SCHREUDER, INC.

Completion Report

Feasibility Report
Exploratory Well TW-1
Hines Energy Complex
Bartow, Florida

WACS ID # 98695

Prepared for:

Progress Energy Florida, Inc.
7700 County Road 555
Bartow, FL 33830

Prepared by:

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July 26, 2004

Table of Contents

List of Figures

List of Tables

List of Appendices

1.0 Professional Certification

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

/s/ H. Cliff Harrison

H. Cliff Harrison, P.G.
Registered Professional Geologist
Florida Registration No. 1926

7/23/04
Date

2.0 Introduction

2.1 Background

This report describes the construction and hydrogeologic testing of one Class V Group 8 exploratory well at the Progress Energy Hines Energy Complex (HEC) located south of Bartow in Polk County, Florida. The well was constructed and tested according to the requirement outlined in the Florida Department of Environmental Protection (FDEP) Permit Number 183519-001-UC. Figure 1 shows the HEC property boundary and the location of the exploratory well TW-1.

The exploratory well was constructed to investigate the hydrogeology of the Upper Floridan Aquifer beneath the site with respect to its ability to receive recharge water. No test injection was proposed nor permitted during the construction and hydrogeologic testing of the exploratory well.

2.2 Scope

The exploratory well TW-1 was constructed with surface and intermediate casings isolating the surficial and intermediate aquifers, respectively, from the borehole. The final inner casing setting depth was determined based upon lithologic and hydrogeologic information obtained during drilling operations.

The surface casing was constructed of 20-inch diameter black steel pressure grouted to the borehole wall with a Portland cement grout. The surface casing isolates the surficial aquifer from the remainder of the borehole. Test borings in the area indicate that waste clays and/or tailing sands may extend to at least 45 feet below land surface (ft bls). A 9 5/8-inch diameter pilot hole was drilled using the mud rotary method of drilling to determine the actual depth of the top of undisturbed materials (Hawthorn Group). The pilot hole was then reamed out for the installation of the surface casing at 64 ft bls.

The intermediate casing was constructed of 14-inch diameter black steel pressure grouted to the borehole wall with a Portland cement grout. The intermediate casing isolates the intermediate aquifer (Hawthorn Group) from the remainder of the borehole. A 9 5/8-inch pilot hole was drilled using the mud rotary method of drilling to determine the depth of the top of the Floridan Aquifer (Suwannee Limestone). The pilot hole was reamed out for the installation of the intermediate casing at 315 ft bls.

Following the installation of the intermediate casing, a 13-inch diameter pilot hole was drilled to 899 ft bls to determine the setting depth of the inner casing. The pilot hole was drilled using the reverse air method of drilling. Water quality, lithology, and the specific capacity of the borehole were used to determine the setting depth of the inner casing. The pilot hole was then be reamed out for the installation of the inner casing to a depth of 614 ft bls. The inner casing was constructed of 8-inch diameter black steel pressure grouted to the borehole wall with a Portland Cement grout.

3.0 Hydrogeology

3.1 Regional Hydrogeology

The geology/hydrogeology at the HEC site, with respect to formation contacts and aquifer descriptions, were interpreted using various regional and site-specific data that were available. Regional data included lithologic logs from nearby deep wells, while site-specific data included geophysical logs, lithologic logs, water quality, and video surveys collected during on-site drilling operations.

The hydrogeology in the vicinity of the exploratory well is characterized by three principal aquifer systems: the surficial aquifer system, the intermediate aquifer system, and the Floridan Aquifer system.

The surficial aquifer system in Polk County extends to a depth 10 to 120 ft bls, and is characterized by sands, silts, clays, phosphate, and limestone. The unit is generally referred to geologically as undifferentiated deposits of post-Miocene age. Below the surficial aquifer system lies the intermediate aquifer system consisting of sediments of the Hawthorn Group of Miocene Age. It includes all water bearing units and confining units between the overlying surficial aquifer system and the underlying Upper Floridan Aquifer system. Below the Hawthorn Group/intermediate aquifer lies the Floridan Aquifer system, an extensive aquifer system consisting of permeable carbonate rocks of the Suwannee Limestone, Ocala Limestone, and the Avon Park Formation. The Suwannee Limestone represents the top of the Upper Floridan Aquifer System. Figure 2 shows the hydrogeologic framework developed for this area of Polk County.

3.2 Site-Specific Hydrogeology

Site-specific hydrogeology was determined by using the lithology encountered from three 300 ft-deep boreholes at the HEC and the exploratory well lithologic data. Most of the sediments that comprise the surficial aquifer system at HEC have been altered or removed due to mining activities by previous property owners; these sediments range in thickness from 16 to 40 feet thick at various locations. The surficial deposits overlie the clay, mudstone, and limestone sequence of the Hawthorn Group that comprises the intermediate aquifer. This unit occurs from approximately 16 to 295 ft bls across the site. The Suwannee Limestone, the uppermost portion of the Floridan Aquifer system, was identified at 295 ft bls in the exploratory well lithologic logs and extends to a total depth of 617 ft bls. The Suwannee Limestone overlies the Ocala Limestone that extends from 617 to 831 ft bls. The deepest unit of the Floridan Aquifer system encountered during drilling operations was the Avon Park Formation beginning at 831 ft bls. Drilling terminated at 899 ft bls.

4.0 Exploratory Well Construction

The bid for the construction of the exploratory well was awarded by Progress Energy – Florida, Inc. (PEF) to Diversified Drilling Company, Inc. in September of 2003. Construction of the lined drilling pad was completed on October 10, 2003 and served to stabilize the drilling site and contain potential fuel/chemical spills and drilling fluids. Upon completion of the pad construction, the exploratory well drilling rig was mobilized on site and assembled. Three (3) shallow monitoring wells were drilled around the pad to provide a means of monitoring the surficial aquifer water quality throughout the construction of the well. Samples were collected each week from the newly installed wells and from one existing surficial aquifer monitoring well. The samples were analyzed in the field for chloride concentration, pH, temperature, conductivity, and the results were included in the weekly summary reports. Figure 3 shows a schematic site map with the monitoring well locations and Figure 4 shows a schematic cross-section of the drilling pad design.

During the initial stages of drilling, the mud-rotary method was used to a depth of 185 ft bls. Below this depth, the reverse-air drilling method was used to advance the hole. Construction details for the exploratory well TW-1 are provided in Figure 5.

4.1 Casings

The exploratory well was designed and constructed with multiple casings made of new, unused, seamless ASTM Grade B steel. All casings were set plumb and aligned, and centralized with the borehole. Each casing seat depth was selected based on data gathered during the construction program, and based on regulatory agency requirements. All casing joint ends were beveled and continuously butt-welded by certified welders. A summary of the casing used on exploratory well TW-1 is proved in Table 1. Mill certificates for each casing string are included in Appendix A.

4.2 Cementing Program

Casings were cemented in place from the casing seat depth to land surface. Cementing was accomplished using both the modified Halliburton method of pressure grouting and by tremie grouting. Only ASTM C-150, Type I Class A Portland cement was used in the grouting operations. Table 2 summarizes the cementing program for each casing stage installed for exploratory well TW-1.

The 20-inch diameter surface casing was set to a depth of 64 ft bls and was pressure grouted with 125 sacks of neat cement grout using the modified Halliburton method of pressure grouting. The 14-inch diameter intermediate casing was pressure grouted with 400 sacks of neat cement grout using the

modified Halliburton method of pressure grouting from 315 to 182 ft bls. The grout was allowed to cure before a tremie pipe was lowered into the annulus, confirm the depth of the top of the grout at 182 ft bls. Two more stages of cement were tremied into the annulus to complete the grouting operations. The second stage (350 sacks) and third stage (50 sacks) of tremie grouting was completed successfully.

The 8-inch diameter steel inner casing was set to a depth of 614 ft bls. The casing was pressure grouted with 360 sacks of neat cement grout using the modified Halliburton method of pressure grouting from 614 to 440 ft bls. The grout was allowed to cure for two days before a tremie pipe was lowered into the annulus to confirm the depth of the top of the grout at 440 ft bls. Two more stages of cement were tremied into the annulus to complete the grouting operations. The second stage (212 sacks) of tremie grouting was completed successfully.

As the driller was removing two joints of tremie pipe before continuing the process, the tremie pipe string broke; the entire length was lost down the annular space and was not able to be recovered. This incident was not interpreted as compromising the grout seal because the pipe sections that were lost down the hole were open on both ends; it was therefore expected that they filled completely with wet cement grout. Upon receiving permission to proceed from the FDEP representatives to the Technical Advisory Committee (TAC), the third stage (191 sacks) of tremie grouting was performed until grout returned to the surface. Following the completion of the well, an acoustic Cement Bond Log (CBL) was run to verify the competency of the annular grout in the zone in which the tremie pipe was lost. A detailed review of the CBL was provided to the FDEP representatives to the TAC, who accepted the results of the CBL as having provided assurance that the cement grout seal was not compromised by the presence of the open-ended tremie pipe embedded within the annular grout. Copies of the CBL printout and of the interpretation of the log are provided as Appendix B to this report.

4.3 Construction Summary

Construction of the exploratory well began following completion of site preparation and the drilling pad installation. A 20-inch diameter surface casing was installed to a depth of 64 ft bls and pressure grouted into place for the purpose of stabilizing the surficial sediments for subsequent drilling operations. A 9 5/8-inch diameter bit was then advanced to a depth of 340 ft bls to gather lithologic data for the seating depth of the 14-inch diameter intermediate casing. Next, a 19-inch diameter bit was used to ream the borehole to 317 ft bls. Upon completion of the reaming activities, a caliper log was run by to determine the volume of cement needed for grouting operations and to establish that the reamed hole was suitably stabilized for the installation of the casing. Advanced Borehole Services, Inc. (ABS) performed all geophysical logging for the

construction phase of the exploratory well. The 14-inch diameter steel casing was set to 315 ft bls and pressure grouted into place.

A 13-inch diameter hole was then advanced to determine the depth at which to set the 8-inch diameter inner casing and to collect lithologic, water quality and hydraulic data for the proposed injection zone. The data collected during drilling activities are presented in Section 5.0 - Hydrogeologic Testing and Data Collection. The 13-inch diameter borehole was advanced to a total depth of 899 ft bls. Upon completion of the borehole to the final depth, one compete set of geophysical logs was run in the borehole to determine the nature of the formations (see Section 5.3 – Geophysical Logs).

Upon completion of geophysical logging activities, a drillable bridge plug consisting of sand and cement was placed in the borehole from 694 to 614 ft bls in preparation for setting the 8-inch inner casing. The 8-inch diameter steel casing was set and cemented from surface to 614 ft bls using a combination of pressure grouting and tremie grouting techniques, following which the bridge plug was drilled out and the open borehole was cleared to 900 ft bls. A chronological summary of the construction progress on the exploratory well is provided in Appendix C – Daily Activity Reports and the construction details are shown in Figure 5.

5.0 Hydrogeologic Testing and Data Collection

Throughout construction of the exploratory well TW-1, specific information was collected to determine the hydraulic characteristics and geologic nature of the underlying formations. The data were used for the determination of casing seat depths and hydraulic characteristics of the open portion of the borehole.

5.1 Formation Sampling

Formation samples were collected at 10-foot intervals during drilling operations. Three sets of samples were collected, and upon completion of drilling were distributed to PEF, Florida Geological Survey, and Schreuder, Inc.. Samples were examined and described in a lithologic log, which is included in Appendix D.

5.2 Formation Fluid Sampling

Formation water samples were collected every 30 ft at each rod change during reverse-air drilling. Samples were field analyzed for chloride concentration, pH, temperature, and conductivity; results are provided in Appendix E. Water samples collected during drilling operations were also delivered to Severn Trent Laboratories, Inc. (STL) for analysis of total dissolved solids concentration.

After thoroughly circulating the cuttings from the open borehole and prior to performing the step-drawdown testing, a natural background water quality sample was taken from exploratory well TW-1. The sample was analyzed for primary and secondary drinking water standards, excluding asbestos, acrylamide, and epichlorohydrin. The results of the laboratory analyses reported from STL for the background water sample are included in Appendix F.

5.3 Geophysical Logs

Throughout the construction of the exploratory TW-1, geophysical logging was conducted by ABS to provide information for construction decisions. Caliper logs were run on the borehole prior to cementing the 14-inch and 8-inch diameter casings. The caliper logs were used in developing each cementing program and identify any areas that may present problems during casing runs. A cement bond log was run as part of the final mechanical integrity testing of the exploratory well.

Following completion of the borehole drilling to the total depth, a full set of geophysical logs was conducted in the borehole. The geophysical logs were performed to aid in characterizing the hydraulic and geologic properties of the various formations encountered from 315 to 900 ft bls. These logs included: caliper, gamma ray, fluid resistivity, short/long/normal formation resistivity,

temperature, full wave borehole compensated (BHC) acoustic, and static well flow logs. A summary of all logs conducted is provided in Table 3.

5.4 Hydraulic Testing

Specific capacity and step drawdown testing were conducted to characterize the hydrogeology and water quality of the formations. This information was used evaluate and identify possible injection zone intervals within the borehole.

5.41 Specific Capacity Testing

During reverse-air drilling, specific capacity testing was performed at every rod break from 341 to 899 ft bls. After the cuttings were circulated out of the borehole at the bottom of each rod, the borehole was pumped and the water level drawdown in the pumped interval was recorded. Table 4 shows the specific capacity data collected during the drilling. Increases in the observed specific capacity were noted from the 621 and 743 ft. bls tests, indicating intervals of increased hydraulic conductivity in the vicinity of these depths.

5.42 Step-Drawdown Testing

A step-drawdown test was performed on exploratory well TW-1 to determine the well efficiency and to make an estimate of transmissivity for the open-hole portion of the formation. A temporary pump was installed to a depth of 232 ft bls in the exploratory well. The well was pumped at increasing flow rates and water level measurements were taken on five-minute intervals. The water level in the well was allowed to stabilize prior to increasing the flow rate and collecting a water sample. The flow rate was increased over the five steps of the test ranging from 270 to 760 gallons per minute (gpm). Table 5 summarizes the step-drawdown test data. The data were analyzed and hydraulic parameters were estimated using the Bierschenk (1964) graphical method. The transimissivity of the interval between 315 and 899 ft bls is estimated to be 197,000 gpd/ft and laminar flow loss is estimated at approximately 33%.

6.0 Mechanical Integrity Testing

Throughout the construction, hydrogeoloigc data were collected and analyzed as described above. This data was used as a basis for construction decisions such as casing depths and the open-hole interval. The mechanical integrity of the inner casing of TW-1 was evaluated during construction operations utilizing cement bond log, pressure testing, and a video survey.

6.1 Cement Bond Logs

The Cement Bond Log (CBL) is a geophysical log used to evaluate the quality of the bond between the casing and the cement grout and between cement and formation. On January 15, 2004, a CBL was run by Advanced Borehole Services (ABS) from 97.5 to 635.0 ft bls. The log shows the inner casing was successfully grouted and no significant area exists where the grout integrity was compromised. Appendix B contains a copy of the CBL evaluation provided by ABS.

6.2 Pressure Testing

A pressure test was performed on the inner casing string of exploratory well TW-1 to verify that there were no leaks in the casing or joint welds. The pressure test was conducted by filling the grout-plugged inner casing with water and sealing the wellhead. Next, a pressure gauge and valve were fitted to the wellhead, and any air present was bled off and replaced with water. The casing was pressurized up to 100 psi and monitored for one hour. A 3.5% pressure loss occurred in one hour, which was within the allowable limits and was accepted by the FDEP members of the TAC, and drilling operations proceeded.

6.3 Video Surveys

Two video surveys were conducted by ABS. The first was performed to aid in the recovery of a length of pipe that was dropped during operations to set the 8-inch diameter production casing. The second video survey was performed from land surface to the total depth of 900 ft bls. The video survey showed that the 8-inch diameter inner casing is intact and free of visible defects, and that the casing seat area and the area where drillable bridge plug had been located were in proper condition with no loose material in the borehole.

7.0 Drilling and Testing Program Results

7.1 Discussion

The drilling and testing program was designed and executed to investigate the ability of the selected formation interval to serve as a receiving zone for the recharge of water into the Upper Floridan Aquifer.

The relatively high transmissivity estimate (197,000 gpd/ft) that was calculated from the results of the drilling and testing program indicates that the exploratory well TW-1 is suitable for use as a test injection well at rates of at least 1.1 million gallons per day (MGD), or approximately 760 gpm. At this rate, a rise in water within the well of approximately eight to ten feet above the static water level (~100 ft bls) is anticipated; this is well within accepted operational constraints. As a result, the anticipated increase in wellhead pressure equates to approximately 4.3 psi, well within permittable and safe operational limits.

7.2 Feasibility of Use for Injection Testing

The exploratory well can be safely converted to a test injection well for the purpose of injection testing, following the completion of the permitting. There are no subsurface, geologic, or hydrologic issues that were discovered during the drilling and testing of the exploratory well that would indicate otherwise. The well is anticipated to be capable of accepting at least 1.1 MGD of injected water

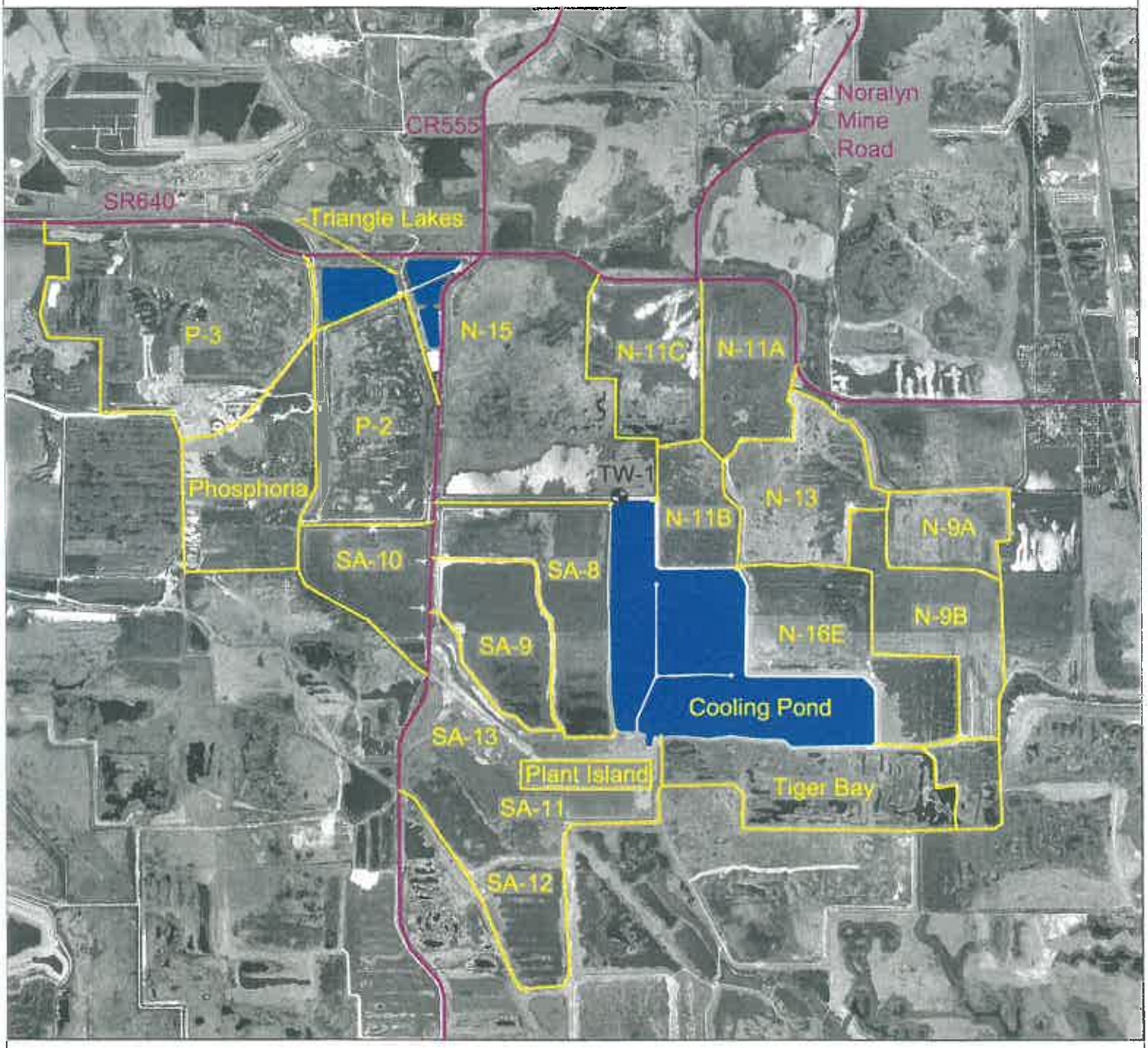
Recharge test(s) will be used to determine feasible injection rates, to obtain data to assist in projecting the groundwater flow dynamics resulting from long-term recharge of water into the Upper Floridan Aquifer, and to provide data that may be used to estimate costs for a full-scale recharge project. The recharge test(s) will be conducted following the installation of monitoring wells in locations and at depths to be determined during the permitting process. The testing program may include such activities as borehole fluid movement investigations (flow logs), step- and constant-rate pumping tests, step- and constant-rate injection tests, laboratory chemical analyses of samples of groundwater and injection water, and well redevelopment.

8.0 References

Florida Power Corporation. 2002. Hines Energy Complex Power Block 3 Supplemental Site Certification Application.

Driscoll, F.G. 1989. Groundwater and Wells. Second Edition. Johnson Filtration Systems, Inc., St. Paul Minnesota.

9.0 Figures



N

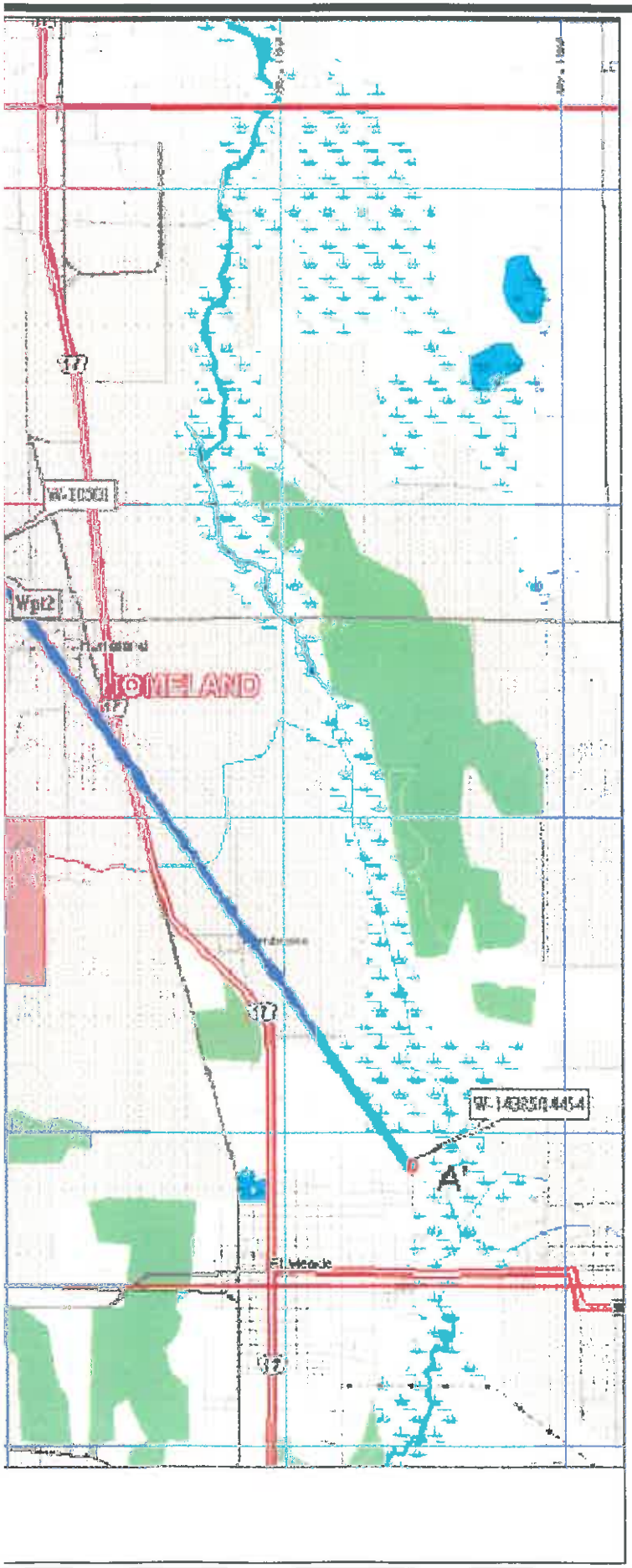
0 0.5 1.0

U.S. Mile

110 West Country Club Drive
Tampa, FL 33612
PH: 813-932-8844, FAX: 813-932-2991

Figure 1. Location Map
Hines Energy Complex

Date- 5/11/2004	Drawn By- NS
Scale- See Scale Bar	Approved By-
S. I. File- F:\DATA\FLPower\FPF 301\Graphics\Fig. 1 Hines ARRP Aerial Site Map.dwg	

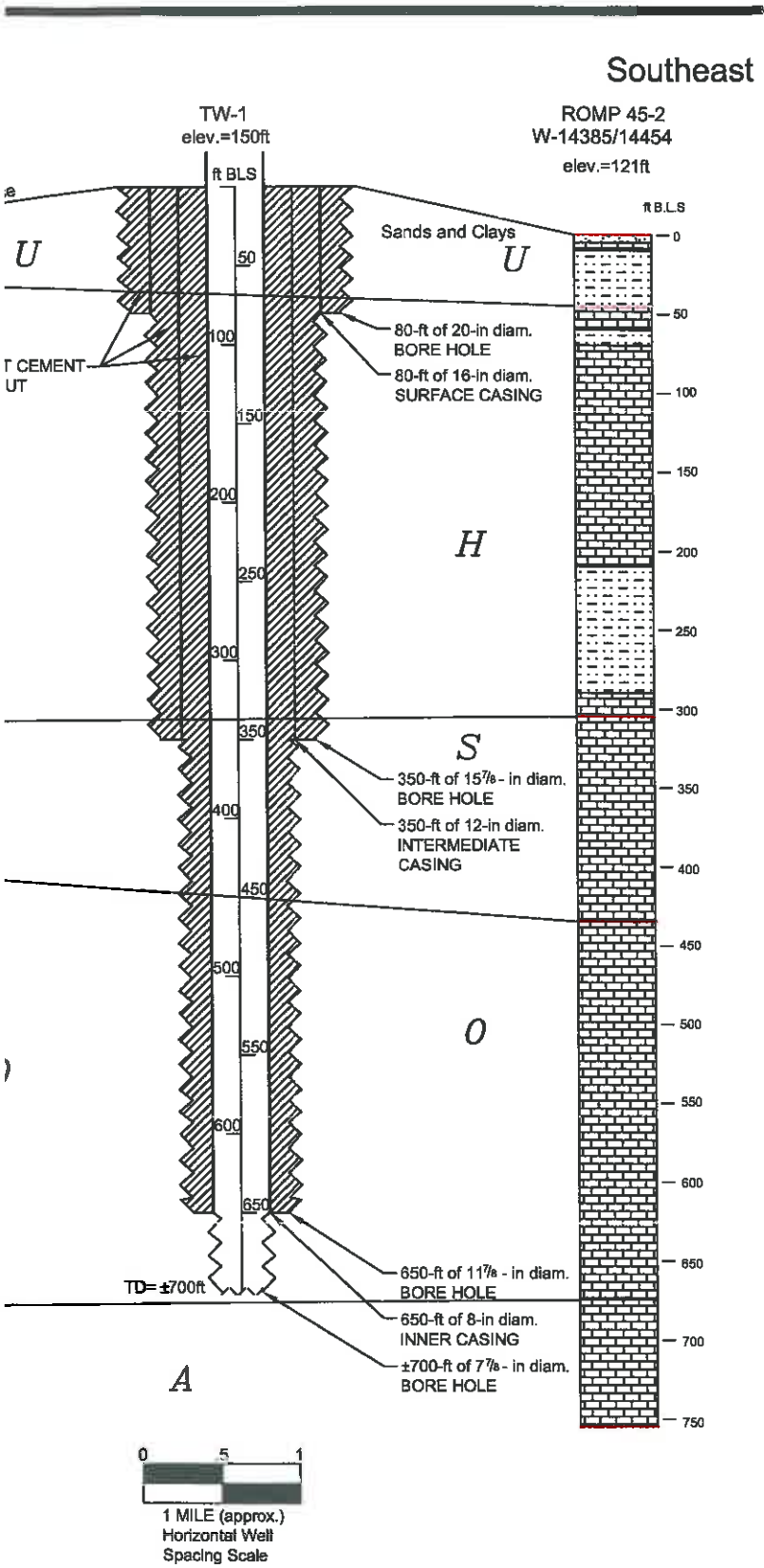


SCHREUDER, INC.

Date: 6/09/2004	Drawn By: NS/GM
Scale: See Drawing	Approved By: HCH

Figure 2. Local Cross Section Map

File # F:\DATA\FLPower\FPF 301\Graphics\Local Cross Section Map.dwg



1 MILE (approx.)
Horizontal Well
Spacing Scale

1 MILE

Vertical
Exaggeration = ~ 53X

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LEGEND

- SAND
- CLAY
- LIMESTONE
- DOLOSTONE
- CALCARENITE
- SANDSTONE

U	=	UNDIFFERENTITATED SURFICIAL SANDS AND CLAYS
H	=	HAWTHORN GROUP
S	=	SUWANNEE LIMESTONE
O	=	OCALA LIMESTONE
A	=	AVON PARK FORMATION

Date: 6/09/2004	Drawn By: NS/GM
Scale: See Drawing	Approved By: HCH

Figure 3.
Hydrogeologic Framework

File # F:\DATA\FLPower\FPF 301\Graphics\Local Cross Section.dwg

5 10
feet
roximate

N

UNPAVED
ROAD

ase
ox

SCHREUDER, INC.

LEGEND

-Wetland

-Silt Fence

-Drilling Pad

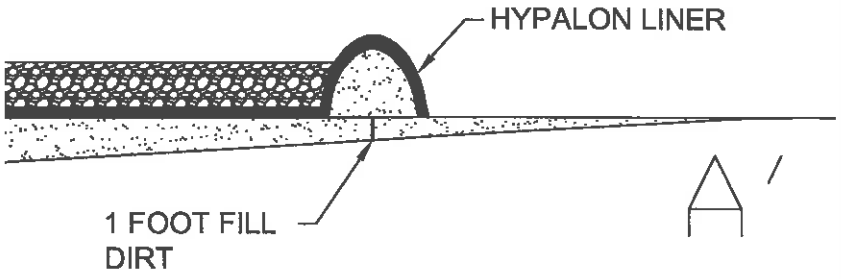
-Road

-Well

Date: 6/09/2004	Drawn By: NS
Scale: N.T.S. For Illustrative Use Only	Approved By:

Figure 4. Site Schematic of Exploratory Well TW-1

S.I. File:
F:\DATA\FLPower\FPF 301\Graphics\ARRP Well Drilling Pad\ARRP Well Drilling Pad Skematic -- as built.dwg



0 5 10

feet

approximate

SCHREUDER, INC.

LEGEND

-Fill Dirt

-Hypalon Liner

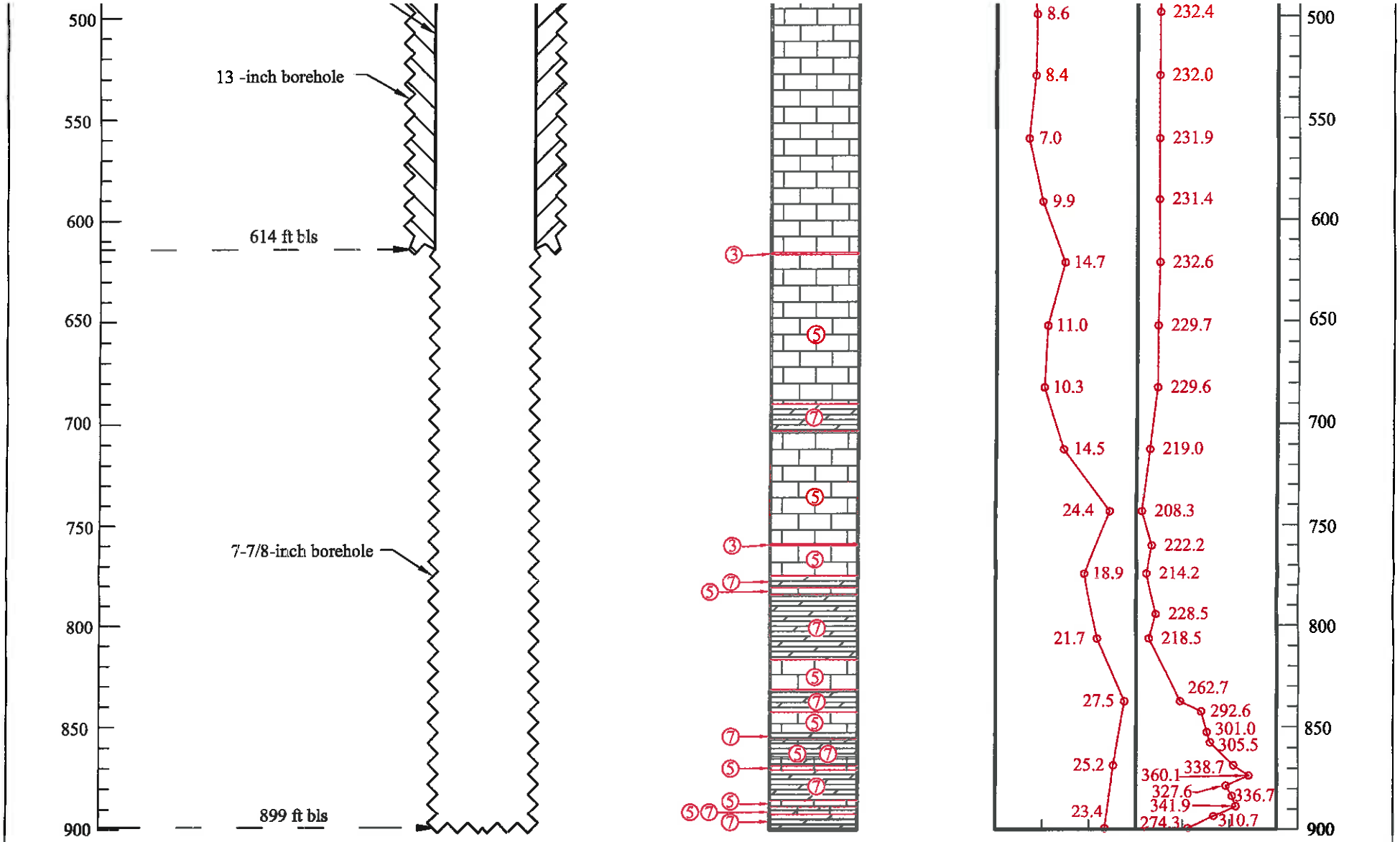
-Crushed Stone

-ARRP Well

Date: 6/09/2004	Drawn By: NS
Scale: N.T.S. For Illustrative Use Only	Approved By:

Figure 5. Schematic Cross-Section of Drilling Pad

S.I. File:
F:\DATA\FLPower\FPF 301\Graphics\ARRP Well Drilling Pad\Liner X-section.dwg



LEGEND

- -Land Surface
- -Borehole
- -Steel Casing
- -Neat Cement Grout
- ① -Sand
- ② -Silt
- ③ -Clay
- ④ -Mudstone
- ⑤ -Limestone
- ⑥ -Void (no returns)
- ⑦ -Dolostone
- ⑧ -Sandstone

Scale note:
Horizontal Exaggeration of 150X to show detail.

Date: 6/09/2004	Drawn By: NS
Scale: See Scale Bar	Approved by: HCH

Figure 6.
Exploratory Well TW-1
Schematic

S.I. File:
F:\DATA\FLPower\FPF 301\Graphics\
Lithology 6-09-2004.dwg

10.0 Tables

Table 1. Casing Summary, Exploratory Well TW-1.

Outside Diameter (inches)	Wall Thickness (inches)	Total Depth (feet bls)
16	0.375	64
14	0.375	315
8.625	0.322	614

Table 2. Cementing Program Summary.

Cementing Stage	Date Time	Cement Volume (sacks)	Tag Depth (ft bls)
20-inch Diameter Surface Casing			
1	11/11/03 1815	125	0
14-inch Diameter Intermediate Casing			
1	11/26/03 1308	400	182
2	12/01/03 1200	350	48
3	12/02/03 0920	50	0
8-inch Diameter Inner Casing			
1	12/31/03 1300	360	440
2	01/05/04 1415	212	356
3	01/05/04 1700	191	0

Table 3. Geophysical Log Summary – Exploratory Well TW-1.

