April 18, 2013

Richard L. Merhar II
SAIC Energy, Environment & Infrastructure, LLC
180 Gordon Drive, Suite 109
Exton, PA 19341

RE: Borehole Geophysical Logging Report;
Hoff VC HSCA Site, New Hanover Township, PA

Dear Mr. Merhar,

In response to your request, Earth Data Northeast, Inc. ("EDN") is pleased to provide SAIC Energy, Environment & Infrastructure, LLC ("SAIC") with the following summary of borehole geophysical logging performed on April 11, 2013, in MW-8D located at the Henkels & McCoy Pipeline Service Facility in New Hanover Township, Pennsylvania.

The following geophysical logs for MW-8D are included in the **Appendix:**

- Fluid Temperature/Fluid Conductivity
- 3-Arm Caliper
- Electrical Resistivity Log
  - Spontaneous Potential ("SP")
  - Single Point Resistance ("SPR")
  - Long/Short Normal Resistivity
- Natural Gamma
- Acoustic Televiewer ("ATV")
- Heat Pulse Flowmeter (*under ambient conditions only*)

Results of Borehole Geophysical Logging

The findings of the geophysical survey conducted in MW-8D, are summarized below. Copies of the geophysical logs are included within a composite graph, attached as an **Appendix**.

The focus of this report will be to identify and characterize fractured intervals within the open borehole, and zones where fluid of differing quality may be entering or exiting the

borehole. Features identified with the acoustic televiewer are presented in graphical format and are also included within the geophysical composite graph (**Appendix**).

All borehole logs were referenced from below Ground Surface ("bgs").

MW-8D

The total depth of the borehole was observed to be approximately 251' bgs during the logging. MW-8D was constructed with nominal 6"steel casing to a depth of approximately 37.5'. The static water level ("SWL") during the borehole survey was 14' bgs.

The *fluid temperature* log displayed an overall decrease in temperature with depth. Changes in log slope within the water column occurred at 30', 33', 36', 75', and 86' bgs. Temperatures ranged from approximately 12.5°C to 16.9°C. The fluid temperature at the bottom of the borehole was 12.5ºC.

The *fluid conductivity* log ranged from approximately 109 µS/cm to 500 µS/cm. Slight changes in log slope occurred at 33', 35', 45', 55', 63'-64', 69', 76', 107'-110', 127', and 153' bgs.

The *caliper* log confirmed that a significant feature exists between 40'-58' bgs. Smaller changes in borehole diameter can be seen at 61'-72', 74'-87', 91'-95', 106'-109', 120', 148'-160', and 187'-203' bgs. The caliper log also suggested that the bottom of the steel casing was located at approximately 37.5' bgs.

The *electrical resistivity* suite of logging confirmed the locations of various dissimilar lithologic units and fractured intervals within the borehole. Sections of the borehole that intersected a larger grain-sized formation(s) were observed between 130'-150', 177'-187', and 208'-230'. Lower resistivity values were generally observed in areas of either higher clay content (44'-112') or fractures/increases in borehole diameter (148'-168' and 187'-203').

The interval between 44'-112' contained the highest clay content in the borehole and corresponded with lower resistivities and a higher frequency of fractures/increases in borehole diameter. A smaller lithologic unit with slightly higher clay content was observed at 247'.

The *acoustic televiewer* image produced for MW-8D was analyzed, and 159 features were identified by EDN personnel. The appendix includes an ATV data package that presents a 3-dimensional, "core-view", as well as a 2-dimensional un-wrapped ("north to north") view of MW-8D, with identified features oriented to True North.

More features may exist than were identified.

The MW-8D Polar and Rose diagrams indicate that the majority of the identified features appeared to have a North-Northeast-South-Southwest strike with a dip-azimuth to the East-Southeast, respectively.

The results of the *heat-pulse flowmeter* logging did not indicate the presence of quantifiable flow under ambient conditions. A summary of the heat-pulse flowmeter logging is included within the geophysical composite graph (alongside the caliper log), provided in the **Appendix**.

The findings and conclusions presented in this report are the result of fieldwork, data analysis, and interpretations completed by EDN personnel as of this date. This report was prepared in response to a request from SAIC, using generally accepted geophysical practices, for the exclusive use of SAIC. No other warranty, expressed or implied, is made.

Additional copies of the geophysical logs are available upon request.

If you should have any further questions or comments, please feel free to contact me at (610) 524-9466, extension 5158, or via email at myamrick@earthdatane.com

Sincerely,

Michael Yamrick Jr.
Environmental Scientist
Earth Data Northeast, Inc.

