#### Ramona,

Thanks for putting the seismicity and faulting analysis for the Office SWD No. 1 app together. I do happen to have a few questions though:

- 1. The Seismicity discussion mentions USGS and Texnet seismic data. For your information, New Mexico Tech now operates a seismic network. Going forward, please include relevant +2 events from New Mexico Tech's seismic monitoring network. For instance:
  - a. 3.5 mi to 2.1 event in May 2020,
  - b. 7.5 mile 2.49 event in 2019,
- 2. I am unable to decipher the information on the geomap regional subsurface structure maps; please resubmit so I am able to read the text
- 3. Why is the Blue Duck State location used in the discussion of the Snee and Zoback Figure?
- 4. Please discuss the discrepancy between the geomap surfaces suggesting the nearest faulting to the proposed location being 16.5 miles, and the Snee and Zoback fault locations?

Thanks, and let me know if you have any additional questions, or if I can help clarify anything.

Regards,

#### **Dylan Rose-Coss**

Petroleum Specialist
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505



From: Ramona Hovey < <a href="mailto:ramona@lonquist.com">ramona@lonquist.com</a>>

Sent: Monday, August 3, 2020 8:55 AM

To: Rose-Coss, Dylan H, EMNRD < <a href="mailto:DylanH.Rose-Coss@state.nm.us">DylanH.Rose-Coss@state.nm.us</a>>

Subject: [EXT] RE: OWL - The Office SWD

Please find our attached seismicity review response. Please reach out if you have any questions.

Regards,

# Seismicity and Faults in the Vicinity of the Proposed OWL SWD Operating, LLC The Office SWD No. 1 Devonian Disposal wells in Eddy County, New Mexico

The proposed The Office SWD No. 1 (The Office) well is located in Eddy County, New Mexico. The proposed well is located in Township 25 South, Range 27 East, Section 4, approximately 8.5 miles Southwest of Malaga, NM. The proposed well is located in the northern portion of the Delaware Basin.

#### Seismicity:

Historically, the area near the proposed Devonian disposal well has not seen any major seismic activity. A search of the USGS Earthquake Hazards Program Earthquake Catalog revealed the nearest event to be located 11.5 miles north-northeast of the proposed location, where a magnitude 3.9 earthquake was recorded on November 28, 1974 at a depth of 5 kilometers. Review of the USGS Earthquake Hazard map indicates a very low risk of seismic activity. The USGS surface geologic map of the area shows no Quaternary-aged faulting, also indicating no recent tectonic activity. In addition to a search of the USGS Earthquake Hazards Program Earthquake Catalog, a seismic event research was conducted on the Bureau of Economic Geology's Seismic Monitoring Program, TexNet. TexNet's seismic history dates from January 1, 2017 to present date. A 15-kilometer radius of investigation detected no seismic events during this time period.