Log Run	Date	Depth Interval of Log (feet bls)	Purpose
Caliper-Volume	11/25/03	1.00 - 317.60	To determine diameter of borehole for cement volume calculations for 14-inch intermediate casing
Gamma Ray (API)-Caliper	12/10/03	1.25 - 900.50	To determine diameter of borehole for cement volume calculations for 8-in inner casing
Static Water Quality	12/10/03	301.75 – 896.50	To determine water quality parameters of the formation fluids
Flow-Static Well	12/10/03	1.25 – 900.50	To determine flow zones within the formation
Full Wave BHC Acoustic	12/10/03	297.50 – 893.75	Indicates porosity and lithology of borehole
Gamma Ray-Resistivity (16-64)	12/10/03	301.75 – 896.50	To determine the natural radioactivity and lithologic characteristics
BHC Acoustic – Discrete AMP	01/05/04	97.50 – 635.00	To show the quality of the cement seal around the 8-inch casing

Table 4. Specific Capacity Testing During Drilling.

Depth Interval (feet bls)	Specific Capacity (gal/min/ft)
341	1.6
373	2.6
404	8.0
435	7.0
467	7.4
499	8.6
529	8.4
560	7.0
591	9.9
621	14.7
652	11.0
682	10.3
712	14.5
743	24.4
774	18.9
806	21.7
837	27.5
868	25.2
899	23.4

Table 5. Step-Drawdown Testing Information, January 13, 2004.

Depth Interval (feet bls)	Time	Static Water Level (feet bmp)	Pumping Water Level (feet bmp)	Drawdown (feet)	Discharge (gpm)	Specific Capacity (gpm/ft)
614 - 901	1140	98.6	100.17	1.57	270	171.97
614 - 901	1240	98.6	101.39	2.79	400	143.37
614 - 901	1340	98.6	102.49	3.89	500	129.87
614 - 901	1440	98.6	103.91	5.31	610	114.88
614 - 901	1540	98.6	106.12	7.52	760	98.45

11.0 Appendices

Appendix A

Mill Certificates

8-inch Diameter Steel Casing

Mill Certificate

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049-3.1B - EN 10204-3.1B - ISO 10474-3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Pág. / Page
SIDERCA CORPORATION	6945/2	6944/2	1	12/04/2003	03 / 03

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTX-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
8,625 " x 8,18 mm 8 5/8 x 0,322 in	42,58 kg/m 28,59 lb/ft	NOMINAL 40 FT	BARNIZ	105 Pz 1354,87 m 59377 kg 108 Pcs 4477,92 ft 130903 lb

Marcación / Marking

@ = Monograma / Monogram API NH = Número de tubo / pipe number LL = Largo / Length PP = Peso / Weight MM/YY = Mes / Año - Month / Year HH = Colada / Heat

Estarcido (tubo) / Stenciling (pipe)

5L-210 SIAT @ MM/YY 8.625" 0.322" 28.59 LB/FT API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B. E. TESTED 2673 PSI. N° HEAT:.
THOMAS PIPE POS TTX-131. MADE IN ARGENTINA N°: NH LENGTH:(FT): LL. PF&T: 6946-2.

Observaciones / Remarks

VISUAL AND DIMENSIONAL CONTROL: 100%.
HYDROSTATIC TEST: 2673 PSI (188 KG/CM2) - 5 SEC.
WELD ULTRASONIC INSPECTION: REFERENCE STANDARD 1/8"
DRILLED HOLE.
MINIMUM WELD HEAT TREATMENT TEMPERATURE: 1600 °F

Length: max. 43.01 Ft
min. 41.61 Ft

STD: API 5L ED.42 - JULY 2000
ASTM A53, ED. 1999
ASME SA53, ED. 2001
NACE MR0175, ED. 1999

Por la presente certificamos que el material aquí descripto ha sido fabricado de acuerdo con las normas y especificaciones solicitadas en vuestra orden y satisfacen los correspondientes requerimientos.

Este certificado se emite mediante un sistema computarizado y es válido con firma electrónica. En el certificado original el logo SIAT-TENARIS (verde) está impreso en la parte superior y como fondo de la hoja. En caso que el poseedor entregue una copia del mismo, deberá garantizar la confidencialidad con el original. La misma es responsable por cualquier ilegalidad, falsificación y/o alteración en este certificado.

We hereby certified that the material herein described has been manufactured in accordance with the standards and specifications required in your order and satisfies the corresponding requirements.

This certificate is issued by a computerized system and it is valid with the electronic signature. On the original the SIAT-TENARIS green coloured logo is stamped on the upper part and as background of the page. In case the owner of the certificate released a copy, he must attest its conformity to the original. Either owner of the copy is responsible for any unlawfulness, falsification and/or alteration of this certificate.

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204.3.1B - ISO 10474.3.1B)

Cliente / Customer	OV	SF. Fab	Número / Number	Fecha / Date	Pág. / Page
SIDERCA CORPORATION	69462	69432	1	17/04/2003	02 / 03

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal EBW. Longitudinal Electric Resistance Welded Steel pipe.	TYX-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
8,625 "x 8,18 mm 8 5/8 x 0,322 in	42,54 kg/m 28,59 lb/ft	NOMINAL 40 FT	BARNIZ	106 Pz 1364,87 m - 59377 kg 106 Pcs 4477,92 ft 130903 Rl

ANÁLISIS QUÍMICOS DE PRODUCTO / PRODUCT CHEMICAL ANALYSES

Muestra / Sample		%																											
		C	Mn	P	S	Si	Al	Cr	Ni	Mo	V	Cu	Sn	Nb	Ti	Co	B	Ca	Elm1	Elm2	Elm3	Ceq1	Ceq2	Pcm	Sum1	Sum2	Sum3	R1	R2	R3
Tubo / Pipe	Colada / Heat	x 100	x 100	x 1000	x 1000	x 100	x 1000	x 100	x 100	x 1000	x 100	x 100	x 100	x 1000	x 1000	x 100	x 10000	x 10000	x	x	x	x 100	x 100	x 100	x 100	x 100	x 100			
Max / Min		22	120	25	15			42	40	150	8	40										43			15					
1	235307 *	15	110	13	1	20	32	2	1	6	5	1	9	2	2	1	3	27				36			5					
21	236010	14	103	14	2	18	29	2	1	7	4	1	8	1	1	1	3	23				33			4					
141	235008 *	13	107	13	1	21	33	2	1	6	5	1	1	1	2	1	3	23				37			6					
146886	235007 *	15	105	16	2	19	31	2	1	8	4	1	3	1	2							35			4					
146862	235008 *	17	106	14	2	19	30	2	1	8	4	1	2	2	2							34			4					
146862	236010 *	15	107	17	2	17	35	2	1	8	4	1	4	1	2							35			6					

Notas / Notes: Elm: Elemento / Element Ceq: Carbono equivalente - Equivalent Carbon Sum: Sum3 - Sum1 R: Ratio

*Corresponde a muestra en Materia Prima. *Samples from raw material.

Elm1 = Elm2 = Elm3 =

Ceq1 = Ceq2 = Pcm =

Sum1 = Sum2 = Sum3 =

R1 = R2 = R3 =

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN50049.3.1B - EN10204.3.1B - ISO 10474.3.1B)

9

Cliente / Customer	OV	Nº. Fab	Número / Number	Fecha / Date	Pág. / Page
SIDERCA CORPORATION	694572	694422	1	17/03/2004	01 / 03

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTX-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
8,625 " x 8,18 mm 8 5/8 x 0,322 in	42,54 kg/m 28,59 lbs/ft	NOMINAL 40 FT	BARNIZ	106 Pz 1368,67 m 59377 kg 106 Pcs 4477,92 ft 130903 lb

ENSAYOS MECÁNICOS / MECHANICAL TESTS

Muestra Sample			Ensayo de Tracción Tensile Test						Guided Bend Test Plegado Guiado		Dureza / Hardness Tipo / Type: HV10			Posición Location	Charpy V Absorbed Energy				Charpy V Shear Area				DWTT Shear Area		
				Weld		Body									1	2	3	Avg	1	2	3	Avg	1	2	Avg
Lote Lot	Tubo Pipe	Colada Heat		UTS	EL	UTS	YS	Ratio	EL	Cara Face	Raiz Root	Max	Min	Max Dif											
			Max			110,0	85,0	0,93				248			Body Min Weld Min HAZ Min	10	10	10	11							
			Min	60,0		60,0	42,0		27																
				ksi	%	ksi	ksi		%							ft.lb	ft.lb	ft.lb	ft.lb	%	%	%	%	%	%	%
	2	285057										218	183	29											
	3	285057		82,8		84,1	53,5	0,63	38						Body	108	105	73	97	100	100	100	100		
	21	285016										218	183	31											
	21	285016		83,5		87,7	58,3	0,75	39						Body	106	110	85	101	100	100	100	100		
	115	285009										211	180	31											
	141	285009		84,7		88,5	60,8	0,92	36						Body	88	74	77	80	100	100	100	100		

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90 ° FROM WELD
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	STRIP SPECIMEN
Tipo / Type	1 1/2"
Tamaño / Size	TRANSVERSAL
Orientación / Orientation	

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (in 2")
Ratio: YS/UTS Ratio - Relación límite/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum difference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Note - Nota:

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO
본사·공장 울산광역시 북구 염포동 265번지 현대하이스코(주)
HEAD OFFICE & ULSAN PLANT: 265, Yeompo-dong, Buk-gu, Ulsan, Korea
TEL:(052)280-0114 FAX:(052)287-8116
서울사무소 SEOUL OFFICE
TEL (02) 746-1114 FAX (02) 335-7895

증명서 번호 CERTIFICATE NO: E36106 | 페이지 PAGE: 1
발행일자 DATE OF ISSUE: JUL. 7. 2003. E4310103
계약번호 CONTRACT P.O. NO:
품명 COMMODITY: E.R.W. STEEL PIPE
규격 SPECIFICATION: API 5L B PSL1/ASTM A53B/ASME SA53B
구매자 CUSTOMER:

TYPE OF PIPE END	DIMENSION (OUTDIA × THICK × LENGTH)	QUANTITY (PCS)	WEIGHT (KGS)	HYDROSTATIC TEST (PSI)	TESTS	HEAT NO.	YIELD STRENGTH	TENSILE STRENGTH		ELONGATION (%)	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V
BVBE NB	4-1/2" × .337" x21.000'	150	21.515	197	G G G G G G	E74348	39.7	46.1		34	4	2	59	15	1	2	1	2	3	Tr
	(114.3mm × 8.56mm × 6.401M)			2800			56500	65600												
BVBE NB	4-1/2" × .337" x40.000'2"	84	23.045	197	G G G G G G	E74348	39.7	46.1		32	4	2	59	15	1	2	1	2	2	Tr
	(114.3mm × 8.56mm × 12.243M)			2800			56500	65600												
BVBE NB	6-5/8" × .280" x21.000'	277	51.832	126	G G G G G G	E73883	39.1	47.5		35	6	1	55	9	2	2	3	1	3	Tr
	(168.3mm × 7.11mm × 6.401M)			1790			55600	67600												
BVBE NB	6-5/8" × .280" x42.000'	192	71.578	126	G G G G G G	E73034	39.1	45.7		36	4	1	56	9	2	2	2	1	2	Tr
	(168.3mm × 7.11mm × 12.802M)			1790			55600	65000												
						E73894	40.3	46.3		34	5	3	55	10	2	2	1	2	1	Tr
							57300	65900												
BVBE NB	8-5/8" × .322" x21.000'	420	114.660	111	G G G G G G	A65454	29.7	46.8	49.6	36	18	1	75	10	9	2	1	2	1	Tr
	(219.1mm × 8.18mm × 6.401M)			1580			42200	66600	70500											
BVBE NB	8-5/8" × .322" x42.000'	175	95.590	111	G G G G G G	A65635	31.8	49.0	51.8	36	19	1	79	15	8	2	1	2	2	Tr
	(219.1mm × 8.18mm × 12.802M)			1580			45200	69700	73700											
BVBE NB	8-5/8" × .500" x21.000'	138	57.091	171	G G G G G G	A65836	29.9	46.6	49.4	35	17	1	76	14	8	2	1	1	1	Tr

비고 REMARK:
* RESIDUAL MAGNETISM TEST : GOOD
* API 2000/ASTM 1999/ASME 1999

주 NOTES:
1. Type of pipe End 관끝
- B Black, G Galvanized, E Expanded
- V Varnish, R Removal Varnish, O Oiling Coating, P PE Coating, C Coal tar Coating, A Asphalt Coating
- PE Plain End, BE Bevel End, TE Thread End, TC Thread Coupling, BL Bell End, SE Swaged End, VJ Victaulic Joint
2. NB Nominal Bore 호칭경, OD Outside Diameter
3. Unit 단위 (M, mm, ft, inch)
4. Unit 단위 M Meter, F Feet, I Inch
5. G Good
6. Weld Ductility Test 용접부 연성시험
7. Flattening or Bending Test 편평 또는 굽힘시험
8. Visual & Dimension Test 외관 및 치수검사
9. Nondestructive Test 비파괴검사
10. Drift Test 확관시험
11. Flaring Test 플레어링
12. Crush Test 압궤시험
13. Reverse Flattening Test 역편평시험
14. Heat Treatment 열처리
15. B Base Metal 원재
16. W Weld Part 용접부
17. H Heat Analysis 용강분석, P Product Analysis 제품분석

본 제품은 관리규정에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS BEEN INSPECTED AND ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

SURVEYOR

QUALITY ASSURANCE TEAM

현대하이스코 HYSCO

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Pág. / Page
SIDERCA CORPORATION	69462	6944/2	1	17/04/2003	01 / 03

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTX-131	-	

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
8,625 " x 8,18 mm 8 5/8 x 0,322 in	42,54 kg/m 28,59 lb/ft	NOMINAL 40 FT	BARNIZ	106 Pz 1364,87 m 58077 kg 106 Pcs 4477,92 ft 130903 lb

Marcación / Marking

@ = Monograma / Monogram API   NII = Número de tubo / pipe number   LL = Largo / Length   PP = Peso / Weight   MM/YY = Mes / Año - Month / Year   HH = Colada / Heat

Estarcido (tubo) / Stenciling (pipe)

5L-210 SIAT @ MM/YY 8.625" 0.322" 28.59 Lb/Ft API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B. E. TESTED 2673 PSI. N° HEAT:.
THOMAS PIPE PO# TTX-131. MADE IN ARGENTINA N°: NII LENGTH(FT): LL. PF/AT: 6945-2.

Observaciones / Remarks

VISUAL AND DIMENSIONAL CONTROL: 100%
HYDROSTATIC TEST: 2673 PSI (188 KG/CM2) - 5 SEC.
WELD ULTRASONIC INSPECTION: REFERENCE STANDARD 1/8" DRILLED HOLE.
MINIMUM WELD HEAT TREATMENT TEMPERATURE: 1600 °F

Length: max. 43.01 Ft
min. 41.01 Ft

STD: API 5L ED.42 - JULY 2000
ASTM A53, ED. 1999
ASME SA53, ED. 2001
NACE MR0175, ED. 1999

Por la presente certificamos que el material aquí descripto ha sido fabricado de acuerdo con las normas y especificaciones solicitadas en vuestra orden y satisfacen los correspondientes requerimientos

Este certificado se emite mediante un sistema computarizado y es válido con firma electrónica. En el certificado original el logo SIAT-TENARIS (verde) está impreso en la parte superior y como fondo de la hoja. En caso que el poseedor entregue una copia del mismo, deberá garantizar la conformidad con el original, haciéndose responsable por cualquier uso ilegal o indebido. Cualquier alteración y/o [illegible] está sujeta a la ley.
Si necesita asegurar la [illegible] de este certificado, contáctese con Siat S.A. [illegible]

We hereby certified that the material herein described has been manufactured in accordance with the standards and specifications required in your order and satisfies the corresponding requirements

This certificate is issued by a computarized system and it is valid with the electronic signature. On the original the SIAT-TENARIS green colored trade mark is stamped on the upper part and as background of the page. In case the owner of the certificate released a copy, he must attest its conformity to the original, taking upon himself the responsibility for any [illegible]. Any alteration and / or falsification will be subject [illegible]
If you need to assure the authenticity of this [illegible] contact Siat S.A., e-mail [illegible]

Process Engineering Department
[illegible] de Proceso
[illegible]

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204.3.1B - ISO 10474.3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Pág. / Page
SIDERCA CORPORATION	69462	69462	1	17/04/2003	02 / 03

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTK-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
8,625 "x 8,18 mm 8 5/8 x 0,322 in	42,54 kg/m 28,59 lb/ft	NOMINAL 40 FT	BARNIZ	106 Pz 1359,87 m 59077 Kg 106 Pcs 4477,92 ft 130203 lb

ANÁLISIS QUÍMICOS DE PRODUCTO / PRODUCT CHEMICAL ANALYSES

Muestra / Sample		%																											
		C	Mn	P	S	Si	Al	Cr	Ni	Mo	V	Cu	Sn	Nb	Ti	Co	B	Ca	Elm1	Elm2	Elm3	Ceq1	Ceq2	Pcm	Sum1	Sum2	Sum3	R1	R2	R3
Tubo / Pipe	Colada / Heat	x 100	x 100	x 1000	x 1000	x 100	x 1000	x 100	x 1000	x 1000	x 100	x 100	x 100	x 1000	x 1000	x 100	x 10000	x 10000	x	x	x	x 100	x 100	x 100	x 100	x 100	x 100			
Max / Min		22	120	25	15			40	40	150	8	40										43			15					
3	286007 *	15	118	11	1	20	32	2	1	6	5	1	0	2	2	1	3	27				38			5					
93	286010	14	105	14	2	19	29	2	1	7	4	1	4	1	1	1	3	23				37			4					
141	286008 *	18	117	13	1	21	33	2	1	8	5	1	1	1	2	1	3	25				39			5					
146865	286007 *	16	105	10	2	18	30	2	1	8	4	1	3	1	2							35			4					
146867	286008 *	17	108	10	2	19	33	2	1	8	5	1	2	2	2							38			4					
146861	286010 *	18	107	11	2	17	31	2	1	9	4	1	4	1	2							35			4					

Notas / Notes: Elm: Elemento / Element Ceq: Carbono equivalente - Equivalent Carbon Sum: Suma - Sum R: Razón
* Corresponde a muestra en Materia Prima. * Samples from raw material.

Elm1 =
Elm2 =
Elm3 =
Ceq1 = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15
Ceq2 =
Pcm =
Sum1 = Nb+V+Ti
Sum2 =
Sum3 =
R1 =
R2 =
R3 =

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049-3.1B - EN 10204-3.1B - ISO 10474-3.1B)

Cliente / Customer: SIDERCA CORPORATION	OV: 69462	F. Fab: 6942/2	Número / Number: 1	Fecha / Date: 17/04/2003	Pág. / Page: 04 / 03
Producto / Product: Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	Orden de Compra / Purchase Order: TTX-131	Item	Referencia del Cliente / Customer Reference		
Norma / Standard: API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	Grado / Grade: X42 PSL2		Extremos / Ends: BEVELLED AT 30° API 5L		
Dimensiones / Dimensions: 8,625 "x 8,18 mm; 8 5/8 x 0,322 in	Peso Nominal / Nominal Weight: 42,54 kg/m; 28,59 lb/ft	Largo / Length: NOMINAL 40 FT	Superficie Externa / External Surface: BARNIZ	Cantidades / Quantities: 106 Pz 1354,67 m 58977 kg; 106 Pcs 4477,92 ft 130903 lb	

ENSAYOS MECÁNICOS / MECHANICAL TESTS

Muestra Sample: Lote Lot	Tubo Pipe	Colada Heat	Ensayo de Tracción Tensile Test:	Weld: UTS	Weld: EL	Body: UTS	Body: YS	Body: Ratio	Body: EL	Guided Bend Test Plegado Guiado: Cara Face	Raíz Root	Dureza / Hardness Tipo / Type: HV10: Max	Min	Max Dif	Posición Location	Charpy V: Absorbed Energy: 1	2	3	Avg	Shear Area: 1	2	3	Avg	DWTT: Shear Area: 1	2	Avg
			Max			110,0	45,0	0,93							Body Min											
			Min	60,0		63,0	42,0		27			248			Weld Min											
				ksi	%	ksi	ksi		%						HAZ Min											
																J/R1	J/R2	J/R3	J/R4	%	%	%	%	%	%	%
	3	285007																								
	5	286007		85,8		88,1	53,5	0,99	28			218	183	35												
	21	286010													Body	108	105	73	97	100	102	100	101			
	29	286009		95,5		97,7	59,1	0,75	29			216	185	32												
	141	286008													Body	106	110	85	101	100	100	100	100			
	191	286008		86,7		78,5	54,0	0,82	36			211	180	31												
															Body	68	74	77	80	100	100	100	100			

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V-Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90 ° FROM WELD
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	
Tipo / Type	STRIP SPECIMEN
Tamaño / Size	1 1/2"
Orientación / Orientation	TRANSVERSAL

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (Lo = 2")
Ratio: YS/UTS Ratio - Relación fluencia/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum difference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Note - Nota:

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

CERTIFICATE NO. E36106 PAGE 1/1
DATE OF ISSUE JUL. 7. 2003.
CONTRACT NO.
COMMODITY E.R.W. STEEL PIPE
SPECIFICATION API 5LB PSL2/ASTM A53B/ASME SA53B
CUSTOMER

HYUNDAI HYSCO
HEAD OFFICE
ULSAN PLANT: TEL:(052)720 0114 FAX:(052)237-0916
SEOUL OFFICE: TEL: (02) 345-1114 FAX: (02) 315-2095

TYPE OF PIPE ENDS	DIMENSION (OUTSIDE DIA. × THICK × LENGTH)	QUANTITY (PCS)	WEIGHT (KG)	HYDROSTATIC TEST (KPa / PSI)	HEAT NO.	TENSILE TEST YIELD STRENGTH (PSI)	TENSILE STRENGTH (PSI)	ELONGATION (%)	HARDNESS	CHEMICAL COMPOSITION C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti	Ceq	IMPACT
BVBE	3-1/2" × .337" × 21.000' (114.3mm × 8.56mm × 6.401M)	150	21.515	197	E74348	37.7	46.1	34		4	2	59	15	1	2	1	2	2Tr					
				2800		56900	66600																
BVBE	3-1/2" × .337" × 40.000'2" (114.3mm × 8.56mm × 12.203M)	88	29.045	197	E74348	37.7	46.1	32		4	2	59	15	1	2	1	2	2Tr					
				2800		56900	66600																
BVBE	6-5/8" × .280" × 21.000' (168.3mm × 7.11mm × 6.401M)	287	51.838	126	E73883	38.1	47.5	35		6	1	55	9	2	2	3	1	2Tr					
				1790		55600	67000																
BVBE	6-5/8" × .280" × 42.000' (168.3mm × 7.11mm × 12.802M)	196	71.518	126	E73034	38.1	45.7	36		4	1	56	9	2	2	2	1	2Tr					
				1790		55600	65000																
					E73894	40.3	46.3		34	5	3	55	10	2	2	1	2	0Tr					
						57300	65900																
BVBE	8-5/8" × .322" × 21.000' (219.1mm × 8.18mm × 6.401M)	420	114.660	111	A65846	20.7	46.8	49.0	36	8	1	75	10	9	2	1	2	1Tr					
				1580		42200	66600	69900															
BVBE	8-5/8" × .322" × 42.000' (219.1mm × 8.18mm × 12.802M)	175	95.596	111	A65835	31.8	49.0	51.8	36	9	1	79	15	8	2	1	2	2Tr					
				1580		45200	69700	73000															
BVBE	8-5/8" × .500" × 21.000' (219.1mm × 12.70mm × 6.401M)	138	57.031	171	A65836	28.9	46.6	49.4	35	17	1	76	14	8	2	1	1	1Tr					

REMARK
* RESIDUAL MAGNETISM TEST : GAUSS
* API 2000/ASTM 1999/ASME 1999

NOTES
[-1] Type of pipe End 끝단
X: a Black, C Galvanized, E Varnish
XX: V Varnish, B Removal Varnish, O Oiling Coating, F PE Coating, C Coaltar Coating, A Asphalt Coating
XX: PE: Plain End, BE: Bevel End, TE: Tapred End, TC: Tapred Coupling, BL: Ball End, SE: Swaging End, VJ: Victaulic Joint
[-2] NB Thereal Size 호칭경, OD Outside Diameter
[-3] G: Good
[-4] Visual&Dimension Test 외관및 치수검사
[-5] Flaring Test 확관시험
[-6] Heat Treatment 열처리
[-7] H: Hardness(Rockwell) 경도(로크웰) Product Analysis 제품분석
[-8] Weld 용접(W: seam, S: Hoop)
[-9] Visual&Dimension Test 외관및 치수검사
[-10] Nondestructive Test 비파괴검사
[-12] Crush Test 압궤시험
[-13] Bend Test 굽힘시험
[-14] Weld Part 용접부
[-15] Reverse Flattening Test 반복확관
[-16] W: Weld Part 용접부
[-17] Flattening or Bending Test 편평또는굽힘시험
[-18] Drift Test 관통시험

SURVEYOR

본 제품은 귀사 규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PURCHASED SPECIFICATION AND ORDER.

QUALITY ASSURANCE DEPARTMENT

HYUNDAI HYSCO

14-inch Diameter Steel Casing

Mill Certificate

Siat
Tenaris Group

INSPECTION CERTIFICATE
(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Pag /
SIDERCA CORPORATION	0948/7	0941/5	1	25/04/2003	01 /

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTX-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
14,000" x 9,53 mm 14 x 0,375 In	81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ	53 Pz 684,29 m 56217 53 Pcs 2245,05 ft 123937

ENSAYOS MECÁNICOS / MECHANICAL TESTS

Muestra / Sample: Lote / Lot	Tubo / Pipe	Colada / Heat		Tensile: Weld UTS	Weld EL	Body UTS	Body YS	Body Ratio	Body EL	Guided Bend Test / Plegado Guiado: Cara / Face	Raíz / Root	Dureza / Hardness Tipo / Type: HV10 Max	Min	Max Dif	Posición / Location	Charpy V Absorbed Energy 1	2	3	Avg	Shear Area 1	2	3	Avg	DWTT Shear Area 1	2
			Max			110,0	65,0	0,93				248			Body Min	10	10	10	13						
			Min	60,0		60,0	42,0		28						Weld Min HAZ Min										
				ksi	%	ksi	ksi		%							ft.lb	ft.lb	ft.lb	ft.lb	%	%	%	%	%	%
	127	286030																							
	127	286030		85,0		75,1	59,6	0,79	36			193	176	21											
	207	286036																							
	207	286036		86,9		78,0	60,2	0,76	38			201	178	23	Body	49	46	47	47	100	100	100	100		
	215	286037																							
	215	286037		85,7		78,4	57,0	0,75	40			195	176	19	Body	72	68	69	70	100	100	100	100		
	234	286038																							
	234	286039		87,0		76,6	61,9	0,81	40			199	179	17	Body	46	58	63	55	100	100	100	100		
	290	286032																							
	290	286032		81,7		73,7	57,4	0,78	38			191	173	18	Body	72	64	77	71	100	100	100	100		
															Body	46	46	44	45	100	100	100	100		

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V-Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90 ° FROM WELD
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	
Tipo / Type	STRIP SPECIMEN
Tamaño / Size	1 1/2"
Orientación / Orientation	TRANSVERSAL

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (Lo = 2")
Ratio: YS/UTS Ratio - Relación fluencia/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum diference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Note - Nota:

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

Siat
Tenaris Group

INSPECTION CERTIFICATE
(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Siat S.A.
Guatemala [illegible]
(1683ZAZZ) [illegible]
Buenos Aires, [illegible]
(54) 11 [illegible]
Fax 11 [illegible]

Cliente / Customer	OV	PT. Fab	Número / Number	Fecha / Date	Pag.
SIDERCA CORPORATION	8948/7	8941/5	1	25/04/2003	02 /

Producto / Product	Orden de Compra / Purchase Order	Item	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	TTX-131		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
14,000"x 9,53 mm 14 x 0,375 in	61,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ	53 Pz 684,29 m 56217 53 Pcs 2245,05 ft 123937

ANÁLISIS QUÍMICOS DE PRODUCTO / PRODUCT CHEMICAL ANALYSES

Muestra / Sample		%																											
Tubo / Pipe	Colada / Heat	C	Mn	P	S	Si	Al	Cr	Ni	Mo	V	Cu	Sn	Nb	Ti	Co	B	Ca	Elm1	Elm2	Elm3	Ceq1	Ceq2	Pcm	Sum1	Sum2	Sum3	R1	R2
		x 100	x 100	x 1000	x 1000	x 100	x 1000	x 100	x 100	x 1000	x 100	x 1000	x 100	x 1000	x 1000	x 100	x 10000	x 10000	X	X	X	x 100	x 100	x 100	x 100	x 100	x 100		
Max Min		.22	120	25	15			40	40	150	8	40										43			15				
127	286030	14	100	9	3	16	32	2	2	9	4	1	8	1	1	3	3	26				32			4				
207	286036	14	97	11	3	20	32	2	1	8	4	1	4	1	1	1	3	24				32			4				
215	286037	15	102	12	2	19	33	2	1	8	4	1	12	1	2	1	3	20				33			4				
234	286038	15	103	13	3	18	29	2	1	8	4	1	8	1	1	1	3	25				34			4				
298	286032	15	100	11	5	17	38	2	1	8	4	1	8	2	2	1	3	21				33			4				
146961	286030 *	15	100	9	5	18	34	2	1	9	4	1	2	1	2							33			4				
146978	286002 *	15	99	10	4	18	31	2	1	8	4	1	7	1	2							33			4				
146958	286035 *	16	101	13	2	20	32	2	1	8	4	1	6	1	2							33			4				
146993	286037 *	17	105	13	3	18	36	2	1	9	4	1	11	2	2							38			4				
146958	286038 *	15	105	12	5	17	28	2	1	8	4	1	5	2	2							34			4				

Notas / Notes: Elm: Elemento / Element Ceq: Carbono equivalente - Equivalent Carbon Sum: Suma - Sum R: Ratio
*Corresponde a muestra en Materia Prima. *Samples from raw material.

Elm1 =
Ceq1 = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15
Sum1 = Nb+V+Ti
R1 =
Elm2 =
Ceq2 =
Sum2 =
R2 =
Elm3 =
Pcm =
Sum3 =
R3 =

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24254
BARTOW STEEL REF. # 2009193

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer
SIDERCA CORPORATION

Producto / Product
Cañería de Acero con Costura Longitudinal ERW.
Longitudinal Electric Resistance Welded Steel pipe.

Norma / Standard
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B

OV	PF, Fab	Número / Number	Fecha / Date	Pag
6946/7	6941/5	1	25/04/2003	03 /

Orden de Compra / Purchase Order: TTX-131
Item
Referencia del Cliente / Customer Reference

Grado / Grade: X42 PSL2

Extremos / Ends: BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface
14,000" x 9,53 mm 14 x 0,375 in	81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ

Cantidades / Quantities
53 Pz 684,29 m 56217
53 Pcs 2245,05 ft 123937

Marcación / Marking
@ = Monograma / Monogram API NN = Número de tubo / pipe number LL = Largo / Length PP = Peso / Weight MM/YY = Mes / Año - Month / Year HH = Colada / Heat

Estarcido (tubo) / Stenciling (pipe)
5L-210 SIAT @ MM/YY 14.000" 0.375" 54.65 Lb/Ft API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B. E. TESTED 2133 PSI. N° HEAT:
THOMAS PIPE PO# TTX-131. MADE IN ARGENTINA N°: NN LENGTH:(Ft): LL. PF/AT: 6946-7.

Observaciones / Remarks

VISUAL AND DIMENSIONAL CONTROL: 100%
HYDROSTATIC TEST: 2133 PSI (150 KG/CM2) - 5 SEC.
WELD ULTRASONIC INSPECTION: REFERENCE STANDARD 1/8" DRILLED HOLE.
MINIMUM WELD HEAT TREATMENT TEMPERATURE: 1600 °F

Length: max. 43,01 Ft
min. 41,01 Ft

STD: API 5L ED.42 - JULY 2000
ASTM A53. ED. 1999
ASME SA53. ED. 2001
NACE MR0175. ED. 1999

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

Por la presenta certificamos que el material aquí descripto ha sido fabricado de acuerdo con las normas y especificaciones solicitadas en vuestra orden y satisfacen los correspondientes requerimientos.
Este certificado se emite mediante un sistema computarizado y es válido sin firma electrónica. En el certificado original el logo SIAT-TENARIS (verde) está impreso en la parte superior y como fondo de la hoja. En caso que el poseedor entregue una copia del mismo, deberá garantizar la conformidad con el original, haciéndose responsable por cualquier uso ilegal o indebido.
Cualquier alteración y / o falsificación estará sujeta a la ley.
Si necesita asegurar la autenticidad de este certificado, contactarse con Siat S.A., e-mail: ctommasi@siat.com.ar

We hereby certified that the material herein described has been manufactured in accordance with the standards and specifications required in your order and satisfies the corresponding requirements.
This certificate is issued by a computerized system and it is valid with the electronic signature. On the original the SIAT-TENARIS green coloured trade mark is stamped on the upper part and as background of the page. In case the owner of the certificate released a copy, he must attest its conformity to the original, taking upon himself the responsibility for any unlawful or not allowed use.
Any alteration and / or falsification will be subject to the law.
If you need to assure the authenticity of this certificate, please do not hesitate to contact Siat S.A., e-mail ctommasi@siat.com.ar

Process Engineering Department
Sector Ingeniería de Procesos
CLAUDIO G. TOMMASI

TenarisSiat

Siat S.A. - Gustavala 3400 - Valentín Alsina
(B1822AXD) - Buenos Aires - República Argentina
Tel.: (54) 11 4205 9500 Fax (54) 11 4205 9671

LISTA DE EMPAQUE
PACKING LIST

Acta N° 1
Fecha/Date: 22/08/2003
Hoja N° 01
FSJ Rev.0 - 03/00

Cliente/Customer: SIDERCA CORPORATION

OC/PO: P.O. NO. 18329 / Thomas PO# 1181

Producto: Cañeria de Acero con Costura Longitudinal ERW.
Diámetro: 14.000 " x Espesor:0.375". Calidad: APIX42 PSL2/API B PSL2/ASTM A53 B
Product : Longitudinal Electric Resistance Welded Steel pipe.
14.000 " Outside Diameter x 0.375". Wall Thickness. APIX42 PSL2/API B PSL2/ASTM A53 B

PF Cliente: 7177-7

Tubo Cliente Pipe Customer	P.F. Fab. N°	Tubo Interno Pipe Internal	Largo Ft Length Ft	Peso Lb Weight Lb	Colada Heat
1	7177-7	31	42.29	2341	382340
3	7177-7	51	42.39	2345	371781
5	7177-7	53	42.39	2345	371781
7	7177-7	57	41.73	2310	380957
9	7177-7	60	41.93	2319	380957
11	7177-7	62	42.42	2350	380957
13	7177-7	66	41.93	2319	371781
15	7177-7	68	42.45	2350	371781
17	7177-7	70	42.06	2328	371781
19	7177-7	73	42.36	2345	381715
21	7177-7	75	41.93	2319	381716
23	7177-7	77	41.80	2314	381716
25	7177-7	81	42.32	2341	382390
27	7177-7	83	42.49	2350	382390
29	7177-7	85	42.42	2345	382390
31	7177-7	89	42.36	2341	382390
33	7177-7	92	42.42	2345	382390
35	7177-7	80	41.27	2283	382390
37	7177-7	97	42.32	2341	382390
39	7177-7	99	42.36	2341	382390
41	7177-7	101	42.39	2345	382390
43	7177-7	95	41.40	2292	382390
45	7177-7	107	41.90	2323	382390
47	7177-7	109	42.39	2345	382390
49	7177-7	113	42.32	2341	382340
51	7177-7	115	42.45	2345	382340
53	7177-7	117	42.36	2341	382340
55	7177-7	44	42.39	2345	382340
57	7177-7	43	42.39	2345	382340
59	7177-7	93	42.32	2341	382390
61	7177-7	40	42.55	2358	382340
63	7177-7	42	42.58	2367	382340
65	7177-7	262	41.96	2328	370970
67	7177-7	258	42.68	2367	370979
2	7177-7	50	42.13	2332	371781
4	7177-7	52	42.39	2345	371781
6	7177-7	54	42.78	2367	371781
8	7177-7	59	42.42	2350	380957
10	7177-7	61	41.86	2314	380957
12	7177-7	65	41.63	2306	371781
14	7177-7	67	42.03	2328	371781
16	7177-7	69	42.39	2345	371781
18	7177-7	63	41.34	2288	380957
20	7177-7	74	42.39	2345	381716
22	7177-7	76	41.83	2314	381716
24	7177-7	78	42.22	2336	381716
26	7177-7	82	42.39	2345	382390
28	7177-7	84	42.42	2345	382390
30	7177-7	86	42.49	2350	382390
32	7177-7	91	42.49	2350	382390
34	7177-7	94	42.45	2350	382390
36	7177-7	87	42.29	2341	382390
38	7177-7	98	42.42	2345	382390
40	7177-7	100	41.86	2319	382390
42	7177-7	102	42.81	2367	382390
44	7177-7	106	42.36	2341	382390
46	7177-7	108	42.39	2345	382390
48	7177-7	110	42.42	2345	382390
50	7177-7	114	42.29	2341	382340
52	7177-7	116	42.39	2341	382340
54	7177-7	118	42.42	2345	382340
56	7177-7	45	42.42	2350	382340
58	7177-7	90	42.29	2341	382390
60	7177-7	41	41.63	2310	382340
62	7177-7	46	42.26	2341	382340
64	7177-7	261	41.93	2323	370970
66	7177-7	259	42.16	2336	370970
68	7177-7	5	42.91	2380	371780

Cantidad/Quantity.....:	68	tubos/pipes
Largo Total/Total Length:	2872.74	Feet.
Peso Total/Total Weigth.:	159010	Pounds.

