

GEOLOGICAL REPORT

BILLMAN GEOLOGIC CONSULTANTS, INC.

TO: MR. JOHN MCCOLLUMS, OPERATIONS MANAGER, KENDRA II, LLC
FROM: DAN A. BILLMAN, PG, CPG, PRESIDENT, BILLMAN GEOLOGIC CONSULTANTS, INC.
SUBJECT: GEOLOGIC REVIEW OF THE BEAR LAKE SWD PROPERTIES COLUMBUS TOWNSHIP, WARREN COUNTY, PENNSYLVANIA
DATE: 9/21/2020
CC:

Geologic Description of the Bear Lake Area and the Proposed Bittering #3 and Smith-Ras Unit #1 Saltwater Disposal (SWD) wells

The Bittering #3 and Smith-Ras Unit #1 are offset wells of one and other, approximately 2,000' well to well. As such, this geologic section is written for both wells, as the general geology of the wells are similar. Both wells have a proposed disposal interval in the Silurian Medina (Grimsby) Sandstone and Whirlpool Sandstone (roughly 4250' to 4425', below ground surface). As needed, specific figures will be used and provided for either well.

Included as figures at the end of this report are maps for both the Bittering #3 and Smith-Ras Unit #1. Both wells have a map of oil and natural gas wells (within the mile-wide buffer) and of water wells (within the quarter-mile wide buffer). These figures are from the EPA permit application prepared by Tetra Tech, February 2015.

Shallow Geologic Characterization

The Bittering #3 and Smith-Ras Unit #1 wells are in the glaciated portion of the Appalachian Plateau Physiographic Province of Columbus Township, Warren County, Pennsylvania. The Northwestern Glaciated Plateau Section as per PA Bureau of Topographic and Geologic Survey Map 13 (Physiographic Provinces of Pennsylvania, compiled by W. D. Sevon. Fourth Edition, 2000, http://elibrary.dcnr.pa.gov/GetDocument?docId=1751225&DocName=Map13_PhysProvs_Pa). The uppermost geologic formation in the Bear Lake area is Wisconsinan Glacial Period kame and glacial outwash deposits. These kame and outwash deposits consist predominately of sand and gravel deposits and can include minor amounts of silts and clays. These deposits are typically unconsolidated.

Beneath the glacial deposits are the uppermost bedrock deposits in the area. The uppermost bedrock is the Devonian Venango Formation. The Venango Formation consists of interbedded sandstones, conglomerates, siltstones, and shales. The Venango Formation could be utilized as an aquifer in the Bear Lake area. Beneath the Venango Formation is the Devonian Chadakoin Formation, which consists of fine-grained clastics, marine siltstones and shales.

The glacial sediments and the Devonian Venango Formation are typically the "underground source of drinking water" in the Bear Lake area. In the Bittinger #3 (123-33945) well, fresh water was reported at a depth of 60' below ground surface (bgs) in Unconsolidated Gravel (Glacial Deposits). In the Smith-Ras Unit #1 (123-34843) well, fresh water was reported at a depth of 105' (bgs) in Unconsolidated Gravel (Glacial Deposits).

As discussed in the EPA permit application prepared by Tetra Tech, February 2015, a conservative depth estimate of 300' bgs for the underground source of drinking water was proposed. Water well logs indicate that freshwater is typically encountered in the +/- 120' bgs of glacial, unconsolidated sediments. Freshwater may also be found in the uppermost Venango Formation, although some indications are the porous portions of the Venango Formation, at continued depth, would include saline water, as is often in association with oil, within reservoirs of the Venango Formation.

Deep, Subsurface Geologic Characterization

Structurally, the Bittinger #3 and Smith-Ras Unit #1 wells are in the Appalachian Plateau Physiographic Province. Structural geologic maps are included with this report (see Attachments). The structural contour maps are on the top of the driller's termed Packer Shell (Irondequoit Limestone) and the top of the Queenston Formation. These two formations are above and below the Medina (Grimsby) and Whirlpool Sandstones, the proposed disposal intervals. General strike across the area is northeast – southwest. The structural geologic maps depict a consistent and gentle dip to the southeast. Mapping shows no existence of faults cutting through the Silurian section in the area of the Bear Lake properties.

Stratigraphically, the disposal wells are planned in the Silurian Medina and Whirlpool Sandstones, as are the current SWD wells in the Bear Lake area. Included within the attachments of this report are contour isopach maps of footage greater or equal to 8.0% log depicted porosity. The Medina Sandstone is interpreted as a braided, fluvial-deltaic channel system. Porous reservoir tends to be discontinuous and has a general northwest to southeast trend, perpendicular to regional strike. The Whirlpool Sandstone is interpreted as a shore-face sandstone, with a very consistent Northeast to southwest trend, parallel to regional strike.

Cross-sections are included within the attachments depicting the interval between the Packer Shell (Irondequoit Formation) and the Queenston Shale. The cross-sections' datum is the top of the Packer Shell. The cross-sections depict the consistency of the Medina and Whirlpool Sandstones (the disposal interval) across the Bear Lake area.

Table 1: Formation Tops bgs from the Corresponding Wells Completion Reports

| <u>Formation</u> | <u>Bittinger #3</u> | <u>Smith-Ras Unit #1</u> |
|-------------------------|---------------------|--------------------------|
| Unconsolidated Gravel | 0' – 30' | 0' – 120' |
| Devonian Shales | 30' – 2,816' | 120' – 2768' |
| Tully Limestone | 2816' – 2926' | 2768' – 2877' |
| Hamilton Shale | 2926' – 3097' | 2877' – 3049' |
| Onondaga Limestone | 3097' – 3256' | 3049' – 3218' |
| "Unconformity Interval" | 3256' – 3285' | 3218' – 3233' |
| Akron-Bertie | 3285' – 3370' | 3233' – 3317' |
| Camillus | 3370' – 3442' | 3317' – 3389' |
| Syracuse | 3442' – 3641' | 3389' – 3579' |
| Saline Salt Zone | 3637' – 3828' | 3579' – 3785' |
| Vernon | 3641' – 3900' | 3785' – 3861' |
| Lockport Dolomite | 3900' – 4108' | 3861' – 4065' |
| Rochester Shale | 4108' – 4224' | 4065' – 4184' |
| Irondequoit-Reynales | 4224' – 4260' | 4184' – 4222' |
| Grimsby Sandstone | 4260' – 4386' | 4222' – 4351' |
| Power Glen Shale | 4386' – 4424' | 4351' – 4383' |
| Whirlpool Sandstone | 4424' – 4439' | 4383' – 4396' |
| Queenston Shale | 4439' – TD (4556') | 4396' – TD (4516') |