#### Faulting:

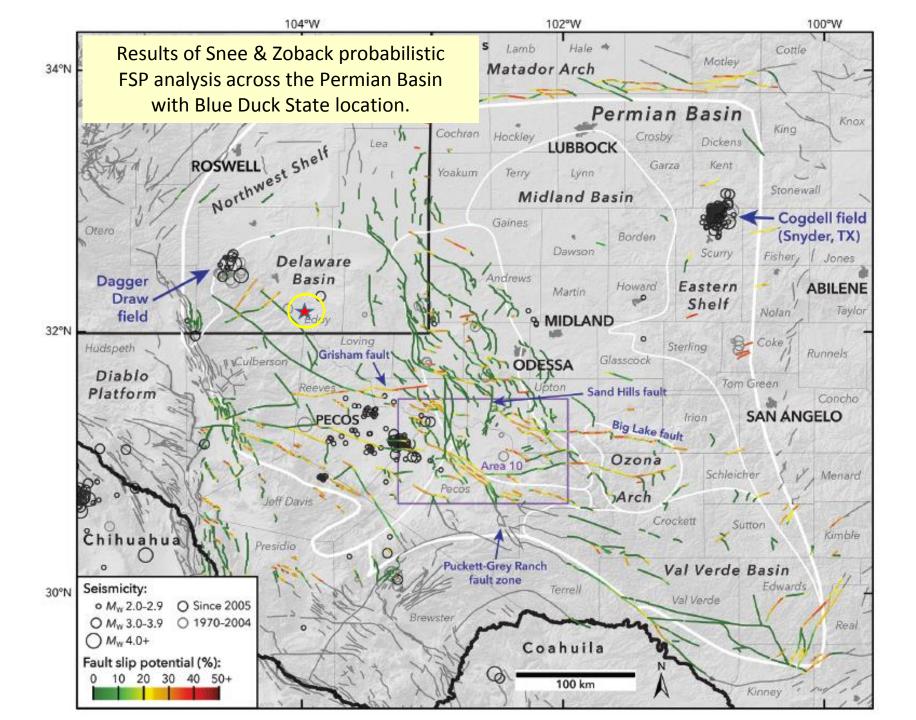
The USGS surface geologic map, a USGS published Devonian structure map, and subscription Geomap regional subsurface structure maps at the three following subsurface horizons: 1. Delaware Lime, Yates, San Andres, 2. Permo-Pennsylvanian Lime, Strawn Lime, and 3. Siluro-Devonian. The first-quarter 2020 edition Geopmap subsurface maps were reviewed for faults. The nearest faults mapped at the Siluro-Devonian level was 16.5 miles southwest of the proposed location. This fault terminates at the Permo-Pennsylvanian Lime and Strawn Lime levels indicated by no fault present in the same region on the map.

The Snee and Zoback paper "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity" was also reviewed to evaluate the presence of faults and fault slip potential risk. These regional maps show no faulting in the area of the proposed wells. Faulting in the New Mexico portion of the Delaware Basin generally shows less than a 10% probability of fault slip movement.

The distance from the proposed wells to the closest mapped faults yields an extremely low probability that the faults will become critically stressed by injection into the referenced wells.

