L-2011-320
10 CFR 52.3

August 18, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Submittal of Underground Injection Control Exploratory Well
Intermediate Casing Setting Depth Recommendation

Reference:

1. FPL Letter to NRC, L-2009-265 dated November 24, 2009, Revised Hydrology Response to NRC Information Requests in COL Application Acceptance Review Letter

This letter provides the Underground Injection Control (UIC) Intermediate Casing Setting Depth Recommendation dated July 20, 2011 and the Intermediate Casing Setting Depth Recommendation - Packer Test #4 Analytical Water Quality Report dated July 22, 2011 submitted to the Florida Department of Environmental Protection (FDEP) as required by Permit #0293962-001-UC, and discussed in FPL's Revised Response to NRC Information Requests in COL Application Acceptance Review Letter (Reference 1). It should be noted that the Enclosure 2 letter submitted to the FDEP incorrectly referred to the date of the letter in Enclosure 1 as June 20, 2011 instead of July 20, 2011.

FDEP provided their approval (electronically) of the intermediate casing setting depth on July 22, 2011.

If you have any questions, or need additional information, please contact me at 561-691-7490.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFB

D097
NRO

Enclosures:

1. Florida Power & Light Company Turkey Point Units 6 & 7 Exploratory Well Project; Permit #0293962-001-UC Intermediate Casing Setting Depth Recommendation dated July 20, 2011

2. Florida Power & Light Company Turkey Point Units 6 & 7 Exploratory Well Project; Intermediate Casing Setting Depth Recommendation - Packer Test #4 Analytical Water Quality Report; Permit #0293962-001-UC dated July 22, 2011

cc:
PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

Enclosure 1

Florida Power & Light Company Turkey Point Units 6 & 7 Exploratory Well Project; Permit #0293962-001-UC Intermediate Casing Setting Depth Recommendation dated July 20, 2011

Note
Pages 29 through 95 were originally part of single strip charts that have been segmented to 8.5 by 11 pages for processing

MHC **McNabb Hydrogeologic Consulting, Inc.**

601 Heritage Drive, Suite 110
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Fax: 561-623-5469

July 20, 2011 MHCDEP-11-0302

Mr. Joseph May, P.G.
Florida Department of Environmental Protection
400 N. Congress Ave, Suite 200
West Palm Beach, FL 33401

RE: Florida Power & Light Company Turkey Point Units 6 & 7 Exploratory Well Project; Permit #0293962-001-UC
Intermediate Casing Setting Depth Recommendation

Dear Mr. May:

The purpose of this letter is to provide you with a recommendation for the 34-inch diameter intermediate casing setting depth for exploratory well EW-1 at the Florida Power & Light Company (FPL) Turkey Point Units 6 & 7 exploratory well project. The interpreted data presented below is provided to justify our recommendation for the intermediate casing setting depth of 1,535 feet below pad level (bpl). This recommendation, hereby submitted on behalf of FPL, is provided for your review and Technical Advisory Committee (TAC) approval.

Background

Construction of exploratory well EW-1 began on May 11, 2011. A 54-inch diameter casing was installed to a depth of 255 feet bpl to isolate the Biscayne Aquifer and unconsolidated sediments from subsequent drilling activities. A 44-inch casing was installed to a depth of 1,090 feet bpl and cemented to surface to isolate the swelling clays of the Hawthorn Group from subsequent drilling activities. A 12-1/4 inch pilot hole was then drilled below the base of the 44-inch diameter casing to a depth of 1,655 feet bpl.

EW-1 Testing and Data Summary

Drill cutting samples were collected at 10-foot intervals during pilot hole drilling. Each cutting sample was described in detail to develop a lithologic log of EW-1. Pilot hole water samples were collected at approximately 90-foot intervals during reverse-air drilling pilot hole. Pilot hole water samples were analyzed for specific conductance, chlorides, total dissolved solids (TDS), ammonia, and total kjeldahl nitrogen (TKN). Deviation surveys were performed at approximately 90-foot intervals while pilot hole drilling. Geophysical logs conducted on the pilot hole below the base of the 44-inch diameter casing include caliper, gamma ray, spontaneous potential, dual-induction, borehole compensated sonic, flowmeter, fluid specific conductance, and temperature. Flowmeter, fluid conductivity and temperature logs were performed under static and dynamic conditions. The remaining logs

were performed under static conditions. Geophysical log data was used to develop an estimate of the depth of the base of the Underground Source of Drinking Water (USDW). Packer testing was performed on the intervals from 1,505 to 1,535 feet bpl, 1,400 to 1,430 feet bpl, 1,225 to 1,285 feet bpl and 1,102 to 1,162 feet bpl to confirm the location of the base of the USDW. A water sample was collected at the end of each packer test and analyzed for specific conductance, chlorides, TDS, ammonia, and TKN.

Drill Cutting Samples

The drill cuttings from the pilot hole below the 44-inch casing consist primarily of limestone, dolomitic limestone and dolomite. Table 1 provides a summary of the drill cuttings description. In general, the interval from 1,090 feet (base of the 44-inch diameter casing) to the base of the pilot hole (1,655 feet bpl) can be divided into two intervals. A detailed lithologic log of the drill cuttings below the 44-inch diameter casing is provided in Attachment A. The drill cutting samples are typical of the Floridan Aquifer.

Table 1. Generalized Lithologic Description of Drill Cuttings

Interval (feet bpl)	Generalized Description
1,090 - 1,270	Well indurated, interbedded, fine grained limestone, dolomitic limestone and dolomite
1,270 - 1,650	Poorly to well indurated, fine grained limestone

Deviation Survey Data

Deviation surveys were performed at approximately 90-foot intervals on the pilot hole below the base of the 44-inch diameter casing to measure the plumbness of the hole. The deviation survey data is summarized in Table 2, below.

Table 2. Deviation Survey Summary Table

Depth (feet bpl)	Inclination (degrees from vertical)
974	0.5
1,064	0.5
1,154	0.6
1,244	0.3
1,334	0.4
1,424	0.4
1,514	0.5
1,604	0.5

Review of the deviation survey data indicates that the drilled borehole is very near vertical in each measurement with the range of measurements from 0.3 to 0.6 degrees out of vertical.

Pilot Hole Water Quality Data

Pilot hole water samples were collected at approximately 90-foot intervals during reverse-air drilling. Each sample underwent specific conductance, chlorides, TDS, ammonia, and TKN analyses. The pilot hole specific conductance, chlorides, and TDS data was evaluated to identify increases in salinity and to assist in the identification of the base of the USDW. Even though the pilot hole water quality samples represent water which is a combination of native water and water from the drilling process as described below, the sample results can be used to assist in the identification of the base of the USDW. The drilling process for EW-1 uses a closed circulation system in which drilling water is present in the pilot hole at all times. In addition a large volume of fresh water was introduced to the closed circulation system at the beginning of pilot hole reverse-air drilling. Adding fresh water at the beginning of reverse-air drilling is a typical process in the drilling of deep underground injection control wells.

Table 3 provides a summary of the pilot hole water quality data. A copy of the water quality sample analytical report is provided in Attachment B. Figure 1 provides a graph of pilot hole water sample chloride, TDS, and specific conductance relative to sample depth. The pilot hole water quality was relatively fresh between the depths of 1,100 and 1,255 feet bpl due to the high percentage of fresh water added to the closed circulation system. A gradual trend of increasing chloride and TDS concentration and specific conductance is apparent from a depth of 1,255 feet bpl to 1,435 feet bpl. This trend is an indication of groundwater with relatively higher chloride, TDS, and specific conductance mixing with closed circulation drilling fluids. A significant increase in chloride concentration, TDS concentration and specific conductance was observed between 1,435 and 1,525 feet bpl. This suggests that a productive interval containing relatively saline water is present between 1,435 and 1,525 feet bpl and that at least some of the sample collected at a depth of 1,525 feet bpl consists of this relatively saline water. The trend of elevated TDS, chloride and specific conductance remains consistent from the shallowest to the deepest sample collected, however, there is some variation in the actual results as expected due to the addition of fresh water at the initiation of reverse-air drilling.

Table 3. Pilot Hole Water Quality Summary

Sample Date	Sample Depth (feet bpl)	Specific conductance (umhos/cm)	TDS (mg/L)	Chloride (mg/L)	Ammonia (mg/L)	TKN (mg/L)
6/30/2011	1,100	1,228	610	61.3	0.04	0.55
7/1/2011	1,190	1,177	768	85.5	0.06	0.59
7/1/2011	1,255	1,167	776	97.3	0.03	0.56
7/1/2011	1,345	2,420	1,428	551	0.06	0.42
7/1/2011	1,435	2,900	1,736	640	0.08	0.44
7/2/2011	1,525	6,760	4,168	2,045	0.09	0.35
7/3/2011	1,615	5,660	3,548	1,670	0.08	0.45

Figure 2 provides a graph of ammonia and TKN data relative to depth. Review of the data indicates the pilot hole water samples have low concentrations typical of the Floridan Aquifer mixed with added fresh water at the beginning reverse-air drilling.

In summary, the pilot hole water quality data suggests the presence of intervals producing brackish water between the depths of 1,100 and 1,255 feet bpl. The data also suggests that there is a significant increase in salinity between the depths of 1,435 and 1,525 feet bpl and that the base of the USDW may be located within this interval.

Geophysical Logging Data

Geophysical logging of the interval from 1,090 to 1,655 feet bpl was conducted to provide geologic and hydrogeologic data for the EW-1 site. Logs conducted include caliper, gamma ray, spontaneous potential, dual induction, borehole compensated sonic, flowmeter, fluid conductivity, and temperature. All logs were performed under static conditions. The flowmeter, fluid conductivity and temperature logs were also performed under dynamic conditions. The dynamic flowmeter, fluid conductivity and temperature logs were performed in two phases due to the presence of kill material (a mix of barite and bentonite) over the interval from 1,560 to 1,655 feet bpl. The barite/bentonite mixture impacted the geophysical log data over the interval from 1,560 to 1,655 feet bpl. Therefore, the drilling contractor installed an open-ended drill pipe to the base of the borehole and pumped the barite/bentonite mixture from the well. The drill pipe was then pulled up to a depth of 1,525 feet bpl and the interval from 1,525 to 1,655 feet bpl underwent flowmeter, fluid conductivity and temperature logging. Copies of the logs are provided in Attachment C.

The interval from 1,090 to 1,655 feet bpl can generally be divided into two intervals. The interval from 1,090 to 1,300 feet bpl is characterized by a generally small diameter borehole that ranges between 12.25 and 14 inches, moderately high gamma ray activity ranging from approximately 15 to 65 American Petroleum Institute (API) units, moderately high and variable resistivity, and a highly variable and moderately long acoustic travel time. Fluid conductivity and temperature are fairly stable through this interval. The flowmeter log, in combination with the fluid conductivity and temperature logs suggests that most of the water production is occurring at the very base of this interval and below this interval. These data are interpreted to indicate the interval from 1,090 to 1,300 feet bpl has a varying lithology and porosity. The small diameter borehole suggests the rocks making up this interval are well indurated. The moderately high resistivity as indicated by the dual induction log indicates this interval contains water with less than 10,000 mg/L TDS. A log-derived TDS curve was generated from the data and is included in Attachment C. The log-derived TDS curve also suggests this interval contains water with less than 10,000 mg/L TDS.

The interval from 1,300 to 1,655 feet bpl is characterized by a larger diameter borehole that ranges from approximately 14 to 18 inches, low to occasionally moderate gamma ray activity, a moderate resistivity that decreases to a low resistivity with depth, and a less variable and shorter sonic travel time when compared to the interval above. The log-derived TDS curve indicates the base of the USDW is located within this interval at a depth of approximately 1,450 feet bpl. Review of the flowmeter, fluid conductivity and temperature logs suggests there are productive intervals at depths of approximately 1,380, 1,470, and 1,525 feet bpl. These data are interpreted to represent an interval that contains relatively soft material that is susceptible to washing out compared to the interval above. The relatively stable sonic travel time suggests the lithology of this interval is less variable than that of the interval above. The decreasing resistivity shown on the dual-induction log suggests increasing salinity with depth.

Packer Testing Data

Packer testing was conducted on the intervals from 1,505 to 1,535 feet bpl, 1,400 to 1,430 feet bpl, 1,225 to 1,285 feet bpl and 1,102 to 1,162 feet bpl to determine water quality and hydraulic characteristics of the tested intervals. Water samples were collected at the end of each packer test and analyzed for specific conductance, chlorides, TDS, ammonia, and TKN.

Water level of the test interval was measured and recorded during packer testing. Table 4 provides a summary of packer test pumping rate and water level drawdown data. Figures 3 through 6 provide an interpreted graph of water level drawdown data for each packer test.

Please note, the information listed in Tables 4 and 5 is listed in the order in which the packer tests were performed (deepest to shallowest).

Table 4. Straddle Packer Test Performance Data Summary

Test #	Test Interval (ft. bpl)	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/foot)
1	1,505 – 1,535	76	31.3	2.43
2	1,400 – 1,430	77	40.6	1.90
3	1,225 – 1,285	78	33.2	2.35
4	1,102 – 1,162	16	161	0.10

The packer test water level data indicates that the packer test #1 through #3 test intervals are productive and are not confining in nature. The test interval for packer test #4 is much less productive than the previous three test intervals.

Water quality data for water samples collected at the end of each packer test are summarized in Table 5. Analytical results for the water sample collected at the end of packer test #4 are not yet available and will be provided to the Department when they become available. A copy of the water quality analytical reports for packer tests #1 through #3 is provided in Attachment D.

Table 5. Straddle Packer Test Water Quality Data Summary

Test #	Test Interval (ft. bpl)	Specific Conductance (umhos/cm)	Chloride (mg/L)	TDS (mg/L)	TKN (mg/L)	Ammonia (mg/L)	Temperature (Celsius)	pH (standard units)
1	1,505 – 1,535	22,420	7,990	13,890	0.22	0.18	25.8	7.55
2	1,400 – 1,430	9,850	3,230	5,780	0.13	0.11	24.4	7.55
3	1,225 – 1,285	5,340	1,500	3,120	0.16	0.08	26.8	7.80

Based on the packer tests water sample analytical data, the base of the USDW is located between the depths of 1,430 and 1,505 feet bpl. This is consistent with the log-derived TDS curve, which showed the base of the USDW at a depth of 1,450 feet bpl.

Summary

Based on interpretation of the data collected and presented herein, it is recommended to set the 34-inch intermediate casing of EW-1 to a depth of 1,535 feet bpl. The proposed casing seat will result in the intermediate casing being set to a depth below the base of the USDW in accordance with the requirements of Rule 62-528, F.A.C. Interpreted packer test data presented above indicates the base of the USDW is located between 1,430 and 1,505 feet bpl. Interpretation of geophysical log data provides a more precise estimate of the location of the base of the USDW at 1,450 feet bpl. Analysis of the sonic log indicates the formation at 1,535 feet bpl is mechanically sound and will serve to allow a good seal at the base of the casing string.

Should you have any questions regarding the application, please contact me at (561) 891-0763 or Matthew Raffenberg (FPL) at (561) 691-2808.

Sincerely,

McNabb Hydrogeologic Consulting, Inc.

7/20/11

David McNabb, P.G.

Attachments: Figures
A – EW-1 Lithologic Log
B – Pilot Hole Water Quality Analytical Report
C – EW-1 Geophysical Logs
D – Packer Tests #1 Through #3 Water Quality Analytical Reports

Cc: George Heuler/FDEP-Tallahassee
Steve Anderson/SFWMD
Matthew Raffenberg/FPL
David Holtz/HCE
Joe Haberfeld/FDEP-Tallahassee
Ron Reese/USGS
David Paul/FGS

