APPENDIX C
PRESSURE TEST RESULTS

IW-1
PRESSURE TEST GAUGE CALIBRATION CERTIFICATION

Received 7-15-05

KELI **Kimball Electronic Laboratory, Inc.**

Precision Measurement Equipment Specialists

Certificate of Calibration # 152916

YOUNGQUIST BROTHERS, INC.

15465 PINE RIDGE ROAD
FORT MYERS, FL 33908

Customer P.O.# N/A
Manufacturer: MCDANIEL
Model Number: 300 PSI
Nomenclature: PRESSURE TEST GAUGE
SN/ID/Asset # 101504-3
Bar Code # N/A
Specifications: +1-.5%
Cal. Procedure: SYN54
KELI Control # YOU-52916

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through certified standards maintained in the laboratories of KELI Labs., Inc. or derived by the ratio of self-calibration techniques and is guaranteed to meet published specifications. The metrology procedures utilized satisfy the requirements set forth in ANSI/NCSL 540-1.

In Tolerance When Received? Y Cal. Tech: 111 Relative Humidity: 50% Temperature: 70 Deg. F

In-House [Y] Cal. Cycle: 6 Mos. Calibration Date: 07/11/2005 Calibration Due: 01/11/2006

Remarks: RECEIVED UNIT LEAKING, REPAIRED GASKET AND PERFORMED ROUTINE CALIBRATION/CERTIFICATION

Standards Used

I.D. #		Cal. Date	Cal. Due
391	EATON UPS 3000BAA PRESSURE INDICATOR	02/17/2004	02/28/2006

Quality Assurance

Kimball Electronic Lab., Inc. - 8881 W. 21 Lane - Hialeah, Florida 33016

KCLI

CONTROL # : 308460

CUSTOMER : YOU410

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

CALIBRATION DATA FORM

MFR:	MCDANIEL	DESCRIPTION :	PRESSURE TEST GAUGE
MODEL # :	300 PSI	TECHNICIAN :	111
SERIAL # :	101504-3	CAL DATE :	07/11/2005
ID #:	101504-3	DUE DATE :	01/11/2006

* IF NO "AS LEFT" READING IS SHOWN ON THIS CHART, IT MEANS THE UNIT WAS IN TOLERANCE AND THERE WERE NO ADJUSTMENTS MADE TO IT.

RANGE	NOMINAL	AS FOUND	AS LEFT *	LOW LIMIT	HIGH LIMIT
300					
PSI	100	100.0		98.5	101.5
	150	150.0		148.5	151.5
	200	201.0		198.5	201.5
	250	251.0		248.5	251.5
	300	301.0		298.5	301.5

FORM 01BLANKDATASHEET

IW-1
PRESSURE TEST ON THE 16-INCH OD FINAL CASING
Performed 7-15-05

IW-1 PRESSURE TEST DATA

15-Jul-05

CITY OF MIRAMAR **WTP CONCENTRATE INJECTION WELL MODIFICATION**

JOBNUMBER 1570820

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Susan Bodmann

COUNTY: Broward
OWNER: City of Miramar

DESCRIPTION OF OPERATIONS:
Pressure test 16-inch OD final casing in IW-1

START TIME: 1627 hours
FINISH TIME: 1814 hours
CASING SIZE: 16-inch OD:15-inch ID
GAGE SERIAL NUMBER: 152916

INITIAL PRESSURE: 1st test - 133 psi: 2nd test - 130 psi
5% on 1st Test = 6.6 psi 5% on 2nd Test = 6.5 psi

PACKER PRESSURE: 420 psi

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
7/15/05 16:27	0	133	
7/15/2005 16:32	5	132.5	0.5
7/15/05 16:37	10	132	1
7/15/2005 16:42	15	131	2
7/15/05 16:47	20	130	3
7/15/2005 16:52	25	129	4
7/15/05 16:57	30	128.5	4.5
7/15/2005 17:02	35	128	5
7/15/05 17:07	40		Test aborted. Leak located in weld on pressure-head. Decision to seal
			with silcon gell and hold pressure on leak to start new test.
7/15/2005 17:14	0	130	
7/15/05 17:19	5	129.7	0.3
7/15/2005 17:24	10	129.1	0.9
7/15/05 17:29	15	129	1 Applied pressure to leak area with work rags
7/15/2005 17:34	20	128	2
7/15/05 17:39	25	127.5	2.5
7/15/2005 17:44	30	127	3
7/15/05 17:49	35	126	4
7/15/2005 17:54	40	125.5	4.5 Applied pressure to leak area with work rags
7/15/05 17:59	45	125	5
7/15/2005 18:04	50	124	6
7/15/05 18:09	55	123.9	6.1
7/15/2005 18:14	60	123.5	6.5
			Met the criteria of no more than 5% loss of pressure over one hour.
			Bleed off:
			5 gal - 75 psi
			10 gal - 30 psi
			14 gal - 0 psi

Observers' Initials

IW-1
PRESSURE TEST ON THE 10.75-INCH FRP TUBING
Performed 8-11-05

IW-1 PRESSURE TEST DATA

11-Aug-05

CITY OF MIRAMAR — **WTP CONCENTRATE INJECTION WELL MODIFICATION**

JOBNUMBER: 1570820

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Susan Bodmann

COUNTY: Broward
OWNER: City of Miramar

DESCRIPTION OF OPERATIONS: Pressure test 10-inch FRP Cemented Tubing in IW-1

START TIME: 10:17
FINISH TIME: 11:17
CASING SIZE: 9.76-inch OD:8.85-inch ID
GAGE SERIAL NUMBER: 152916

INITIAL PRESSURE: 130.5 psi

PACKER PRESSURE: 340 psi

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
8/11/2005 10:17	0	130.50	
8/11/2005 10:23	6.5	130.50	
8/11/2005 10:27	10	130.25	
8/11/2005 10:32	15	130.25	
8/11/2005 10:37	20	130.00	
8/11/2005 10:42	25	130.00	
8/11/2005 10:47	30	130.00	
8/11/2005 10:52	35	129.75	
8/11/2005 10:57	40	129.75	
8/11/2005 11:02	45	129.50	
8/11/2005 11:07	50	129.50	
8/11/2005 11:12	55	129.50	
8/11/2005 11:17	60	129.50	
			Bleed off: 5 gal - 26 psi
			2 gal - 0 psi

Observers' Initials:

IW-2
PRESSURE TEST GAUGE CALIBRATION CERTIFICATION

Received 10-13-05

KELI

Kimball Electronic Laboratory, Inc.

