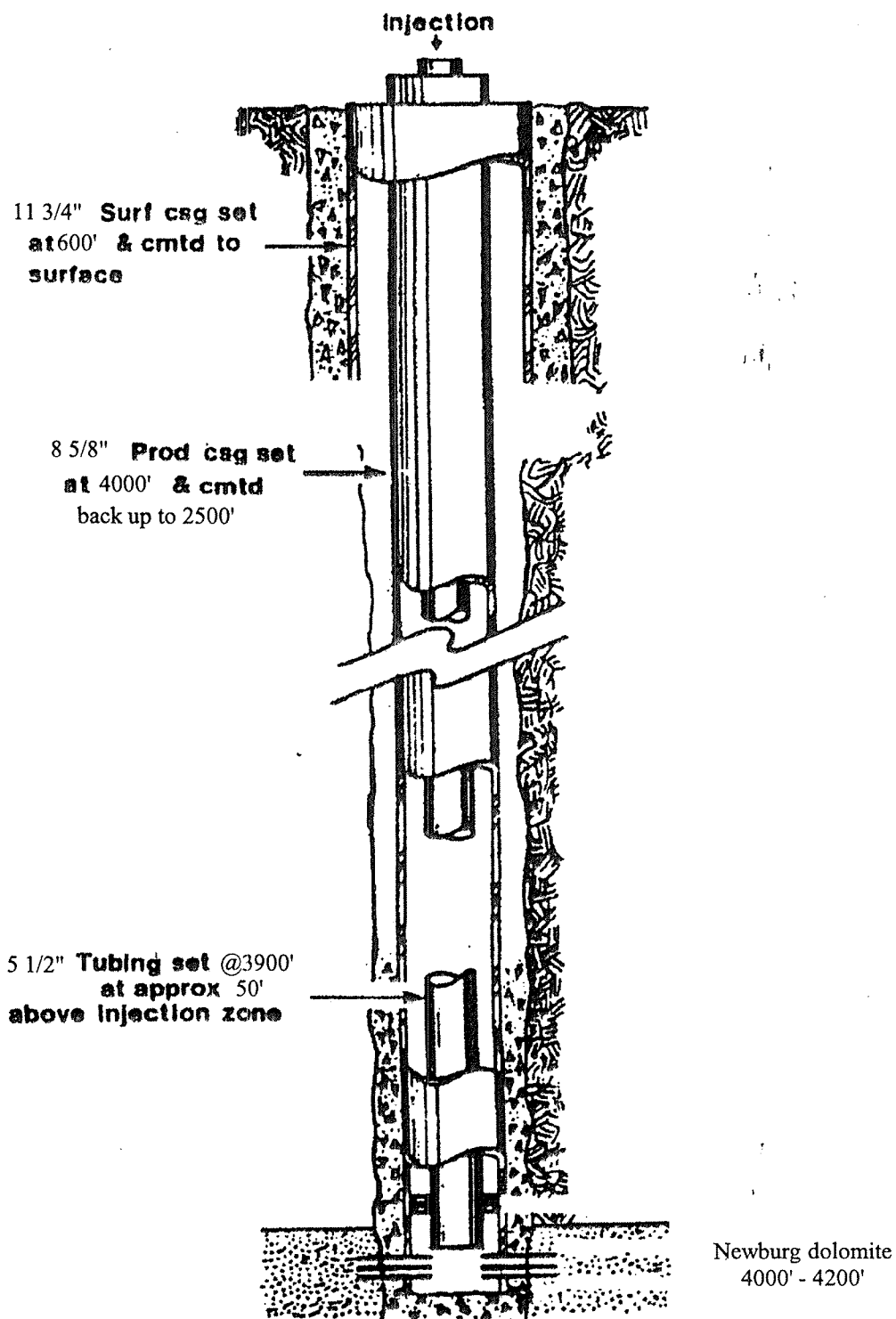


Portage County, Windham Twp., SWIW # 37
Soinski SWD # 1

Subsurface Construction For Injection Well

Maximum Injection Pressure: 920 psi

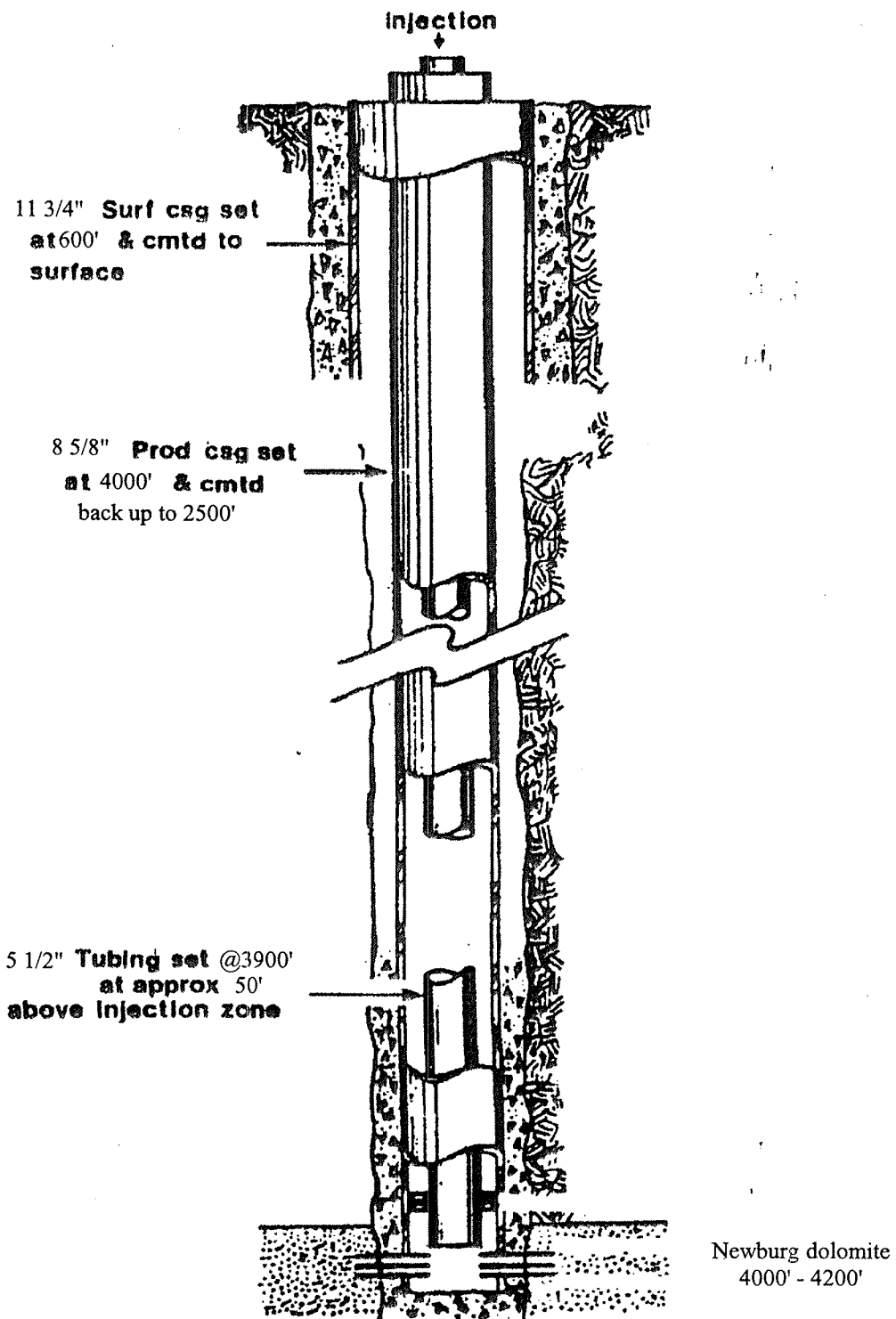


Total Depth: 4200'

Portage County, Windham Twp., SWIW # 37
Soinski SWD # 1

**Subsurface Construction
For Injection Well**

Maximum Injection Pressure: 920 psi



Total Depth: 4200'

aAMY0000908

Class II Injection Well Permit Review Package

- Disclaimer
- Contents
- Overview
- References
- Basic Permit Review
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 - Water Well Layer
 - Underground Coal Mine Layer
 - Surface Water Layer
 - Surface Topography layer
 - Quaternary Geology Layer
 - Oil and gas Layer
 - Groundwater-Source Water Protection Layer
 - Groundwater-Pollution Potential Layer
 - Coal Layer
- Extended Class II Injection Permit Review
 - Gravity Bouguer Anomaly
 - Gravity Free Air
 - Magnetic First Derivative
 - Magnetic Second Derivative
 - Magnetic Reduce Dipole
 - Precambrian Structure from PG-23
 - Knox Structure
 - Trenton Structure
 - EGSP Onondaga Structure
 - MRCSP Onondaga Structure
 - EGSP Berea Structure
 - Mississippian/Pennsylvanian Unconformity Surface
 - Middle Kittanning Coal Structure
 - Upper Freeport Coal Structure
 - Pittsburgh Coal Structure
 - Bedrock Geology
 - Bedrock Topography
 - EGSP Aerial Photo Lineament
 - EGSP LANDSAT Lineament
 - Mason Lineament
 - Oil and gas fields

Disclaimer

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Geologic Review for Class II Wells

Application No. aAmy0000908

Portage County, Windham Twp.

SWIW: (Salt Water Injection Well)

Proposed Well Depth: 4,200 feet

Proposed Injection Zone: "Newburg"

Study area investigated ~ 15 mile radius centered on the proposed well location for all maps except the gravity and magnetic maps, which used 30 mile radius.

Gravity Bouguer Anomaly

- Nothing of note.

Gravity Free Air

- Nothing of note.

Magnetic First Derivative

- There is a northeast-southwest trend located about 24 miles to the northwest of the permit application.

Magnetic Second Derivative

- There is a northeast-southwest trend located about 24 miles to the northwest of the permit application.

Magnetic Reduce Dipole

- There is a northeast-southwest trend located about 24 miles to the northwest of the permit application.

Precambrian Structure from PG-23

- There are no known structural features near the permit application.
- The northeast-southwest trending Akron Magnetic boundary is approximately 20 miles to the northwest of the permit application.

Knox Structure

- There are no known structural features in the study area.

Trenton Structure

- There are no known structural features in the study area.

EGSP Onondaga Structure

- There are no known structural features in the study area.

MRCSP Onondaga Structure

- There are no known structural features near the permit application.

EGSP Berea Structure

- The permit application is located on the flank of a northeast-southwest trending high.

Mississippian/Pennsylvanian Unconformity Surface

- Nothing of note.

Middle Kittanning Coal Structure

- Unit not present.

Upper Freeport Coal Structure

- Unit not present.

Pittsburgh Coal Structure

- Unit not present.

Bedrock Geology

- The top of bedrock for the permit application is near the boundary of the Upper Pennsylvanian Allegheny and Pottsville undivided and Mississippian Logan and Cuyahoga Formations undivided.

Bedrock Topography

- The bedrock topography map indicates an east-west trending channel approximately 2 miles to the northwest.

1,200 feet

EGSP Aerial Photo Lineament

- Numerous lineaments generally less than 1 mile in length have been interpreted from aerial photos by Gray and others (1982) over and in the immediate vicinity of the permit application with 2 dominant directions oriented northwest-southeast and northeast-southwest.

EGSP LANDSAT Lineament

- A northwest-southeast trending lineament less than 1 mile in length is present about ½ mile to the northwest of the permit application.

Mason Lineament

- An east west trending lineament is present approximately 1 1/2 miles to the north of the permit. Another northeast-southwest trending lineament is present approximately 4 miles to the south.

Oil and gas fields

- Production in the study area is in the “Clinton,” Berea, and Knox. The permit application is located within the Aurora gas field that produces from the “Clinton.”

Earthquakes

- There has been 1 earthquake in 1988 within the 30-mile study area. The epicenter is approximately 4 miles northwest of the salt water injection permit and had a magnitude of 2.8.

Injection Wells

- There are 17 active salt water disposal (SWD), 1 injection for enhanced oil recovery (EOR), 1 producing for enhanced oil recovery (IEOR), and 16 inactive salt water disposal (ISWD) wells within the 30-mile study area. They are injecting into the “Clinton/Medina” and Lockport (“Newburg”). The nearest injection well is less than 1 mile to the southeast.

To summarize, this proposed injection well in the “Newburg” is of no major concern. It is not located within close proximity to any known faults. There has been 1 documented earthquake with a magnitude of 2.8 within the 30-mile study area, which was 4 miles to the northwest of the permit application. Injection well records indicate there are currently 17 SWD wells, 1 EOR, 1 IEOR, and 16 ISWD wells in the 30-mile study area. The nearest oil and gas producing field is the Aurora field that produces from the “Clinton” sandstone.

References

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- Hansen, M.C., 2002, Earthquake epicenters in Ohio and adjacent areas: Ohio Division of Geological Survey Map EG-2, scale 1:500,000.
- Hildenbrand, T.G., Gravity anomaly maps of Ohio, U.S. Geological Survey Geophysical Investigations Map GP-963, scale 1:1,000,000.
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- Hildenbrand, T.G. and Kucks, R.P., 1984b, Complete Bouguer gravity anomaly map of Ohio: U.S. Geological Survey Geophysical Investigations Map GP-962, scale 1:500,000.
- Mason, Greg, 1999, Structurally related migration of hydrocarbons in the central Appalachian basin of eastern Ohio: Ohio Geological Society, Proceedings of the sixth annual fall symposium, p. 20-33.
- Ohio Division of Geological Survey, 2003, Shaded bedrock-topography map of Ohio: Ohio Department of Natural Resources, Division of Geological Survey Map BG-3, available as 1:500,000-scale and digital (GIS) format.
- Ohio Division of Geological Survey, 2003, Structure map of the Lower Freeport coal, unpublished digital (GIS) map.
- Ohio Division of Geological Survey, 2003, Structure map of the Lower Kittanning coal, unpublished digital (GIS) map.
- Ohio Division of Geological Survey, 2003, Structure map of the Middle Kittanning coal, unpublished digital (GIS) map.
- Ohio Division of Geological Survey, 2003, Structure map of the Mississippian-Pennsylvanian unconformity, unpublished digital (GIS) map.
- Ohio Division of Geological Survey, 2003, Structure map of the Pittsburgh coal, unpublished digital (GIS) map.

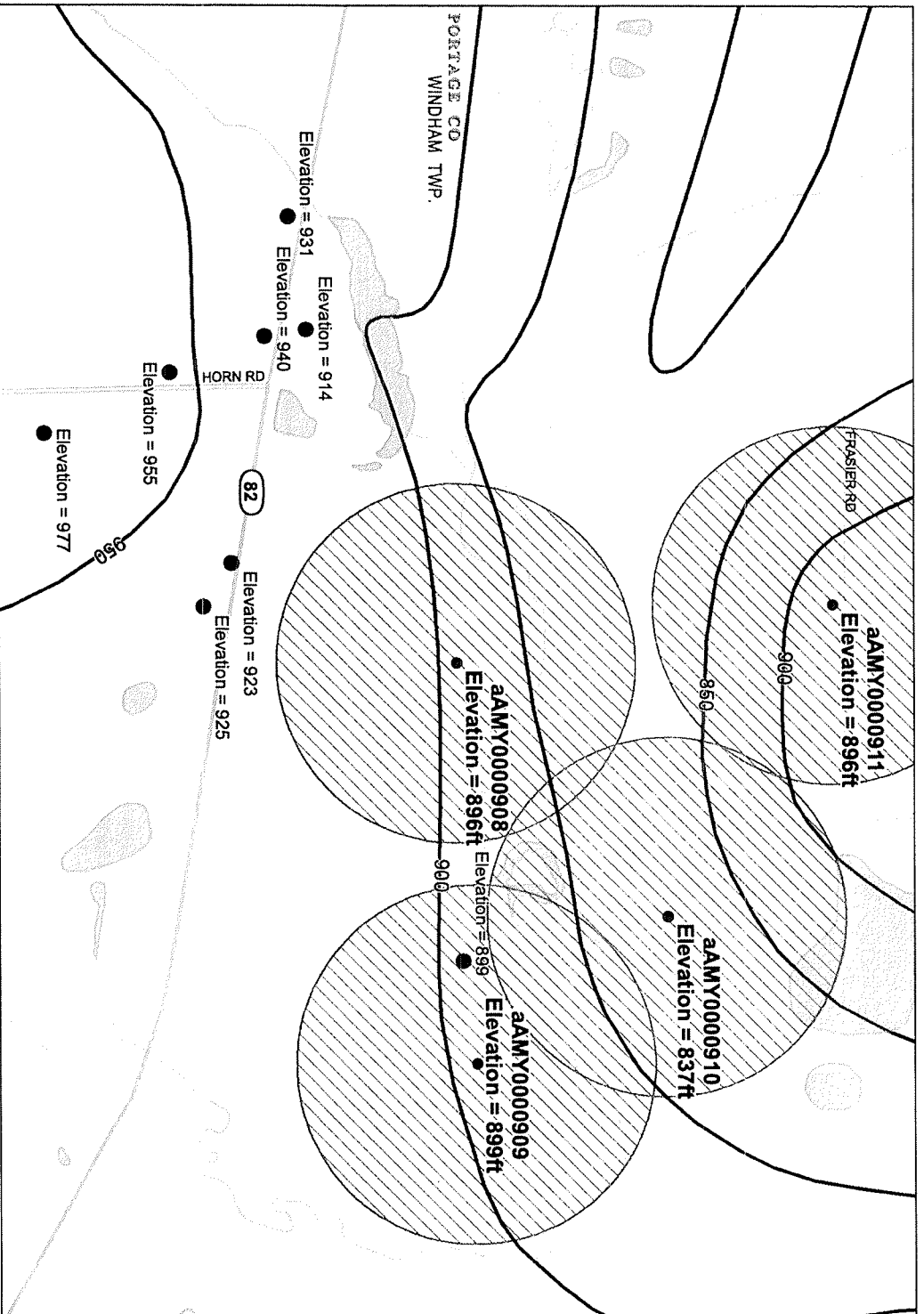
Ohio Division of Geological Survey, 2003, Structure map of the Upper Freeport coal, unpublished digital (GIS) map.