Figures

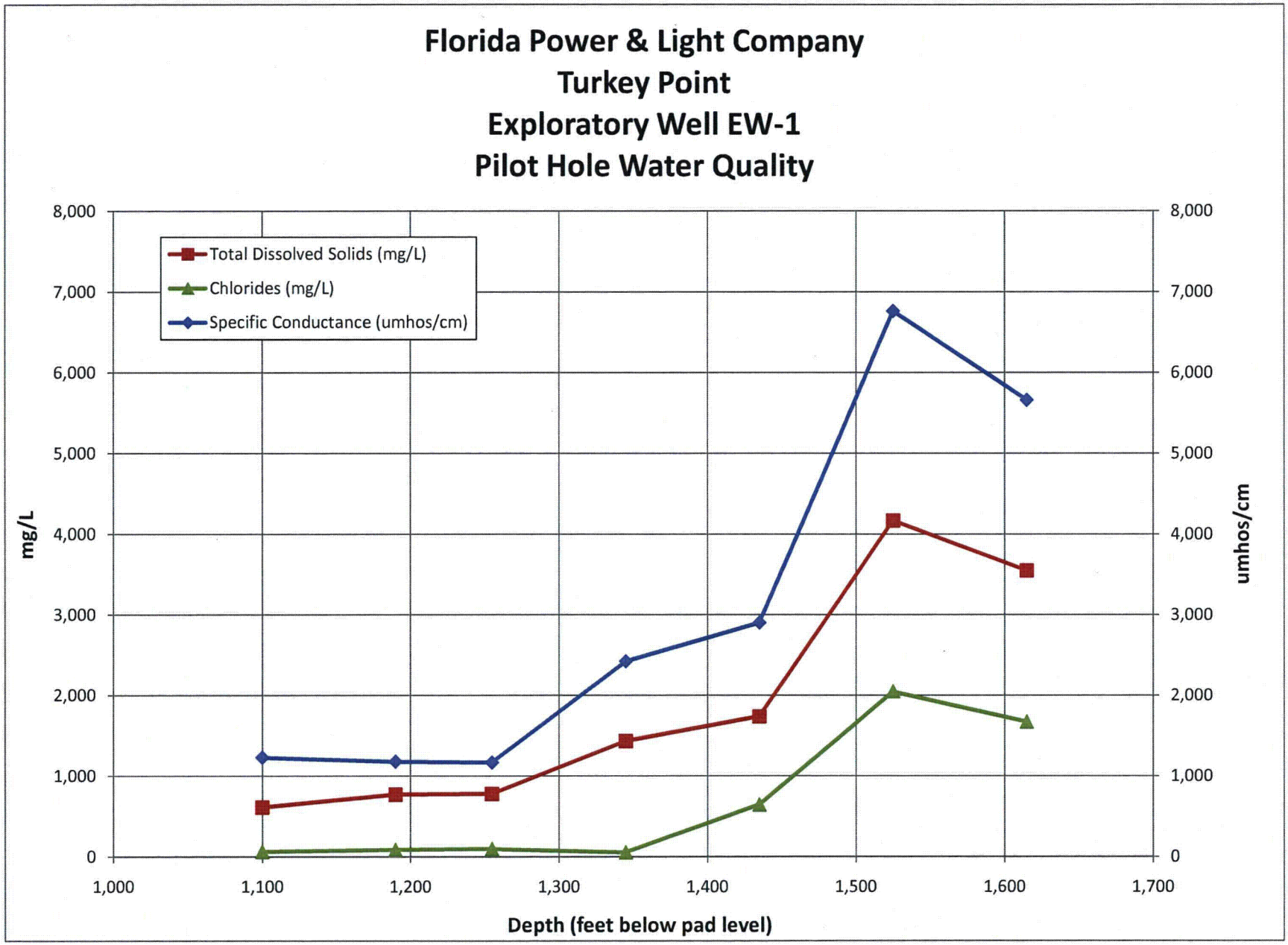

Figure 1. Pilot hole TDS, chloride and specific conductance data

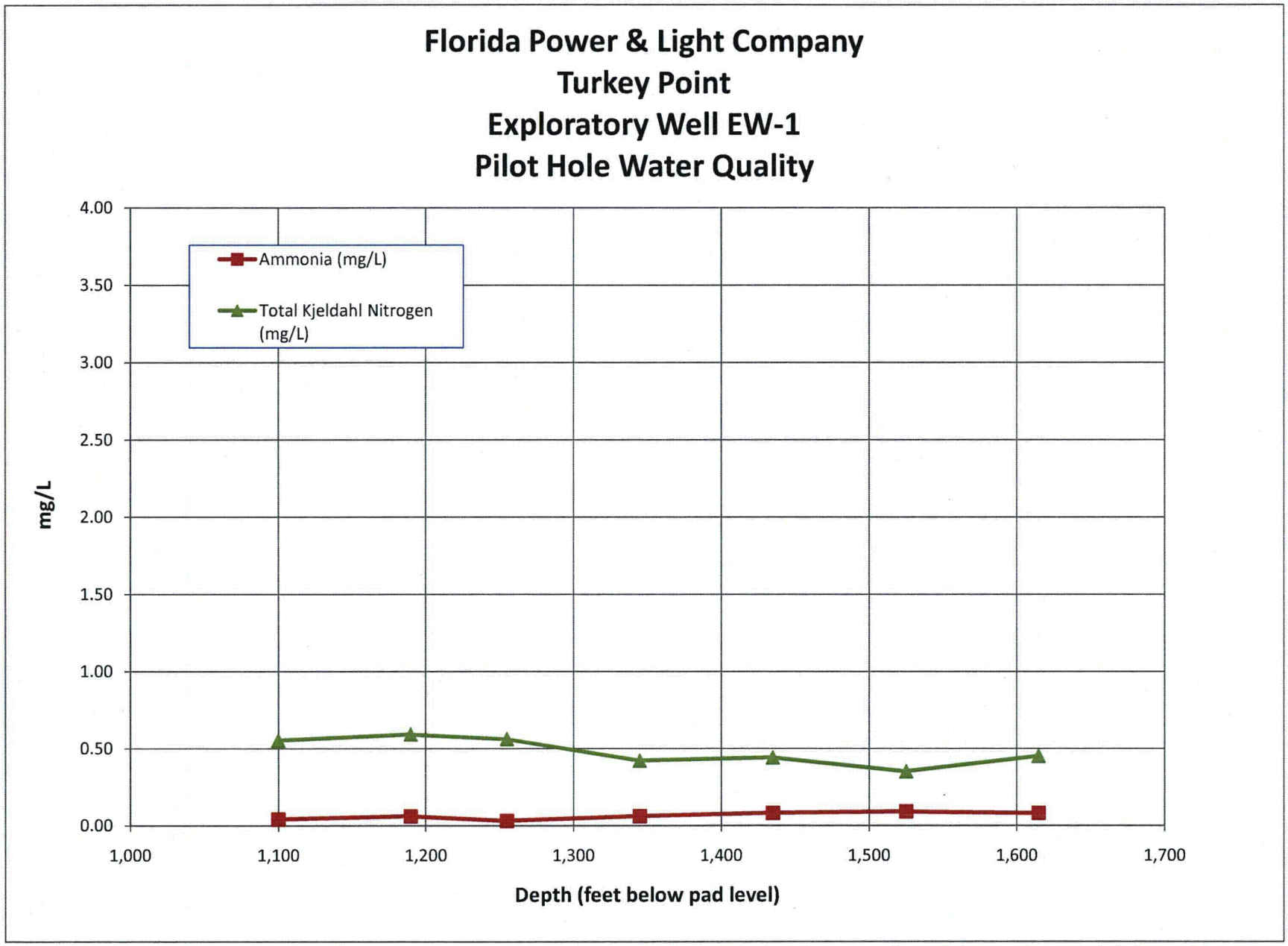

Figure 2. Pilot hole ammonia and TKN data

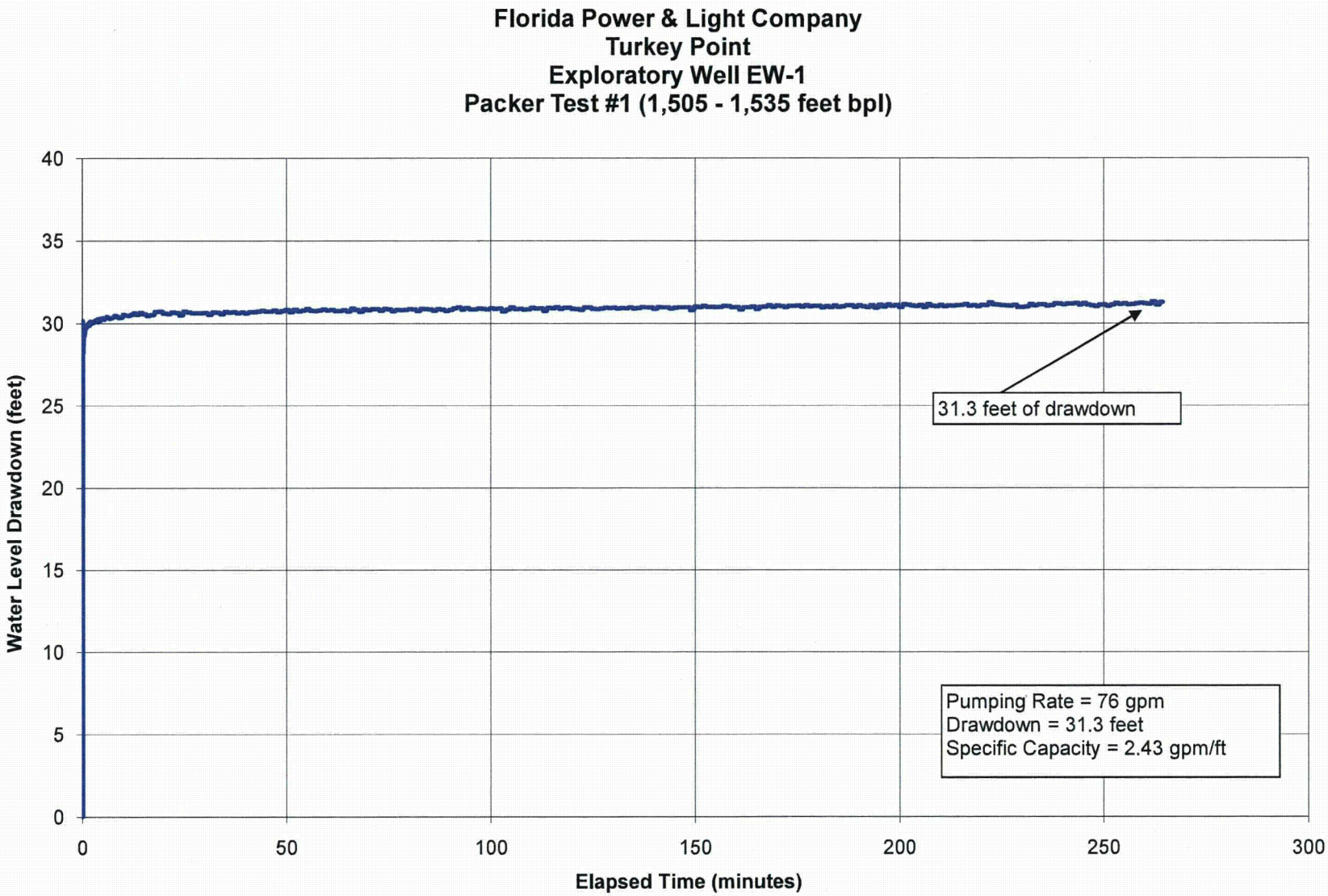

Figure 3. Packer Test #1 Water Level Drawdown Data.

