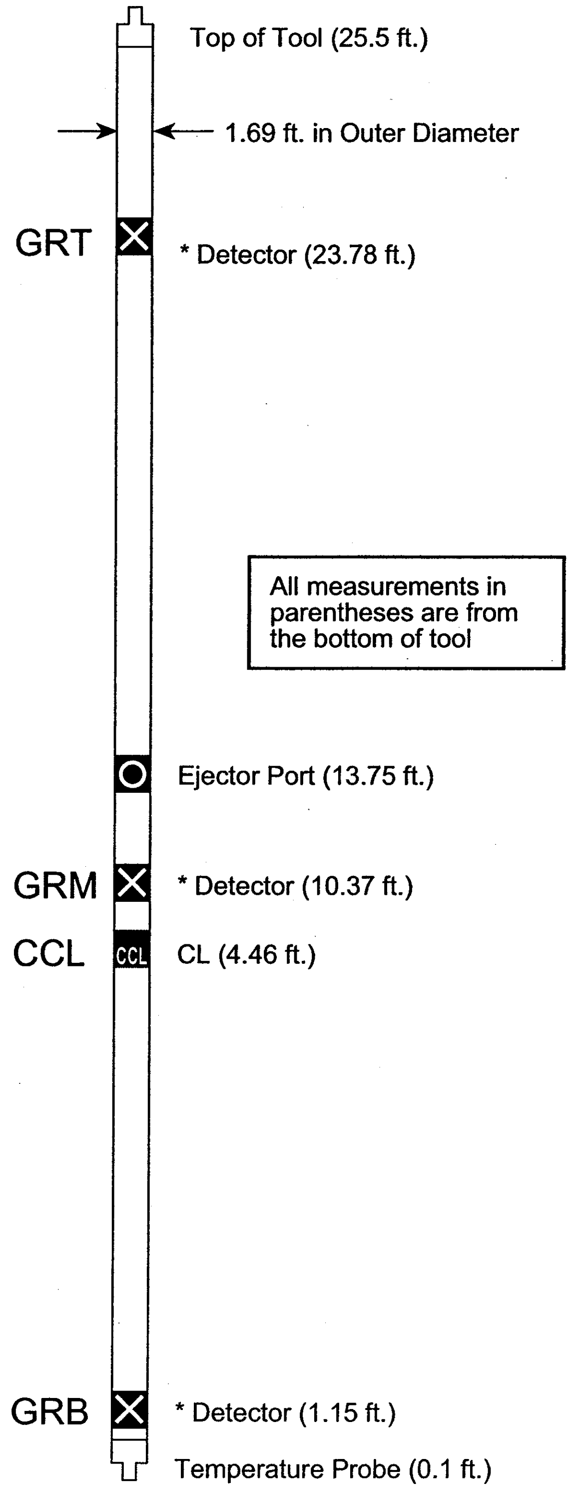

FIGURE 4-1
Radioactive Tracer Survey (RTS) Tool Diagram
Gasparilla Island Water Association

4.2 External RTS Test Methodology

Table 4-1 summarizes the FDEP-approved external MI testing procedures for RO IW-1. A copy of the RTS geophysical survey log is included in Appendix E.

To establish the ambient gamma levels in the well a background gamma log was run on the entire well prior to releasing any radioactive material. The background gamma radiation log provides a baseline of comparison for establishing MI. A static temperature log was also run to determine the static temperature gradient within the injection well. The static temperature log is useful in identifying areas where internal or external MI may be suspect and is a standard procedure during external MI testing. A CCL log was also performed before the RTS testing to locate the bottom of the injection casing.

TABLE 4-1
FDEP-Approved External Radioactive Tracer Survey Procedures

External RTS Procedures
1. Notify FDEP 72 hours in advance of testing.
2. Run static temperature, CCL, and background gamma radiation logs of the entire well.
3. Position RTS logging probe ejector port approximately 5 feet above the base of the well casing, and eject 1 mCi of ^{131}I while pumping into the well at a downhole velocity, not to exceed 5 feet per minute.
4. With the tool stationary, monitor for upward migration of the plume external to the well casing for at least 60 minutes under dynamic conditions.
5. Log profile of tracer plume to verify positioning. Log up out of position to at least 200 feet above the top of the radioactive plume.
6. Flush tracer material down hole until tracer material is flushed sufficiently below the base of the casing to perform additional testing.
7. Log through area affected by static radioactive plume to verify that plume has been properly flushed and to identify areas that may have become stained by the ^{131}I.
8. Repeat dynamic external test.
9. Run a final gamma radiation log from approximately 200 feet below the base of the casing to land surface.
General Requirements
1. Calibrate all geophysical tools within 1 week of testing.
2. The tracer (^{131}I) must be dated less than one-half-life at time of actual use during testing.
3. All mechanical and digital gauges used for flow and pressure measurements must be calibrated within 60 days of actual testing.
4. Gamma radiation detectors shall be field calibrated by the geophysical logging crew upon mobilization at each injection well.
5. The RTS probe shall be emptied of all tracer material prior to removal from the well.

The format of each gamma radiation log is as follows:

- The top detector (GRT) trace is on the far left of each log. The CCL, which provides depth control, is also shown on the left side.
- The bottom detector (GRB) trace is located in the center.
- The middle detector (GRM) trace is located on the far right.

The background temperature log has been formatted at 2 degrees Fahrenheit (°F)/inch with the scale ranging from 80°F to 90°F. A less detailed temperature log, formatted from 0°F to 200°F over 2.5 inches, is provided on the left of the temperature log. The differential temperature in °F is also shown on the log, with a range from –0.5 to 0.5 over 5 inches.

The static temperature log is identified at the bottom of the RTS survey log (Appendix E) as BACKGROUND TEMPERATURE. The background gamma log of the well, including the measured API gamma recorded for each of the three detectors is recorded as BGRT (top), BGRB (bottom), and BGRM (middle), and recorded on the second log sheet as BACKGROUND GAMMA UP. The CCL was used to locate the base of the 12-inch diameter steel casing at a depth of 1491 feet bls. The CCL log is recorded on the third log sheet and identified as CASING BOTTOM TIE-IN.