Appendix

MW-8D Borehole Geophysical Logs

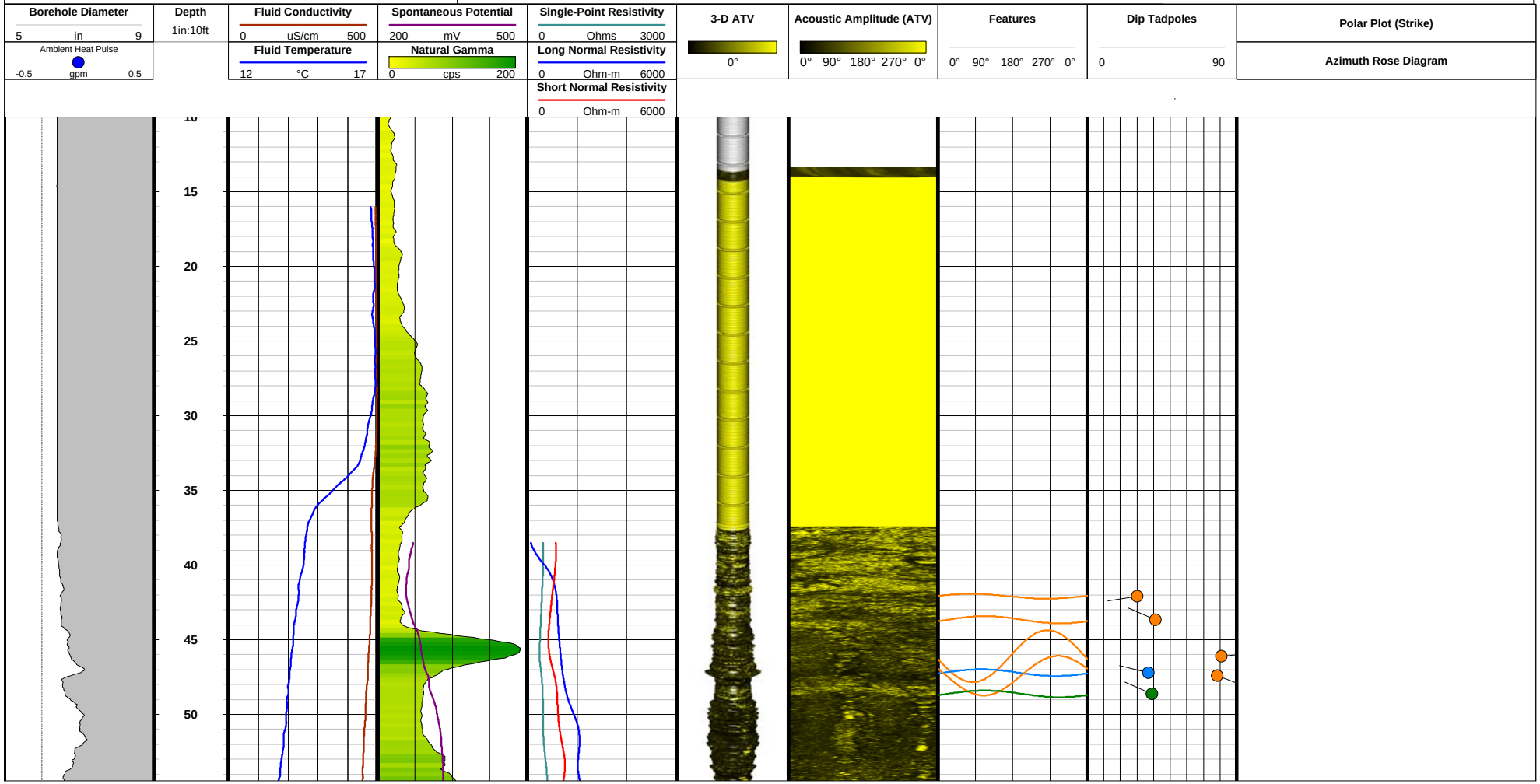