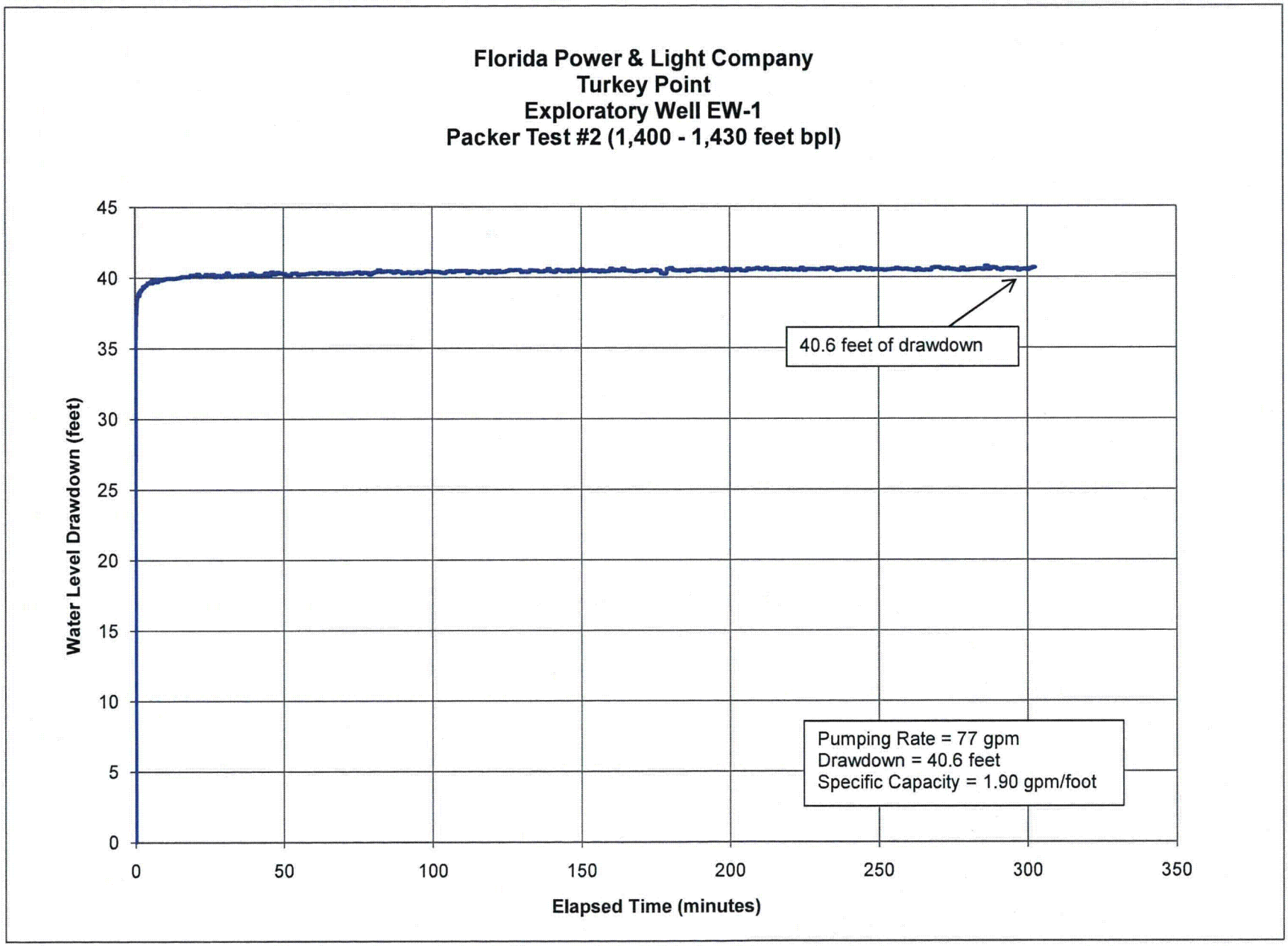

Figure 4. Packer Test #2 Water Level Drawdown Data

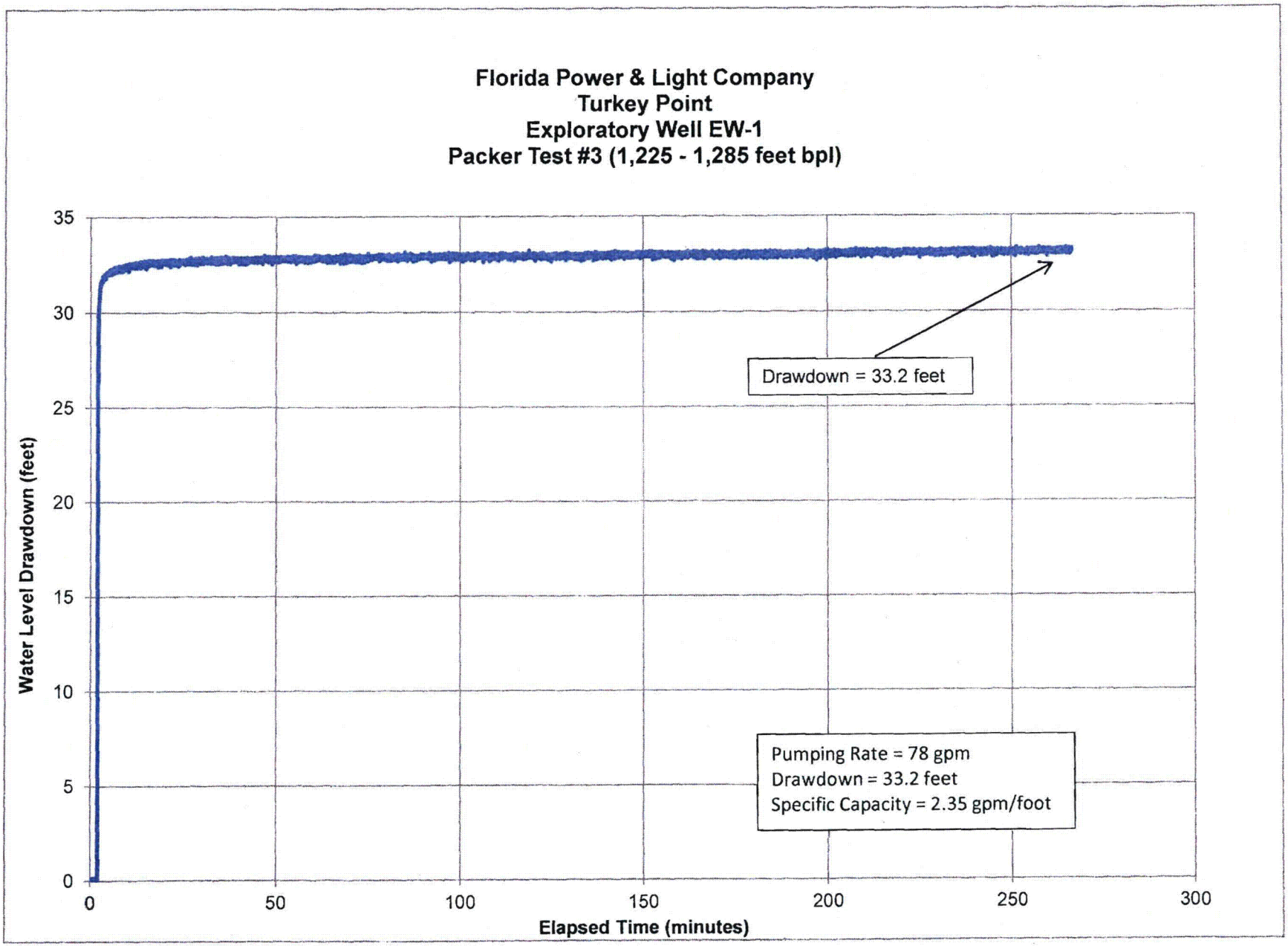

Figure 5. Packer Test #3 Water Level Drawdown Data

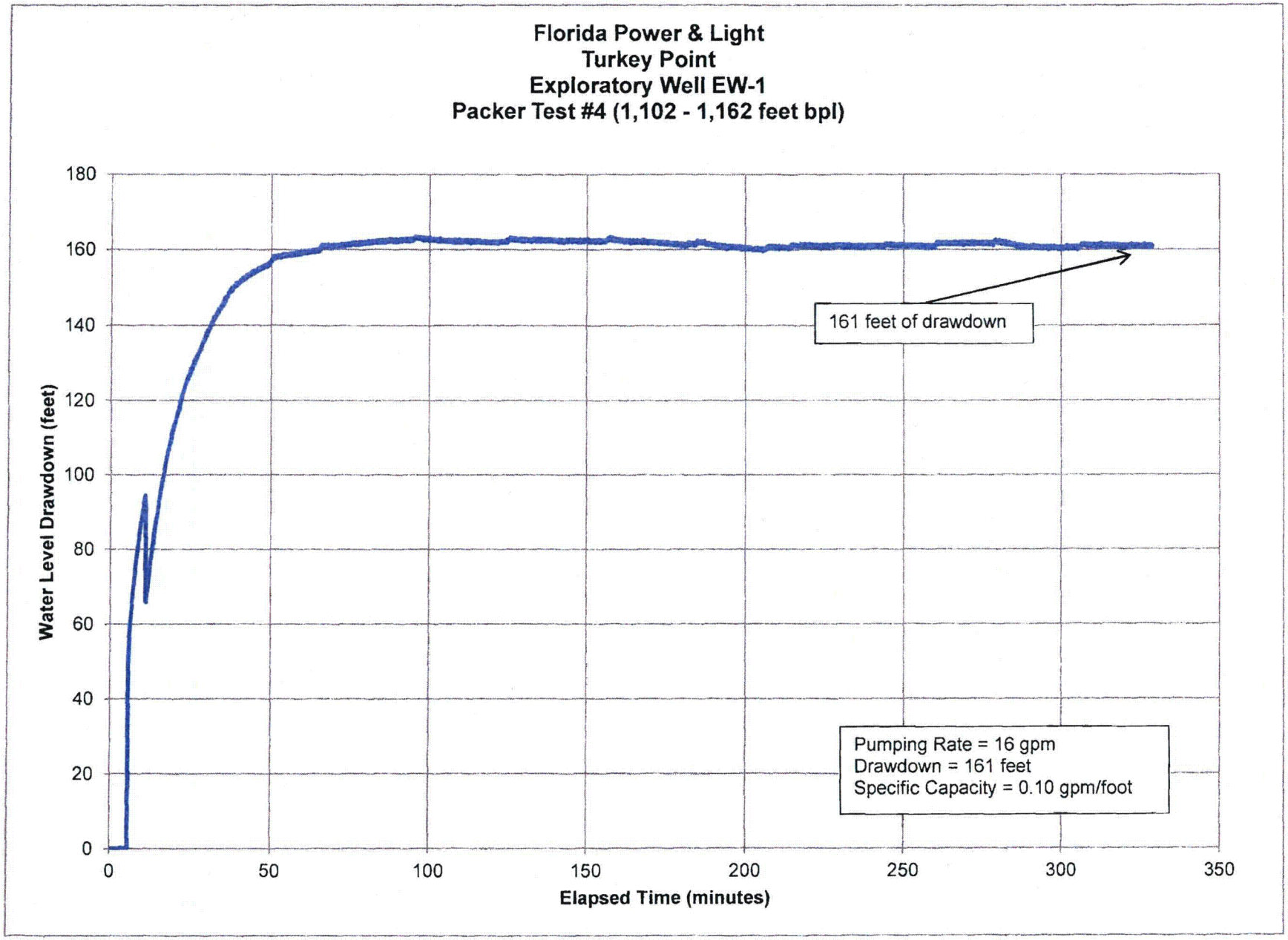

Figure 6. Packer Test #4 Water Level Drawdown Data

Attachment A

EW-1 Lithologic Log

MHC

Florida Power & Light Company
Turkey Point
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	Depth (ft. bpl) To	Observer's Description
6/30/2011	1,090	1,100	Limestone and Dolomitic Limestone: Limestone, 50%, pelecypod shell fragments, pale yellowish gray (5Y 8/1); Limestone 30%, yellowish gray (5Y 7/2), arenaceous, soft; Dolomitic Limestone, 20%, pale yellowish brown (10YR 6/2), well indurated with pelecypod shell fragments.
7/1/2011	1,100	1,110	Limestone and Dolomitic Limestone: Limestone, 80%, yellowish gray (5Y 7/2), arenaceous, fine grained, soft; Dolomitic Limestone, 20%, pale yellowish brown (10YR 6/2), well indurated with minor amount of pelecypod shell fragments, trace phosphate grains.
7/1/2011	1,110	1,120	Shell Fragments and Limestone: Shell Fragments, 90% pelecypod shell fragments, yellowish gray (5Y 8/1), well indurated, partially dolomitized; Limestone, 10%, yellowish gray (5Y 7/2, arenaceous, fine grained, slightly vuggy, soft.
7/1/2011	1,120	1,130	Limestone and Shell Fragments: Limestone, 80%, yellowish gray (5Y 7/2), arenaceous, fine grained, moderate to poorly indurated; Shell Fragments, 20% pelecypod shell fragments, yellowish gray (5Y 8/1), well indurated, partially dolomitized.
7/1/2011	1,130	1,140	Limestone and Dolomitic Limestone: Limestone, 60%, yellowish gray (5Y 7/2), very fine grained, moderately well indurated, slightly vuggy, very fossiliferous, low porosity, low permeability; Dolomitic Limestone, 40%, pale yellowish brown (10YR 6/2) and moderate yellowish brown (10YR 5/4), fine crystalline, slightly brittle; Trace Shell Fragments.
7/1/2011	1,140	1,150	Dolomitic Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained, well indurated, slightly brittle, vuggy, low porosity, low permeability; Trace clay.
7/1/2011	1,150	1,160	Dolomitic Limestone: same as above.
7/1/2011	1,160	1,170	Dolomitic Limestone: 100%, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), fine grained, well indurated, slightly brittle, very fossiliferous, low porosity, low permeability; Trace clay.
7/1/2011	1,170	1,180	Limestone and Dolomite: Limestone, 70%, yellowish gray (5Y 7/2), very fine grained, well indurated, fossiliferous, vuggy; Dolomite, 30% light gray (N7), fine crystalline, well indurated, vuggy.
7/1/2011	1,180	1,190	Limestone: yellowish gray (5Y 7/2), very fine grained, well indurated, fossiliferous, vuggy; Dolomite trace.
7/1/2011	1,190	1,200	Limestone: same as above.
7/1/2011	1,200	1,210	Dolomite: 100%, pale yellowish brown (10YR 6/2), fine crystalline, well indurated vuggy.
7/1/2011	1,210	1,220	Limestone and Dolomite: Limestone, 60%, yellowish gray (5Y 7/2), very fine grained, moderately well indurated, slightly fossiliferous; Dolomite, 40%, pale yellowish brown (10YR 6/2), fine crystalline, well indurated, vuggy.
7/1/2011	1,220	1,230	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately well indurated, slightly fossiliferous.
7/1/2011	1,230	1,240	Limestone and Dolomite: Limestone, 50%, yellowish gray (5Y 7/2), very fine grained, moderately well indurated, slightly fossiliferous; Dolomite, 50%, pale yellowish brown (10YR 6/2), fine crystalline, well indurated, vuggy.
7/1/2011	1,240	1,250	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, well indurated, very well sorted, low porosity, low permeability; Dolomite trace, phosphate trace.
7/1/2011	1,250	1,260	Limestone: same as above.
7/1/2011	1,260	1,270	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, well indurated, slightly fossiliferous (pelecypods, gastropods), very well sorted, low porosity, low permeability; Dolomite trace, phosphate trace.

MHC

Florida Power & Light Company
Turkey Point
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	Depth (ft. bpl) To	Observer's Description
7/1/2011	1,270	1,280	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to well indurated, fossiliferous (pelecypods, gastropods), well sorted, low porosity, low permeability; Dolomite trace.
7/1/2011	1,280	1,290	Limestone: same as above.
7/1/2011	1,290	1,300	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to poorly indurated, slightly fossiliferous (pelecypods), well sorted, low porosity, low permeability.
7/1/2011	1,300	1,310	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to well indurated, fossiliferous (pelecypods), well sorted, low porosity, low permeability; Dolomite trace.
7/1/2011	1,310	1,320	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to poorly indurated, well sorted, low porosity, low permeability.
7/1/2011	1,320	1,330	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to well indurated, fossiliferous (pelecypods), well sorted, slightly vuggy.
7/1/2011	1,330	1,340	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to poorly indurated, fossiliferous (pelecypods), well sorted, low porosity, low permeability.
7/1/2011	1,340	1,350	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately indurated, fossiliferous (pelecypods, echinoids), well sorted, low porosity, low permeability.
7/1/2011	1,350	1,360	Limestone: same as above.
7/1/2011	1,360	1,370	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately indurated, slightly fossiliferous (pelecypods), well sorted, low porosity, low permeability, slightly vuggy; Dolomite trace.
7/2/2011	1,370	1,380	Limestone: same as above.
7/2/2011	1,380	1,390	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, well indurated, more fossiliferous (pelecypod and gastropod casts and molds, echinoids), well sorted, low porosity, low permeability, slightly vuggy.
7/2/2011	1,390	1,400	Limestone: 100%, yellowish gray (5Y 7/2) and light gray (N7), very fine grained, well indurated, highly fossiliferous (pelecypod and gastropod casts and molds, echinoid spines), well sorted, low porosity, low permeability, slightly vuggy.
7/2/2011	1,400	1,410	Limestone: 100%, yellowish gray (5Y 7/2), very fine grained, moderately to well indurated, highly fossiliferous (pelecypods, abundant whole echinoids 5-10 mm in diameter), well sorted, low porosity, low permeability.
7/2/2011	1,410	1,420	Limestone: 100%, yellowish gray (5Y 7/2), fine grained, well indurated, highly fossiliferous (pelecypods, sparse echinoids), less well sorted, low to moderate porosity, low permeability.
7/2/2011	1,420	1,430	Limestone: 100%, very pale orange (5YR 8/2), fine grained, well indurated, highly fossiliferous (Dictyoconus, Lituonella, Fabiana, Echinoid spines), well sorted, low to moderate intergranular porosity, moderate permeability.
7/2/2011	1,430	1,440	Limestone: 100%, very pale orange (5YR 8/2) to light olive gray (5Y 6/1), fine grained, poorly indurated, friable, highly fossiliferous (Dictyoconus), well sorted, moderate intergranular porosity, moderate permeability.
7/2/2011	1,440	1,450	Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained, well indurated, fossiliferous (pelecypods, Dictyoconus), well sorted, low intergranular porosity, vugs, low permeability.
7/2/2011	1,450	1,460	Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained, well indurated, fossiliferous (Dictyoconus, Lituonella, gastropod molds), well sorted, low intergranular porosity, vugs, low permeability.
7/2/2011	1,460	1,470	Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained, well indurated, fossiliferous (Dictyoconus, Archaias), well sorted, low intergranular porosity, low permeability.

MHC

Florida Power & Light Company
Turkey Point
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	Depth (ft. bpl) To	Observer's Description
7/2/2011	1,470	1,480	Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained with calcite replacement, moderately indurated, fossiliferous (Dictyoconus, shell), well sorted, moderate intergranular porosity, vugs, moderate permeability.
7/2/2011	1,480	1,490	Limestone: 100%, pale yellowish brown (10YR 6/2), fine grained, moderately indurated, fossiliferous (Dictyoconus), well sorted, moderate intergranular porosity, vugs, moderate permeability, black to dark gray trace mineral.
7/2/2011	1,490	1,500	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, well indurated, well sorted, low intergranular porosity, low permeability.
7/2/2011	1,500	1,510	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, well indurated, slightly fossiliferous (Dictyoconus, whole echinoid), well sorted, low intergranular porosity, low permeability.
7/2/2011	1,510	1,520	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderately to well indurated, slightly fossiliferous (Dictyoconus, echinoids), well sorted, low to moderate intergranular porosity, low permeability; Dolomite trace.
7/2/2011	1,520	1,530	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderately to poorly indurated, fossiliferous (Dictyoconus, abundant echinoids, sparse pelecypods), well sorted, low to moderate intergranular porosity, low permeability.
7/2/2011	1,530	1,540	Limestone: 100%, partially dolomitized, pale yellowish brown (10YR 6/2), very fine grained, well indurated, slightly fossiliferous (Dictyoconus, echinoid spines), well sorted, low intergranular porosity, low permeability.
7/2/2011	1,540	1,550	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderately indurated, slightly fossiliferous (Dictyoconus and other foraminifera), moderately well sorted, moderate intergranular porosity, low permeability.
7/2/2011	1,550	1,560	Limestone: 80%, pale yellowish brown (10YR 6/2), very fine grained, moderately indurated, fossiliferous (Dictyoconus and other foraminifera abundant), well sorted, moderate to high intergranular porosity, low permeability, vuggy. Limestone: 20%, yellowish gray (5Y 8/1), very fine grained, moderately indurated, well sorted, low intergranular porosity, low permeability.
7/3/2011	1,560	1,570	Limestone: pale yellowish brown (10YR 6/2), very fine grained, well indurated, slightly fossiliferous (sparse Dictyoconus), well sorted, low intergranular porosity, low permeability.
7/3/2011	1,570	1,580	Limestone: yellowish gray (5Y 8/1), very fine grained, well indurated, well sorted, low intergranular porosity, low permeability.
7/3/2011	1,580	1,590	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, well indurated, highly fossiliferous (Dictyoconus, echinoids, and echinoid spines abundant), moderately well sorted, low intergranular porosity, low permeability.
7/3/2011	1,590	1,600	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderately indurated, generally devoid of large benthic foraminifera (Dictyoconus and Archaias observed), well sorted, low intergranular porosity, low permeability.
7/3/2011	1,600	1,610	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderate to low induration, fossiliferous (benthic foraminifera Dictyoconus and Valvulina observed), well sorted, low intergranular porosity, low permeability, dark gray accessory mineral.
7/3/2011	1,610	1,620	Limestone: 100%, pale yellowish brown (10YR 6/2) to pinkish gray (5YR 7/1), very fine grained, moderate to low induration, fossiliferous (benthic foraminifera Dictyoconus; echinoids), well sorted, moderate intergranular porosity, low permeability.
7/3/2011	1,620	1,630	Limestone: 100%, grayish orange (10YR 7/4), very fine grained, moderate to low induration, fossiliferous (benthic foraminifera Dictyoconus; echinoids), well sorted, moderate intergranular porosity, moderate permeability.

MHC

Florida Power & Light Company
Turkey Point
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	Depth (ft. bpl) To	Observer's Description
7/3/2011	1,630	1,640	Limestone: 100%, grayish orange (10YR 7/4), very fine grained, low induration, fossiliferous (mostly benthic foraminifera Dictyoconus), well sorted, moderate to high intergranular porosity, moderate permeability.
7/3/2011	1,640	1,650	Limestone: 100%, pale yellowish brown (10YR 6/2), very fine grained, moderate induration, fossiliferous (Dictyoconus, Borelis, casts of benthic foraminifera), sparry calcite cement, well sorted, moderate to high intergranular porosity, moderate permeability.

ft. bpl = feet below pad level

Attachment B

Pilot Hole Water Quality Analytical Report

Florida Spectrum Environmental Services, Inc.

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71285

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1100 Ft
Collected: 06/30/11 18:30
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	1228		uS/cm	0.1	0.3	120.1	07/06 08:54	07/06 08:54	DGK
Chloride	61.3		mg/L	1.10	3.30	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.04		mg/L	0.01	0.03	350.1	07/06 14:11	07/06 14:11	RPV
Nitrogen (Kjeldahl) as "N"	0.55		mg/L	0.070	0.210	351.2	07/12 06:00	07/12 09:03	MSG
Total Dissolved Solids (TDS)	610		mg/L	1.00	3.00	SM 2540C	07/06 13:02	07/07 14:42	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

Analytes not currently NELAC certified denoted by ~.
Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71286

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1190 Ft
Collected: 07/01/11 10:30
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	1177		uS/cm	0.1	0.3	120.1	07/06 08:54	07/06 08:54	DGK
Chloride	85.5		mg/L	1.10	3.30	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.06		mg/L	0.01	0.03	350.1	07/06 14:12	07/06 14:12	RPV
Nitrogen (Kjeldahl) as "N"	0.59		mg/L	0.070	0.210	351.2	07/12 06:00	07/12 09:03	MSG
Total Dissolved Solids (TDS)	768		mg/L	1.00	3.00	SM 2540C	07/06 13:02	07/07 14:42	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

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Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

W. Castellanos
Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71287

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1255 Ft
Collected: 07/01/11 15:30
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	1167		uS/cm	0.1	0.3	120.1	07/06 08:54	07/06 08:54	DGK
Chloride	97.3		mg/L	1.10	3.30	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.03		mg/L	0.01	0.03	350.1	07/06 14:12	07/06 14:12	RPV
Nitrogen (Kjeldahl) as "N"	0.56		mg/L	0.070	0.210	351.2	07/12 06:00	07/12 09:03	MSG
Total Dissolved Solids (TDS)	776		mg/L	1.00	3.00	SM 2540C	07/06 13:03	07/07 14:43	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

Analytes not currently NELAC certified denoted by ".
Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71288

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1345 Ft
Collected: 07/01/11 21:40
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	2420		uS/cm	0.1	0.3	120.1	07/06 08:54	07/06 08:54	DGK
Chloride	551		mg/L	1.10	3.30	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.06		mg/L	0.01	0.03	350.1	07/06 14:12	07/06 14:12	RPV
Nitrogen (Kjeldahl) as "N"	0.42		mg/L	0.070	0.210	351.2	07/12 06:01	07/12 09:03	MSG
Total Dissolved Solids (TDS)	1428		mg/L	1.00	3.00	SM 2540C	07/06 13:03	07/07 14:43	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

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Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71289

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1435 Ft
Collected: 07/02/11 06:10
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	2900		uS/cm	0.1	0.3	120.1	07/06 08:54	07/06 08:54	DGK
Chloride	640		mg/L	2.20	6.60	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.08		mg/L	0.01	0.03	350.1	07/06 14:13	07/06 14:13	RPV
Nitrogen (Kjeldahl) as "N"	0.44		mg/L	0.070	0.210	351.2	07/12 06:01	07/12 09:03	MSG
Total Dissolved Solids (TDS)	1736		mg/L	1.00	3.00	SM 2540C	07/06 13:03	07/07 14:43	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

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Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71290

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1525 Ft
Collected: 07/02/11 19:30
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	6760		uS/cm	0.1	0.3	120.1	07/06 08:55	07/06 08:55	DGK
Chloride	2045		mg/L	5.50	16.50	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.09		mg/L	0.01	0.03	350.1	07/06 14:16	07/06 14:16	RPV
Nitrogen (Kjeldahl) as "N"	0.35		mg/L	0.070	0.210	351.2	07/12 06:00	07/12 09:03	MSG
Total Dissolved Solids (TDS)	4168		mg/L	1.00	3.00	SM 2540C	07/06 13:04	07/07 14:44	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

Analytes not currently NELAC certified denoted by ".
Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services, Inc.
Certification # E86006

Report To:
Brooke Allen
Layne Christensen Co-FL
5061 Luckett Road
Fort Myers, FL 33905

Report Printed: 07/15/11 Rev. 1
Submission # 1107000027
Order # 71291

Project: Pilot Hole WQ EW-1 Analysis
Site Location: Turkey Point, Homestead, FL
Matrix: Water

Sample I.D.: EW1-PH-1615 Ft
Collected: 07/03/11 05:25
Received: 07/05/11 13:10
Collected by: Client

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Specific Conductance (grab)	5660		uS/cm	0.1	0.3	120.1	07/06 08:55	07/06 08:55	DGK
Chloride	1670		mg/L	5.50	16.50	300.0	07/05 16:48	07/05 16:48	DGK
Nitrogen (Ammonia) as N	0.08		mg/L	0.01	0.03	350.1	07/06 14:17	07/06 14:17	RPV
Nitrogen (Kjeldahl) as "N"	0.45		mg/L	0.070	0.210	351.2	07/12 06:00	07/12 09:03	MSG
Total Dissolved Solids (TDS)	3548		mg/L	1.00	3.00	SM 2540C	07/06 13:00	07/07 14:44	LYR

Unless indicated, soil results are reported based on actual (wet) weight basis.

Analytes not currently NELAC certified denoted by ~.
Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.
Results relate only to this sample.
QC=Qualifier Codes as defined by DEP 62-160
U=Analyzed for but not detected.
Q=Sample held beyond accepted holding time.
I=Value is between MDL and PQL.
J=Estimated value.

Authorized CSM Signature (954) 978-6400
Florida-Spectrum Environmental Services,Inc.
Certification # E86006

Attachment C

EW-1 Geophysical Logs

MV Geophysical

X-Y CALIPER GAMMA RAY LOG

Company Layne Christensen Company
Well Turkey Point EW-1
Field Florida City
County Miami-Dade
State/Prv Florida

Company Layne Christensen Company

Well Turkey Point EW-1

Field Florida City

County Miami-Dade State/Prv Florida

Location
FPL Turkey Point Power Plant
LAT: 25 25' 19" N LONG: 80 20' 08" W
McNabb Hydrogeologic Consulting, Inc.

Other Services
XY/GR,FCT
DIL,BHC
FLO,TDS

Permanent Datum	Pad Level	Elevation
Log Measured From	Pad Level	
Drilling Measured From	Pad Level	

Elevation
K.B.
D.F.
G.L.