Inspector/Repres.Cliente

SIAT S.A.

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24254
BARTOW STEEL REF. # 2009193

Ing. CLAUDIO G. TUMMAS
Jefe de Ingeniería de Proceso
SIAT S.A.

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24254
BARTOW STEEL REF. # 2009193

17

4pgs.

Tenaris

Inspection Certificate
(EN 10204 3.1B - ISO 10474 3.1B)

Siat S.A.
[illegible]
Buenos Aires, Argentina
(54) 11 4365 9500 tel
(54) 11 4365 9671 fax

Cliente / Customer SIDERCA CORPORATION	OV 717717	PF. Fab 717717	Número / Number [illegible]	Fecha / Date 23/03/2003	Página / Page 01 / 04
Producto / Product Cañería de Acero con Costura Longitudinal ERW / Longitudinal Electric Resistance Welded Steel pipe	Orden de compra / Purchase Order P.O. NO. 18329 / Thomas POI 1181		Item	Referencia del Cliente / Customer Reference	
Norma / Standard API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	Grado / Grade X42 PSL2			Extremos / Ends BEVELLED AT 30° API 5L	
Dimensiones / Dimensions 14,000 " x 9,53 mm 14 x 0,375 in Schedule Peso Nominal / Nominal Weight 81,33 kg/m 54,65 lb/ft	Longitud / Length NOMINAL 40 FT	Superficie Externa / External Surface BARNIZ		Cantidades / Quantities 44 Pz 875,61 m 72176 kg 44 Pcs 2872,74 ft 159010 lb	

Ensayos Mecánicos / Mechanical Tests

Muestra / Sample: Lote / Lot	Tubo / Pipe	Colada / Heat		Tensile Weld UTS	Weld EL	Body UTS	Body YS	Body Ratio	Body EL	Guided Bend Face	Guided Bend Root	Hardness HV10 Max	Min	Max Dif	Posición / Location	Charpy V Absorbed Energy 1	2	3	Avg	Shear Area 1	2	3	Avg	DWTT Shear Area 1	2	Avg
			Max			110,0	65,0	0,93				248			Body Min Weld Min HAZ Min	10	10	10	13							
			Min	60,0		60,0	42,0		28																	
				ksi	%	ksi	ksi		%							ft.lb	ft.lb	ft.lb	ft.lb	%	%	%	%	%	%	%
	2 2	371780 371780		87,2		77,9	61,8	0,79	42			216	191	25	Body	49	57	48	52							
	14 14	371780 371780		88,9		80,8	61,5	0,76	38			212	196	16	Body	45	50	54	49							
	26 26	382340 382340		87,0		76,7	58,2	0,76	36			207	185	22	Body	34	38	38	37							
	33 33	382390 382390		89,2		82,4	64,0	0,78	37			217	194	23	Body	75	94	97	89							
	51 51	371781 371781		85,6		76,7	60,0	0,78	40			210	191	19	Body	48	53	46	49							
	58 58	380957 380957		88,0		77,6	60,6	0,78	40			215	183	32	Body	69	72	68	69							
	77 77	381716 381716		83,4		75,4	59,0	0,78	36			199	180	19	Body	41	44	53	46							
	85 85	382390 382390		88,9		78,6	62,7	0,80	37			217	185	32	Body	53	40	43	45							

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V-Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90° FROM WELD.
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	
Tipo / Type	STRIP SPECIMEN
Tamaño / Size	1 1/2"
Orientación / Orientation	TRANSVERSAL

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (Lo = 2")
Ratio: YS/UTS Ratio - Relación fluencia/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum difference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Note - Nota:

Tenaris

Inspection Certificate
(EN 10204 3.10 - ISO 10474 3,10)

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

Siat S.A.
Guatemala 1868
(B1822AXF) Valentín Alsina
Buenos Aires, Argentina
(54) 11 4165 9500 tel
(54) 11 4365 9671 fax

Cliente / Customer SIDERCA CORPORATION	OV 717777	Pf. Fab 717777	Número / Number 1	Fecha / Date 22/08/2003
Página / Page 02 / 04				
Producto / Product Cañería de Acero con Costura Longitudinal ERW / Longitudinal Electric Resistance Welded Steel pipe	Orden de compra / Purchase Order P.O. NO. 18329 / Thomas PO# 3181	Item	Referencia del Cliente / Customer Reference	
Norma / Standard API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	Grado / Grade X42 PSL2	Extremos / Ends BEVELLED AT 30° API 5L		
Dimensiones / Dimensions 14,000 " x 9,53 mm 14 x 0,375 in	Schedule	Peso Nominal / Nominal Weight 81,33 kg/m 54,65 lb/ft	Longitud / Length NOMINAL 40 FT	Superficie Externa / External Surface BARNIZ
Cantidades / Quantities 68 Pz 875,41 m 72126 kg 68 Pcs 2872,74 ft 159010 lb				

Ensayos Mecánicos / Mechanical Tests

Muestra / Sample				Ensayo de Tracción / Tensile Test						Guided Bend Test / Plegado Guiado		Dureza / Hardness Tipo / Type: HV10			Posición / Location	Charpy V Absorbed Energy				Charpy V Shear Area				DWTT Shear Area		
Lote / Lot	Tubo / Tipe	Colada / Heat		Weld UTS	Weld EL	Body UTS	Body YS	Body Ratio	Body EL	Cara / Face	Raiz / Root	Max	Min	Max Dif		1	2	3	Avg	1	2	3	Avg	1	2	Avg
			Max			110,0	65,0	0,93				248			Body Min	10	10	10	13							
			Min	60,0		60,0	42,0		28						Weld Min HAZ Min											
				ksi	%	ksi	ksi		%							ft.lb	ft.lb	ft.lb	ft.lb	%	%	%	%	%	%	%
	182	387340										204	187	22												
	182	382340		85,4		78,0	61,1	0,78	36						Body	37	40	37	38							
	260	370970										234	185	29												
	260	370970		86,6		76,9	57,9	0,75	40						Body	51	48	44	46							

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V-Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90° FROM WELD.
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	
Tipo / Type	STRIP SPECIMEN
Tamaño / Size	1 1/2"
Orientación / Orientation	TRANSVERSAL

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (Lo = 2")
Ratio: YS/UTS Ratio - Relación fluencia/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum difference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Nota - Note:

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

Tenaris

Inspection Certificate

(EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer SIDERCA CORPORATION	OV 747777	PF. Fab 717717	Número / Number 1	Fecha / Date 22/08/2003	Página / Page 03 / 04
Producto / Product Cañería de Acero con Costura Longitudinal ERW / Longitudinal Electric Resistance Welded Steel pipe	Orden de compra / Purchase Order P.O. NO. 18329 / Thomas PO# 1881	Item	Referencia del Cliente / Customer Reference		
Norma / Standard API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	Grado / Grade X42 PSL2		Extremos / Ends BEVELLED AT 30° API 5L		
Dimensiones / Dimensions 14,000 " x 9,53 mm X4 x 0,375 in	Schedule	Peso Nominal / Nominal Weight 81,338 kg/m 54,65 lbs/ft	Longitud / Length NOMINAL 40 FT	Superficie Externa / External Surface BARE/X	Cantidades / Quantities 68 Pc 875,61 m 72326 kg 68 Pcs 2872,74 ft 159010 lb		

Análisis Químicos de Producto / Product Chemical Analyses

Muestra - Sample		%																											
Tubo Pipe	Colada Heat	C x 100	Mn x 100	P x 1000	S x 1000	Si x 100	Al x 1000	Cr x 100	Ni x 100	Mo x 1000	V x 100	Cu x 100	Sn x 100	Nb x 1000	Ti x 1000	Ca x 100	B x 10000	Ca x 10000	Elm1 x	Elm2 x	Elm3 x	Ceq1 x 100	Ceq2 x 100	Pcm x 100	Sum1 x 100	Sum2 x 100	Sum3 x 100	R1	R2	R3
Max		22	120	25	15			40	30	15	8	40										43		25	15					
Min																														
1	371780	14	98	10	1	19	25	2	1	9	4	1	1	1	2	1	3	25				32		20	4					
14	378770	14	98	10	1	19	25	2	1	10	4	1	1	1	2	1	3	24				32		20	5					
26	382340	13	98	15	4	20	33	2	2	10	4	1	2	1	2	1	3	22				31		19	4					
31	382390	14	103	13	1	21	30	2	2	9	4	2	2	1	2	1	3	17				33		21	4					
51	378781	13	100	10	1	18	25	2	2	8	4	2	3	2	2	1	3	24				31		19	4					
58	380957	14	98	12	1	17	26	2	2	9	4	1	2	1	2	1	3	22				32		20	4					
77	381716	13	97	8	2	18	29	2	2	11	4	3	3	1	2	1	3	22				31		19	4					
85	382390	14	101	12	1	20	29	2	2	8	4	2	2	1	2	1	3	17				32		21	4					
162	382340	14	98	16	5	20	32	2	1	9	4	2	2	1	2	1	3	22				32		20	4					
260	370970	13	97	11	1	17	24	2	1	9	4	2	3	1	2	1	3	19				31		19	4					
149316	370970*	16	99	13	3	17	46	2	1	10	4	1	2	2	2							34		22	4					
148146	371781*	13	102	10	1	16	26	2	1	8	4	2	3	1	2							32		19	4					
149392	380957*	15	99	13	3	18	27	3	2	9	4	2	2	2	2							33		21	4					
147946	381716*	14	103	9	2	18	29	2	2	9	4	2	3	1	1							33		20	4					

Notas / Notes: Elm: Elemento / Element Ceq: Carbono equivalente / Equivalent Carbon Sum: Suma / Sum R: Ratio

* Corresponde a muestra en Materia Prima. * Samples from raw material.

Elm1 =

Elm2 =

Elm3 =

Ceq1 = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15

Ceq2 =

Pcm = C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5B

Sum1 = Nb+V+Ti

Sum2 =

Sum3 =

R1 =

R2 =

R3 =

TSI Rev. 0-12/01

Tenaris

Inspection Certificate

(EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Página / Page
SIDERCA CORPORATION	717777	717777	1	22/08/2003	04 / 04

Producto / Product	Orden de compra / Purchase Order	Ítem	Referencia del Cliente / Customer Reference
Cañería de Acero con Costura Longitudinal ERW / Longitudinal Electric Resistance Welded Steel pipe	P.O. NO. 18329 / Thomas PO# 1181		

Norma / Standard	Grado / Grade	Extremos / Ends
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	X42 PSL2	ELEVELED AT 30° API 5L

Dimensiones / Dimensions	Schedule	Peso Nominal / Nominal Weight	Longitud / Length	Superficie Externa / External Surface	Cantidades / Quantities	
14,000 " x 9,53 mm 14 x 0,375 in		81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARE	48 Pc 875,61 m 48 Pcs 2872,74 ft	72126 kg 159010 lb

Marcación / Marking

O = Monograma / Monogram API — NN = Número de tubo / pipe number — LL = Largo / Length — PP = Peso / Weight — MM/YY = Mes / Año - Month / Year — HH = Colada / Heat

Estarcido (tubo) / Stenciling (pipe)

SL-2D SIAT O MM/YY 14.000" 0.375" 54,65 lb/ft API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B/ASME SA53 /NACE NACE MR0175. E. TESTED 2133 PSI. Nº HEAT:. THOMAS PIPE PO 1181. MADE IN ARGENTINA Nº: NN LENGHT(ft): LL. PF/IT: 2177-7.

Observaciones / Remarks

VISUAL AND DIMENSIONAL CONTROL: 100%
HYDROSTATIC TEST: 2133 PSI (150 KG/CM2) - 5 SEC.
WELD ULTRASONIC INSPECTION: REFERENCE STANDARD 1/8"
DRILLED HOLE.
MINIMUM WELD HEAT TREATMENT TEMPERATURE: 1600 °F

Length: max. 43.01 Ft
min. 41.01 Ft

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

STD: API 5L ED 42 - JULY 2000
ASTM A53. ED. 1999
ASME SA53. ED. 2001
NACE MR0175. ED. 1999

Por la presente certificamos que el material aquí descripto ha sido fabricado de acuerdo con las normas y especificaciones solicitadas en vuestra orden y satisfacen los correspondientes requerimientos

Este certificado se emite mediante un sistema computarizado y es válido con firma electrónica. En el certificado original el logo Tenaris (verde) está impreso en la parte superior y como fondo de la hoja. En caso que el poseedor entregue una copia del mismo, deberá garantizar la conformidad con el original, haciéndose responsable por cualquier uso ilegal o indebido. Cualquier alteración y / o falsificación estará sujeta a la ley.
Si necesita asegurar la autenticidad de este certificado, contactarse con Siat S.A., e-mail: ctommasi@siat.com.ar

We hereby certified that the material herein described has been manufactured in accordance with the standards and specifications required in your order and satisfies the corresponding requirements

This certificate is issued by a computarized system and it is valid with the electronic signature. On the original the Tenaris green coloured trade mark is stamped on the upper part and as background of the page. In case the owner of the certificate released a copy, he must attest its conformity to the original, taking upon himself the responsibility for any unlawful or not allowed use. Any alteration and / or falsification will be subject to the law.
If you need to assure the authenticity of this certificate, please do not hesitate to contact Siat S.A., e-mail ctommasi@siat.com.ar

Process Engineering Department
Sector Ingeniería de Procesos
CLAUDIO G. TOMMASI

PSI Rev. 0-12/01.

Siat
Tenaris Group

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer	OV	PF. Fab	Número / Number	Fecha / Date	Pag. /
SIDERCA CORPORATION	6940/7	6941/5	1	25/04/2003	01 /

Producto / Product: Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.

Orden de Compra / Purchase Order: TTX-131

Item | Referencia del Cliente / Customer Reference:

Norma / Standard: API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B

Grado / Grade: X42 PSL2

Extremos / Ends: BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
14,000" x 9,53 mm 14 " x 0,375 in	81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ	53 Pz 684,20 m 56217 53 Pcs 2245,05 ft 123937

ENSAYOS MECÁNICOS / MECHANICAL TESTS

Muestra / Sample: Lote / Lot	Tubo / Pipe	Colada / Heat		Ensayo de Tracción / Tensile Test: Weld UTS	Weld EL	Body UTS	Body YS	Body Ratio	Body EL	Guided Bend Test / Plegado Guiado: Cara / Face	Raíz / Root	Dureza / Hardness Tipo / Type: HV10: Max	Min	Max Dif	Posición / Location	Charpy V Absorbed Energy 1	2	3	Avg	Shear Area 1	2	3	Avg	DWTT Shear Area 1	2
			Max			110,0	55,0	0,93				248			Body Min	10	10	10	13						
			Min	60,0		60,0	42,0		28						Weld Min										
															HAZ Min										
				ksi	%	ksi	ksi		%							ft.lb	ft.lb	ft.lb	ft.lb	%	%	%	%	%	%
	127	286030		84,0		76,1	59,6	0,78	35			199	178	21	Body	49	46	47	47	100	100	100	100		
	127	286030																							
	207	286018		86,9		78,0	58,7	0,75	36			201	178	23	Body	72	68	69	70	100	100	100	100		
	207	286030																							
	216	286037		85,7		76,4	57,0	0,75	40			195	176	19	Body	46	59	63	56	100	100	100	100		
	215	296037																							
	234	286038		87,0		76,6	61,9	0,81	40			196	179	17	Body	72	84	77	71	100	100	100	100		
	234	286039																							
	290	286032		81,7		73,7	57,4	0,78	39			191	173	18	Body	46	46	44	45	100	100	100	100		
	290	286032																							

Aplastamiento y ductilidad / Flattening and ductility tests	API 5L
Charpy V-Notch Test	API 5L
Temperatura / Temperature	32 °F
Probeta / Specimen	2/3 TRANSVERSAL
Ubicación / Location	90 ° FROM WELD
Ensayo de Tracción / Tensile Test	
Probeta / Specimen	
Tipo / Type	STRIP SPECIMEN
Tamaño / Size	1 1/2"
Orientación / Orientation	TRANSVERSAL

UTS: Ultimate tensile strength - Límite de rotura
YS: Yield Strength - Límite de fluencia
EL: Elongation - Alargamiento (Lo = 2")
Ratio: YS/UTS Ratio - Relación fluencia/rotura
Max: Maximum - Máximo
Min: Minimum - Mínimo
Max Dif: Maximum diference - Diferencia máxima
Avg: Average - Promedio
HAZ: Heat affected zone - Zona afectada

Note - Nota:

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 242566
BARTOW STEEL REF. # 2009193

F-341 P.011/022 T-143 863-569-8520 FROM-Bartow Steel 12:07PM NOV-20-2003

Siat
Tenaris Group

INSPECTION CERTIFICATE
(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer: SIDERCA CORPORATION	OV: 6946/7	IT. Lab: 6941/5	Número / Number: 1	Fecha / Date: 25/04/2003	02
Producto / Product: Cañería de Acero con Costura Longitudinal ERW. Longitudinal Electric Resistance Welded Steel pipe.	Orden de Compra / Purchase Order: TTX-131		Item	Referencia del Cliente / Customer Reference	
Norma / Standard: API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B	Grado / Grade: X42 PSL2		Extremos / Ends: BEVELLED AT 30° API 5L		

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface	Cantidades / Quantities
14,000" x 9,53 mm 14 x 0,375 in	81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ	53 Pz 684,29 m 56217 53 Pcs 2245,05 ft 123937

ANÁLISIS QUÍMICOS DE PRODUCTO / PRODUCT CHEMICAL ANALYSES

Muestra / Sample Tubo / Pipe	Colada / Heat	C	Mn	P	S	Si	Al	Cr	Ni	Mo	V	Cu	Sn	Nb	Ti	Co	B	Ca	Elm1	Elm2	Elm3	Ceq1	Ceq2	Pcm	Sum1	Sum2	Sum3	R1	R2
		x 100	x 100	x 1000	x 1000	x 100	x 1000	x 100	x 100	x 1000	x 100	x 100	x 1000	x 1000	x 1000	x 100	x 10000	x 10000	x	x	x	x 100	x 100	x 100	x 100	x 100	x 100		
Max		22	120	25	15																	43			15				
Min								40	40	150	8	40																	
127	286030	14	100	9	3	16	32	2	2	9	4	1	8	1	1	1	3	26				32			4				
207	234036	14	97	11	3	20	32	2	1	8	4	1	4	1	1	1	3	24				32			4				
215	286037	15	102	12	2	19	38	2	1	8	4	1	12	1	2	1	3	20				33			4				
231	286039	15	103	13	3	16	29	2	1	8	4	1	6	1	1	1	3	25				34			4				
260	286032	15	100	11	5	17	34	2	1	8	4	1	8	2	2	1	3	21				33			4				
146881	286030 *	15	100	9	5	18	34	2	1	9	4	1	2	1	2							33			4				
146971	286032 *	15	99	10	4	18	31	2	1	9	4	1	7	1	2							33			4				
148960	286036 *	16	101	13	2	20	32	2	1	8	4	1	5	1	2							36			4				
148993	286037 *	17	105	13	3	18	38	2	1	9	4	1	11	2	2							36			4				
146958	286039 *	15	105	12	0	17	28	2	1	9	4	1	6	2	2							34			4				

Notas / Notes: Elm: Elemento / Element Ceq: Carbono equivalente - Equivalent Carbon Sum: Suma - Sum R: Ratio
*Corresponde a muestra en Materia Prima. *Samples from raw material.

Elm1 =	Elm2 =	Elm3 =
Ceq1 = C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15	Ceq2 =	Pcm =
Sum1 = Nb+V+Ti	Sum2 =	Sum3 =
R1 =	R2 =	R3 =

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24254
BARTOW STEEL REF # 200919-2

Siat
Tenaris Group

Siat S.A. [illegible]

INSPECTION CERTIFICATE

(DIN 50049.3.1B - EN 10204 3.1B - ISO 10474 3.1B)

Cliente / Customer
SIDERCA CORPORATION

Producto / Product
Cañería de Acero con Costura Longitudinal ERW.
Longitudinal Electric Resistance Welded Steel pipe.

Norma / Standard
API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B

OV	PF. Fab	Número / Number	Fecha / Date	Pág /
6946/7	6941/5	1	25/04/2003	03 /

Orden de Compra / Purchase Order
TTX-131

Item

Referencia del Cliente / Customer Reference

Grado / Grade
X42 PSL2

Extremos / Ends
BEVELLED AT 30° API 5L

Dimensiones / Dimensions	Peso Nominal / Nominal Weight	Largo / Length	Superficie Externa / External Surface
14,000" x 9,53 mm 14 x 0,375 In	81,33 kg/m 54,65 lb/ft	NOMINAL 40 FT	BARNIZ

Cantidades / Quantities

53	Pz	684,29	m	56217
53	Pcs	2245,05	ft	123937

Marcación / Marking
@ = Monograma / Monogram API   NN = Número de tubo / pipe number   LL = Largo / Length   PP = Peso / Weight   MM/YY = Mes / Año - Month / Year   HH = Colada / Heat

Estarcido (tubo) / Stenciling (pipe)
5L-210 SIAT @ MM/YY 14.000" 0.375" 54.65 Lb/Ft API 5L X42 PSL2/API GR.B PSL2/ASTM A53 B. E. TESTED 2133 PSI. N° HEAT:.
THOMAS PIPE PO# TTX-131. MADE IN ARGENTINA N°: NN LENGTH:(Ft): LL. PF/IT: 6946-7.

Observaciones / Remarks

VISUAL AND DIMENSIONAL CONTROL: 100%
HYDROSTATIC TEST: 2133 PSI (150 KG/CM2) - 5 SEC.
WELD ULTRASONIC INSPECTION: REFERENCE STANDARD 1/8" DRILLED HOLE.
MINIMUM WELD HEAT TREATMENT TEMPERATURE: 1600 °F

Length: max. 43,01 Ft
min. 41,01 Ft

STD: API 5L ED.42 - JULY 2000
ASTM A53. ED. 1999
ASME SA53. ED. 2001
NACE MR0175. ED. 1999

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 24256
BARTOW STEEL REF. # 2009193

Por la presente certificamos que el material aquí descripto ha sido fabricado de acuerdo con las normas y especificaciones solicitadas en vuestra orden y satisfacen los correspondientes requerimientos.
Este certificado se emite mediante un sistema computarizado y es válido sin firma electrónica. En el certificado original el logo SIAT-TENARIS (verde) está impreso en la parte superior y como fondo de la hoja. En caso que el poseedor entregue una copia del mismo, deberá garantizar la conformidad con el original, haciéndose responsable por cualquier uso ilegal o indebido. Cualquier alteración y / o falsificación estará sujeta a la ley.
Si necesita asegurar la autenticidad de este certificado, contactarse con Siat S.A., e-mail: ctommasi@siat.com.ar

We hereby certified that the material herein described has been manufactured in accordance with the standards and specifications required in your order and satisfies the corresponding requirements.
This certificate is issued by a computerized system and it is valid with the electronic signature. On the original the SIAT-TENARIS green coloured trade mark is stamped on the upper part and as background of the page. In case the owner of the certificate released a copy, he must attest its conformity to the original, taking upon himself the responsibility for any unlawful or not allowed use.
Any alteration and / or falsification will be subject to the law.
If you need to assure the authenticity of this certificate, please do not hesitate to contact Siat S.A., e-mail ctommasi@siat.com.ar

Process Engineering Department
Sector Ingeniería de Procesos
CLAUDIO G. TOMMASI

20-inch Diameter Steel Casing

Mill Certificate

MAR-24-2003 03:36PM FROM-Bartow Steel 863-869-9520 T-654 P.007/007 F-747

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

• 본사 · 공장 : 울산광역시 북구 염포동 265번지 (683-370)
HEAD OFFICE (ULSAN PLANT) #265, Yeompo-dong, Buk-gu, Ulsan, Korea TEL:(052)280-0114 FAX:(052)287-4915

• 서울사무소 : 서울특별시 종로구 계동 140-2번지 (110-793)
SEOUL OFFICE 140-2, Kye-dong, Chongro-gu, Seoul, Korea TEL:(02) 746-1114 FAX:(02) 775-7095

증서번호 CERTIFICATE NO: E28045 페이지 PAGE: 1

발행일자 DATE OF ISSUE: SEP. 2. 2002. B4226202

계약번호 CONTRACT (P.O) NO:

품명 COMMODITY: E.R.W. STEEL PIPE

규격 SPECIFICATION: API 5L X42/API 5LB PSL1/ASTM A53B

수요가 CUSTOMER: TTX-Le

치수 DIMENSION 외경×두께×길이 (OUTDIA. × THICK. × LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDROSTATIC TEST MPa / kg f/cm² PSI	Tests ※6–※14 (G: GOOD)	경도 HARDNESS HRB HV	제강번호 HEAT NO.	항복강도 YIELD STRENGTH kg f/mm² PSI	인장강도 TENSILE STRENGTH (N/mm²)		연신율 ELONGATION %	C ×100	Si ×100	Mn ×100	P ×1000	S ×1000	Cu ×100	Ni ×100	Cr ×100	Mo ×100	V	Nb ×1000	Al	Ceq
NB 20" × .500" x42.000'	5	9.929	133	G G G G G G	175	A38851	30.9	45.5	48.3	36	18	2	79	16	7	2	2	1	3	Tr			
(508.0mm x12.70mm x 12.802M)			1890				44000	64700	68700														
					172	A40297	31.4	45.3	48.0	36	17	1	75	15	10	2	1	1	3	Tr			
							44700	64400	68300														
NB 24" × .500" x42.000'	24	57.474	111	G G G G G G	176	A39162	30.8	46.7	49.3	38	18	1	73	16	7	2	3	1	3	Tr			
(610.0mm x12.70mm x 12.802M)			1580				43800	66400	70100														
					174	A39305	31.8	45.4	48.2	36	17	2	78	16	8	2	3	1	4	Tr			
							45200	64600	68600														
					177	A39704	32.8	46.0	48.8	35	19	2	74	16	8	1	3	1	3	Tr			
							46700	65400	69400														
					175	A39709	35.3	50.9	53.8	39	17	1	76	16	8	2	3	1	3	Tr			
							50200	72400	76500														
					172	A43669	33.8	48.5	51.3	36	17	2	74	11	9	1	2	1	2	Tr			
							48100	69000	73000														
					172	A43671	31.5	48.4	51.2	39	18	2	73	9	8	2	2	1	3	Tr			

~~* HARDNESS TO NACE MR0175~~

* RESIDUAL MAGNETISM TEST : GOOD

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verbal Adrian 12/6/02
~~BARTOW STEEL REF. #~~ S8S10

※1 Type of pipe End 관끝
X B: Black, G: Galvanized
X V: Varnish, R: Removal Varnish, O: Oiling Coating
XX PE: Plain End, BE: Bevel End, TE: Thread End

※2 NB: Nominal Bore 호칭경, OD: Outside Diameter
※5 G: Good
※6 Weld Ductility Test 용접부 연성시험
※11 Flaring Test 압확시험
※3 Unit 단위 (M: mm, I: inch)
※6 Visual & Dimension Test 외관 및 치수검사
※8 Nondestructive Test 비파괴검사
※12 Crush Test 압착시험
※4 Unit 단위 (M: Meter, F: Feet, I: Inch)
※7 Flattening or Bending Test 편평 또는 굽힘시험
※10 Drift Test 확관시험
※13 Reverse Flattening Test 역편평시험

http://soarprod.db:7782/pls/portal30/EDGEN.DYN_IMAGES_PRINT.SHOW?p_arg_nam... 3/24/2003

MAR.24.2003 2:37PM EDGEN PURCHASING NO.875 P.2/2

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

- 본사·공장 : 울산광역시 북구 염포동 265번지 [illegible] - [illegible]
  HEAD OFFICE (ULSAN PLANT) #265, Yeompo-dong, Buk-gu, Ulsan, Korea TEL:(052)280-0114 FAX:(052)287-8916
- 서울사무소 : 서울특별시 종로구 계동 140-2번지 [illegible] - [illegible]
  SEOUL OFFICE 140-2, Kye-dong, Chongro-gu, Seoul, Korea TEL:(02) 746-1114 FAX:(02) 715-1095

증명서번호 CERTIFICATE NO: E2A153 페이지 PAGE: 1

발행일자 DATE OF ISSUE: OCT. 25. 2002. E4242800

계약번호 CONTRACT (P/O) NO:

품명 COMMODITY: E.R.W. STEEL PIPE

제품규격 SPECIFICATION: API 5L X42/API 5LB PSL1/ASTM A53B/ASME SA53B

수요가 CUSTOMER:

단종 TYPE OF PIPE END	치수 DIMENSION 외경 x 두께 x 길이 (OUTDIA. x THICK. x LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDRO-STATIC TEST	도막시험 COATING TEST	경도 HARDNESS	제강번호 HEAT NO.	인장시험 TENSILE TEST	화학성분(%) CHEMICAL COMPOSITION	충격시험 IMPACT
※1	※2 ※3 ※4									
BVBE	NB 20" x .500" x42.000"	8	15.889	133			A46597	31.1 45.7 48.5 39	C 17 Si 1 Mn 80 P 15 S 9 Cu 2 Ni 3 Cr 1 Mo 3 V Tr	
	(508.0mm x12.7mm x 12.802M)			1890				44200 65000 69000		
							Y44226	32.0 45.8 48.3 37	19 1 85 13 7 2 2 1 1 Tr	
								45500 65100 68700		
							Y46769	29.7 45.9 48.5 35	19 2 80 14 9 2 1 2 3 Tr	
								42200 65300 69000		
BVBE	NB 24" x .250" x42.000"	12	14.680	56			A43514	33.7 47.8 50.5 38	16 1 65 13 6 2 2 1 3 Tr	
	(610.0mm x 6.35mm x 12.802M)			800				47900 68000 71800		
							A44578	33.7 48.5 51.3 36	17 1 77 13 7 2 3 1 2 Tr	
								47900 69000 73000		
							A45372	33.9 47.4 50.2 37	16 1 63 14 10 2 2 1 2 Tr	
								48300 67400 71400		
	TOTAL ->	20	30.522							

※ RESIDUAL MAGNETISM TEST : [illegible]

비고 REMARK

- API 2000/ASTN 1999/ASME 1999

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verbal-Adam 12/6/02
BARTOW STEEL REF. # 58510

참고 NOTES

※1 Type of pipe End 관종
- X: B : Black, G : Galvanized, E : Enameled
- X: V : Varnish, R : Removal Varnish, O : Oiling Coating, F : PE Coating, C : Coaltar Coating, A : Asphalt Coating
- XX: PE : Plain End, BE : Bevel End, TE : Thread End, TC : Thread Coupling, BL : Bell End, SE : Swaging End, VJ : Victaulic Joint

※2 NB : Nominal Bore 호칭경, OD: Outside Diameter
※3 O : Bore
※4 Weld Ductility Test 용접부 연성시험
※5 Unit 단위 (M : mm, I : Inch)
※6 visual & Dimension Test 육안 및 치수검사
※7 Flattening or Bending Test 편평 또는 굽힘시험
※8 Nondestructive Test 비파괴검사 ( )
※9 Unit 단위 (M : Meter, F : Feet, I : Inch)
※10 Drift Test 관통시험
※11 Flaring Test 입확시험
※12 Crush Test 동압시험
※13 Reverse Flattening Test 편개시험
※14 Heat Treatment 열처리
※15 B : Base Metal 모재부
※16 W : Weld Part 용접부
※17 H : Heat(Ladle)Analysis 제강분석,P.Product Analysis 제품분석

SURVEYOR

본 제품은 권검규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE REFERENCE STANDARD

H. G. Lee

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO.,LTD.

• 본사·공장 : 울산광역시 북구 염포동 265번지 ☎(052)289-0114
HEAD OFFICE : # 265, YUMPO-DONG, BUK-KU, ULSAN, KOREA
(ULSAN PLANT) TEL:280-0114 FAX:(052)287-8916
TLX:HDPIPE K 53776

• 서울사무소 : 서울특별시 중구 무교동 77번지 ☎(02)318-0114
SEOUL OFFICE : # 77, MUGYO-DONG, JOONG-KU, SEOUL, KOREA
TEL:3455-0500 FAX:775-7095

증명서번호 CERTIFICATE NO : B05090 페이지 PAGE : 1
발행일자 DATE OF ISSUE : APR. 27, 2000. B4012902
계약번호 CONTRACT (P/O) NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5L X42/API 5LB/ASTM A53B/ASME SA53B
수요가 CUSTOMER :

G:GOOD

검증 TYPE OF PIPE END	치수 DIMENSION 외경 x 두께 x 길이 (OUTDIA. x THICK. x LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDROSTATIC TEST MPa / kg f/cm² / PSI	비파괴검사 NDE	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH	연신율 ELONGATION %	화학성분 CHEMICAL COMPOSITION C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Al	Ceq	충격시험 IMPACT
	×1	×2 ×3 ×4				PSI / kg f/mm² / N/mm²																
BVBE	OD 18" x .250" x21.000'	15	6,829	210	G G G G G																	
	(457.0mm x 6.35mm x 6.401M)			2990																		
						23.6	44.7	47.2	38	.15	.1	.71	.18	.10	.1	.1	.2	Tr	Tr			
						42400	63600	67100														
						34.1	48.3	51.5	34	.15	.1	.68	.13	.9	.3	.1	.1	Tr	Tr			
						48500	68700	73300														
BVBE	OD 20" x .500" x42.000'	39	77,445	133	G G G G G																	
	(508.0mm x12.70mm x 12.802M)			1890																		
						32.1	48.1	51.5	40	.17	.1	.81	.20	.10	.2	.1	.2	Tr	Tr			
						45700	68400	73300														
						30.1	47.9	50.8	24	.18	.2	.82	.18	.8	.1	.2	.1	Tr	Tr			
						42800	68100	72300														
						31.1	49.9	51.8	22	.17	.1	.75	.18	.9	.2	.1	.1	Tr	Tr			
						44700	69700	73700														
	TOTAL ->	54	84,274																			

비고 REMARK

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verbal Adnan 12/4/02
BARTOW STEEL REF. # 58510

참고 NOTES

×1 Type of pipe End 관종
- B : Black
- G : Galvanized
- E : Enameled

×2 NB : Nominal Bore 호칭경, OD: Outside Diameter

×3 Unit 단위(M : mm, I : Inch)

×4 Unit 단위(M : Metal, F : Feet, I : Inch)

×5 G : Good

×6 visual & Dimension Test 육안 및 치수검사

×7 Flattening or Bending Test 편평 또는 굽힘시험

×8 V : Varnish
- R : Removal Varnish
- O : Oiling Coating
- F : PE Coating
- C : Coaltar Coating
- A : Asphalt Coating

×9 Weld Ductility Test 용접부 연신시험

×10 Drift Test 관확관시험

×11 Flaring Test 팽복시험

×12 Nondestructive Test 비파괴검사

×13 Crush Test 충압시험

×14 Heat Treatment 열처리

×15 R : Reverse Flattening Test 편단시험

×16 W : Weld Part 용접부

×17 H : Heat(Ladle)Analysis 용탕분석, P:Product Analysis 제품분석

XX
- PE : Plain End
- BE : Bevel End
- TE : Thread End
- TC : Thread Coupling
- BL : Bell End
- SE : Swaging End
- VJ : Victaulic Joint

본 제품은 관련규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

K. G. Lee
QUALITY ASSURANCE TEAM GENERAL MGR.

SURVEYOR

HYUNDAI PIPE CO., LTD.