The first dynamic test began with the geophysical logging probe held stationary with the ejector located at a depth of 1,486 feet, at the base of the injection tubing. During the test potable water was injected at a constant rate of 7 gallons per minute (gpm), establishing a 5 feet per minute (fpm) fluid velocity down the injection tubing. With the three gamma detectors recording in time-drive mode, 1mCi of ^{131}I tracer was released after 2 minutes of time-drive logging. The response of the three gamma detectors GRT, GRB, and GRM over the following 60 minute period is recorded on the fourth log sheet and identified as D1: 1 mCi @7GPM.

The first response was recorded at GRM, (which was located within the 12-inch diameter injection tubing a distance of 3.38 feet below the ejector port), 1 minute after tracer ejection. The tracer was then detected at GRB, (which was located 12.6 feet below the ejector port, and with the open hole of the well), 6 minutes after tracer ejection.

The upper detector, GRT, which is located 10.03 feet above the ejector port, did not record the passage of any tracer over the 60-minute dynamic test period. If GRT had detected the tracer this could be interpreted as an indication that upward fluid movement had occurred outside the injection well casing.

After the 60-minute observation period of time-drive logging, the tool was logged out of position upwards to a depth of 1,285 feet, while maintaining the same 7 gpm potable injection rate. The record of GRB, GRM, and GRT is plotted adjacent to the previously recorded background values BGRB, BGRM, and BGRT on the fifth log sheet indicated as LOG OUT OF POSITION. As can be seen from the log sheet, some ^{131}I staining occurred adjacent to the ejector port at 1,486 feet bls. Otherwise, no significant deviation from the background gamma record was detected within 200 feet of the base of the 6-inch injection tubing.

After the first dynamic test was completed the well was flushed with brackish water at a rate of 120 gpm and the 50-foot interval above the base of the injection tubing was logged again. The log of GRB, GRM, and GRT for this interval is recorded on log sheet 6, indicated as LOG AFTER FLUSH. The detectors GRB and GRM still record the iodine stain at a depth of 1486 feet bls, although the API GR values were slightly lower than they had been prior to the flush.

The second dynamic test was conducted in a manner similar to the first test. The tool was repositioned such that the ejector port was located at a depth of 1,486 feet bls. Injection of potable water at a rate of 7 gpm was established and the equipment was set up to record GRT, GRB, and GRM in time-drive mode. 2 minutes later, 1 mCi of ^{131}I tracer was ejected. The second ejection tracer is recorded on log sheet 7, indicated as D2: 1 mCi @ 7 gpm. The log records the first arrival of tracer at GRM 1-minute after injection followed by its arrival at GRB after 6 minutes. In accordance with the MI demonstration plan approved by FDEP, the duration of the second dynamic test was limited to 30 minutes. Over the 30-minute monitoring period in time-drive mode, no indication of tracer was detected at the upper detector, GRT. After logging data in time-drive mode for 30 minutes the tool was logged out of position to a depth of 1285 feet, while potable water injection continued at 7 gpm. Other than the significant staining of ^{131}I in the injection tubing at the depth of tracer ejection (1,486 feet) no significant deviation from the background gamma values was detected. The record of the second log out of position is recorded on log sheet 8. Log sheet 8 was inadvertently unnamed, but can be identified by the data set pathname "pass 10".

After the two RTS tests were completed, the remaining ^{131}I tracer was released in accordance with the workplan at a depth of 1,550 feet bls. A Final pass with the RTS tool was made from a depth of 1,615 feet to land surface, completing the RTS survey. This final pass is recorded on log sheet 9, indicated as FINAL GAMMA PASS.

4.3 External RTS Test Results

Table 4-2 summarizes the geophysical logging conducted during the external MI testing. Each logging run completed is a separate digital dataset. All 9 logs used to demonstrate external MI at the well were completed on July 6, 2006.

The background temperature log (dataset HRT) shows that the temperature decreased from approximately 106°F at the top of the casing to 86°F as the tool gradually equilibrated with the water temperature through the first 122 feet of casing. Between the depths of 122 feet bls and 1,042 feet bls, the temperature gradually increased to approximately 89.3°F. The temperature remained relatively stable to a depth of 1,456 feet bls, where a relatively sharp decrease was observed from 1,456 feet to 1,504 feet bls as the temperature decreased from 89.3°F to 87.7°F in that 48-foot interval. Between the depths of 1,456 feet and 1,660 feet bls, the temperature remained relatively constant. The temperature increased to 88.2°F from 1,660 feet to 1670 feet bls and then remain nearly constant to a depth of 1,684 feet bls. Below 1,684 feet to the total depth logged of 1,697 feet bls, the temperature increased sharply to 91.6°F.

The background gamma radiation log (dataset BGGR) shows gamma radiation counts through the casing ranging between 12 and 25 API units, with the exception of one relatively high measurement of 40 API at a depth of 1,112 feet bls. Below the 12-inch diameter casing, the background gamma radiation log indicates gamma radiation counts ranging between 25 and 65 API. Traces from all three detectors are similar in magnitude.

The casing collar locator log identified the bottom of the casing at 1,491 feet bls, which is consistent with the well construction and video logs.

4.3.1 Dynamic Testing

During the first dynamic test the ^{131}I tracer was observed in less than 1 minute at the GRM detector and within 6 minutes at the GRB detector. No increase gamma radiation was observed at the GRT during the entire monitoring time.

Following the first dynamic test, a log out of position (dataset pass7) was conducted from approximately 1,502 feet to 1,286 feet bls while continuing to inject at 7 gpm. The GRB and GRM detectors identified iodine staining at the base of the injection tubing at the depth of tracer ejection, 1,486 feet bls. Apart from the iodine staining, the gamma radiation log showed very good correlation with background radiation. After flushing, the gamma radiation log (pass8) indicated that the iodine stain at the base of the injection tubing was still present, but smaller in magnitude. No external MI problems were noted in RO IW-1 during the dynamic external MI testing.

During the second dynamic test the ^{131}I tracer was observed within 1 minute 20 seconds at the GRM detector and within 6 minutes at the GRB detector, which are similar to results from the first dynamic test. The final background gamma radiation log (pass11) showed a good correlation with the initial background gamma radiation log (BGGR) within the 6-inch injection tubing. The results of the two dynamic external RTS tests were conclusive in demonstrating the external MI of the GIWA RO IW-1 injection well.