Date	12-JUL-2011		
Run Number	SIX-d		
Depth Driller	1655'		
Depth Logger	1654'		
Bottom Logged Interval	1654'		
Top Log Interval	1045'		
Open Hole Size	12.25"		
Type Fluid	H2O		
Density / Viscosity	NA/NA		
Max. Recorded Temp.	see FCT log		
Estimated Cement Top	SURFACE		
Time Well Ready	01:15 7/12/2011		
Time Logger on Bottom	01:45 7/12/2011		
Equipment Number	MVGS-1		
Location	Ft. Myers		
Recorded By	S.Miller		
Witnessed By	S.Durall (MHC)	K.Greuel (LCC)	

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
ONE	12.25"	SURFACE	255'				1655'
TWO	62.5"	SURFACE	259'				
THREE	12.25"	255'	1090'				
FOUR	52.5"	255'	1095'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	64"	0.375" WT	SURFACE	33'
Prot. String	54"	0.375" WT	SURFACE	255'
Production String	44"	0.375" WT	SURFACE	1090'
Liner				LTP1.db
Invoice No.	2011102	P.O. #:	8fld/las/pdf	* FINAL PRINT *

<< Fold Here >>>

Comments

MAXIMUM Caliper Arm Extensions: 33"

BOREHOLE VOLUMES IN CUBIC FEET

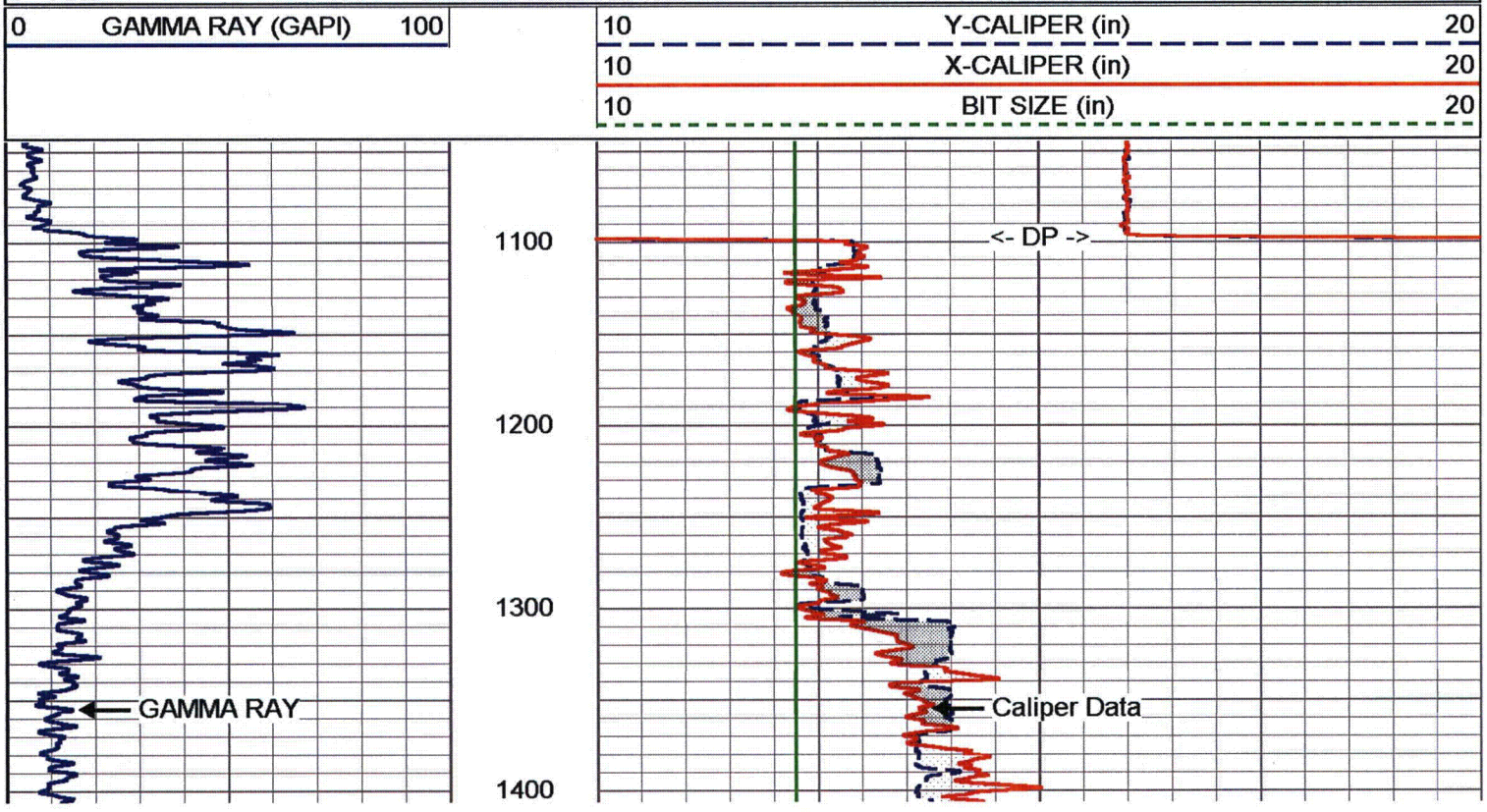
Drill Pipe set to 1098'

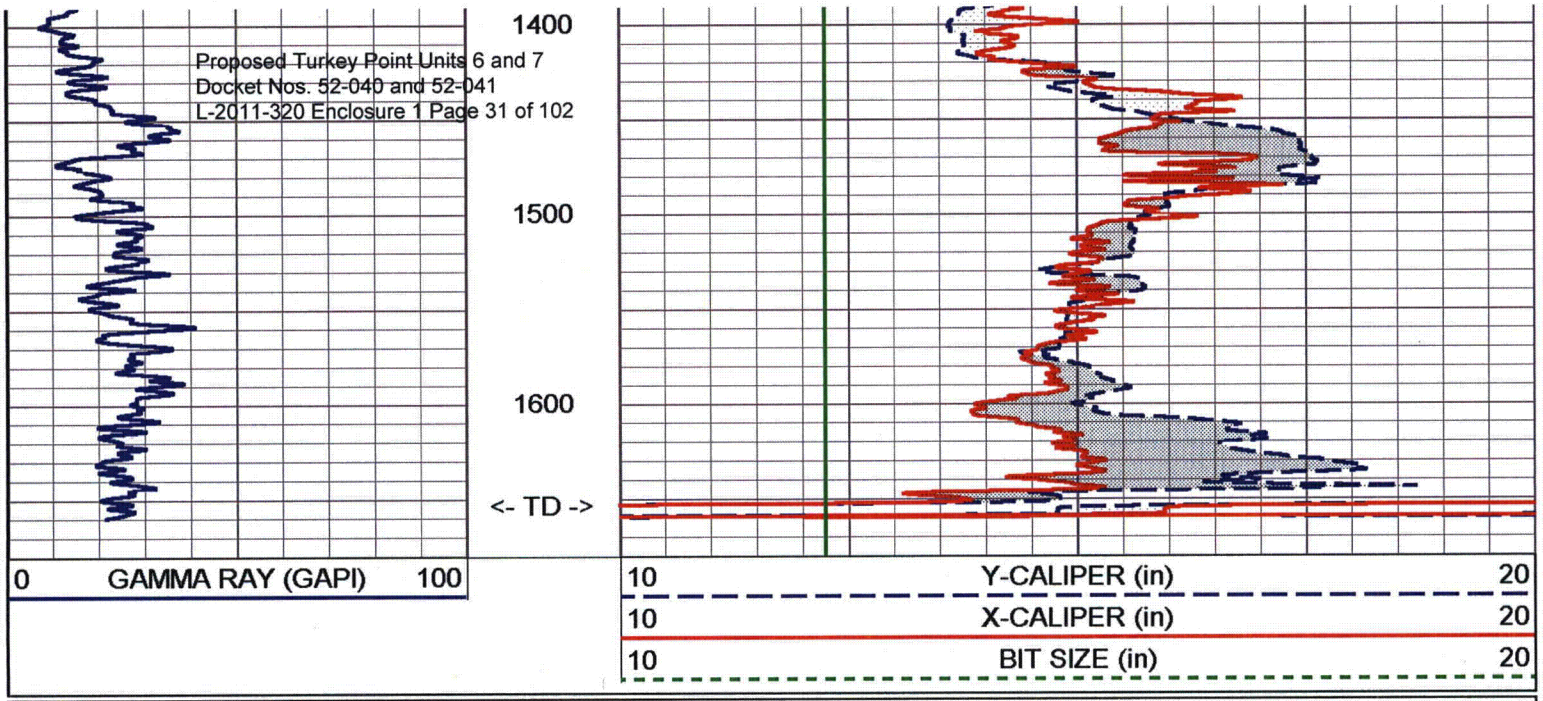
Full Riser / Hydraulic Packoff

MV Geophysical

MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	XY1020-1
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:1200

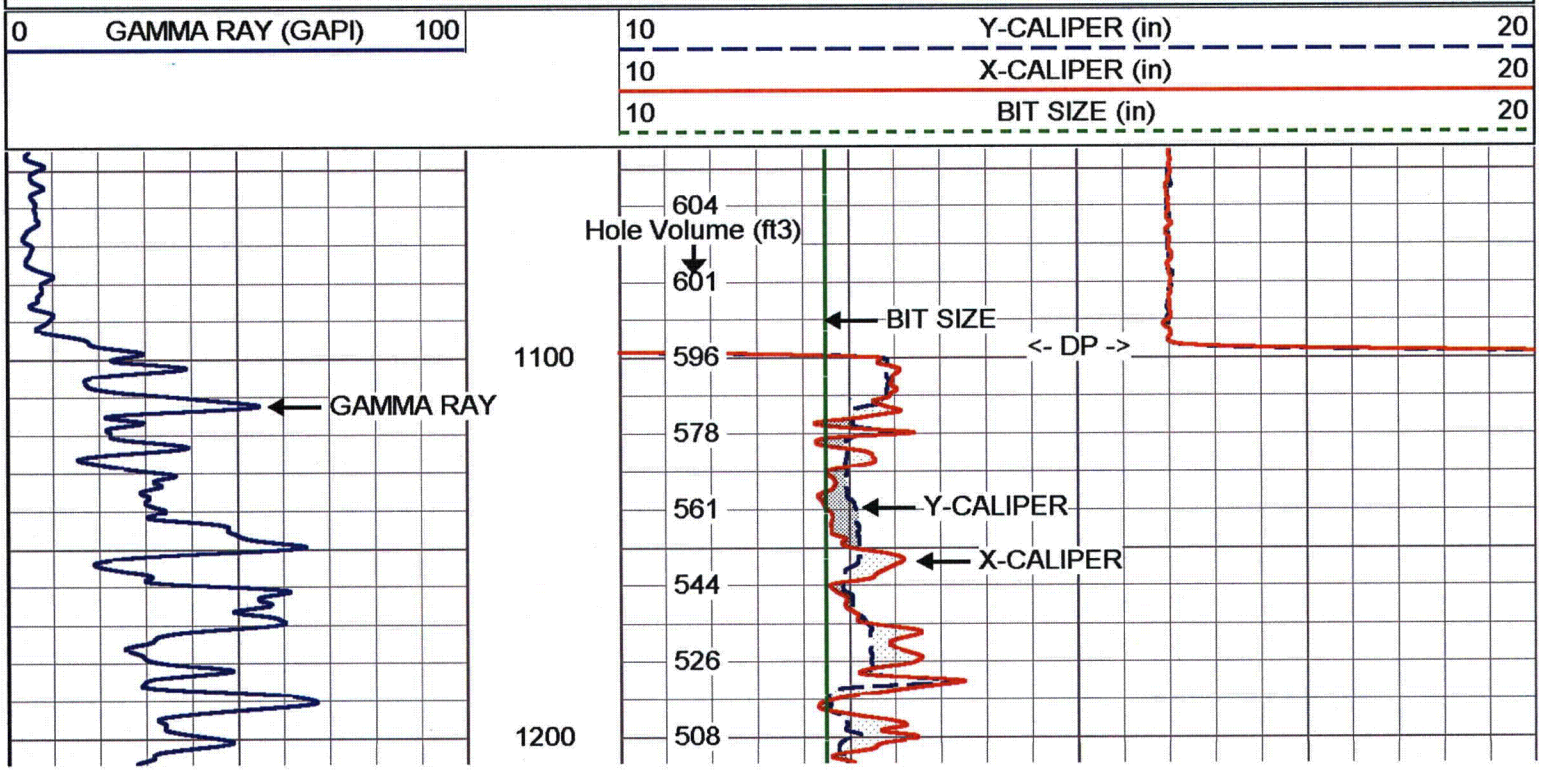


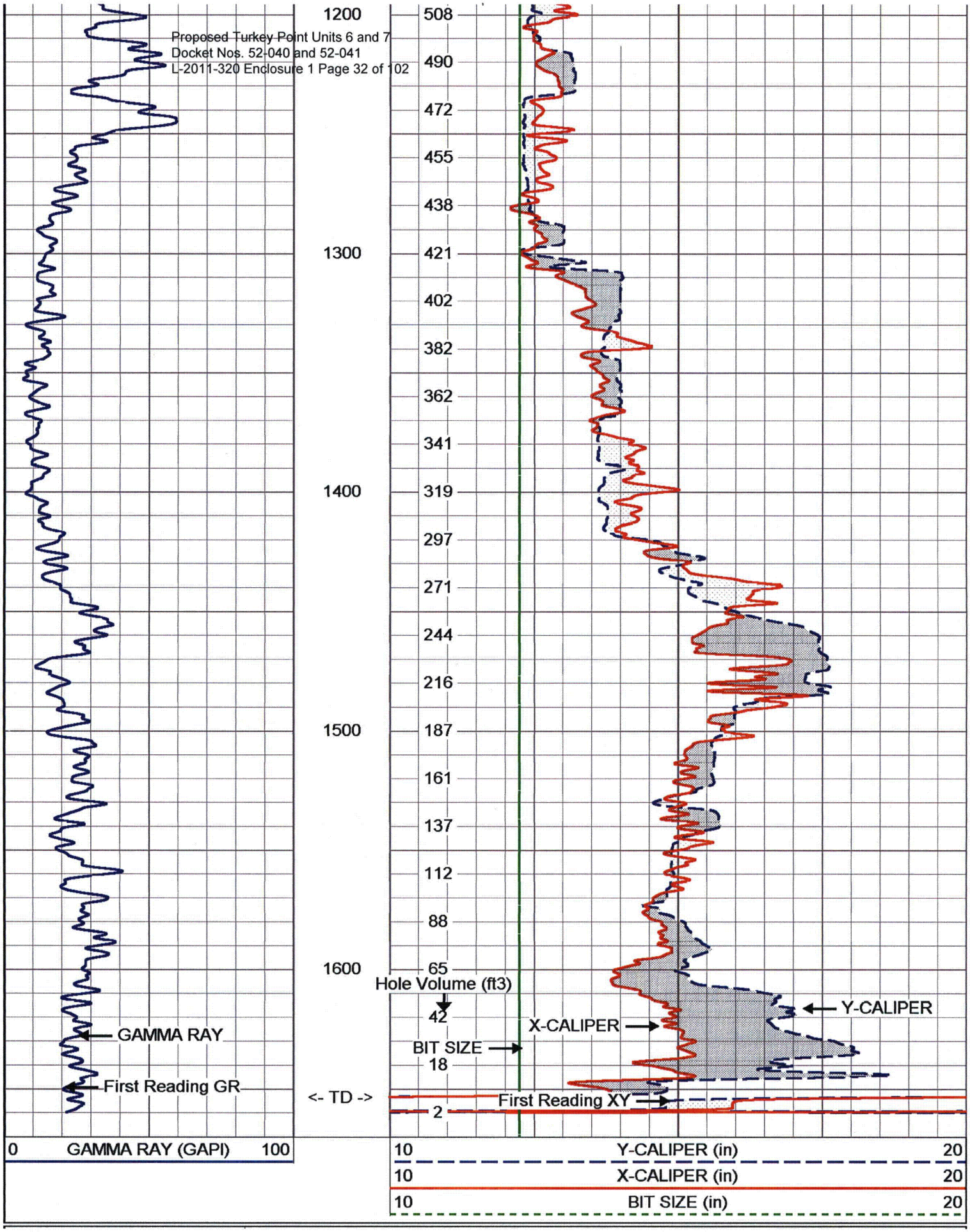


MV Geophysical

MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	XY1020-5
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:600