Confining intervals are those formations that are deemed to be significantly impermeable to not allow upward migration of fluids from depth. As seen in Table 1, above, numerous intervals can be considered confining intervals. The Devonian Shales (greater than 2,500' in the Bear Lake area) is predominately impermeable shale. The Silurian Salina Salt Formation is located throughout much of the Appalachian Basin, including Columbus Township, Warren County, Pennsylvania. In the Bear Lake area, the Salina interval is approximately 200' in thickness and lies approximately 650' above the top of the Medina Sandstone. The Salina Formation is a series of interbedded salt (halite), anhydrite, gypsum and dolostones. The Salina Formation tends not to be significantly fractured (due to the flowing nature of the salt) and considered an important confining layer. The Lockport Dolomite (Dolostone) is also considered a confining layer and is approximately 150' to 200' in thickness. The Lockport Dolomite lies approximately 360' above the Medina Sandstone.

As per the PA Bureau of Topographic and Geologic Survey Open-File Report 05-01.0

"Precambrian Basement Map of the Appalachian Basin and Piedmont Province in Pennsylvania"

([http://elibrary.dcnr.pa.gov/GetDocument?docId=1751399&DocName=OFGG05-](http://elibrary.dcnr.pa.gov/GetDocument?docId=1751399&DocName=OFGG05-01)

[01](http://elibrary.dcnr.pa.gov/GetDocument?docId=1751399&DocName=OFGG05-01) BasementDepth-GeospatialDB Pa) the depth to basement in the site vicinity is estimated at approximately 2,500 meters (or 8,200 feet) below sea level. The base of the Medina Group at the Bear Lake area is approximately 2,800 ft. below sea level, or approximately a mile above Pre-Cambrian basement. Between the Pre-Cambrian Basement and the disposal interval lies the Ordovician Shales (Queenston, Lorraine and Utica Shales) and the Cambrian-Ordovician Carbonates.

No subsurface coal mines or natural gas storage facilities exist near the Bear Lake properties.

Table II: Casing and Cement program in subject wells

| | <u>Bittinger #3</u> | <u>Smith-Ras Unit #1</u> |
|------------------------|---------------------|--|
| 13 3/8" csg. Cement | 38' driven | None reported |
| 8 5/8" csg. Cement | 205' 200 sacks | 406' 150 sacks |
| 4 1/2" csg. Cement | 4508' 225 sacks | 4493' 75 sacks cement/150 sacks gel |
| Perforations | 4,321' – 4,334' | 4269' – 4383' |

Table II, above, is a summary of the casing and cementing programs, as report, when the Bittinger #3 and the Smith-Ras Unit #1 were initially drilled in 1984. Completion reports for both wells are included as attachments to this report.

Seismicity in and around the Bear Lake Properties

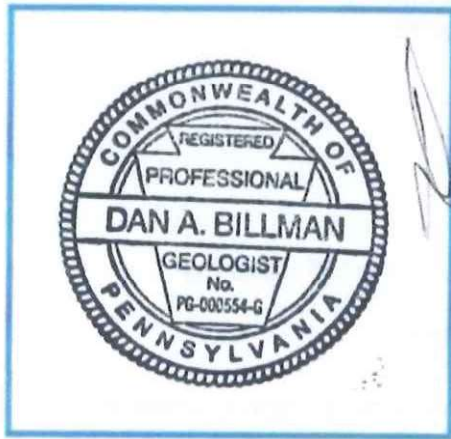
Seismicity across Pennsylvania tends to be of minimal impacts. Much of the seismicity in the states has occurred in the southeast (related to thin skin tectonics and the continued "push" from sea-floor spreading) or in northwestern most Pennsylvania (related to isostatic rebound from past glaciation). Past seismic activity can be viewed on the PA Bureau of Topographic and Geologic Survey Map 69 (Earthquake Epicenters in and Near Pennsylvania, compiled by R.T. Faill, 2004, [http://elibrary.dcnr.pa.gov/GetDocument?docId=1751247&DocName=Map69_EOCatalog-Epicenter Pa](http://elibrary.dcnr.pa.gov/GetDocument?docId=1751247&DocName=Map69_EOCatalog-Epicenter_Pa)). The only reported earthquake epicenter in Warren County occurred on 07/08/1995. It was registered as a 2.4 magnitude earthquake.

Induced seismicity is not expected in the Bear Lake area. The area is seismically inactive (as discussed in the paragraph above). Within the area, no faulting is mapped through the disposal interval or the formations above (Packer Shell/Irondequoit Formation) or below the disposal interval (Queenston Formation). Also, no significant faulting is mapped on PA Geologic Survey's Map 69, near the Bear Lake facility, through Warren County. Lastly, the operator already has an induced seismicity monitoring system in place at the Bear Lake facility.

Attachments to this Report

1. Geophysical Logs for the Bittinger #3 and Smith-Ras Unit #1
2. Completion Reports for the Bittinger #3 and Smith-Ras Unit #1
3. Isopach mapping of the Bear Lake Area of the Medina Sandstone and Whirlpool Sandstone
4. Structural Mapping on the Packer Shell (Irondequoit Limestone) and the Queenston Formation)
5. Cross-section of the Medina and Whirlpool formation through the Bear Lake Area