Patchen, D.G., Hickman, J.B., Harris, D.C., Drahovzal, J.A., Lake, P.D., Smith, L.B., Nyahay, Richard, Schulze, Rose, Riley, R.A., Baranoski, M.T., Wickstrom, L.H., Laughrey, C.D., Kostelnik, Jaime, Harper, J.A., Avary, K.L., Bocan, John, Hohn, M.E., and McDowell, Ronald, 2006, A Geologic Play Book for Trenton-Black River Appalachian Basin Exploration: Final report prepared for U.S. Department of Energy, contract no. DE-FC26-03NT41856, 601 p.

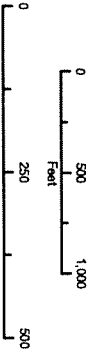
Slucher, E. R., compiler, Swinford, E. M., Larsen, G. E., Schumacher, G. A., Shrake, D. L., Rice, C. L., Caudill, M. R., and Rea, R. G., 2006, Bedrock geologic map of Ohio: Ohio Division of Geological Survey Map BG-1, scale 1:500,000.

Bedrock Topography Layers

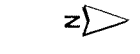
Well APPNO - aAMY0000908



- Basemaps**
- Railroad
 - Local Road
 - State Route
 - U.S. Highway
 - Interstate
 - Hydrography Line
 - Hydrography Polygon
 - Hydrography Polygon
 - City
 - Township
 - County



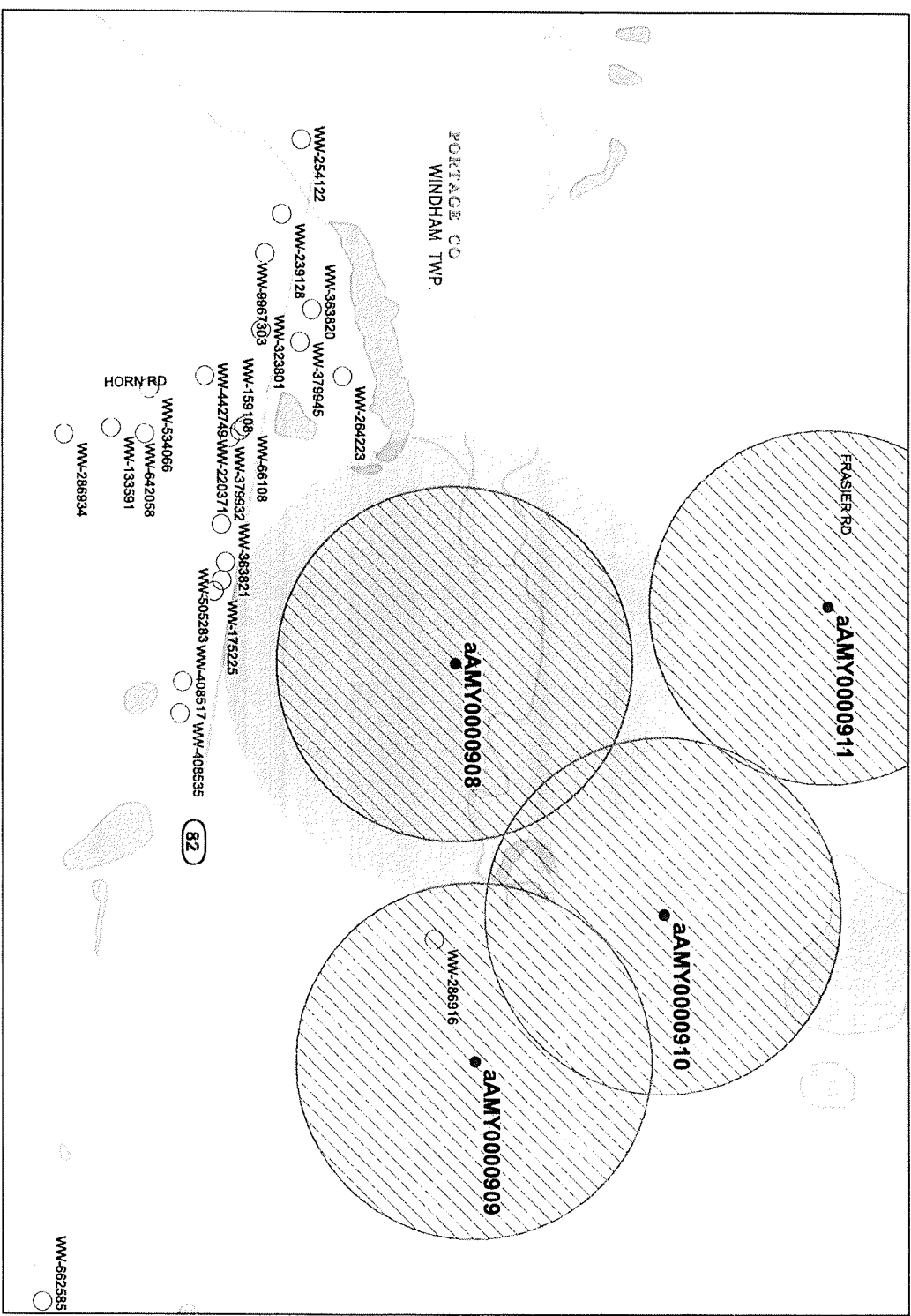
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 Data Source: Bedrock Topography Layers, Division of Geological Survey (DGS)



- Data Point (Well)
 - Contour Line
 - Well Feature Type
 - DR
 - District/County Bound
 - State/County Bound
 - Point Data Name Bound
 - BT Data Points**
 - POINT_TYPE
 - Approximate data point
 - Known sequence
 - Data Entry Point
 - True position (w/line well)
 - Local sequence (SN)
 - Global sequence (SN)
 - Intersected point
 - POINT Type
 - Data Division of Geological Survey connection
 - Quarry
 - City
 - County
 - City
 - County
- Bedrock Topography 500K**
- Scale: 1:400
- Map: 327

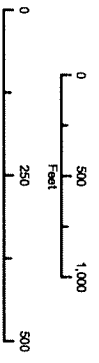
Water Well Layer

Well APPNO - aAMY0000908



Basemaps

- Railroad
- Local Road
- State Route
- U.S. Highway
- Interstate
- Hydrography Line
- Hydrography Polygon
- Hydrography Polygon
- Hydrography Polygon
- City
- Township
- County



Date Created: 4/4/2012
Data Source: Water Well Layer, Division of Soil and Water Resources (DSWR)

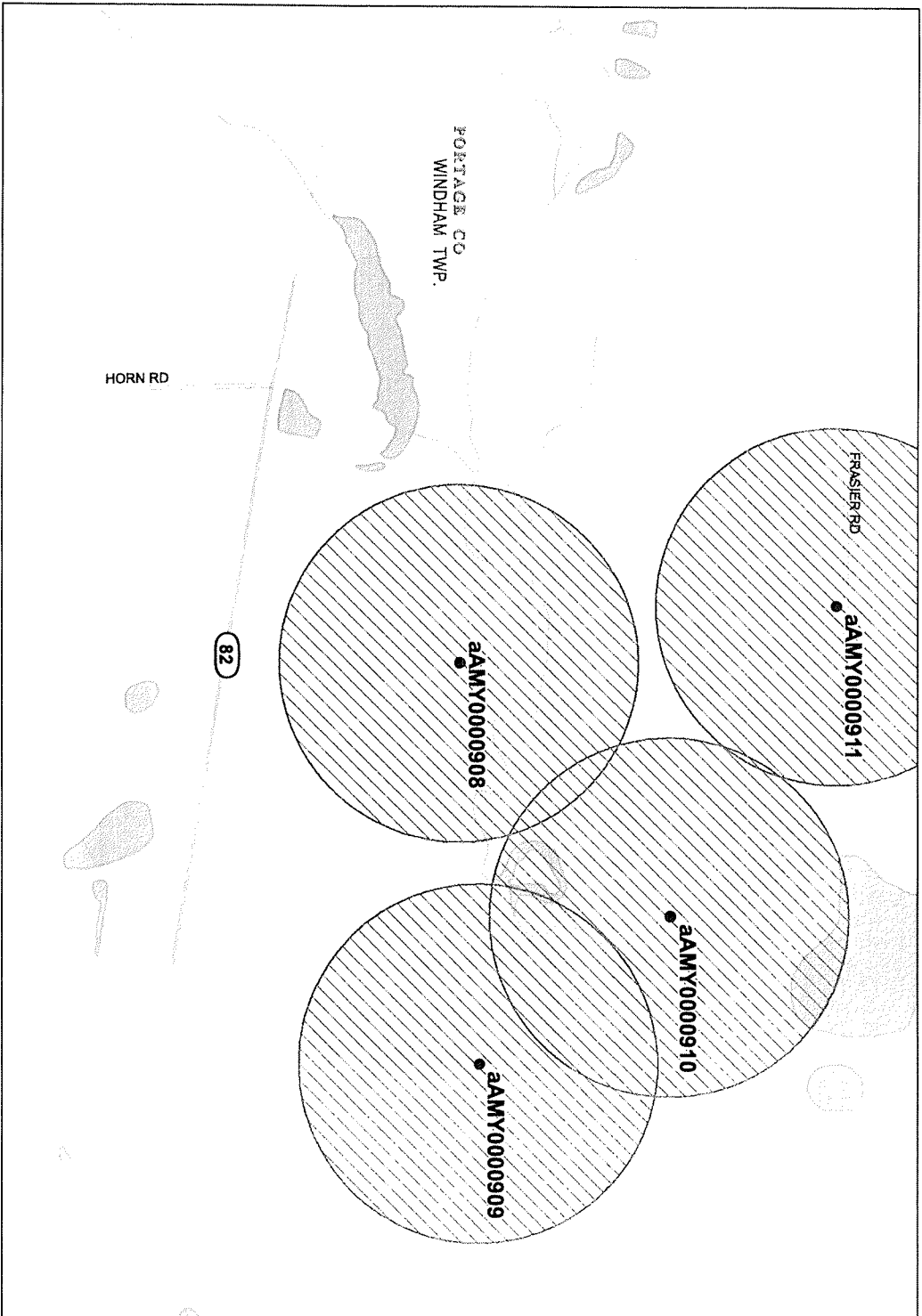


● Data Point Well

- Existing Well
- Well Feature Type
- DR
- Closed Above Ground
- Closed Below Ground
- Open Closed Above Ground
- Open New Location
- Well, Well, 2007 Data

Underground Coal Mine Layers

Well APPNO - aAMY0000908

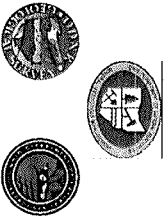
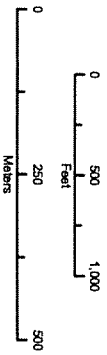


- Basemaps**
- Railroad
 - Local Road
 - State Road
 - U.S. Highway
 - Interstate
 - Hydrography Line
 - Hydrography Polygon
 - Intermittent
 - City
 - Township
 - County



Data Source: Underground Coal Mine Layers, Division of Geological Survey (DGS) and (DMRM)

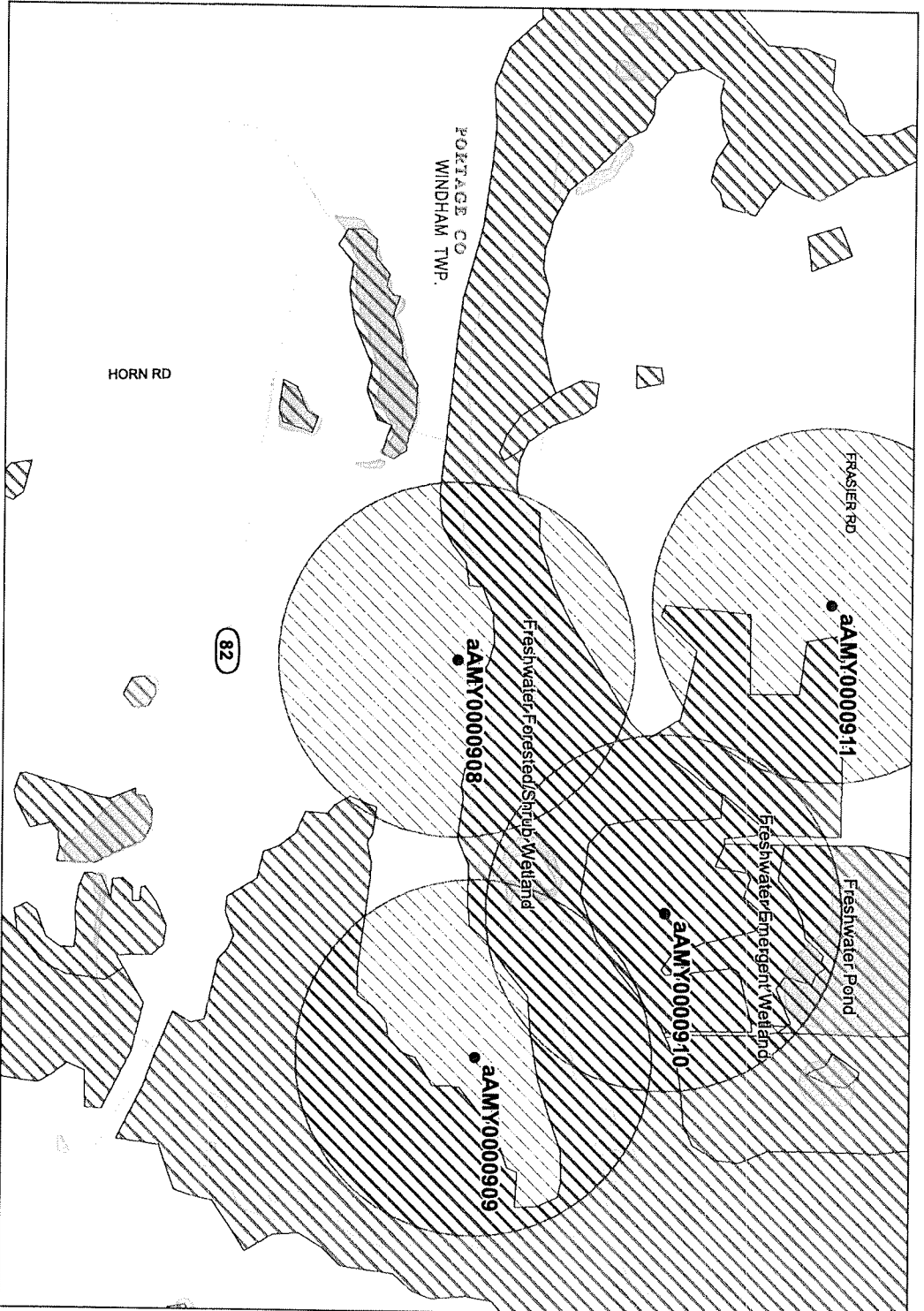
Date Created: 4/4/2012



- Coal Mine Well
- Abandoned Layer
- Active Layer
- Well Number Type
- DR
- Abandoned Opening Entry Code
- Active Opening Entry Code
- Well Point
- ▲ Well Entry
- Abandoned Layer Point
- Active Layer Point
- Abandoned Layer Point
- Active Layer Point
- ▲ Well Entry
- ▲ Well Entry
- ▲ Well Entry

Surface Water Layers

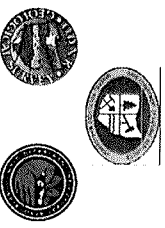
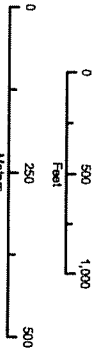
Well APPNO - aAMY0000908



- Basemaps**
- Railroad
 - Local Road
 - State Road
 - U.S. Highway
 - Interstate
 - Hydrography Line
 - Hydrography Polygon
 - Intermittent
 - City
 - Township
 - County