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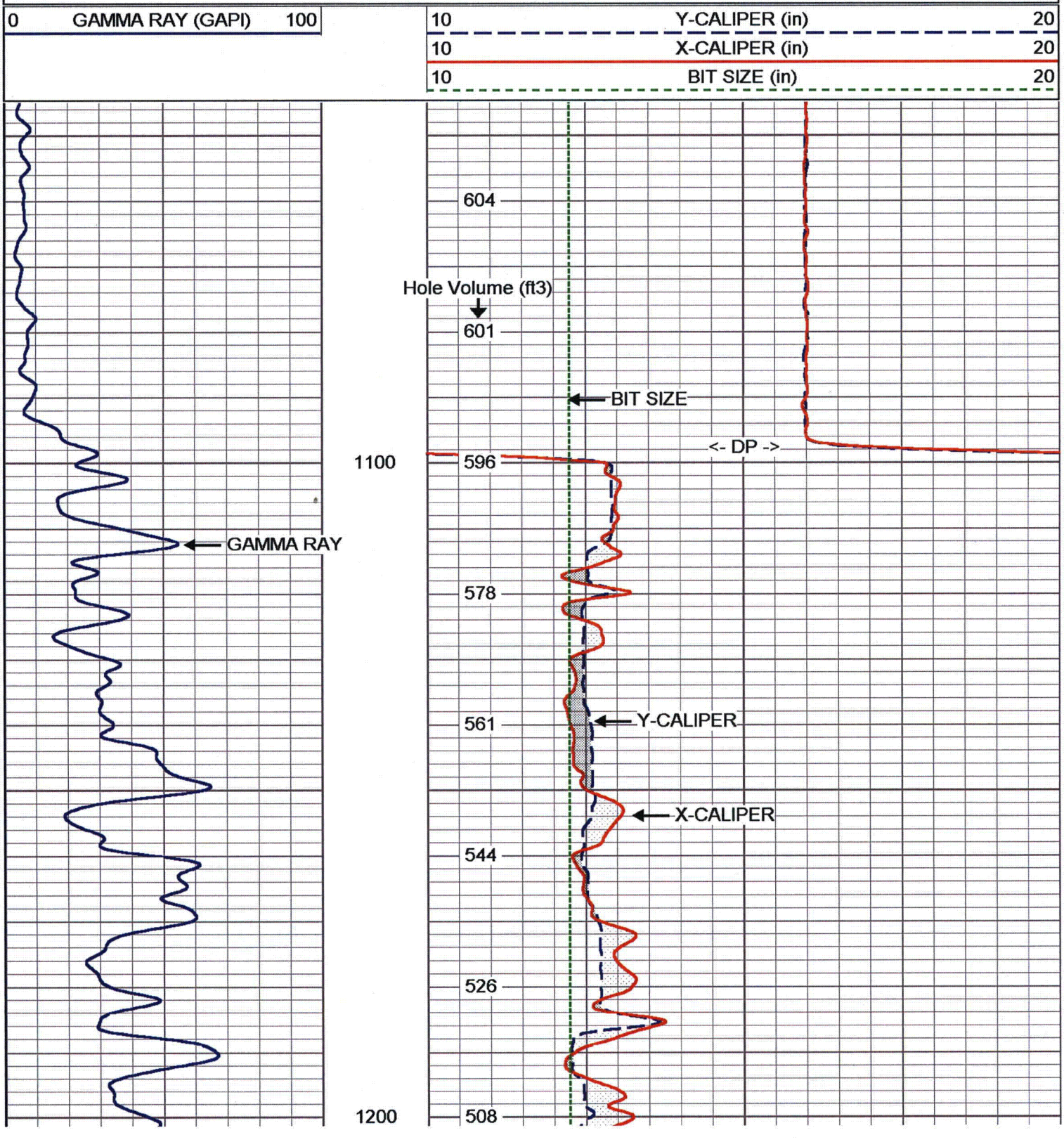
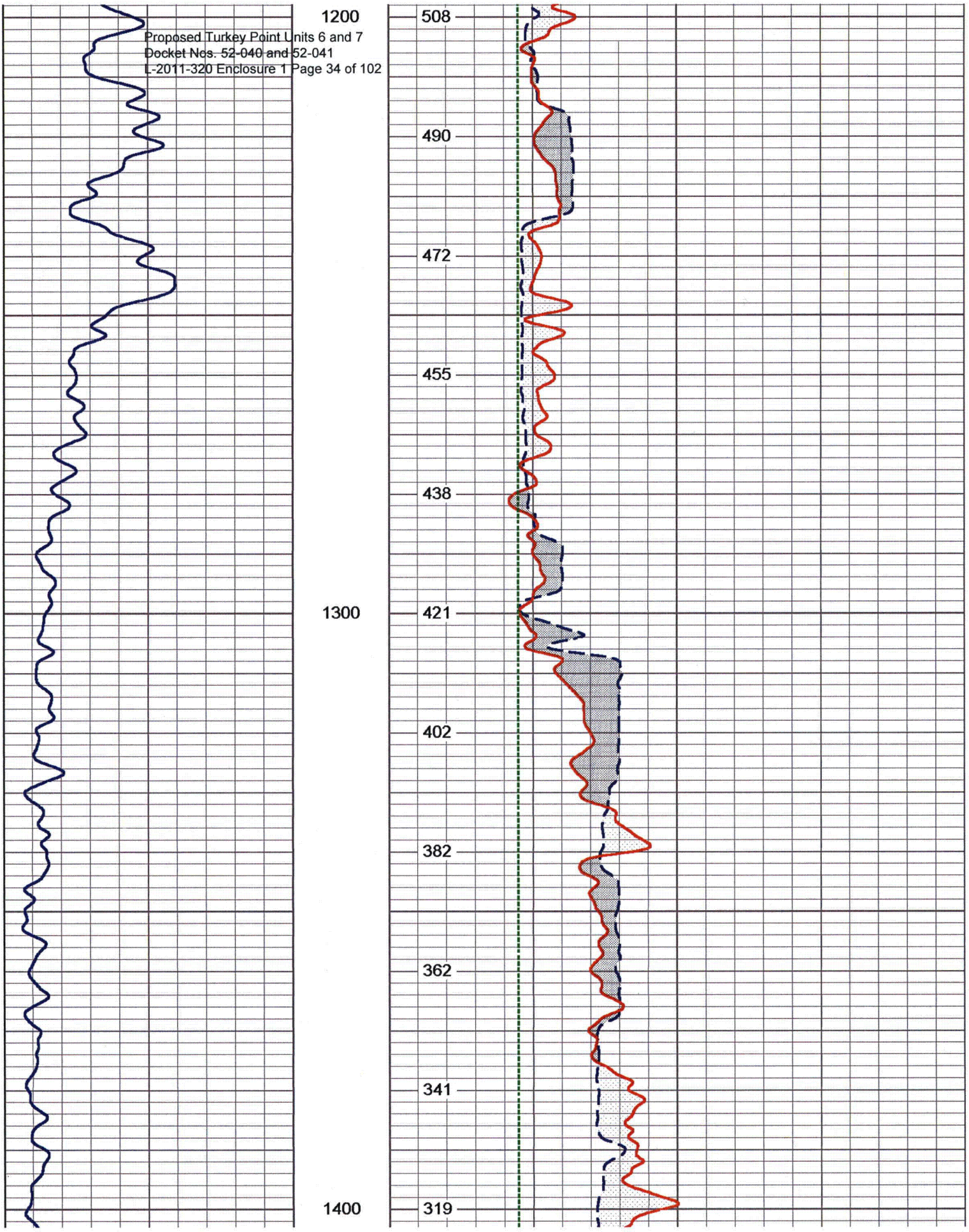
1300
1400
1500
1600
508
490
472
455
438
421
402
382
362
341
319
297
271
244
216
187
161
137
112
88
65
Hole Volume (ft3)
42
18
2
<- TD ->
GAMMA RAY
First Reading GR
X-CALIPER
Y-CALIPER
BIT SIZE
First Reading XY
0
GAMMA RAY (GAPI)
100
10
Y-CALIPER (in)
20
10
X-CALIPER (in)
20
10
BIT SIZE (in)
20

MV Geophysical

MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	XY1020-5
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:240

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1300
1400
508
490
472
455
438
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382
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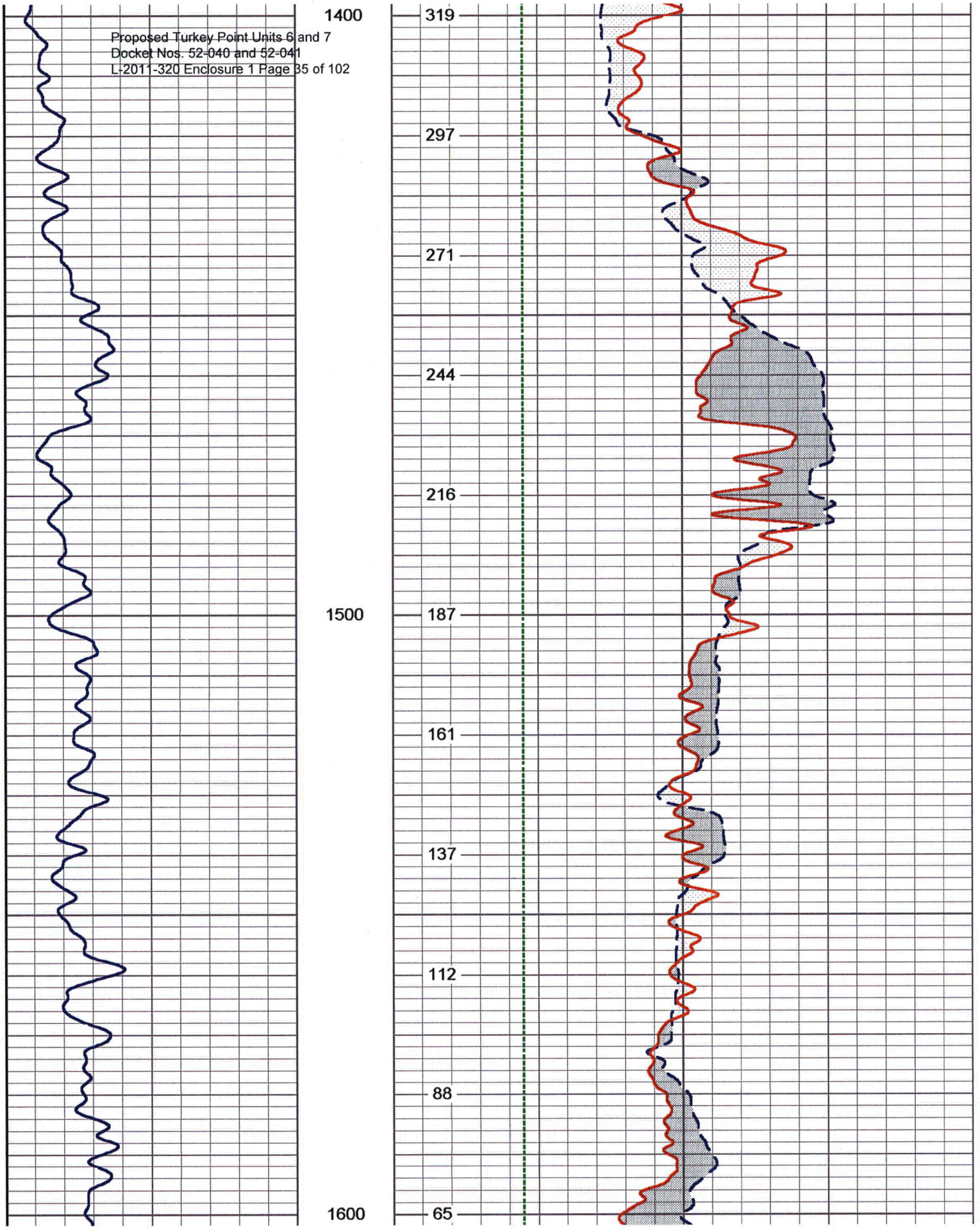
341
319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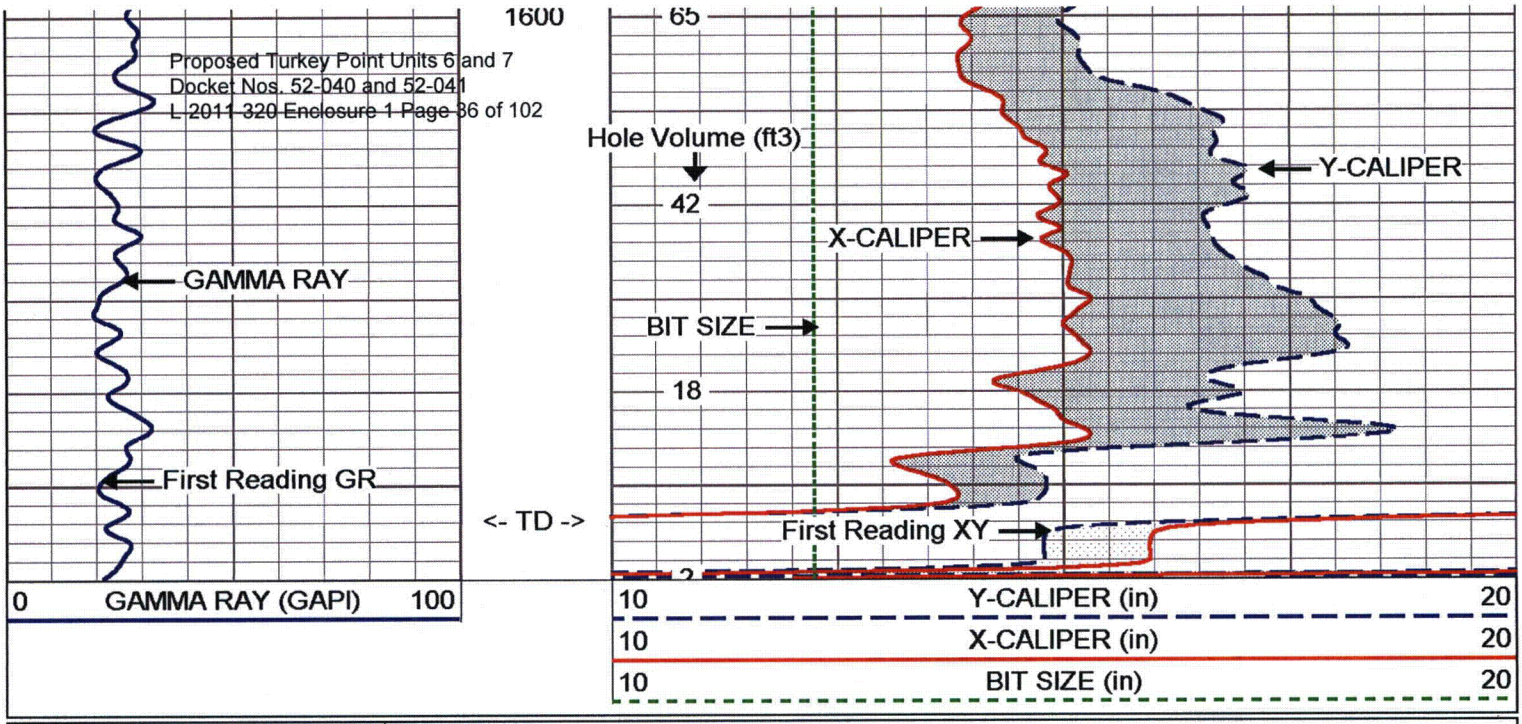
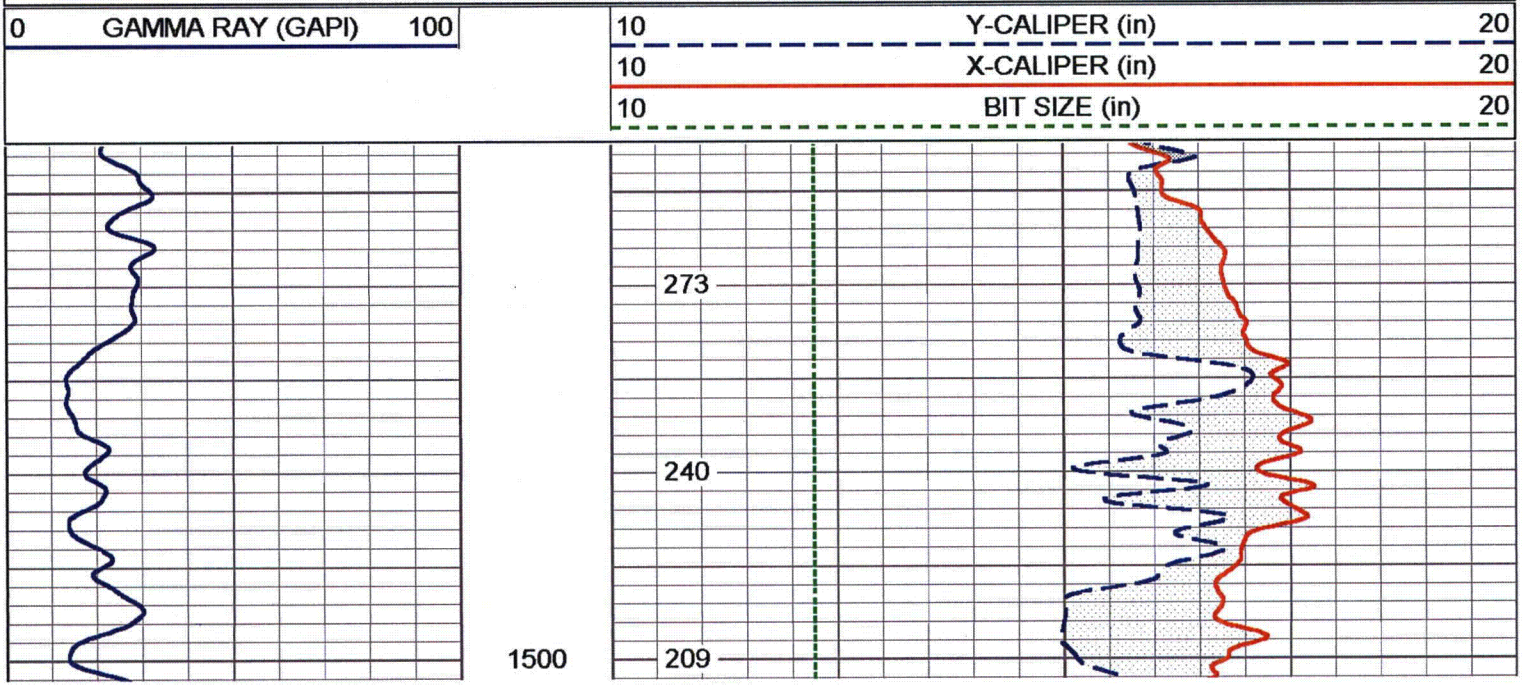
1500
1600
319
297
271
244
216
187
161
137
112
88
65

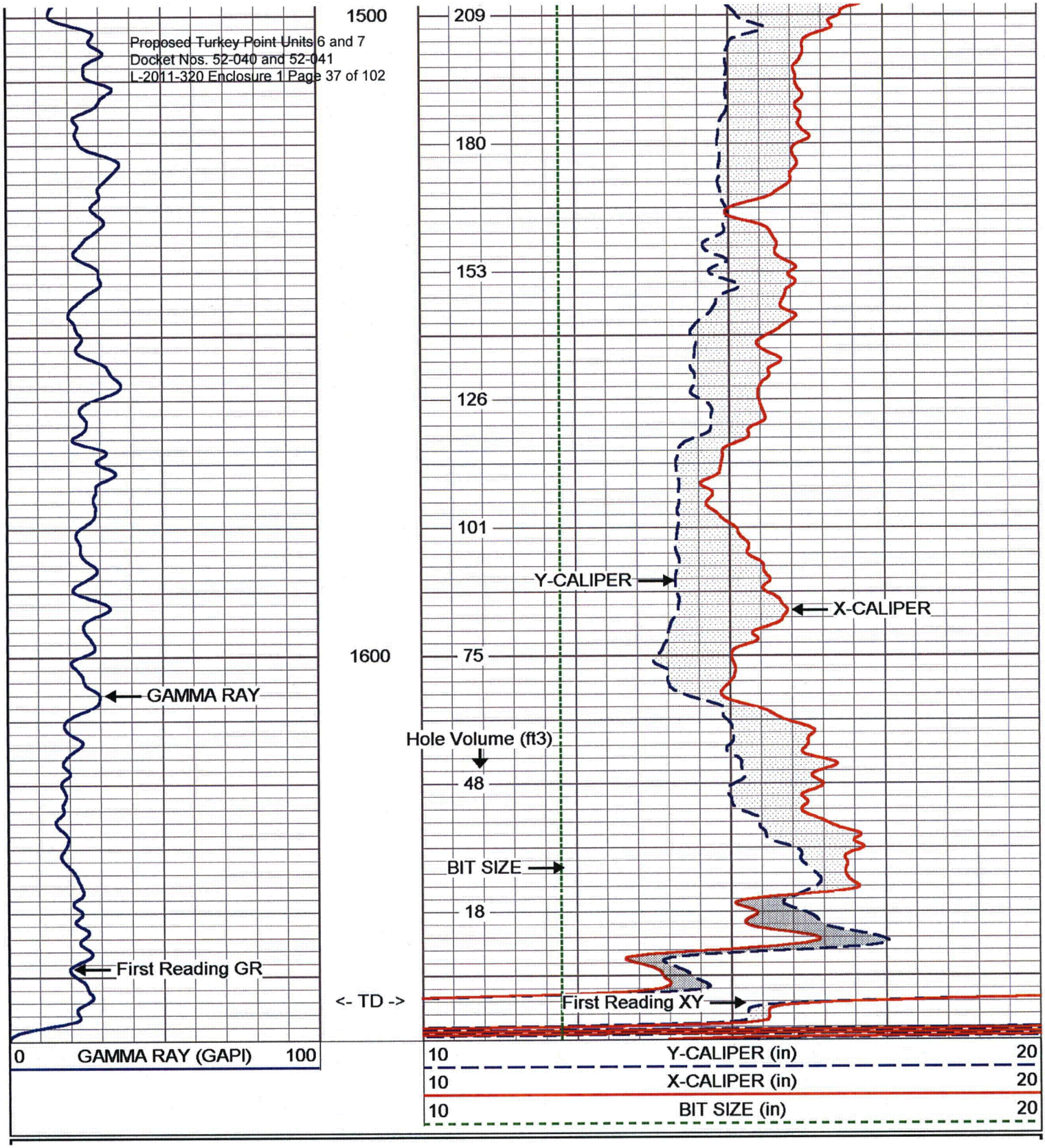


MV Geophysical

REPEAT SECTION

Database File:	ltp1.db
Dataset Pathname:	run7/repeat
Presentation Format:	XY1020-5
Dataset Creation:	Tue Jul 12 02:40:15 2011
Charted by:	Depth in Feet scaled 1:240