TABLE 4-2
Summary of Geophysical Logs Conducted during the GIWA Injection Well External RTS, July 18, 2005

	Dataset	Interval Logged (1)(3)	Logging Performed (2)	Injection Rate (gpm)(fluid velocity (fpm))(5)	Comments
	HRT	0 feet -1,700 feet	T, del-T, GR	----	Static temperature down pass
	BGGR	1,700 feet - 0 feet	GR	----	Initial background gamma up pass
	Pass 5	1,534 feet -1,460 feet	GR, CCL	----	Bottom of casing at 1,491 feet bls
Dynamic Tests	pass 6	Time Drive(4)	GR	7 gpm (5 fpm)	Eject 1 mCi @ 1,486 feet (5 feet above casing bottom)
	pass 7	1,502 feet - 1,286 feet	GR	7 gpm (5 fpm)	(LOP) Log Out of Position
	pass 8	1,502 feet - 1,448 feet	GR	----	Log after flush
	pass 9	Time Drive	GR	7 gpm (5 fpm)	Eject 1 mCi @ 1,486 feet (5 feet above casing bottom)
	pass 10	1,502 feet - 1,286 feet	GR	7 gpm (5 fpm)	LOP
	pass 11	1,614 feet - 0 feet	GR, CCL	----	Log after flush. Eject remaining tracer. Final background gamma up pass.

GIWA WTP Injection Well Specifications

	FRP Tubing Diameter (in.)	FRP Tubing Depth (ft bls)	Casing Diameter (in.)	Casing Depth (ft bls)	Current Well Depth (ft bls)	Original Well Depth (ft bls)
RO IW-1	6	1,486	12	1,491	1,697	1,700

(1) Depths indicated are referenced as feet below land surface.

(2) CCL: Casing Collar Locator; GR: Gamma Radiation; T: Temperature; del-T: Differential Temperature

(3) Casing/well depths were determined with video camera

(4) Time Drive: stationary tool

(5) Velocity maximum 5 fpm within 6-inch diameter tubing

SECTION 5

Summary and Recommendations

5.1 Summary

GIWA has successfully completed internal and external MI demonstrations of its injection well RO IW-1. These demonstrations were conducted in accordance with the FDEP-approved testing program that included two annular monitoring zone pressure tests, external radioactive tracer surveys, a downhole video survey, and static temperature logging. The initial pressure test was completed on May 18, 2006 which satisfied the FDEP's June 6 deadline. The RTS survey was completed on July 6, 2006, which satisfied FDEP's deadline of September 18, 2006. By repeating the pressure test on July 12, 2006, subsequent MI testing will be required prior to July 6, 2011.

The test results indicate no leaks in the well casing, the injection tubing, or around the positive seal packer. The RTS testing indicates no vertical fluid movement outside the injection tubing or behind the well casing, demonstrating internal and external mechanical integrity for GIWA's RO IW-1. The FDEP representatives present during the internal MI testing activities were satisfied with the results of the testing and have indicated such by their acceptance of the pressure test results.

5.1.1 Downhole Video Surveys

The downhole video survey was performed first and provided visual data from land surface to the total available logging depth. The injection tubing and the lowermost 5 feet of the 12-inch diameter casing were observed to be in good condition.

5.1.2 Internal Mechanical Integrity

The annular zone pressure tests conducted on May 18, 2006 and on July 12, 2006 were determined successful. Over the course of the tests the pressure changes in the last hour were 1.3 percent and 1.7 percent, respectively. These pressure changes are well within the 5 percent pressure change allowed by state regulations, and convincingly demonstrated the internal MI of the well casing, packer, and the FRP injection tubing.

5.1.3 External Mechanical Integrity

External MI was tested using a RTS to establish if vertical fluid movement occurs immediately adjacent to the outside of the casing. Each of the two RTS tests established that the GIWA injection well has maintained external MI.

5.2 Recommendations

Based on the results of the internal and external MI demonstrations of the GIWA injection well, CH2M HILL offers the following general recommendations:

- Continue to operate the injection well as designed and at the current permitted injection pressures and rates. The well successfully demonstrated internal and external MI, as required every 5 years by state regulations.
- Monitor the injection capacity closely over the next 5-year period to ensure proper well operation and efficiencies.
- Based on the date of the RTS survey, the next demonstration of mechanical integrity for RO IW-1 will be required prior to July 6, 2011.

Appendix A

FDEP-Approved MIT Testing Plan

CH2MHILL

CH2MHILL
4350 West Cypress Street
Suite 600
Tampa, FL 33607-4155
Tel 813.874.0777
Fax 813.874.3056

May 10, 2006

Jack Myers, P.G.
FDEP
2295 Victoria Avenue
Suite 364W
Ft. Myers, Fl 33901

Subject: Gasparilla Island Water Association, Inc. RO Water Treatment Plany Injection Well Mechanical Integrity Testing Plan - Operation Permit No. 43980-012-UO

Dear Mr. Myers,

Per your emailed comments on May 9, 2006, the previous testing plan has been modified to incorporate Florida Department of Environmental Protection (FDEP) comments. This letter is prepared to obtain approval from the FDEP for the Mechanical Integrity (MI) test demonstrations at the Gasparilla Island Water Association (GIWA) injection well permitted under FDEP permit number 43980-012-UO. Construction details of this injection well are presented in Figure 1. This plan was prepared to fulfill the requirements of Chapters 62-528.300(6) and 62-528.425(1), Florida Administrative Code, which stipulate that all Class I injection wells demonstrate internal and external mechanical integrity at least once every five years. The last mechanical integrity test of the GIWA injection well was conducted on June 6th, 2001 (annular pressure test) September 18th, 2001 (radioactive tracer survey). The deadlines for the annular pressure test and radioactive tracer survey (RTS) are June 6th, 2006 and September 18th, 2006, respectively.

From a scheduling standpoint, conducting both tests together would be ideal. However, during the dry season, generally from November into June, GIWA's potable water demands are at their peak and GIWA is typically operating their RO water treatment plant (WTP) at nearly full capacity. Shutting down the WTP for the injection well RTS during June may create a hardship for GIWA and their customers. In accordance with the permit deadline for the RTS, it is proposed that the well annulus pressure test will be run to meet the June 5th, 2006 deadline, then be conducted again prior to September 2006 when the RTS is performed. Following completion of the RTS testing, subsequent MI testing would then be scheduled concurrently. A minor permit modification is being prepared requesting that the RTS be allowed to be conducted after June 5 and prior to September 18, 2006.