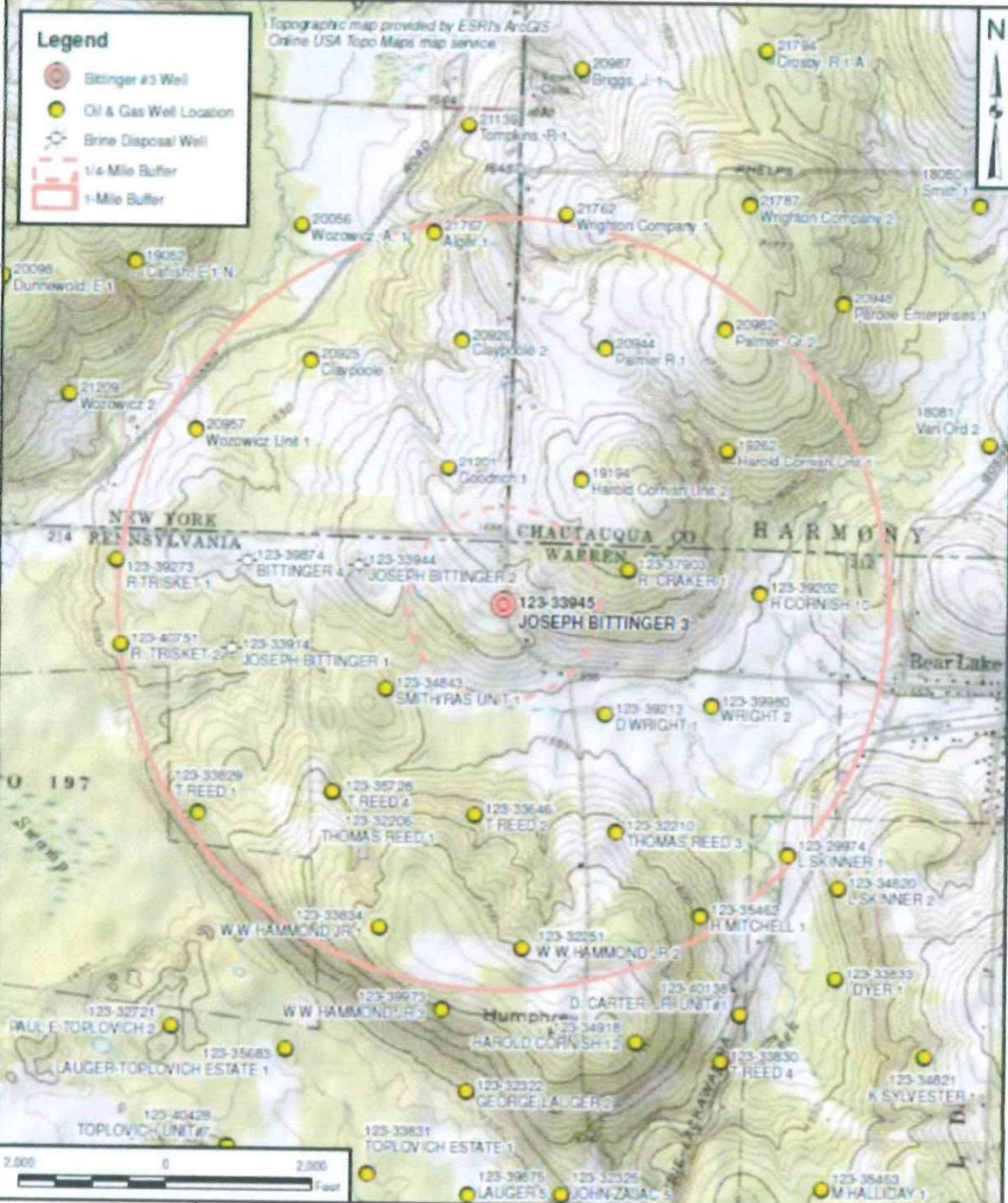
Respectfully submitted by Dan A. Billman, P.G., C.P.G.



DISCLAIMER

This document includes forward-looking statements as well as historical information. Forward-looking statements include but are not limited to statements relating to geological and seismic data interpretations, prospect reserve estimates and prospect risk. Although BGC believes that its expectations reflected in these forward-looking statements are reasonable, such statements involve risks and uncertainties, and no assurance can be given that actual results will be consistent with these forward-looking statements. Investment in oil and gas exploration is high risk by its very nature. Important factors that could cause actual results to differ from these forward-looking statements include, but are not limited to: erroneous interpretations of the seismic and geological data; the inability to acquire leases on identified prospects; mechanical problems while drilling and producing wells which prevent completion of a well or result in plugging of a well; dry holes; less reserves than originally estimated due to poor sand development or drainage by offsetting wells; non-commercial wells; and the variations in future gas pricing. BGC cannot and has not beyond normal due diligence care standards confirmed the accuracy and completeness of all the information we have reviewed during this consulting engagement. Data for this review has been provided by Kendra II, LLC., its clients or is publicly available and BGC, Inc. cannot be held responsible for errors in this provided data. Further, we express no opinion regarding any legal or securities issues. BGC shall assume no liability whatsoever for the use or reliance there upon by Kendra II, LLC., their clients, and/or their investors, of information, opinions and interpretations provided by BGC. BGC reserves the right to adjust these findings and interpretations with the discovery of relevant data or future production data.