Precision Measurement Equipment Specialists

Certificate of Calibration # 169537

YOUNGQUIST BROTHERS, INC.

15465 PINE RIDGE ROAD
FORT MYERS, FL 33908

Customer P.O.# .
Manufacturer: MCDANIEL
Model Number: 300 PSI
Nomenclature: PRESSURE GAUGE
SN/ID/Asset # 325681
Bar Code # N/A
Specifications: +/-.25%
Cal. Procedure: SYN54
KELI Control # YOU-66232

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through certified standards maintained in the laboratories of KELI Labs., Inc. or derived by the ratio of self-calibration techniques and is guaranteed to meet published specifications. The metrology procedures utilized satisfy the requirements set forth in ANSI/NCSL 540-1.

In Tolerance When Received? Y Cal. Tech: 120 Relative Humidity: 50% Temperature: 70 Deg. F

In-House [Y] Cal. Cycle: 12 Mos. Calibration Date: 10/11/2005 Calibration Due: 10/11/2006

Remarks: PERFORMED ROUTINE CALIBRATION/CERTIFICATION

Standards Used

I.D. #		Cal. Date	Cal. Due
391	EATON UPS 3000BAA PRESSURE INDICATOR	07/05/2005	07/31/2007

Quality Assurance

KELI

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

CONTROL # : 329430

CUSTOMER : YOU410

CALIBRATION DATA FORM

MFR:	MCDANIEL	DESCRIPTION :	PRESSURE GAUGE
MODEL # :	300 PSI	TECHNICIAN :	120
SERIAL # :	325681	CAL DATE :	10/11/2005
ID #:	325681	DUE DATE :	10/11/2006

* IF NO "AS LEFT" READING IS SHOWN ON THIS CHART, IT MEANS THE UNIT WAS IN TOLERANCE AND THERE WERE NO ADJUSTMENTS MADE TO IT.

RANGE	NOMINAL	AS FOUND	AS LEFT *	LOW LIMIT	HIGH LIMIT
300 PSI	50	50.4	50.4	49.25	50.75
	100	100.0	100.0	99.25	100.75
	150	150.0	150.0	149.25	150.75
	200	200.4	200.4	199.25	200.75
	250	250.2	250.2	249.25	250.75
	275	274.9	274.9	279.25	275.75

IW-2
PRESSURE TEST ON THE 16-INCH OD FINAL CASING
Performed 10-13-05

IW-2 PRESSURE TEST DATA

13-Oct-05

CITY OF MIRAMAR **WTP CONCENTRATE INJECTION WELL MODIFICATION**

JOBNUMBER 1570820

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Susan Bodmann

COUNTY: Broward
OWNER: City of Miramar

DESCRIPTION OF OPERATIONS:
Pressure test 16-inch OD final casing in IW-2

START TIME: 08:18 hours
FINISH TIME: 09:18 hours
CASING SIZE: 16-inch OD:15-inch ID
GAGE SERIAL NUMBER: 325681

INITIAL PRESSURE: 138.5 psi

PACKER PRESSURE: Bridge Plug and Cement Used

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
10/13/05 8:18	0	138.5	Start Test
10/13/05 8:23	5	138.5	
10/13/05 8:28	10	138.5	
10/13/05 8:33	15	138.5	
10/13/05 8:38	20	138.0	
10/13/05 8:43	25	138.0	
10/13/05 8:48	30	138.0	
10/13/05 8:53	35	138.0	
10/13/05 8:58	40	137.5	
10/13/05 9:03	45	137.5	
10/13/05 9:08	50	137.0	
10/13/05 9:13	55	137.0	
10/13/05 9:18	60	137.0	
			Met the criteria of no more than 5% loss of pressure over one hour.
			Bleed off:
			5 gal - 88 psi
			10 gal - 44 psi
			15 gal - 0 psi

Observers' Initials_____

IW-2
PRESSURE TEST ON THE 10.75-INCH FRP TUBING

Performed 11-4-05

IW-2 PRESSURE TEST DATA

4-Nov-05

CITY OF MIRAMAR **WTP CONCENTRATE INJECTION WELL MODIFICATION**

JOBNUMBER 1570820

CONTRACTOR: Youngquist Brothers, Inc.