HPS - B301 - 631 - 0 - CLT

(350 x 260)

Example

CERTIFICATE NO: R37119 PAGE: 1
DATE OF ISSUE: JUL. 9. 2002. E4226202
CONTRACT (P/O) NO:
COMMODITY: E.R.W. STEEL PIPE
SPECIFICATION: API 5L X42/API 5LB PSL1/ASTM A53B
CUSTOMER:

MILL INSPECTION CERTIFICATE

HYSCO.
HEAD OFFICE (ULSAN PLANT): #265, Yeompo-dong, Buk-gu, Ulsan, Korea TEL:(052)280-0114 FAX:(052)287-8916
SEOUL OFFICE: 140-2, Kye-dong, Chongro-gu, Seoul, Korea TEL:(02) 745-1114 FAX:(02) 715-7095

G:GOOD

TYPE OF PIPE END *1	*2	DIMENSION (OUTDIA. x THICK. x LENGTH) *3 *4	QUANTITY (PCS)	WEIGHT (KG)	HYDROSTATIC TEST (kg f/cm² / PSI)	5	6	7	8	9	14 HEAT TREATMENT	HARDNESS HRB HV	HEAT NO.	YIELD STRENGTH (PSI)	TENSILE STRENGTH B	TENSILE STRENGTH W	ELONGATION %	C (x100)	Si (x100)	Mn (x100)	P (x1000)	S (x1000)	Cu (x100)	Ni (x100)	Cr (x100)	Mo (x100)	V	Nb	Al	Ceq	IMPACT
BVBE	NB	20" x .250" x42.000'	66	66.898	66	G	G	G	G	G	G	172	A38089	33.1	46.6	49.5	38	15	1	67	12	9	2	2	1	3	Tr				
		(508.0mm x 6.35mm x 12.802M)			940									47100	66300	70400															
												177	A39436	34.3	47.1	49.8	34	14	1	68	14	7	2	2	1	3	Tr				
														48800	67000	70800															
BVBE	NB	20" x .375" x42.000'	50	74.739	100	G	G	G	G	G	G	173	A39374	33.4	48.5	51.3	36	18	2	77	17	6	2	2	1	4	Tr				
		(508.0mm x 9.53mm x 12.802M)			1420									47500	69000	73000															
BVBE	NB	20" x .500" x42.000'	20	39.715	133	G	G	G	G	G	G	17?	A38851	30.9	45.5	48.3	36	18	2	79	16	7	2	2	1	3	Tr				
		(508.0mm x 12.70mm x 12.802M)			1890									44000	64700	68700															
		TOTAL ->	136	181.342																											

REMARK:
~~* HARDNESS TO HARE HR8175~~
* RESIDUAL MAGNETISM TEST : GOOD

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verba-Adran 12/6/02
BARTOW STEEL REF. # 58810

NOTES:
*1 Type of pipe End: X: B : Black, G : Galvanized, E : Uncoated; X: V : Varnish, R : Removal Varnish, O : Oiling Coating, P : PE Coating, C : Coater Coating, A : Asphalt Coating; XX: PE : Plain End, BE : Bevel End, TE : Thread End, TC : Thread Coupling, DL : Bell End, SE : Swaging End, VJ : Victaulic Joint
*2 NB : Nominal Bore, OD : Outside Diameter
*3 Unit (M : mm, I : Inch)
*4 Unit (M : Meter, F : Feet, I : Inch)
*5 G : Good
*6 Visual & Dimension Test
*7 Flattening or Bending Test
*8 Weld Ductility Test
*9 Nondestructive Test
*10 Drift Test
*11 Flaring Test
*12 Crush Test
*13 Reverse Flattening Test
*14 Heat Treatment
*15 B : Base Metal
*16 W : Weld
*17 H : Heat(Ladle) Analysis, P: Product Analysis

WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

SURVEYOR

H. G. Lee
QUALITY ASSURANCE TEAM GENERAL MGR.

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

- 본사·공장 : 울산광역시 북구 염포동 265번지 [illegible] - [illegible]
  HEAD OFFICE #265, Yeompo-dong, Buk-gu, Ulsan, Korea
  (ULSAN PLANT) TEL:(052)280-0114 FAX:(052)287-8918
- 서울사무소 : 서울특별시 종로구 계동 140-2번지 [illegible] - [illegible]
  SEOUL OFFICE 140-2, Kye-dong, Chongro-gu, Seoul, Korea
  TEL:(02) 746-1114 FAX:(02) 775-7095

성적서번호 CERTIFICATE NO: E2A153 페이지 PAGE: 1
발행일자 DATE OF ISSUE: OCT. 25. 2002. 64242800
계약번호 CONTRACT (P/O) NO:
품명 COMMODITY: E.R.W. STEEL PIPE
제품규격 SPECIFICATION: API 5L X42/API 5LB PSL1/ASTM A53B/ASME SA53B
수요가 CUSTOMER:

G:GOOD

형태 TYPE OF PIPE END	치수 DIMENSION 외경 x 두께 x 길이 (OUTDIA. x THICK. x LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDRO-STATIC TEST MPa / kg f/cm² / PSI	육안 VISUAL INSPECTION	편평 FLATTENING TEST	확관 FLARING TEST	굽힘 BENDING TEST	용접부 WELD DUCTILITY TEST	인장 TENSILE TEST	드리프트 DRIFT TEST	압궤 CRUSH TEST	편평 FLATTENING TEST	열처리 HEAT TREATMENT	도막시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT g/m² / OZ/FT²	굽힘성 DSP TEST	경도 HARD-NESS HRB / HV	제강번호 HEAT NO.	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH B	W	연율 ELONGATION	화학성분(%) CHEMICAL COMPOSITION C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Al	Ceq	충격시험 IMPACT 시험온도 TEST TEMP.	흡수율 ABSORBED ENERGY
	#1	#2	#3 #4		#5	#7	#8	#9	#10	#11	#12	#13	#14	#17																							
BVBE	NB 20" x .500" x42.000'	8	15,886	135	G	G	G	G	G	G	G	G	G	G				A46397	31.1	45.7	48.9	39	17	1	80	15	9	2	3	1	2	Tr				
	(508.0mm x12.7mm x 12.802M)			1890															44200	65000	69000																
																		Y44226	32.0	45.8	48.3	37	19	1	85	13	7	2	2	1	1	Tr				
																			45500	65100	68700																
																		Y46769	29.7	45.9	48.5	35	19	2	80	14	9	2	1	2	3	Tr				
																			42200	65300	69000																
BVBE	NB 24" x .250" x42.000'	12	14,636	56	G	G	G	G	G	G				G				A43514	33.7	47.8	50.5	38	16	1	65	13	8	2	2	1	3	Tr				
	(610.0mm x 6.35mm x 12.802M)			800															47900	68000	71800																
																		A44578	33.7	48.5	51.3	36	17	1	77	13	7	2	2	1	2	Tr				
																			47900	69000	73000																
																		A45372	33.9	47.4	50.2	37	16	1	63	14	10	2	2	1	2	Tr				
																			48300	67400	71400																
	TOTAL ->	20	30,523																																		

* RESIDUAL MAGNETISM TEST : [illegible]

비고 REMARK

* API 2000/ASTM 1999/ASME 1999

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verlool- Advice 121602
BARTOW STEEL REF. # 58510

주기 NOTES

#1 Type of pipe End 관종
- X: B: Black; G: Galvanized; E: Enameled
- X: V: Varnish; R: Removal Varnish; O: Oiling Coating; F: PE Coating; C: Coaller Coating; A: Asphalt Coating
- XX: PE: Plain End; BE: Bevel End; TE: Thread End; TC: Thread Coupling; BL: Bell End; GE: Grooging End; VJ: Victaulic Joint

#2 NB: Nominal Bore 호칭경, OD: Outside Diameter
#3 O: Good
#5 Unit 단위 (M: Mm, I: Inch)
#6 Visual & Dimension Test 육안 및 치수검사
#7 Flattening or Bending Test 편평 또는 굽힘시험
#8 Weld Ductility Test 용접부 연성시험
#9 Nondestructive Test 비파괴검사 (
#10 Drift Test 경통시험
#11 Flaring Test 압축시험
#12 Crush Test 압궤시험
#13 Reverse Flattening Test 편개시험
#14 Heat Treatment 열처리
#15 B: Base Metal 모재부
#16 W: Weld Part 용접부
#17 H: Heat(Ladle)Analysis 얼런분석,P:Product Analysis 제품분석
#4 Unit 단위 (M: Meter, F: Feet, I: Inch)

본 제품은 관련규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE [illegible]

H. G. Lee

SURVEYOR

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

- 본사 · 공장 : 울산광역시 북구 염포동 265번지 [illegible] - [illegible]
HEAD OFFICE #265, Yeompo-dong, Buk-gu, Ulsan, Korea
(ULSAN PLANT) TEL:(052)280-0114 FAX:(052)287-8916

- 서울사무소 : 서울특별시 종로구 계동 140-2번지 [illegible] - [illegible]
SEOUL OFFICE 140-2, Kye-dong, Chong-ro-gu, Seoul, Korea
TEL:(02) 746-1114 FAX:(02) 745-7095

성적서번호 CERTIFICATE NO : 02A153 페이지 PAGE : 1
발행일자 DATE OF ISSUE : OCT. 25. 2002. 84242800
계약번호 CONTRACT (P/O) NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5L X42/API 5LB PSL1/ASTM A538/ASME SA538
수요가 CUSTOMER :

G:GOOD

관종 TYPE OF PIPE END	치수 DIMENSION 외경 x 두께 x 길이 (OUTDIA. x THICK. x LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDRO-STATIC TEST	육안검사 VISUAL DIMENSION TEST	편평시험 FLATTENING TEST	용접부연성시험 WELD DUCTILITY TEST	경도 HARDNESS	드리프트시험 DRIFT TEST	플레어링시험 FLARING TEST	압궤시험 CRUSH TEST	재킷시험 JACKET TEST	열처리 HEAT TREATMENT	도막시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT	도막시험 COATING TEST 담금성 DIP TEST	경도 HARDNESS HRB HV	제강번호 HEAT NO.	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH	연신율 ELONGATION	화학성분(%) CHEMICAL COMPOSITION C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Al	Ceq	충격시험 IMPACT 흡수에너지 ABSORBED ENERGY	전단면적 SHEAR AREA
※1	※2 ※3 ※4			kg f/㎠ PSI	※5	G	G	G	G	G	G	G	G					PSI	kg f/㎟ N/㎟	%	※17	x 100	x 1000	x 100	x 1000	JOULE	%
BVBE	NB 20" x .500" x42.000'	8	15,899	135	G	G	G	G	G				G				A46597	31.1	45.7	48.5	39	17	1	80	15	9	2	3	1	2	Tr					
	(508.0mm x12.70mm x 12.802M)			1890														44200	65000	69000																
																	Y44226	32.0	45.8	48.3	37	19	1	85	13	7	2	2	1	1	Tr					
																		45500	65100	68700																
																	Y46769	29.7	45.9	48.5	35	19	2	80	14	9	2	1	2	3	Tr					
																		42200	65300	69000																
BVBE	NB 24" x .250" x42.000'	12	14,639	56	G	G	G	G	G				G				A43514	33.7	47.8	50.5	38	16	1	65	13	8	2	2	1	3	Tr					
	(610.0mm x 6.35mm x 12.802M)			800														47900	68000	71800																
																	A44978	33.7	48.5	51.3	36	17	1	77	13	7	2	2	1	2	Tr					
																		47900	69000	73000																
																	A45372	33.9	47.4	50.2	37	16	1	63	14	10	2	2	1	2	Tr					
	TOTAL ->	20	30,527															48200	67800	71400																
	* RESIDUAL MAGNETISM TEST : 13.00																																			

비고 REMARK

* API 2000/ASTM 1999/ASME 1999

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # Verbal-Adam 12/6/02
BARTOW STEEL REF. # 58510

참고 NOTES

※1 Type of pipe End 관종
- X
  - B : Black
  - G : Galvanized
  - E : Enameled
- X
  - V : Varnish
  - R : Removal Varnish
  - O : Oiling Coating
  - F : PE Coating
  - C : Coaltar Coating
  - A : Asphalt Coating
- XX
  - PE : Plain End
  - BE : Bevel End
  - TE : Thread End
  - TC : Thread Coupling
  - BL : Bell End
  - SE : Swaging End
  - VJ : Victaulic Joint

※2 NB ; Nominal Bore 호칭경, OD: Outside Diameter
※3 Unit 단위 (M : mm, I : Inch)
※4 Unit 단위 (M : Meter, F : Feet, I : Inch)
※5 G: Good
※6 visual & Dimension Test 육안 및 치수검사
※7 Flattening or Bending Test 편평 또는 굽힘시험
※8 Nondestructive Test 비파괴검사 ( )
※9 Weld Ductility Test 용접부 연성시험
※10 Drift Test 관경시험
※11 Flaring Test 압력시험
※12 Crush Test 압궤시험
※13 Reverse Flattening Test 역편시험
※14 Heat Treatment 열처리
※15 B : Base Metal 모재부
※16 W : Weld Part 용접부
※17 H : Heat(Ladle)Analysis 용탕분석, P : Product Analysis 제품분석

SURVEYOR

본 제품은 관련규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PURCHASE ORDER

H. G. Lee

Appendix B

Cement Bond Log

Advanced Borehole Services
16406 East Course Dr.,
Tampa, Fl 33624
813.962.7558
813.269.8404 fax
813.727.7881 cell

ABS
Advanced Borehole Services

January 28, 2004

Mr. Paul Petrey
Diversified Drilling
8801 Maslin Drive
Tampa, Florida 33637

Subject: **Evaluation of Cement Bond Log**
Progress Energy Well RW-1
Bartow, Florida

Dear Mr. Petrey:

I have been asked to review the cement bond log, run by Art Benson, P.G. of ABS on the above named well, January 15, 2004.

It is my understanding that the question has been asked, "are there any significant voids in the cement grout seal outside of the 8-inch steel casing, particularly in the interval above the first cement stage (440-615 BOC) and below the bottom of the surface casing, approximately 310 feet below land surface?" It was in this interval (310-440) that a steel tremie pipe was lost and grouted in place.

The first stage of cement had already "hard-set prior to grouting the section above 440 feet. The cement presence and integrity is not being questioned below 440 feet to the bottom of the casing (615 feet).

In order to evaluate the presence of cement and quality of the cement to the steel pipe and formation of a borehole compensated (BMC) acoustic tool was used with receiver spacings at 2 and 3 feet from the transmitter. In addition to the full wave form log, a computer program was used to generate a bond log selectively recording the first arrival amplitude signals, recorded in millivolts (0.2500 mv). Other logs generated include the arrival times of the signal at the near (N) and far (F) receivers, BHC-Delta and the natural gamma log.

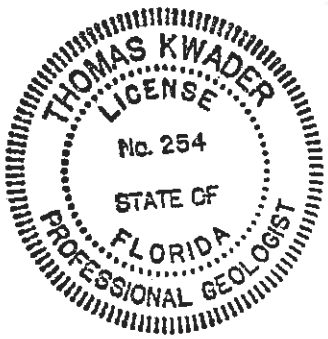
After careful review of the section casing and annular space, which may contain the encased tremie pipe (310-440 feet), it is my professional opinion that there are no section of the casing that have not been satisfactorily grouted or significant area where the grout integrity has been compromised (voids in the cement). In fact, the quality of the cement bond to the casing and formation is one of the best examples of cement bonding I've seen in a well of this diameter.

If you have any further questions, or require additional information, please do not hesitate to contact me at (850) 574-3197, extension 521.

Sincerely,

Thomas Kwader

Thomas Kwader, Ph.D., P.G.
Vice President
Senior Consulting Hydrogeologist
Florida Professional Geologist No. 254
Certified Well Log Analyst (SPWLA) No. 5158
Florida Licensed Water Well Contractor No. 2444



DIVERSIFIED DRILLING CORPORATION

LETTER OF TRANSMITTAL

Job No. 2093

Date 2-4-04

Our strengths go deep.

TO Schreuder, Inc.
110 W. Country Club Dr.
Tampa, FL 33612
Attn: H. Cliff Harrison, P.G.

RE

NO. OF COPIES	DRAWING NO.	LAST DATED	CODE	DESCRIPTION
1				Letter of evaluation of cement bond log

THESE ARE TRANSMITTED

- ☐ For approval
- ☐ For your use
- ☐ As requested
- ☐ For review and comment
- ☐ Resubmit _____ Copies for review
- ☐ Submit _____ copies for distribution
- ☐ Return _____ corrected prints
- ☐ _____
- ☐ No exceptions taken (NE)
- ☐ Make corrections noted (MCN)
- ☐ Amend and resubmit (AR)

PLEASE NOTE:

CC:

DIVERSIFIED DRILLING CORPORATION

Per Paul Petrey

P.O. Box 585648, Orlando, FL 32818 • 407/291-4755 • FAX 407/578-8649 formerly MERIDITH ENVIRONMENTAL SERVICES
17174 Jean Street, Fort Myers, FL 33912 • 941/267-1020 • FAX 941/267-0440 formerly WELL WATER SYSTEMS
Post Office Box 290699 • Tampa, FL 33687-0699 • Phone 813/988-1132 813/821-6763 • FAX 813/985-6636

Appendix C

Daily Activity Log

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 10/15/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
1155	Arrived at HEC. Signed in at guard station and at office building.
1200	Waited at HEC entrance for DDC to arrive.
1300	Met Bruce, Jimmy, and Rambo of DDC. All signed in, escorted them to the drilling site via County Road 555.
1320	Diversified representatives began unloading a water tank/pump, and a storage unit at well location.
1322	Took a depth to water reading in monitoring well MW-1 (along northern edge of drilling pad). DTW= 4.05 ft bmp. Began recording drill pad dimensions for as-built drawing.
1350	Talked with DDC employees about future plans on and around pad.
1400	DDC off-site.
1400	Finished taking drill pad measurements.
1440	Signed out at HEC office.

Total Daily On-Site Man Hours SI 4.5 DDC 1

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 10/16-20/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
	Off-site equipment preparation. DDC and SI off-site.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 10/21/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
1240	Depart SI office (Tampa) for Hines Energy Complex
1410	Arrived at HEC. Signed in at guard station and at office building.
1420	Waited at HEC entrance for DDC drillers to arrive.
1605	Met Bruce and Jason and front entrance to HEC
1615	Drove Bruce and Jason of DDC to drilling pad and unloaded pump.
1640	Took a depth to water reading in monitoring well MW-1 (along northern edge of drilling pad). DTW = 4.03 ft bmp. Finished recording drill pad dimensions for as-built drawing.
1650	Second truck arrived. Unloaded pipe trailer. Met Sean.
1705	Bruce, Jason, and Sean left site.
1715	Locked gate #1 and signed out of HEC.
1720	Left HEC for SI.

Total Daily On-Site Man Hours SI 6.25 DDC 1

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/23/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
1200	Jack Breland on-site waiting for DDC.
1230	DDC on-site with rig and pump trailer.
1330	DDC off-site. Returning with rig.
1400	SI off-site.
1630	Cliff Harrison (SI) and Jeff Stephens (PEF) on-site for field safety meeting.
1730	Jeff off-site.
1800	Rig on-site. Safety meeting with Bruce and four helpers (DDC).
1900	Jack, Cliff, and DDC crew off-site.

Total Daily On-Site Man Hours: SI 6 DDC 4

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/24/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
1000	Jack Breland on-site waiting for DDC.
1030	DDC driver on-site with tractor truck.
1230	Bruce from DDC and four helpers on-site setting up rig. Positioned rig over well location.
1300	Jack B., Bruce, and crew off-site. All checked out with security.

Total Daily On-Site Man Hours SI 3.0 DDC 2.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 10/25-26/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI_0__ DDC_0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/27/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0800	Jack B. on-site. Checked in with security
0900	Bruce (DDS) and two helpers on-site. DDS signed in at guardhouse for safety training.
1000	Two more crew (DDS) on-site. Sent them to safety training. Bruce and helpers on-site.
1130	Placed seven feet of 30-inch diameter conductor casing over hole. DDS crew still on site moving equipment, 5 total personnel. Dana G. (SI) on-site for weekly sampling event.
1300	SI off-site
1400	DDS back on-site.
1500	Unloaded mud pump and set in place. Matt and Holly (SI) unloaded table.
1600	Unloaded and set pipe rack. Jeff (PEF) on-site for safety inspection.
1630	Jeff off-site.
1700	Unloaded and set the mud/cutting separator (goose).
1800	SI off-site

Total Daily On-Site Man Hours SI 9.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/28/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0700	Drillers had security unlock gate.
0730	Jack B. (SI) and DDC on-site.
0830	Delivered sign-in sheet.
0930	Safety meeting with Jeff and Nathan (PEF).
1100	Safety meeting completed. Drillers setting up mud system. Jeff and Nathan off-site.
1200	DDC off-site for lunch.
1300	DDC on-site. Dana (SI) on-site.
1430	Dana off-site.
1500	Peter S. (SI) on-site.
1600	Peter S. talked with Randy M. (PEF) by phone and discussed monitoring well locations.
1630	Peter S. off-site. DDC are working on digging a hole for the mud pump.
1730	Jack B. and DDC off-site. Called security to check out. Locked gate.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/29/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0700	Security unlocked gate.
0730	Jack B. (SI) on-site. Bruce H (DDC) and two helpers on-site. Delivered sign in sheet to security trailer.
0800	DDC is working on mud system. DDC had to run to Tampa for plumbing materials.
1000	Waste Management on-site and delivered Port-a-Potty.
1100	Waste Management on-site and delivered two dumpsters. One for trash and the other one for collecting drilling fluid and drill cuttings.
1130	Nick and Matt (SI) on-site. Delivered office trailer.
1200	SI and DDC lunch break.
1330	DDC are working on the water line. Robert (DDC welder) on site.
1430	Nick and Matt (SI) off-site. Jeff, Nathan, and Stacey (PE) on site for safety training of welder.
1500	Called Cliff H. (SI) about pad integrity.
1600	Safety officers off site. Cliff called and said there will be a meeting at 0900 tomorrow to correct pad issues.
1700	DDC welding stair railing.
1730	Jack B. and DDC off-site. Called security to check out. Locked gate.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/30/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0730	Checked in at security trailer. Delivered sign-in sheet.
0800	Johnson Brothers on-site to check on pad.
0830	Peter (SI) on site for pad issues meeting. Drillers are working on water supply line. Vince and Jeff of (PEF), Paul (DDC), and Peter and Jack (SI) discussing drill pad issues.
1030	Drilling pad meeting over.
1100	Jeff, Vince, and Paul off-site. Talked with Cliff (SI) via phone. Discussed drill pad meeting with him.
1200	Jack and DDC off-site for lunch.
1300	Verified pad dimensions.
1430	DDC started welding handrails.
1730	Jack and DDC off-site. Checked out with security. Locked gate.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 10/31/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0730	Checked in with security. Bruce and two helpers on site (DDC).
0800	DDC driver on-site. Drillers are de-mobilizing around cans.
0900	SI working on office trailer.
1100	Matt V. (SI) on-site with office building materials.
1200	Drillers pulled back gravel and fill material to expose liner around cans. DDC off site for lunch.
1300	Jeff (PEF) called for update. Stressed that the diesel tank must be off-site today. Also stressed that liner must be patched before the end of the day.
1315	Drillers on-site.
1430	Matt V. off-site.
1500	Drillers securing rig area for the weekend.
1600	Checked out with security. Locked gate. DDC and Jack B. off-site.

Total Daily On-Site Man Hours SI 8.5 DDC 7.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 11/1-2/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI_0__ DDC_0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/3/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0800	Meeting with Randy Melton (PEF) on drill pad and other issues. Peter, Cliff, and Jack (SI) on site for meeting.
1200	Everyone off-site. Checked out with security and locked gate.

Total Daily On-Site Man Hours SI 4 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 11/4/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
	No work due to pad problems. DDC off-site.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/5/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0930	Jack B. on-site. Checked in with security.
0945	Jeff and Nathan (PEF) on-site for site visit and to check on schedule of DDC. DDC driver on-site and dropped off trailer with 20 inch steel casing and two pallets of bentonite.
1115	Matt and Dana on-site. Working on FRF-202 project. DDC driver off-site.
1145	Johnson Brothers on-site. Reworking pad area.
1215	Secured office building using hurricane ties.
1330	Lunch.
1415	Matt and Dana off-site.
1515	DDC drillers back with doghouse.
1530	Bruce DDC on-site with two helpers.
1600	Raining
1630	Covered in area around cans with fill material. Rain. Checked out with security and locked gate. Off-site.

Total Daily On-Site Man Hours SI 6.5 DDC 2.75

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/6/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0730	Jack B. on-site. Bruce (DDC) and two helpers on-site. Delivered sign-in sheet to guard house.
0800	DDC setting up rig platform. Jimmy (DDC) on-site to install one wood retaining fence adjacent to drilling pad.
0900	DDC welder on-site. Johnson brothers on-site to install second wood retaining fence.
1100	DDC finished hooking up discharge pipe from mud pump to the designated discharge area over the dam into SA-8 retention area.
1200	Johnson brothers placed gravel in between fences and pad berm.
1200	Lunch
1400	Working on flow line to the rig.
1530	Welder finished welding conduit pipe between the pit casing and sump.
1600	DDC concentrating on area around rig platform.
1730	Jack B. and DDC off-site. Locked gate. Checked out with security.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/7/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0730	Jack B. on-site. Bruce (DDC) and two helpers on-site. Checked in with security.
0800	Rig floor set. Installing water line.
1000	Derrick up and leveled.
1100	Jeff and Jamie (PEF) on-site for an update and left.
1200	Connected 6-inch flow line to mud pump. Safety chained all high-pressure hoses. Matt V. (SI) on-site with office equipment.
1230	Collected well construction info for pad monitoring well MW–1. Construction data entered into field data form, along with water quality data.
1300	DDC and SI off-site.

Total Daily On-Site Man Hours: SI 5.5 DDC 5.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Matt Vasapolli

Date: 11/8-9/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours: SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/10/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: N/A

Time	Activity Description
0800	Jack B. on-site. Checked in with security. Waiting on drillers.
0830	DDC welder and one helper on-site.
0900	Driller Bruce and one helper on-site.
0930	Called Jeff and informed him of the lock on the electric panel. He informed Jack B. that he would find someone to unlock the panel.
1000	PE security on-site. Opened electric panel for electrician. Drillers working on mud/cuttings separator (goose).
1100	Electrician on-site.
1200	Lunch
1300	Still working on flow line to the goose. Bruce handed Jack list of all chemical quantities DDC has on-site. Electrician powered up shed. Left site.
1500	DDC still fixing problem associated with the goose.
1630	Preparing to mix drilling fluid and check drilling mud system.
1730	SI and DDC off-site. Checked out with security. Locked gate.

Total Daily On-Site Man Hours: SI 8.5 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/11/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary

PILOT HOLE, REAMING, CASING INSTALLATION, AND CEMENTING.	
Time	**Activity Description**
0730	Jack Breland (SI) on-site. Bruce Harmon (DDC) on-site with two helpers (Shaun and Jason). Mixing drilling fluid. Preparing to start drilling pilot hole.
0800	Spudded well. Bit diameter: 9 5/8-inches. BHA length (bit + sub): 1.5 feet. Kelly travel: 32 ft. Called Security and informed then of on-site personnel.
0830	Kelly down at the depth of 32 ft below land surface (bls). Circulating up cuttings.
0845	Adding DP#1 (31.00 ft) to kelly.
0900	Rig down. Fuel filters collapsed. Changing filters while circulating.
1000	Working on rig. Fuel problems.
1100	On bottom drilling at the depth of 32 ft bls.
1128	Kelly down at the depth of 62 ft bls. Encountered light olive gray confining clay at the depth of 56 ft bls. Circulating hole.
1130	Preparing to ream borehole to the diameter of 24 inches using a stage bit. Matt V. and Dana G. (SI) on-site.
1200	Connected stage bit (3.5 ft length) to Kelly. Paul P. (DDC) on-site.
1210	Reaming nominal 24-inch diameter hole at the depth of 6 ft bls.
1256	Kelly down and circulating up cuttings. Jimmy and Rambo (DDC) on-site with cement truck.
1400	Reamed 24-inch diameter hole to the depth of 64 ft bls. The crew is getting ready for setting 20-inch diameter surface casing.
1500	Circulated up cuttings. Cleaned nominal 24-inch diameter borehole by running bit sting up and down. Tripping out of the hole. Matt and Dana (SI) off-site. Setting 20-inch diameter steel casing inside borehole.

PILOT HOLE, REAMING, CASING INSTALLATION, AND CEMENTING.	
Time	**Activity Description**
1610	Placed first steel casing joint (21.61 ft) up in the air.
1625	Lowered Casing #1 into hole and added centralizers halfway down the casing.
1635	Raised casing #2 (42.00 ft) in the air. Welding casing #1 to casing #2.
1655	Adding 3 ft cementing sub to casing string. Total length of casing string is 63.61 ft bls.
1720	Lowered 2¼-inch diameter cement pipe inside casing to the depth of 60 ft bls. And sealed casing head flange.
1745	Attached cement hoses to cement pump. Preparing to pre-flush line.
1755	Flushed line with 80 gallons (2 brls) of fresh water.
1815	Cementing annulus between 24-inch diameter borehole and 20-inch diameter steel casing. Theoretical volume = 0.8727 sacks/ft = 55.5 sacks.
1835	Pumped 125 sacks of cement into annulus using the pressure grout method. (225% of theoretical volume). Cement returns to surface.
1845	Flushed line with 30 gallons (0.71 brls) of fresh water.
1855	Pumped 57 sacks of cement around conductor cans and pad area.
1900	Cleaned up site. Jack B. and crew off-site. Called security and informed them of our departure.

Total Daily On-Site Man Hours: SI 12 DDC 12

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/12/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary

PILOT HOLE BELOW SURFACE CASING	
Time	**Activity Description**
0700	Jack B. (SI) on-site. Bruce Harmon (DDC) on-site with two helpers (Shaun and Jason). Mixing drilling fluid. Waiting on 17-inch center punch bit.
0800	Called Security and informed then of on-site personnel. DDC said it would be around noon before they could get started. The crew is cleaning up the site.
0900	Called Cliff Harrison (SI) and informed him of the days proceedings. The crew is pumping cuttings into discharge area. Jack B. off-site.
1000	Jack B. on-site. Crew is cutting off top of wellhead. Preparing to drill out cement inside casing with a 17-inch diameter center punch bit.
1130	Rig down. Starter has to be replaced. Matt V. (SI) on-site. DDC are cementing annulus with cement slurry. Tagged annulus at 12 ft bls.
1245	Rig back on line. Small DDC drilling rig on-site to place in three monitoring wells around drill pad. Jose (driller) and two helpers.
1330	Preparing to drill out cement with 17-inch diameter bit to the depth of 65 ft bls.
1400	Tagged cement inside casing at the depth of 52 ft bls. Matt is overseeing monitoring well placements.
1437	Kelly down and circulating up cement cuttings. Pumped cuttings over the berm and into discharge area.
1530	Tripped out 17-inch diameter center punch stage bit.
1540	Tripped in hole with 9 5/8-inch (1.0 ft) diameter pilot hole bit.
1545	Added DP#1 (29.76 ft) to bit. Total string length: 30.76 ft.
1550	Added Sub (0.48 ft) and DP#2 (31.00 ft) to drill string. Total length of string: 62.21 ft.
1650	Kelly down and circulating at the depth of 93.21 ft bls.
1703	Added DP#3 (30.50 ft) to drill string. Total string length: 92.71 ft.

PILOT HOLE BELOW SURFACE CASING	
Time	**Activity Description**
1710	On bottom drilling at the depth of 93.21 ft bls.
1740	Kelly down and circulating at the depth of 125.21 ft bls.
1750	Driller is shutting down for the day. Pulling up inside the surface casing.
1800	SI and DDC off-site. Locked gate and notified security of our departure.

Total Daily On-Site Man Hours SI 12 DDC 12

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/13/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 185-192 ft bls

PILOT HOLE BELOW SURFACE CASING	
Time	**Activity Description**
0700	Jack Breland (SI) on site. Bruce Harmon (DDC) on site with two helpers (Shaun and Jason). Mixing drilling fluid.
0800	Called Security and informed then of on-site personnel. Circulating while mixing drilling fluid.
0815	Added DP#4 (30.41 ft) to drill string. Total string length: 123.12 ft.
0845	Kelly down and circulating at the depth of 155.12 ft bls.
0905	Added DP#5 (30.50 ft) to drill string. Total string length: 153.62 ft.
0950	Drill string dropped three feet while drilling at the depth between 182 to 185 ft bls. Kelly is down at the depth of 185.62 ft bls.
1000	Called Cliff H. (SI) to inform him that the driller (Bruce) wants to switch over to reverse air and finish the pilot hole.
1030	Cliff H. called back and said that we have verbal approval from Judy Richtar of the FDEP to switch over to reverse air.
1100	Matt V. and Dana G. (SI) on-site. Matt V. is working in the field office. Dana G. is working on the FRF-202 project.
1300	DDC welder on-site. Drilling crew is switching over to reverse-air drilling. Dana off-site.
1430	Matt V. off-site. The drilling crew is waiting on the welder to finish before they can proceed with their work.
1545	Started reverse air circulation method of drilling. Pumping approximately 80 gallons per minute from the formation.
1600	Kelly down and circulating at the depth of 185.62 ft.
1630	Added DP#6 (30.50 feet). Total string length 184.12 ft.
1730	Drilled to 192 ft bls. Stopped for the day. Jack B. and DDC off-site. Checked out with security and locked gate.

Total Daily On-Site Man Hours: SI 9.5 DDC 9.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/14/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 185-247 ft bls

PILOT HOLE BELOW SURFACE CASING	
Time	**Activity Description**
0700	Jack Breland on-site. Bruce Harmon (DDC) on-site with two helpers (Shawn and Jason).
0800	Called security and informed them of on-site personnel. On bottom drilling at a depth of 192 ft bls. Dredge approximately five feet of fill.
0845	Kelly down and circulating at the depth of 216.12 feet.
0905	Added DP#7 (31.00 ft) to drill string. Total string length: 215.12 ft. On bottom drilling.
1030	Plugged off drill string with clay cuttings. Unplugged line by pouring water into the top of the string and rotating drill string.
1045	On bottom drilling at a depth of 225 ft bls.
1135	Kelly down and circulating at a depth of 247.12 ft bls.
1200	DDC stop activities for the weekend.
1230	Drillers secured site. Raised drill string 60 ft from the bottom. Performed tailgate safety meeting. DDC left site.
1300	Matt V. (SI) on-site. Completing weekly reports.
1400	Jack and Matt off-site. Checked out with security and locked gate.

Total Daily On-Site Man Hours: SI 7.0 DDC 5.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/15-16/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 185-247 ft bls

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-site Man Hours: SI__0__ DDC__0__

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/15-16/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 185-247 ft bls

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours: SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/17/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary: 0 –192 ft. bls
Reverse-air: 192 – 340 ft bls

Reverse-Air Pilot Hole Drilling below Surface Casing	
Time	**Activity Description**
0700	Jack Breland (SI) on-site. Preparing office and field equipment for the days drilling activities.
0800	Called security and informed them of on-site personnel. Paul (DDC) called, the driller and his crew will be on-site around noon.
1000	SI bagged drill cuttings from grab samples taken from borehole. Three sets of samples are bagged from the depths: 60 – 240 ft bls.
1200	Marked sample bags from 250 to 350 ft. Updated lithology logs from grab samples taken from 190 to present depth of 247 ft bls.
1200-1300	Off-site for lunch.
1300	DDC and SI on-site. Adding air line inside drill pipe. Preparing to send drill string to the bottom of the borehole.
1330	Added DP#8 (31.80 ft) to drill string. Total length of string: 246.92 ft. Drilling at the depth of 247.12 ft bls.
1508	Kelly down and circulating at the depth of 278.12 ft bls.
1535	Added DP#9 (31.00 ft) to drill string. Total length of string: 278.12 ft.
1600	Kelly down and circulating at the depth of 310.12 ft. Encountered the top of the Suwannee Limestone at the depth of 295 ft bls.
1610	Added DP#10 (30.50 ft) to drill string. Total length of string. 308.62 ft. Collected reverse-air water sample. Sample #142.
1709	Kelly down and circulating at the depth of 340.62 feet bls.
1745	Tripped out of the borehole with 9 5/8-inch diameter bit.
1800	DDC shut down for the day. Called security to inform them of our departure. Locked gate #1. DDC and SI off-site.

Total Daily On-Site Man Hours SI 10.0 DDC 5.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/18/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 247-350 ft bls

Reaming for Intermediate Casing	
Time	**Activity Description**
0700	Jack Breland on-site. Bruce Harmon (DDC) on-site with two helpers (Shawn and Jason).
0800	Called security and informed them of on-site personnel. The crew is placing 19-inch diameter stage bit (5.68 ft) onto DP#1 (29.80 ft). Total Length: 39.78ft.
0845	Added 2nd 19-inch diameter bit and sub (4.3 ft) onto the top of DP#1. Total Length: 38.76 ft.
0905	Reamed out cement (17-inches to 19-inches) inside casing between 58 and 64 ft bls. Kelly down at the depth of 70.76 ft bls. Driller is drilling dry. He hopes to pick up enough water to evacuate the cuttings from the borehole within a rod or two.
1012	Added DP#2 (31.00 ft) to drill string. Total string length: 69.76 ft. On bottom dry reaming at the depth of 71.00 ft bls. No water is being added.
1030	DDC welder (Robert) on-site. Dana (SI) on-site. She is collecting data for FPF-202 study.
1050	Kelly down at the depth of 101.76 ft bls. No returns. Reamed cuttings are falling down the borehole.
1105	Added DP#3 (30.50 ft) to drill string. Total string length: 100.26 ft. On bottom dry reaming at the depth of 102 ft bls. Driller will ream 10 ft, raise drill string, and repeat this process as he advances the hole.
1130	Kelly down at the depth of 133.76 ft bls. No returns. Cuttings are falling down the borehole.
1135	Shut down. Working on rig. Lunch break.
1235	Added DP#4 (30.41 ft) to drill string. Total string length: 130.41 ft. On bottom dry reaming at the depth of 130.0 ft bls.
1332	Kelly down at the depth of 165.76 ft bls. No returns. Reamed cuttings are falling down the borehole.
1344	Added DP#5(30.50 ft) to drill string. Total string length: 160.91 ft. On bottom dry reaming at the depth of 166.0 ft bls.