Parker Jessee

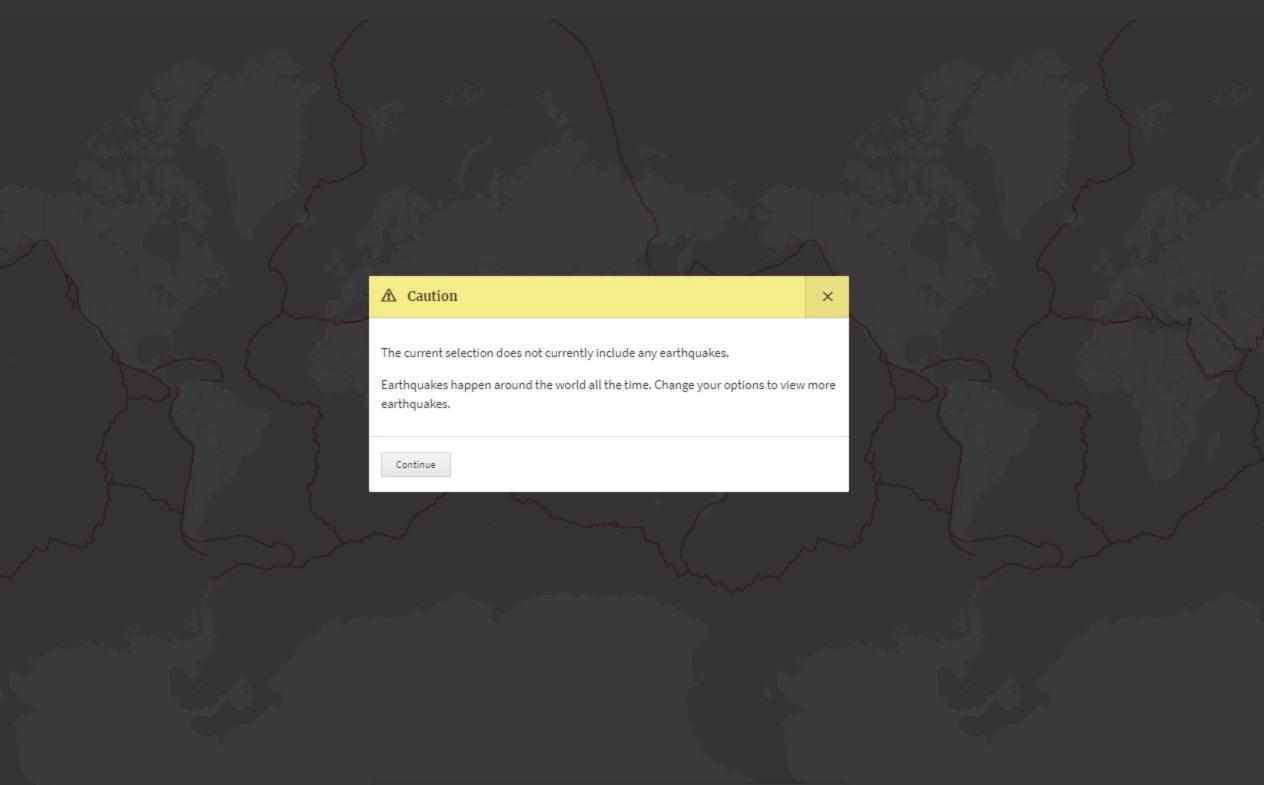
Geologist, Lonquist & Co. 以C



# UNITED STATES GEOLOGICAL SURVEY 15 KM SEISMIC EVENT SEARCH (1900 – 2019)

## **Basic Options**

Magnitude		Date & Time		Geographic Region	
○ 2.5+		O Past 7 Days		○ World	
O 4.5+		O Past 30 Days		Conterminous U.S. <sup>1</sup>	
○ Custom		○ Custom		○ Custom	
Minimum		Start (UTC)		Custom Circle  32.15254 Latitude -104.18753 Longitude 15 Radius (km)	
2		1900-01-01 00:00:00			
Maximum		End (UTC)			
		2020-07-27 23:59:59			Draw Rectangle on Map
- Advanced Options					
Geographic Region  Decimal degree coordinates. North must be greater than South. East must be greater than West.			Depth (km)  Minimum  Maximum		
North					
West East		East	Azimuthal Gap  Minimum  Maximum		
South					Maximum
		Review Status			
Circle					
Center Latitude	Center Longitude		Any		
32.15254	-104.18753		O Automatic		
Outer Radius (km)			Reviewed		
15					



# UNITED STATES GEOLOGICAL SURVEY 25 KM SEISMIC EVENT SEARCH (1900 – 2019)



### Search Results

1 of 1 earthquakes in map area.

^ Click for more information

Last Updated 2020-07-27 19:01:50 (UTC)

Download

Search Parameters

starttime 1900-01-01 00:00:00

2020-07-27 23:59:59 endtime latitude

-104.18753 longitude

maxradiuskm

minmagnitude orderby

Modify Search

New Mexico 3.9 1974-11-28 03:35:20 (UTC)