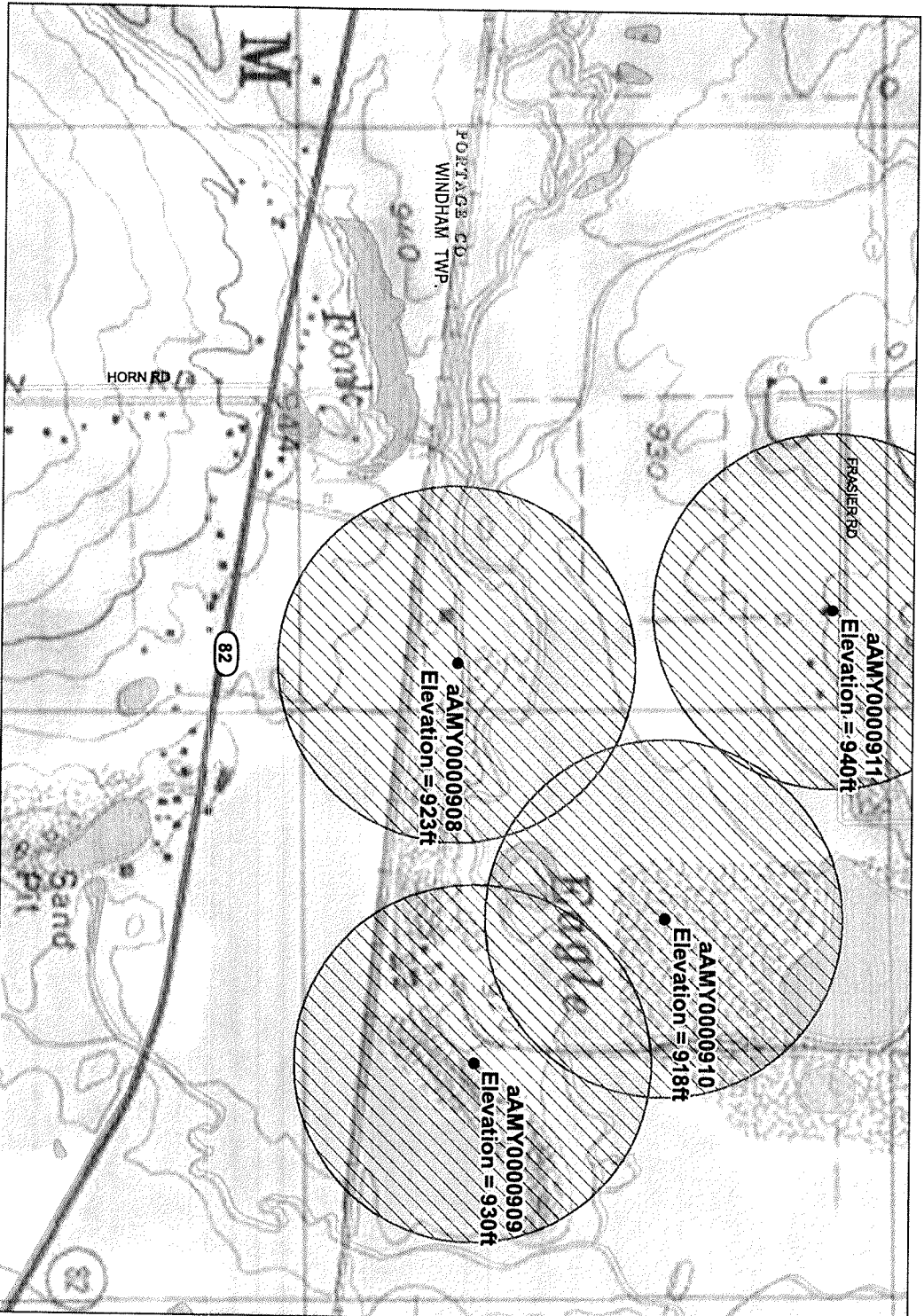
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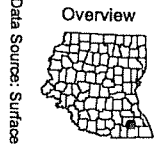
- Well
- Dam
- Dam Name
- Dam Type
- Direct Known Ground
- Ground Water
- Intermittent Ground
- Intermittent
- Historical Wetland Inventory (HWI)
- Intermittent
- Intermittent

Surface Topography Layers

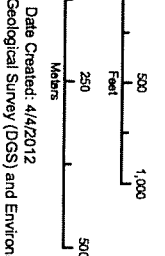
Well APPNO - aAMY0000908



- Basemaps**
- National Road
 - Local Road
 - State Route
 - U.S. Highway
 - Interstate
 - Hydrography Line
 - Hydrography Polygon
 - Hydrography Polygon Terminator
 - City
 - Township
 - County



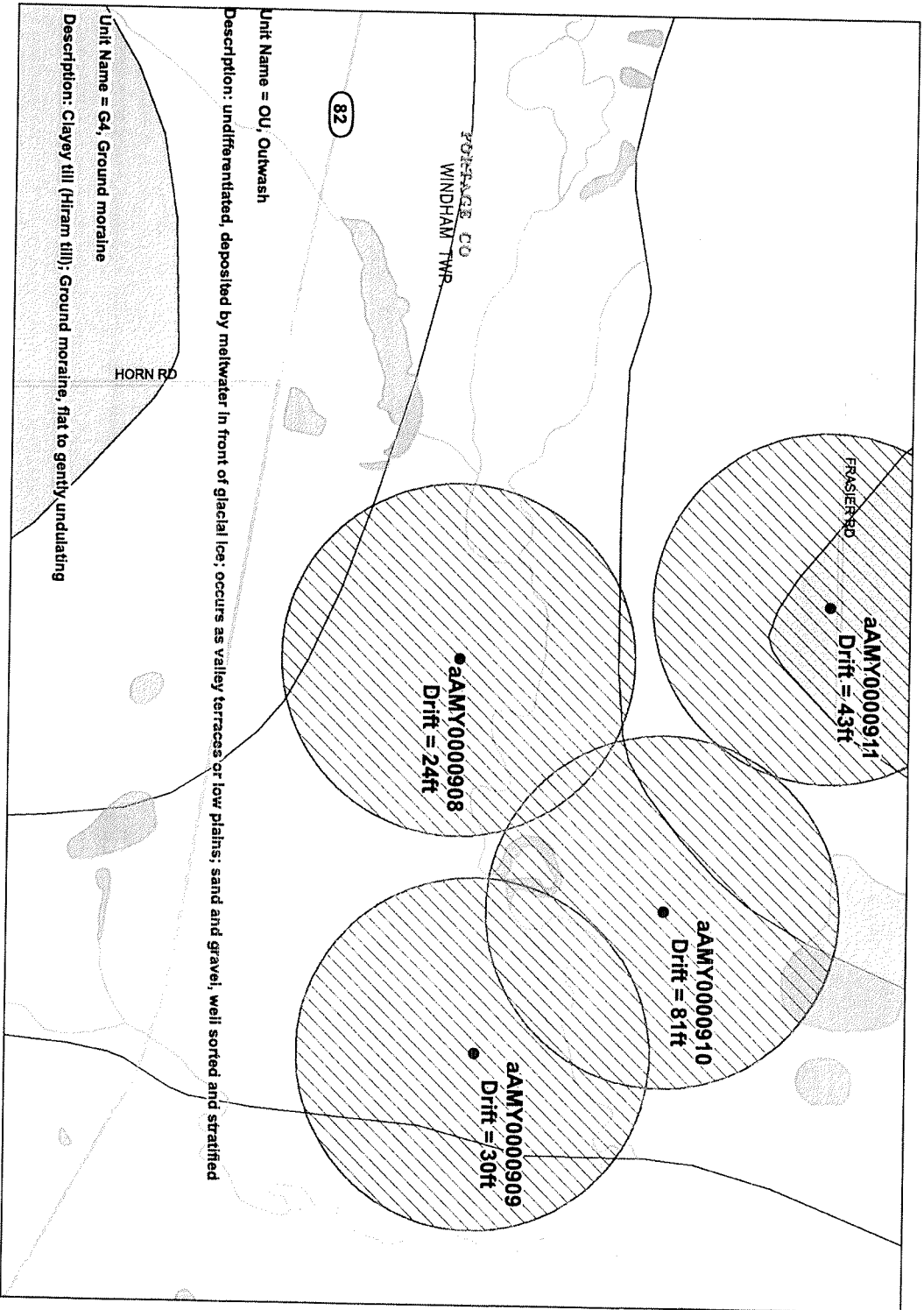
Data Source: Surface Topography Layers, Division of Geological Survey (DGS) and Environmental Science Research Institute (ERSI)



- Well Point Mark
- Division Line
- Well Number Type
- DW
- Division Line
- Division Line
- Division Line

Quaternary Geology Layers

Well APPNO - aAMY0000908



Unit Name = OU, Outwash

Description: undifferentiated, deposited by meltwater in front of glacial ice; occurs as valley terraces or low plains; sand and gravel; well sorted and stratified

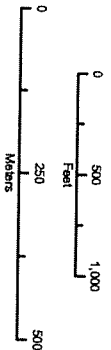
Unit Name = G4, Ground moraine

Description: Clayey till (Hiram till); Ground moraine; flat to gently undulating

Basemaps

- Railroad
- Local Road
- State Route
- U.S. Highway
- Interstate
- Hydrography Line
- Hydrography Polygon
- Hydrography Polygon
- City
- Township
- County

Overview



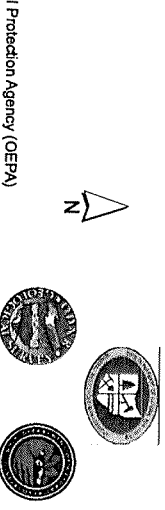
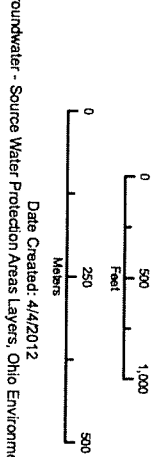
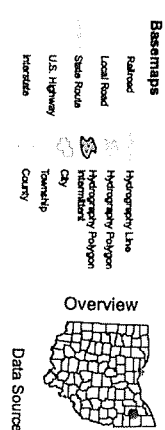
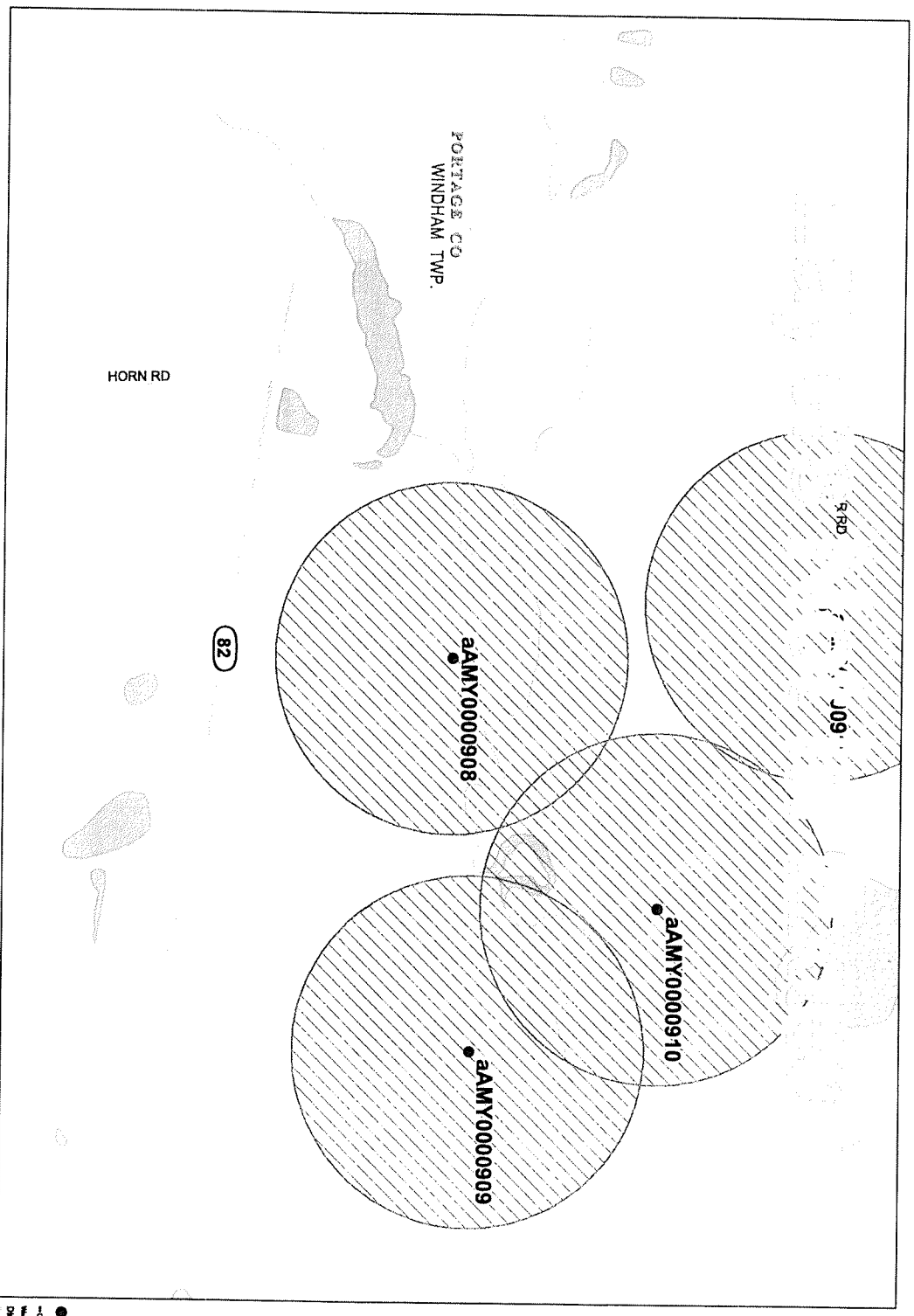
Data Source: Quaternary Geology Layers, Division of Geological Survey (DGS)
Data Created: 4/4/2012



- 30 Feet Well
- Check Line
- Well Section Type
- DR
- Description Group
- Check Meter Group
- Well Section Group

Groundwater - Source Water Protection Area Layers

Well APPNO - aAMY0000908



● Well Point Well

○ Observation Line

○ Well Feature Type

○ DW

○ District Name Bound

○ Port District Name Bound

○ Port District Name Bound

○ Unincorporated Area Bound

○ Special Well District Bound

○ SMDA TYPE

○ Prime Management Zone (1-year flow of base)

○ Source Water Protection Area - 5-Mile T27

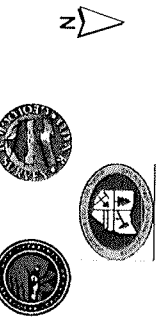
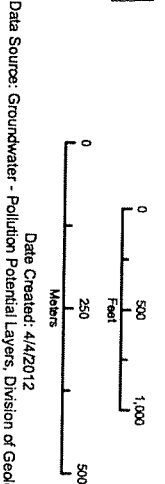
Projection: NAD 83, UTM

Groundwater - Pollution Potential Layers

Well APPNO - aAMY0000908

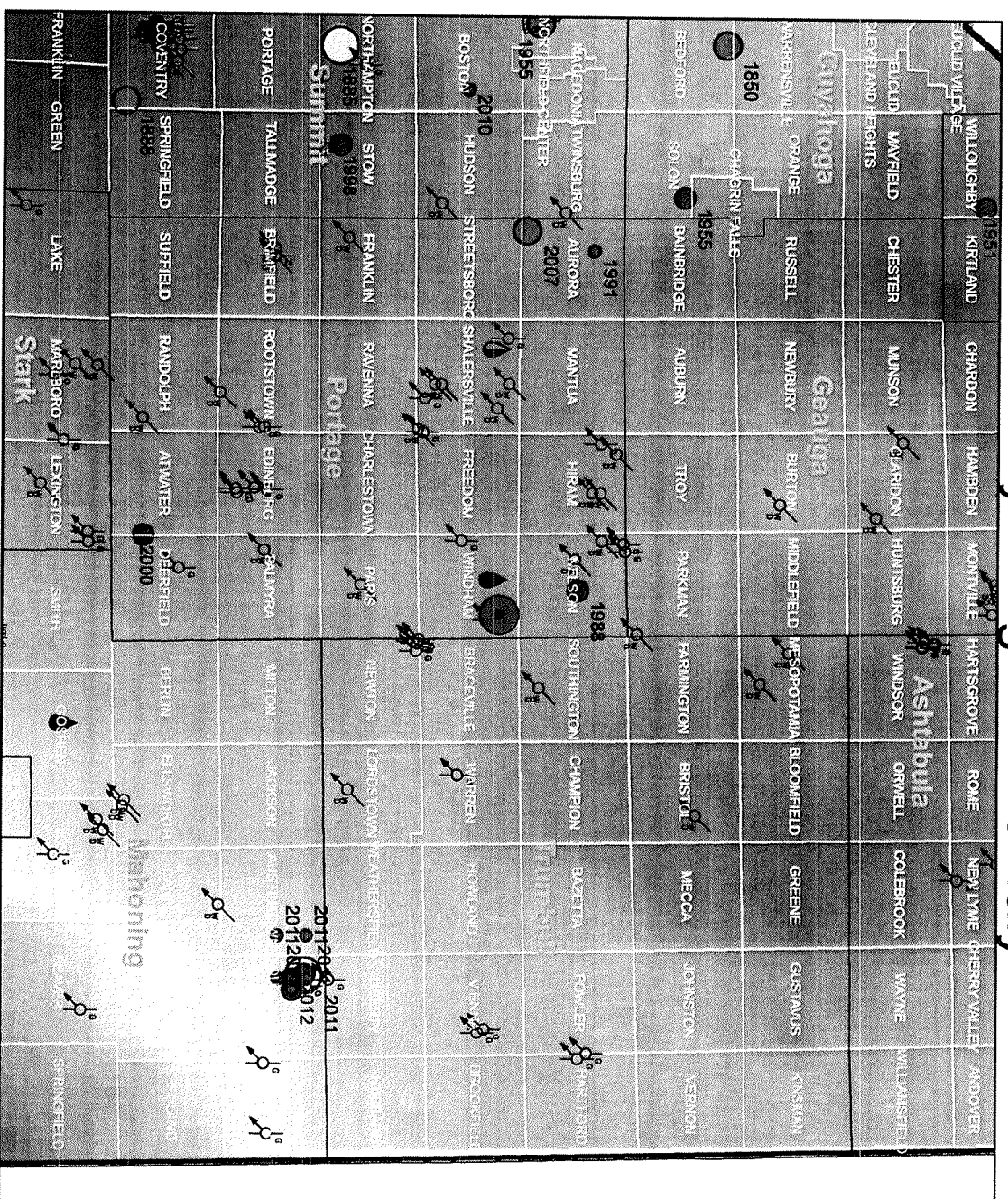


- Basemaps**
- Railroad
 - Local Road
 - State Route
 - U.S. Highway
 - Interstate
 - Hydrography Line
 - Hydrography Polygon
 - Hydrography Polygon Identifier
 - City
 - Township
 - County
- Overview**
-



- DRASTIC - AUM and Strip Mines**
- Well Point Mark
 - Well Point Line
 - Well Point Type
 - DR
 - Drift Above Ground
 - Open Water Ground
 - Open Water Ground
- DRASTIC - AUM and Strip Mines**
- Drastic AUM and Strip Mines
 - Drastic Base Value
 - DRASTIC Rating
 - Layer
 - Interpolate