Mapping of the Bittinger #3 and Smith-Ras Unit #1

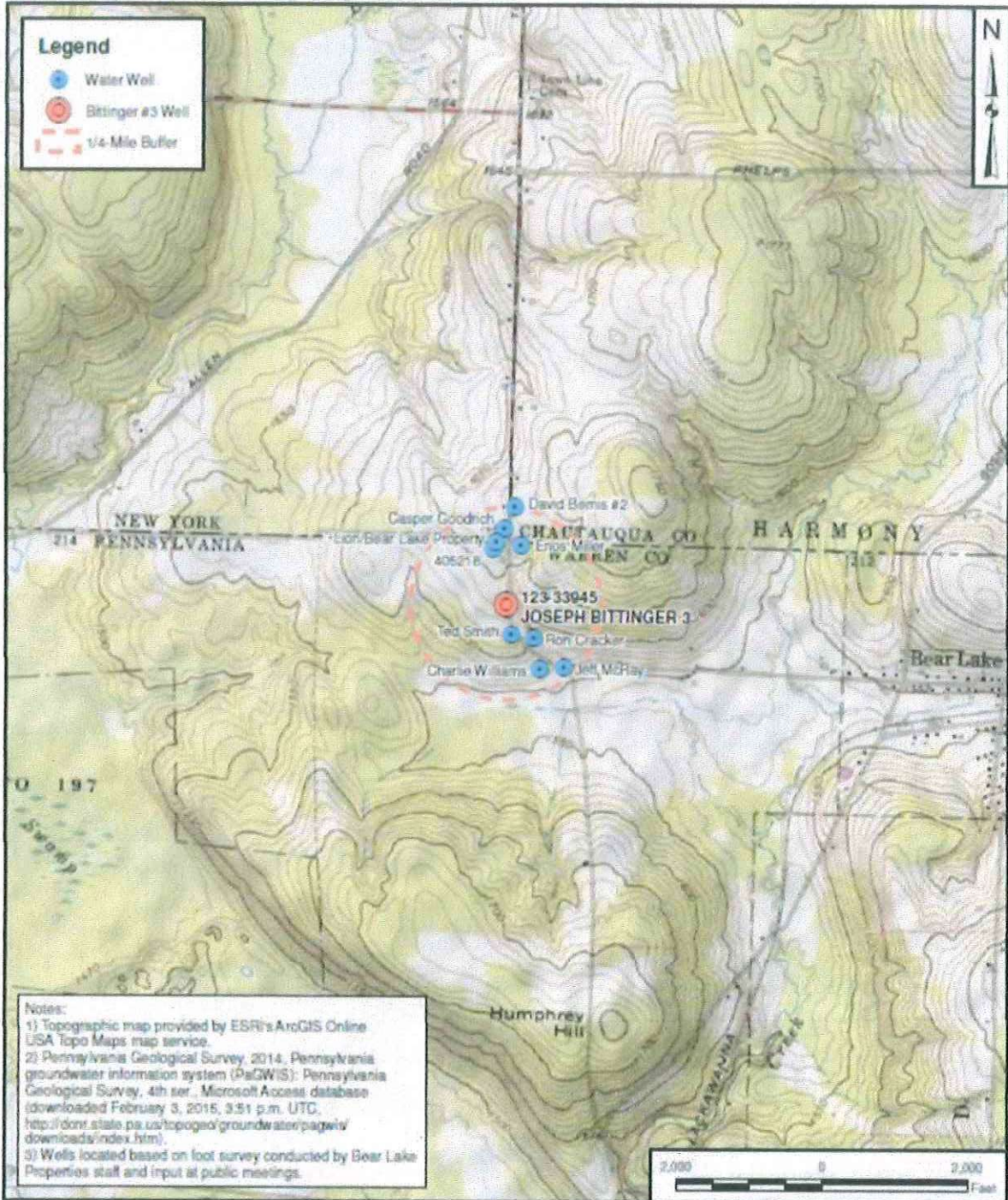


OIL & GAS WELL LOCATIONS
 JOSEPH BITTINGER 3 WELL
 BEAR LAKE PROPERTIES, LLC
 WARREN COUNTY, PENNSYLVANIA

DRAWN BY: S. RAXTON 01/27/15
 CHECKED BY: D. SKOFF 02/03/15
 APPROVED BY:

CONTRACT NUMBER: 212C-PB-001/03

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| FIGURE NUMBER | REV |
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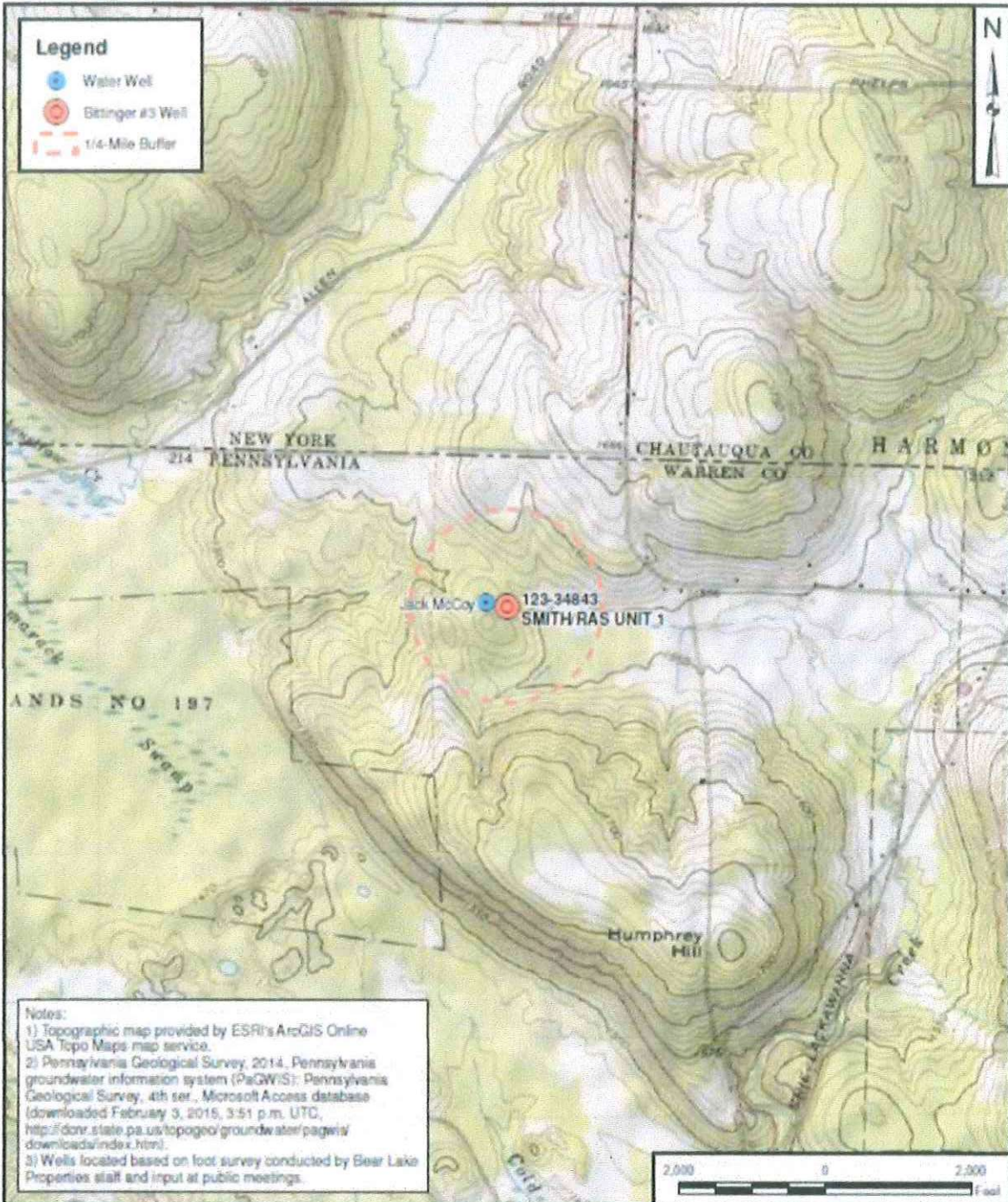
Notes:
 1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service.
 2) Pennsylvania Geological Survey 2014. Pennsylvania groundwater information system (PaGWIS): Pennsylvania Geological Survey, 4th ser. Microsoft Access database (downloaded February 3, 2015, 3:51 p.m. UTC. (<http://doris.state.pa.us/topogeo/groundwater/pagwis/downloads/index.htm>)).
 3) Wells located based on foot survey conducted by Bear Lake Properties staff and input at public meetings.