Purpose

The purpose of the tests is to determine whether the injection well has adequate mechanical integrity. Mechanical integrity shall be established as follows:

1. Determine the presence of injection well casing leaks by pressure testing the final casing.

2. Determine the presence of fluid movement through channels adjacent to the injection well bore by conducting a radioactive tracer survey (RTS).

Guidelines

The following guidelines will be used during the MI test demonstrations:

1. Injection will cease to the injection well and the well will be shut in for for a period of time to allow for pressure equilibration. This time is expected to be approximately 2 hours. The temperature of the brine water and the temperature of the monitoring zone water are similar enough that an extended equilibration period is not expected.
2. In 2001, the annular zone (prior to operational testing) was pressure tested at 105 pounds per square inch (psi). The pressure will be monitored with a pressure gauge calibrated within 6 months prior to testing. For this annular pressure test, the annular zone will again be pressurized to 105 psi and monitored for a minimum of one hour for any pressure change. Internal MI will be demonstrated if there is no more than a 5 percent pressure change within the one-hour test period.
3. A borehole television survey will be used to evaluate the condition of the casing and open hole prior to pressure testing the final casing. This survey will be the initial testing activity.
4. RTS methodology will be utilized to demonstrate external MI. This will be the third testing activity. A diagram of this RTS logging probe is presented in Figure 2.
5. The FDEP shall be notified 72 hours prior to the testing activities for MI on the injection well. Daily communication with the FDEP South District Office shall be maintained throughout the testing period.
6. An engineering report will be prepared documenting the results of the MI testing activities. Within 20 days of completion of the MI test demonstrations, GIWA shall submit copies of the final report summarizing the results of the testing program to the FDEP for review and approval. The report shall be signed and sealed by a Florida

registered Professional Engineer and Professional Geologist. If any test fails a corrective action plan shall be included for all discovered deficiencies.

Procedures

The following procedures will be used during the MI test demonstrations:

1. General

1.1. A pre-construction meeting will be held at the site of the injection well prior to initiating work. Representatives from GIWA, FDEP, and the logging subcontractor will be invited to attend.

1.2. All testing shall be initiated during daylight hours, Monday through Friday. No work will be scheduled for weekends or legal holidays.

1.3. All geophysical logging tools will be calibrated within 1 week of initiating testing activities. In addition, gamma radiation detectors shall be field calibrated by the geophysical logging crew upon mobilization at each injection well.

1.4. The tracer iodine 131 (I^{131}) will be dated less than one half-life (8 days) at the time of actual use during testing. The logging subcontractor will be required to provide a manufacturer's certification and other appropriate documentation to support this.

1.5. All mechanical and digital gauges used for flow and pressure measurements will be calibrated within 6 months of actual testing. The logging subcontractor will be required to provide adequate documentation, including the calibration data and certification, to support this.

1.6. The RTS probe shall be emptied of all tracer material prior to the removal of the geophysical tool from the well.

2. Borehole Television Survey

2.1. Notify FDEP at least 72 hours prior to initiating the borehole television survey.

2.2. Run a borehole television survey of the entire injection well (casing and open borehole). Center downhole camera in the casing using centralizers appropriate for the diameter of the GIWA injection well casing and borehole. The outer diameter of the final steel casing is 6.625 (6-5/8) inches and it is rated at 32 pounds per foot well casing. The inner diameter of the well casing is 5.675 inches.

2.3. Clarity will be monitored closely. Flushing the well with potable or well production water may be required during the survey to enhance clarity.

3. External Mechanical Integrity Test Demonstrations

Dynamic External MI Testing Activities

3.1. A background gamma ray and temperature log will be conducted for the entire well depth prior to performing the dynamic external MI test. A Casing Colar Locator (CCL) will be used during each logging run throughout the RTS to locate the bottom of the steel casing.

3.2. Position RTS logging probe ejector port approximately 5 feet above the base of the well casing and eject a quantity of I^{131} with an activity of 1 mCi while injecting into the well at a downhole velocity not to exceed 5 feet per minute (7 gpm). Downhole velocity shall be calculated by directly measuring flow with a flowmeter/totalizer device over a small fixed period (e.g., 1 to 5 minutes). The flow rate will be capable of being precisely incremented so that the rate remains consistent throughout the testing each day.

3.3. With the tool stationary, monitor for upward migration of the plume external to the well casing for at least 60 minutes under dynamic conditions. After this 60 minute period, the well will be logged upward to at least 200 feet above the bottom of the casing prior to flushing.

3.4. Using 2 to 3 casing volumes of well with potable or well production water, flush tracer material below the base of the casing to perform additional testing.

3.5. Log through area affected by static radioactive plume to verify plume has been properly flushed and to identify areas that may have become stained by the I^{131}.

3.6. Repeat steps 3.2 through 3.5 above, except the monitoring period shall be 30 minutes.

3.7. Run a final gamma ray log from approximately 100 feet below the base of the casing to land surface.

3.8. Review dynamic external MI test results with FDEP representative(s) and logging subcontractor in field. Repeat the dynamic external MI test as necessary to confirm external MI on the injection well.

Please call me at 813.874.0777 (x4116) if you have any questions concerning this MIT plan approval request.

Sincerely,

CH2M HILL

Michael Weatherby, P.G.
Project Manager

c: Bonnie Pringle/GIWA
Joe Haberfeld/FDEP
Ron Reese/USGS
Steve Anderson/SFWMD
Nancy Marsh/EPA

Appendix B

Video Log Summary and Video

Underwater TV Survey Record

CH2MHILL

Project: Gasparilla Island Water Association
Well: RO IW-1
Survey By: MV Geophysical

Survey Date: July 6, 2006 **Total Depth:** 1,681 feet
Witnessed By: Michael Weatherby / CH2M HILL

Reviewed By: Mike Weatherby / CH2M HILL
Remarks: All depths referenced to land surface