Reaming for Intermediate Casing	
Time	**Activity Description**
1400	Stopped at the depth of 185 ft bls. Switched over to reverse air drilling in order to ream the rest of the open hole. Dana (SI) off-site.
1500	Dredging up cuttings as driller is slowly advancing borehole. Driller will pump drilling fluid into hole at different intervals. Currently dredging at the depth of 166 ft bls. Welder (DDC) off-site.
1600	Dredging at the depth of 170 ft bls. Pumping fluid often. Slow rate of formation flow. Driller may tie into the filtration water system if flow does not increase.
1630	Dredging at the depth of 174 ft bls. Driller dry reamed the borehole to the depth of 185 ft bls. Bruce (driller) seems to think that he will not need any makeup water.
1730	Dredging at the depth of 178 ft bls. Flow line keeps plugging with borehole cuttings. Slowly dredging back to the depth of 185 ft bls.
1745	Driller is shutting down for the night. DDC is fueling up equipment. DDC said that the pad monitoring wells #2 and #3 would be developed tomorrow.
1800	Called Security to inform them of our hiatus. Gate #1 locked. Jack B. (SI) and DDC off-site.

Total Daily On-Site Man Hours: SI 10.0 DDC 10.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301 Date: 11/19/03
Location: Hines Energy Complex Drilling Contractor: Diversified Drilling Corp.
Well Number ID: TW-1 Drilling Method: Reverse-air
Completed by Jack Breland Summary: Dredged from 173 to 175 ft. bls.

REAMING 9 5/8-INCH DIAMETER PILOT HOLE TO 19-INCHES IN DIAMETER	
Time	**Activity Description**
0730	Jack Breland on-site. Bruce Harmon (DDC) on-site with two helpers (Shawn and Jason).
0800	Called security and informed them of on-site personnel. The crew is repairing a leak from the 6-inch flat hose coming from the sump pump.
0830	Driller started dredging nominal 19-inch borehole at the previous depth of 173 ft bls. It is beginning to rain. Heavy at times.
0930	Raining heavy. Driller is currently dredging at the depth of 173 ft bls. Paul (DDC) on site with equipment to develop pad monitor wells.
1000	DDC is re-circulating formation water back into the borehole after the suspended cuttings have been removed.
1030	Paul off-site. Jason is developing pad monitoring wells with a small down hole pump.
1145	Bruce said that he does not think the water from the hole and the make up water is enough to get the cuttings out of the hole.
1245	Bit or rod is plugged. Tripping out of the hole to locate the plugged location.
1450	Dana (SI) on-site. Working in the field office.
1510	Dana off-site with well information for main office. Out of the hole with bit. Two of the three openings in the bit were plugged.
1530	Tripping back into the borehole with drill string. Water level inside the well was measured at the depth of 58.5 ft btoc.
1600	Dredging up cuttings as driller is slowly advancing borehole depth. Currently dredging at the depth of 172 ft bls.
1700	Dredging at the depth of 173 ft bls. Cuttings are making their way from out of the borehole.
1800	Dredged to the depth of 174 ft bls. Checked out with Security and locked gate. SI and DDC off-site.

Total Daily On-Site Man Hours: SI 9.5 DDC 9.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/20/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Dredged from 174 to 185 ft bls
Reamed from 185 to 210 ft bls

Reaming 9 5/8-inch diameter pilot hole to 19-inch diameter	
Time	**Activity Description**
0730	Jack Breland (SI) on-site. Bruce Harmon (DDC) on-site at 0700 with two helpers, Shawn and Jason. Currently dredging at the depth of 175 ft bls.
0800	Called security and informed them of on-site personnel. Dredging at the depth of 178 ft bls.
0900	Dredging at the depth of 181 ft bls. Broke through bridged area. Drilling rate has increased significantly.
1000	Reaming at the depth of 185 ft bls. Dredged back to the reamed borehole that was drilled during dry reaming operation.
1100	Reaming at the depth of 189 ft bls.
1130	Kelly down at the depth of 192.91 ft bls. Adding DP#6 (30.50') to drill string. Total Length of drill string: 191.41 ft.
1230	Rig down. 6.0-inch flat hose coming from sump pump blew apart at a connection. Sand locked. Unplugging line using backhoe arm and gravity.
1430	Rig still down. Driller fixing small washout along left south side of berm before reconnecting hose line.
1535	Reaming at the depth of 193 ft bls.
1600	Reaming at the depth of 195 ft bls.
1700	Reaming at the depth of 201 ft bls. Plugged up only once during the last hour of reaming.
1745	Dredged to the depth of 210 ft bls. Stopped here for the day.
1800	Checked out with Security and locked gate. SI and DDC off-site.

Total Daily On-Site Man Hours SI 10.0 DDC 10.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/21/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Reamed from 210 to 223 ft bls

Reaming 9 5/8-inch diameter pilot hole to 19-inch diameter	
Time	**Activity Description**
0800	Jack Breland (SI) on-site. Bruce Harmon (DDC) on-site at 0700 with two helpers, Shawn and Jason. Currently reaming at the depth of 212 ft bls.
0830	Called security and informed them of on-site personnel. Reaming at the depth of 214 ft bls.
0900	Reaming at the depth of 216 ft bls. Broke through bridged area. Drilling rate has increased significantly.
1000	Reaming at the depth of 220 ft bls. Dredged back to the reamed borehole that was drilled during dry reaming operation.
1100	Reaming at the depth of 221 ft bls. Plugged twice during this hour.
1200	Nick (SI) on-site. Field office work.
1230	Kelly down at the depth of 222.91 ft bls. Nick off-site. Driller is circulating up cuttings using reverse-air.
1300	Bruce informed SI that they would be stopping here for the weekend.
1330	Drillers have raised drill string and shut off rig. The site has been picked up and secured for the weekend. DDC off-site.
1400	Jack B. finished with office work and locked up. Checked out with security and left the site for the weekend.

Total Daily On-Site Man Hours SI 10.0 DDC 10.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/22-23/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary 0-185 ft bls
Reverse Air 185-247 ft bls

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours: SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/24/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Reamed from 210 to 223 ft bls

Reaming 9 5/8-inch diameter pilot hole to 19-inch diameter	
Time	**Activity Description**
0800	Jack B. (SI) on-site and opened up field office. Waiting on DDC
0830	Drilling area still clean and secure from weekend shutdown. No spills were noted.
0900	Cliff H. (SI) called and informed me that Bruce (DDC) had a doctor's appointment this morning and will be out later to drill today. Another driller has been dispatched to the job site until Bruce arrives.
1030	Dana G. (SI) on-site. Collected field data and is working on the FPF-202 study.
1115	Joe P. (driller for DDC) on-site with two helpers, (Jason and Shawn).
1200	Circulating up small quantities of cuttings. Preparing to add DP#7.
1240	Added DP#7 (31.00 ft) to drill string. Total length of drill string is 222.41 ft.
1300	Reaming at the depth of 228 ft bls. Started reaming into the clay-confining zone located between 225 and 270 ft bls. Plugged off several times in the past hour.
1345	Dana G. off-site. Reaming at the depth of 330 ft bls.
1700	Jack B. finished with office work and locked up. Checked out with security. DDC and SI left the site.

Total Daily On-Site Man Hours SI 6.0 DDC 6.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/25/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Reamed from 265 to 318 ft bls

Reaming and Geophysical Logging	
Time	**Activity Description**
0730	Jack B (SI) and DDC on-site. Currently reaming at the depth of 268 ft bls.
0800	Rig down. Sprung a leak on the topside of the gooseneck on rig. Driller shut down to fix it.
0900	Reaming at the depth of 284 ft bls. Collected and sampled water quality data from the monitoring wells.
0915	Kelly down and circulating at the depth of 286.41 ft bls.
0920	Added DP#9 (31.00 ft) to drill string. Total length of drill string is 285.21 ft. Added additional lengths to airline
1000	Reaming at the depth of 295 ft bls (top of Suwannee Limestone).
1045	Kelly down and circulating at the depth of 317.21 ft bls. The base of the 14-in diameter steel casing will be set at the depth of 315 ft bls. Conditioning borehole. Geophysical logger is scheduled to be on-site at 1500 hours to run caliper log of 19-inch diameter borehole.
1130	Tripping drill string out of the hole, 9 joints plus bits and subs.
1230	Tripped out of hole. Measured 14-in (ID) diameter steel casing joints. Total casing lengths on-site is 361.15 ft. Driller will leave out one joint measuring 41.25 ft and hang the rest of the casing 5.0 ft above land surface.
1300	Lunch
1400	Cleaning area. Preparing for geophysical logging and placement of the intermediate steel casing.
1440	Geophysical logger (Advanced Borehole Services) on-site to run caliper log of the reamed borehole.
1530	Logger (Art B.) off-site. Driller lowered 1st 14-in diameter casing joint (42.55 ft) into the borehole and left hanging for the night.
1600	DDC off-site. Cliff H. (SI) on-site. Technical site meeting with SI field personnel.
1630	Checked out with security. Jack B. and Cliff H. (SI) off-site.

Total Daily On-Site Man Hours SI 8.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/25/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Reamed from 265 to 318 ft bls

Reaming and Geophysical Logging	
Time	**Activity Description**
0730	Jack B (SI) and DDC on-site. Currently reaming at the depth of 268 ft bls.
0800	Rig down. Sprung a leak on the topside of the gooseneck on rig. Driller shut down to fix it.
0900	Reaming at the depth of 284 ft bls. Collected and sampled water quality data from the monitoring wells.
0915	Kelly down and circulating at the depth of 286.41 ft bls.
0920	Added DP#9 (31.00 ft) to drill string. Total length of drill string is 285.21 ft. Added additional lengths to airline
1000	Reaming at the depth of 295 ft bls (top of Suwannee Limestone).
1045	Kelly down and circulating at the depth of 317.21 ft bls. The base of the 14-in diameter steel casing will be set at the depth of 315 ft bls. Conditioning borehole. Geophysical logger is scheduled to be on-site at 1500 hours to run caliper log of 19-inch diameter borehole.
1130	Tripping drill string out of the hole, 9 joints plus bits and subs.
1230	Tripped out of hole. Measured 14-in (ID) diameter steel casing joints. Total casing lengths on-site is 361.15 ft. Driller will leave out one joint measuring 41.25 ft and hang the rest of the casing 5.0 ft above land surface.
1300	Lunch
1400	Cleaning area. Preparing for geophysical logging and placement of the intermediate steel casing.
1440	Geophysical logger (Advanced Borehole Services) on-site to run caliper log of the reamed borehole.
1530	Logger (Art B.) off-site. Driller lowered 1st 14-in diameter casing joint (42.55 ft) into the borehole and left hanging for the night.
1600	DDC off-site. Cliff H. (SI) on-site. Technical site meeting with SI field personnel.
1630	Checked out with security. Jack B. and Cliff H.off-site.

Total Daily On-Site Man Hours SI 8.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 11/26/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Set 315 ft of 14-inch steel casing. Pressure grouted

SET AND CEMENTED 14-INCH DIAMETER STEEL CASING TO 315 FT BLS

Time	Activity Description
0700	Jack B. (SI) on-site. Opened up office. DDC on-site. DDC welder on-site.
0740	Welding14-in diameter steel casing #1 (42.55 ft) to casing #2 (42.90 ft). Total depth of casing string: 85.45 ft. Centralizers are placed at the welded connection. All pipe joints will be welded with double wraps.
0800	Lowered casing string into the hole. Placed casing joint #3 (41.90 ft) over the top of the casing string and started welding the joints together.
0825	Welding14-in diameter steel casing #3 to casing string. Total depth of casing string: 127.35 ft. Centralizers are placed at the welded connection.
0830	Lowered casing string into the hole. Placed casing #4 (42.05 ft) on top of the casing string and started welding.
0900	Welding14-in diameter steel casing #4 to casing string. Total depth of casing string: 169.40 ft. Centralizers were added.
0905	Lowered casing string into the hole. Placed casing #5 (42.70 ft) over the top of the casing string and started welding.
0930	Welding14-in diameter steel casing #5 to casing string. Total depth of casing string: 212.10 ft.
0935	Lowered casing string into the hole. Placed casing joint #6 (42.65 ft) over the top of the casing string and started welding.
0940	Welding14-in diameter steel casing #6 to casing string. Total depth of casing string: 254.75 ft. Centralizers were added.
1000	Lowered casing string into the hole. Placed casing joint #7 (42.85 ft) over the top of the casing string and started welding.
1005	Welding14-in diameter steel casing #7 to casing string. Total depth of casing string: 297.60 ft. Cement operators of DDC on-site. (Rambo and Jimmy).
1025	Lowered casing string into the hole. Placed the last casing joint #8 (22.30 ft) over the top of the casing string and started welding.
1055	The header plate is welded to top of the casing string. The base of the casing string is located at approximately 315 ft below land surface. Approximately 5.0 ft hanging up to the rig floor. Casing string welded and secured to the rig floor.

1100	Running 2-in diameter steel cement tubing (15 joints) into the well to approximately 300 ft bls.
1120	Down time. Ran out of cement tubing at the depth of 189 ft. The truck that is hauling the rest of the cement tubing broke down in transit.
1150	Waiting on 6 joints of cement tubing.
1200	Cement tubing on-site with two additional helpers of DDC. Cementers are ready to go.
1230	Pre-flushed (168 gallons of water) borehole with pump on cement truck. DDC will cement 400 sacks of neat cement slurry continuously using the pressure grout method.
1245	Started cementing using the pressure grout method.
1255	Cement weight after approximately 100 sacks: 14.9 lbs.
1300	Cement weight after approximately 200 sacks: 15.1 lbs.
1303	Cement weight after approximately 300 sacks: 15.2 lbs.
1308	Pumped 400 sacks into the well. Cement weight at the end of the cement stage: 15.1 lbs. Flushed tubing with approximately 180 gallons of water. Water level inside well rose to the surface during flush.
1315	DDC cleaning up site. DDC and SI will be off-site until the following Monday. Happy Thanksgiving! Cliff H. (SI) on-site.
1400	DDC and SI off-site. Checked out with security.

Total Daily On-Site Man Hours SI 7.0 DDC 7.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 11/27-30/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method:

Time	Activity Description
	SI and DDC off-site for holiday weekend.

Total Daily On-site Man Hours: SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/01/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: grouting activities

CEMENTED 14-INCH DIAMETER STEEL CASING TO 315 FT BLS	
Time	**Activity Description**
0800	Jack B. (SI) on-site. Opened up office. Waiting on DDC to arrive on-site.
0900	Jeff S. (PE) stopped for a site visit. Bruce Harmon (DDC) and two helpers, Shawn and Jason, on-site.
0930	Pulled 2-in diameter cement pipe out from the inside of the casing string.
1000	Tripped in 1 ¼-in diameter tremie pipe inside the annulus between nominal 19-in diameter borehole and 14-in diameter steel casing.
1030	Hard tagged top of 1st stage cement at the depth of approximately 182 ft bls. Waiting on cement for the second stage.
1115	Dana (SI) on-site to gather data from the FPF-202 study. DDC (Rambo and Jimmy) with cement for the 2nd stage. Calculated theoretical volume of annulus to be cemented from caliper log: 60 ft at 19-in diameter (0.8999), 92 ft at 25-in diameter (2.3398), and 30 ft at 30-in diameter (3.5598). Total cubic feet: 376.04. Total annular volume to be filled: 319 sacks (SI) and 307 sacks (DDC) calculated by Rambo.
1135	Pre-flushed tremie line with 2 brls of water.
1140	Started cementing 2nd stage. Cement weight from grab sample during the beginning: 15.2 lbs.
1150	Weight of cement from grab sample after 100 barrels: 15.1 lbs. Water is flowing out of the well due to cement displacement.
1155	Weight of cement from grab sample after 300 barrels: 15.0 lbs.
1200	Cement returns coming from the annulus. Stopped pumping.
1230	Pumped a total of 350 sacks into the annulus using the tremie method. Flushed tremie line with 20 gallons of water.
1300	Cement dropped down to 60 ft bls. DDC will finish topping off tomorrow. They are going to work on the rig for the rest of the day. Called Cliff H. (SI) and he said that I did not need to stay on-site during this working phase. Jack B off-site.

Total Daily On-Site Man Hours SI 5.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/02/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Pumped third and last stage cement.
Tripped in hole with 12 ¼ pilot hole bit
Followed by 13-inch diameter stage bit
Drilled out cement inside casing.

Time	Activity Description
0730	Jack B (SI) on-site. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason already on-site.
0810	Tagged cement from 2nd stage at the depth of 48 ft bls. Theoretical calculation of cement to be placed inside the annulus. 0.8999 ft^3 x 48 = 43.0 sacks.
0830	DDC (Rambo and Jimmy) on-site with cement truck.
0945	Pre-flushed line with 2 brls of water. Pumped 50 sacks of neat cement into the annulus. Weight of cement from grab sample measured 15.0 lbs/gal. Flushed line with 10 gallons of water.
1000	Driller wants to use a 12 ¼-in bit on the bottom of the 13-inch diameter stage bit. DDC (Jimmy and Rambo) off-site. Cleaned up area.
1015	Checked with Cliff H. (SI). Received permission to proceed with the larger diameter hole.
1100	Tripped in hole with stage bit and sub (3.8 ft). 1.8 ft. between cones Attached first heavy collar (31.00 ft) to bit assembly. Total length of string: 33.80 ft
1115	Tripped in DP#2 (29.80 ft) heavy collar drill rod. Total length: 63.60 ft
1120	Tripped in DP#3 (30.50 ft) weighted drill rod. Total length: 94.10 ft
1124	Tripped in DP#4 (30.41 ft) weighted drill rod. Total length: 124.51 ft
1127	Tripped in DP#5 (30.50 ft) + sub (2.0) regular drill rod. Total length: 157.01 ft
1145	Rig down. Driller needs to replace one of the "tong" cables. Driller will meet a driver in Mulberry with a cable from their Tampa office.
1200	Lunch.
1245	Dana (SI) on-site with sample collection canisters for drill cuttings.
1320	Driller on-site with cable.
1350	Drilling crew is stringing the cable. Dana off-site.
1520	Driller adding DP#6 (30.50ft) to the drill string. Total Length: 186.51 ft

1526	Driller adding DP#7 (31.00 ft) to the drill string. Total Length: 217.00 ft
1532	Driller adding DP#8 (30.50 ft) to the drill string. Total Length: 247.50 ft
1540	Added Kelly. Tagged cement inside the 14-in diameter steel casing at the depth of 352 ft bls. 66.0 ft of cement to be drilled out.
1545	Started drilling out cement inside casing using the reverse-air method.
1620	Kelly down and circulating at the depth of 249.50 ft bls.
1630	Driller adding DP#9 (30.70 ft) to the drill string. Total Length: 278.20 ft
1638	Back to drilling at the depth of 278 ft bls.
1715	Kelly down and circulating at the depth of 310.20 ft bls.
1730	Driller adding DP#10 (30.50 ft) to the drill string. Total Length: 308.70 ft
1815	Drilled out cement down to the depth of 320 ft bls. Encountered formation cuttings at the depth of 318 ft bls. Stopped for the day.
1845	DDC and SI off-site. Called security to inform them of our departure. Locked gate.

Total Daily On-Site Man Hours SI 10.0 DDC 10.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/03/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Reamed from 320 to 342 ft.
Drilled from 342 to 467 ft.

DRILLING 13-INCH DIAMETER HOLE BELOW INTERMEDIATE CASING.	
Time	**Activity Description**
0730	Jack B. (SI) on-site. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0740	Static water level inside casing: 96.88 ft below top of casing. Top of casing is 2.5 ft above land surface.
0800	Site meeting with drilling crew. Sampling procedure is critical at this stage and directions were givien as to how (SI) wants to proceed with the drilling operation.
0830	Cliff H. (SI) on-site with sampling materials and canisters for continuous sampling recovery. DDC are cleaning out cuttings from the goose.
0900	Started reaming out below casing at the depth of 320 ft bls. 9 5/8-in pilot hole was previously drilled to 342 ft bls.
1000	Reaming at the depth of 330 ft bls. Collecting continuous cuttings from reverse air discharge and shale shaker for lab analysis of the mineral content. Cuttings bulk packaged in 2 gal HDPE buckets, contents purged with nitrogen before sealing to retard oxicdation.
1050	Kelly down at the depth of 341.41 ft bls. Water level down to water inside well: 136.18 ft bmp. Rate of flow: 50 gal/min. Drawdown: 39.3 ft Specific capacity: 1.6 gal/min/ft. Collected water samples. Specific capacity of formation from 318 to 340.
1125	Added DP#11 (31.00 ft) to drill string: Total String length: 341.41 ft
1200	Drilling at the depth of 350 ft bls.
	Drilling at the depth of 360 ft bls.
1310	Kelly down at the depth of 373.41 ft bls. Water level down to water inside well: 116.2 ft bmp. Rate of flow: 50 gal/min. Drawdown: 19.32 ft Specific capacity: 2.59 gal/min/ft. Collecting water samples at each rod break. Specific capacity of formation from 318 to 373 ft bls. Cliff H. off-site.
1330	Lunch
1400	Cleaned cuttings out of the goose. Added DP#12 (30.80 ft) to drill string. Total string length: 372.21 ft
1420	Drilling at the depth of 380 ft bls.

1445	Drilling at the depth of 390 ft bls.
1500	Kelly down at the depth of 404.21 ft bls. Water level down to water inside well: 110.4 ft bmp. Rate of flow: 109 gal/min. Drawdown: 13.52 ft Specific capacity: 8.0 gal/min/ft.
1540	Added DP#13 (31.00 ft) to drill string. Total length of string: 403.21ft
1552	Drilling at the depth of 410 ft. bls.
1605	Drilling at the depth of 420 ft. bls.
1620	Kelly down at the depth of 435.21 ft. bls. Water level inside well: 111.76 ft bmp. Rate of flow: 124.5 gal/min. Drawdown: 17.62 ft Specific capacity: 7.0 gal/min/ft.
1640	Added DP#14 (31.80 ft) to drill string. Total length of string: 435.011 ft
1645	Started back drilling at the depth of 435 ft bls.
1700	Drilling at the depth of 445 ft bls.
1715	Drilling at the depth of 455 ft bls.
1735	Kelly down at the depth of 467.01 ft bls. Water level inside well: 111.76 ft bmp. Rate of flow: 124.5 gal/min. Drawdown: 16.17 ft Specific capacity: 7.4 gal/min/ft.
1750	Driller is stopping here for the day. DDC drilled approximately 147 ft today.
1800	DDC off-site. SI catching up on office work.
1810	SI off-site. Locked gate. Called Security to inform them of our departure.

Total Daily On-Site Man Hours SI 10.0 DDC 10.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/04/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilled from 467 to 590 ft

Time	Activity Description
0700	Jack B (SI) on-site. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0720	Static water level inside casing: 97.85 ft below top of casing. Top of casing is 2.5 feet above land surface.
0730	Started drilling at the depth of 467 ft bls. Added DP#14 (31.80 ft) to drill string last night before leaving: Total String length: 466.01 ft
0755	Drilling at the depth of 477 ft bls.
0805	Drilling at the depth of 487 ft bls.
0820	Kelly down at the depth of 498.81 ft bls. Pumping water level: 111.23 ft bls. Rate of flow from pumping: 115.38 gal/min. Drawdown from static water level: 13.38 ft. Specific capacity: 8.62 gal/min/ft.
0900	Added DP #15 (30.40 ft) to drill string. Total length of string: 497.21 ft.
0915	Drilling at the depth of 500 ft bls.
0925	Drilling at the depth of 510 ft bls.
0935	Kelly down at the depth of 529.21 ft bls. Water level down to water inside well: 112.23 ft bmp. Rate of flow: 120.5 gal/min. Drawdown: 14.38 ft. Specific capacity: 8.4 gal/min/ft.
0950	Added DP#16 (31.00 ft) to drill string. Total length of string: 528.31 ft
1010	Drilling at the depth of 539 ft bls.
1030	Drilling at the depth of 549 ft bls.
1100	Kelly down at the depth of 560.31 ft bls. Water level inside well: 114.23 ft bmp. Rate of flow: 116.2 gal/min. Drawdown: 17.62 ft. Specific capacity: 7.0 gal/min/ft.
1105	Added DP#18 (30.30 ft) to drill string. Total length of string: 558.61 ft
1110	Started back drilling at the depth of 560 ft bls.
1125	Drilling at the depth of 570 ft bls.

Time	Activity Description
1140	Drilling at the depth of 580 ft bls.
1155	Kelly down at the depth of 590.61 ft bls. Water level inside well: 112.23 ft bmp. Rate of flow: 142.8 gal/min. Drawdown: 14.32 ft. Specific capacity: 9.9 gal/min/ft.
1200	Added DP#19 (31.2 ft). Total String Length: 589.81 ft. Driller is stopping here for lunch.
1245	SI catching up on office work for weekly report.
1323	Drilling at a depth of 600 ft bls.
1344	Drilling at a depth of 610 ft bls.
1400	Kelly down at the depth of 621.81 ft bls. Water level inside well: 108 ft bmp. Rate of flow: 150 gal/min. Drawdown: 10.15 ft. Specific capacity: 14.7 gal/min/ft.
1429	Added DP#20 (30.50 ft) to drill string. Total length of string: 650.51 ft
1500	Drilled to a depth of 641 ft bls. Jeff S. (PEF) on-site briefly.
1510	Kelly down at the depth of 652.81 ft bls. Water level inside well: 111.2 ft bmp. Rate of flow: 150 gal/min. Drawdown: 13.61 ft. Specific capacity: 11.02 gal/min/ft.
1543	Adding DP#21 (30.20 ft). Total length of string: 680.65 ft
1550	Nathan and Jeff (PEF) return to site to make suggestions to DDC.
1613	Drilled to a depth of 672 ft bls. Circulating cuttings.
1622	Kelly at the depth of 680.65 ft bls. Water level inside well: 110.7 ft bmp. Rate of flow: 143 gal/min. Drawdown: 13.82 ft. Specific capacity: 10.3 gal/min/ft.
1655	Added DP#22 (30.3 ft) to drill string. Total length of drill string: 710.95 ft.
1715	Drilled to a depth of 690 ft bls. Circulating up cuttings. Stopping here for the day.
1730	DDC off-site.
1800	SI off-site. Called Security and locked gate.

Total Daily On-Site Man Hours SI 11.0 DDC 10.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/05/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilled from 690 to 760 feet

DRILLING 13-INCH DIAMETER HOLE BELOW INTERMEDIATE CASING	
Time	**Activity Description**
0700	Jack B (SI) on-site. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0720	Static water level inside casing: 98.10 ft btc. Top of casing is 2.5 ft above land surface.
0900	Started drilling at the depth of 690 ft bls.
0915	Drilled to the depth of 700 ft bls. Circulated up cuttings.
0930	Kelly down at the depth of 712.81 ft bls. Pumping water level: 108.40 ft bls. Rate of flow from pumping: 150.0 gal/min. Drawdown from static water level: 10.30 ft. Specific capacity: 14.5 gal/min/ft.
0958	Added DP#23 (31.00 ft) to drill string. Total length of string: 711.41 ft. On bottom drilling at the depth of 712 ft bls.
1000	Drilled to the depth of 722 ft bls. Circulated up cuttings.
1024	Drilled to the depth of 732 ft bls. Circulated up cuttings.
1045	Kelly down at the depth of 743.41 ft bls. Pumping water level: 104.25 ft bls. Rate of flow from pumping: 150.0 gal/min. Drawdown from static water level: 6.15 ft. Specific capacity: 24.39 gal/min/ft.
1110	Added DP#24 (31.00 ft) to drill string. Total length of string: 742.41 ft. On bottom drilling at the depth of 743 ft bls.
1141	Drilled to the depth of 753 ft bls. Circulated up cuttings.
1145	Encountered clay layer between the depths of 759 and 760 ft bls. Called Cliff H. (SI) and decided to stop since the driller is scheduled to be off-site at noon.
1300	Completed office work. Jack B off-site. Called Security and informed them of our departure. Locked gate.

Total Daily On-Site Man Hours SI 6.0 DDC 5.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by Jack Breland

Date: 12/6-7/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method:

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-site Man Hours: SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/08/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilled from 760 to 899 feet

DRILLING 13-INCH DIAMETER HOLE BELOW INTERMEDIATE CASING	
Time	**Activity Description**
0800	Jack B (SI) on-site. Opened up office.
0900	Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site. Terry (PE) security on-site. He wrote down on-site personnel.
0905	Static water level inside casing: 98.40 ft btoc. Top of casing is 2.5 ft above land surface.
0910	Started drilling at the depth of 760 ft bls.
0928	Kelly down at the depth of 774.41 ft bls. Pumping water level: 104.21 ft bls. Rate of flow from pumping: 110.0 gal/min. Drawdown from static water level: 5.81 ft. Specific capacity: 18.9 gal/min/ft.
1004	Added DP#25 (31.80 ft) to drill string. Total length of string: 774.01 ft. On bottom drilling at the depth of 774 ft bls.
1050	Drilled to the depth of 784 ft bls. Circulated up cuttings.
1135	Drilled to the depth of 794 ft bls. Circulated up cuttings.
1215	Kelly down at the depth of 806.01 ft bls. Pumping water level: 103.4 ft bls. Rate of flow from pumping: 108.5 gal/min. Drawdown from static water level: 5.00 ft. Specific capacity: 21.7 gal/min/ft.
1245	Added DP#26 (31.60 ft) to drill string. Total length of string: 837.61 ft. On bottom drilling at the depth of 837.61 ft bls.
	Drilled to the depth of 753 ft bls. Circulated up cuttings.
1300	Lunch and supply run.
1430	On bottom drilling very slow at the depth of 807 ft bls.
1515	Drilling very slow at the depth of 812 ft bls.
1545	Drilled to the depth of 816 ft bls. Circulating up cuttings.
1640	Kelly down at the depth of 837.61 ft bls. Pumping water level: 102.34 bls. Rate of flow from pumping: 108.5 gal/min. Draw down from static water level: 3.94 ft. Specific capacity: 27.5 gal/min/ft.
1716	On bottom drilling at the depth of 837 ft bls. Added DP#27 (31.00 ft) to drill string.

DRILLING 13-INCH DIAMETER HOLE BELOW INTERMEDIATE CASING	
Time	**Activity Description**
1732	Drilled to a depth of 842 ft bls.
1745	DDC off-site.
1800	Checked out with Security and SI off-site.

Total Daily On-Site Man Hours SI 6.0 DDC 5.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/09/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilled from 842 to 899 feet

DRILLING 13-INCH DIAMETER HOLE BELOW INTERMEDIATE CASING	
Time	**Activity Description**
0700	Jack B (SI) on-site. Check in at the gatehouse. Drilling crew is five minutes ahead of me. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0710	Static water level inside casing: 98.50 ft btoc. Top of casing is 2.5 ft above land surface.
0715	Started drilling at the depth of 842 ft bls.
0900	Drilled to the depth of 852 ft bls. Circulated up cuttings.
0928	Drilled to the depth of 857 ft bls. Circulated up cuttings
1100	Kelly down at the depth of 868.21 ft bls. Pumping water level: 102.80 ft bls. Rate of flow from pumping: 134.0 gal/min. Drawdown from static water level: 5.31 ft. Specific capacity: 25.2 gal/min/ft.
1132	Added DP#28 (31.20 ft) to drill string. Total length of string: 867.41 ft. On bottom drilling at the depth of 868 ft bls.
1230	Drilled to the depth of 873 ft bls.
1300	Drilled to the depth of 874 ft bls. Circulated up cuttings. Brief lunch.
1445	Drilled to the depth of 878 ft bls. Circulated up cuttings.
1610	Drilled to the depth of 888 ft bls. Circulated up cuttings.
1700	Drilled to the depth of 893 ft bls.
1745	Kelly down and END OF BOREHOLE advancement at the depth of 899.41 ft bls. Pumping water level: 103.4 ft bls. Rate of flow from pumping: 135.0 gal/min. Drawdown from static water level: 5.00 ft. Specific capacity: 21.7 gal/min/ft.
1800	DDC cleaned up site. SI stopped at the guardhouse to let them know that DDC locked the gate on the way out. SI off-site.

Total Daily On-Site Man Hours SI 11.0 DDC 11.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/10/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Tripped out bit and logged well.

GEOPHYSICAL LOGGING	
Time	**Activity Description**
0730	Jack B (SI) on-site. Check in at the gatehouse. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0745	Static water level inside casing: 97.80 ft btoc. Top of casing is 2.5 ft above land surface.
0800	Began tripping out of the hole with drill string after circulating hole clean.
0945	Out of the hole with casing string. Waiting on logger.
0950	Geophysical logging truck (Advance Borehole Services) on-site.
1000	Logger (Art B.) is set up.
1036	First run: Caliper/Gamma
1138	Second run: Temperature, Fluid Resistivity, SP Potential.
1230	Third run: Flow Log-Static Condition.
1340	Fourth run: Sonic Log (Full wave BHC acoustic).
1434	Out of hole with tool.
1500	Logger off-site.
1530	DDC cleaned up site. SI stopped off at the guardhouse to let them know that DDC locked the gate on the way out. SI off-site.

Total Daily On-Site Man Hours SI 8.0 DDC 8.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/11/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
0730	Jack B (SI) on-site. Check in at the gatehouse. Opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0745	Static water level inside casing: 98.2 ft btoc. Top of casing is 2.5 ft above land surface. Preparing to temporarily seal off source of higher TDS water.
0800	Placed 1st bag of sand (3000 lbs.) in hole from top of well. No water slurry was mixed.
0900	Placed 2nd bag of sand in well. Cliff (SI) called and told to return to the main office in Tampa.
1000	Placed 3rd bag of sand in well. There is only one more sack on site to be placed inside the well today. The rest of the sand bags will be here on Monday. Jack B. to SI office.
1130	Arrived at Tampa office for well meeting.
1700	Meeting over.

Total Daily On-Site Man Hours SI 8.0 DDC 5.0+

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/12-14/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/15/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
0900	Jack B (SI) on-site. Check in at the gatehouse. Opened up office.
0930	Static water level inside casing: 98.6 ft below top of casing. Top of casing is 2.5 ft above land surface.
1150	Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
1210	Tractor-trailer on-site with 8-in diameter steel casing.
1245	Unloaded steel casing from trailer with forks on backhoe. DDC is preparing to run 2-in diameter cement pipe inside well in order to tag the top of the sand fill.
1315	Another trailer on-site with two pallets of Portland cement, and the rest of the 2-in diameter cement pipe.
1400	Cement mixer (55 gallon capacity) on-site.
1445	Cleaned pipe threads and replaced worn couplings. Tripping in hole with cement pipe.
1500	3 joints on pipe string. Total depth of string: 63 feet.
1530	9 joints on pipe string. Total depth of string: 189 feet.
1600	13 joints on pipe string. Total depth of string: 273 feet.
1630	13 joints on pipe string. Total depth of string: 525 feet.
1700	37 joints on pipe string. Total depth of string: 777 feet.
1730	Soft tag at 840 ft bls. Hard tag sand fill at the depth of 878 ft bls.
1745	DDC off-site.
1800	SI checked out at the security gate and left site.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/16/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Fishing out cement pipe

Casing Preparation	
Time	**Activity Description**
0730	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. Bruce Harmon (DDC) and two helpers; Shawn and Jason on-site.
0800	Driller is tripping out cement pipe and racking the pipe (2 joint lengths) up in the derrick. Static water level inside casing: 98.8 feet below top of casing. Top of casing is 2.5 feet above land surface.
0830	Tripped out 10 stands.
0900	Five joints of 2-in diameter cement pipe did not make it to surface. Called Cliff H. (SI) to inform him of the situation.
0915	Proposed procedure from DDC: Trip in hole with drill pipe to 820 ft bls and flush well. Run a video camera to see how to hook on to the top of the cement string. Run in fishing tool to retrieve pipe.
0930	Tripping in hole with drill string to the depth of 820 ft bls.
1030	Tripped to the depth of approximately 420 ft bls. Minor problem with sand line.
1214	Tripped in 20 joints of pipe. Approximately 620 ft bls. Geophysical logging truck (Advance Borehole Services) on-site.
1235	Tagged top of cement pipe with drill rods at the depth of 720 ft bls.
1335	Flushed well using reverse-air lift.
1400	Tool is too big to run down hole along side of drill string. Tripping out of the hole with drill pipe string.
1515	Out of the hole with drill string. Camera is being sent down the hole.
1630	Camera is out of hole. Requested field copy. A grab tool is being formed to retrieve the rest of the cement string (105 ft).
1700	Art B. (ABS) off-site with logging truck. DDC off-site.
1710	Jack B. checked out with security and left site.