WATER WELL LOCATIONS WITHIN AOR
 JOSEPH BITTINGER 3 WELL
 BEAR LAKE PROPERTIES, LLC
 WARREN COUNTY, PENNSYLVANIA

DRAWN BY: S. PAXTON 02/03/15
 CHECKED BY: D. SKOFF 02/05/15
 APPROVED BY:
 CONTRACT NUMBER: 212C-PB-00103

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|---------------|-----|
| FIGURE NUMBER | REV |
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Notes:
 1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service.
 2) Pennsylvania Geological Survey, 2014, Pennsylvania groundwater information system (PaGWIS): Pennsylvania Geological Survey, 4th ser., Microsoft Access database (downloaded February 3, 2015, 3:51 p.m. UTC, <http://dowr.state.pa.us/topogeo/groundwater/pagwis/downloads/index.html>).
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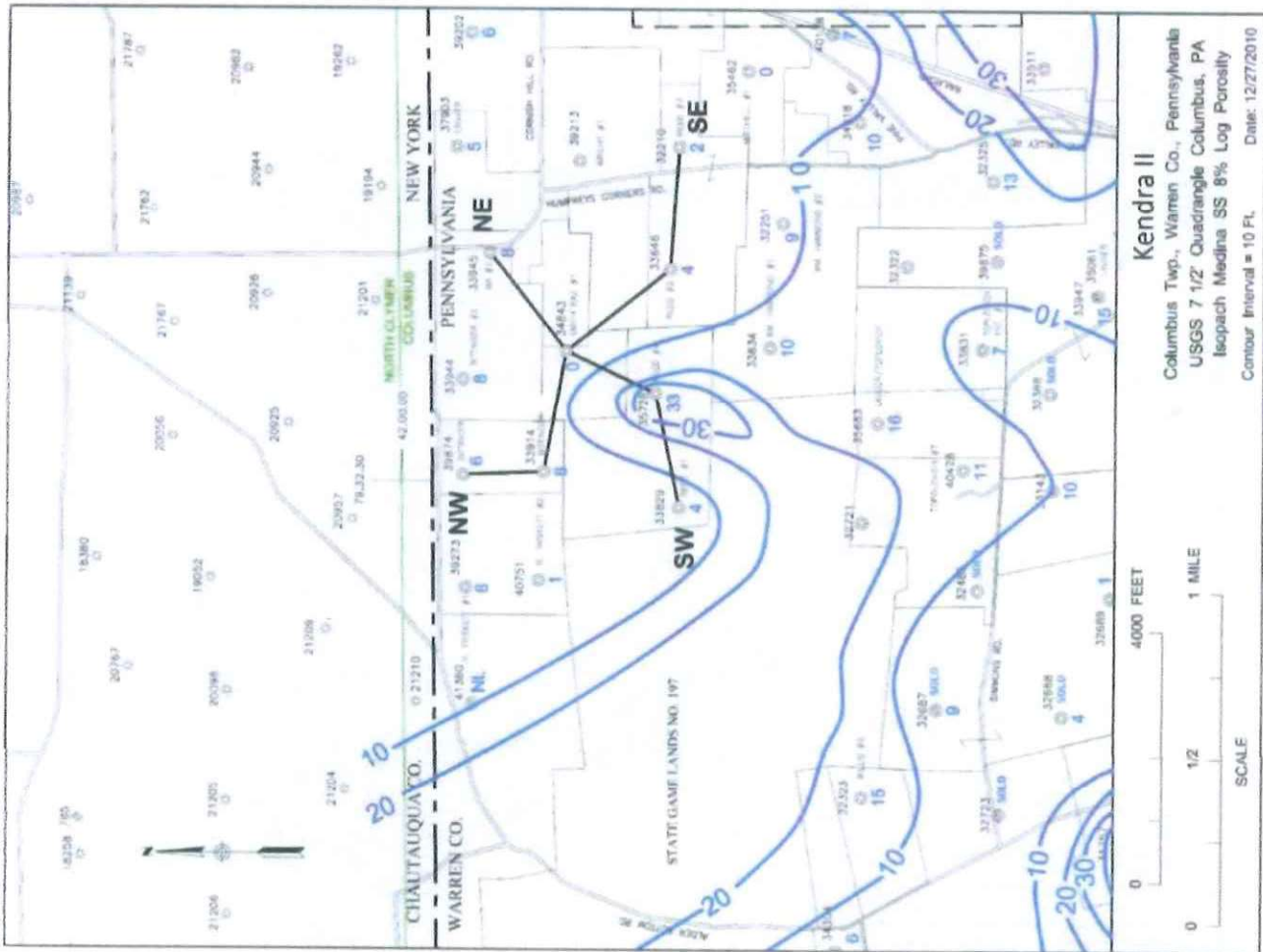


WATER WELL LOCATIONS WITHIN AOR
 SMITH/RAS UNIT 1 WELL
 BEAR LAKE PROPERTIES, LLC
 WARREN COUNTY, PENNSYLVANIA

DRAWN BY: S. PAXTON 02/03/15
 CHECKED BY: D. SKOFF 02/05/15
 APPROVED BY:

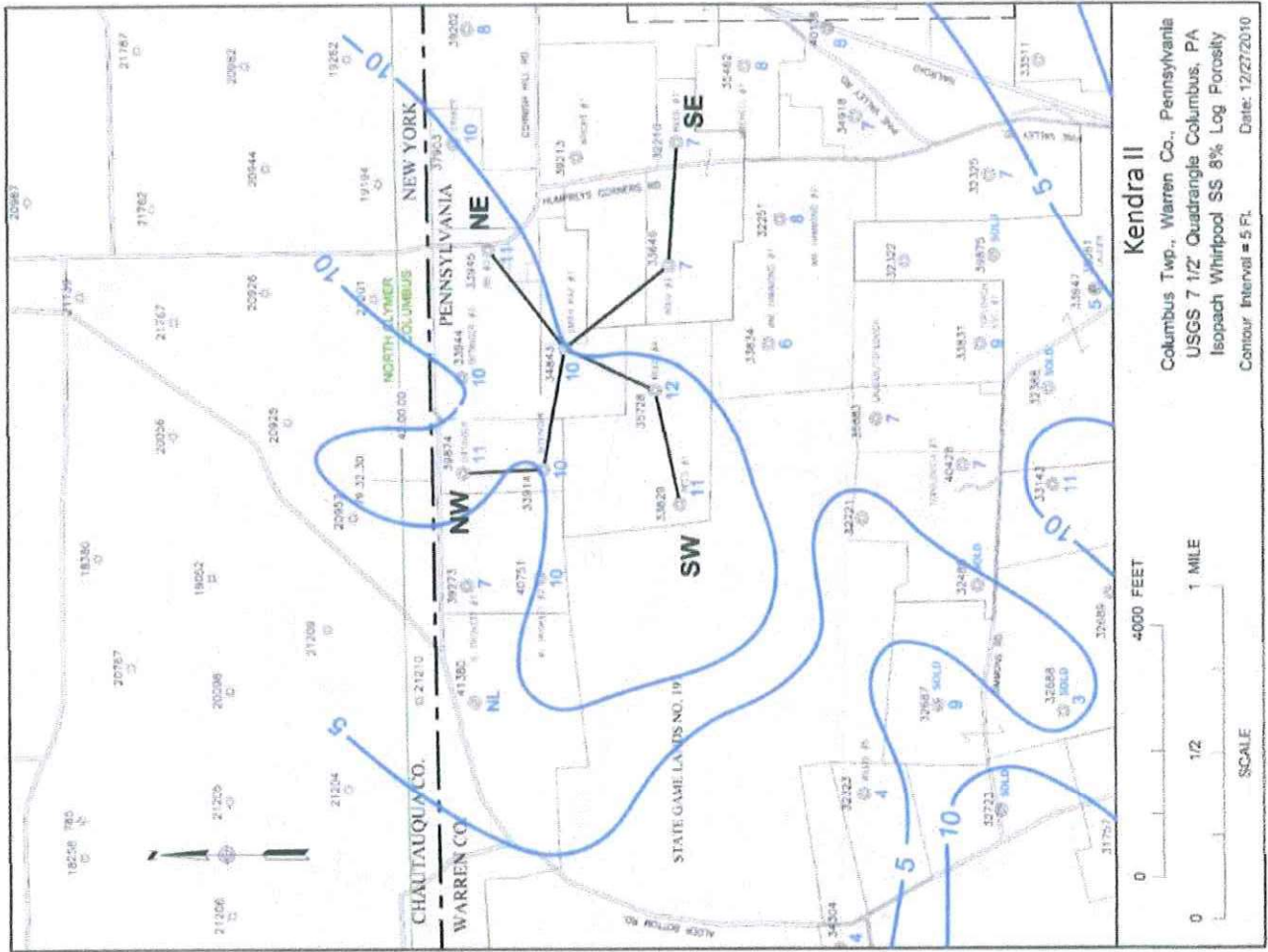
CONTRACT NUMBER: 212C-PB-00103

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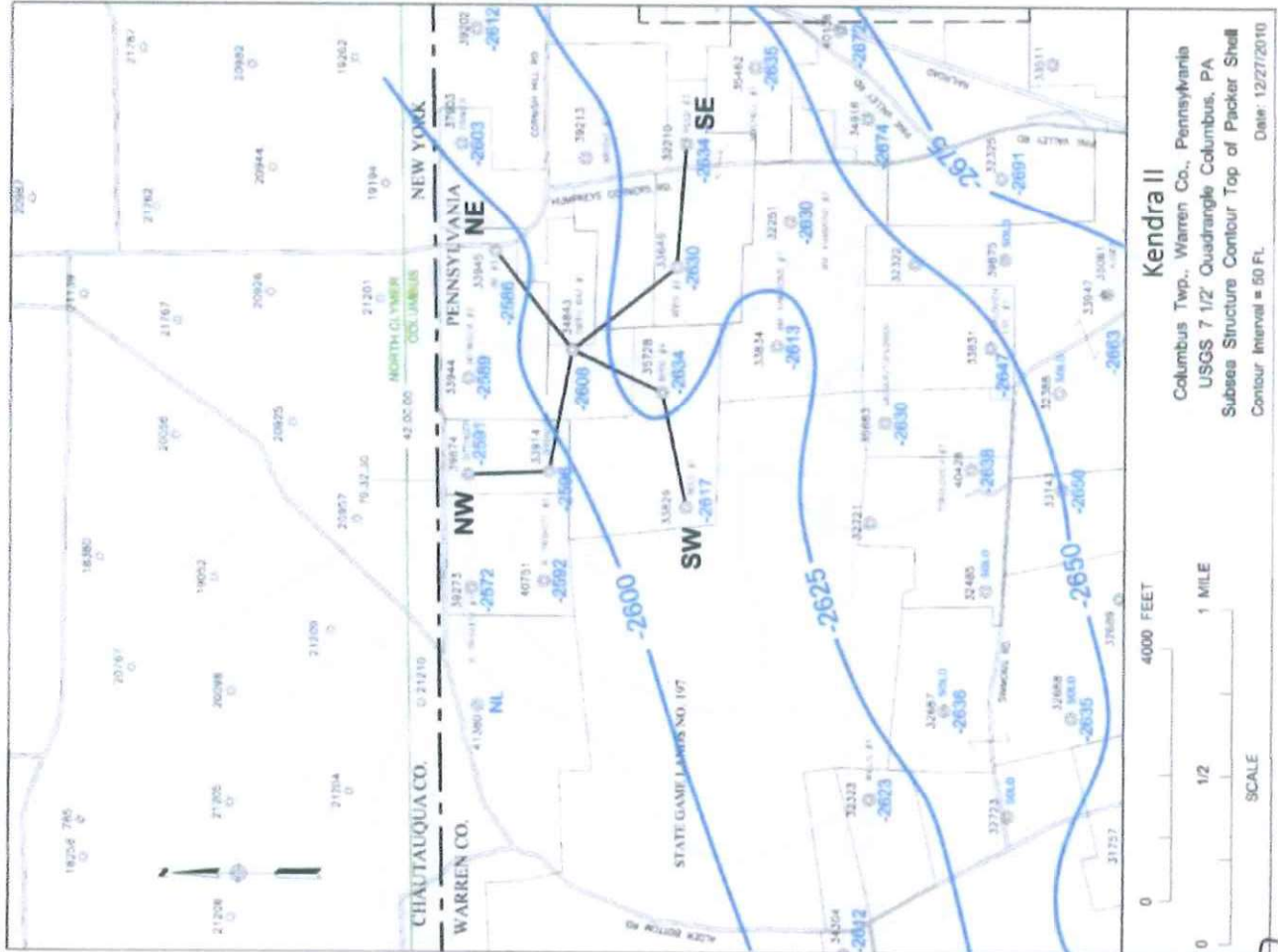
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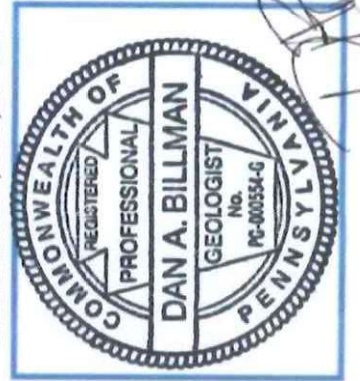