Depth in Feet From	To	Observations
0	100	FRP tubing joints at 4 feet, 14 feet, 34 feet, 63 feet, and 93 feet
100	200	FRP tubing joints at 122 feet, 152 feet, 181 feet
200	300	FRP tubing joints at 210 feet, 240 feet, 269 feet, and 299 feet
300	400	FRP tubing joints at 328 feet, 358 feet, and 388 feet
400	500	FRP tubing joints at 417 feet, 447 feet, and 477 feet
500	600	FRP tubing joints at 506 feet, 536 feet, 566 feet, and 595 feet
600	700	FRP tubing joints at 625 feet, 655 feet, and 684 feet
700	800	FRP tubing joints at 714 feet, 744 feet, and 773 feet
800	900	FRP tubing joints at 803 feet, 833 feet, 863 feet, and 892 feet
900	1000	FRP tubing joints at 922 feet, 952 feet, and 981 feet
1000	1100	FRP tubing joints at 1,011 feet, 1,040 feet, 1,070 feet, and 1,100 feet
1100	1200	FRP tubing joints at 1,129 feet, 1,159 feet, and 1,188 feet
1200	1300	FRP tubing joints at 1,218 feet, 1,248 feet, and 1,277 feet
1300	1400	FRP tubing joints at 1,307 feet, 1,337 feet, 1,366 feet, and 1,396 feet
1400	1500	FRP tubing joints at 1,426 feet and 1,455 feet; Bottom of FRP tubing at 1,486 feet; Bottom of 12-inch steel casing at 1,491 feet; Lowermost 5 feet of 12-inch casing appears to be in good condition.
1500	1600	Borehole enlarges at 1,526 feet; Cavernous zone between 1,531 feet and 1538 feet; Cavernous zone between 1,567 feet and 1,574 feet; Cavernous zone between 1,578 feet and 1,584 feet; Cavernous zone between 1,586 feet and 1,590 feet
1600	1700	Borehole Enlarges at 1,607 feet; Circular band of dark material at 1,610 feet; Relatively large canvernous zone between 1,611 feet and 1,642 feet; Extreme turbidity encountered at 1,681 feet. Unwilling to enter with camera
	1700	Original borehole depth (April 2001)

Appendix C

Pressure Gauge and Flow Meter Calibration

BNI

PMB #213
Naples, FL 44119
Phone: 239-455-7008
Fax: 239-352-7097
Cell: 239-398-1115

SERVICE REPORT

CUSTOMER NAME: Gasparilla Water Association
REGULAR HOURS: N/A

PLANT NAME Gasparilla Injection Well
OVERTIME HOURS: N/A

DATE: 10-Jul-06
MILES: N/A

CUSTOMER PO NUMBER: Per Contract
EXPENSES: N/A

FIELD ENGINEER: CHARLIE MARCOM
TOTAL: No charge

PROJECT QUOTE NUMBER: 10045-GWA
COMPLETED? ☒ YES ☐ NO

CALIBRATION: ☒ YES ☐ NO
CONTRACT? ☒ YES ☐ NO

EMERGENCY CALL NUMBER: N/A
CALIBRATION CALL NUMBER: N/A

SERVICE PERFORMED: **Calibrated the following instruments:**

Checked calibration of WIKA 0-160 psi analog gauge
P/N 9834591
Test calibration equipment
Fluke 718100GPC Pressure calibrator
Range 0-200 psi
S/N 7969053 Date last calibrated 9/23/05

Meter reads zero @ zero pressure
Tested meter @ 40 psi, 80 psi, 120 psi and 160 psi
Fluke meter reads 40.0 psi, 79.9 psi, 120.0 psi and 158.7 psi
respectively

Total accuracy: 100.35%
No adjustments required to guage

Name on Purchasing Card: ______
Card Type: Visa: ____ M/C: ____
Purchasing Card Number: ______
Expiration Date: ______

BY HIS/HER STATEMENT BELOW, CUSTOMER (1) AGREES TO PAY FOR THE WORK DESCRIBED IN THIS SERVICE REPORT AT THE CURRENT RATES AND CHARGES OF BNI LLC. AND (2) ACKNOWLEDGES THAT THE WORK REQUESTED BY CUSTOMER HAS BEEN PERFORMED BY A BOK NYU INSTRUMENTATION REPRESENTATIVE IN A SATISFACTORY MANNER.

Customer Signature: Kery Fogarty
Date: 7-10-06

Customer Comments: ______

JSABlueBook

.O. Box 9004
urnee, IL 60031-9004
ALL BEFORE RETURNING PRODUCTS.

PACKING LIST

www.usabluebook.com
FAX: (847) 689-3030
TOLL FREE:1-800-548-1234
F.E.I.N.: 36-3645787
INTERNATIONAL DIRECT: (847) 689-3000

SALES ORDER #	104278
PAGE	1 of 1
DATE	05/12/06

1

SHIP TO
GASPARILLA ISLAND
ATTN: KERRY FOGARTY
WATER ASSOCIATION
1700 E RAILROAD AVE
BOCA GRANDE, FL 33921

BILL TO
GASPARILLA ISLAND WATER ASSN
PO BOX 310
BOCA GRANDE FL 33921

CUSTOMER P.O. #	ORDER DATE		SLP.	TERMS	W/H	FREIGHT	SHIP VIA
RRY	05/12/06	ASAP or 05/17/06	JLC	1%/10 NET 30	01	PREPAID	UPSBLUE

A STOCK #	DESCRIPTION	ORDERED	SHIPPED	BACK ORDER	U/M	PAGE	LOC.
163	Wika Process Gauge - 0-160PSI 4-1/2"Face - 1/4"NPT Bottom	1	|		EA	744	2M-09-2B
689	316 SS Bushing 1/2" x 1/4"NPT	1	|		EA	744	20-28-5C

ank you for your order. JANICE CRAIG
UPSBLUE * UPSBLUE * UPSBLUE * UPSBLUE * UPSBLUE * 941

2.1

ked by: ______ Checked by: ______ Packed by: ______

Appendix D

Annular Zone Pressure Test Data Sheets

CH2MHILL MIT ANNULAR ZONE PRESSURE TEST DATA

Site Activity: **Final Annular Zone Pressure Test**
Date: May 18, 2006
Observers: Jack Myers/FDEP, Michael Weatherby/CH2M HILL, and [?]/GIWA

Time	Pressure (psi)	Pressure Change (psi)	Pressure Change (%)
Jack Myers/FDEP arrives onsite (time 0=10:05 am)			
10:05 AM	118.0	0.0	0.0
10:48 AM	119.0	1.0	0.8
11:05 AM	119.5	1.5	1.3
end of test - FDEP approved			

CH2MHILL MIT ANNULAR ZONE PRESSURE TEST DATA

Site Activity: **Final Annular Zone Pressure Test**
Date: July 12, 2006
Observers:
Jack Myers/FDEP, Michael Weatherby/CH2M HILL, Pete Larkin/CH2M HILL, and [?]/GIWA