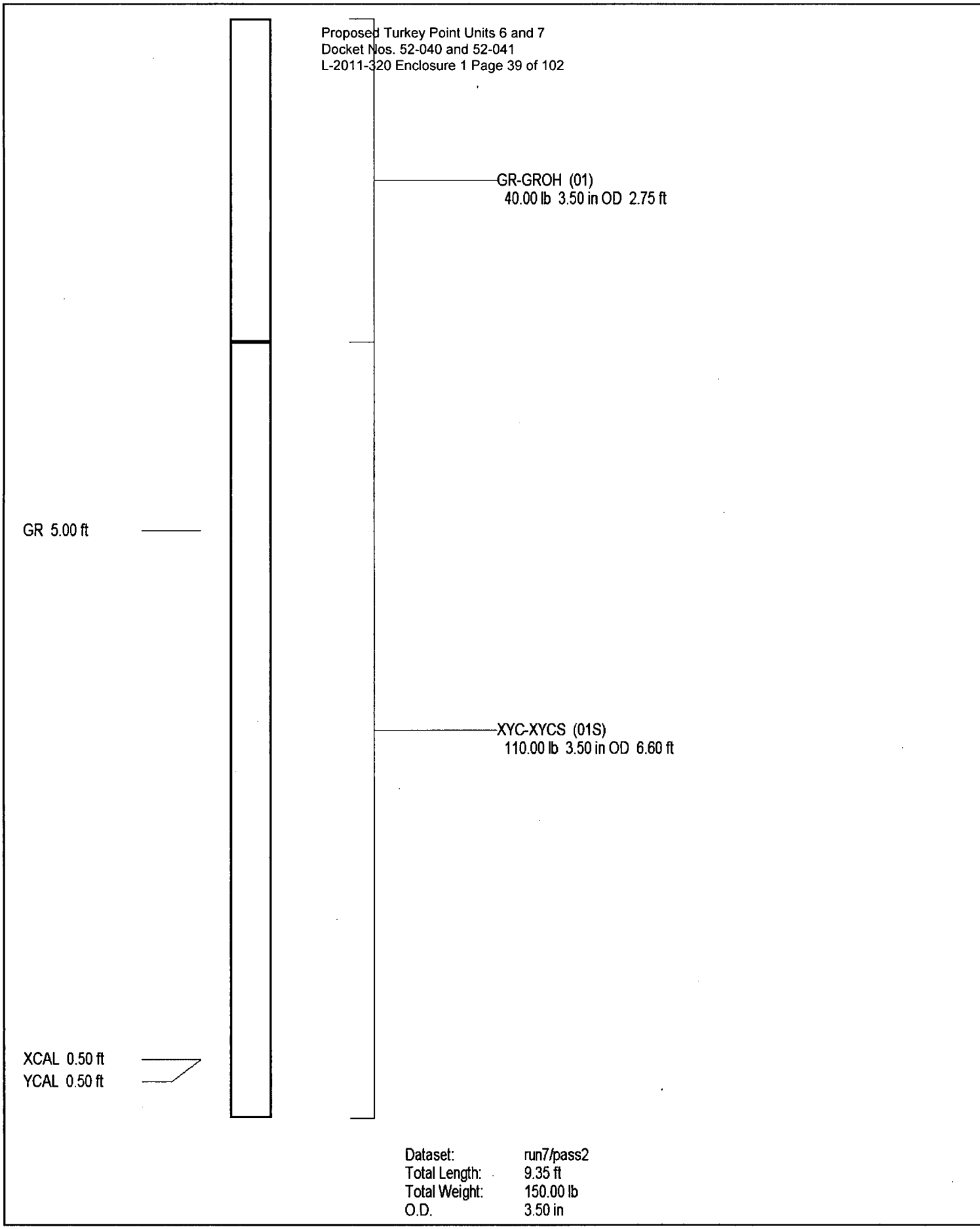

1500
1600
GAMMA RAY
First Reading GR
<- TD ->
0
GAMMA RAY (GAPI)
100
209
180
153
126
101
75
Y-CALIPER
X-CALIPER
Hole Volume (ft3)
48
BIT SIZE
18
First Reading XY
10
Y-CALIPER (in)
20
10
X-CALIPER (in)
20
10
BIT SIZE (in)
20

XY Caliper Calibration Report

Serial Number:	01S		
Tool Model:	XYCS		
Performed:	Tue Jul 12 02:16:20 2011		
Small Ring:	12.25	in	
Large Ring:	33	in	
	X Caliper	Y Caliper	
Reading with Small Ring:	729.2	754	cps
Reading with Large Ring:	1113	1072	cps
Gain:	0.0540646	0.0652516	
Offset:	-27.1739	-36.9497	

Gamma Ray Calibration Report

Serial Number:	01	
Tool Model:	GROH	
Performed:	Wed Jul 06 18:44:54 2011	
Calibrator Value:	120	GAPI
Background Reading:	14.214	cps
Calibrator Reading:	131.667	cps
Sensitivity:	1.02169	GAPI/cps



Dataset:	run7/pass2
Total Length:	9.35 ft
Total Weight:	150.00 lb
O.D.	3.50 in

MV Geophysical

Proposed Turkey Point Units 6 and 7
Docket Nos 52-040 and 52-041
L-2011-320 Enclosure 1 Page 40 of 102

DUAL INDUCTION LL3 / SP LOG

Company Layne Christensen Company
Well Turkey Point EW-1
Field Florida City
County Miami-Dade State/Prv Florida

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Well Turkey Point EW-1
Field Florida City
County Miami-Dade State/Prv Florida

Location
FPL Turkey Point Power Plant
LAT: 25 25' 19" N LONG: 80 20' 08" W
McNabb Hydrogeologic Consulting, Inc.

Other Services
XY/GR,FCT
DIL,BHC
FLO,TDS

Permanent Datum	Pad Level	Elevation
Log Measured From	Pad Level	
Drilling Measured From	Pad Level	

Elevation
K.B.
D.F.
G.L.

Date	12-JUL-2011		
Run Number	SIX-d		
Depth Driller	1655'		
Depth Logger	1654'		
Bottom Logged Interval	1652'		
Top Log Interval	1098'		
Open Hole Size	12.25"		
Type Fluid	H2O		
Density / Viscosity	NA/NA		
Max. Recorded Temp.	see FCT log		
Estimated Cement Top	SURFACE		
Time Well Ready	01:15 7/12/2011		
Time Logger on Bottom	06:45 7/12/2011		
Equipment Number	MVGS-1		
Location	Ft. Myers		
Recorded By	S.Miller		
Witnessed By	D.Daigle (ASRus)	K.Greuel (LCC)	

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
ONE	12.25"	SURFACE	255'				1655'
TWO	62.5"	SURFACE	259'				
THREE	12.25"	255'	1090'				
FOUR	52.5"	255'	1095'				

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	64"	0.375" WT	SURFACE	33'
Prot. String	54"	0.375" WT	SURFACE	255'
Production String	44"	0.375" WT	SURFACE	1090'
Liner				LTP1.db
Invoice No.	2011102	P.O. #:	8fld/las/pdf	* FINAL PRINT *

<< Fold Here >>>

Comments

Rm=1.761 ohm-m @ 78.9 degF

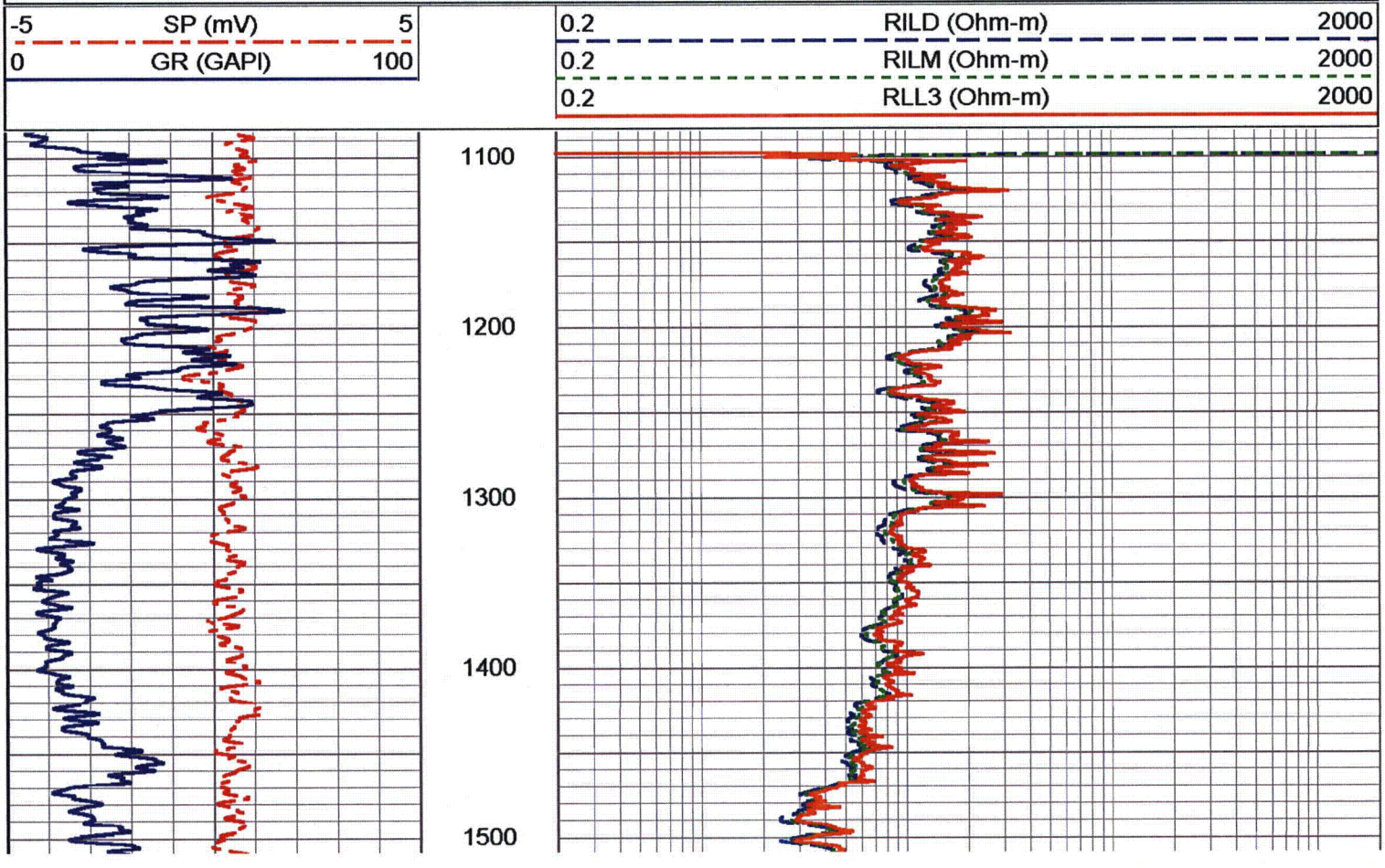
Drill Pipe set to 1098'

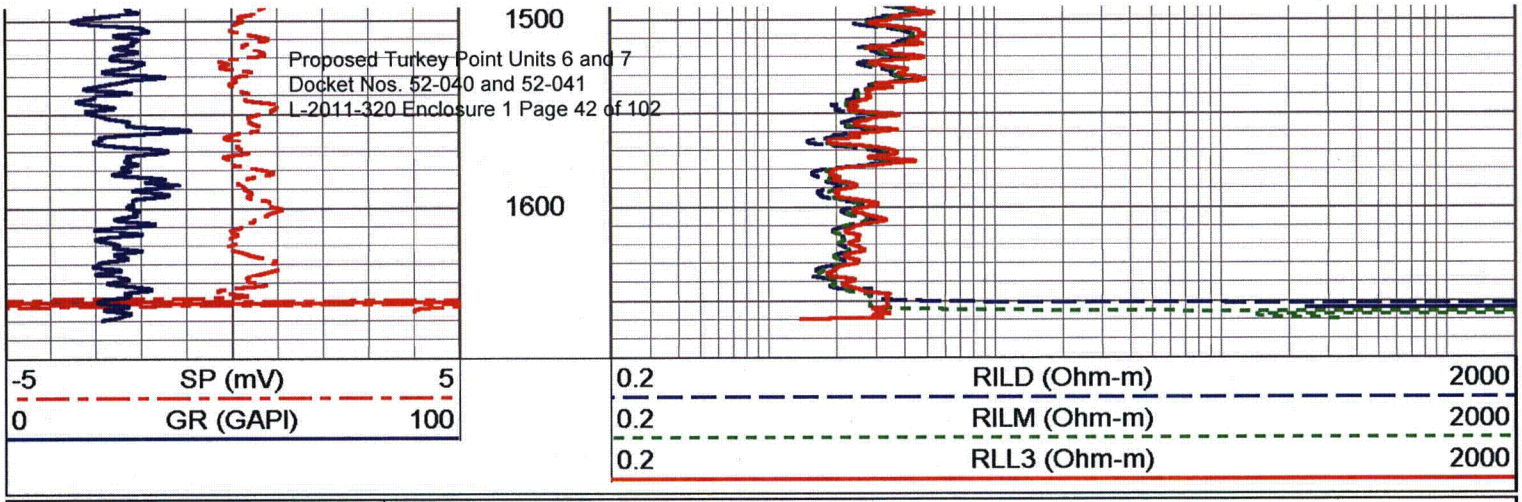
Full Riser / Hydraulic Packoff

MV Geophysical

MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	DIL-1
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:1200