April 11, 2013

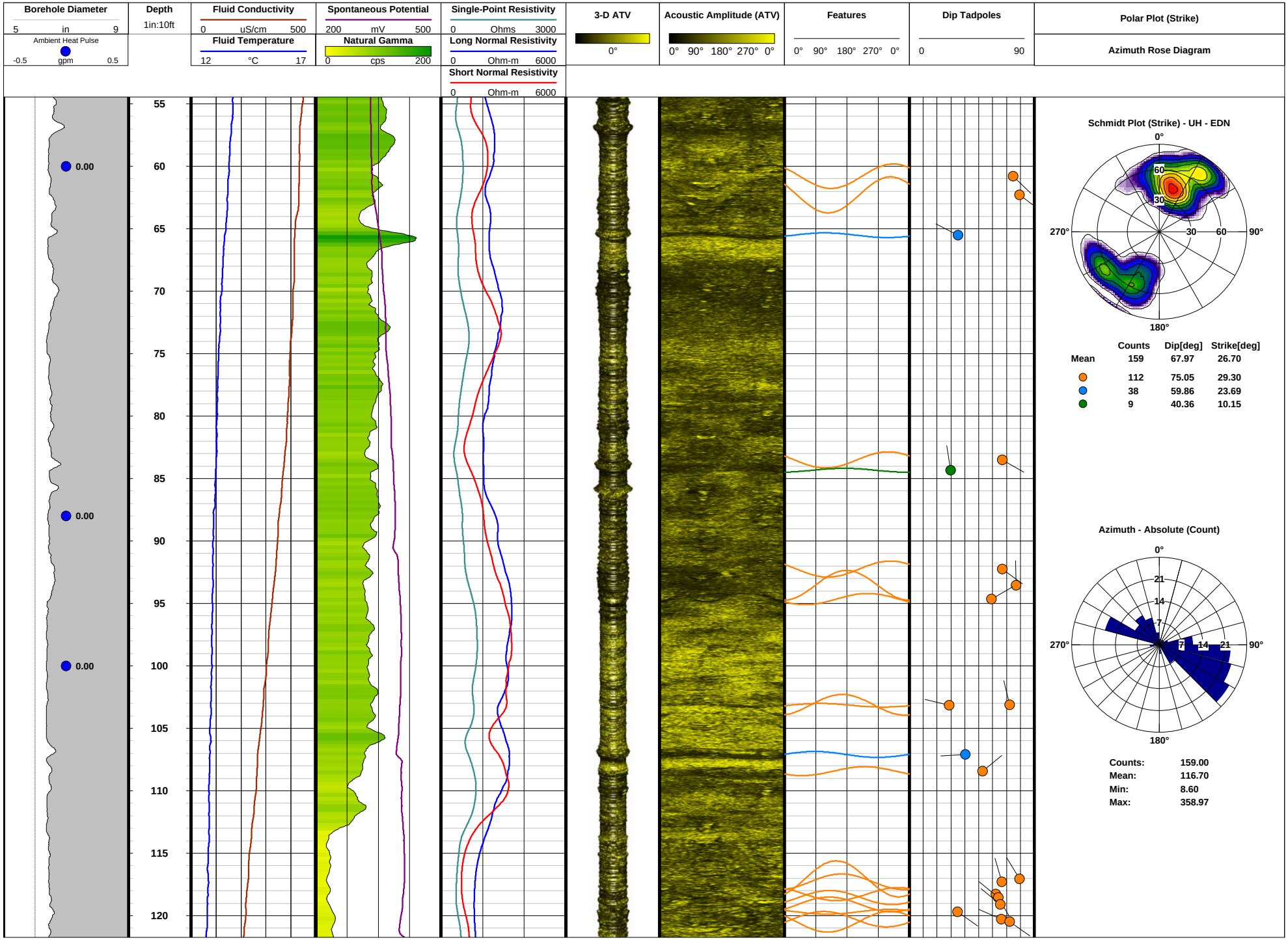
EDN
Earth Data Northeast, Inc.