PROJECT MANAGER: Susan Bodmann

COUNTY: Broward
OWNER: City of Miramar

DESCRIPTION OF OPERATIONS: Pressure Test 10.75-inch FRP Casing

START TIME: 10:25 AM
FINISH TIME: 11:25 AM
CASING SIZE: 10.75-inch FRP
GAGE SERIAL NUMBER: 325681

INITIAL PRESSURE: 131 psi

PACKER PRESSURE: 300 psi

TIME	TOTAL MINUTES	PRESSURE	COMMENTS
11/4/05 10:25	0	131	Start Test
11/4/05 10:30	5	131	
11/4/05 10:35	10	131	
11/4/05 10:40	15	131	
11/4/05 10:45	20	131	
11/4/05 10:50	25	131	
11/4/05 10:55	30	131	
11/4/05 11:00	35	130.5	
11/4/05 11:05	40	130	
11/4/05 11:10	45	130	
11/4/05 11:15	50	130	
11/4/05 11:20	55	130	
11/4/05 11:25	60	130	
			Met the criteria of no more than 5% loss of pressure over one hour.
			Bleed off: Approximately 7 gallons
			Packer was set at 2,950 feet below pad level

Observers' Initials_____

APPENDIX D
INSTALLATION OF FIBERGLASS REINFORCED PLASTIC (FRP) TUBING

IW-1
FIBERGLASS REINFORCED PLASTIC (FRP) TUBING SPECIFICATIONS

Submitted 7-25-05

FUTURE PIPE INDUSTRIES, INC.
(TUBULAR FIBERGLASS CORPORATION)
11811 Proctor Road • Houston, Texas 77039
Phone: (281) 847-2987 • Fax: (281) 847-1931

September 2000

RED BOX 1250

FIBERGLASS TUBING, CASING, AND LINERS
AROMATIC AMINE CURED EPOXY RESIN

DIMENSIONAL SPECIFICATIONS

Nominal Size (inches)	Nominal I.D. (inches)	Minimum Drift Dia (inches)	Nominal O.D. (inches)	Nominal Wall (inches)	Pin Upset O.D. (inches)	Max Box OD* (inches)	Nominal Weight (lbs/ft)	Nominal Weight (lbs/joint)	Connection Type API 5B, Table 14*, 7**, 8*** Fourteenth Edition August 98
2-3/8	2.00	1.91	2.21	0.10	2.69	3.47	0.7	21	2-3/8" 8Rd EUE Long**U
2-7/8	2.47	2.37	2.73	0.13	3.19	3.97	1.0	31	2-7/8" 8Rd EUE Long**U
3-1/2		2.90	3.30	0.15	3.85	4.49	1.5	44	3-1/2" 8Rd EUE Long**U
4	3.33		3.68	0.17	4.35	5.18	2.0	61	4" 8Rd EUE Long TC
4-1/2	3.98	3.89	4.38	0.20	4.85	5.49	2.4	73	4-1/2" 8Rd EUE Long**U
5-1/2	4.42	4.33	4.87	0.23	5.60	6.72	3.2	97	5-1/2" 8Rd Cag Long**U
6-5/8	5.43	5.33	5.97	0.27	6.73	8.00	4.8	146	6-5/8" 8Rd Cag Long**U
7	6.21	6.11	6.83	0.31	7.10	8.40	5.8	173	7" 8Rd Cag Long**U
7-5/8	6.21	6.11	6.83	0.31	7.73	9.37	6.4	192	7-5/8" 8Rd Cag Long**U
9-5/8	7.84	7.75	8.63	0.40	9.73	11.84	10.3	309	9-5/8" 8Rd Cag*** U
10-3/4	8.85	8.76	9.76	0.45	10.85	13.14	13.1	394	10-3/4" 8Rd Cag***U
11-3/4	10.72	10.62	11.70	0.49	11.85	14.00	16.0	480	11-3/4" 8/8Rd Cag***TC
13-3/8	11.96	11.89	13.21	0.61	13.48	15.35	22.1	664	13-3/8" 8/8Rd Cag***TC
16	14.48	14.39	15.80	0.66	16.20	18.55	29.9	897	16" 8Rd Cag TC

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

Thread lengths on larger sizes exceed API L4 30 ft Standard Joint Length

PERFORMANCE AND RATINGS (-60 deg F to +210 deg F)

Nominal Size	Internal Pressure Rating (psi)	Mill Test Pressure (psi)	Collapse Rating (psi)	Axial Tension Rating (lbs)	Stretch vs Tension-Over-Pipe-Wt Stretch (ft) = Coeff. x P x L
2-3/8	1,250	1,570	640	10,500	0.467
2-7/8	1,250	1,570	670	16,000	0.295
3-1/2	1,250	1,570	600	22,500	0.221
4	1,250	1,570	640	29,000	0.169
4-1/2	1,250	1,570	580	39,500	0.129
5-1/2	1,250	1,570	600	49,500	0.101
6-5/8	1,250	1,570	590	74,000	0.069
7	1,250	1,570	590	79,500	0.052
7-5/8	1,250	1,570	590	90,000	0.052
9-5/8	1,250	1,570	580	146,500	0.033
10-3/4	1,250	1,570	600	169,000	0.025
11-3/4	1,250	1,570	450	149,000	0.029
13-3/8	1,380	1,740	600	183,000	0.021
16	1,250	1,570	450	248,000	0.016