5.0 km

# Didn't find what you were looking for?

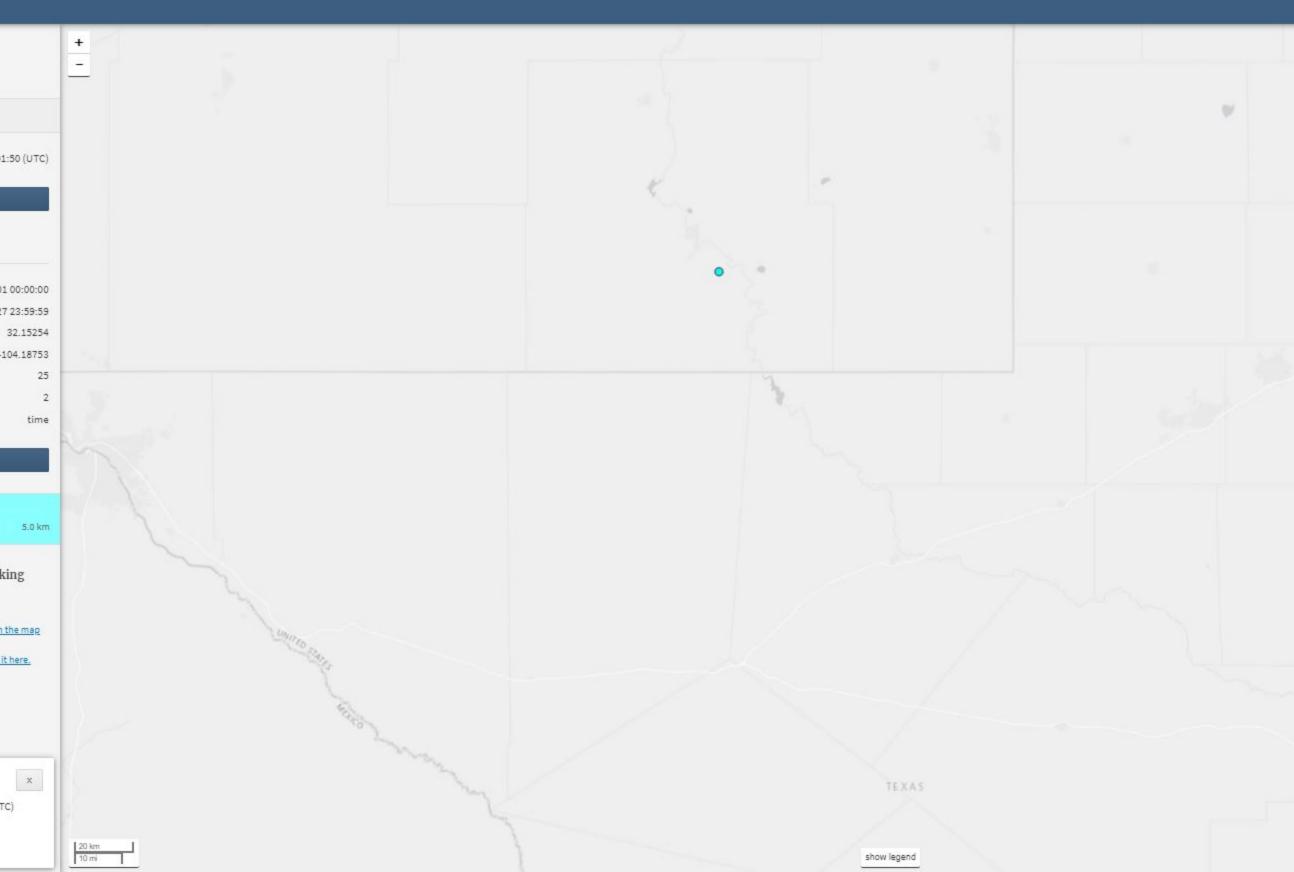
- Check your <u>Settings</u>.
- Which earthquakes are included on the map
- . Felt something not shown report it here.

### M 3.9 - New Mexico

1974-11-28 03:35:20 (UTC)

Depth

Location 32.311°N 104.143°W 5.0 km



# UNITED STATES GEOLOGICAL SURVEY 35 KM SEISMIC EVENT SEARCH (1900 – 2019)

## **■USGS**

### Search Results

2 of 2 earthquakes in map area.

^ Click for more information

2020-07-27 19:03:54 (UTC) Last Updated

Download

#### Search Parameters

starttime

2020-07-27 23:59:59 endtime 32.15254 latitude longitude -104.18753 maxradiuskm minmagnitude orderby

#### Modify Search

2012-03-18 10:57:22 (UTC)

1974-11-28 03:35:20 (UTC)