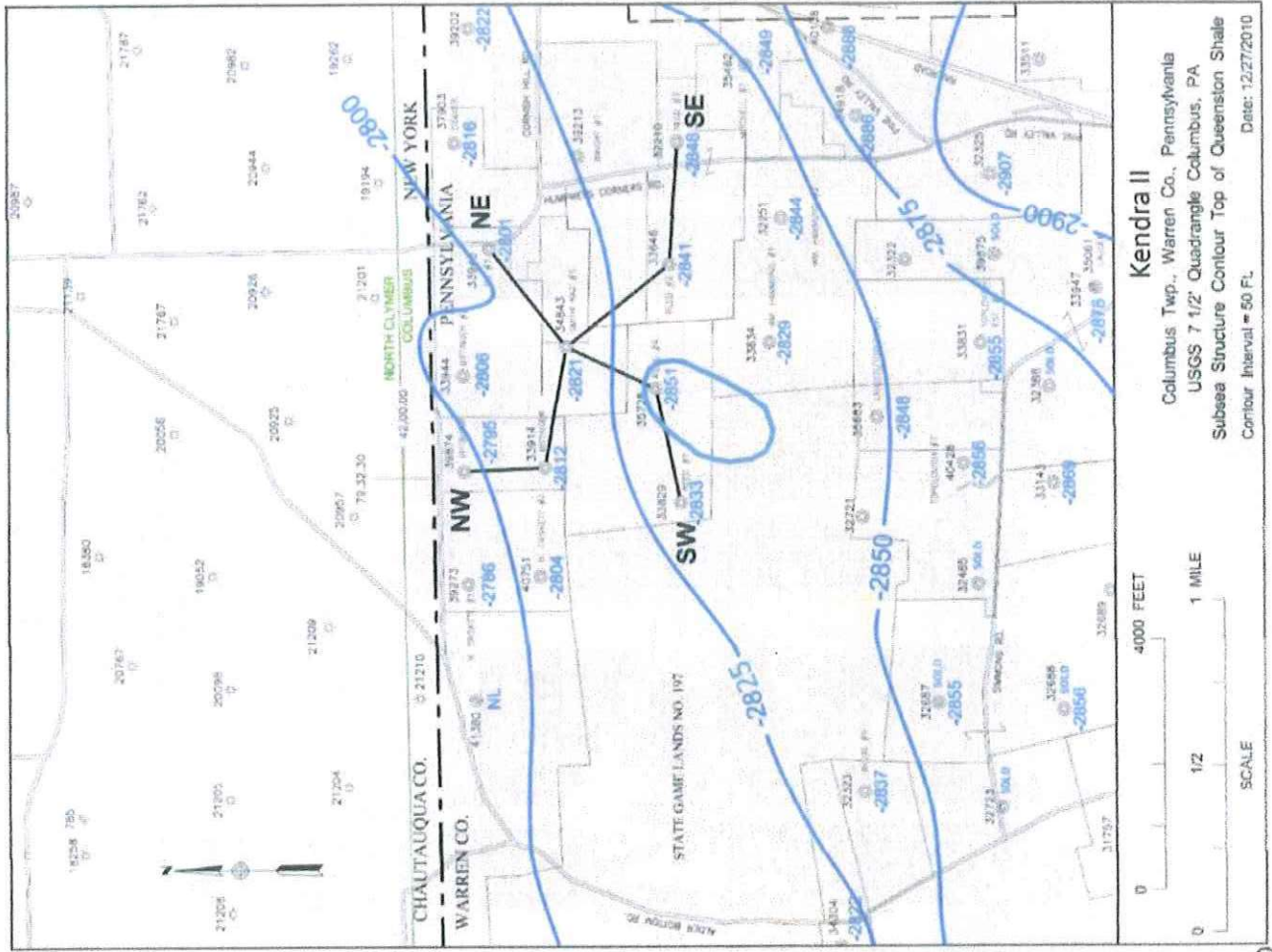
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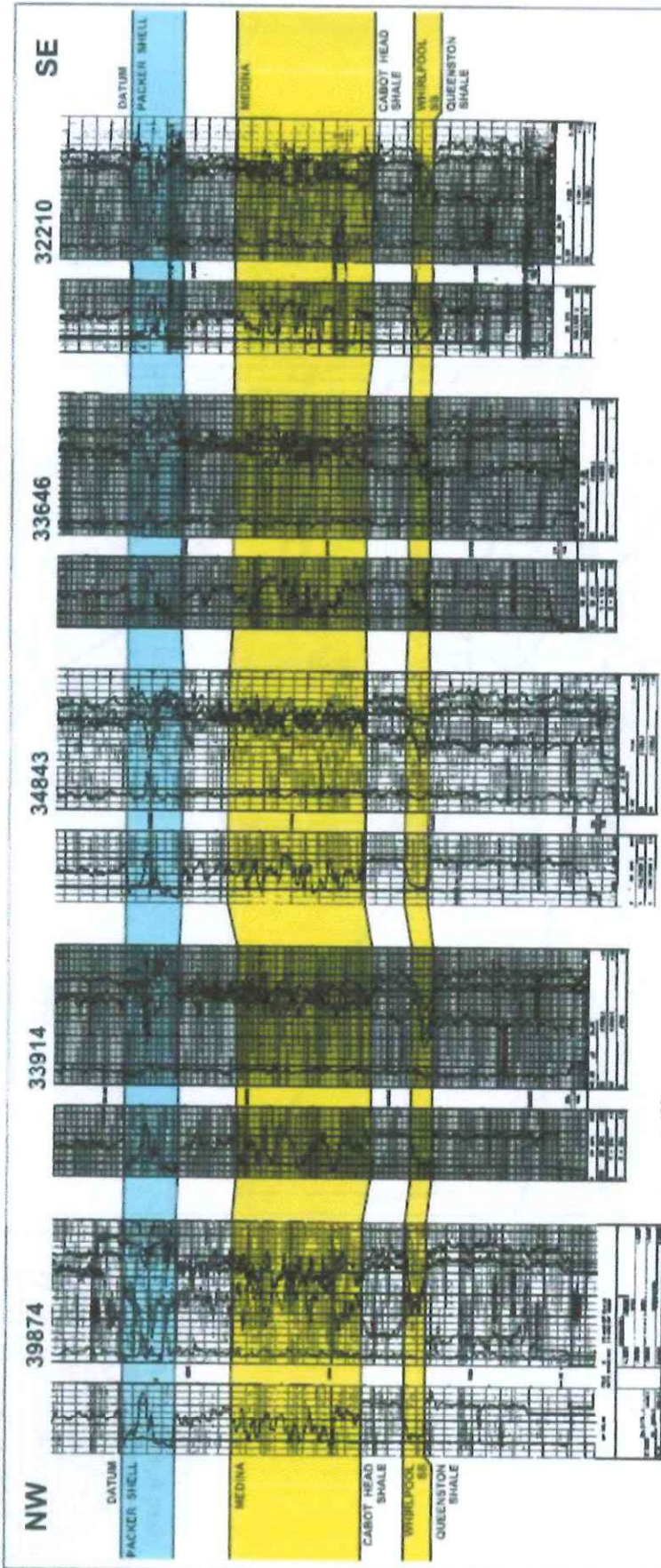
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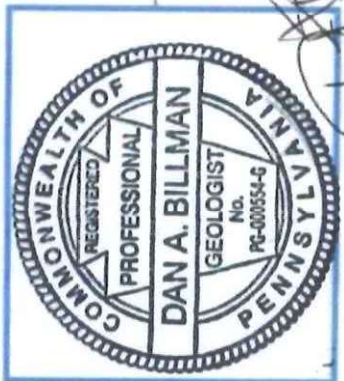