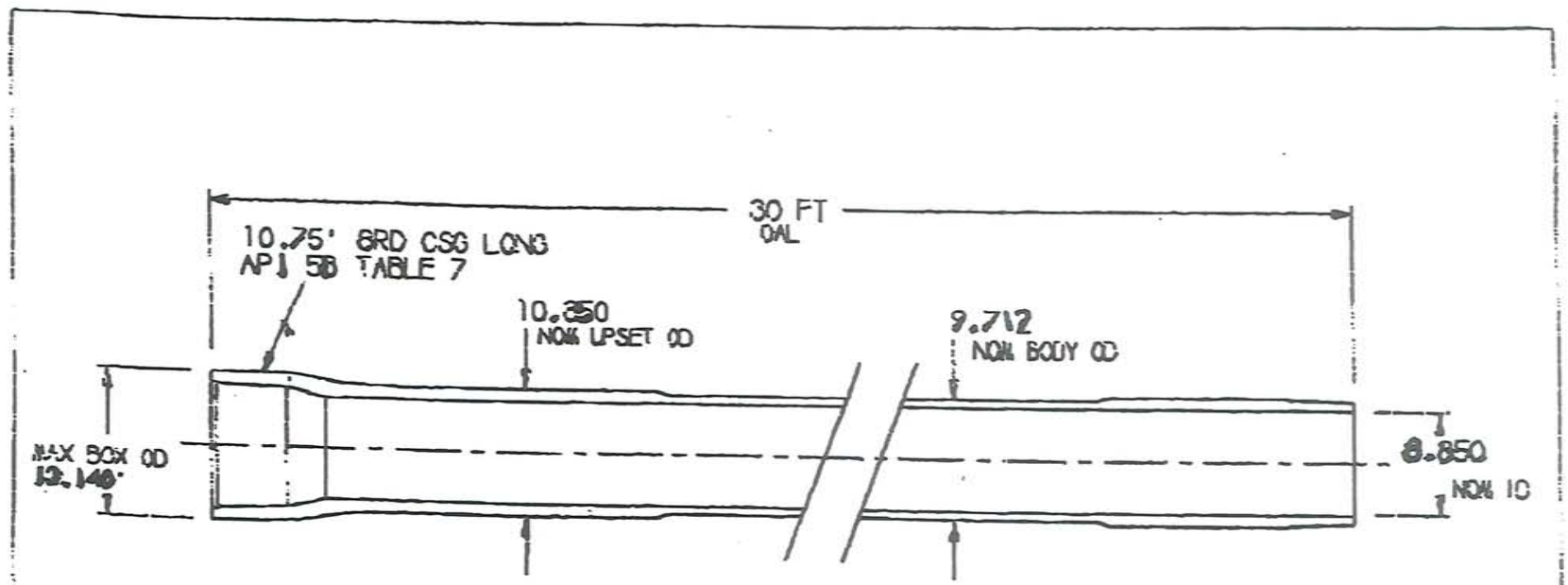
Where: P = Tensile Load (1,000 lbs)
L = String Length (1,000 ft)

MECHANICAL AND PHYSICAL PROPERTIES

TUBING/CASING BODY PROPERTIES	UNIT	VALUE 2-3/8 - 10-3/4	VALUE 11-3/4 - 16	TEST METHOD
Tensile Strength, Hoop	psi	31,300	31,300	ASTM D1599
Tensile Strength, Axial	psi	20,000	20,000	ASTM D2105
Modulus of Elasticity, Axial	10E+06 psi	3.0	2.0	ASTM D2105
Long Term Hydrostatic Strength at 20 Years	psi	16,875	18,100	ASTM D2992 (B)
Specific Gravity	—	1.9	1.9	ASTM D792
Density	lbs/in^3	0.07	0.07	ASTM D792
Thermal Conductivity	Btu/hr/ft^2/in/degF	2.4	2.4	ASTM C177
Thermal Expansion Coefficient (Linear)	10E-06in/in/degF	1.1	1.2	ASTM D696
Flow Factor	—	150	150	Hazen Williams

RED BOX® CASING AND TUBING SYSTEM

YELLOW BOX® LINE PIPE SYSTEM



NOM. WEIGHT IN AIR **13.3** LBS/ FT

NOM. WEIGHT IN FRESH WATER **6.83** LBS/ FT

INTERNAL VOLUME GAL/ FT **3.19**

DISPLACEMENT VOLUME GAL/ FT **3.96**

INTERNAL PRESSURE RATING **1250** PSI

EXTERNAL COLLAPSE RATING **600** PSI

AXIAL TENSION RATING (LBS.) **124.050**

REVISIONS			
REV#	DATE	APP	REVISION

FUTURE PIPE INDUSTRIES, INC
HOUSTON, TEXAS (281) 847-2800

10 3/4" RG 1250 DATA DWG

7/25/05

10.75" RG 1250

Y
X

inch

CEMENT PLAN

(Received from Contractor 7-15-05)

Cement Plan IW 1

TIW Packer that came out of Hole Will be set back in place after filling Inside w/ cement. (Picture)

5-7' Grout will be placed on Top of that. Top of Plug Approx 3042'

After FRP is run to Approx 3040' We will do Bond log.

Entire Annulus will be Pressure grouted to Surface.

Will Pressure test Casing again

Bond log again.

Drill out Bridgeplug

IW-1
CASING SEAT REQUEST
Submitted 7-20-05

MWH

July 19, 2005

0500709

Mr. Joseph R. May, P.G.
Florida Department of Environmental Protection
400 North Congress Avenue, Suite 200
West Palm Beach, Florida 33401

SUBJECT: Miramar West Water Treatment Facility
Modification to Injection Wells IW-1 and IW-2
IW-1 Casing Seat Request
UIC Permit 153722-003-UC

Dear Mr. May:

MWH is pleased to submit the following documentation in support of the 10.75-inch reinforced fiberglass (FRP) tubing setting depth for the City of Miramar Concentrate Injection Well IW-1, per the above-referenced construction permit. The supporting information is presented below for your review.

REQUEST

MWH proposes to set the 10.75-inch FRP tubing at an approximate depth of **3,035 feet below pad level (bpl)**. This depth has been selected based on the condition of the existing liner hanger packer and the interior of the 16-inch OD final casing as seen in the video survey.