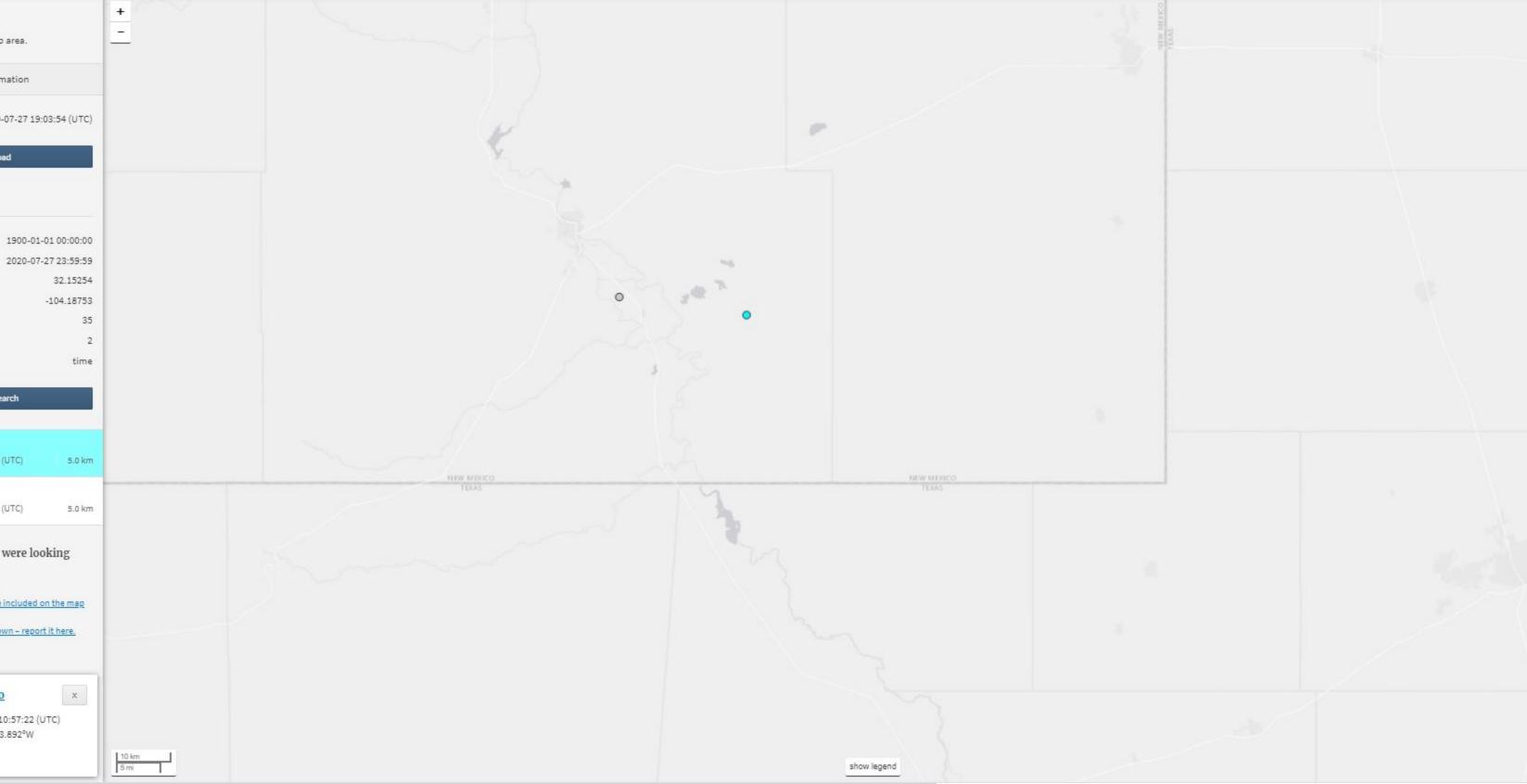
# Didn't find what you were looking for?

- Check your <u>Settings</u>.
- Which earthquakes are included on the map
- Felt something not shown report it here.