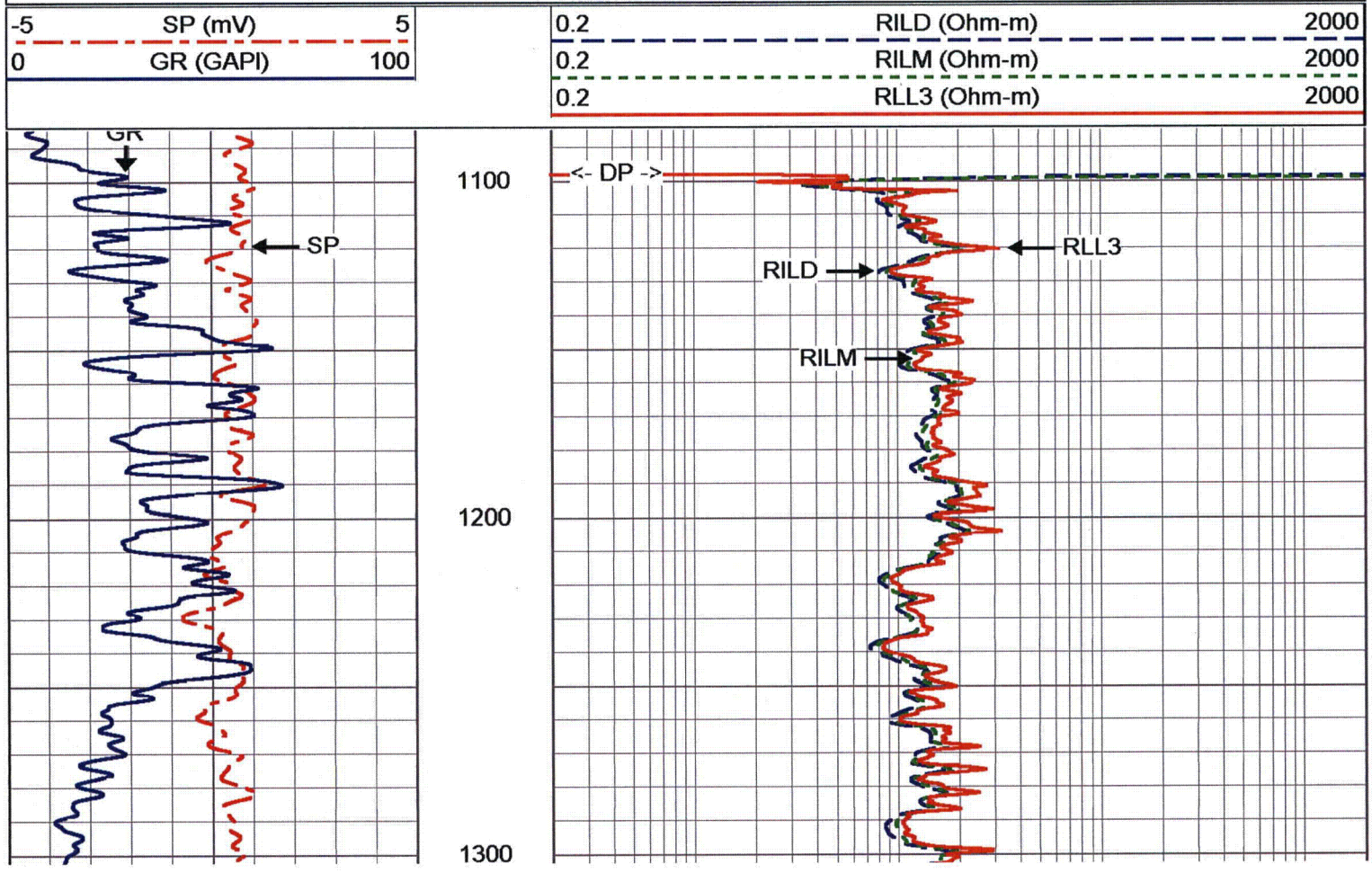


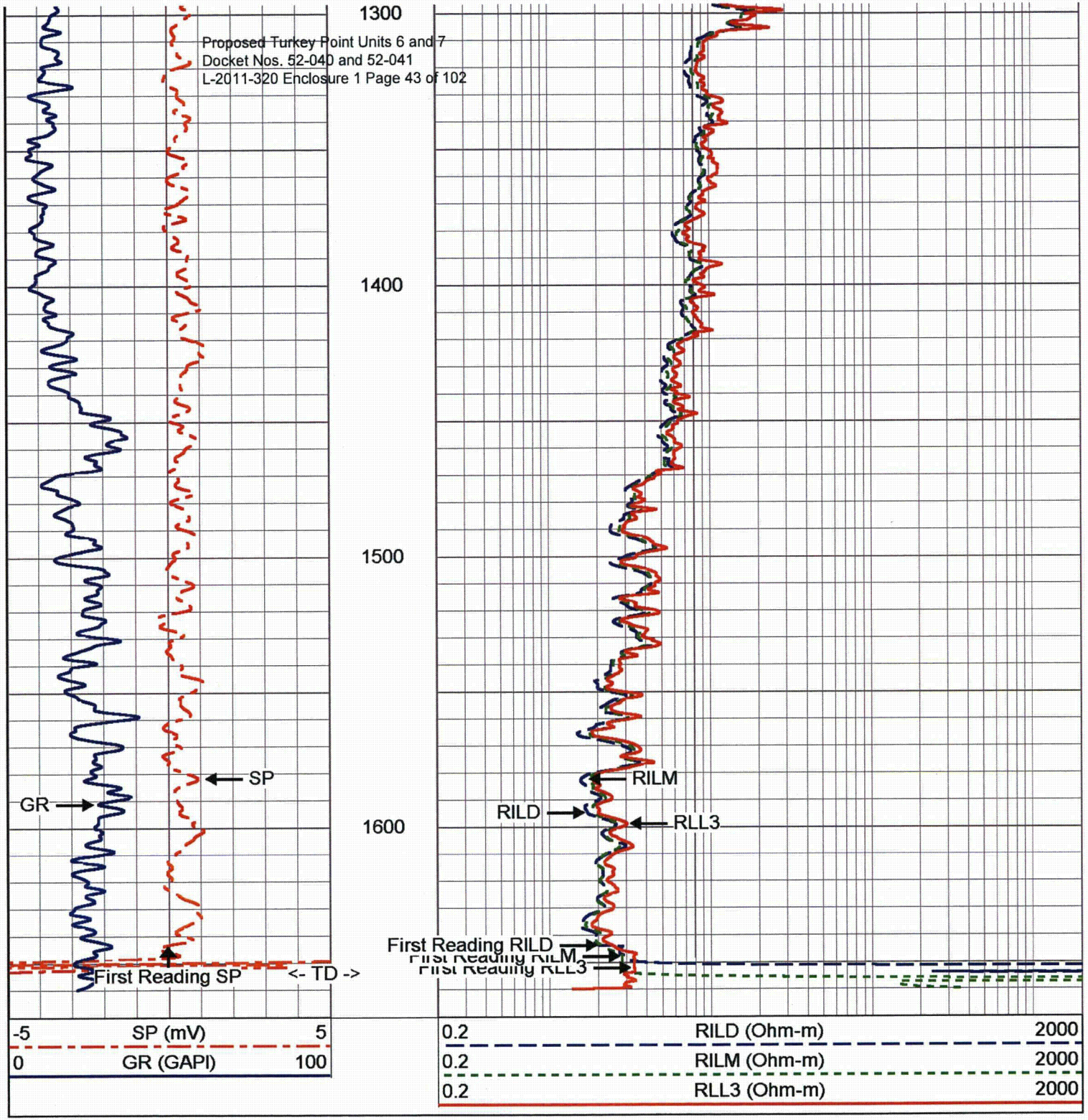


MV Geophysical

MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	DIL-5
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:600

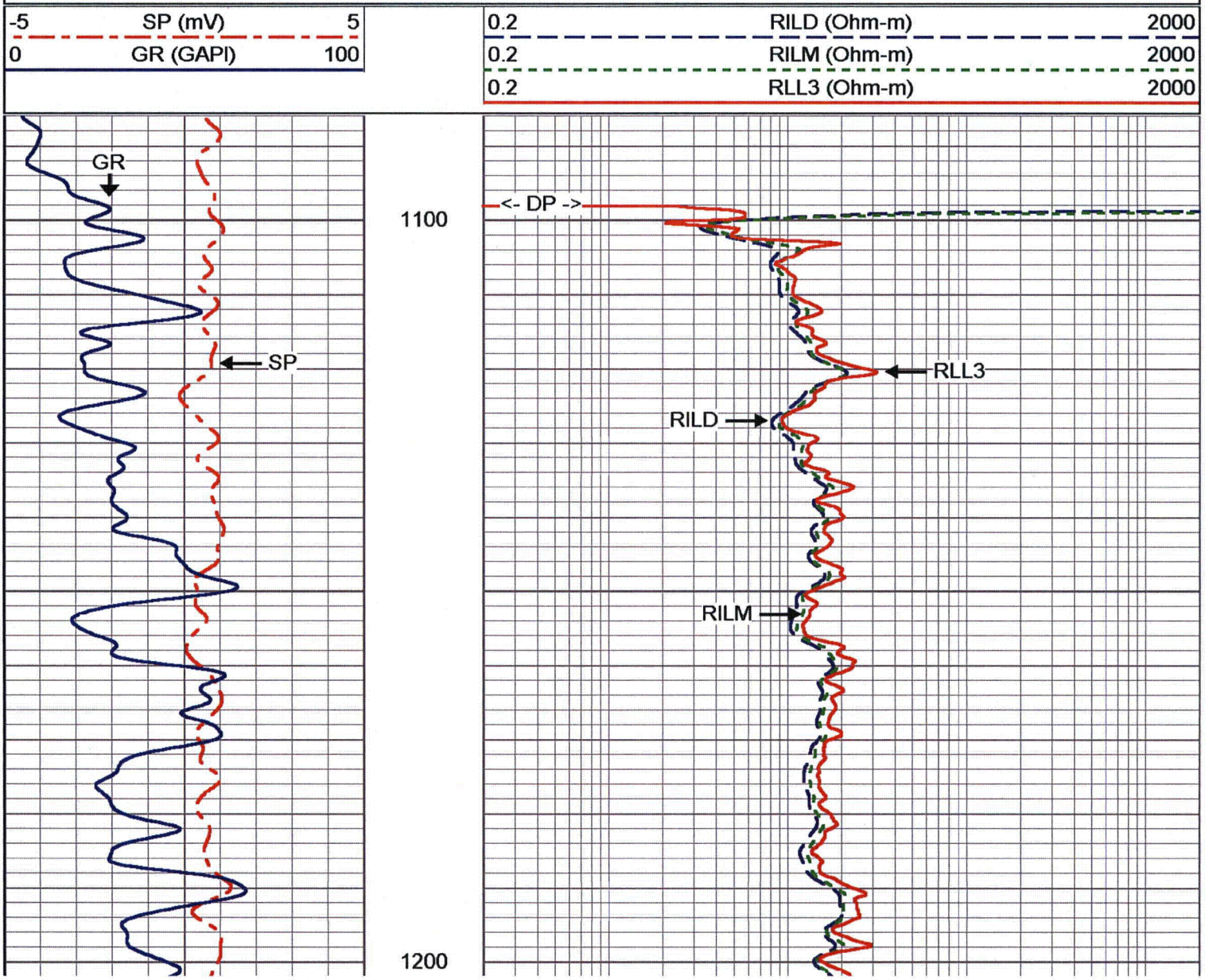


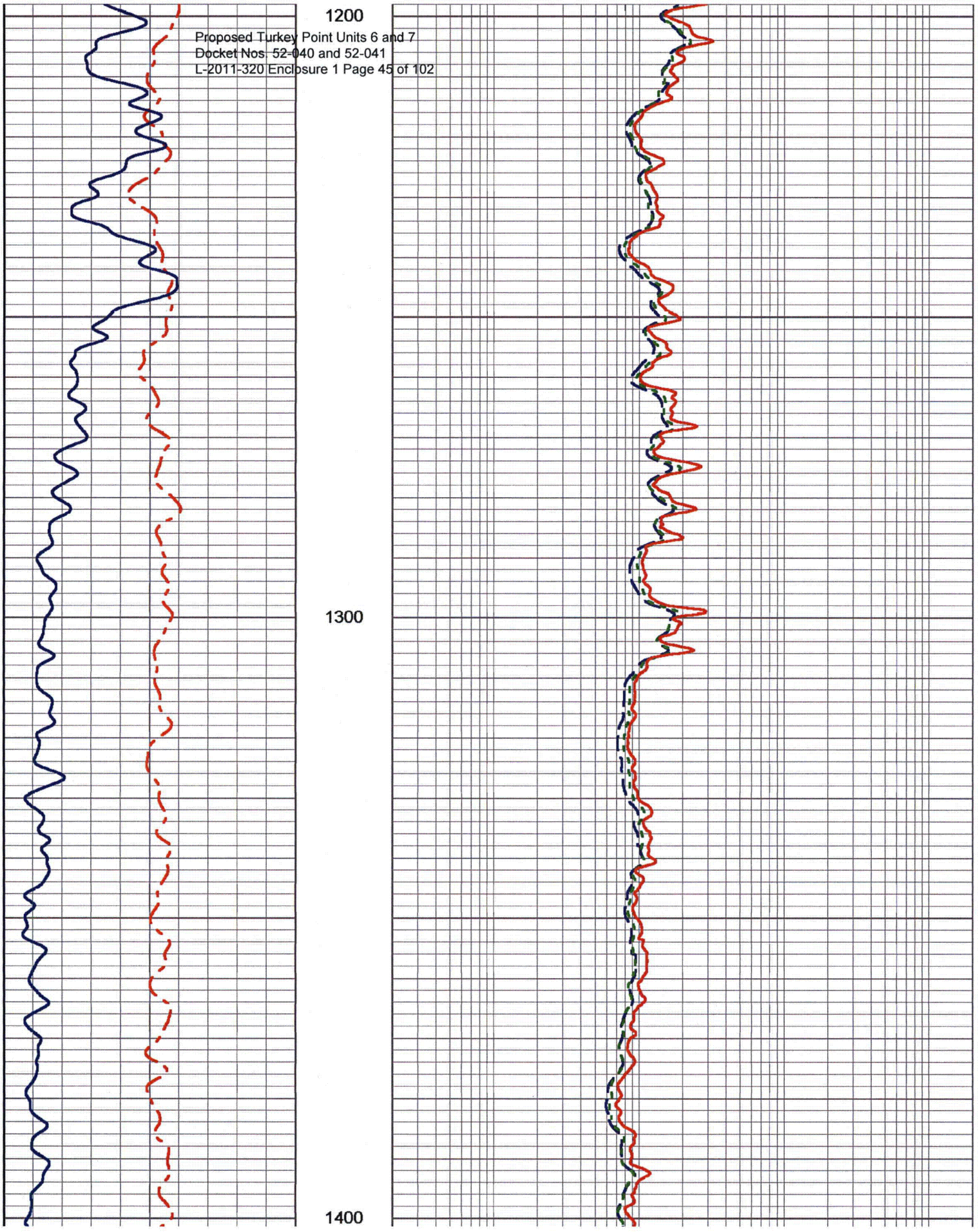

1300
1400
1500
1600
SP
GR
First Reading SP
<- TD ->
RILM
RILD
RLL3
First Reading RILD
-5
SP (mV)
5
0
GR (GAPI)
100
0.2
RILD (Ohm-m)
2000
0.2
RILM (Ohm-m)
2000
0.2
RLL3 (Ohm-m)
2000

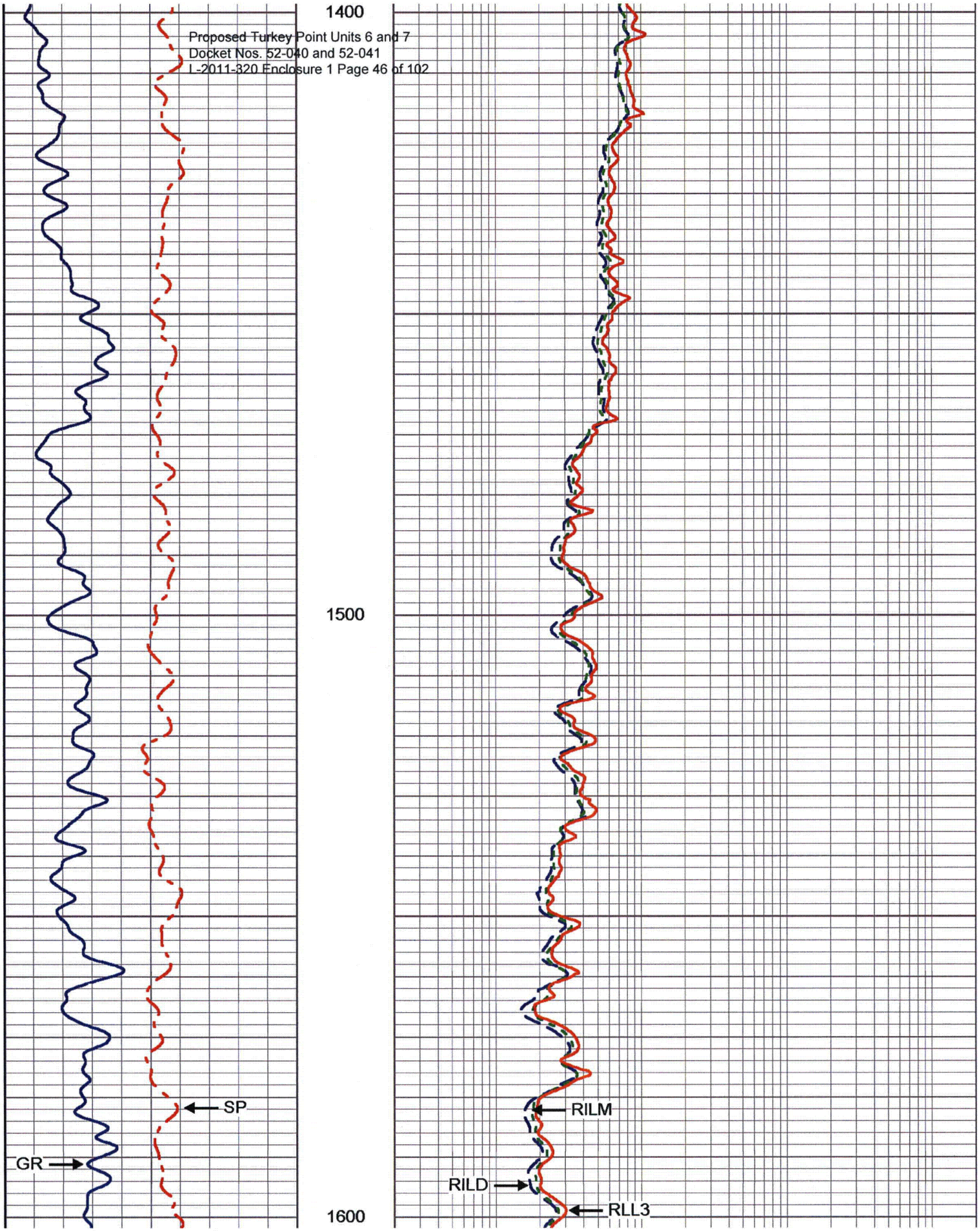
MV Geophysical

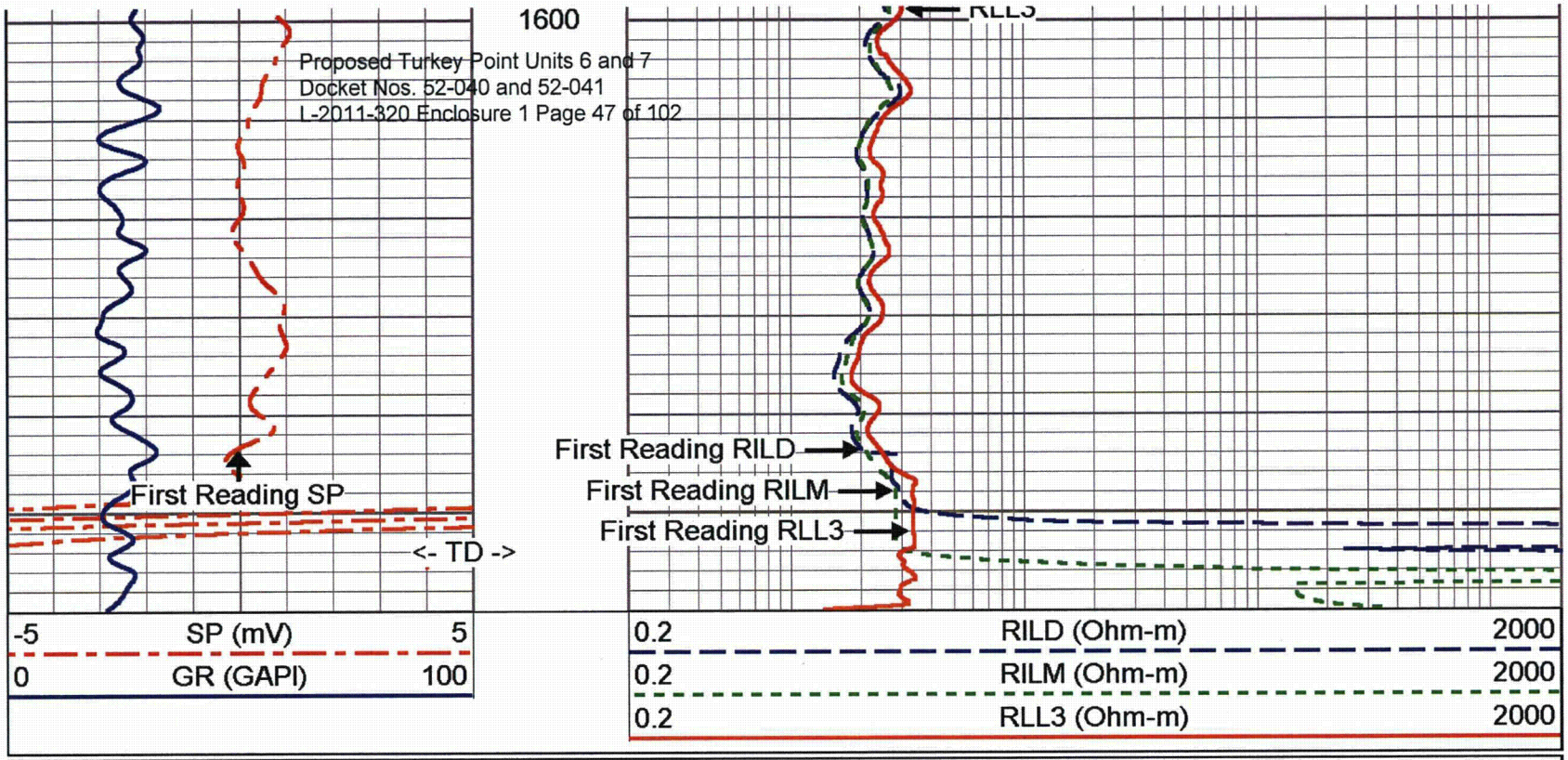
MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	DIL-5
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:240