DATA SUPPORTING CASING SETTING DEPTH

In accordance with Specific Conditions 2f(1) and 4f of UIC Permit 153722-003-UC the following tests were performed in the final 16-inch outer diameter (OD) steel casing of IW-1:

A. Video Survey
B. Pressure Test

Tubing Removal

Modification work on City of Miramar injection well IW-1 began on June 20, 2005 when the well was killed and the wellhead removed. Removal of the 13.375-inch OD steel

490 Sawgrass Corporate Parkway
Suite 300
Sunrise, FL
33325

Tel: 954 846 0401
Fax: 954 846 0424

injection tubing in IW-1 began on July 29, 2005. The 13.375-inch OD injection tubing was removed intact and laid down in the yard for Florida Department of Environmental Protection (FDEP) inspection. MWH inspected the casing and observed the original grease marker numbers written on the casing that were used to keep track of the casing joints during installation. Heat numbers also were still legible on the outside of the some of the tubing lengths. The Texas Ironworks (TIW) packer and a small amount of tubing is being modified by Youngquist Brothers, Inc. (YBI) to be used as a bridge plug that will be placed in the original packer hanger assembly in the 16-inch OD final casing at approximately 3,050 feet in depth.

Video Survey

The 16-inch OD final steel casing in IW-1 was brushed on July 13, 2005. Very little debris was generated as a result of brushing activities. The well was brought alive and flushed to clear the 16-inch OD casing for the video survey. The video survey was performed on July 14, 2005 by Florida Geophysical. The video was observed by Cameron Webster, YBI and Susan Bodmann, P.G., MWH. The casing from 50 feet bpl to the base of the top of the packer hanger at 3,022 feet bpl was free of any incrustation. No pitting of the interior of the casing was observed and casing joints were easily identifiable. At 3,044 feet bpl the grapple pads on the packer hanger assembly can be seen and the base of the packer hanger assembly appears to be at 3,091 feet bpl. The base of the 16-inch OD casing was observed at 3,095 feet bpl and the injection zone was present at 3,118 feet bpl. The video was ended at a depth of 3,128 feet bpl because of poor visibility. A copy of the Video and the Video Log is attached to this letter request for review.

Pressure Test

The criterion for running a pressure test is that the initial test pressure must be equal to at least 1.5 times the normal operating pressure. Under stable temperature conditions within the well, there should be no pressure change over the period of the test. Changes in pressure can result from the following influences: temperature fluctuations, leaks in the pressure test equipment and leaks in the casing.

Temperature fluctuations during the test can result from temperature changes at the wellhead or temperature changes downhole. Wellhead temperature changes usually result from a heating of the wellhead by the sun. Downhole temperature changes normally result from the warming or cooling of the effluent being injected into the well. Increases in pressure result from increases in temperature whereas decreases in pressure result from decreases in temperature. The acceptance criterion established by FDEP is a maximum of 5 percent change in test pressure over a one-hour period to compensate for the variability.

This criterion allows for ordinary heating and cooling of the wellhead by temperature fluctuations throughout the day.

The pressure test of the 16-inch OD was performed on July 15, 2005 and observed by Len Fishken, P.G., FDEP, Susan Bodmann, P.G., MWH and Bill Knee, City of Miramar. An inflatable packer was run to a depth of 3,045 just above the liner hanger packer assembly and seated against the final casing. The wellhead was shut in and the pressure in the well was increased to approximately 133 psi. The selected pressure is in excess of 1.5 times the maximum annular space pressure (86 psi as documented in the FDEP approved Injection Well System Work Plan) that was maintained during normal injection well operation. A preliminary test was conducted and a leak was discovered at the weld on the pressure header that was added to the wellhead for testing purposes. Due to the fact that the leak was minimal, a decision was made by the contractor not to deflate the packer and re-weld the pressure header. Silicon gel was applied to the leak and pressure was applied to the leak. The test was restarted at a pressure of 130 psi and pressures were recorded every 5 minutes for one hour. Five percent variation from the initial 130 psi would be +/- 6.5 psi. Over the one hour period the pressure in the well dropped to a final reading of 123.5 psi. The opinion of the observers was that the well passed the pressure test and that the drop in pressure was mostly due to the leak at the weld. The estimated bleed down volume is approximately 15 gallons. The actual bleed down volume was equal to approximately 14 gallons. A copy of the pressure log is attached to this letter request.

Cementing Plan

The area of the 16-inch OD casing and the packer hanger assembly appeared to be in good condition, based on review of the interior of the 16-inch OD final casing as documented in the video. YBI will be using the packer that was removed with the 13.75-inch tubing as a bridge plug. The packer will be filled with cement and re-hung in the packer hanger assembly that is in tact on the inside the 16-inch OD final casing. The top of the cement filled packer will be at approximately 3,044 feet bpl. Once the cement filled packer is positioned in the 16-inch OD casing, approximately 6 to 7 feet of cement will be placed on top of the cement filled packer to seal the bottom of the casing. The top of the cement fill will be at approximately 3,037 feet bpl. The casing will be pressure tested again to ensure that the bridge plug has sealed the base of the 16-inch OD casing before running the 10.75-inch FRP tubing into the well. **It is proposed that the 10.75-inch FRP tubing be positioned at 3,035 feet bpl following the successful placement of the bridge plug.**

After the 10.75-inch FRP tubing has been run into the well, and a background cement bond log will be run inside the tubing. The annular space between the 10.75-inch tubing and the 16-inch OD casing will be pressure grouted in a single stage from 3,035 feet bpl to land surface as stated in the Injection Well System Work Plan approved by FDEP. A final

cement bond log will be run inside the 10.75-inch tubing between 48 and 72 hours after the completion of annular space cementing activities. The bridge plug will be drilled out and mechanical integrity testing will be performed following the final cement bond log. A copy of the YBI cementing plan and diagrams of the packer placement and liner hanger packer are attached to this request letter for review.

MWH has presented the data requested in the construction permit to justify the proposed final casing-setting depth of 3,040 feet bpl, together with all supporting documentation. If you should have any questions, please do not hesitate to contact me at (954) 846-0401. Address and telephone numbers for MWH are supplied on the attached distribution list.