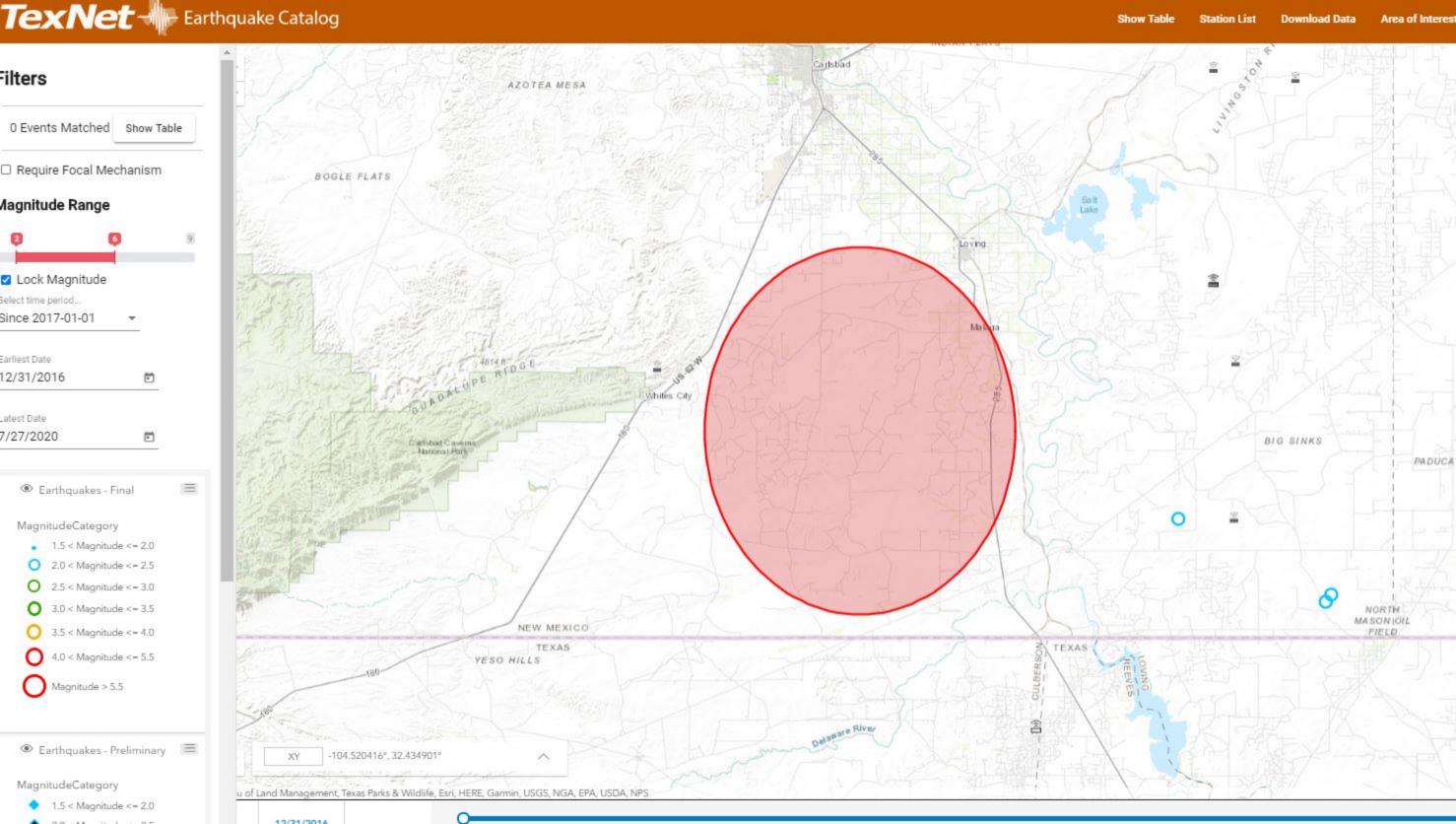
## M 3.1 - New Mexico

2012-03-18 10:57:22 (UTC) 32.281°N 103.892°W Location

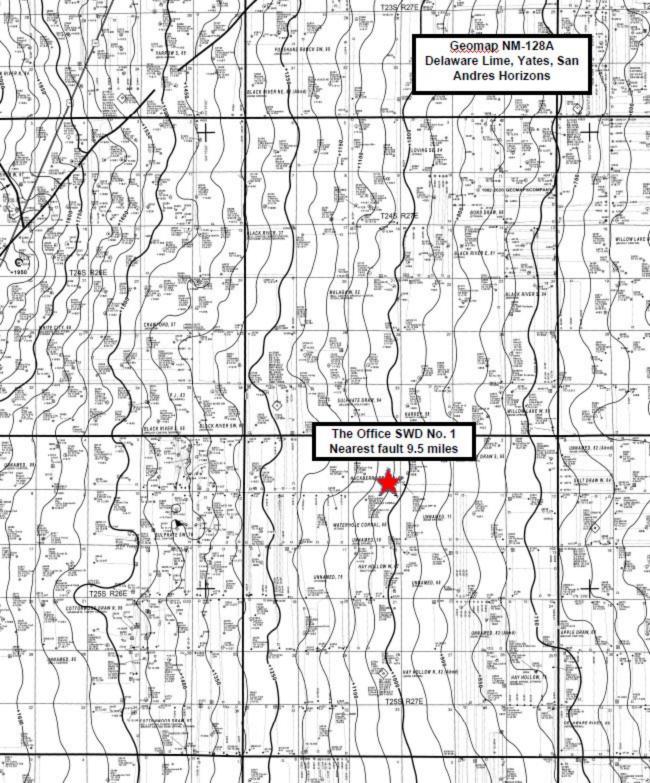
Depth 5.0 km



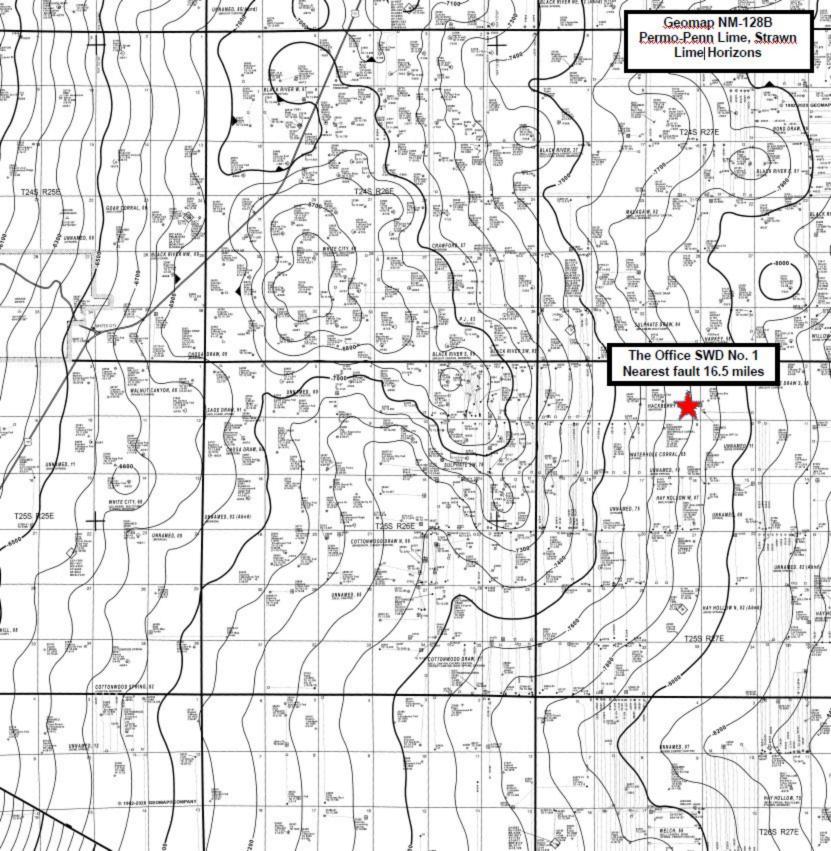
# BUREAU OF ECONOMIC GEOLOGY THE UNIVERSITY OF TEXAS AT AUSTIN 15 KM SEISMIC EVENT SEARCH (2017 – 2019)



# GEOMAP NM-128A DELAWARE LIME, YATES, SAN ANDRES HORIZONS



# GEOMAP NM-128B PERMO-PENN LIME, STRAWN LIME HORIZON



# GEOMAP NM-128C SILURO-DEVONIAN HORIZON