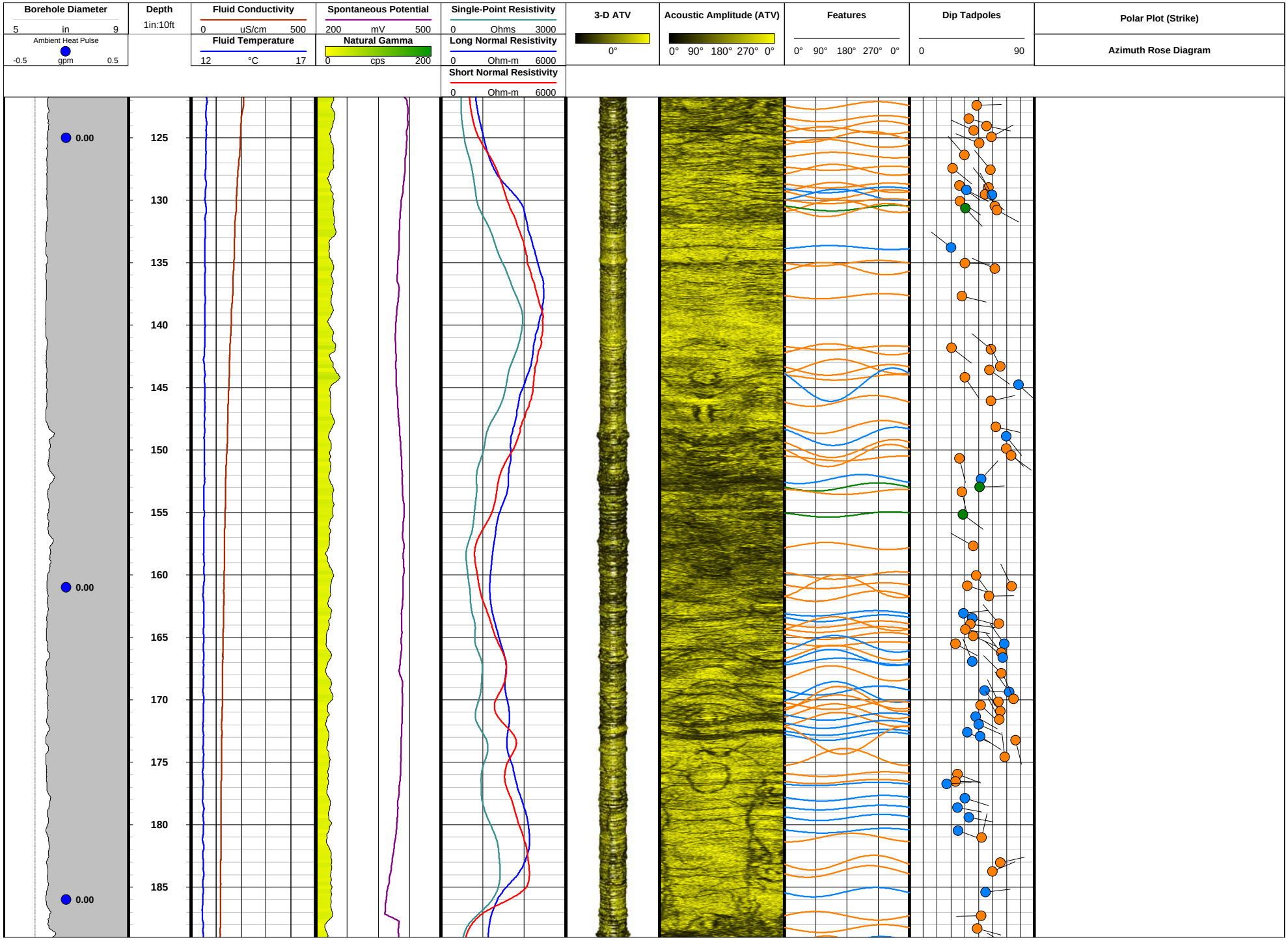
Client: **SAIC**
Location: **NEW HANOVER, PA - HENKELS McCOY**
Well Name: **MW-8D**
Date: **4-11-13**
Depth Reference: **GROUND SURFACE**
Magnetic Declination: **-12.05**
North reference: **TRUE**

Borehole Diameter: **6" NOMINAL**
Static Water Level: **14'**
Casing Depth: **37.5'**
Total Depth: **251'**

Hairline Fracture/Feature
Discontinuous Hairline Fracture/Feature
Bedding/Change in Lithology