Sincerely,

MWH

FOR

Susan Bodmann, P.G.
Supervising Hydrogeologist

Attachments: Distribution List
16-inch Diameter Casing Video Survey IW-1
Pressure Gauge Certificate of Calibration
16-inch Diameter Casing Pressure Test IW-1
Contractor Cement Plan

15708293.1

Department of Environmental Protection

Jeb Bush
Governor

Southeast District
400 N. Congress Avenue, Suite 200
West Palm Beach, Florida 33401

Colleen M. Castille
Secretary

ELECTRONIC CORRESPONDENCE

25 July 2005

Brig M. Garg, PE, DEE
Director of Public Utilities,
City of Miramar
13900 Pembroke Road
Miramar, FL 33027

BROWARD COUNTY
UIC: City of Miramar West WTP
FILE: 125256-007-UO

RE: 10.75-inch Tubing Seat Request
IW-1

Dear Mr. Garg:

The Florida Department of Environmental Protection (Department or FDEP) acknowledges the receipt of your casing seat request for injection well IW-1, on July 20, 2005, for the above referenced facility.

Based on information provided and after review and receipt of comments from the UIC Technical Advisory Committee (TAC), the Department concurs with the request, to set the 10.75 inch tubing at 3035 feet below pad level.

If you have any questions, please contact Heidi Vandor, PG at 561/681-6695 or me at 561/681-6691. When referring to this letter, please reference the above date and file number.

Sincerely,

Joseph May, PG
Program Manager
Underground Injection Control

JRM/HV

CC: Richard Deuerling, FDEP/TLH
Steve Anderson, SFWMD/WPB
Susan Bodman, MWH
Nancy Marsh, USEPA/ATL
Garth Hinckle, BCDPEP
Ron Reese, USGS/MIA
Heidi Vandor, FDEP/WPB

IW-2
FIBERGLASS REINFORCED PLASTIC (FRP) TUBING SPECIFICATIONS
Submitted 10-20-05

11811 Proctor Road
Houston, TX 77038
(phone) 281-847-2987
(fax) 281-847-1931
(web address) www.futurepipe.com

Future Pipe Industries, Inc.

Fax

To: CAMERON From: Chris Blanchard

Fax: Pages: 10

Phone: Date: 10/20/05

Re: cc:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• Comments:

Certs 10 3/4 RB 1250

Inspection Certificate

No: 8803 — October 07, 2005

Purchaser: Youngquist Brothers — PO #: 258090001

Destination: Miramar, Florida — Terms: 30 days

Product: 10 ¾" Red Box 1250 PSI Internal Rating — Quantity: 6,000 Ft.

Raw Material:

Resin-	Epoxy (Hexion Chemicals)
Curing Agent	Aromatic Amine (Air Products)
Glass Fiber	E-Type (Owens Corning)

Mechanical Performance:

Internal Pressure- 1,250 PSI
External Pressure- 1,570 PSI
Axial Tension- 161,500 Lbs.
Operating Temperature- 210 Degrees F Max

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

Quality Department

Material Certificate

In accordance with: DIN 50049/EN10204.1B

Material: 10 ¾" Red Box 1250

Certificate Number: FPII-2005-18

Customer: Youngquist Brothers

Purchase Order: 258090001

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

FPII Order Number: 8803

Production Date: 5/2005

Pipe System: Aromatic Amine heat cured epoxy

Nom Size	Nom ID	Nom OD	Nom Wall	LBS/FT	LBS/JT	Connection	Temp
10 ¾"	8.85"	8.76"	.450"	13.1	394	IJ and T&C	210 F

Raw Material Specifications:

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

Non Destructive Tests:

Dimensional Exam- ASTM D 3564
Visual Exam- ASTM D 2563

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

Daniel Esparza

Quality Department

Material Certificate Cont'd

Hydrostatic Test: 100% Standard

Mill Test Pressure:

Standard Product: Working Pressure x 124%

API 15 HR: Working pressure x 150%

Produst Tested: 1250 x 124% = 1550 PSI

Destructive Test: N/A

Mechanical & Physical Properties:

Pipe Body Properties	Value	Unit	ASTM Test Method
Tensile Strength Hoop	31,300	PSI	D1599
Tensile Strength Axial	30,000	PSI	D2105
Mod of Elasticity	3.0	10E = 06 PSI	D2105
Specific Gravity	1.9	-----	D792
Density	0.07	Lbs/ in3	D792
Thermal Conductivity	2.4	BTU/HR/FT2/IN/DEGF	C177
Thermal Expansion (Linear)	1.1	10E-.05"/IN/DEGF	D696
Flow Factor	150	-----	Hazen Williams

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

Quality Department
Laboratory Test Results: Minimum Maximum

Glass Content: ASTM D 2584% Glass-	72	78
Degree of cure: ASTM D 3418 Degrees Celcius	130	170

Actual DSC Results: 147.34

Joint # 8

Burst Test Results:

Joint Number-	N/A	Glass Content-	75%
Weep Pressure-	N/A	Burst Pressure-	N/A
Coupling-	N/A		

Certificate of conformity Statement:

In accordance with DIN 50049/EN 10204 2.1, all items delivered under this certificate number are manufactured in accordance with the following specifications:

a. FPII- Red box inspection program
b. FPII-Quality assurance manual

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

Daniel Escamilla

Quality Department

Production Report

10 ¾" Red Box 1250 down hole tubing, 30' lengths. 1250 PSI working pressure, -60 degrees F minimum to +210 degrees F maximum operating temperature. 10 ¾" EUE long threaded IJ & T&C connections