1200
1300
1400

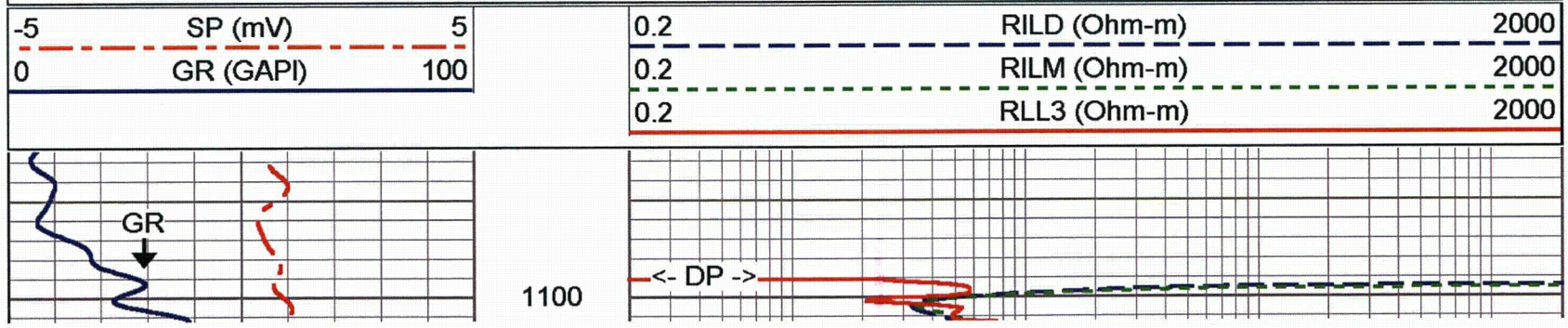

1400
1500
1600
SP
GR
RILM
RILD
RLL3

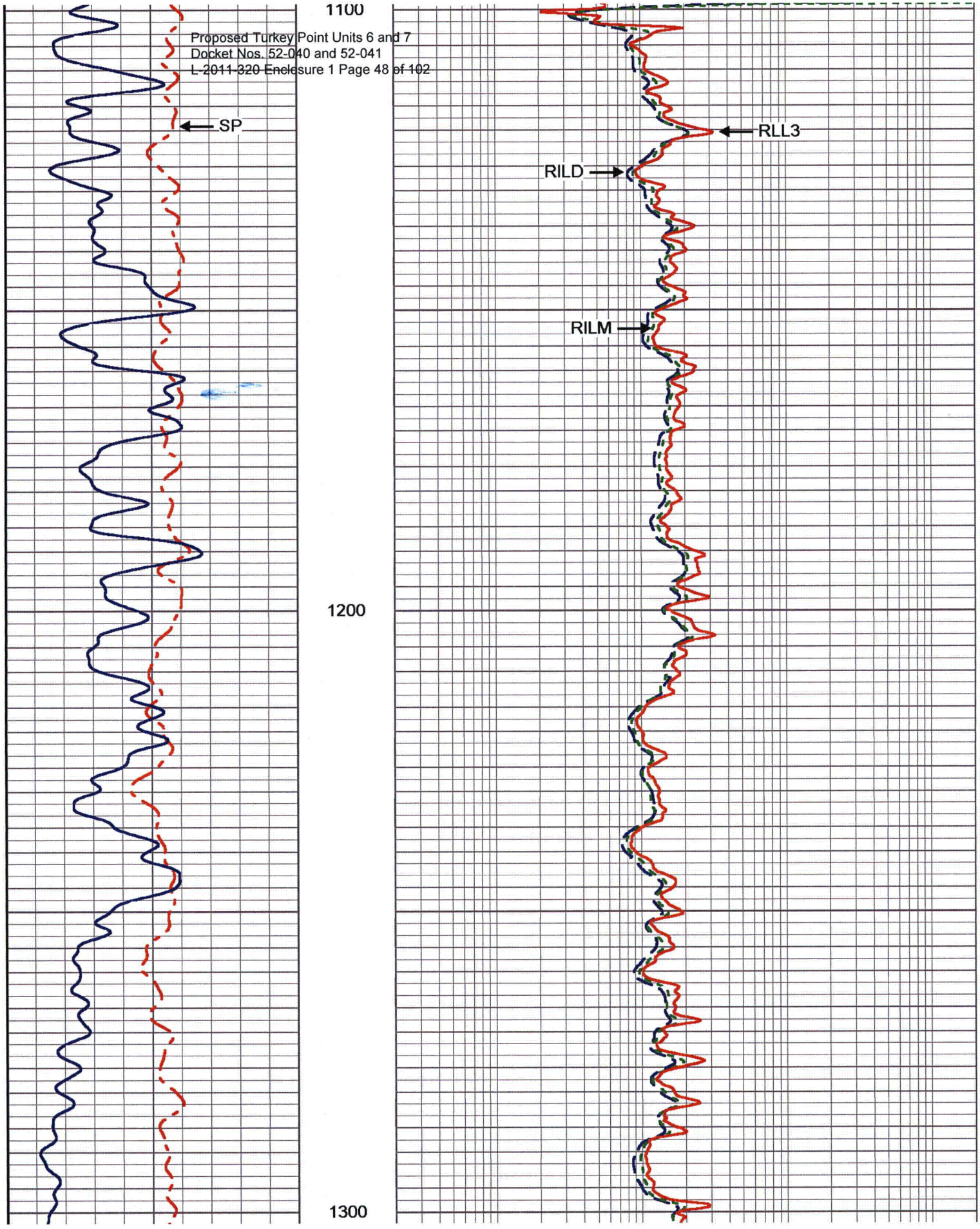


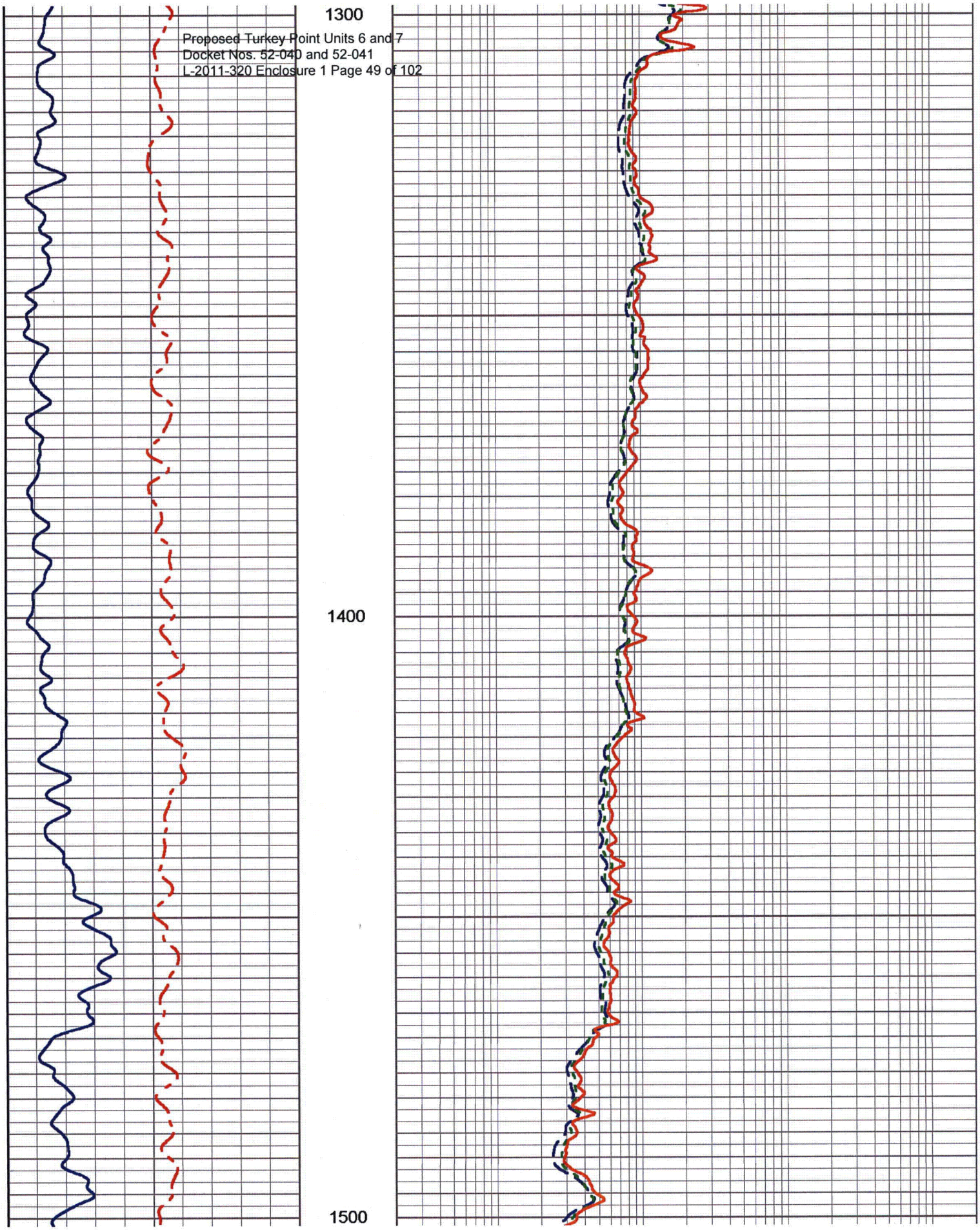
MV Geophysical

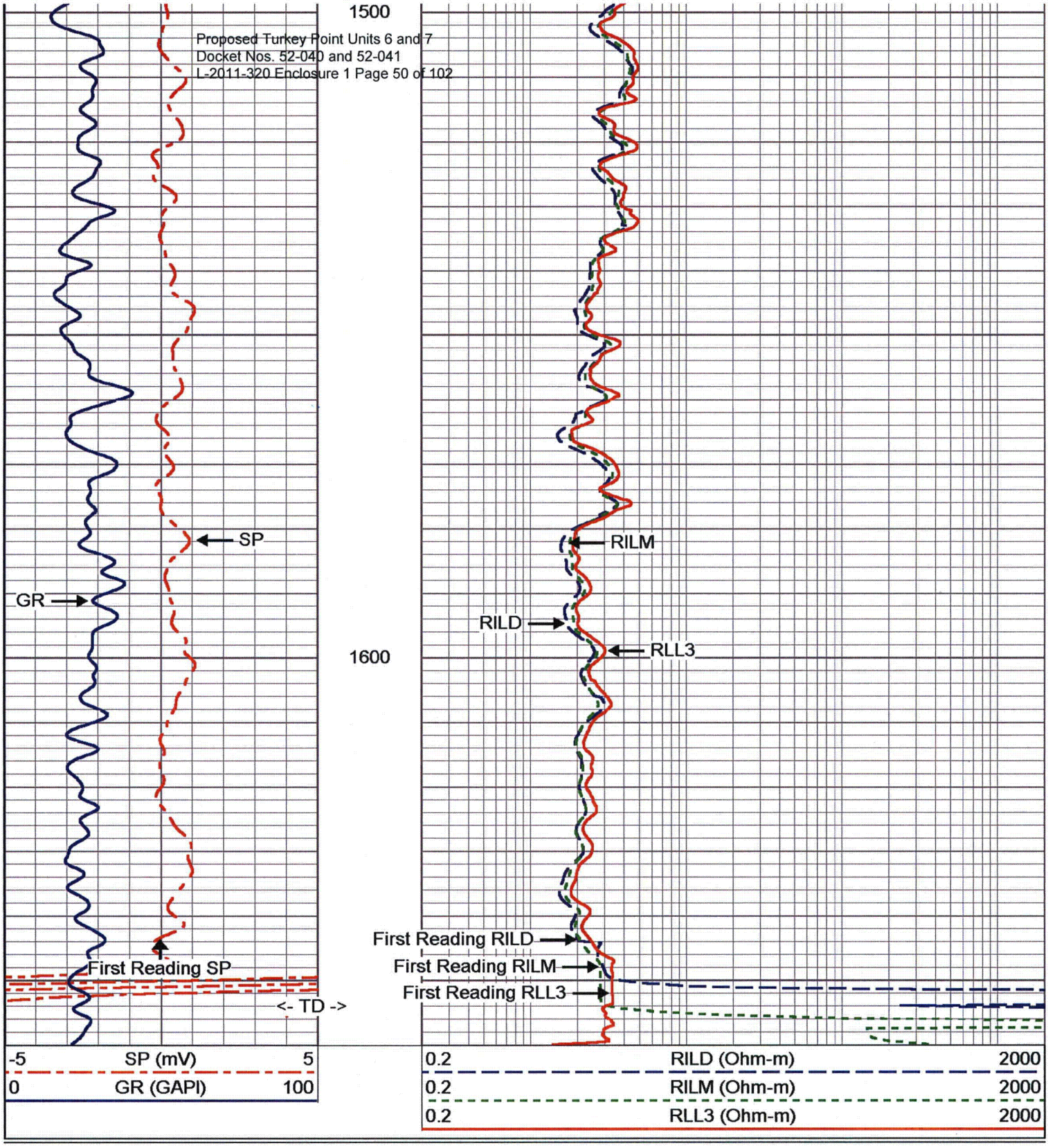
MAIN PASS

Database File:	ltp1.db
Dataset Pathname:	run7/MAIN
Presentation Format:	DIL-5
Dataset Creation:	Tue Jul 12 02:36:16 2011
Charted by:	Depth in Feet scaled 1:240




1100
SP
RLL3
RILD
RILM
1200
1300


1300
1400
1500


1500
SP
GR
RILM
RILD
RLL3
1600
First Reading RILD
First Reading RILM
First Reading RLL3
First Reading SP
<- TD ->
-5
SP (mV)
5
0
GR (GAPI)
100
0.2
RILD (Ohm-m)
2000
0.2
RILM (Ohm-m)
2000
0.2
RLL3 (Ohm-m)
2000

Dual Induction Calibration Report

Serial-Model:	5390-R
Surface Cal Performed:	Wed Apr 21 11:17:23 2010
Downhole Cal Performed:	Wed Apr 21 11:04:55 2010
After Survey Verification Performed:	Wed Apr 21 11:04:55 2010

Surface Calibration

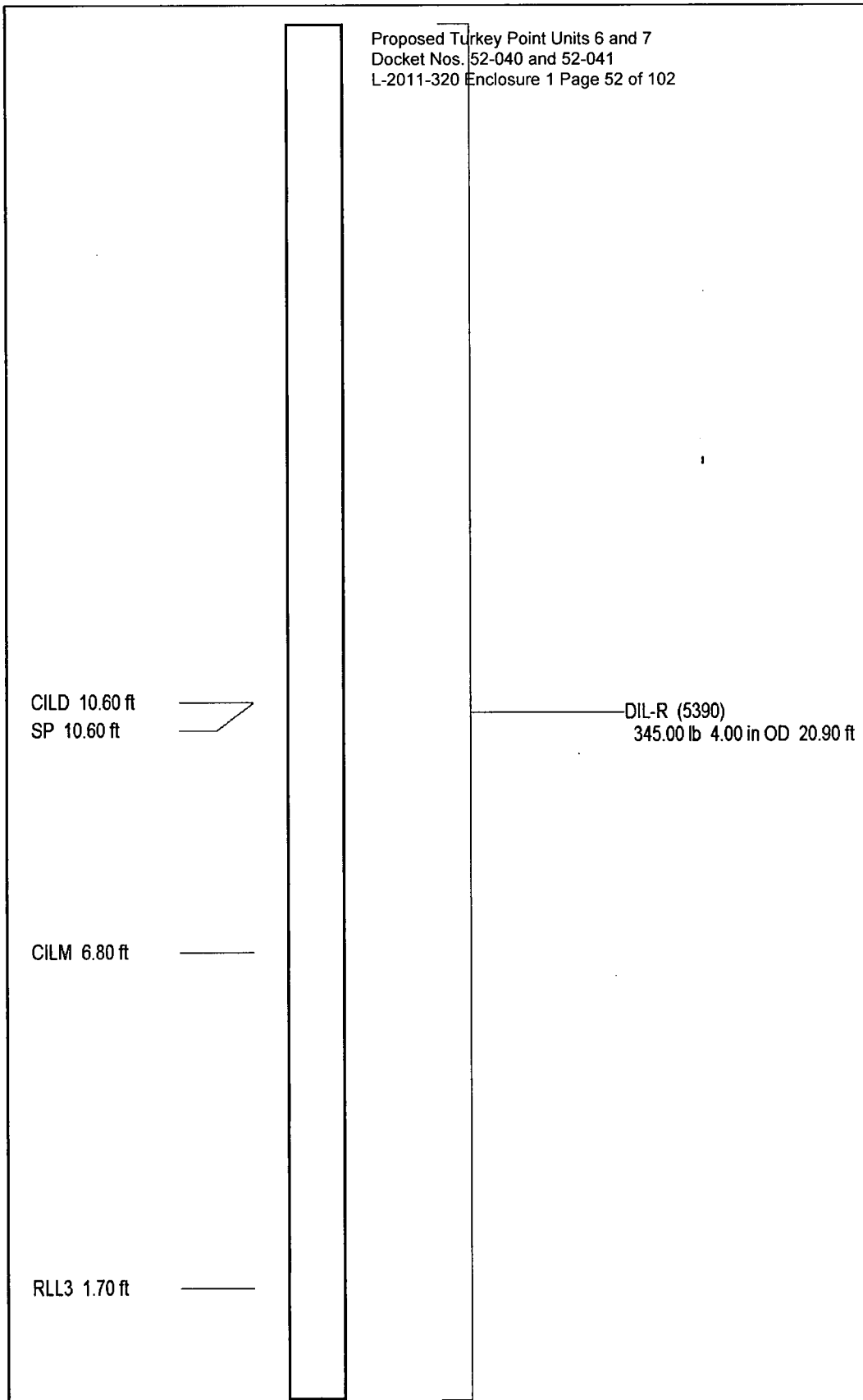
	Readings			References			Results	
Loop:	Air	Loop		Air	Loop		m	b
Deep	0.050	0.645	V	0.000	400.000	mmho-m	672.269	-33.613
Medium	0.018	0.735	V	0.000	464.000	mmho-m	647.120	-11.545
Internal:	Zero	Cal		Zero	Cal		m	b
Deep	0.011	0.641	V	0.000	400.000	mmho-m	634.921	-6.984
Medium	0.005	0.739	V	0.000	464.000	mmho-m	632.408	-3.370

Downhole Calibration

	Readings			References			Results	
Internal:	Zero	Cal		Zero	Cal		m	b
Deep	-43.158	78.288	mmho-m	-42.562	77.982	mmho-m	0.993	0.275
Medium	-9.475	466.701	mmho-m	-8.097	466.698	mmho-m	0.997	1.351
Shallow	2.516	0.025	V	494.500	2.000	Ohm-m	197.703	-2.980

After Survey Verification

	Readings			Targets			Results	
Internal:	Zero	Cal		Zero	Cal		m'	b'
Deep	0.000	0.000	mmho-m	-43.158	78.288	mmho-m	0.993	0.275
Medium	0.000	0.000	mmho-m	-9.475	466.701	mmho-m	0.997	1.351
Shallow	0.000	0.000	Ohm-m	494.500	2.000	Ohm-m	1.000	0.000



Dataset:	run7/pass14
Total Length:	20.90 ft
Total Weight:	345.00 lb
O.D.	4.00 in