Borehole Diameter
5 in 9
Ambient Heat Pulse
-0.5 gpm 0.5
Depth
1in:10ft
Fluid Conductivity
0 uS/cm 500
Fluid Temperature
12 °C 17
Spontaneous Potential
200 mV 500
Natural Gamma
0 cps 200
Single-Point Resistivity
0 Ohms 3000
Long Normal Resistivity
0 Ohm-m 6000
Short Normal Resistivity
0 Ohm-m 6000
3-D ATV
0°
Acoustic Amplitude (ATV)
0° 90° 180° 270° 0°
Features
0° 90° 180° 270° 0°
Dip Tadpoles
0 90
Polar Plot (Strike)
Azimuth Rose Diagram
0.00
0.00
0.00
55
60
65
70
75
80
85
90
95
100
105
110
115
120
Schmidt Plot (Strike) - UH - EDN
0°
60
30
270°
30
60
90°
180°
Counts Dip[deg] Strike[deg]
Mean 159 67.97 26.70
112 75.05 29.30
38 59.86 23.69
9 40.36 10.15
Azimuth - Absolute (Count)
0°
21
14
7
270°
7
14
21
90°
180°
Counts: 159.00
Mean: 116.70
Min: 8.60
Max: 358.97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5 in 9
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-0.5 gpm 0.5
Depth
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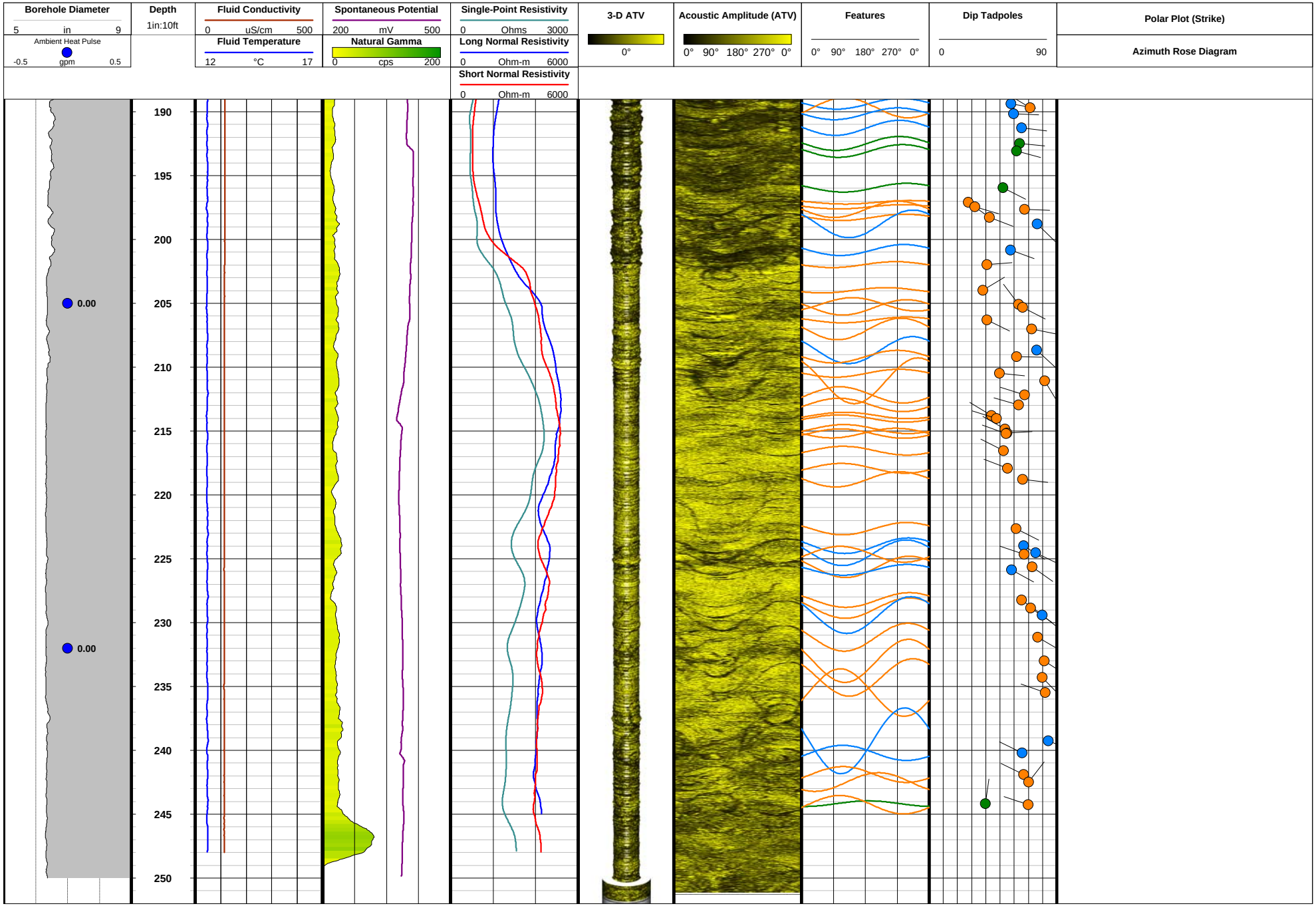
Fluid Temperature
12 °C 17
Spontaneous Potential
200 mV 500
Natural Gamma
0 cps 200
Single-Point Resistivity
0 Ohms 3000
Long Normal Resistivity
0 Ohm-m 6000
Short Normal Resistivity
0 Ohm-m 6000
3-D ATV
0°
Acoustic Amplitude (ATV)
0° 90° 180° 270° 0°
Features
0° 90° 180° 270° 0°
Dip Tadpoles
0 90
Polar Plot (Strike)
Azimuth Rose Diagram
0.00
0.00
0.00
125
130
135
140
145
150
155
160
165
170
175
180
185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0°
Acoustic Amplitude (ATV)
0° 90° 180° 270° 0°
Features
0° 90° 180° 270° 0°
Dip Tadpoles
0 90
Polar Plot (Strike)
Azimuth Rose Diagram
0.00
0.00
190
195
200
205
210
215
220
225
230
235
240
245
250