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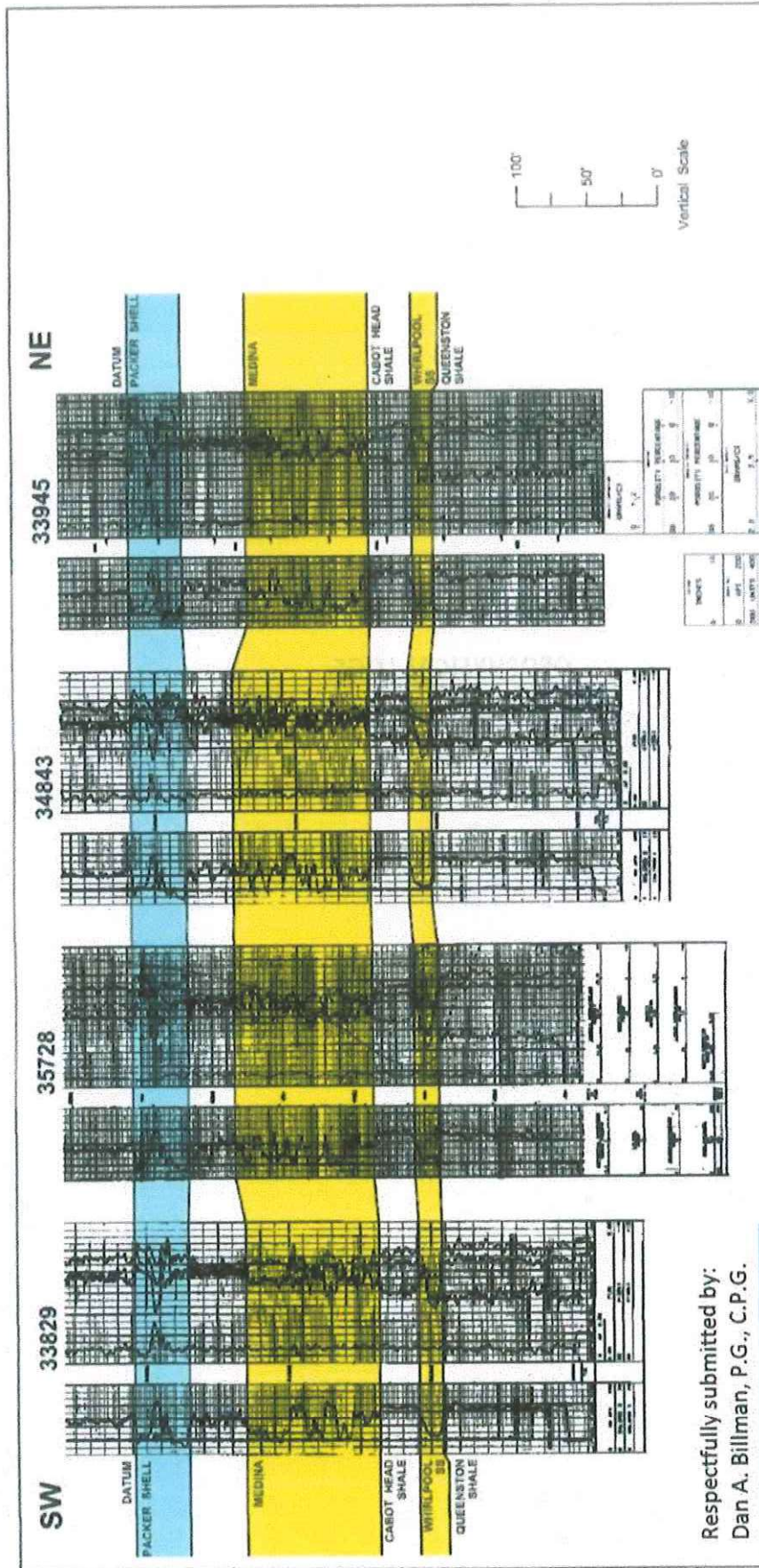




Respectfully submitted by:
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Kendra II
Cross Section NW - SE
Columbus Twp., Warren Co., PA
Date: 12/27/2010



Kendra II
 Cross Section SW - NE
 Columbus Twp., Warren Co., PA
 Date: 12/27/2010

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