Gravity Bouguer Anomaly



Hildenbrand, T.G. and Kucks, R.P., 1984b

Legend
24MY0000908

MAPINJWE Events

WELL_TYP

EOR

IEOR

IER

ISWD

SM

SWD

GEOLOGY.LOADER.eq_epicenters
MAG

2.000000 - 2.500000

2.500001 - 3.000000

3.000001 - 3.400000

3.400001 - 4.200000

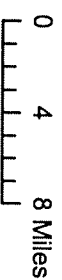
4.200001 - 5.400000

obigrav

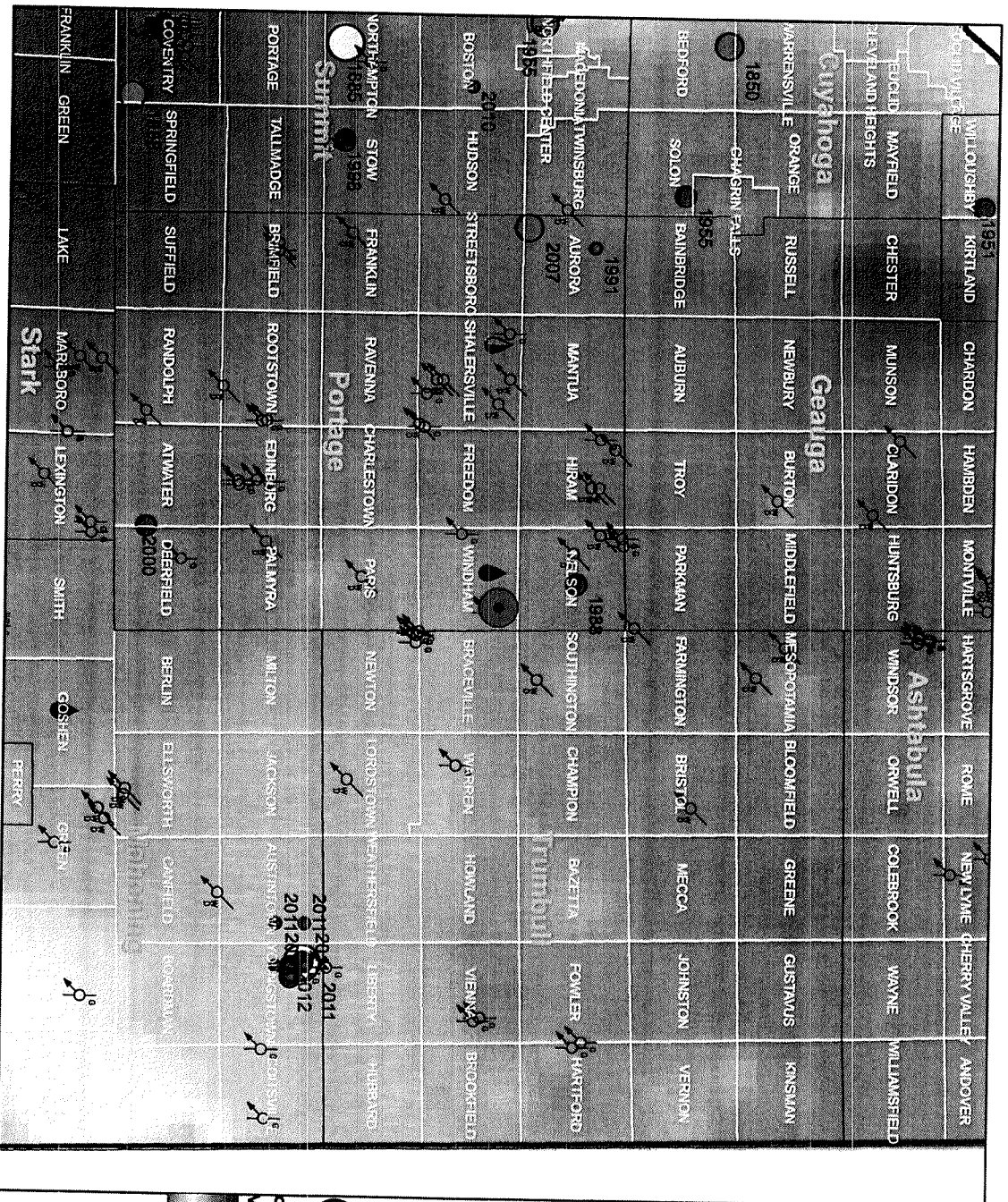
Value

High : 19.1978

Low : -82.0105



Gravity Free Air



Hildenbrand, T.G., 1986

Legend

● 24MY0000908

MAPINWJE Events

WELL_TYP

● EOR

● IEOR

○ IER

○ ISWD

○ SM

○ SWD

GEOLOGY.LOADER.eq_epicenters

MAG

● 2.000000 - 2.500000

● 2.500001 - 3.000000

● 3.000001 - 3.400000

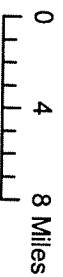
● 3.400001 - 4.200000

● 4.200001 - 5.400000

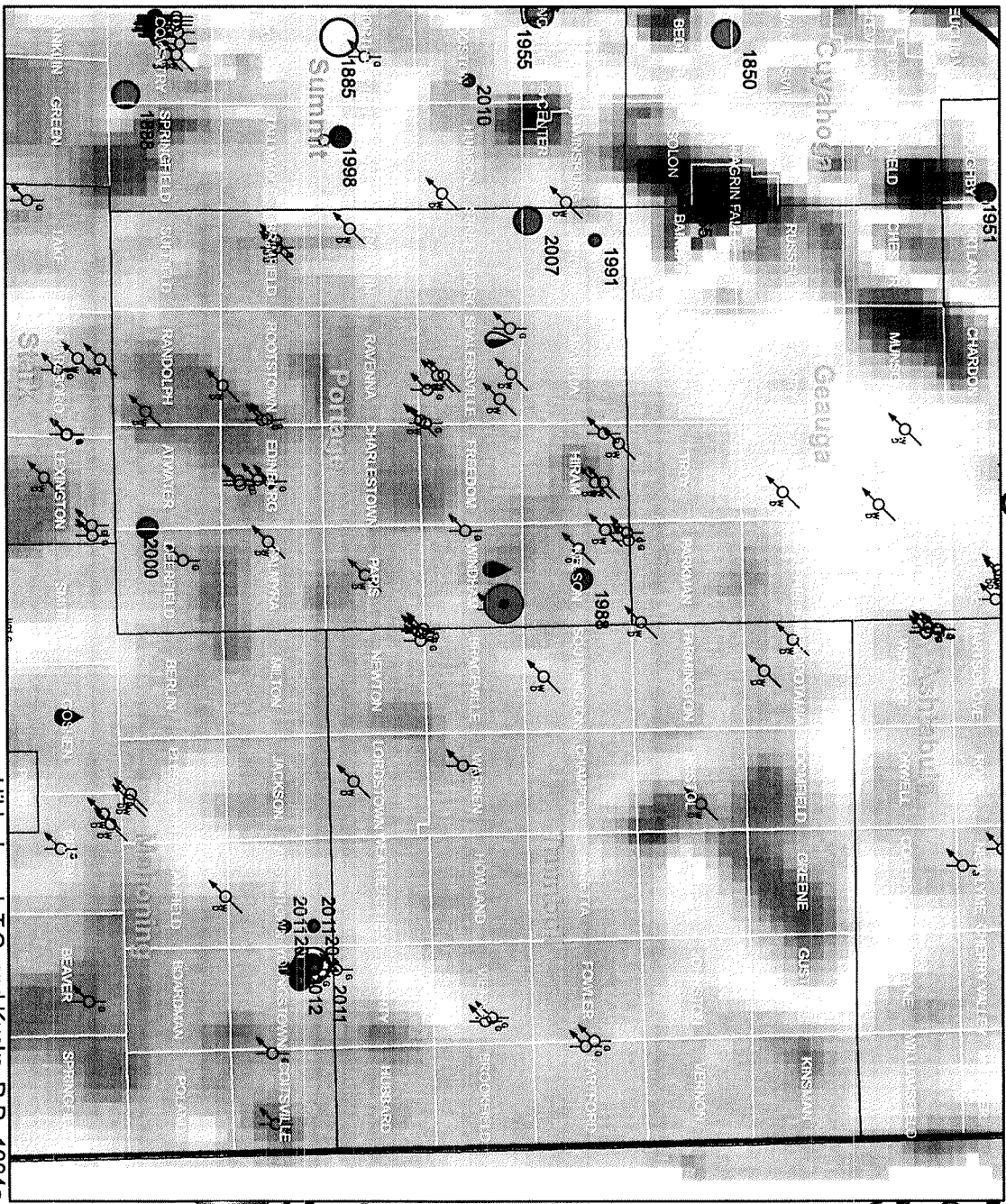
ohfreeairgrav Value

High : 53.6218

Low : -56.7874



Mag First Derivative



Hildenbrand, T.G. and Kucks, R.P., 1984a

Legend

- 2AAY00000908
- MAGINJWE Events**
- WELL_TYP**
- EOR
- IEOR
- IER
- ISWD
- SM
- SWD

GEOLOGY.LOADER.eq_epicenters

MAG

- 2.000000 - 2.500000
- 2.500001 - 3.000000
- 3.000001 - 3.400000
- 3.400001 - 4.200000
- 4.200001 - 5.400000

magnetic1st Value

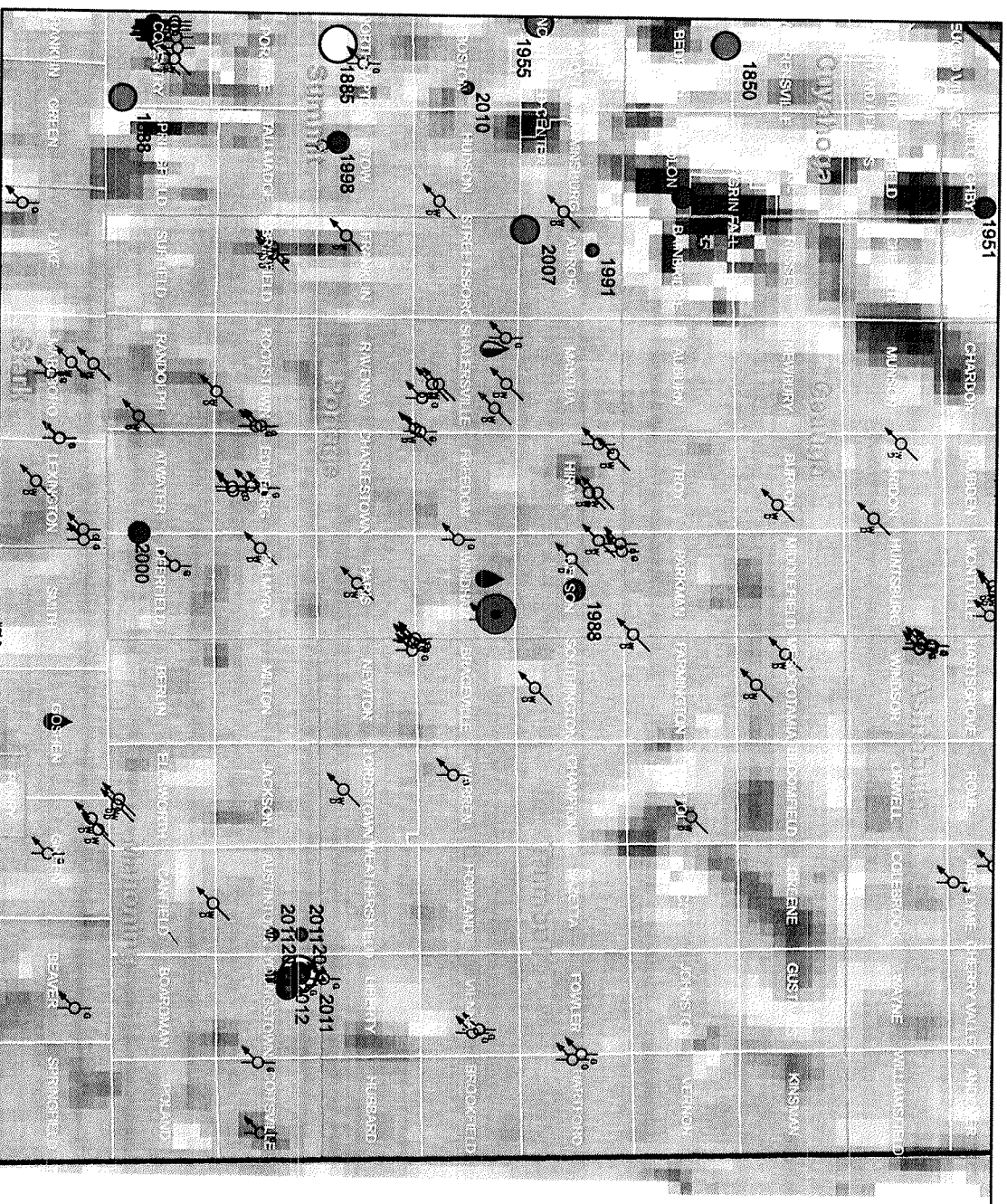
High : 1293.44

Low : -1215.91

0 4 8 Miles

N

Magnetic Second Derivative



Hildenbrand, T.G. and Kucks, R.P., 1984a

Legend

- 2AMN0000908
- MAPINJWE Events
- WELL_TYP
- EOR
- IEOR
- IER
- ISWD
- SM
- SWD

GEOLOGY.LOADER.eq_epicenters

MAG

- 2.000000 - 2.500000
- 2.500001 - 3.000000
- 3.000001 - 3.400000
- 3.400001 - 4.200000
- 4.200001 - 5.400000