Total Daily On-Site Man Hours SI 9.0 DDC 9.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/17/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Fishing out cement pipe

Casing Preparation	
Time	**Activity Description**
0830	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. Bruce H. (DDC) and two helpers; Shawn and Jason on-site.
0800	Driller is designing cement basket on-site. Static water level inside casing: 98.28 ft below top of casing. Top of casing is 2.5 feet above land surface.
0900	Waiting for fishing tool. The fishing tool will be run with 2-inch diameter steel hydril pipe.
0930	Bruce (DDC) said it would be in the afternoon before fishing tool will be on-site.
0945	Collected and ran field parameters of pad monitoring wells.
1300	Tripping in hole with hydril pipe.
1405	Tripped to approximately 807 ft with fishing tool. DDC (Joe and Bruce) think they have the missing pipe. Tripping out of the hole.
1530	Successful fishing trip. DDC will trip back in to bottom and reverse-air sand plug out of the hole.
1600	DDC will lay down cement pipe that is standing up in the derrick. He will run 9-7/8 inch diameter drill bit into the hole tomorrow.
1630	Jack B. (SI) checked out with security and off-site.

Total Daily On-Site Man Hours SI 8 DDC___

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/18/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Clearing bottom of hole.

Clearing Hole	
Time	**Activity Description**
0800	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. Bruce H. (DDC) and two helpers; Shawn and Jason on-site.
0830	Driller (DDC) is tripping to bottom hole with 9-7/8 inch diameter bit. Static water level inside casing: 98.28 ft below top of casing. Top of casing is 2.5 ft above land surface.
0900	Tripped in 12 joints.
0930	Tripped in 25 joints. Hooked up to reverse-air. Started cleaning sand from hole at the depth of 773 ft bls.
1045	Kelly down at the depth of 805 ft bls. pH=7.85 Temperature =17.3, Conductivity = 631.
1110	Added DP#26 to drill string. On bottom clearing sand from hole.
1200	Developing out sand at the depth of 824 ft bls.
1230	Kelly down at the depth of 834 ft bls.
1230	Kelly down and circulating at the depth of 834 ft bls. Pumping water level: 98.55 feet bmp. Pumping rate: 125 gpm. Conductivity = 647, pH = 8.01, Temperature = 24.4.
1245	Rig down. A hole ruptured in the top nipple of the standpipe. Welder is on the way.
1314	Welder (DDC) on-site.
1445	Welder off-site. On bottom reaming at the depth of 834 ft bls.
1450	On bottom clearing hole at the depth of 834 ft bls.
1545	Kelly down and circulating at the depth of 864 ft bls. Pumping water level: 99.56 ft bmp. Pumping rate: 120 gpm. Drawdown-1.54 ft. Specific Capacity = 77.9 gal/min/ft. Conductivity = 713, pH = 8.03, Temperature =23.5.
1600	On bottom clearing hole at the depth of 864 ft bls, after adding DP#28 to drill string.

Clearing Hole	
Time	**Activity Description**
1640	Kelly down and circulating at the depth of 900 ft bls. Pumping water level: 99.58 ft bmp. Pumping rate: 120 gpm. Drawdown-1.55 ft. Specific Capacity = 77.4 gal/min/ft. Conductivity = 596, pH = 7.98, Temperature = 24.3.
1650	Circulating and surging well. Formation water is slowly clearing up. Cliff H. (SI) on-site.
1750	Circulated for one hour surging frequently. Cliff H. off-site.
1800	DDC and SI leaving site. Checked out with security.

Total Daily On-Site Man Hours SI 10 DDC 11

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/20-21/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/22/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Tripped out drill string.

Time	Activity Description
1100	Jack B (SI) on-site. Check in at the gatehouse and opened office. Bruce Harmon (DDC) and one helper; Shawn, already on-site.
1115	Currently tripping out of the hole with drill string. Driller is one helper short today. Tripped out 8 drill pipes.
1200	18 joints of pipe out of the hole. Slow process due to the fact that the sand line on the rig is down and driller having to lay pipe down using backhoe.
1220	DDC out of hole with drill string. Lunch break.
1230	Jeff S. (PEF) on-site.
1320	DDC back from lunch. Driller is moving drill pipe out of the way.
1345	Jeff S. off-site.
1445	Paul P. (DDC) on-site.
1500	DDC helper finally showed up. Tripping in hole with bridge plug. The middle of the plug will be set at the depth of 692 feet below land surface.
1600	Bridge plug plus 5 (2-inch diameter) hydril pipes on boot string. Total depth of string: 166.07 feet.
1605	Bridge plug hung up on the inside 14-inch diameter intermediate casing. Tripping out to understand and correct the problem.
1630	Bridge plug filled with water and broke the tape that was holding the bladder shut. The 10-inch diameter casing holding the bladder had also collapsed. DDC will regroup and try again tomorrow
1700	SI checked out at the gatehouse with security and left site.

Total Daily On-Site Man Hours SI 6.0 DDC 8.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/23/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Set and cemented bridge plug.

Time	Activity Description
1100	Jack B (SI) on-site. Check in at the gatehouse and opened office. Bruce Harmon (DDC) and one helper; Shawn, already on-site.
1115	Working on building another bridge plug. Holes will be added to the top of the bladder so water can fill bladder.
1345	Tripped in 2-inch diameter cement pipe string. The base of the 8-foot bladder will be located at the depth of 695 feet below land surface.
1400	DDC and SI calculated water displacement for tubing, pumps, and hoses: 72 gallons of chase water.
1500	Began pumping cement into the bridge plug located at the depth between 687 feet to 695 feet below land surface. A 100-gallon capacity drum is being used to calculate volumes to be pumped.
1530	Finished pumping 10 sacks of cement and chase water.
1600	DDC cleaned site, unloaded 6 bags (3000 lbs.) of fill sand. They will work onsite till 1730 hours. SI checked out at the gatehouse with security and left site.

Total Daily On-Site Man Hours SI 5.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/24/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Cemented top of bridge plug.

Time	Activity Description
0715	Jack B (SI) on-site. Check in at the gatehouse and opened up office. Bruce Harmon (DDC) and one helper; Shawn, already on-site.
0745	Set hydril pipe string weight down on bridge plug. Turned hydril string counter clockwise to release attached bridge plug. Water level in well: 98.13 feet below measuring point.
0830	Tripped out 2 pipe joints. The bridge plug is located between 687 to 695 feet below land surface. Water displacement for tubing, pumps, and hoses: 72 gallons of chase water.
0900	Began pumping cement into the top of the bridge plug located at the depth between 687 feet to 695 feet below land surface.
0930	Finished pumping 10 sacks of cement and chase water. Water level rose above five feet during pumping and fell back to static conditions at 98.13 feet below measuring point.
0945	DDC tripped pipe string up to 620 feet and stopped.
1000	Sampled and tested pad monitoring wells for weekly water quality field parameters.
1015	SI checked out at the gatehouse with security and left site for SI. DDC drillers will be here till noon. Happy Holidays!

Total Daily On-Site Man Hours SI 4.0 DDC 4.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/24-28/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/29/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air
Summary: Preparation for casing installation

Preparation for Casing Installation	
Time	**Activity Description**
0900	Jack B (SI) on-site. Check in at the gatehouse and opened up office.
0930	Bruce Harmon (DDC) two helpers; Shawn and Jason, and one welder, Roger, on-site. Water level in well: 97.30 feet below measuring point.
0945	DDC are working on repairing sand line winch on rig.
1020	Tagged top of stage two cement plug at the depth of 672 ft bls. Total cement fill from this stage: 5 feet. Preparing to place sand fill up to the casing depth at approximately 620 ft bls.
1200	Calculated theoretical volume of average hole from caliper log. 2.4 ft^3/ft x 52 ft = 125 ft^3. Placed 3 bags (9000 lbs) of clear, coarse, rounded silica sand in the well from surface. Sand: 100 lbs/ft^3 = 90 ft^3.
1205	DDC will wait one hour for the sand to fall to the top of the cement plug before tagging.
1330	Tagged sand lift at the depth of 639 ft bls. Approximately 11.0 feet for each bag. DDC will place one more bag to bring theoretical lift to the depth of approximately 628 ft bls.
1405	Placed bag #4 (3000 lbs or 30 ft^3) into well from the surface. Waiting for the sand to settle to the bottom.
1540	Tagged sand lift at the depth of 628 ft bls. Approximately 11.0 feet for the bag of sand. Preparing to pump 8 sacks (90 lbs) of Portland cement slurry.
1630	Pumped 8 sacks of cement on top of sand plug. Weight of cement 16.7 lbs. Pumped 72 gallons of chase water. Stopped here for the day.
1700	DDC off-site. SI checked out at the gatehouse with security and left site

Total Daily On-Site Man Hours SI 8.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/30/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Casing installation

Installation of 8-inch Diameter Steel Casing	
Time	**Activity Description**
0700	Jack B (SI), DDC and welder on-site.
0730	Preparing to set 8-inch diameter steel casing to 614 ft bls.
0800	Setting casing to 42. 50 ft bls.
1000	Setting casing to 211.10 ft bls.
1300	Setting casing to 379.34 ft bls.
1505	Setting casing to 505.74 ft bls.
1700	Settling casing to 614 ft bls. Depth is approximately six feet shallower than the target of 620 ft bls. Apparent error in pipe tally during bridge plug and cement/sand fill operations. Cement truck on-site. Paul P. of DDC on site.
1715	DDC and SI off-site.

Total Daily On-Site Man Hours SI 8.0 DDC 8.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 12/31/03
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: set 614 ft of casing

SET AND CEMENTED 8-INCH DIAMETER STEEL CASING TO 614 FT BLS.

Time	Activity Description
0700	Jack B (SI) on-site. Opened up office. Diversified Drilling Company on site with a welder.
0900	Re-measure hydril pipe tally. The bottom of cement boot DDC 694.1 ft bls and SI 694.16 ft. The top of boot is 677 ft bls. Stage one cement plug 672 ft bls; top of stage 2 sand plug 639 ft bls; top of stage 3 sand 628 ft bls, top of stage four cement plug 614 ft bls. Still trying to determine source of tally error.
1030	DDC and SI (Paul P. and Cliff H.) inform crew to set casing to a depth of 614 ft bls.
1055	The header plate is welded to top of the casing string. The base of the casing string is located at approximately 614 feet below land surface. Approximately 4.0 feet hanging up to the rig floor. Casing string welded and secured to the rig floor.
1100	Running 2.0-in diameter steel cement tubing (19 joints) into the well to approximately 590 ft bls.
1230	Pre-flushed (168 gallons of water) borehole with pump on cement truck. DDC will cement approximately 400 sacks of neat cement slurry continuously using the modified pressure grout method.
1236	Started cementing using the pressure grout method.
1240	Cement weight after approximately 100 sacks: 14.4 lbs.
1245	Cement weight after approximately 200 sacks: 14.2 lbs.
1250	Cement weight after approximately 300 sacks: 14.4 lbs.
1300	Pumped approximately 360 sacks into the annulus. Cement weight at the end of the cement stage: 14.4 lbs. Flushed tubing with approximately 220 gallons of water. Constant 40 PSI on pressure gage. Theoretical volume of cement 360 sacks with approximately 173 ft lift. Top of cement will be approximately 440 ft bls.
1315	DDC cleaning up site and will be off site until the following week.
1410	SI perform site water quality monitoring and off-site.

Total Daily On-Site Man Hours SI 7.0 DDC 7.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 1/1-4/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method:
Summary: Casing Preparation

Casing Preparation	
Time	**Activity Description**
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/05/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Completed cementing 2nd stage

CEMENTING 8-INCH DIAMETER CASING	
Time	**Activity Description**
0830	Jack B. (SI) on-site and checked in at the gatehouse. Opened up office. Waiting for DDC. The crew will be cementing the casing annulus using the tremie method (second stage).
0930	Bruce Harmon (DDC) two helpers; Shawn and Jason on-site. Water level in well: 1.2 feet below measuring point (bmp). Inside Annulus: 97.20 feet bmp. Diapers from around drilling area were changed and secured.
1000	DDC (Jimmy and Rambo) cementing crew onsite with 425 sacks of cement.
1045	Running 1 ¼ galvanized cement pipe inside the annulus of the 8-inch diameter casing.
1100	Hard tag with tremie line at the depth of 440 ft bls. Preparing to cement the second stage. Calculated Theoretical Volume:~ 371 ft bls.
1250	Pre-flushed (80 gallons of water) with pump on cement truck. DDC will cement approximately 425 sacks of neat cement slurry continuously using the tremie method.
1300	Started cementing using the tremie method. Only one of the two pumps on the cement truck is being used.
1310	Cement weight after approximately 100 sacks: 15.2 lbs.
1320	Cement weight after approximately 200 sacks: 14.9 lbs.
1415	Pumped 212 sacks into the well. Driller was pulling out two joints of tremie pipe before continuing the cementing process when the tubing pulled loose and both pieces of the string fell down the well. Theoretical Volume of 212 sacks of cement: 144 foot lift or 296 ft bls. Informed Cliff H. (SI) of the situation.
1430	DDC went off-site for lunch. Driller said they are sending more tubing to the rig site. SI off-site.
1600	SI on-site. Driller is running new string of 1¼ cement tubing to the top of the cement plug inside the annulus.
1645	Tagged cement at the depth of 356 ft bls at 60 feet less than calculated. Theoretical Volume: 296 ft.

CEMENTING 8-INCH DIAMETER CASING	
Time	**Activity Description**
1700	Started cementing 3rd stage. Beginning weight of cement: 15.2 lbs. Formation water flowed from the annulus during pumpage.
1710	Cement weight after approximately 100 sacks: 15.1 lbs.
1715	Cement weight after approximately 200 sacks: 15.2 lbs.
1720	Cement returns from pumping. Pumped a total of 191 sacks into the annulus. Cement weight at the end of the cement stage: 15.3 lbs. Flushed tubing with approximately 120 gallons of water. Theoretical Volume of Cement: 1.938 ft/ft^3 or 368 feet lift. Actual lift 356 feet.
1730	DDC cleaned up site and left.
1735	SI checked out with security and left site.

Total Daily On-Site Man Hours SI 7.5 DDC 8.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/06/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Pressure test on 8-inch casing.

PRESSURE TEST 8-INCH DIAMETER CASING	
Time	**Activity Description**
1300	Jack B. (SI) on-site and opened up office. Waiting for DDC. The crew will be pressure testing 8-inch diameter casing.
1330	Bruce Harmon (DDC) two helpers, Shawn and Jason back from lunch. Water level in well: 1.0 foot below measuring point (bmp).
1400	Pressurized casing to 100 psi.
1415	Pressure dropped 5.0 psi. A leak was noticed in one of the fittings. Preparing to redo test after fixing fitting.
1430	Pressurized casing to 100.0 psi.
1445	Reading on pressure gauge: 99.4 psi.
1500	Reading on pressure gauge: 98.2 psi.
1515	Reading on pressure gauge: 97.1 psi.
1530	Reading on pressure gauge: 96.5 psi. Test completed. A total of 3.5 psi change or 3.5% loss in one hour. Informed Cliff H. of readings. Driller has the go ahead to start drilling out plug.
1600	Removed header plate. Waiting on drill bit.
1610	7 and 7/8-inch diameter tooth drill bit on-site. Tripping in hole with drill pipe.
1715	Hard tag inside casing the depth of 611 ft bls. (New pipe tally).
1730	Stopping here for the day. DDC and SI off-site.

Total Daily On-Site Man Hours SI 4.5 DDC 10.5

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/07/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilling out plug.

DRILLING OUT CEMENT AND SAND PLUGS	
Time	**Activity Description**
0730	Jack B. (SI) on-site and opened office. The drilling crew will be drilling out cement and sand plugs below 8-inch diameter casing.
0800	Bruce Harmon (DDC) two helpers, Shawn and Jason are waiting on vegetable oil for sump pump. Water level in well: 3.2 ft below measuring point (bmp).
0830	Tagged top of cement plug at the depth of 611 ft bls. Driller is meeting a carrier in Lakeland to retrieve specialized vegetable oil for sump pump.
0930	On bottom drilling out cement plug at the depth of 611 ft bls.
1000	Drilled through cement plug at the depth of 616 ft bls. Approximately five feet of plug. Kelly down and circulating at the depth of 616.10 ft bls.
1030	Placed DP#16 (31.80 ft) on drill string. Total length of drill string: 615.90 ft
1040	On bottom dredging sand at the depth of 617 ft bls.
1200	Kelly down at the depth of 648.10 ft bls.
1215	Added DP #17 (30.50 ft) on drill string. Total length of drill string: 646.40 ft
1220	Lunch
1320	On bottom dredging at the depth of 647 ft bls.
1400	Dredging at the depth of 655 ft bls.
1450	Top of cement plug above bridge plug is located at the depth of 668 ft bls.
1530	Kelly down at the depth of 678.10 ft bls. Circulating.
1545	Added DP #18 (31.18 ft) on drill string. Total length of drill string: 678.58 ft
1600	Top of bridge plug was encountered at the depth of 686 ft bls.
1615	Bottom of bridge plug: 694 ft bls. Raising and lowering Kelly through bridged interval. Driller would turn drill bit half a turn at the time and continuously through interval.

DRILLING OUT CEMENT AND SAND PLUGS	
Time	**Activity Description**
1620	Added DP #19 (31.30 ft) on drill string. Total length of drill string: 707.30 ft
1635	Kelly down and circulated well till clear of bridge material.
1710	Added DP#20 through #25. Total string length 891.70 ft bls. Circulating.
1730	Dredged down to the depth of 900 ft bls. Conditioning hole.
1800	Stopping here for the day. DDC and SI off-site after checking out with security.

Total Daily On-Site Man Hours SI 10.5 DDC 11.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/08/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air:
Summary: Drilling out plug.

DRILLING OUT CEMENT AND SAND PLUGS	
Time	**Activity Description**
0730	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. The drilling crew will be drilling out what is left of the bridge plug at the bottom of the well.
0800	Bruce Harmon (DDC) two helpers, Shawn and Jason are on-site dredging out bridge plug.
0900	Dredging boot material from bottom of well. Depth: 896 ft bls.
1000	Dredging boot material from bottom of well. Depth: 897 ft bls.
1100	Dredging boot material from bottom of well. Depth: 898 ft bls.
1200	Dredging boot material from bottom of well. Depth: 900 ft bls. Conditioning hole.
1655	Complete tripping out of hole.
1830	Stopping here for the day. SI off-site after checking out with security.

Total Daily On-Site Man Hours SI_DDC___

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/9/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air
Summary: Step drawdown testing

HYDRAULIC TESTING	
Time	**Activity Description**
0800	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. Bruce Harmon (DDC) two helpers, Shawn and Jason are on-site. Driller is preparing to run the Franklin Submersible Pump (60 hp) to the depth of approximately 232 ft bls. Six-inch diameter pipe and electric line rubbing against casing. Will use a smaller diameter drop pipe on Monday.
0900	Jeff S. (PEF) on-site. DDC is removing 6-inch diameter drop pipe from the site.
1000	Jeff S. (PEF) off-site. Finished up office work and checked out with security.
1030	SI off-site.

Total Daily On-Site Man Hours SI 2.5 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 1/10-11/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method:
Summary:

Time	Activity Description
	SI and DDC off-site for weekend.

Total Daily On-Site Man Hours SI 0 DDC 0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/12/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air
Summary: Setting pump

HYDRAULIC TESTING	
Time	**Activity Description**
1000	Jack B. (SI) on-site. Check in at the gatehouse and opened up the office.
1015	Bruce Harmon (DDC) two helpers, Shawn and Jason are on-site cleaning and moving reverse-air equipment.
1100	DDC (Robert) on-site with 4-inch diameter drop pipe.
1200	Placed 12 joints of 4-inch diameter steel pipe on to drill table.
1215	Lunch.
1315	Driller is preparing to run the Franklin Submersible Pump (60 hp) to the depth of approximately 232 ft bls.
1448	New pigtail placed on pump (2.4 ft). Tripping in hole with pipe #1 (21.0 ft).
1504	Pipe #4 of 11 on string.
1530	Pipe #9 of 11 on string.
1630	Pipe in well. Hooking up to the orifice.
1700	Hooked up three-phase generator.
1730	Pumping rate was established at the rate of 780 gpm with approximately 10 feet of drawdown. Specific Capacity: 78.0 gpm/ft. DDC and SI off-site after checking out with security.

Total Daily On-Site Man Hours SI 6.0 DDC 7.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/13/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air
Summary: Step drawdown testing

HYDRAULIC TESTING	
Time	**Activity Description**
0700	Jack B. (SI) on-site. Check in at the gatehouse and opened up office.
0705	Bruce Harmon (DDC) two helpers, Shawn and Jason are on-site. Static water level inside well: 98.52 ft bls.
1030	Dana G. (SI) on-site to sample well for lab analysis of background water quality.
1040	Started Step #1 at the rate of 300 gpm. Completed lab sampling. Rate dropped to 270 gpm 30 minutes into test.
1140	Stepped rate up to 400 gpm (Step #2). Specific Capacity of Step 1: 171.90 gpm/ft.
1240	Stepped rate up to 500 gpm (Step #3). Specific Capacity of Step 2: 143.36 gpm/ft. Dana G. (SI) off-site.
1340	Stepped rate up to 610 gpm (Step #4). Specific Capacity of Step 3: 129.87 gpm/ft.
1440	Stepped rate up to 760 gpm (Step #5). Specific Capacity of Step 4: 111.52 gpm/ft.
1540	Stopped test. Specific Capacity of Step 5: 98.40 gpm/ft.
1600	Driller is pulling pump out of the well.
1700	Pulled pump out of the well. DDC and SI off-site after checking out with security.

Total Daily On-Site Man Hours SI 10.0 DDC 10.0

Schreuder, Inc.
Daily Activity Report

SI Project No: FPF-301
Location: Hines Energy Complex
Well Number ID: TW-1
Completed by: Jack Breland

Date: 01/14/04
Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Reverse-air
Summary: Site Clean Up

Site Clean Up	
Time	**Activity Description**
0800	Jack B. (SI) on-site. Check in at the gatehouse and opened up office. Bruce Harmon (DDC) two helpers, Shawn and Jason are already on-site
0900	DDC are picking up drilling accessories and materials. SI is clearing out office and working on weekly report information.
1000	Obtained samples from the pad monitoring wells.
1030	DDC off-site.
1200	Waiting for Dana G. (SI) to pick up office materials and supplies, as well as the weekly report information. Lunch.
1300	Dana G. (SI) on-site to sample well for lab analysis.
1400	Helped Dana G. load office materials into vehicle. SI off-site.

Total Daily On-Site Man Hours SI 5.0 DDC 5.0

Appendix D

Lithologic Log

SCHREUDER, INC.

Schreuder, Inc.
Lithology Log

Project: FPF-301
Location: Hines Energy Complex
Well Number: TW – 1
Sample Description By: Jack Breland
Sampling Method: Grab

Date: 12/9/03

Drilling Contractor: Diversified Drilling Corp.
Drilling Method: Mud Rotary: 0-182 ft bls
Reverse Air: 182-899 ft bls

Depth Interval	Sample Description	Drilling Comments
0 – 0.5	**Gravel**, multicolored, clean, limestone.	Fill material
0.5 – 5	**Sand**, (fill), white (N9) to off white (5W 6/2), very fine to fine grained, well sorted.	Fill material
5– 7	**Sand**, as above, except traces of shell fragments and slightly organic.	
7– 8	**Sand**, light olive gray (5Y 6/1), clayey, very fine rained, well sorted, abundant yellowish brown organics.	
8 – 16	**Silt**, off white (5W 6/2), clayey, loosely consolidated, traces of very fine-grained sand, well sorted.	
16 – 25	**Clay**, brown (5YR 5/6), silty, very phosphatic-yellowish traces of black (N1), soft to pebbly size.	
25 – 31	**Clay**, off white (5W 6/2) to white, loosely consolidated, minor gummy layers, decreasing phosphate with depth.	Kelly down
31 – 45	**Clay**, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), soft, gummy texture, abundant phosphatic grains, minor sand, very fine grained well sorted.	Added DP#1 (31.0 ft)
45 – 56	**Clay**, off white (N9) to very light gray (N8), soft, gummy texture. Traces of phosphatic limestone.	
56 – 62	**Clay**, light gray (N7) to medium light gray (N6), soft, gummy texture.	End pilot hole for surface casing
62 – 78	**Clay**, light gray (N7), soft, gummy texture, sticky.	Added DP#2 (31.0 ft)
78 – 86	**Clay**, grayish olive (10Y 4/2), soft to semi-firm, minor black (N1) phosphate layers, very low porosity.	

Depth Interval	Sample Description	Drilling Comments
86-93	**Mudstone**, light olive gray (5Y6/1), stiff, blocky, interbedded shell fragments, very fine to coarse phosphate, poor porosity.	Added DP#3 (30.5 ft)
93 –103	**Mudstone**, light olive gray (5Y 6/1) to medium olive gray (5Y 4/1), blocky, low porosity, interbedded light gray (N6) stiff clay, minor black phosphatic grains (15%).	
103 – 114	**Mudstone**, very light gray to white (N9 – N8), blocky moderately firm, minor phosphatic layers as above. Traces of soft, olive gray clay.	
114 – 125	**Clay**, medium gray (N7) soft, gummy texture, common black phosphatic layers, fine grained to pebble size.	Added DP#4 (30.41 ft)
125 – 135	**Limestone**, Light olive gray (5Y 6/1) to very light gray (N8), mudstone, moderately soft to moderately firm, pebbly sized phosphatic grains, poor apparent porosity.	
135 – 150	**Limestone**, yellowish gray, mudstone, moderately firm to firm, phosphatic specks. Splinty texture, fair to good apparent porosity.	
150 –160	**Limestone**, grayish yellow (5Y 8/4) and pale yellowish brown (10 YR 6/2), wackestone and mudstone, platey texture, traces of molds and casts, good apparent porosity and permeability.	Added DP#5 (30.50 ft)
160 – 175	**Limestone**, very light gray (N8) to light gray (N7), mudstone soft to moderately firm, common wackestone layers as above, minor phosphate, very fine specks to pebble sizes. Traces of very light gray gummy clay layers.	
175 – 182	**Limestone**, moderate yellowish brown (10 YR 5/4), wackestone, biomicritic to dolomitic, very hard to friable, excellent moldic and intergranular porosity. Minor pinhole and vuggy porosity, common hard to very hard layers.	
182 – 185	**Cavernous**. No samples. Lost circulation zone.	Added DP#6 (30.50 ft) Lost circulation, switched over to reverse air-drilling method.

Depth Interval	Sample Description	Drilling Comments
185 - 190	**Dolostone**, very pale orange (10 YR 8/2) to brownish gray (5YR 4/1), hard to very hard, good intergranular porosity, traces of phosphatic grains, remnants of shell fragments.	
190 - 200	**Sandstone**, brownish gray (5YR 4/1) to very pale orange (10YR 8/2), loosely consolidated, fine to coarse grained, sub-angular to sub-rounded, moderate to well sorted, decreasing phosphate grains and shell fragments.	
200 – 210	**Dolostone**, medium bluish gray (N7), hard, microcrystalline to very fine, common sand sized black (N1) phosphatic grains.	
210 - 215	**Clay**, light gray (N7), soft, gummy texture, common sand sized phosphatic grains.	Added DP#7 (31.0 ft)
215 – 250	**Limestone**, light olive gray (5Y 6/1) to pale olive gray (10Y 6/2), wackestone, hard to very hard, microcrystalline to very fine, excellent moldic porosity, common phosphatic layers. Traces of light olive gray, soft, clay.	
225 – 230	**Dolostone**, yellowish gray (5Y 4/1) to dark greenish gray (5GY 4/1), stiff to gummy texture, decreasing hard phosphatic layers. Poor apparent porosity.	
230 –247	**Clay**, olive gray (5Y 4/1) to dark greenish gray (5GY 4/1), stiff to gummy texture, minor hard, phosphatic grains, poor apparent porosity.	
247 – 269	**Clay,** dark greenish gray, (5GY 4/1), stiff, chunky, moderately firm, poor apparent porosity.	Added DP#8 (31.80 ft)
269 - 277	**Limestone,** light gray (N7), to light olive gray (5Y 6/1), wackestone to mudstone, microcrystalline to very fine grained, moderately hard to hard, common mollusk shell fragments, minor molds and casts, good moldic porosity.	
277- 282	**Sandstone,** greenish gray, (5GY 6/1), fine to medium grained, moderately to well cemented, well sorted, minor black sand size to pebbly phosphatic grains, good intergranular porosity.	Added DP#9 (31.00 ft)
282 – 295	**Clay,** white (N9), to very light gray (N8), soft, gummy texture, minor phosphate grains, as above, common hard mudstone layers, abundant brownish black sharks teeth and shell fragments.	

Depth Interval	Sample Description	Drilling Comments
295 – 310	**Limestone,** light gray (N7) to light olive gray (5Y 6/1), wackestone to calcarenitic, moderately hard, abundant shells and shell fragments, molds and casts, mollusks, foraminifera, bryozoans, echinoids, good apparent porosity and permeability.	Top of Suwannee Limestone
310 – 330	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), packstone to grainstone, calcarenitic, moderately hard to hard, abundant shells and shell fragments, molds and casts, mollusks, foraminifera, bryozoans, echinoids, good apparent porosity, good apparent permeability.	Added DP#10 (30.50 ft)
330 –340	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), packstone to grainstone, calcarenitic, moderately soft to hard, abundant shells and shell fragments, molds and casts, mollusks, foraminifera, bryozoans, echinoids, good apparent moldic porosity, good apparent permeability.	End of pilot-hole drilling.
340 - 350	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), packstone to grainstone, calcarenitic, moderately soft to hard, abundant shells and shell fragments, molds and casts, mollusks, foraminifera, bryozoans, echinoid, good apparent moldic porosity, good apparent permeability.	AddedDP#11 (31.00 ft) Started drilling with 13-inch diameter stage bit. Lead bit is 12 ¼-inch diameter
350 - 360	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1),wackestone to grainstone, calcarenitic, moderately soft to hard, abundant shells and shell fragments, molds and casts, mollusks, foraminfera, bryozoans, good apparent moldic porosity, good apparent permeability.	
360 - 370	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), minor calcarenite, moderately soft to hard, abundant shells and shell fragments, molds and casts, mollusks, foraminfera, good apparent moldic porosity, good apparent permeability.	
370 - 380	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), grain stone, moderately soft to moderately hard, minor loosely consolidated, increase in shell fragments and molds and casts.	Added DP#12 (30.80 ft)

Depth Interval	Sample Description	Drilling Comments
380 - 400	**Limestone,** yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), wackestone to grainstone, loosely consolidated to moderately hard, abundant shell fragments, molds, and casts, calcareous texture, mollusks, good apparent porosity.	
400 - 410	**Limestone,** light olive gray (5Y 6/1), wackestone to grain stone, loosely consolidated to moderately hard, abundant shell fragments, molds, and casts, calcareous texture, mollusks, good apparent porosity	Added DP#13 (31.00 ft)
410 - 420	**Limestone,** light olive gray (5Y 6/1), grainstone, loosely consolidated to moderately hard, decreased shell fragments, molds, and casts, calcareous texture, mollusks, good apparent porosity	
420 - 430	**Limestone,** light olive gray (5Y 6/1), grainstone, loosely consolidated to moderately hard, decreased shell fragments, molds, and casts, calcareous texture, mollusks, good apparent porosity, good apparent permeability.	
430 - 450	**Limestone,** yellowish gray (5Y 6/1), grainstone, loosely consolidated to moderately hard, decreased shell fragments, molds, and casts, calcareous texture, mollusks, good apparent porosity, fair to good apparent permeability.	Added DP#14 (31.80 ft)
450 - 465	**Limestone,** yellowish gray (5Y 6/1), grainstone, loosely consolidated to soft, calcarenitic texture, abundant foraminfera, mollusks, echinoderm spines, good apparent porosity, fair to good apparent permeability.	
465 - 495	**Limestone,** yellowish gray (5Y 6/1), grainstone, loosely consolidated to soft, calcarenitic texture, crumbly, abundant shell fragments, molds, and casts, mollusks, good apparent porosity, fair to good apparent permeability.	Added DP#15 (31.80 ft)
495 - 525	**Limestone,** yellowish gray (5Y 6/1), grainstone, loosely consolidated to soft, calcarenitic texture, crumbly, abundant shell fragments, molds, and casts, mollusks, good apparent porosity, fair to good apparent permeability.	Added DP#16 (30.40 ft)

Depth Interval	Sample Description	Drilling Comments
525 - 555	**Limestone,** yellowish gray (5Y 6/1), wackestone to grainstone, loosely consolidated to moderately hard, calcarenitic texture, crumbly, decreased shell fragments, molds, and casts, mollusks, good apparent porosity, fair to good apparent permeability.	Added DP#17 (31.10 ft)
555 - 560	**Limestone,** yellowish gray (5Y 6/1), wackestone to grainstone, very hard stringers of very hard boundstone (calcite cement), loosely consolidated to moderately hard, calcarenitic texture, crumbly, abundant foraminfera, increased shell fragments, molds, and casts, good apparent porosity.	
560 - 580	**Limestone,** yellowish gray (5Y 6/1), wackestone to grain stone, good moldic porosity, loosely consolidated to moderately hard, calcarenitic texture, crumbly, decreased shell fragments, molds, and casts, good apparent porosity	Added DP#18 (30.30 ft)
580 - 590	**Limestone,** yellowish gray (5Y 6/1), wackestone to grainstone, loosely consolidated to moderately hard, moldic texture, crumbly, increased shell fragments, abundant molds, and casts, good apparent porosity, fair to good apparent permeability.	
590 - 610	**Limestone,** yellowish gray (5Y 6/1), wackestone to mudstone, loosely consolidated to moderately hard, moldic texture, crumbly, traces of shell fragments, minor molds, and casts, good apparent porosity, fair to good apparent permeability.	Added DP#19 (31.20 ft)
610 - 616	**Limestone,** light brownish gray (5Y 6/1), mudstone, moderately hard, moldic texture, traces of shell fragments, poor apparent porosity, fair to poor apparent permeability.	
616 - 617	**Marl,** light olive gray (5Y 6/1) to yellowish gray (5Y 6/1), soft, gummy texture, interbedded mudstone layers as above.	
617 - 621	**Limestone,** yellowish gray (5Y 6/1), dark yellowish orange (10YR 5/4), grainstone, loosely consolidated, crumbly, sucrosic texture, abundance of echinoids and echinoid spines, foraminfera, good to excellent porosity, good to excellent apparent permeability.	Top of Ocala Formation

Depth Interval	Sample Description	Drilling Comments
621 - 641	**Limestone,** yellowish gray (5Y 6/1), dark yellowish orange (10YR 5/4), grainstone, moderately soft, loosely consolidated, crumbly, good apparent moldic porosity, good apparent permeability.	Added DP#20 (30.50 ft)
641 - 651	**Limestone,** very pale orange (10YR 8/2), grainstone, moderately soft to moderately hard, calcarenitic texture, crumbly, good apparent moldic porosity, good apparent permeability.	
671 - 682	**Limestone,** very pale orange (10YR 8/2), mudstone to grainstone, moderately hard, earthy texture, fair apparent moldic porosity, fair apparent permeability. Very hard layer at 671 feet below land surface. Crystallized echinoids in cuttings.	
682 - 690	**Limestone,** moderate yellowish brown (10YR 5/4), grainstone, moderately soft, loosely consolidated, common shell fragments, minor molds and casts, good apparent porosity, fair apparent permeability.	Added DP#22 (30.30 ft)
690 - 693	**Dolostone,** brownish gray, (5YR 4/1), hard to very hard, crystalline texture, poor to fair apparent porosity.	
693 - 703	**Dolostone,** as above except, interbedded layers of light gray (5Y 6/1), moderately soft, mudstone, abundant shell fragments and foraminifera.	
703 - 710	**Limestone,** yellowish gray (5Y 6/1) to light olive gray (5Y 8/1), calcarenite, loosely consolidated, sucrosic texture, crumbly, common echinoids, minor shell fragments, molds and casts, good apparent porosity.	
710 - 722	**Limestone,** yellowish gray (5Y 6/1) to light olive gray (5Y 8/1), calcarenite, moderately hard to loosely consolidated, sucrosic texture, crumbly, common echinoids, minor shell fragments, molds and casts, good apparent porosity, good apparent permeability.	Added DP#23 (30.60 ft)
722 - 743	**Limestone,** yellowish gray (5Y 6/1) to grayish orange (10YR 8/2), calcarenite, loosely consolidated, sucrosic texture, crumbly, common echinoids, minor shell fragments, molds and casts, good apparent porosity, good apparent permeability.	