Time	Pressure (psi)	Pressure Change (psi)	Pressure Change (%)
Jack Myers/FDEP arrives onsite (time 0=8:54 am)			
8:54 AM	116.5	0.0	0.0
9:07 AM	117.0	0.5	0.4
9:29 AM	117.5	1.0	0.9
9:38 AM	118.0	1.5	1.3
9:46 AM	117.5	1.0	0.9
9:52 AM	118.5	2.0	1.7
9:55 AM	118.5	2.0	1.7
end of test - FDEP approved			

Appendix E

RTS Geophysical Logs

MV Geophysical

HIGH RESOLUTION TEMPERATURE LOG

Company	Gasparilla Island WA
Well	IW-1
Field	Rotunda
County	Charlotte
State/Prv	Florida

Company	Gasparilla Island Water Assoc.
Well	IW-1
Field	Rotunda
County	Charlotte
State/Prv	Florida
Location	Gasparilla Island Water Association Cape Haze / Rotunda RO Facility CH2M Hill, Inc.
Other Services	RTS HRT VIDEO
Permanent Datum	Pad Level
Log Measured From	Pad Level
Drilling Measured From	Pad Level
Elevation	
Elevation K.B.	
Elevation D.F.	
Elevation G.L.	

Date	6-JUL-2006
Run Number	MIT '06
Depth Driller	1700'
Depth Logger	1691'
Bottom Logged Interval	1691'
Top Log Interval	SURFACE
Open Hole Size	11"
Type Fluid	WATER
Density / Viscosity	NA/NA
Max. Recorded Temp.	89.4 degF
Estimated Cement Top	NA
Time Well Ready	10:00 7/6/06
Time Logger on Bottom	16:00 7/6/06
Equipment Number	MVGS-1
Location	Ft. Myers
Recorded By	S.Miller/C.Miller
Witnessed By	M.Weatherby (CH2M) P.Larkin (CH2M)

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
ONE	11"	1491'	1700'				

Casing Record	Size	Wgt/ft	Top	Bottom
Surface String	12"	0.375" WT	SURFACE	1491'
Prot. String	6" FRP	NA	SURFACE	1486'
Production String				
Liner				

Invoice No. 2006196

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Comments

TEMPERATURE CALIBRATION REPORT
(performed: 6-JUN-2006 09:15)

DEG-F	CPS
35.3	145.22
148.7	2733.27

MV Geophysical — Background Temperature

Database File:	giwaiw16.db
Dataset Pathname:	HRT
Presentation Format:	hrtgiwa1.prs
Dataset Creation:	Thu Jul 06 19:02:06 2006
Charted by:	Depth in Feet scaled 1:240

Gamma Ray Calibration Report

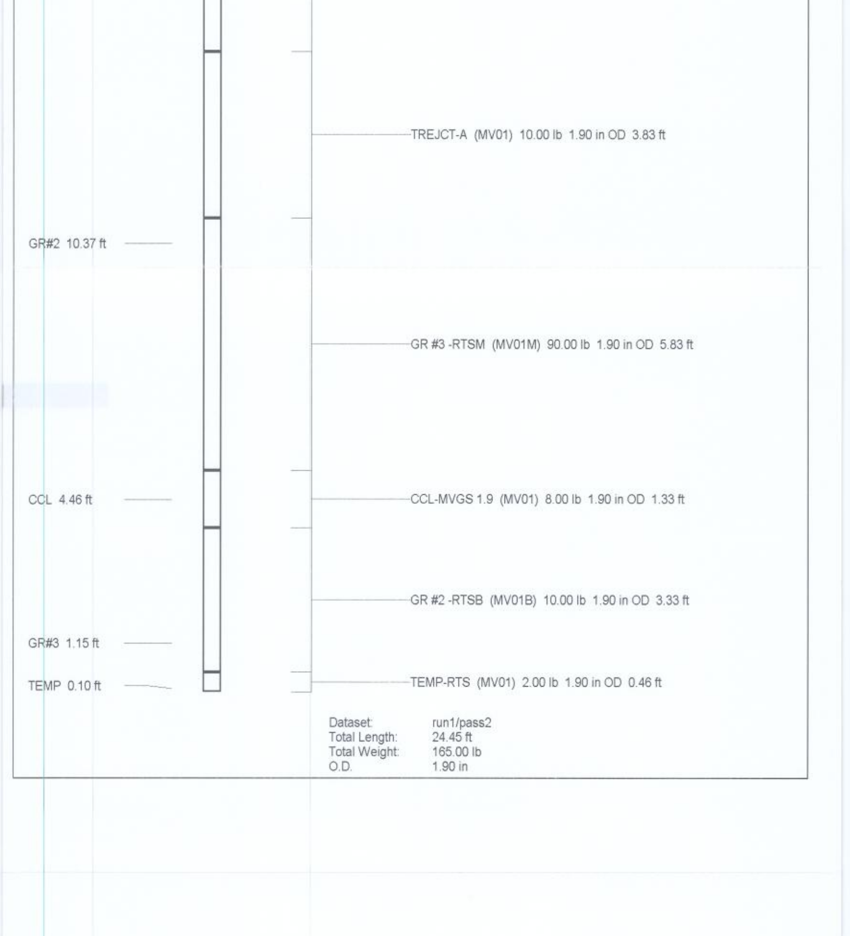
Serial Number:	MV01B	
Tool Model:	RTSB	
Performed:	Thu Jul 06 17:00:08 2006	
Calibrator Value:	120	GAPI
Background Reading:	18.181	cps
Calibrator Reading:	188.721	cps
Sensitivity:	0.703647	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	MV01M	
Tool Model:	RTSM	
Performed:	Thu Jul 06 17:00:03 2006	
Calibrator Value:	120	GAPI
Background Reading:	26.3461	cps
Calibrator Reading:	141.241	cps
Sensitivity:	1.04443	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	MV01T	
Tool Model:	RTST	
Performed:	Thu Jul 06 17:00:14 2006	
Calibrator Value:	120	GAPI
Background Reading:	33.2612	cps
Calibrator Reading:	153.283	cps
Sensitivity:	0.999817	GAPI/cps



Dataset:	run1/pass2
Total Length:	24.45 ft
Total Weight:	165.00 lb
O.D.	1.90 in

MV Geophysical

RADIOACTIVE TRACER SURVEY

Company	Gasparilla Island Water Assoc.
Well	IW-1
Field	Rotunda
County	Charlotte
State/Prv	Florida
Location	Gasparilla Island Water Association Cape Haze / Rotunda RO Facility CH2M Hill, Inc.
Other Services	RTS HRT VIDEO
Permanent Datum	Pad Level
Log Measured From	Pad Level
Drilling Measured From	Pad Level
Elevation	K.B. D.F. G.L.