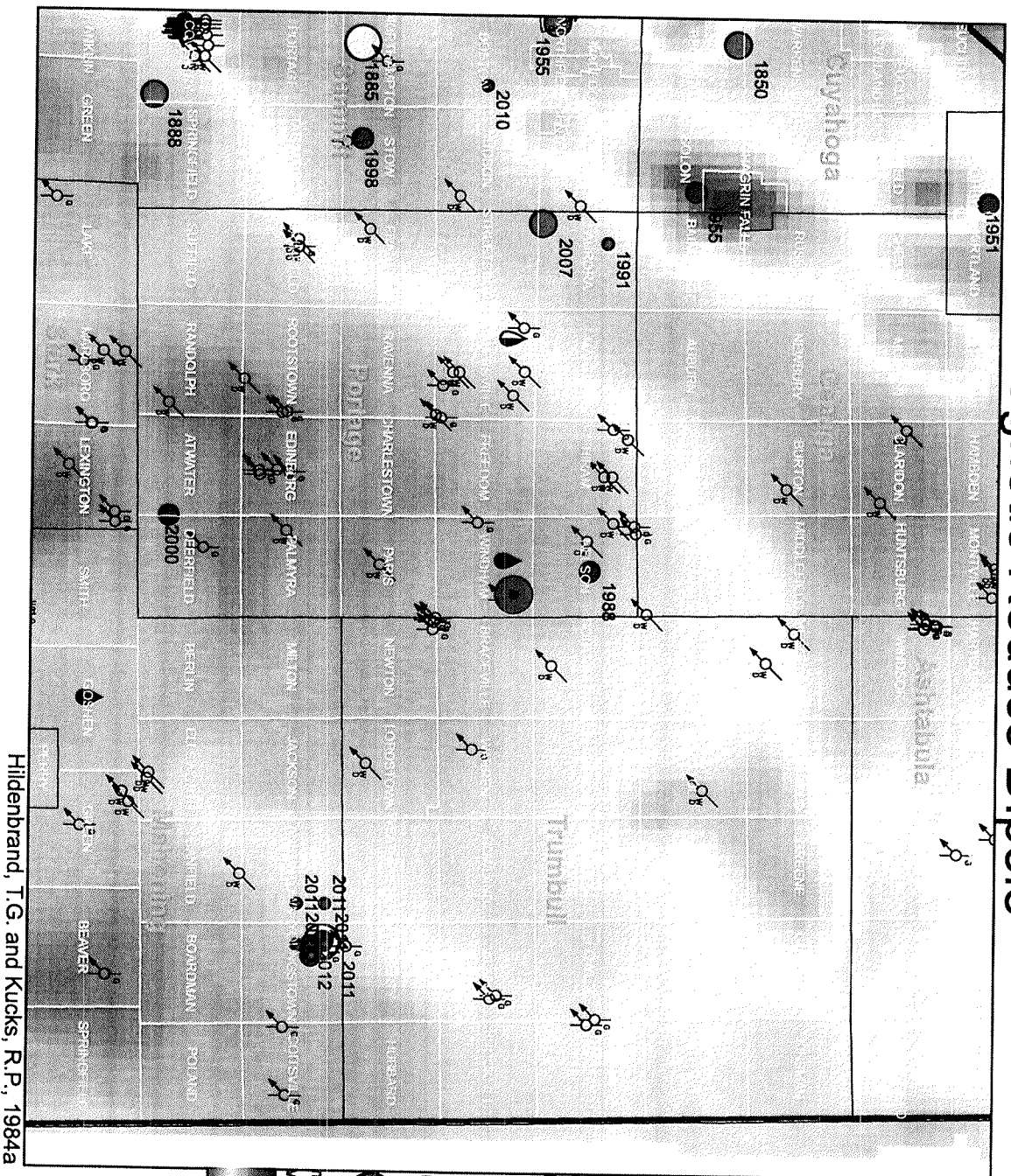
mag2nd Value

- High : 1366.31
- Low : -1526.25

0 4 8 Miles

N

Magnetic Reduce Dipole



Hiddenbrand, T.G. and Kucks, R.P., 1984a

Legend
 ● 6AMT0000908

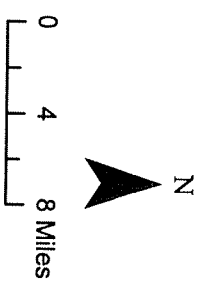
MAPINJWE Events
 WELL_TYP

● EOR
 ● IEOR
 ○ IER
 ● ISWD
 ○ SM
 ● SWD

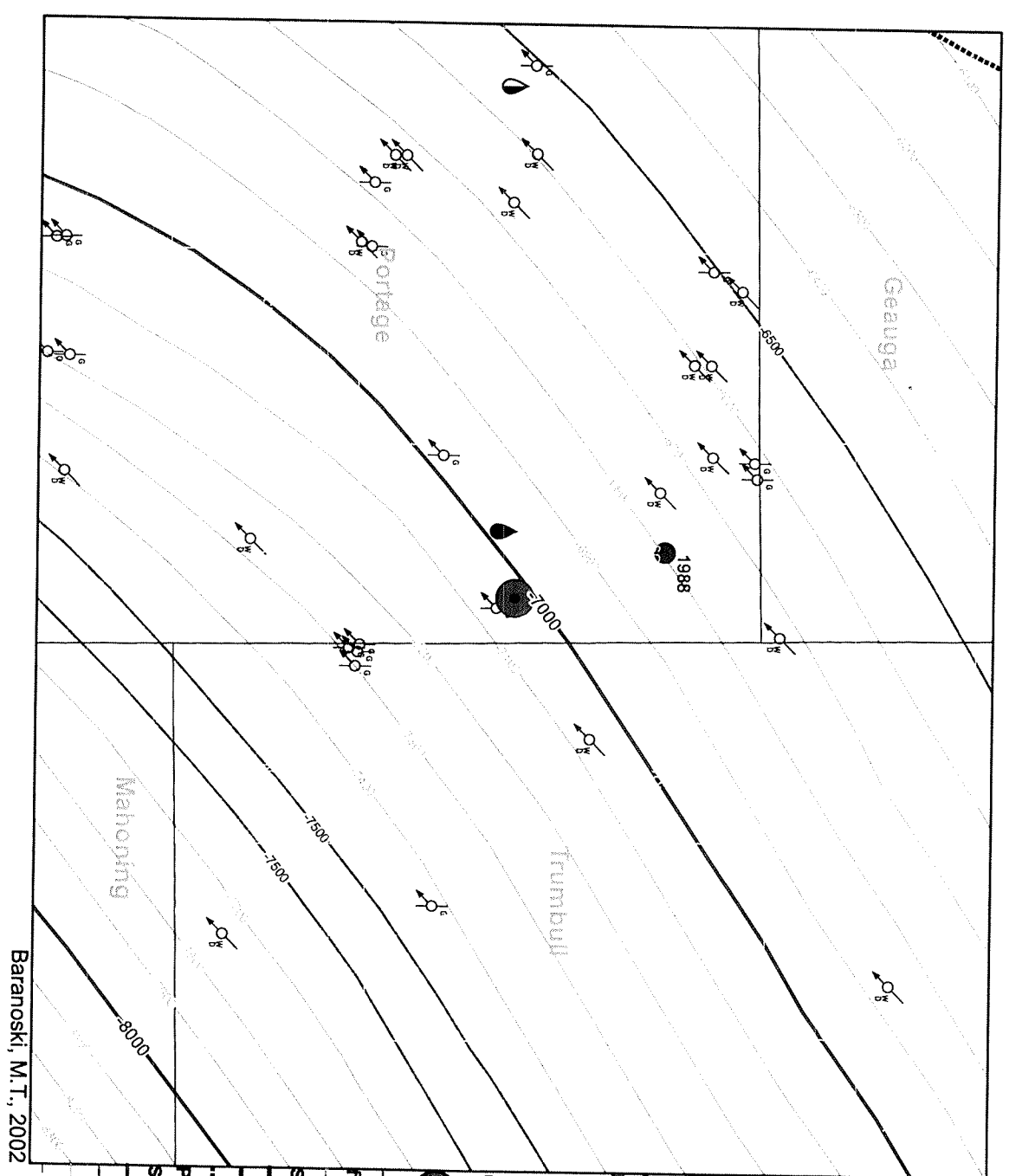
GEOLOGY.LOADER.eq_epicenters
 MAG

● 2.000000 - 2.500000
 ● 2.500001 - 3.000000
 ● 3.000001 - 3.400000
 ● 3.400001 - 4.200000
 ● 4.200001 - 5.400000

magredp
 Value
 High : 2265.63
 Low : -1623.9



Precambrian Structure Contours from PG-23 (C.I. = 100 feet)



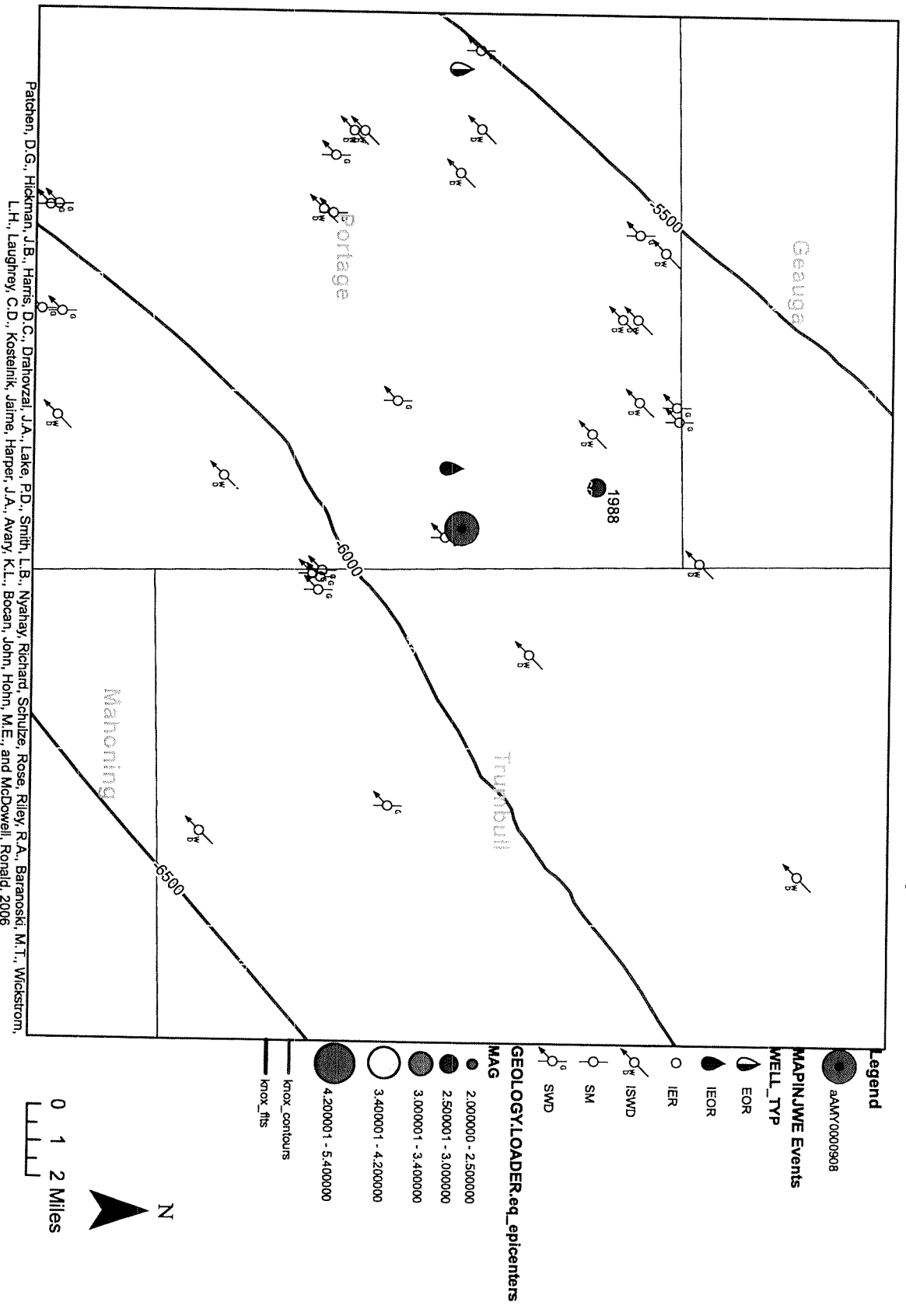
Legend

- 2AMY0000908
- MAPINJWE Events
- WELL_TYP
 - EOR
 - ▲ IEOR
 - IER
 - ISWD
 - SM
 - SWD
- GEOLOGY.LOADER.eq_epicenters
 - 2.000000 - 2.500000
 - 2.500001 - 3.000000
 - 3.000001 - 3.400000
 - 3.400001 - 4.200000
 - 4.200001 - 5.400000
- faults
 - coocorp
 - <all other values>
- STYLE
 - Know
 - - - Inferred
 - Questionable displacement
- PCMB_contours
- SPOT
 - 1000's
 - 500's
 - 100's
 - all other

0 2 4 Miles

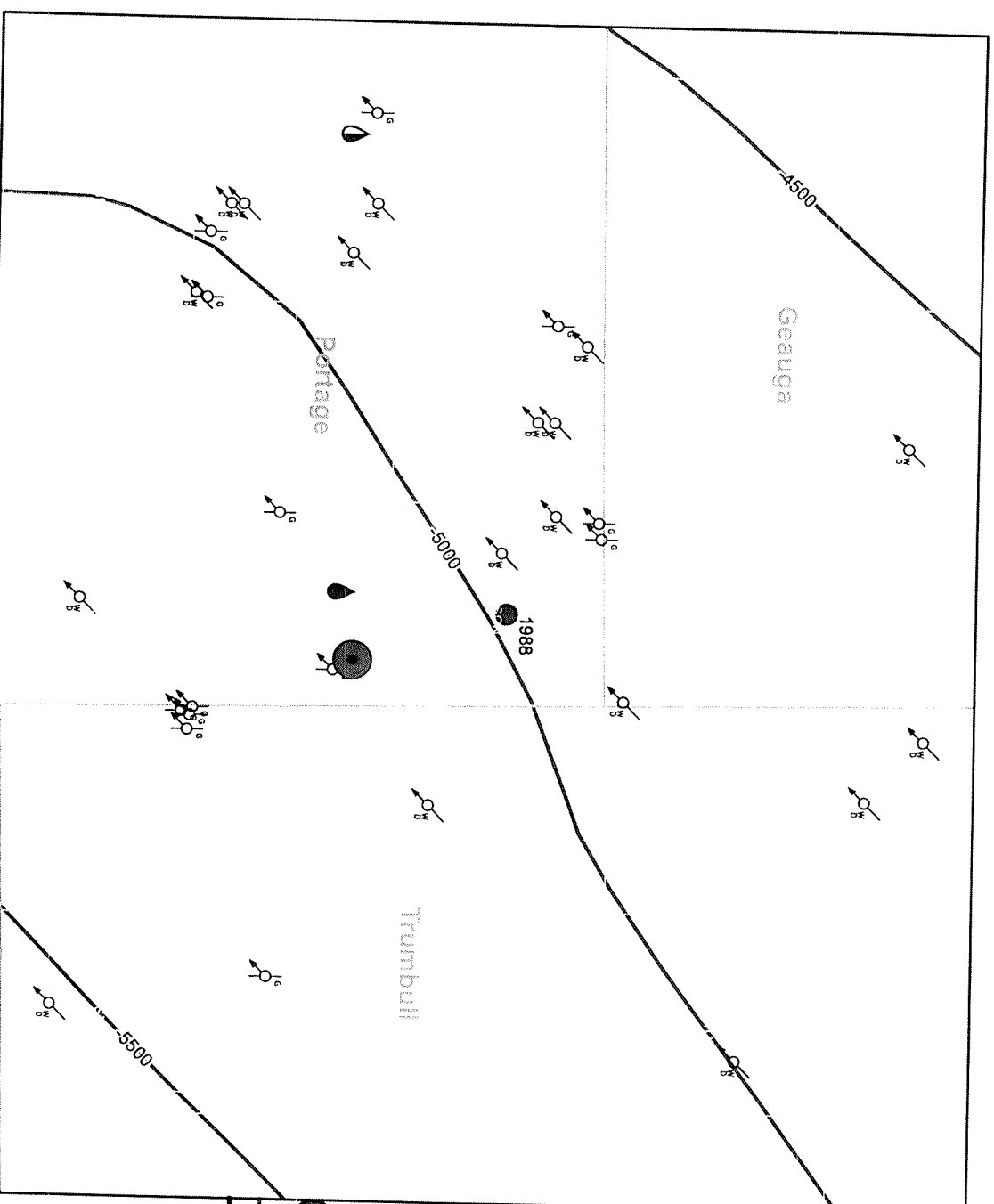
Baranoski, M.T., 2002

Knox Structure (C.I. = 500 feet)



Patchen, D.G., Hickman, J.B., Harris, D.C., Drahovzal, J.A., Lake, P.D., Smith, L.B., Nyhanay, Richard, Schulte, Rose, Riley, R.A., Baranowski, M.T., Wickstrom, L.H., Laughney, C.D., Kostelnik, Jaime, Harper, J.A., Avary, K.L., Bocan, John, Hohn, M.E., and McDowell, Ronald, 2006

Trenton Structure Contours (C.I. = 500 feet)



Patchen, D.G., Hickman, J.B., Harris, D.C., Drahozal, J.A., Lake, P.D., Smith, L.B., Nyahay, Richard, Schulte, Rose, Riley, R.A., Baranowski, M.T., Wickstrom, L.H., Laughrey, C.D., Kostelnik, Jaime, Harper, J.A., Avery, K.L., Boean, John, Hohn, M.E., and McDowell, Ronald, 2006

Legend

- 24MY00003908
- MAPINJWE Events**
- WELL_TYP**
- EOR
- IEOR
- IER
- ISWD
- SM
- SWD

GEOLOGY/LOADER_eq_epicenters

MAG

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- 2.500001 - 3.000000
- 3.000001 - 3.400000
- 3.400001 - 4.200000
- 4.200001 - 5.400000