Depth Interval	Sample Description	Drilling Comments
743 - 759	**Limestone,** yellowish gray (5Y 6/1) to very pale orange (10YR 8/2), calcarenite, mudstone, moderately soft to hard, loosely consolidated, common echinoids, minor shell fragments, molds and casts, good apparent porosity, good apparent permeability.	Added DP#25 (31.60 ft)
759 - 760	**Clay,** light gray (5Y 6/1), soft, gummy texture, poor apparent porosity, poor apparent permeability.	
760 - 765	**Limestone,** very pale orange (10YR-8/2), grainstone to wackestone, moderately hard to hard, loosely consolidated, common shell fragments, fair to good apparent porosity.	
765 - 775	**Limestone,** very pale orange (10YR-8/2), grainstone, to wackestone, moderately hard to hard, loosely consolidated, common shell fragments, interbedded layer of very pale yellowish brown (10YR 8/2), very hard, crystalline dolostone, abundant shell fragments, foraminifera, echinoids.	
775 - 781	**Dolostone,** very pale yellowish brown (10YR 8/2), very hard, crystalline texture, poor to fair intergranular porosity, interbedded limestone (as above).	
781 - 784	**Limestone,** very pale orange (10YR-8/2), grainstone, to wackestone, moderately hard to hard, loosely consolidated, common shell fragments, interbedded layer of very pale yellowish brown (10YR 8/2), very hard, crystalline dolostone, abundant shell fragments, foraminifera, echinoids.	
784 - 794	**Dolostone,** pale yellowish brown (10YR 8/2), very hard (slow drilling), crystalline texture, poor to fair intergranular porosity, poor apparent permeability.	
794-806	**Dolostone,** pale yellowish brown, (10 YR 4/2), very hard, (slow drilling rate), crystalline texture, massive, fair to poor apparent porosity, minor limestone layers.	
806-816	**Dolostone,** dark yellowish brown (10YR 4/2), very hard, crystalline texture, dense, no fossils, poor to fair inter-crystalline porosity.	Added DP#26 (31.60 ft)

Depth Interval	Sample Description	Drilling Comments
816-831	**Limestone,** yellowish gray (5Y 6/1), to light olive gray (5 GY 6/1), wackestone to grainstone, abundant shell fragments, molds and casts, traces of light gray (N6), soft, light gray, gummy clay layers at base, fair to good inter-particle and moldic porosity, good apparent permeability.	
831-837	**Dolostone,** greenish black (5 GY 2/1) to black (N1), very hard to hard, minor layered organic black marl, crystalline texture, dense, fair apparent inter-crystalline porosity,	Top of Avon Park Formation
837-842	**Dolostone,** as above except, increase of black clayey layers, interbedded with very hard crystalline dolostone.	Added DP#27 (30.60 ft)
842-852	**Limestone,** pale brown, (5 YR 5/2), hard, crystalline texture, dolomitic, poor inter-crystalline porosity, poor apparent permeability	
852-856	**Dolostone,** greenish black (5GY 2/1) to black (N1), very hard to hard, layered, crystalline texture, dense to fractured, fair to good apparent inter-crystalline porosity,	
856-868	**Interbedded Dolostone and Limestone,** Limestone: pale brown, (5 YR 5/2), wackestone to grainstone, abundant shell fragments, loosely consolidated to moderately hard, good inter-granular porosity, good to fair apparent permeability. Dolostone: light brownish gray (5GY 2/1) to black (N1), very hard to hard, dense to layered, crystalline texture, fair to good apparent inter-crystalline porosity,	
868-870	**Limestone,** yellowish gray (5Y 6/1) to light olive gray (5 GY 6/1), wackestone to grainstone, abundant shell fragments, molds and casts, good inter-particle and moldic porosity, good apparent permeability.	Added DP#28 (31.20 ft)
870-885	**Dolostone,** greenish black (5GY 2/1) to black (N1), very hard to hard, layered, crystalline texture, dense, fair apparent inter-crystalline porosity, good vuggy porosity, fair apparent permeability.	

Depth Interval	Sample Description	Drilling Comments
885-888	**Limestone,** yellowish gray (5Y 6/1) to pale yellowish gray (10YR 8/2), wackestone to grainstone, abundant shell fragments, molds and casts, good inter-particle and moldic porosity, good apparent permeability, minor layers of very hard dolostone, as above.	
888-892	**Interbedded Dolostone and Limestone,** Limestone: pale brown, (5YR 5/2), wackestone to grainstone, abundant shell fragments, loosely consolidated to moderately hard, good inter-grainular porosity, good to fair apparent permeability. Dolostone: light brownish gray (5GY 2/1) to black (N1), very hard to hard, dense to layered, crystalline texture, fair to good apparent inter-crystalline porosity, traces of vuggy porosity.	
892-899	**Dolostone,** light brownish gray (5GY 2/1) to black (N1), very hard to hard, dense to layered, crystalline texture, fair to good apparent inter-crystalline porosity, traces of vuggy porosity, minor grainstone layers, as above.	End of borehole advancement using 13-inch diameter stage bit.

SCHREUDER, INC.

Appendix E

Field Water Quality Data – TW-1

SCHREUDER, INC.

Schreuder Inc.
Water Quality Data

Project: FPF-301 Location: Hines Energy Complex
Well ID: TW–1 Sampled By: Jack Breland

Date/Time Collected	Sample ID	Depth Interval (ft bls)	pH (su)	Temperature (C^0)	Conductivity (µS)	Chloride (mg/l)
12/03/03 0820	H-143	342	8.13	24.4	402.7	30
12/03/03 0820	H-149	373	8.16	24.1	350.6	38
12/03/03 0820	H-141	404	8.33	23.6	345.1	40
12/03/03 0820	H-133	435	8.32	22.9	354.4	44
12/03/03 0820	H-130	467	8.21	22.4	359.0	40
12/04/03 0820	H-106	498	7.94	21.1	357.6	38
12/04/03 0935	H-121	529	8.12	23.3	356.9	44
12/04/03 1050	H-125	560	8.11	23.8	356.7	42
12/04/03 1100	H-123	590	8.19	24.3	356.0	40
12/04/03 1415	H-113	621	8.06	24.7	357.8	42
12/04/03 1520	H-124	652	8.23	24.8	353.4	32
12/04/03 1630	H-111	682	8.14	24.5	353.2	26
12/05/03 0930	H-107	712	8.01	24.1	336.9	20
12/05/03 1000	H-103	743	8.02	24.6	320.4	24
12/08/03 0900	H-120	760	8.13	18.6	341.9	36
12/08/03 0930	H-101	774	8.14	23.0	329.5	32
12/08/03 1140	-	794	8.13	23.9	351.5	28
12/08/03 1230	H-104	806	7.98	24.2	336.1	32
12/08/03 1700	H-131	837	7.99	24.4	404.1	38
12/08/03 1800	-	842	8.10	17.0	450.2	36
12/09/03 0830	-	852	8.01	23.7	463.1	38
12/09/03 0930	-	857	7.98	23.1	470.0	32
12/09/03 1100	H-142	868	7.90	24.4	521.0	38
12/09/03 1200	H-500	873	8.04	24.5	554.0	38
12/09/03 1330	H-501	878	8.11	24.4	504.0	36
12/09/03 1530	H-502	883	8.04	23.6	518.0	32
12/09/03 1620	H-503	888	8.10	24.5	526.0	38
12/09/03 1700	H-504	893	8.09	23.3	478.0	36

Date/Time Collected	Sample ID	Depth Interval (ft bls)	pH (su)	Temperature (C^0)	Conductivity (µS)	Chloride (mg/l)
12/09/03 1800	H-505	899	7.86	24.5	422.0	32
12/18/03 1045		805	7.85	17.3	631	
12/18/03 1230		834	8.01	24.4	647	
12/18/03 1545		864	8.03	23.5	713	
12/18/03 1640		900	7.98	24.3	596	

Appendix F

Background Water Quality Data

Severn Trent Laboratories, Inc.

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Report

For: Mr. Cliff Harrison
Schreuder, Inc.
110 W. Country Club Dr.
Tampa, FL 33612
CC:

Order Number: B420134
SDG Number:
Client Project ID:
Project:
Report Date: 02/04/2004
Sampled By: Client
Sample Received Date: 01/13/2004
Requisition Number:
Purchase Order:

Tina Fritz, Project Manager
tfritz@stl-inc.com

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Sample Summary

Order: B420134 Client: Schreuder, Inc.
Date Received: 01/13/2004 Project:

Client Sample ID	Lab Sample ID	Matrix	Date Sampled
TW-1	B420134*1	Liquid	01/13/2009 11:00

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
Chlorinated Pesticides (508)		
Aroclor-1016	ug/l	0.50U
Aroclor-1221	ug/l	0.50U
Aroclor-1232	ug/l	0.50U
Aroclor-1242	ug/l	0.50U
Aroclor-1248	ug/l	0.50U
Aroclor-1254	ug/l	0.50U
Aroclor-1260	ug/l	0.50U
Toxaphene	ug/l	2.5U
Chlordane (technical)	ug/l	0.25U
Prep Date		01/20/04
Analysis Date		01/21/04
Chlorinated Herbicides (515.1)		
2,4-D	ug/l	0.50U
Dalapon	ug/l	10U
Dinoseb	ug/l	3.0U
Pentachlorophenol	ug/l	1.0U
Picloram	ug/l	0.50U
2,4,5-TP (Silvex)	ug/l	0.50U
Prep Date		01/19/04
Analysis Date		01/20/04
SEMIVOLATILE ORGANICS (525.2)		
Alachlor	ug/l	0.076U
Atrazine	ug/l	0.087U
Benzo(a)pyrene	ug/l	0.038U
bis(2-Ethylhexyl)adipate	ug/l	0.094U
bis(2-Ethylhexyl)phthalate	ug/l	0.56U

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
SEMIVOLATILE ORGANICS (525.2)		
Endrin	ug/l	0.14U
Heptachlor	ug/l	0.087U
Heptachlor epoxide	ug/l	0.064U
Hexachlorobenzene	ug/l	0.058U
Hexachlorocyclopentadiene	ug/l	0.50U
gamma-BHC (Lindane)	ug/l	0.057U
Methoxychlor	ug/l	0.069U
Simazine	ug/l	0.11U
Prep Date		01/21/04
Analysis Date		01/24/04
Total Cyanide (335.4)		
Total Cyanide	mg/l	0.010U
Prep Date		01/16/04
Analysis Date		01/19/01
Diquat (549.2)		
Diquat	ug/l	1.6U
Prep Date		01/23/04
Analysis Date		01/23/04
Chloride (325.3)		
Chloride	mg/l	10
Analysis Date		01/22/04

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
Total Dissolved Solids (SM2540C)		
Total Dissolved Solids	mg/l	470
Analysis Date		01/17/04
Nitrate-N (353.2)		
Nitrate-N	mg/l	0.010U
Analysis Date		01/14/04
Nitrite-N (353.2)		
Nitrite-N	mg/l	0.032I
Analysis Date		01/14/04
Color, Apparent (SM2120A)		
Color, Apparent	PCU	5U
Analysis Date		01/13/04
Sulfate as SO4 (375.4)		
Sulfate as SO4	mg/l	230
Analysis Date		01/19/04
Fluoride (340.2)		
Fluoride	mg/l	0.45
Analysis Date		01/20/04

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
Odor (140.1)		
Odor	TON	1U
Analysis Date		01/13/04
Dissolved Oxygen (SM4500C)		
Dissolved Oxygen	mg/l	6.4
Analysis Date		01/13/04
pH (150.1)		
pH	units	7.3
Analysis Date		01/13/04
Surfactants (MBAS) (SM5540C)		
Surfactants (MBAS)	mg/l	0.039U
Prep Date		01/15/04
Analysis Date		01/15/04
2,3,7,8-TCDD		
2,3,7,8-TCDD		*F71
Endothall (548.1)		
Endothall	ug/l	2.5U
Prep Date		01/19/04
Analysis Date		01/21/04

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
DW-531.1 (Primary) (531.1)		
Carbofuran	ug/l	1.0U
Oxamyl	ug/l	1.0U
Prep Date		01/27/04
Analysis Date		01/28/04
DW-524.2 (Primary) (524.2)		
Benzene	ug/l	0.090U
Carbon tetrachloride	ug/l	0.10U
Chlorobenzene	ug/l	0.10U
1,2-Dichlorobenzene	ug/l	0.23U
1,4-Dichlorobenzene	ug/l	0.21U
1,2-Dichloroethane	ug/l	0.11U
1,1-Dichloroethene	ug/l	0.12U
cis-1,2-Dichloroethene	ug/l	0.080U
trans-1,2-Dichloroethene	ug/l	0.090U
1,2-Dichloropropane	ug/l	0.090U
Ethylbenzene	ug/l	0.10U
Methylene chloride (Dichloromethane)	ug/l	0.34U
Styrene	ug/l	0.13U
Tetrachloroethene	ug/l	0.080U
Toluene	ug/l	0.13U
1,2,4-Trichlorobenzene	ug/l	0.26U
1,1,1-Trichloroethane	ug/l	0.080U
1,1,2-Trichloroethane	ug/l	0.17U
Trichloroethene	ug/l	0.090U
Vinyl chloride	ug/l	0.070U
Xylenes, Total	ug/l	0.16U
Analysis Date		01/21/04

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
VOC Trihalomethanes (524.2)		
Trihalomethanes (Total)(**)	ug/l	2.0U
Analysis Date		01/21/04
Primary Organics - Fumigants (504)		
1,2-Dibromoethane (EDB)	ug/l	0.014U
1,2-Dibromo-3-chloropropane	ug/l	0.011U
Prep Date		01/21/04
Analysis Date		01/21/04
Glyphosate (547)		
Glyphosate	ug/l	10U
Prep Date		01/16/04
Analysis Date		01/17/04
ICP Metals (200.7)		
Aluminum	mg/l	0.042I
Arsenic	mg/l	0.0033I
Barium	mg/l	0.020
Beryllium	mg/l	0.00054U
Cadmium	mg/l	0.00071U
Chromium	mg/l	0.0017U
Copper	mg/l	0.013I
Iron	mg/l	0.23
Lead	mg/l	0.0015U
Manganese	mg/l	0.0063I
Nickel	mg/l	0.0047U
Silver	mg/l	0.0019U

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
ICP Metals (200.7)		
Sodium	mg/l	11
Thallium	mg/l	0.0049U
Zinc	mg/l	0.020
Prep Date		01/13/04
Analysis Date		01/19/04
Mercury (245.1)		
Mercury	mg/l	0.000072U
Prep Date		01/19/04
Analysis Date		01/19/04
Iron (6010)		
Iron	mg/l	0.23
Prep Date		01/13/04
Analysis Date		01/19/04
Antimony (200.9)		
Antimony	mg/l	0.0050U
Prep Date		01/28/04
Analysis Date		02/03/04
Selenium (200.9 Rev 2.2)		
Selenium	mg/l	<0.050*F65
Prep Date		01/28/04
Analysis Date		01/29/04

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-1	TW-1	Liquid	01/13/04	01/13/09 11:00	

Parameter	Units	Lab Sample IDs 20134-1
Gross Alpha (900.0)		
Gross Alpha	pCi/l	*F71
Thallium (200.9)		
Thallium	mg/l	<0.0020
Prep Date		01/28/04
Analysis Date		01/28/04
Lead (200.9)		
Lead	mg/l	0.0062
Prep Date		01/28/04
Analysis Date		02/03/04
Total Coliform - Present/Absent (SM9223B)		
Total Coliform - Present/Absent	CFU/100ml	A
Analysis Date		01/13/04
Fecal Coliform - Present/Absent (SM9223B)		
Fecal Coliform - Present/Absent	CFU/100ml	A
Analysis Date		01/13/04

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description			Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)			Liquid	01/13/04		
			Lab Sample IDs				
Parameter		Units	20134-2				
Chlorinated Pesticides (508)							
Aroclor-1016		ug/l	0.50				
Aroclor-1221		ug/l	0.50				
Aroclor-1232		ug/l	0.50				
Aroclor-1242		ug/l	0.50				
Aroclor-1248		ug/l	0.50				
Aroclor-1254		ug/l	0.50				
Aroclor-1260		ug/l	0.50				
Toxaphene		ug/l	2.5				
Chlordane (technical)		ug/l	0.25				
Chlorinated Herbicides (515.1)							
2,4-D		ug/l	0.50				
Dalapon		ug/l	10				
Dinoseb		ug/l	3.0				
Pentachlorophenol		ug/l	1.0				
Picloram		ug/l	0.50				
2,4,5-TP (Silvex)		ug/l	0.50				
SEMIVOLATILE ORGANICS (525.2)							
Alachlor		ug/l	0.20				
Atrazine		ug/l	0.20				
Benzo(a)pyrene		ug/l	0.20				
bis(2-Ethylhexyl)adipate		ug/l	0.50				
bis(2-Ethylhexyl)phthalate		ug/l	2.0				
Endrin		ug/l	0.50				
Heptachlor		ug/l	0.20				
Heptachlor epoxide		ug/l	0.20				
Hexachlorobenzene		ug/l	0.20				

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-2
SEMIVOLATILE ORGANICS (525.2)		
Hexachlorocyclopentadiene	ug/l	2.0
gamma-BHC (Lindane)	ug/l	0.20
Methoxychlor	ug/l	0.50
Simazine	ug/l	0.50
Total Cyanide (335.4)		
Total Cyanide	mg/l	0.010
Diquat (549.2)		
Diquat	ug/l	5.0
Chloride (325.3)		
Chloride	mg/l	1.0
Total Dissolved Solids (SM2540C)		
Total Dissolved Solids	mg/l	5.0
Nitrate-N (353.2)		
Nitrate-N	mg/l	0.050

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Analytical Data Report

Lab Sample ID	Description			Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)			Liquid	01/13/04		
			Lab Sample IDs				
Parameter		Units	20134-2				
Nitrite-N (353.2)							
Nitrite-N		mg/l	0.050				
Color, Apparent (SM2120A)							
Color, Apparent		PCU	5				
Sulfate as SO4 (375.4)							
Sulfate as SO4		mg/l	5.0				
Fluoride (340.2)							
Fluoride		mg/l	0.20				
Odor (140.1)							
Odor		TON	1				
Dissolved Oxygen (SM4500C)							
Dissolved Oxygen		mg/l	0.10				
Surfactants (MBAS) (SM5540C)							
Surfactants (MBAS)		mg/l	0.10				

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-2
Endothall (548.1)		
Endothall	ug/l	10
DW-531.1 (Primary) (531.1)		
Carbofuran	ug/l	2.5
Oxamyl	ug/l	2.5
DW-524.2 (Primary) (524.2)		
Benzene	ug/l	0.090
Carbon tetrachloride	ug/l	0.10
Chlorobenzene	ug/l	0.10
1,2-Dichlorobenzene	ug/l	0.23
1,4-Dichlorobenzene	ug/l	0.21
1,2-Dichloroethane	ug/l	0.11
1,1-Dichloroethene	ug/l	0.12
cis-1,2-Dichloroethene	ug/l	0.08
trans-1,2-Dichloroethene	ug/l	0.09
1,2-Dichloropropane	ug/l	0.90
Ethylbenzene	ug/l	0.10
Methylene chloride (Dichloromethane)	ug/l	0.34
Styrene	ug/l	0.13
Tetrachloroethene	ug/l	0.08
Toluene	ug/l	0.13
1,2,4-Trichlorobenzene	ug/l	0.26
1,1,1-Trichloroethane	ug/l	0.080
1,1,2-Trichloroethane	ug/l	0.17
Trichloroethene	ug/l	0.090
Vinyl chloride	ug/l	0.070

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-2
DW-524.2 (Primary) (524.2)		
Xylenes, Total	ug/l	0.16
VOC Trihalomethanes (524.2)		
Trihalomethanes (Total)(**)	ug/l	2.0
Primary Organics - Fumigants (504)		
1,2-Dibromoethane (EDB)	ug/l	0.014
1,2-Dibromo-3-chloropropane	ug/l	0.011
Glyphosate (547)		
Glyphosate	ug/l	25
ICP Metals (200.7)		
Aluminum	mg/l	0.033
Arsenic	mg/l	0.0032
Barium	mg/l	0.0012
Beryllium	mg/l	0.00054
Cadmium	mg/l	0.00071
Chromium	mg/l	0.0017
Copper	mg/l	0.00090
Iron	mg/l	0.023
Lead	mg/l	0.0015
Manganese	mg/l	0.0014
Nickel	mg/l	0.0047
Silver	mg/l	0.0019
Sodium	mg/l	0.31

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-2	Reporting Limit (RL)	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-2
ICP Metals (200.7)		
Thallium	mg/l	0.0049
Zinc	mg/l	0.0059
Mercury (245.1)		
Mercury	mg/l	0.00020
Iron (6010)		
Iron	mg/l	0.050
Antimony (200.9)		
Antimony	mg/l	0.0050
Selenium (200.9 Rev 2.2)		
Selenium	mg/l	0.010
Thallium (200.9)		
Thallium	mg/l	0.0020
Lead (200.9)		
Lead	mg/l	0.0020

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Chlorinated Pesticides (508)						
Aroclor-1016	ug/l	<0.50	92 %	70-130 %	11 %	<30 %
Aroclor-1221	ug/l	<0.50				
Aroclor-1232	ug/l	<0.50				
Aroclor-1242	ug/l	<0.50				
Aroclor-1248	ug/l	<0.50				
Aroclor-1254	ug/l	<0.50				
Aroclor-1260	ug/l	<0.50	90 %	70-130 %	5.7 %	<30 %
Toxaphene	ug/l	<2.5				
Chlordane (technical)	ug/l	<0.25				
Prep Date		01/20/04	01/20/04		01/20/04	
Analysis Date		01/21/04	01/21/04		01/21/04	
Chlorinated Herbicides (515.1)						
2,4-D	ug/l	<0.50	90 %	70-130 %	15 %	<30 %
Dalapon	ug/l	<10	105 %	70-130 %	17 %	<30 %
Dinoseb	ug/l	<3.0	60 %	30-130 %	28 %	<30 %
Pentachlorophenol	ug/l	<1.0	85 %	70-130 %	16 %	<30 %
Picloram	ug/l	<0.50	75 %	70-130 %	24 %	<30 %
2,4,5-TP (Silvex)	ug/l	<0.50	75 %	70-130 %	18 %	<30 %
Prep Date		01/19/04	01/19/04		01/19/04	
Analysis Date		01/20/04	01/20/04		01/20/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
SEMIVOLATILE ORGANICS (525.2)						
Alachlor	ug/l	0.076U	111 %	70-130 %	9.0 %	<30 %
Atrazine	ug/l	0.087U	95 %	70-130 %	15 %	<30 %
Benzo(a)pyrene	ug/l	0.038U	110 %	70-130 %	11 %	<30 %
bis(2-Ethylhexyl)adipate	ug/l	0.094U	110 %	70-130 %	11 %	<30 %
bis(2-Ethylhexyl)phthalate	ug/l	0.56U	114 %	70-130 %	10 %	<30 %
Endrin	ug/l	0.14U	113 %	70-130 %	5.3 %	<30 %
Heptachlor	ug/l	0.087U	110 %	70-130 %	7.3 %	<30 %
Heptachlor epoxide	ug/l	0.064U	101 %	70-130 %	9.9 %	<30 %
Hexachlorobenzene	ug/l	0.058U	98 %	70-130 %	12 %	<30 %
Hexachlorocyclopentadiene	ug/l	0.50U	107 %	70-130 %	9.3 %	<30 %
gamma-BHC (Lindane)	ug/l	0.057U	100 %	70-130 %	4.0 %	<30 %
Methoxychlor	ug/l	0.069U	124 %	70-130 %	0 %	<30 %
Simazine	ug/l	0.11U	111 %	70-130 %	1.8 %	<30 %
Prep Date		01/21/04	01/21/04		01/21/04	
Analysis Date		01/24/04	01/24/04		01/24/04	
Total Cyanide (335.4)						
Total Cyanide	mg/l	<0.010	102 %	90-110 %	0.92 %	<20 %
Prep Date		01/16/04	01/16/04		01/16/04	
Analysis Date		01/19/04	01/19/04		01/19/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Diquat (549.2)						
Diquat	ug/l	1.6U	125 %	70-130 %	8.3 %	<30 %
Prep Date		01/23/04	01/19/04		01/19/04	
Analysis Date		01/23/04	01/26/04		01/23/04	
Chloride (325.3)						
Chloride	mg/l	1.0U	100 %	75-125 %	0.90 %	<30 %
Analysis Date		01/22/04	01/22/04		01/22/04	
Total Dissolved Solids (SM2540C)						
Total Dissolved Solids	mg/l	5.0U	99 %	80-120 %	0 %	<25 %
Analysis Date		01/17/04	01/17/04		01/17/04	
Nitrate-N (353.2)						
Nitrate-N	mg/l	0.010U	105 %	80-120 %	0.34 %	<30 %
Analysis Date		01/14/04	01/14/04		01/14/04	
Nitrite-N (353.2)						
Nitrite-N	mg/l	0.032I	105 %	80-120 %	0.51 %	<30 %
Analysis Date		01/14/04	01/14/04		01/14/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Sulfate as SO4 (375.4)						
Sulfate as SO4	mg/l	5.0U	101 %	75-125 %	2.0 %	<30 %
Analysis Date		01/19/04	01/19/04		01/19/04	
Fluoride (340.2)						
Fluoride	mg/l	0.044U	107 %	85-115 %	1.9 %	<30 %
Analysis Date		01/20/04	01/20/04		01/20/04	
Dissolved Oxygen (SM4500C)						
Dissolved Oxygen	mg/l	3.2			1.2	<30 %
Analysis Date		01/13/04				
Surfactants (MBAS) (SM5540C)						
Surfactants (MBAS)	mg/l	0.039U	101 %	78-114 %	6.9 %	<30 %
Prep Date		01/15/04	01/15/04		01/15/04	
Analysis Date		01/15/04	01/15/04		01/15/04	
Endothall (548.1)						
Endothall	ug/l	2.5U	90 %	80-120 %	4.4 %	<30 %
Prep Date		01/19/04	01/19/04		01/19/04	
Analysis Date		01/21/04	01/21/04		01/21/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
DW-531.1 (Primary) (531.1)						
Carbofuran	ug/l	1.0U	120 %	80-120 %	0 %	<20 %
Oxamyl	ug/l	1.0U	120 %	80-120 %	0 %	<20 %
Prep Date		01/27/04	01/28/04		01/28/04	
Analysis Date		01/28/04	01/28/04		01/28/04	
DW-524.2 (Primary) (524.2)						
Benzene	ug/l	0.090U	100 %	70-130 %	0 %	<30 %
Carbon tetrachloride	ug/l	0.10U				
Chlorobenzene	ug/l	0.10U	100 %	70-130 %	0 %	<30 %
1,2-Dichlorobenzene	ug/l	0.23U				
1,4-Dichlorobenzene	ug/l	0.21U				
1,2-Dichloroethane	ug/l	0.11U				
1,1-Dichloroethene	ug/l	0.12U	110 %	70-130 %	0 %	<30 %
cis-1,2-Dichloroethene	ug/l	0.080U				
trans-1,2-Dichloroethene	ug/l	0.090U				
1,2-Dichloropropane	ug/l	0.090U				
Ethylbenzene	ug/l	0.10U				
Methylene chloride (Dichloromethane)	ug/l	0.34U				
Styrene	ug/l	0.13U				
Tetrachloroethene	ug/l	0.080U				
Toluene	ug/l	0.13U	105 %	70-130 %	9.5 %	<30 %
1,2,4-Trichlorobenzene	ug/l	0.26U				
1,1,1-Trichloroethane	ug/l	0.080U				
1,1,2-Trichloroethane	ug/l	0.17U				

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
DW-524.2 (Primary) (524.2)						
Trichloroethene	ug/l	0.090U	110 %	70-130 %	0 %	<30 %
Vinyl chloride	ug/l	0.070U				
Xylenes, Total	ug/l	0.16U				
Analysis Date		01/21/04	01/21/04		01/21/04	
VOC Trihalomethanes (524.2)						
Trihalomethanes (Total)(**)	ug/l	2.0U				
Chloroform	%		99 %	70-130 %	2.0 %	<30 %
Bromodichloromethane	%		100 %	70-130 %	1.0 %	<30 %
Dibromochloromethane	%		99 %	70-130 %	2.0 %	<30 %
Bromoform	%		100 %	70-130 %	0 %	<30 %
Analysis Date		01/21/04	01/22/04		01/22/04	
Primary Organics - Fumigants (504)						
1,2-Dibromoethane (EDB)	ug/l	0.014U	125 %	70-130 %	0 %	<30 %
1,2-Dibromo-3-chloropropane	ug/l	0.011U	125 %	70-130 %	0 %	<30 %
Prep Date		01/21/04	01/21/04		01/21/04	
Analysis Date		01/21/04	01/21/04		01/21/04	

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Glyphosate (547)						
Glyphosate	ug/l	10U	100 %	70-130 %	0 %	<30 %
Prep Date		01/16/04	01/16/04		01/16/04	
Analysis Date		01/16/04	01/16/04		01/16/04	
ICP Metals (200.7)						
Aluminum	mg/l	0.033U	107 %	85-115 %	2.5 %	<20 %
Arsenic	mg/l	0.0032U	106 %	85-115 %	2.4 %	<20 %
Barium	mg/l	0.0012U	103 %	85-115 %	0.64 %	<20 %
Beryllium	mg/l	0.00054U	107 %	85-115 %	0.39 %	<20 %
Cadmium	mg/l	0.00071U	106 %	85-115 %	0.19 %	<20 %
Chromium	mg/l	0.0017U	95 %	85-115 %	0.50 %	<20 %
Copper	mg/l	0.00090U	114 %	85-115 %	0.66 %	<20 %
Iron	mg/l	0.023U	107 %	85-115 %	0.30 %	<20 %
Lead	mg/l	0.0015U	108 %	85-115 %	0.07 %	<20 %
Manganese	mg/l	0.0014U	104 %	85-115 %	0.08 %	<20 %
Nickel	mg/l	0.0047U	107 %	85-115 %	0.57 %	<20 %
Silver	mg/l	0.0019U	115 %	85-115 %	0.23 %	<20 %
Sodium	mg/l	0.31U	101 %	85-115 %	2.6 %	<20 %
Thallium	mg/l	0.0049U	110 %	85-115 %	0.11 %	<20 %
Zinc	mg/l	0.0059U	106 %	85-115 %	0.39 %	<20 %
Prep Date		01/13/04	01/13/04		01/13/04	
Analysis Date		01/19/04	01/19/04		01/19/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Mercury (245.1)						
Mercury	mg/l	0.000072U	107 %	85-115 %	3.8 %	<20 %
Prep Date		01/19/04	01/19/04		01/19/04	
Analysis Date		01/19/04	01/19/04		01/19/04	
Iron (6010)						
Iron	mg/l	0.023U	107 %	75-125 %	0.30 %	<20 %
Prep Date		01/13/04	01/13/04		01/13/04	
Analysis Date		01/19/04	01/19/04		01/19/04	
Antimony (200.9)						
Antimony	mg/l	<0.0050	101 %	90-110 %	2.0 %	<20 %
Prep Date		01/28/04	01/28/04		01/28/04	
Analysis Date		02/03/04	02/03/04		02/03/04	
Selenium (200.9 Rev 2.2)						
Selenium	mg/l	<0.010	98 %	90-110 %	0 %	<20 %
Prep Date		01/28/04	01/28/04		01/28/04	
Analysis Date		01/29/04	01/29/04		01/29/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
20134-3	Method Blank	Liquid	01/13/04		
20134-4	Accuracy (%Rec)	Liquid	01/13/04		
20134-5	LCS Accuracy Control Limit (%R)	Liquid	01/13/04		
20134-6	Precision (%RPD)	Liquid	01/13/04		
20134-7	LCS Precision Control Limit (Advisory) %RPD	Liquid	01/13/04		

Parameter	Units	Lab Sample IDs 20134-3	20134-4	20134-5	20134-6	20134-7
Thallium (200.9)						
Thallium	mg/l	<0.0020	100 %	90-110 %	0.40 %	<20 %
Prep Date		01/28/04	01/28/04		01/28/04	
Analysis Date		01/28/04	01/28/04		01/28/04	
Lead (200.9)						
Lead	mg/l	<0.0020	92 %	90-110 %	2.8 %	<20 %
Prep Date		01/28/04	01/28/04		01/28/04	
Analysis Date		02/03/04	02/03/04		02/03/04	

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Method: EPA 40 CFR PART 136,EPA 600/4-79-020,EPA 600/4-80-032, Standard Method, SW-846,FDEP
DOH Certification #'s: E84282,E87052

I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

U = Indicates that the compound was analyzed for but not detected.

STL Savannah, 5102 LaRoche Ave., Savannah, GA 31404
Phone #912/354-7858. DOH Certification #E87052

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL project manager who signed this test report.

The estimated uncertainty associated with these reported results is available upon request.

*F71 = Subcontracted results are attached to this report.

*F65 = Elevated detection limits were reported due to sample matrix interference which required sample or extract dilution.

Serial Number 042134

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL** 42 0134

(2)

✓ STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
ARRP	FSP-301	
SAMPLER'S SIGNATURE	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM: H. Clift Harrison	CLIENT PHONE: 632-8844	CLIENT FAX
CLIENT NAME	CLIENT E-MAIL	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: 524	Sulfur Thiosulfate 5154	Gross Alpha, 226, 228	Sr, Se	Sulfur Thiosulfate 547	Nitrite order	Dissolved Iron	Total Iron	NUMBER OF CONTAINERS SUBMITTED	REMARKS
1/13/09	11:00	TW-1		✓				3	3	3	1	2	1				Please add DO and Fe from other bottles

PAGE ___ OF ___

STANDARD REPORT DELIVERY ○

DATE DUE ___

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE ___

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
V. Rosenquist	1-8-09	1530	Nicholas Schein	1-13-09	1555			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				1-13-09	1555			

LABORATORY USE ONLY 40

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ✓ NO ○	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS
	1-13-09	1605		N/S	B420134	

STL 8240 660 (1-09)

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL** 42 0134

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
ARRP	FPF-301	
SAMPLER'S SIGNATURE	P.O. NUMBER	CONTRACT NO.
CLIENT (SITE) PM: H. Cliff Harrison	CLIENT PHONE: 932-8844	CLIENT FAX
CLIENT NAME: Schreuder, Inc	CLIENT E-MAIL: holly@schreuderwater.us	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE ____ OF ____

STANDARD REPORT DELIVERY ○

DATE DUE ____

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE ____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: 515,508 (None)	525 (Hydrochloric acid)	Cyanide (Sodium Hydroxide)	Dioxin (None)	504.1 - Hexachlorocyclohexane (Sulfuric acid)	As, Ba, Be, Cd, Cr, Pb, Mg, Ni, Na, Tl, Al, Ca, Fe, Mn, Ag, Zn (Nitric Acid)	Fe, Mn, Na, Cl, SO4, Color, pH, TDS (None)	1613 PAHs (None)	549.2 - Endothall (None)	531 (None - Chloroacetic)
								NUMBER OF CONTAINERS SUBMITTED									
1/13/04	11:00	TW-1		√				4	2	1	1	1	1	1	1	1	2

REMARKS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
C. Kasey Quinn	1-8-04	1530	Nicholas Schrier	1/13/03	15:55			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
				1-13-04	1555			

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES / NO	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS
	1-13-04	1605	NO	N/S	6420134	

STL 8240 660 (12-09)

LAB FORMAT FOR REPORTING DRINKING WATER ANALYSES

PUBLIC WATER SYSTEM INFORMATION (to be completed by system or lab)

System Name: ARRP PWS ID#: _____

Address: _____ Phone #: _____

Type (Check one): ☐ Community ☐ Nontransient Noncommunity ☐ Noncommunity

SAMPLE INFORMATION (to be completed by sampler)

Sample Date (MM/DD/YY): 01/13/04 Sample Time: 11:00

Sample Location (be specific): TW-1

Sampler Name and Phone: _____

Sampler's Signature: _____

Title: _____

Check Types:
☐ Distribution
☐ Clearance
☐ Distribution Entry Point
☐ Composite of Multiple Sites -- Attach a format for each site
☐ Recheck of MCL
☐ THM Max Res Time
☐ Raw
☐ Resample of Lab Invalidated Sample
☐ Plant Tap

LABORATORY CERTIFICATION INFORMATION (to be completed by lab) -- ATTACH DOH ANALYTE SHEET*

Lab Name: STL Tampa DOH #: E84282 Expiration Date: 6/30/2004

Address: 6712 Benjamin Rd. suite 100 Tampa FL 33634 Phone #: (813)885-7427

Subcontracted Lab DOH#: **E87052, E87829, E87570** – ATTACH DOH ANALYTE SHEET FOR SUBCONTRACTED LAB TOO*

ANALYSIS INFORMATION (to be completed by lab) -- SAMPLE NUMBER(S):

Date Sample(s) Received: 1/13/04

Group(s) Analyzed & Results attached for compliance with Chapter 62-550, F.A.C.:

☐ Nitrate Only ☐ Nitrite Only ☐ Asbestos Only ☒ Trihalomethanes

Inorganics	Volatile Organics	Secondaries	Pesticides/PCBs
☒ All 17 ☐ Partial	☒ All 21 ☐ Partial	☒ All 14 ☐ Partial	☒ All 30 ☐ Partial

Group I Unregulateds	Group II Unregulateds	Group III Unregulateds	Radiochemicals
☐ All 13 ☐ Partial	☐ All 23 ☐ Partial	☐ All 11 ☐ Partial	☒ Single Sample ☐ Qtrly Composite

*All DOH lab #s and their DOH Analyte Sheet for labs performing the attached water analyses must be provided. Failure to do so will result in rejection of the analyses and possible enforcement against the public water system for failure to sample.