Date	6-JUL-2006
Run Number	MIT '06
Depth Driller	1700'
Depth Logger	1691'
Bottom Logged Interval	1691'
Top Log Interval	SURFACE
Open Hole Size	11"
Type Fluid	WATER
Density / Viscosity	NA/NA
Max. Recorded Temp.	89.4 degF
Estimated Cement Top	NA
Time Well Ready	10:00 7/6/06
Time Logger on Bottom	17:00 7/6/06
Equipment Number	MVGS-1
Location	Ft Myers
Recorded By	S.Miller/C.Miller
Witnessed By	M.Weatherby (CH2M) P.Larkin (CH2M)

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
ONE	11"	1491'	1700'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	12"	0.375" WT	SURFACE	1491'
Prot. String	6" FRP	NA	SURFACE	1486'
Production String				
Liner				

Invoice No. 2006196

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Comments

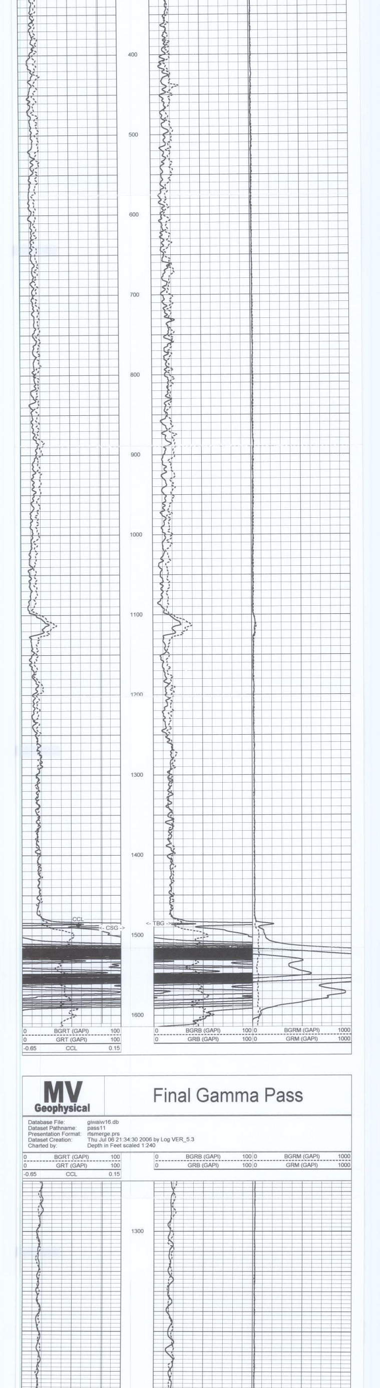
"Real Time" curves are presented as "solid lines".
"Memorized Background" curves presented as "dashed lines".

Tracer Solution: I-131 (assay 7/6/06)

Ejector is 13.75' above tool bottom (zero point).

MV Geophysical — Final Gamma Pass

Database File: giwaiw16.db
Dataset Pathname: pass11
Presentation Format: rtsmerge.prs
Dataset Creation: Thu Jul 06 21:34:30 2006 by Log VER_5.3
Charted by: Depth in Feet scaled 1:600



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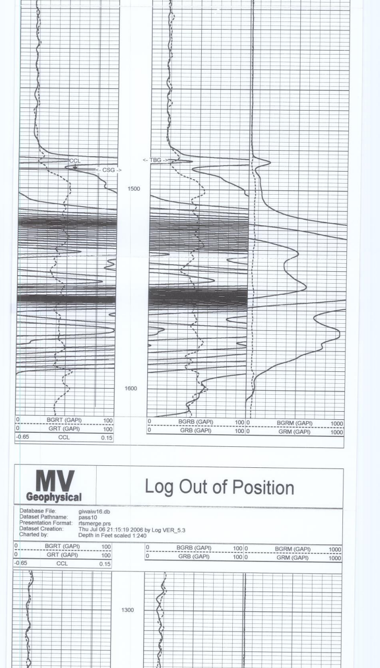
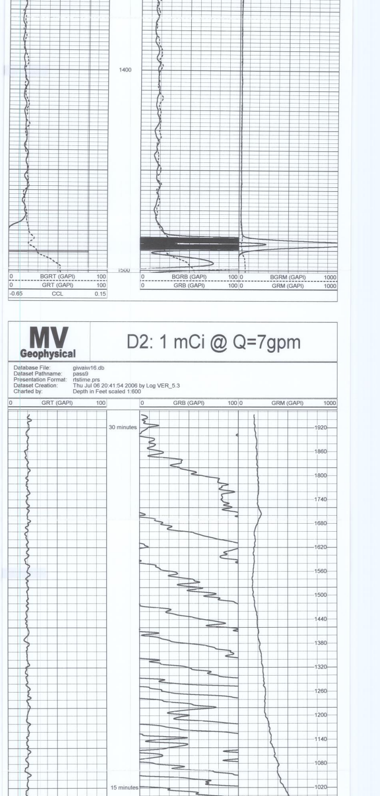
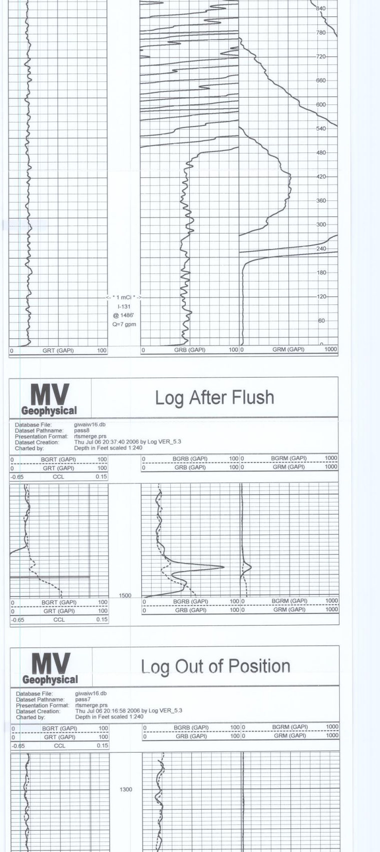