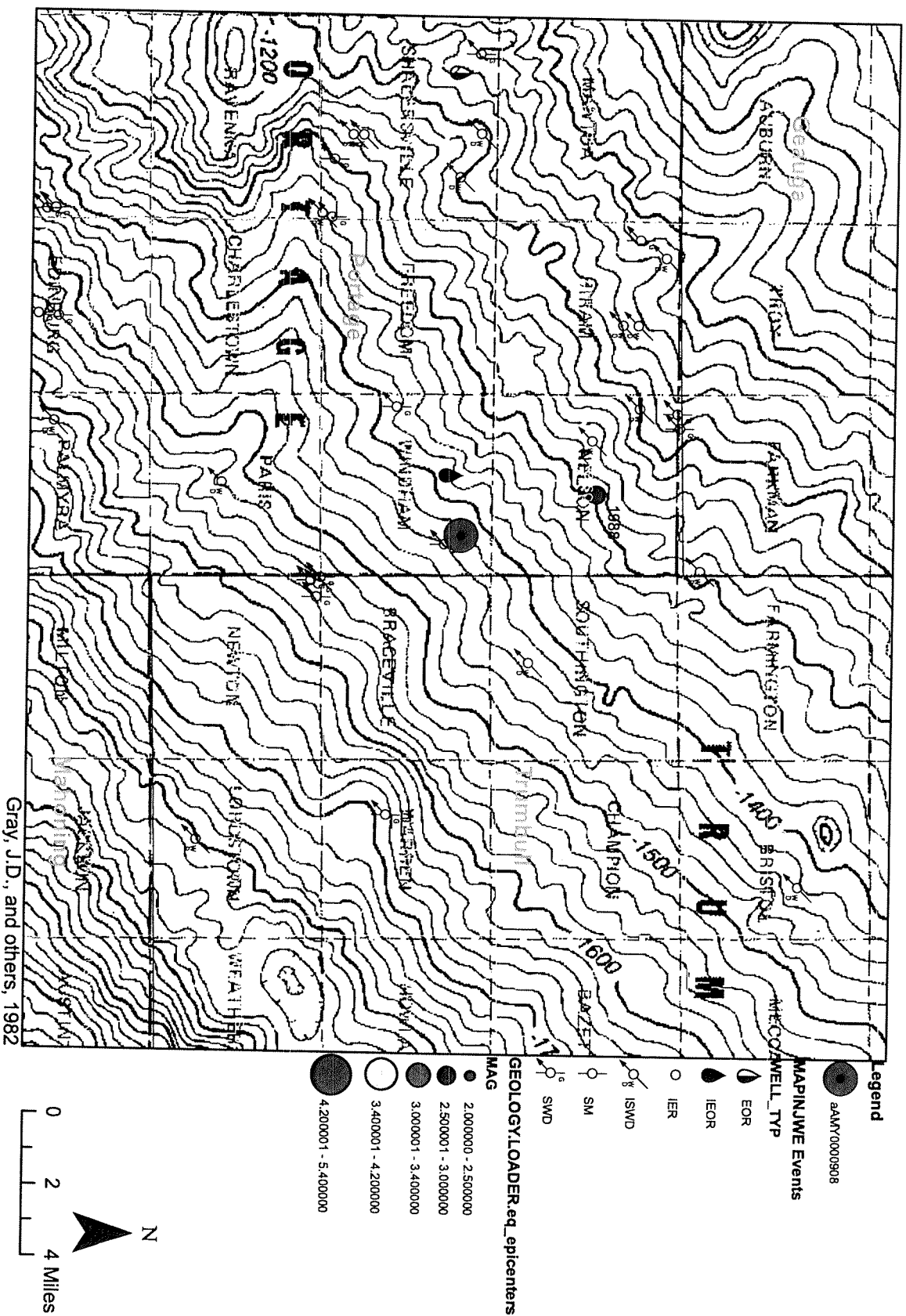
TRNT_Contours

trml_fls

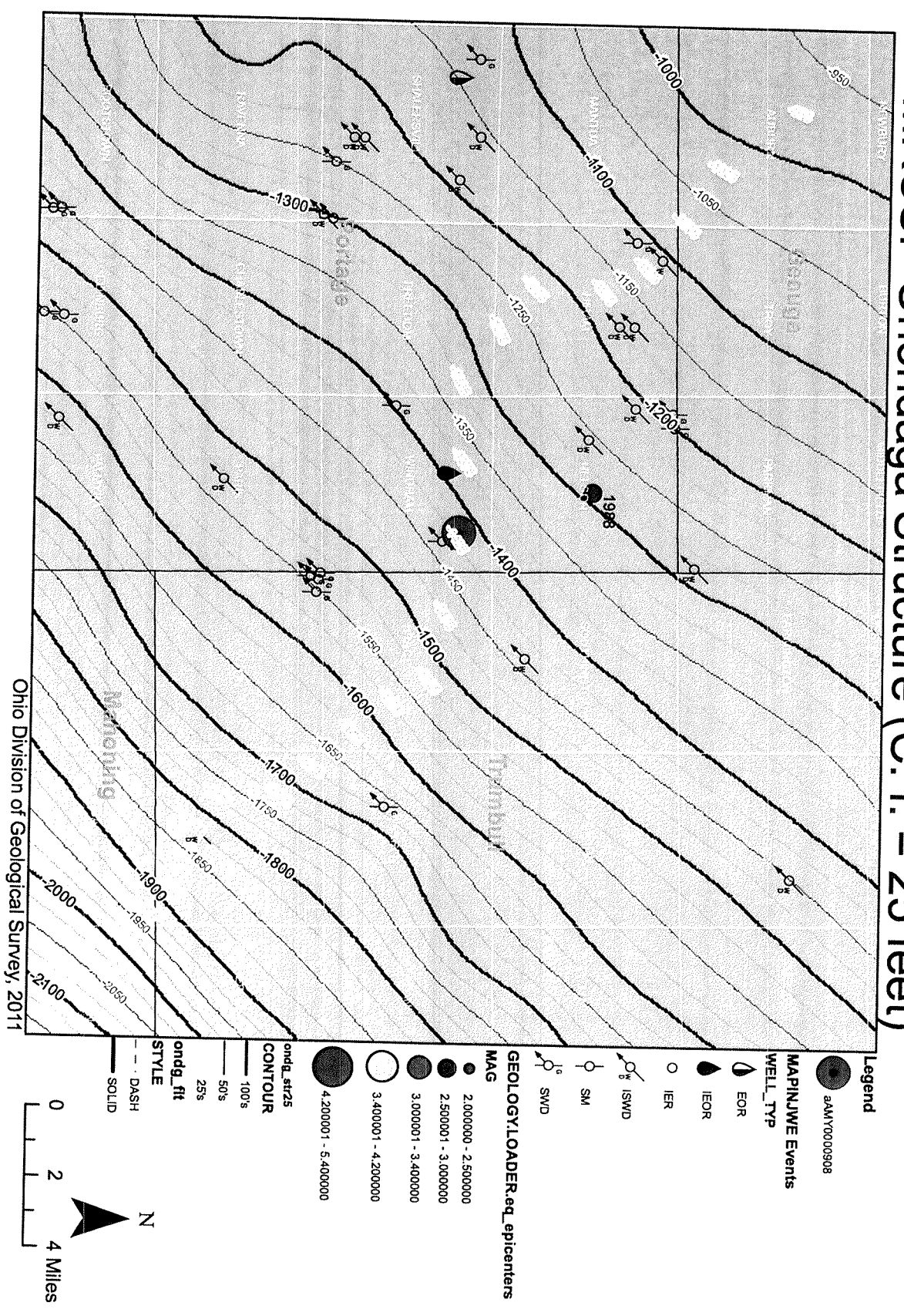
0 2 4 Miles

N

EGSP Onondaga Structure (C. I. = 20 feet)

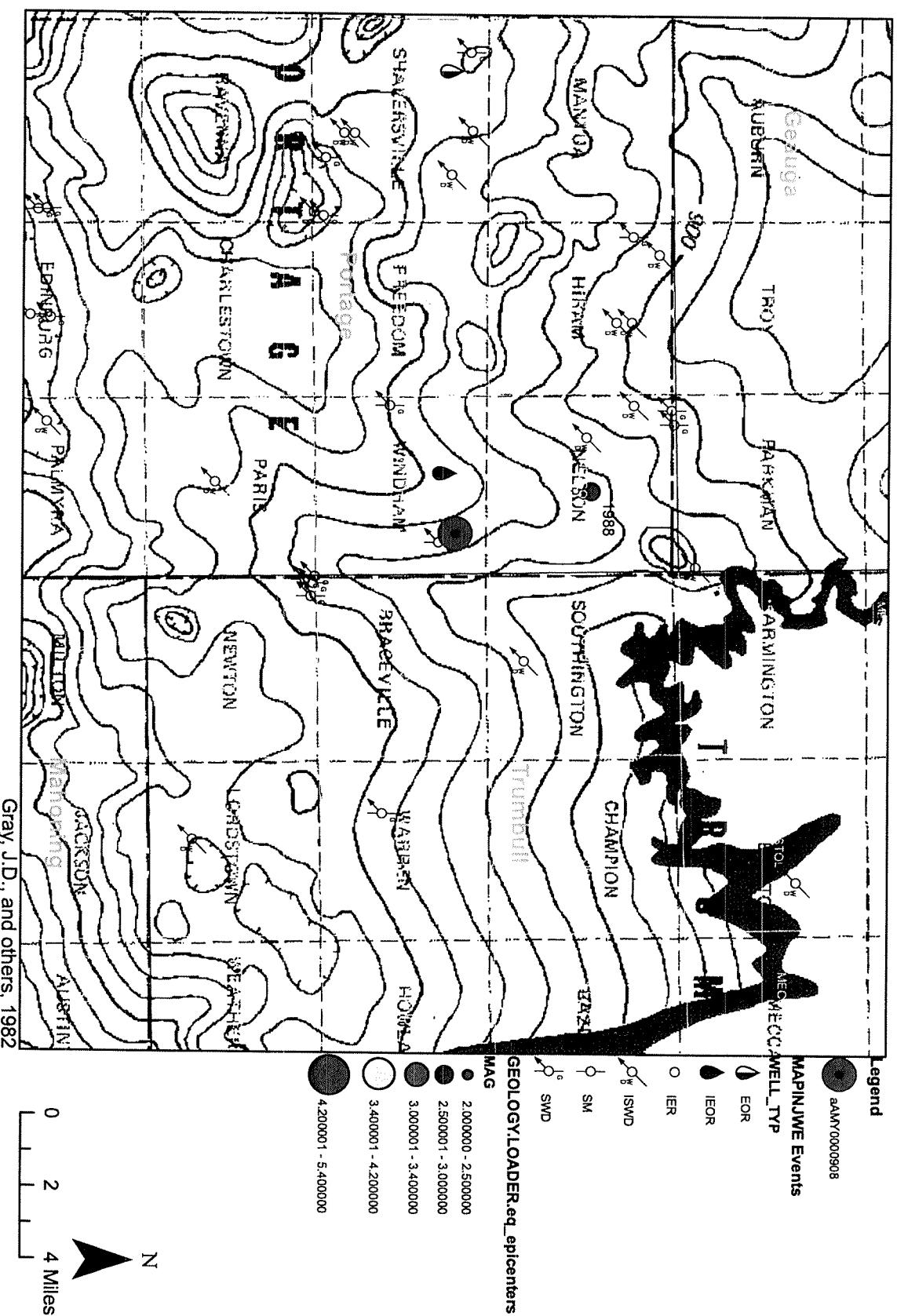


MRCSP Onondaga Structure (C.I. = 25 feet)

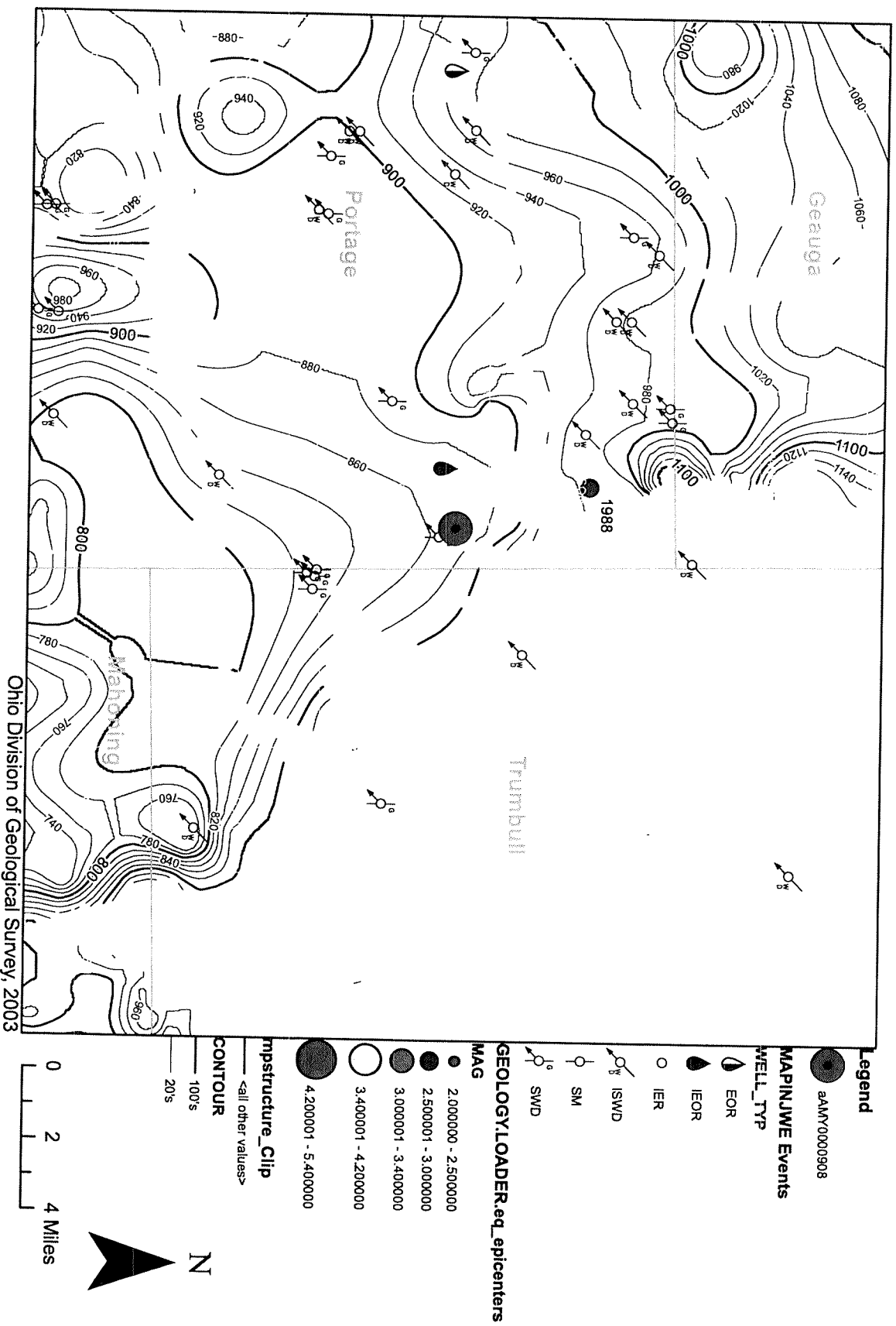


Ohio Division of Geological Survey, 2011

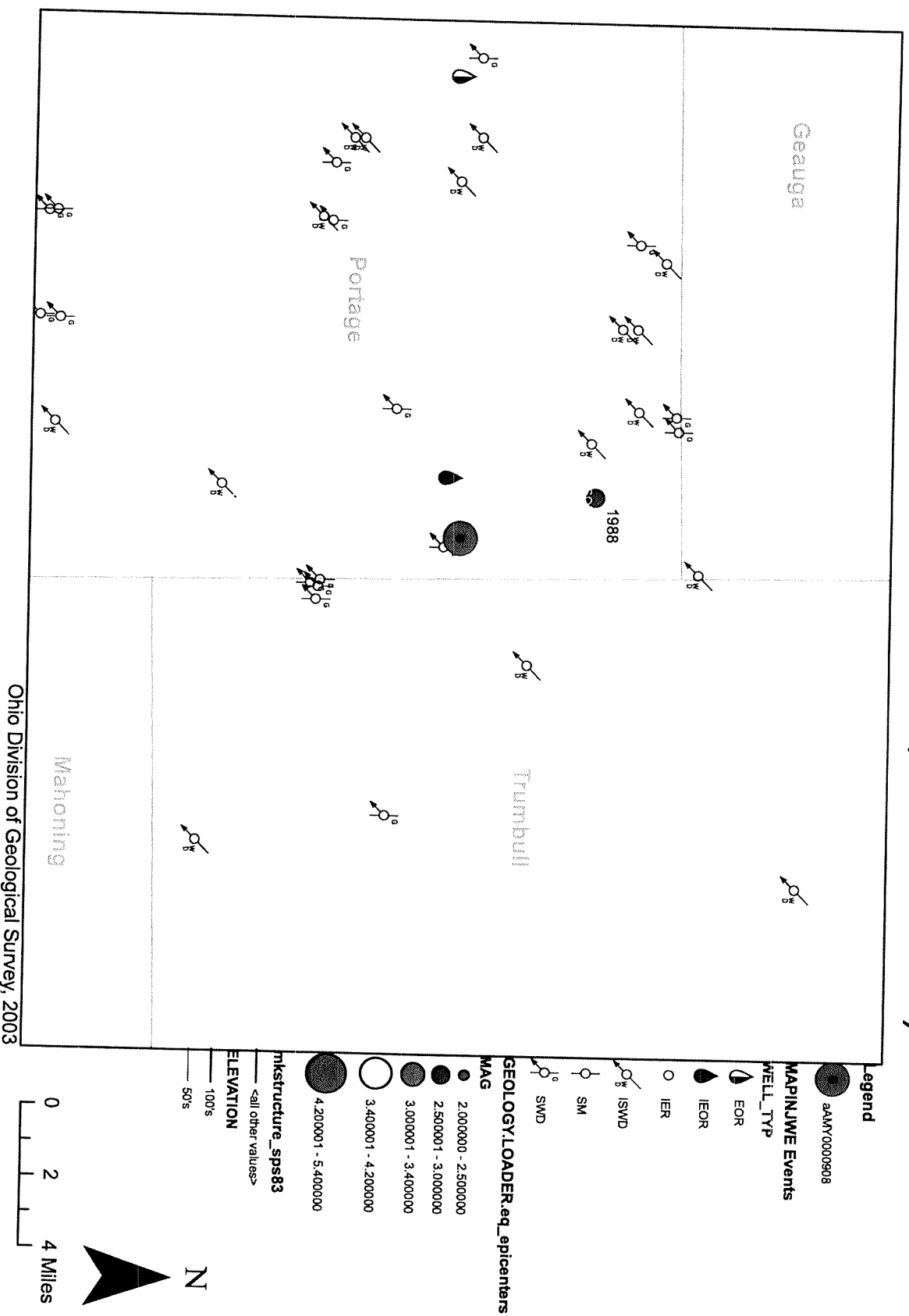
EGSP Berea Structure (C. I. = 20 feet)



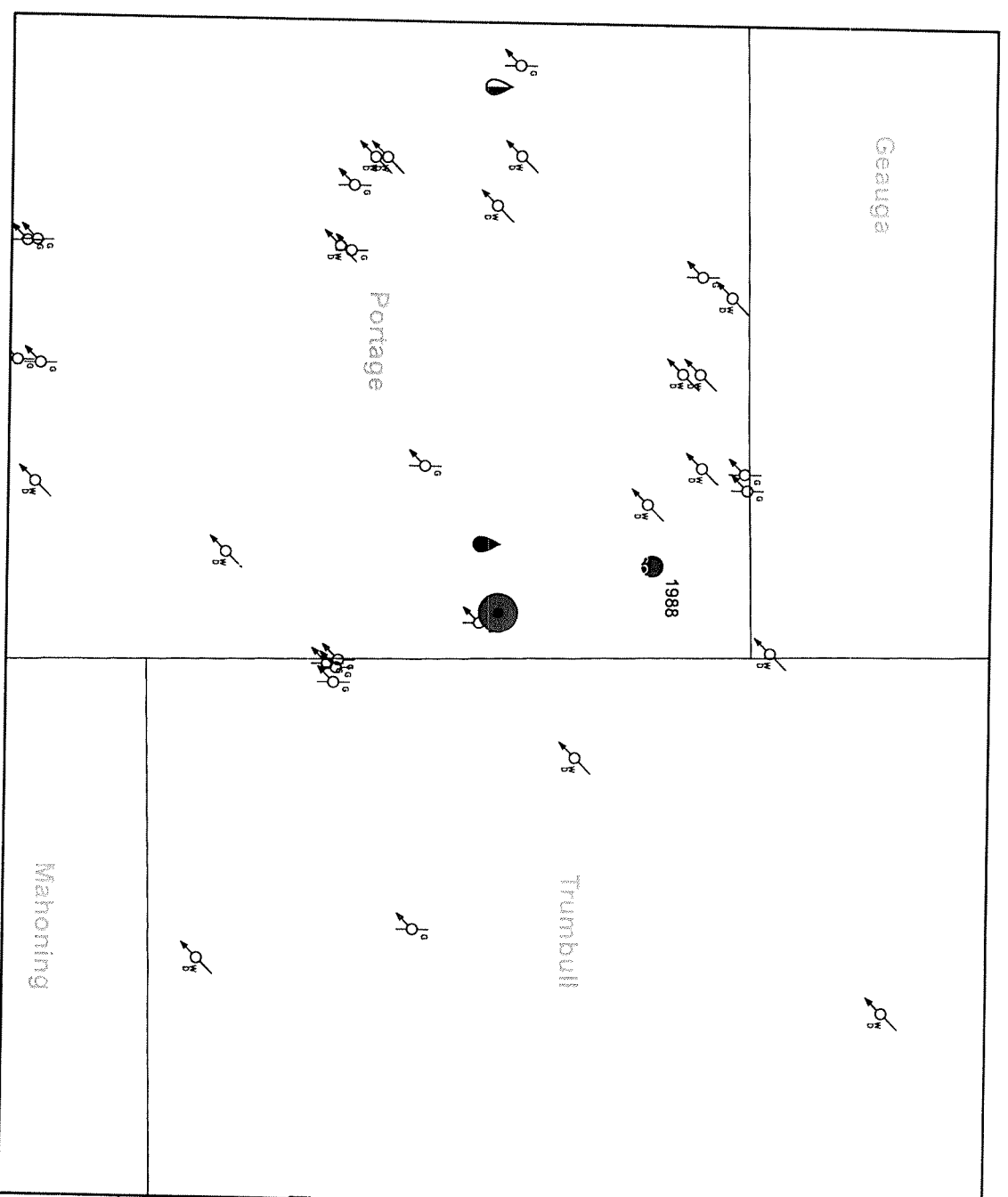
Mississippian/Pennsylvanian Unconformity Surface Countours (C.I. = 20 feet)