Number	Joint Number	Test Pressure	Pass/Fail
1	1	1550	Pass
2	2	1550	Pass
3	3	1550	Pass
4	4	1550	Pass
5	5	1550	Pass
6	6	1550	Pass
7	7	1550	Pass
8	8	1550	Pass
9	9	1550	Pass
10	10	1550	Pass
11	11	1550	Pass
12	12	1550	Pass
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146	146	1550	Pass
147	147	1550	[redacted]
148	148	1550	Pass
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189	189	1550	Pass
190	190	1550	[redacted]
191	191	1550	Pass
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193	193	1550	Pass
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195	195	1550	Pass
196	196	1550	Pass
197	197	1550	Pass
198	198	1550	Pass
199	199	1550	Pass
200	200	1550	Pass
201	201	1550	Pass
202	202	1550	Pass
203	203	1550	Pass
204	204	1550	Pass
205	205	1550	Pass
1	1 – pup joint	1550	Pass
2	2 – pup joint	1550	Pass

We hereby certify hat the materials described above have been tested and complies with the terms and conditions of the purchase order.

Quality Department

IW-2
CASING SEAT REQUEST
Submitted 10-13-05

MWH

October 13, 2005 0501005

Mr. Joseph R. May, P.G.
Florida Department of Environmental Protection
400 North Congress Avenue, Suite 200
West Palm Beach, Florida 33401

SUBJECT: Miramar West Water Treatment Facility
Modification to Injection Wells IW-1 and IW-2
IW-2 Casing Seat Request
UIC Permit 153722-003-UC

Dear Mr. May:

MWH is pleased to submit the following documentation in support of the 10.75-inch fiberglass reinforced plastic (FRP) tubing setting depth for the City of Miramar Concentrate Injection Well IW-2, per the above-referenced construction permit. The supporting information is presented below for your review.

REQUEST

MWH proposes to set the 10.75-inch FRP tubing at an approximate depth of **2,972 feet below pad level (bpl).** This depth has been selected based on the condition of the existing liner hanger packer and the interior of the 16-inch OD final casing as seen in the video survey.

DATA SUPPORTING CASING SETTING DEPTH

In accordance with Specific Conditions 2f(1) and 4f of UIC Permit 153722-003-UC, a video survey and pressure test were performed in the final 16-inch outer diameter (OD) steel casing of IW-2.

490 Sawgrass Corporate Parkway
Suite 300
Sunrise, FL
33325

Tel: 954 846 0401
Fax: 954 846 0424

Tubing Removal

Modification work on City of Miramar injection well IW-2 began on September 28, 2005 when the well was killed and the wellhead removed. The 13.375-inch OD steel injection tubing then was removed from IW-2. The 13.375-inch OD injection tubing was removed intact and laid down in the yard for Florida Department of Environmental Protection (FDEP) inspection. MWH inspected the casing and observed the original grease marker numbers written on the casing that were used to keep track of the casing joints during installation. Heat numbers also were still legible on the outside the some of the tubing lengths. The Texas Ironworks (TIW) packer and a small amount of tubing was modified by Youngquist Brothers, Inc. (YBI) and used as a bridge plug. According to the Contractor a pin-hole leak was observed within the upper 15 ft of tubing removed.

Video Survey

The 16-inch OD final steel casing in IW-2 was brushed on October 3, 2005. The well was brought alive and flushed to clear the 16-inch OD casing for the video survey. The video survey was performed on October 5, 2005 by Florida Geophysical. The video was observed by Cameron Webster, YBI and Susan Bodmann, P.G., MWH. The casing from 50 feet bpl to the base of the top of the packer hanger at 2,991 feet bpl was free of any incrustation. No pitting of the interior of the casing was observed and casing joints were easily identifiable. The top of the packer hanger assembly is observed at approximately 2,991 feet bpl and the base of the packer hanger assembly appears to be at 3,007 feet bpl. The base of the 16-inch OD casing was observed at 3,044 feet bpl. The video was stopped at a depth of approximately 3,100 feet when the camera encountered sediment. Two days of drilling were conducted to clear the bridged debris from the open hole section of the well. The open hole was cleared to an approximate depth of 3,154 feet bls. A copy of the Video and the Video Log is attached to this letter request for review.

Bridge Plug Cementing

The bridge plug was placed in the liner hanger packer assembly at approximately 2,991 feet bls on October 10, 2005. Twenty feet of cement was set on top of the packer to seal the base of the 16-inch OD final casing. The top of the cement above the bridge plug was tagged at approximately 2,974 feet bpl. The casing was pressure tested to ensure that the bridge plug has sealed the base of the 16-inch OD casing and that there were no leaks in the 16-inch OD casing.

Pressure Test

The criterion for running a pressure test is that the initial test pressure must be equal to at least 1.5 times the normal operating pressure. Under stable temperature conditions within the well, there should be no pressure change over the period of the test. Changes in pressure can result from the following influences: temperature fluctuations, leaks in the pressure test equipment and leaks in the casing.

Temperature fluctuations during the test can result from temperature changes at the wellhead or temperature changes downhole. Wellhead temperature changes usually result from a heating of the wellhead by the sun. Downhole temperature changes normally result from the warming or cooling of the effluent being injected into the well. Increases in pressure result from increases in temperature whereas decreases in pressure result from decreases in temperature. The acceptance criterion established by FDEP is a maximum of 5 percent change in test pressure over a one-hour period to compensate for the variability. This criterion allows for ordinary heating and cooling of the wellhead by temperature fluctuations throughout the day.