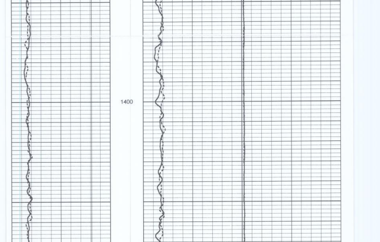
MV Geophysical — Log Out of Position



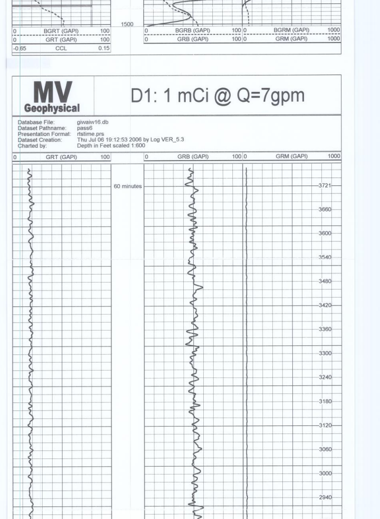
MV Geophysical — D2: 1 mCi @ Q=7gpm



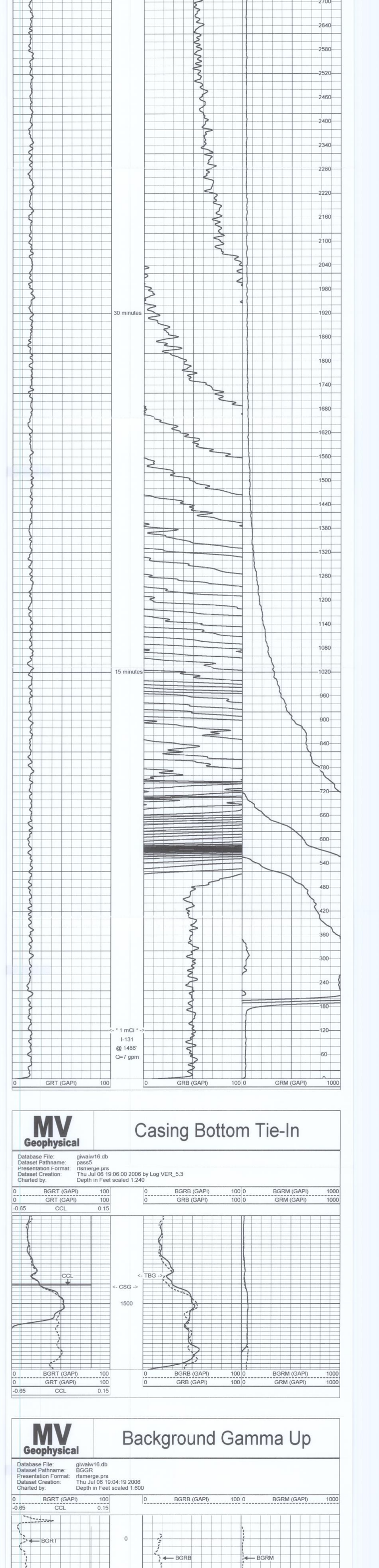
MV Geophysical — Log After Flush



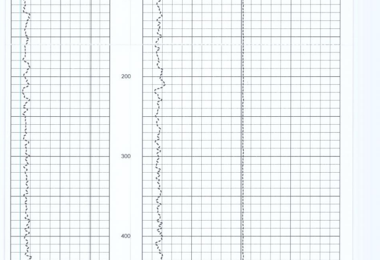
MV Geophysical — Log Out of Position



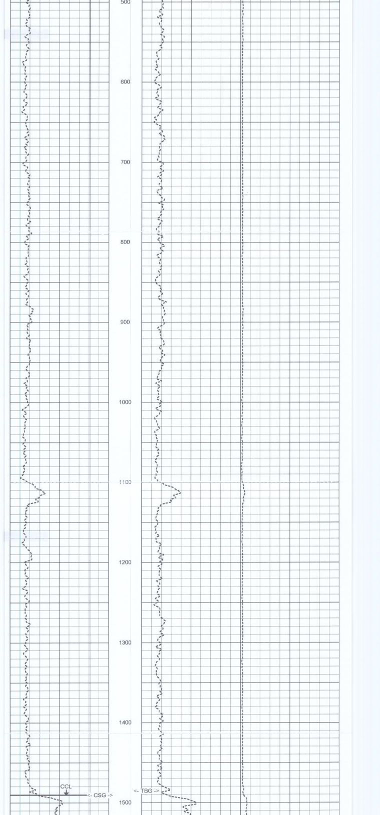
MV Geophysical — D1: 1 mCi @ Q=7gpm



MV Geophysical — Casing Bottom Tie-In



MV Geophysical — Background Gamma Up



Gamma Ray Calibration Report

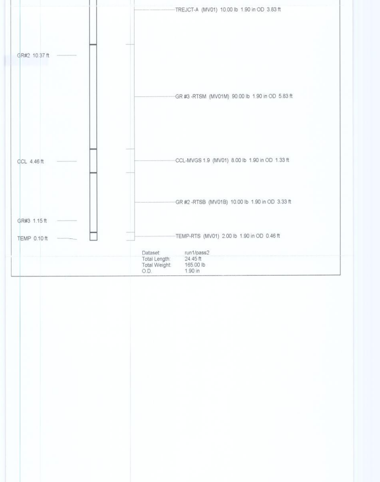
Serial Number:	MV01B	
Tool Model:	RTSB	
Performed:	Thu Jul 06 17:00:08 2006	
Calibrator Value:	120	GAPI
Background Reading:	18.181	cps
Calibrator Reading:	188.721	cps
Sensitivity:	0.703647	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	MV01M	
Tool Model:	RTSM	
Performed:	Thu Jul 06 17:00:03 2006	
Calibrator Value:	120	GAPI
Background Reading:	26.3461	cps
Calibrator Reading:	141.241	cps
Sensitivity:	1.04443	GAPI/cps

Gamma Ray Calibration Report

Serial Number:	MV01T	
Tool Model:	RTST	
Performed:	Thu Jul 06 17:00:14 2006	
Calibrator Value:	120	GAPI
Background Reading:	33.2612	cps
Calibrator Reading:	153.283	cps
Sensitivity:	0.999817	GAPI/cps



Dataset: run1/pass2
Total Length: 24.45 ft
Total Weight: 165.00 lb
O.D. 1.90 in