Middle Kittanning Coal Structure (C.I. = 50 feet)



Upper Freeport Coal Structure (C.I. = 20 feet)



Ohio Division of Geological Survey, 2003

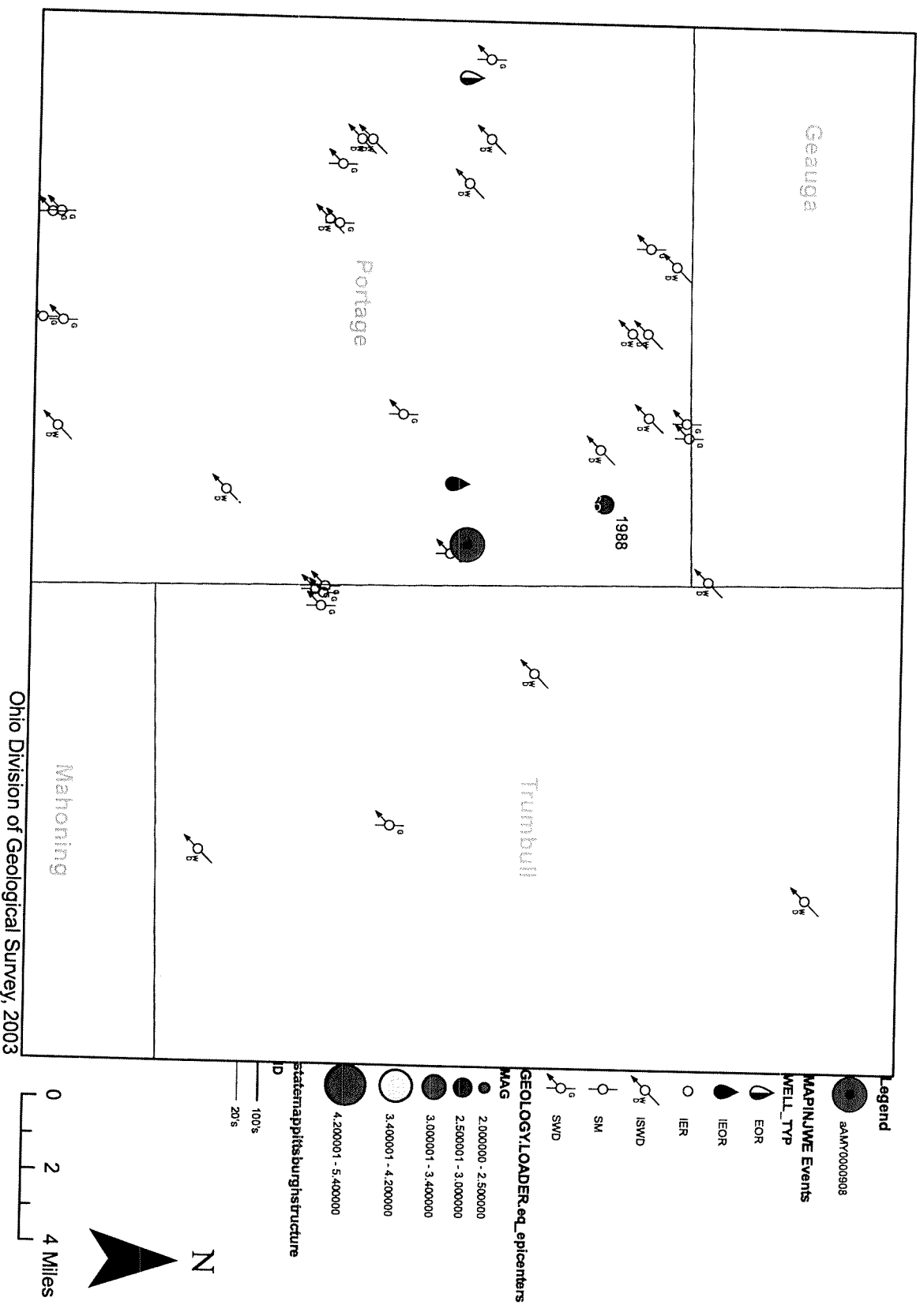
Legend

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- MAPINJWE Events
- WELL_TYP
 - ◐ EOR
 - ◑ IEOR
 - IER
 - ◒ ISWD
 - ◓ SM
 - ◔ SWD
- GEOLOGY/LOADER.eq_epicenters
 - 2,000,000 - 2,500,000
 - 2,500,001 - 3,000,000
 - 3,000,001 - 3,400,000
 - 3,400,001 - 4,200,000
 - 4,200,001 - 5,400,000
- State_Ohio
- Counties_Ohio
- BASEMAP/LOADER_Townships
- Infrastructure
- <all other values>
- ELEVATION
 - 100's
 - 20's

0 2 4 Miles

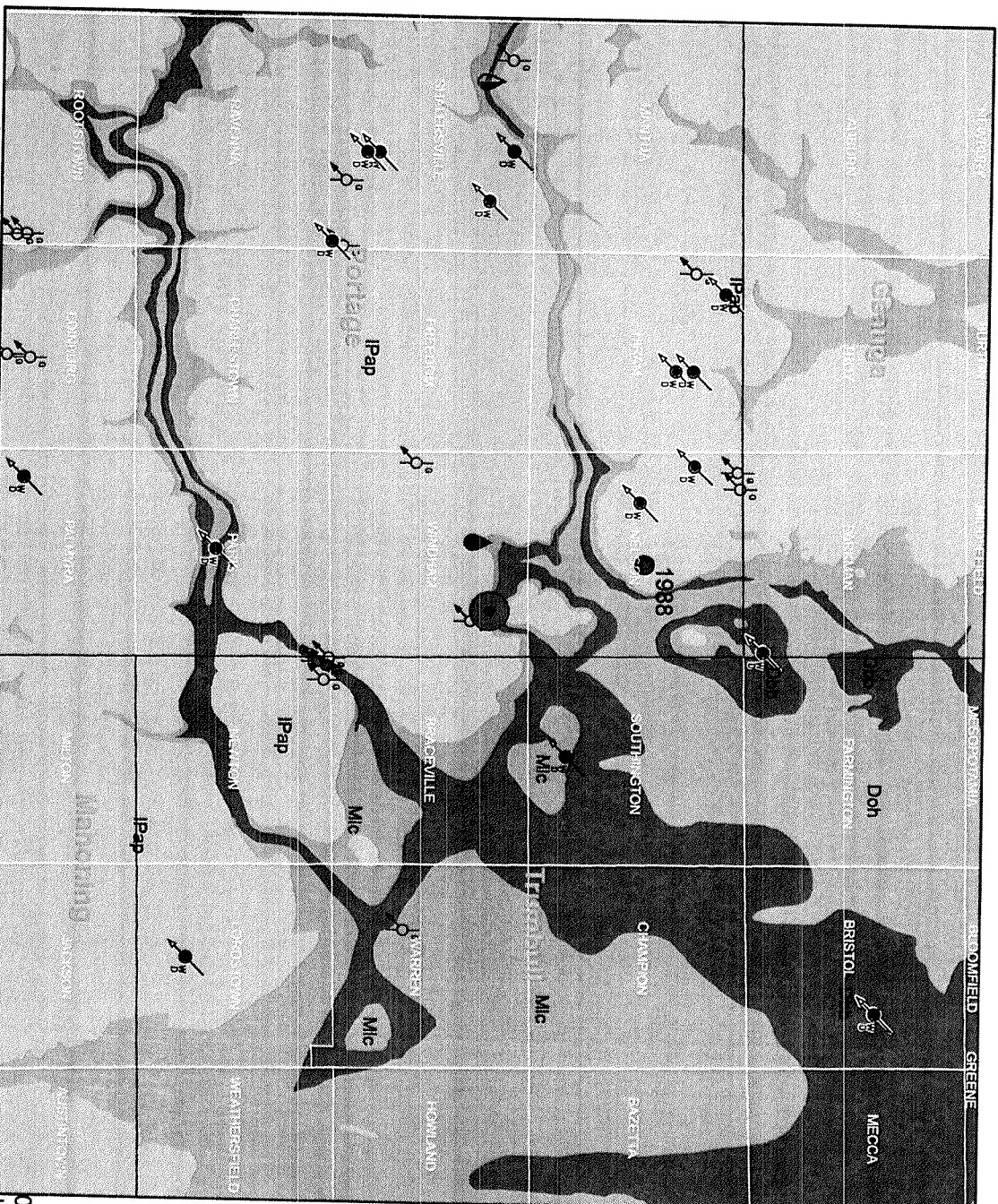
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Pittsburgh Coal Structure Contours (C.I. = 20 feet)



Ohio Division of Geological Survey, 2003

Bedrock Geology



Slucher, E. R., compiler, Swinford, E. M., Larsen, G. E., Schumacher, G. A., Shrake, D. L., Rice, C. L., Caudill, M. R., and Rea, R. G., 2006

Legend

- 24M700009308
- MAPINJWE Events**
- WELL_TYP**
- EOR
- IEOR
- IER
- ISWD
- SWD
- SM

GEOLOGYLOADER.eq_ epicenters

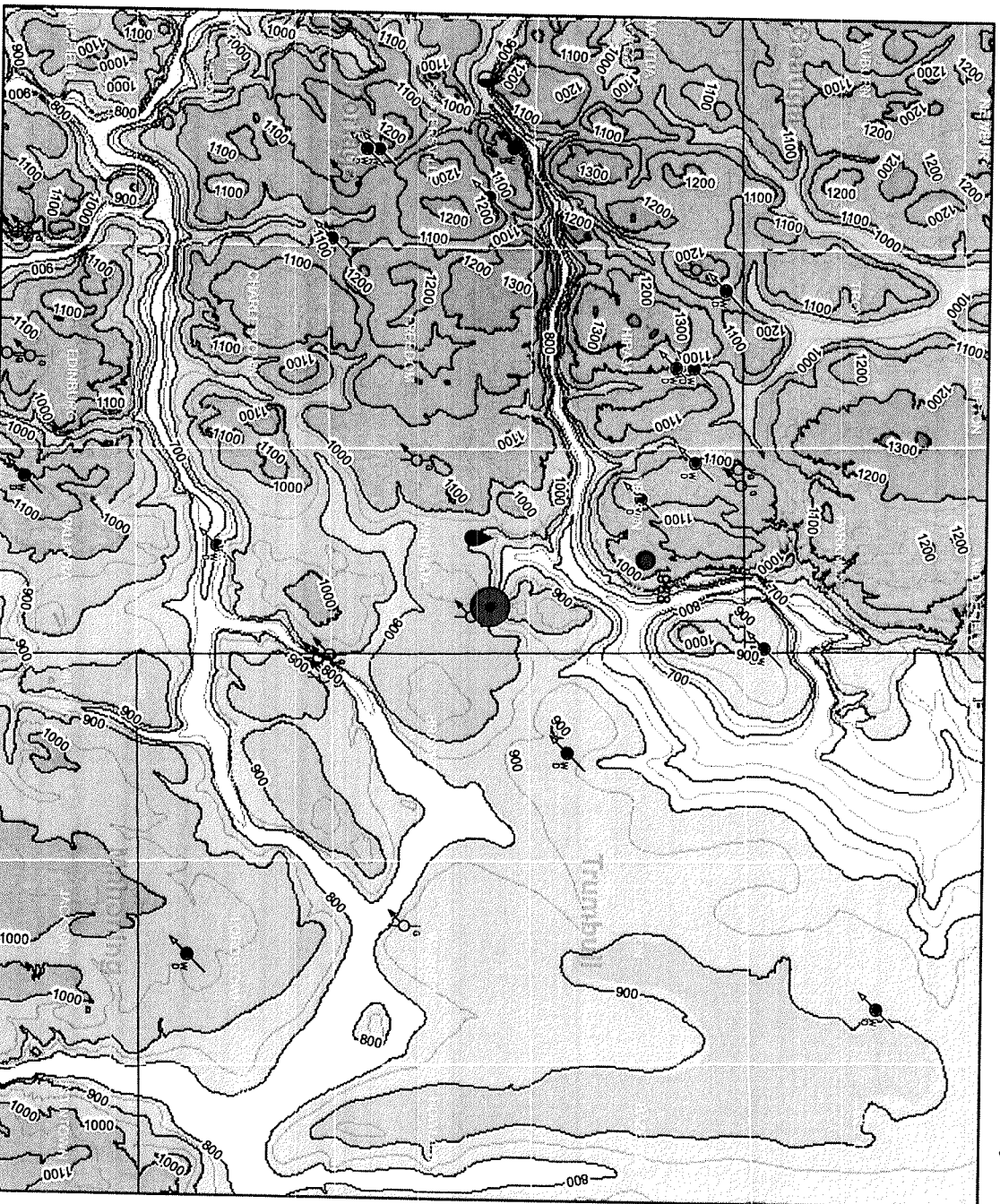
MAG

- 2,000,000 - 2,500,000
- 2,500,001 - 3,000,000
- 3,000,001 - 3,400,000
- 3,400,001 - 4,200,000
- 4,200,001 - 5,400,000

0 2 4 Miles

N

Bedrock Topography (C.I. = 50 feet)



Ohio Division of Geological Survey, 2003

Legend

- 24N1700009308
- MAPINFO Events
- WELL_TYP
- EOR
- EOR
- IER
- ISWD
- SM
- SWD

GEOLOGY.LOADER.eq epicenters

MAG

- 2,000000 - 2,500000
- 2,500001 - 3,000000
- 3,000001 - 3,400000
- 3,400001 - 4,200000
- 4,200001 - 5,400000