**Provide radiochemical sample dates and locations for each quarter

CERTIFICATION

I, Tina Fritz do HEREBY CERTIFY that all attached analytical data are correct.

Signature: _____

Title: Project Manager

Date: _____

COMPLIANCE INFORMATION (to be completed by State)

Sample Collection Satisfactory: _____

Sample Analysis Satisfactory: _____

Resample Requested for: _____

Reason: _____

Person notified to resample: _____

Date Notified: _____

DEP/DOH Reviewing Official: _____

INORGANIC ANALYSIS
62-550.310(1)
(PWS030)

Parameter ID	Name	MCL (mg/L)	Sample Number	Analysis Result (mg/L)	Analysis Method	Analysis Date	MDL (mg/L)	Lab ID
1005	Arsenic	(0.05)	B420134*1	0.0033 I	200.7	1/19/04 15:14	0.0032	E84282
1010	Barium	(2)	B420134*1	0.02	200.7	1/19/04 15:14	0.0012	E84282
1015	Cadmium	(0.005)	B420134*1	0.00071 U	200.7	1/19/04 15:14	0.00071	E84282
1020	Chromium	(0.1)	B420134*1	0.0017 U	200.7	1/19/04 15:14	0.0017	E84282
1024	Cyanide	(0.2)	B420134*1	0.010 U	335.4	1/19/01	0.010	E87052
1025	Fluoride	(4)	B420134*1	0.45	340.2	1/20/04	0.044	E84282
1030	Lead	(0.015)	B420134*1	0.0015 U	200.7	1/19/04 15:14	0.0015	E87052
1035	Mercury	(0.002)	B420134*1	0.000072 U	245.1	1/19/04	0.000072	E84282
1036	Nickel	(0.1)	B420134*1	0.0047 U	200.7	1/19/04 15:14	0.0047	E84282
1040	Nitrate	(10)	B420134*1	0.010 U	353.2	1/14/04	0.010	E84282
1041	Nitrite	(1)	B420134*1	0.032 I	353.2	1/14/04	0.010	E84282
1045	Selenium	(0.05)	B420134*1	0.050 U	:00.9 Rev 2.	1/29/04	0.050	E87052
1052	Sodium	(160)	B420134*1	11	200.7	1/19/04 15:14	0.31	E84282
1074	Antimony	(0.006)	B420134*1	0.0050 U	200.9	2/3/04	0.0050	E87052
1075	Beryllium	(0.004)	B420134*1	0.00054 U	200.7	1/19/04 15:14	0.00054	E84282
1085	Thallium	(0.002)	B420134*1	0.0049 U	200.7	1/19/04 15:14	0.0049	E87052

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

SECONDARY CHEMICAL ANALYSIS
62-550.320
(PWS031)

Parameter ID	Name	MCL (mg/L)	Sample Number	Analysis Result (mg/L)	Analysis Method	Analysis Date	MDL (mg/L)	Lab ID
1002	Aluminum	(0.2)	B420134*1	0.042 I	200.7	1/19/04 15:14	0.033	E84282
1017	Chloride	(250)	B420134*1	10	325.3	1/22/04	1.0	E84282
1022	Copper	(1)	B420134*1	0.013 I	200.7	1/19/04 15:14	0.00090	E84282
1025	Fluoride	(2.0)	B420134*1	0.45	340.2	1/20/04	0.044	E84282
1028	Iron	(0.3)	B420134*1	0.23	200.7	1/19/04 15:14	0.023	E84282
1032	Manganese	(0.05)	B420134*1	0.0063 I	200.7	1/19/04 15:14	0.0014	E84282
1050	Silver	(0.1)	B420134*1	0.0019 U	200.7	1/19/04 15:14	0.0019	E84282
1055	Sulfate	(250)	B420134*1	230	375.4	1/19/04	5.0	E84282
1095	Zinc	(5)	B420134*1	0.02	200.7	1/19/04 15:14	0.0059	E84282
1905	Color	(15 cu)	B420134*1	5 U	SM2120A	1/13/04	5	E84282
1920	Odor	(3 ton)	B420134*1	1 U	140.1	1/13/04	1	E84282
1925	pH	(6.5 - 8.5)	B420134*1	7.3	150.1	1/13/04		E84282
1930	Total Dissolved Solids	(500)	B420134*1	470	SM2540C	1/17/04	5.0	E84282
2905	Foaming Agents	(0.5)	B420134*1	0.039 U	SM5540C	1/15/04	0.039	E84282

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

RADIOCHEMICAL ANALYSIS*
62-550.310(5)
(PWS033)

Parameter ID	Name	MCL (pCi/l)	Sample Number	Analysis Result (pCi/l)	Analysis Method	Analysis Date	MDL (pCi/l)	Lab ID
4000	Gross alpha	5	B420134*1	7.95 +/- 5.12	900.0	1/21/04	5.02	E87829
4020	Radium-226	3	B420134*1	2.52 +/- 0.70	903.1	1/29/03	0.22	E87829

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

VOLATILE ORGANIC ANALYSIS
62-550.310(2)(b)
(PWS028)

Parameter ID	Name	MCL (ug/L)	Sample Number	Analysis Result (ug/L)	Analysis Method	Analysis Date	MDL (ug/L)	Lab ID
2378	1,2,4-trichlorobenzene	(70)	B420134*1	0.26 U	524.2	1/21/04 18:15	0.26	E84282
2380	Cis-1,2-dichloroethylene	(70)	B420134*1	0.080 U	524.2	1/21/04 18:15	0.080	E84282
2955	Xylenes (total)	(10,000)	B420134*1	0.16 U	524.2	1/21/04 18:15	0.16	E84282
2964	Dichloromethane	(5)	B420134*1	0.34 U	524.2	1/21/04 18:15	0.34	E84282
2968	O-dichlorobenzene	(600)	B420134*1	0.23 U	524.2	1/21/04 18:15	0.23	E84282
2969	Para-dichlorobenzene	(75)	B420134*1	0.21 U	524.2	1/21/04 18:15	0.21	E84282
2976	Vinyl Chloride	(1)	B420134*1	0.070 U	524.2	1/21/04 18:15	0.070	E84282
2977	1,1-dichloroethylene	(7)	B420134*1	0.12 U	524.2	1/21/04 18:15	0.12	E84282
2979	Trans-1,2-dichloroethylene	(100)	B420134*1	0.090 U	524.2	1/21/04 18:15	0.090	E84282
2980	1,2-dichloroethane	(3)	B420134*1	0.11 U	524.2	1/21/04 18:15	0.11	E84282
2981	1,1,1-trichloroethane	(200)	B420134*1	0.080 U	524.2	1/21/04 18:15	0.080	E84282
2982	Carbon tetrachloride	(3)	B420134*1	0.10 U	524.2	1/21/04 18:15	0.10	E84282
2983	1,2-dichloropropane	(5)	B420134*1	0.090 U	524.2	1/21/04 18:15	0.090	E84282
2984	Trichloroethylene	(3)	B420134*1	0.090 U	524.2	1/21/04 18:15	0.09	E84282
2985	1,1,2-trichloroethane	(5)	B420134*1	0.17 U	524.2	1/21/04 18:15	0.17	E84282
2987	Tetrachloroethylene	(3)	B420134*1	0.080 U	524.2	1/21/04 18:15	0.080	E84282
2989	Monochlorobenzene	(100)	B420134*1	0.10 U	524.2	1/21/04 18:15	0.10	E84282
2990	Benzene	(1)	B420134*1	0.090 U	524.2	1/21/04 18:15	0.090	E84282
2991	Toluene	(1,000)	B420134*1	0.13 U	524.2	1/21/04 18:15	0.13	E84282
2992	Ethylbenzene	(700)	B420134*1	0.10 U	524.2	1/21/04 18:15	0.10	E84282
2996	Styrene	(100)	B420134*1	0.13 U	524.2	1/21/04 18:15	0.13	E84282

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

PESTICIDE/PCB CHEMICAL ANALYSIS
62-550.310(2)(c)
(PWS029)

Parameter ID	Name	MCL (ug/L)	Sample Number	Analysis Result (ug/L)	Analysis Method	Analysis Date	MDL (ug/L)	Lab ID
2063	2,3,7,8-TCDD (Dioxin)	(0.00003)	B420134*1	0.00003 U	1613B	1/20/04	0.00003	E87570
2005	Endrin	(2)	B420134*1	0.14 U	525.2	1/24/04 17:28	0.14	E87052
2010	Lindane	(0.2)	B420134*1	0.057 U	525.2	1/24/04 17:28	0.057	E87052
2015	Methoxychlor	(40)	B420134*1	0.069 U	525.2	1/24/04 17:28	0.069	E87052
2020	Toxaphene	(3)	B420134*1	2.5 U	508	1/21/04 17:11	2.5	E87052
2031	Dalapon	(200)	B420134*1	10 U	515.1	1/20/04 19:16	10	E87052
2032	Diquat	(20)	B420134*1	1.6 U	549.2	1/23/04 18:31	1.6	E87052
2033	Endothall	(100)	B420134*1	2.5 U	548.1	1/21/04 13:41	2.5	E87052
2034	Glyphosate	(700)	B420134*1	10 U	547	1/17/04 1:40	10	E87052
2035	Di(2-ethylhexyl)adipate	(400)	B420134*1	0.094 U	525.2	1/24/04 17:28	0.094	E87052
2036	Oxamyl (Vydate)	(200)	B420134*1	1.0 U	531.1	1/28/04 3:54	1.0	E87052
2037	Simazine	(4)	B420134*1	0.11 U	525.2	1/24/04 17:28	0.11	E87052
2039	Di(2-ethylhexyl)phthalate	(6)	B420134*1	0.56 U	525.2	1/24/04 17:28	0.56	E87052
2040	Picloram	(500)	B420134*1	0.50 U	515.1	1/20/04 19:16	0.5	E87052
2041	Dinoseb	(7)	B420134*1	3.0 U	515.1	1/20/04 19:16	3.0	E87052
2042	Hexachlorocyclopentadiene	(50)	B420134*1	0.50 U	525.2	1/24/04 17:28	0.50	E87052
2046	Carbofuran	(40)	B420134*1	1.0 U	531.1	1/28/04 3:54	1.0	E87052
2050	Atrazine	(3)	B420134*1	0.087 U	525.2	1/24/04 17:28	0.087	E87052
2051	Alachlor	(2)	B420134*1	0.076 U	525.2	1/24/04 17:28	0.076	E87052
2065	Heptachlor	(0.4)	B420134*1	0.087 U	525.2	1/24/04 17:28	0.087	E87052
2067	Heptachlor Epoxide	(0.2)	B420134*1	0.064 U	525.2	1/24/04 17:28	0.064	E87052
2105	2,4-D	(70)	B420134*1	0.50 U	515.1	1/20/04 19:16	0.50	E87052
2110	2,4,5-TP (Silvex)	(50)	B420134*1	0.50 U	515.1	1/20/04 19:16	0.50	E87052
2274	Hexachlorobenzene	(1)	B420134*1	0.058 U	525.2	1/24/04 17:28	0.058	E87052
2306	Benzo(a)pyrene	(0.2)	B420134*1	0.038 U	525.2	1/24/04 17:28	0.038	E87052
2326	Pentachlorophenol	(1)	B420134*1	1.0 U	515.1	1/20/04 19:16	1.0	E87052
2383	PCB	(0.5)	B420134*1	0.50 U	508	1/21/04 17:11	0.50	E87052
2931	Dibromochloropropane	(0.2)	B420134*1	0.011 U	504	1/21/04 16:12	0.011	E84282
2946	Ethylene Dibromide	(0.02)	B420134*1	0.014 U	504	1/21/04 16:12	0.014	E84282
2959	Chlordane	(2)	B420134*1	0.25 U	508	1/21/04 17:11	0.25	E87052

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

DISINFECTION BYPRODUCTS
62-550.310(3)
(PWS027)

Parameter ID	Name	MCL (ug/L)	Sample Number	Analysis Result (ug/L)	Analysis Method	Analysis Date	MDL (ug/L)	Lab ID
2950	Total Trihalomethanes	(80)	B420134*1	2.0 U	524.2	1/21/04	2.0	E84282

U: Indicates the compound was analyzed for but not detected.
I: The reported value is between the lab MDL and the lab PQL

CASE NARRATIVE

STL SACRAMENTO PROJECT NUMBER G4A150325

General comments

The sample was received at 1° C. The cooling agent used was wet ice.

There were no other anomalies associated with this project.

SEVERN TRENT STL

ACCREDITED IN ACCORDANCE WITH nelac

STL Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	Oregon	CA 200005
Arizona	AZ0615	Pennsylvania	68-1272
Arkansas	NA	South Carolina	87014001
California	01169CA	Utah	TQUAN1
Connecticut	PH-0691	Virginia	00178
Florida	E87570	Washington	C087
Georgia	960	West Virginia	9930C, 334
Hawaii	NA	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Nevada	CA044	USACE	NA
New Jersey*	CA005	USDA Foreign Plant	37-82605
New York	11666	USDA Foreign Soil	S-46613

*NELAP accredited. A more detailed parameter list is available upon request.

QC Parameter Definitions

QC Batch: The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

Method Blank: An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD): An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also used to evaluate the precision of the process.

Duplicate Sample (DU): Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

Surrogates: Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

Matrix Spike and Matrix Spike Duplicate (MS/MSD): An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

Isotope Dilution: For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

Control Limits: The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

SAMPLE SUMMARY

G4A150325

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
F73R6	001	TW-1	01/13/04	11:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

To STL W. Sacramento

Serial Number 08827

G-A-L-5325

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO. B420134	PROJECT LOCATION (STATE) FL	
SAMPLER'S SIGNATURE	P.O. NUMBER B420134	CONTRACT NO.	
CLIENT (SITE) PM Tina Fritz	CLIENT PHONE	CLIENT FAX	
CLIENT NAME STL-Tampa	CLIENT E-MAIL		
CLIENT ADDRESS			
COMPANY CONTRACTING THIS WORK (if applicable)			

PAGE ___ OF ___

STANDARD REPORT DELIVERY X

DATE DUE ___

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE ___

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	MATRIX: COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX: AQUEOUS (WATER)	MATRIX: SOLID OR SEMISOLID	MATRIX: AIR	MATRIX: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: Dioxin	NUMBER OF CONTAINERS SUBMITTED	REMARKS
1-13-04	1100	TW-1		X					1	

PLEASE ADVISE

STL Sacramento (916) 373-5600

RECEIVED IN GOOD CONDITION UNDER COC

JAN 15 2004

INI: AW

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS				1-13-04	1730			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS								

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS
4.0c	1/15/04	1150				

STL8240-660 (12/02)

STL TAMPA

Client Sample ID: TW-1

Trace Level Organic Compounds

Lot-Sample #...: G4A150325-001 Work Order #...: F73R61AA Matrix.....: WATER
Date Sampled...: 01/13/04 Date Received..: 01/15/04
Prep Date.....: 01/19/04 Analysis Date..: 01/20/04
Prep Batch #...: 4020360
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	30	pg/L	EPA-5 1613B-Tetra

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	98	(25 - 141)

QC DATA ASSOCIATION SUMMARY

G4A150325

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	EPA-5 1613B-Tetra		4020360	

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G4A150325 Work Order #...: F78TA1AD Matrix.....: WATER
MB Lot-Sample #: G4A200000-360

Prep Date.....: 01/19/04
Analysis Date..: 01/19/04 Prep Batch #...: 4020360
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	30	pg/L	EPA-5 1613B-Tetra

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	94	(25 - 141)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Trace Level Organic Compounds

Client Lot #...: G4A150325 Work Order #...: F78TA1AC Matrix.....: WATER
LCS Lot-Sample#: G4A200000-360
Prep Date.....: 01/19/04 Analysis Date..: 01/19/04
Prep Batch #...: 4020360
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
2,3,7,8-TCDD	80	(73 - 146)	EPA-5 1613B-Tetras

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	(25 - 141)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G4A150325 Work Order #...: F78TA1AC Matrix.....: WATER
LCS Lot-Sample#: G4A200000-360
Prep Date.....: 01/19/04 Analysis Date..: 01/19/04
Prep Batch #...: 4020360
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
2,3,7,8-TCDD	**200**	**159**	**pg/L**	**80**	**EPA-5 1613B-T**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	(25 - 141)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Analytical Data Package Prepared For

STL TAMPA

B420134

Radiochemical Analysis By

STL Richland

2800 G.W. Way, Richland Wa, 99352, (509)-375-3131.

Assigned Laboratory Code: STLR

Data Package Contains __11__ *Pages*

Report No.: 24707

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
24957		TW-1	J4A140288-1	F709R1AA	9F709R10	4015474

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99352

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

Certificate of Analysis

January 23, 2004

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Attention: Tina Fritz

Date Received in Lab	:	January 14, 2004
Sample Type	:	One (1) Water
SDG Number	:	24957
Project Name/Number	:	B420134

CASE NARRATIVE

I. Introduction

On January 14, 2004, one water sample was received at the STL Richland (STLR) laboratory for radiochemical analysis. Upon receipt, the sample was assigned a STLR identification number as described on the cover page of the Analytical Data Package report form. The sample was assigned to Lot Number J4A140288.

II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical uncertainties.

The analyses requested were:

Gas Proportional Counting
Gross Alpha by method RICH-RC-5014 (EPA 900.0)

IV. Quality Control

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

V. Comments

Gross Alpha by method RICH-RC-5014 (EPA 900.0):
The minimum detectable activity (MDA) of the sample did not meet the required detection limit. A reduced aliquot was used due to high weight screen results. The sample activity is greater than the MDA; therefore, the data is accepted. Except as noted, the LCS, batch blank, and sample results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:

Sara B Verba

Sara B. Verba
Project Management Assistant

1) EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**STL Richland's SOP number**
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value ($S/\sqrt{n}$), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) *u_c - Combined Uncertainty.*	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *u_c the combined uncertainty.* The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 23-Jan-04

STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Report No. : 24707

SDG No: 24957

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	MDC or MDA	CRDL	RER2
4015474	E900.0								
	TW-1								
	F709R1AA	ALPHA	7.95 +- 5.12		pCi/L	100%	5.02	3.0	
No. of Results: 1									

STL Richland RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

rptSTLRchSaSum
mary2 V4.05 A97

QC Results Summary
STL Richland STLR

Date: 23-Jan-04

Ordered by Method, Batch No, QC Type,.

Report No. : 24707

SDG No.: 24957

Batch Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	Recovery	Bias	MDC|MDA
E900.0								
4015474 BLANK QC								
F74C61AA	ALPHA	0.149 +- 0.671	U	pCi/L	100%			1.79
4015474 LCS								
[illegible]	[illegible]	[illegible]		pCi/L	108%	79%	0.2	
F74C61AC	ALPHA	63.9 +- 16.4		pCi/L	100%	79%	0.6	6.4
No. of Results: 3								

STL Richland
rptSTLRchQcSummary V4.05 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-04

Lab Name: STL Richland
SDG: 24957
Collection Date: 1/13/2004 11:00:00 AM
Lot-Sample No.: J4A140288-1
Report No. : 24707
Received Date: 1/14/2004 1:45:00 PM
Client Sample ID: TW-1
COC No. : 08828
Matrix: WATER
B420134

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis Prep Date	Total Sa Size	Aliquot Size	Primary Detecto
Batch: 4015474	E900.0			Work Order: F709R1AA		Report DB ID: 9F709R10						
ALPHA	7.95		4.7	5.1	5.02	pCi/L	100%	*(1.6)*	1/21/04 02:38 p		0.0847	GPC10
						1.66	3.0	*(3.1)*			L	

No. of Results: 1 Comments:

8

STL Richland
rptSTLRchSample
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

BLANK RESULTS

Date: 23-Jan-04

Lab Name: STL Richland

SDG: 24957

Matrix: WATER

Report No. : 24707

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4015474	E900.0			Work Order: F74C61AA		Report DB ID: F74C61AB						
ALPHA	0.149	U	0.67	0.67	1.79	pCi/L	100%	0.08	1/21/04 02:[illegible]3 p		0.1009	GPC10B
					0.644	3.0		0.45			L	

No. of Results: 1 Comments:

6

STL Richland
rptSTLRchBlank
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda/Total Uncert or gamma scan software did not identify the nuclide.

FORM II

LCS RESULTS

Date: 23-Jan-04

Lab Name: STL Richland SDG: 24957

Matrix: WATER Report No. : 24707

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4015474	E900.0			**Work Order:** F74C61AC			**Report DB ID:** F74C61CS						
ALPHA	63.9		7.1	16.0	1.64	pCi/L	100%	80.7	2.7	79	1/21/04 02:38 p	0.101 L	GPC10C
							Rec Limits:	70	130	-0.2			
Batch: 4015474	E900.0			**Work Order:** F74C61AD			**Report DB ID:** F74C61DS						
ALPHA	59.2		6.5	15.0	1.67	pCi/L	100%	74.5	2.5	79	1/21/04 02:38 p	0.1093 L	GPC10E
							Rec Limits:	70	130	-0.2			

No. of Results: 2 **Comments:**

4-54380 7am To STL Richland

Serial Number 08828

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

J4A140288
SDG 24957
Due 1-28

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO. B420134	PROJECT LOCATION (STATE) FL	MATRIX TYPE
SAMPLER'S SIGNATURE	P.O. NUMBER B420134	CONTRACT NO.	
CLIENT (SITE) PM Tina Fritz	CLIENT PHONE	CLIENT FAX	
CLIENT NAME STL-Tampa	CLIENT E-MAIL		
CLIENT ADDRESS			
COMPANY CONTRACTING THIS WORK (if applicable)			

REQUIRED ANALYSIS: Gross Alpha, Ra 226, 228

PAGE ____ OF ____

STANDARD REPORT DELIVERY ✓

DATE DUE ____

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE ____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
1-13-04	1100	TW-1		X				3	Drinking Water
								F	GA conditional,
								7	GA 75 run 226,
								0	228 73 run 228
								9	
								R	

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
				1-13-04	1730			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			Fed Ex PM	1/14/04	13.45			

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS

FORM I

SAMPLE RESULTS

Date: 23-Jan-04

Lab Name: STL Richland
SDG: 24957
Collection Date: 1/13/2004 11:00:00 AM

Lot-Sample No.: J4A140288-1
Report No. : 24707
Received Date: 1/14/2004 1:45:00 PM

Client Sample ID: TW-1
COC No. : 08828
Matrix: WATER

B420134

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis Prep Date	Total Sa Size	Aliquot Size	Primary Detecto
Batch: 4015474	E900.0			Work Order: F709R1AA		Report DB ID: 9F709R10						
ALPHA	7.95		4.7	5.1	5.02	pCi/L	100%	*(1.6)*	1/21/04 02:38 p		0.0847	GPC1(
						1.66	3.0	*(3.1)*			L	

No. of Results: 1 Comments:

∞

STL Richland
rptSTLRchSample
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

BLANK RESULTS

Date: 23-Jan-04

Lab Name: STL Richland
SDG: 24957
Matrix: WATER
Report No. : 24707

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4015474	E900.0			**Work Order:** F74C61AA		**Report DB ID:** F74C61AB						
ALPHA	0.149	U	0.67	0.67	1.79	pCi/L	100%	0.08	1/21/04 02:[illegible]3 p		0.1009	GPC10B
					0.644	3.0		0.45			L	

No. of Results: 1 Comments:

6

STL Richland
rptSTLRchBlank
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

LCS RESULTS

Date: 23-Jan-04

Lab Name: STL Richland

Matrix: WATER

SDG: 24957

Report No. : 24707

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4015474	E900.0			**Work Order:** F74C61AC			**Report DB ID:** F74C61CS						
ALPHA	63.9		7.1	16.0	1.64	pCi/L	100%	80.7	2.7	79%	1/21/04 02:38 p	0.101 L	GPC10C
							Rec Limits:	70	130	-0.2			
Batch: 4015474	E900.0			**Work Order:** F74C61AD			**Report DB ID:** F74C61DS						
ALPHA	59.2		6.5	15.0	1.67	pCi/L	100%	74.5	2.5	79%	1/21/04 02:38 p	0.1093 L	GPC10E
							Rec Limits:	70	130	-0.2			

No. of Results: 2 **Comments:**

10

Q-54380 TAM. To STL Richland

Serial Number 08828

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

J4A140288
8DG 24957
Due 1-28

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634
Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO. B420134	PROJECT LOCATION (STATE) Fl
SAMPLER'S SIGNATURE	P.O. NUMBER B420134	CONTRACT NO.
CLIENT (SITE) PM Tina Fritz	CLIENT PHONE	CLIENT FAX
CLIENT NAME STL-Tampa	CLIENT E-MAIL	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS: GT 5 & Alpha RAD 226, 228 HNO3 LP

PAGE ___ OF ___

STANDARD REPORT DELIVERY ✗ DATE DUE ______

EXPEDITED REPORT DELIVERY (SURCHARGE) ○ DATE DUE ______

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	NUMBER OF CONTAINERS SUBMITTED								REMARKS
1-13-04	1100	TW-1		X				3	F	7	0	9	R			Drinking Water GA conditional, GA>5 run 226, 226>3 run 228
"																

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
			[signature]	1-13-04	1730			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			[signature] ALOOCPR Phld	1/14/04	13.45			

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS
			YES ○ NO ○			

Analytical Data Package Prepared For

STL TAMPA

B420134

Radiochemical Analysis By

STL Richland

[redacted]

Assigned Laboratory Code: STLR

Data Package Contains 12 *Pages*

Report No.: 24782

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
25040		TW-1 (F709R)	J4A260118-1	F8JJ21AA	9F8JJ210	4026427

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99352

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

Certificate of Analysis

January 30, 2004

STL Tampa
[redacted]
Tampa, FL 33634

Attention: Tina Fritz

Date Received in Lab	:	January 14, 2004
Sample Type	:	One (1) Water
SDG Number	:	25040
Project Name/Number	:	B420134

CASE NARRATIVE

I. Introduction

On January 14, 2004, one water sample was received at the STL Richland (STLR) laboratory for radiochemical analysis. The sample was originally assigned to Lot Number J4A140288. The Gross Alpha analysis for sample TW-1 was greater than 5 pCi/L; therefore, the sample was logged in for Radium-226 per client request. Upon login, the sample was assigned a STLR identification number as described on the cover page of the Analytical Data Package report form. The sample was assigned to Lot Number J4A260118.

II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analysis requested was:

Gas Proportional Counting
Radium-226[1] by method RICH-RC-5027 (EPA 903.0)

FORM II

LCS RESULTS

Date: 23-Jan-04

Lab Name: STL Richland SDG: 24957

Matrix: WATER Report No. : 24707

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4015474	E900.0			Work Order: F74C61AC			Report DB ID: F74C61CS						
ALPHA	63.9		7.1	16.0	1.64	pCi/L	100%	80.7	2.7	79%	1/21/04 02:38 p	0.101	GPC10C
							Rec Limits:	70	130	-0.2		L	
Batch: 4015474	E900.0			Work Order: F74C61AD			Report DB ID: F74C61DS						
ALPHA	59.2		6.5	15.0	1.67	pCi/L	100%	74.5	2.5	79%	1/21/04 02:38 p	0.1093	GPC10E
							Rec Limits:	70	130	-0.2		L	

No. of Results: 2 Comments:

10

Q-54380 7aM. To STL Richland

Serial Number 08828

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

J4A140288
SDG 21957
Due 1-28

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

○ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO. B420134	PROJECT LOCATION (STATE) FL
SAMPLER'S SIGNATURE	P.O. NUMBER B420134	CONTRACT NO.
CLIENT (SITE) PM Tina Fritz	CLIENT PHONE	CLIENT FAX
CLIENT NAME STL-Tampa	CLIENT E-MAIL	
CLIENT ADDRESS		
COMPANY CONTRACTING THIS WORK (if applicable)		

PAGE ____ OF ____

STANDARD REPORT DELIVERY ✓

DATE DUE ____

EXPEDITED REPORT DELIVERY (SURCHARGE) ○

DATE DUE ____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	MATRIX TYPE: AQUEOUS (WATER)	MATRIX TYPE: SOLID OR SEMISOLID	MATRIX TYPE: AIR	MATRIX TYPE: NONAQUEOUS LIQUID (OIL, SOLVENT,...)	REQUIRED ANALYSIS: GC/MS VOA 8260B, 226, 228	REQUIRED ANALYSIS: THM's RAD 226, 228	NUMBER OF CONTAINERS SUBMITTED	REMARKS
11-3-04	1100	TW-1		X				LP		3 F 7 0 9 R	Drinking Water GA conductional, GA>5 run 226, 226 73 run 228

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
				1-13-04	1730			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			a lacopo PM2	11/4/04	13.45			

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS

Analytical Data Package Prepared For

STL TAMPA

B420134

Radiochemical Analysis By

STL Richland

2800 George Washington Way Richland, WA 99352 (509) 375-3131

Assigned Laboratory Code: STLR

Data Package Contains 12 *Pages*

Report No.: 24782

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
25040		TW-1 (F709R)	J4A260118-1	F8JJ21AA	9F8JJ210	4026427

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99352

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

Certificate of Analysis

January 30, 2004

STL Tampa
[redacted]
Tampa, FL 33634

Attention: Tina Fritz

Date Received in Lab	:	January 14, 2004
Sample Type	:	One (1) Water
SDG Number	:	25040
Project Name/Number	:	B420134

CASE NARRATIVE

I. Introduction

On January 14, 2004, one water sample was received at the STL Richland (STLR) laboratory for radiochemical analysis. The sample was originally assigned to Lot Number J4A140288. The Gross Alpha analysis for sample TW-1 was greater than 5 pCi/L; therefore, the sample was logged in for Radium-226 per client request. Upon login, the sample was assigned a STLR identification number as described on the cover page of the Analytical Data Package report form. The sample was assigned to Lot Number J4A260118.

II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analysis requested was:

Gas Proportional Counting
Radium-226[1] by method RICH-RC-5027 (EPA 903.0)

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**STL Richland's SOP number**
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5008
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
[illegible]	[illegible]
u_c - *Combined Uncertainty*	of the uncertainty associated with the result. u_c *the combined uncertainty*. The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

Sample Results Summary

Date: 30-Jan-04

STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Report No. : 24782

SDG No: 25040

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	MDC or MDA	CRDL	RER2
4026427	E903.0								
	TW-1 (F709R)								
	F8JJ21AA	RA-226	2.52 +- 0.703	R	pCi/L	96%	0.224	1.0	
	TW-1 (F709R) DUP								
	F8JJ21AC	RA-226	2.65 +- 0.689	R	pCi/L	100%	0.212	1.0	

No. of Results: 2

STL Richland

rp:STLRchSaSummary2 V4.06 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.

Sample Results Summary

STL Richland STLR

Ordered by Method, Batch No., Client Sample ID.

Date: 30-Jan-04

Report No. : 24782

SDG No: 25040

Batch	Client Id / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	MDC or MDA	CRDL	RER2
4026427	E903.0								
	TW-1 (F709R)								
	F8JJ21AA	RA-226	2.52 +- 0.703	R	pCi/L	96%	0.224	1.0	
	TW-1 (F709R) DUP								
	F8JJ21AC	RA-226	2.65 +- 0.689	R	pCi/L	100%	0.212	1.0	

No. of Results: 2

STL Richland

rp:STLRchSaSummary2 V4.05 A97

RER2 - Replicate Error Ratio = (S-D)/(sqrt(sq(TPUs)+sq(TPUd))) as defined by ICPT BOA.

R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.

QC Results Summary
STL Richland STLR

Ordered by Method, Batch No, QC Type,.

Date: 30-Jan-04

Report No. : 24782

SDG No.: 25040

Batch / Work Order	Parameter	Result +- Uncertainty (2s)	Qual	Units	Yield	Recovery	Bias	MDC/MDA
E903.0								
4026427 BLANK QC								
F8J7A1AA	RA-226	0.00743 +- 0.0807	U	pCi/L	95%			0.214
4026427 LCS								
F8J7A1AC	RA-226	3.64 +- 0.956	R	pCi/L	94%	99%	0.0	0.196

No. of Results: 2

STL Richland
rptSTLRchQcSummary V4.05 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 30-Jan-04

Lab Name: STL Richland
SDG: 25040
Collection Date: 1/13/2004 11:00:00 AM

Lot-Sample No.: J4A260118-1
Report No. : 24782
Received Date: 1/26/2004 9:25:00 AM

Client Sample ID: TW-1 (F709R)
COC No. : 08828
Matrix: WATER

B420134

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4026427	E903.0			Work Order: F8JJ21AA		Report DB ID: 9F8JJ210						
RA-226	2.52	R	0.44	0.7	0.224	pCi/L	96%	*(11.3)*	1/29/04 09:17 a		0.5 L	GPC10A
						0.0871	1.0	*(7.2)*				

No. of Results: 1 Comments:

8

STL Richland
rptSTLRchSample
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

DUPLICATE RESULTS

Date: 30-Jan-04

Lab Name: STL Richland
SDG: 25040
Collection Date: 1/13/2004 11:00:00 AM

Lot-Sample No.: J4A260118-1
Report No. : 24782
Received Date: 1/26/2004 9:25:00 AM

Client Sample ID: TW-1 (F709R) DUP
COC No. : 08828
Matrix: WATER

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4026427 E903.0				Work Order: F8JJ21AC		Report DB ID: F8JJ21CR			Orig Sa DB ID: 0F8JJ210			
RA-226	2.65	R	0.45	0.69	0.212	pCi/L	100%	(12.5)	1/29/04 09:57 a		0.4662	GPC10B
	2.52	R	RER2 0.3			1.0		(7.7)			L	

No. of Results: 1 Comments:

6

STL Richland
rptSTLRchDupV4.0 5 A97

RER2 - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.

FORM II

BLANK RESULTS

Date: 30-Jan-04

Lab Name: STL Richland

Matrix: WATER

SDG: 25040

Report No. : 24782

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 4026427	E903.0			Work Order: F8J7A1AA			Report DB ID: F8J7A1AB					
RA-226	0.00743	UR	0.081	0.081	0.214	pCi/L	95%	0.03	1/29/04 09:57 a		0.5003	GPC10C
					0.0819	1.0		0.18			L	

No. of Results: 1 Comments:

10

STL Richland

rptSTLRchBlank
V4.05 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

LCS RESULTS

Date: 30-Jan-04

Lab Name: STL Richland

Matrix: WATER

SDG: 25040

Report No.: 24782

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 4026427	E903.0			Work Order: F8J7A1AC			Report DB ID: F8J7A1CS						
RA-226	3.64	R	0.53	0.96	0.196	pCi/L	94%	3.68	0.2	99%	1/29/04 09:57 a	0.5015 L	GPC10D
							Rec Limits:	70	130	0.0			

No. of Results: 1 Comments:

STL Richland
rptSTLRchLcs
V4.05 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.
R Qual - EPA Method 903.0 measures total soluble alpha-emitting radioisotopes of Radium, namely Radium-223,224,226 in drinking water, surface water and groundwater.

also log in to STL Richland

Serial Number 08828

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT STL

J1A110258
SDG 24940
Due 1-28

STL Tampa
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO. B420134	PROJECT LOCATION (STATE) FL	MATRIX TYPE	REQUIRED ANALYSIS	PAGE	OF
SAMPLER'S SIGNATURE	P.O. NUMBER D420134	CONTRACT NO.			STANDARD REPORT DELIVERY ✓	
CLIENT (SITE) PM Tina Fritz	CLIENT PHONE	CLIENT FAX			DATE DUE	
CLIENT NAME STL-Tampa	CLIENT E-MAIL				EXPEDITED REPORT DELIVERY (SURCHARGE) ○	
CLIENT ADDRESS					DATE DUE	
COMPANY CONTRACTING THIS WORK (if applicable)					NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	NUMBER OF CONTAINERS SUBMITTED	REMARKS
F13-04	1100	TW-1 log in for Ra-226		X				3 F 7 0 9 R	GA conditional,
12		F8JJ2 J (Total Radium)							GA>5 run 226
		SSV 1/23/01							226,73 run 228
		J1A260118							
		SDG 25040							
		Due 2-9							

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
				1-13-04	1730			
RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			or Lucy Phan	1/14/04	13:45			

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL TAMPA LOG NO.	LABORATORY REMARKS