The pressure test of the 16-inch OD was performed on October 13, 2005 and observed by Len Fishken, P.G., FDEP and Susan Bodmann, P.G., MWH. The bridge plug was set in the liner hanger packer and cemented in place to seal the base of the 16-inch OD final casing. The top of the cement over the bridge plug was tagged at a depth of approximately 2,974 feet bpl. The wellhead was shut in and the pressure in the well was increased to approximately 138.5 psi. The selected pressure is in excess of 1.5 times the maximum annular space pressure (86 psi as documented in the FDEP approved Injection Well System Work Plan) that was maintained during normal injection well operation. Pressures were recorded every 5 minutes for one hour. Five percent variation from the initial 138.5 psi would be +/- 6.9 psi. Over the one-hour period the pressure in the well dropped to a final reading of 137.0 psi. The bleed down volume was equal to approximately 15 gallons. A copy of the pressure test log is attached to this letter request.

After the 10.75-inch FRP tubing has been run into the well, a background cement bond log will be run inside the tubing. The annular space between the 10.75-inch tubing and the 16-inch OD casing will be pressure grouted in a single stage from 3,007 feet bpl to land surface as stated in the Injection Well System Work Plan approved by FDEP. A final cement bond log will be run inside the 10.75-inch tubing between 48 and 72 hours after the completion of annular space cementing activities. The bridge plug will be drilled out and mechanical integrity testing will be performed following the final cement bond log.

MWH has presented the data requested in the construction permit to justify **the proposed final casing-setting depth of 2,972 feet bpl**, together with all supporting documentation. If you should have any questions, please do not hesitate to contact me at (954) 846-0401. Address and telephone numbers for MWH are supplied on the attached distribution list.

Sincerely,

MWH

Susan Bodmann, P.G.
Supervising Hydrogeologist

Attachments: Distribution List
16-inch Diameter Casing Video Survey IW-1
Pressure Gauge Certificate of Calibration
16-inch Diameter Casing Pressure Test IW-1

APPENDIX E
RADIOACTIVE TRACER SURVEY (RTS) RESULTS

IW-1
RTS
CALIBRATION CERTIFICATIONS
Received 8-18-05

WATER METER
ACCURACY TEST REPORT

6/16/2005

#	MAKE	SERIAL NUMBER	LOW FLOW	INT. FLOW	HIGH FLOW
1	2"	4739630	101	101.5	101.5
2	USG				
3	MJ		2 GPM	8 GPM	80 GPM
4	METER				
5					
6					
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14					
15		ENDING			
16		USAGE			
17		15482			
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1001 McKesson Dr.
Longview, TX 75604
(903) 297-0635
(800) 765-6518
FAX (903) 297-5963

Rma # 12206

CUSTOMER: YOUNGQUIST BROS. INC

TEST DATE: 6/16/2005

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**

WATER METER
ACCURACY TEST REPORT

6/16/2005

#	MAKE	SERIAL NUMBER	LOW FLOW	INT. FLOW	HIGH FLOW
1	2"	4739630	101	101.5	101.5
2	USG				
3	MJ		2 GPM	8 GPM	80 GPM
4	METER				
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15		ENDING			
16		USAGE			
17		15482			
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***80% - 104.0% for Low Flows**

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

MedTech Diagnostic Services
1040 Bay Scout Dr Suite 201
Ft.Myers, Fl 33907
(239) 277-0000

I-131 THERAPY SOLUTION **Disp.Date** **8/16/05**

Youngquist Brothers Inc.

[redacted]

Doctor:

Patient: MEDICINAL GRADE

Procedure: Iodine Therapy Solution

Exp Time: 12:00 **Exp Date:** 8/17/05

Lic.#: 2771-1

Special Instructions: MEDICINAL GRADE

CAUTION: To be used under the direct supervision of physician. WARNING: The U.S. Nuclear Regulatory Commission has approved this radiopharmaceutical for distribution pursuant to 35 14 and 35. 100 Group of 10 CFR Part 35, or under equivalent licenses of Agreement

Lot #:

Patient: MEDICINAL GRADE

Filled By: [redacted]

16.60 mCi @ 08:00 on 8/17/05 RX#: 65853

8/17/05 I-131 THERAPY SOLUTION

Iodine Therapy Solution

IW-2
RTS
CALIBRATION CERTIFICATIONS
Received 11-10-05

MedTech Diagnostic Services
1888 Boy Scout Dr. Suite 201
Ft.Myers, Fl 33907
(239) 277-0000

Youngquist Brothers Inc.

Address: 15465 Pine Ridge Rd Fort Myers FL 33908

Doctor:

Patient: MEDICINAL GRADE

Procedure: Iodine Therapy Solution

I-131 THERAPY SOLUTION **Disp.Date** 11/9/2005

Act. 12.00 mCi @ 08:00 on 11/10/2005

Vol. 10.00 ml **Assay: 1.2 mCi/ml**

Lot #:

RX#: 678180

Exp Time: 12:00

Exp Date: 12/10/2005

Lic.#: 2771-1

Special Instructions:

CAUTION: To be used under the direct supervision of physician. WARNING: The U.S. Nuclear Regulatory Commission has approved this radiopharmaceutical for distribution pursuant to 35.14 and 35.100 Group of 10 CFR Part 35, or under equivalent licenses of Agreement States.

WATER METER
ACCURACY TEST REPORT

8/17/2005

	MAKE	SERIAL NUMBER	LOW FLOW	INT. FLOW	HIGH FLOW
1	2"	*4739631*	101.4	100.5	100
2	USG				
3	MJ				
4	METERS				
5					
6					
7					
8			2 GPM	8 GPM	80 GPM
9					
10					
11					
12					
13					
14					
15		*ENDING*			
16		*USAGE*			
17		5114			
18					
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1001 McKesson Dr.
Longview, TX 75604
(903) 297-0635
(800) 765-6518
FAX (903) 297-5963

Rma # 11267

CUSTOMER: YOUNGQUIST BROS. INC
TEST DATE: 8/17/2005
TESTER: STEVE WHITE

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

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

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