geology.LOADER.btcontours

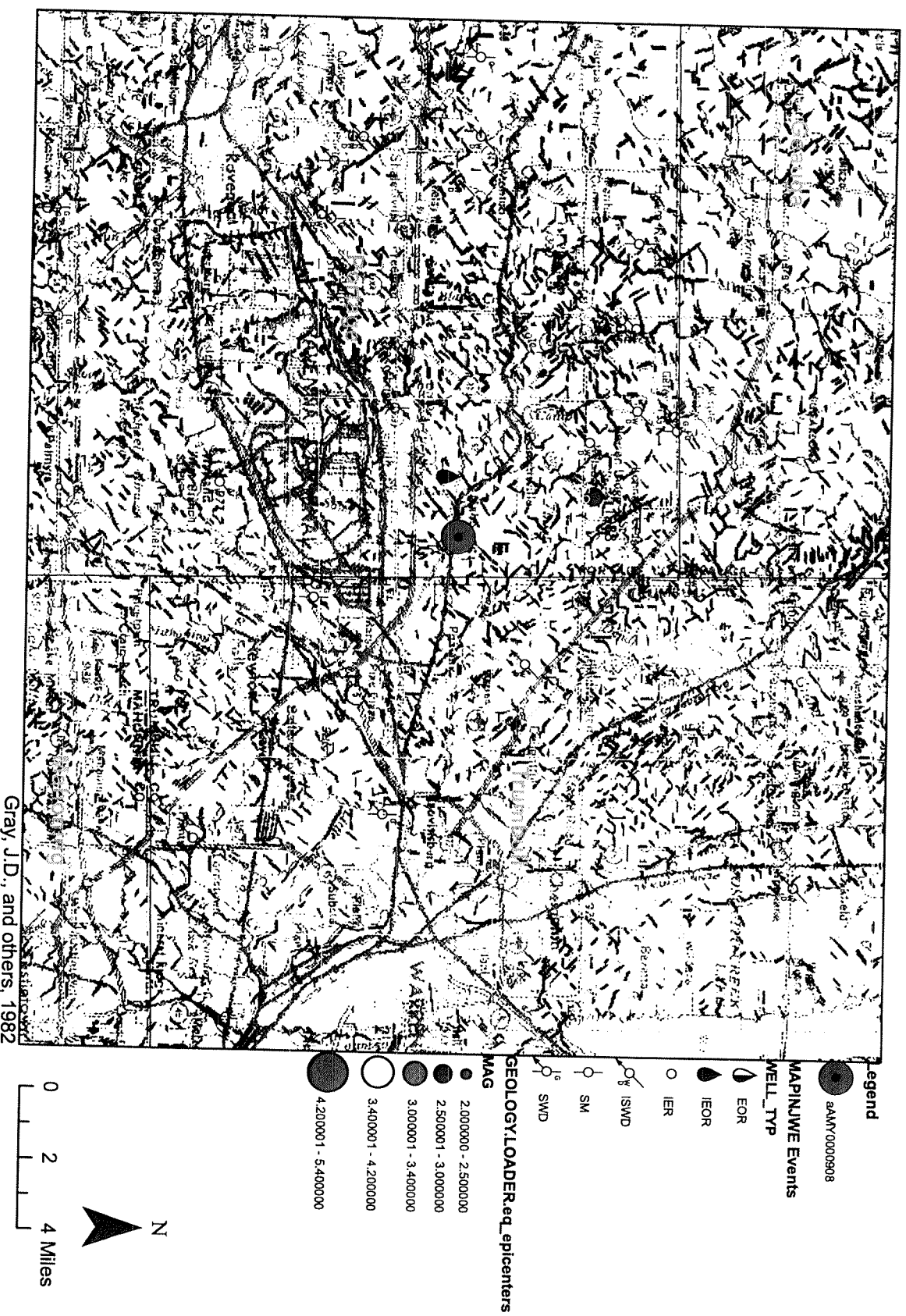
ELEVATION

- 100's
- 50's

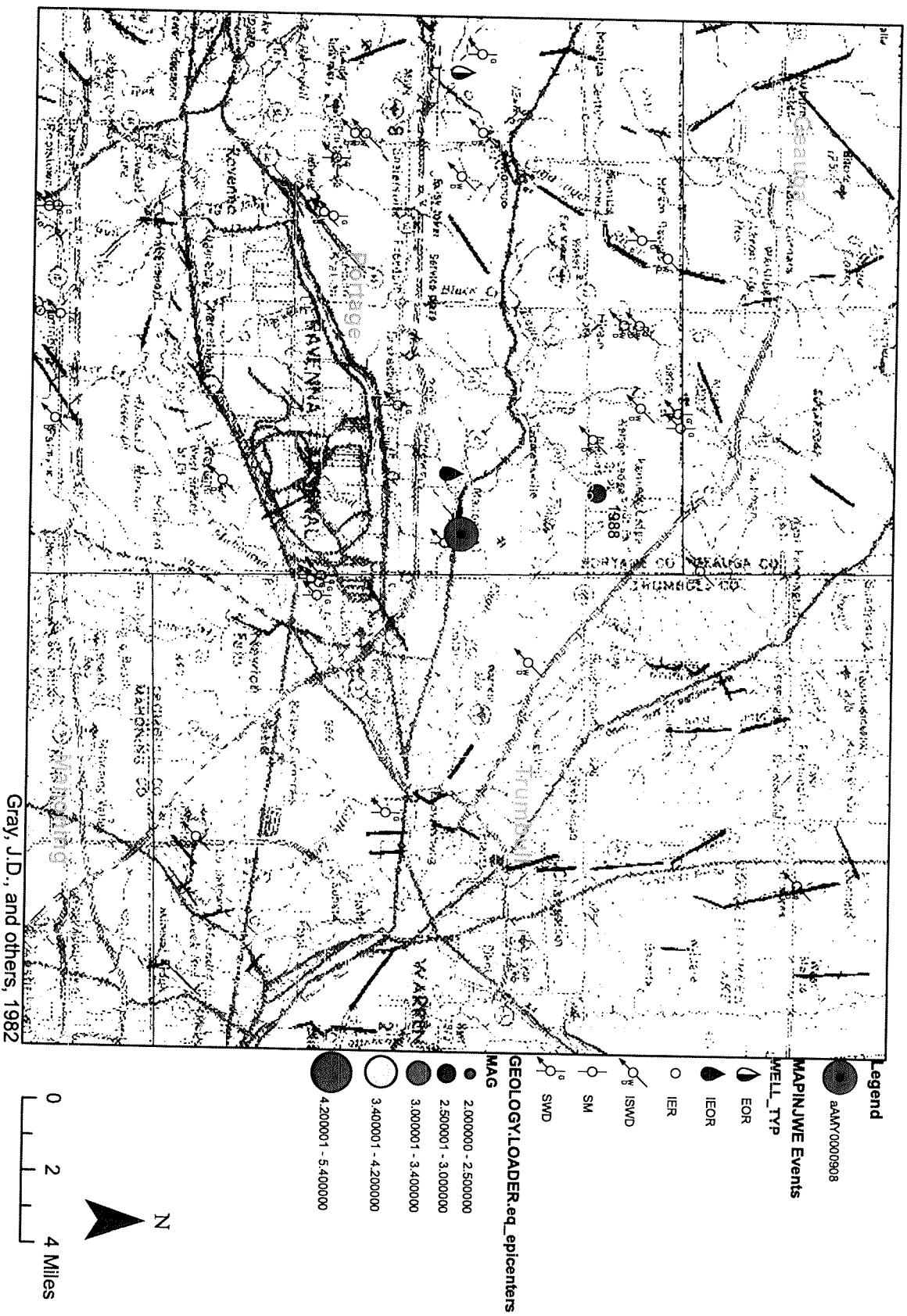
Scale: 0, 2, 4 Miles

North Arrow: N

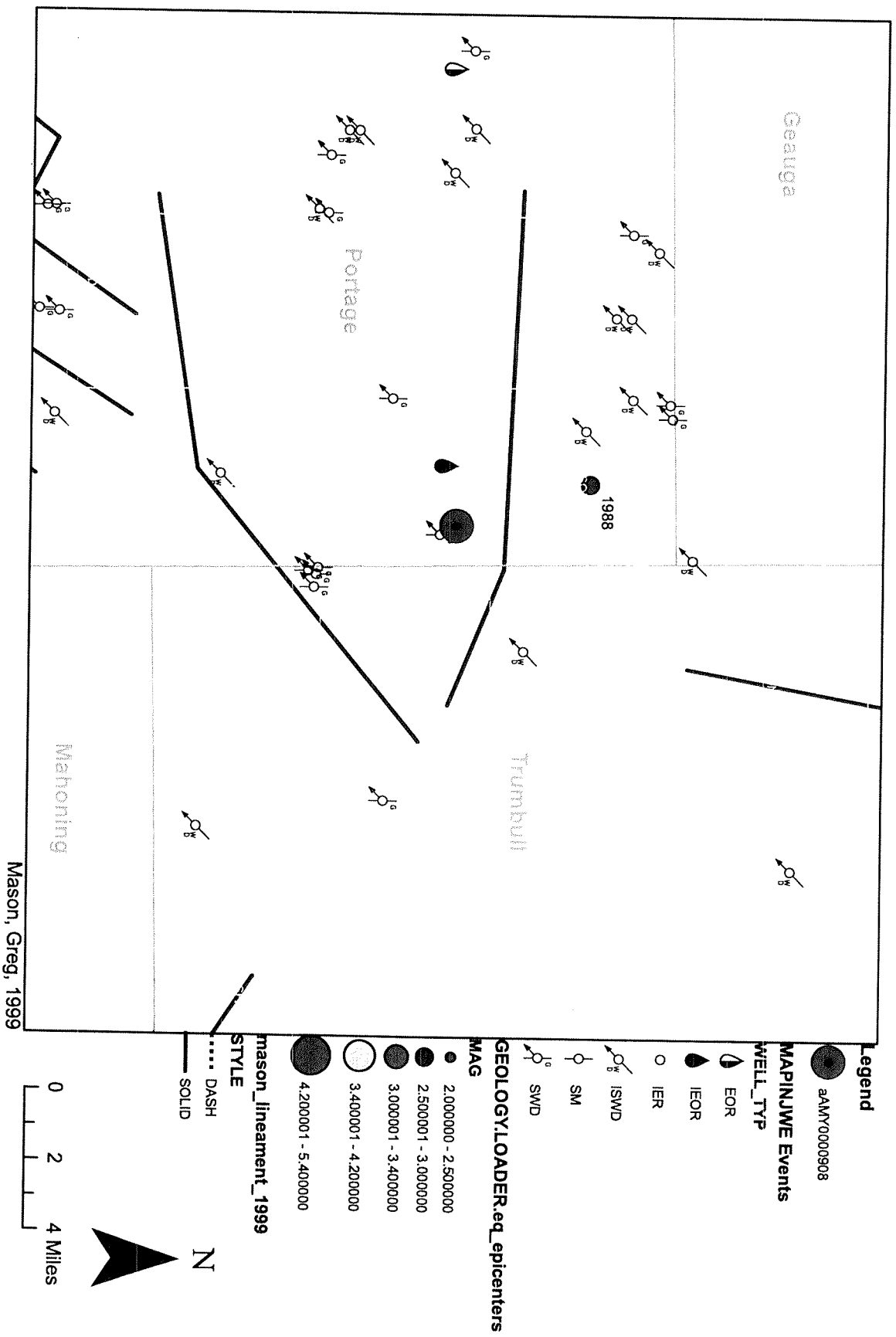
EGSP Aerial Photo Lineament



EGSP LANDSAT Lineament



Mason Lineament Map



Legend
 ● aAMY0000908

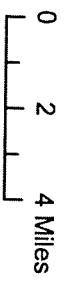
MAPINJWE Events
 WELL_TYP

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- IEOR
- IER
- ISWD
- SM
- SWD

GEOLOGY.LOADER.eq_epicenters
 MAG

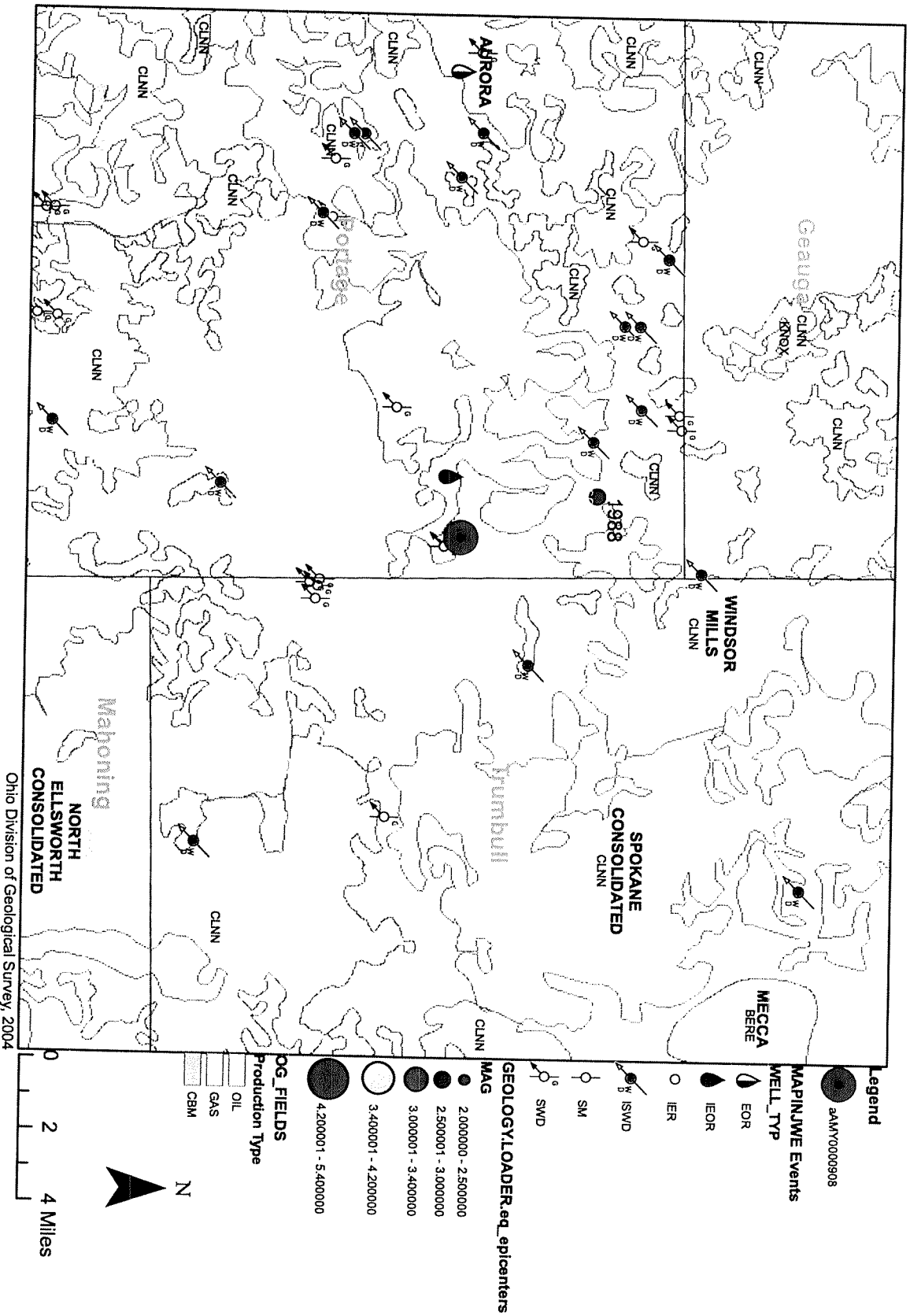
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- 3.400001 - 4.200000
- 4.200001 - 5.400000

mason_lineament_1999
 STYLE
 DASH
 ——— SOLID



Mason, Greg, 1999

Oil and Gas Fields





To: Tom Tomastik, ODNR-DOGRM
From: Michael Eggert, Assistant Chief, Ohio EPA-DDAGW
Date: June 19, 2012
Subject: Class II Injection Well Permit Reviews

Ohio EPA Division of Drinking and Ground Waters has completed its review of five (5) Class II underground injection well permits.

Our review of the Class II permits focused on well construction relative to the protection of underground sources of drinking water (USDW) and the location of the surface facilities relative to public water system source water protection areas and other sensitive hydrogeologic settings.

Our review indicated no major problems that should cause a delay in approving the permits. However, the following technical issues should be addressed by the applicants prior to well construction.

The **Evrol #1 Evrol LLC** (Portage Co., Atwater Twp., Lot 98) has the following concerns:

- The surface casing and cement appear adequate. However, the type of cement (Class A is recommended) to be used and the placement of centralizers should be specified.
- The proposed injection zone is an open hole completion in the Newburg Dolomite. Atwater Twp. has been heavily drilled, with eight (8) Clinton Sandstone wells within the area of review (1/2 mile). Review of the cementing practices for the completion casing shows that the industry standard was to place cement over the producing (Clinton) interval with the cement top below the Newburg. Surface casing was set below the lowermost USDW and cemented to surface. However, the interval between the top of the Clinton cement and the base of the USDW is open. The potential for fluid movement out of the Newburg exists through these un-cemented well bores.
- The requested maximum injection pressure (1103 psi) exceeds the calculated value (958 psi) using a specific gravity of 1.2.

The **Hard Rock Drilling & Producing Soinski Wells 1-I, 2-I, 3-I and 4-I** (Portage Co., Windham Twp. Lots 89 & 90) have the following questions:

- The proposed depth of the surface casing listed for each well in the proposed casing program (No. 21) does not agree with the depths shown in the well construction and operation (No. 32) and the well schematic (No. 37). The latter are considered to be the correct depths. The type of cement to be used (Class A is recommended) and the placement of centralizers should be specified.
- A description of the surface facility for each well was given, but the locations were not shown. It is assumed that a single unloading facility was envisioned by Hard Rock Drilling, but not specified. If this is the case, then the locations of the flow lines and any stream crossings should be shown.
- The requested maximum injection pressure (1000 psi) exceeds the calculated value (968 psi).

Tomastik
June 19, 2012
Page 2 of 2

Attachment A is a summary of source water protection comments and two figures of the injection wells location in relation to public water systems. None of the proposed Class II injection wells are within one half mile of a public water system well or within a source water protection area. Note our review did not evaluate the location of private water system wells.

If you have any questions, please contact either Chuck Lowe or Craig Smith.

Attachments

cc: Chuck Lowe, DDAGW
Craig Smith, DDAGW

Attachment A

The Division of Drinking and Ground Waters has reviewed the UIC Class II injection well permits submitted for the Kelly Disposal Well (Evrol, LLC) and the Soinski #1I, #2I, #3I and #4I Wells (Hard Rock Drilling & Production, LLC) with regard to the following features within ½ mile:

Public water system wells and intakes;
Drinking water source protection areas for surface and ground water sources;
Federally-designated Sole Source Aquifers;
Unconsolidated aquifers capable of producing 100 or more gallons per minute;
Sand and gravel aquifers; and
Other glaciated areas covered by less than 25 feet of glacial material.

The following provide the results of this review:

Evrol (Kelly Disposal Well) (Evrol, LLC)

- No public water system wells or intakes are located within ½ mile of the proposed well location.
- No drinking water source protection area for a public water system using a ground water source extends to within ½ miles of the proposed well location.
- The proposed well location is within the corridor management zone determined for the City of Alliance's Dale Walborn Reservoir and Deer Creek Lake intakes. The corridor management zone for the intake extends 1,000 feet inland from the Mahoning River and 500 feet from each bank of tributary streams. The corridor management zone extends ten miles upstream of the intake. The project area is approximately 5.6 river miles upstream of the Dale Walborn Reservoir intake and 10 river miles upstream of the Deer Creek Lake intake. Based on the distance between the proposed well and the City of Alliance's intakes there is a very low probability that proper operation of a Class II injection well will impact Alliance's water quality.
- The proposed well location does not lie over a Federally-designated sole source aquifer.
- The well location is over the sand and gravel deposits of the Mahoning Buried Valley Aquifer.
- The well location does not lie over an unconsolidated aquifer capable of producing 100 or more gallons per minute or other glaciated areas covered by less than 25 feet of glacial material.

Soinski #1I, Soinski #2I, Soinski #3I & Soinski #4I (Hard Rock Drilling & Production, LLC):

- No public water system wells or intakes are located within ½ mile of the proposed well locations.
- No drinking water source protection area extends to within ½ miles of the proposed well locations.

- The proposed well locations do not lie over a Federally-designated sole source aquifer.
- The proposed well locations are over the sand and gravel deposits of the Mahoning Buried Valley Aquifer.
- The proposed well locations do not lie over an unconsolidated aquifer capable of producing 100 or more gallons per minute.
- Glacial deposits less than 25 feet thick, Alliance Thin Upland, are located within ½ mile of the proposed well locations.

The attached maps show the spatial relationships of these features to the Kelly Disposal Well and the Soinski #11, #21, #31 and #41 Wells and are provided for your files.