



Injection/Disposal Permitting

Injection-Storage Permits Unit January, 2020



Session Overview



- UIC Online Manual
- Safe Drinking Water Act & Primacy
- Permit Application Details
 - Forms and Attachments
 - Administrative Review
 - Technical Review
 - Seismicity Review
- Application Decisions, Protests & Hearings



Where is it?

UIC ONLINE MANUAL



Permitting UIC Manual

http://www.rrc.texas.gov/

Contact Us RRC A to Z RRC Online Log In Jobs Resource Center



About Us - Oil & Gas - Alternative Fuels - Gas Services - Pipeline Safety - Mining & Exploration - Hearings - General Counsel -

Railroad Commission of Texas

Capitol Complex Construction

Visiting the RRC's Austin offices in the William B. Travis (WBT) state office building? Give yourself extra time. Note ongoing street, sidewalk and parking closures in the area due to the Capitol Complex Construction project. [Click here for information on parking availability and access to the WBT building.](#) Additional information can be found on Texas Facility Commission's website [State of Texas Capitol Complex newsletter.](#)

The Railroad Commission serves Texas through:

- our stewardship of natural resources and the environment;
- our concern for personal and community safety; and
- our support of enhanced development and economic vitality for the benefit of Texans.

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Recent News [View All](#)

Texas Drilling Permits and Completions Statistics for June 2019

July 10, 2019

The Railroad Commission of Texas (Commission) issued a total of 1,001 original drilling permits in June 2019 compared 1,230 in June 2018. The June 2019 total included 905 permits to drill new oil or gas wells, 10 to re-enter plugged well bores and 86 for re-completions of existing well bores. The breakdown of well types for those permits is [Read More...](#)

Texas Oil and Gas Production Statistics for April 2019

Commissioners



Chairman Wayne Christian



Commissioner Christi Craddock



Commissioner Ryan Sitton

What We Do

Find Permitting Manual - 1



Click Injection/Disposal Well Permitting, Testing and Monitoring Manual

Home / Oil & Gas /

Publications & Industry Notices

Manuals

- Injection/Disposal Well Permitting, Testing, and Monitoring Manual
- Surface Waste Management Manual
- The Interim Guidance for Hazardous Waste (Statewide Rule 98) Manual

Maps

Notices to Operators

Publications

- Drilling Permits Online Filing User's Guide
- Filing Oil and Gas Reports Using Electronic Media
- Field Guide For Reportable Surface Releases of Crude Oil in Non-Sensitive Areas
- Modern Shale Gas Development in the United States: A Primer
- Oil and Gas New Field Discoveries
- Oil and Gas Statewide Rule 101 Approved Tight Gas Formation Listing
- Subscriptions and Publications
- Statewide Rule 36 - Hydrogen Sulfide Safety
- Waste Minimization Program

Find Permitting Manual - 2



Injection and Disposal Well Permitting

1. Summary of Standards and Procedures
2. Guidelines for Permit Amendments: Non-Productive Formations
3. Guidelines for Permit Amendments: Productive Formations
4. Examples of Rule 9 and Rule 46 GAU letters
5. Notice Instructions for:
 - Rules 9 Disposal into Non-Productive Formations
 - Rules 46 Injection / Disposal into Productive Formations
 - Rules 95 Liquid Hydrocarbon Storage in Salt Formations
 - Rules 96 Gas Storage in Depleted Reservoirs
 - Rules 97 Gas Storage in Salt Formations
6. Fresh Water Questionnaire
7. Cement Criteria
8. Packer Setting Depths
9. Fracture Step-Rate Test Guidelines
10. Downhole Oil/Water Separators
11. Permitting Flowchart
12. Frequently Asked Questions

Summary of Standards and Procedures

Administrative Review

This page discusses the administrative check done to verify that all filing requirements are satisfied.

Attachments for new wells

This page discusses the required attachments for injection permit applications.

Transfer and Amendments

This page discusses the transfer of permits and subsequent changes to permit conditions.

Technical Review

This page discusses the review of the proposed injection well for compliance with well construction, operation and injected

Seismicity Review

This page discusses the review of disposal wells permit applications in areas of seismicity.

Permit Processing

This page discusses the various stages of processing the permit application.

Protested Applications

This page discusses the processing of applications that are protested by an affected party.

Post-Permitting

This page discusses filing, testing, and monitoring requirements after the injection permit is issued.



Where does RRC get their authority? What does RRC have authority over?

SAFE DRINKING WATER ACT & PRIMACY

Safe Drinking Water Act



- Safe Drinking Water Act (SDWA) – 1974
- To protect human health and drinking water
- Underground Injection Control (UIC)
 - Prohibits contamination of USDWs
- Underground Sources of Drinking Water (USDW)
- Enforcement Primacy
 - RRC: April 23, 1982
- There are 33,000 active injection wells in Texas!

Water Quality Terms & Uses



- USDW \leq 10,000 ppm Total Dissolved Solids (TDS)
 - SDWA protects, “freshwater” from SWR 9 & 46
- Usable-Quality Water \leq 3,000 ppm TDS
 - RRC standard for casing
- Superior Water \leq 1,000 ppm TDS
 - RRC may recognize and require additional protection

Injection Well Classes & Jurisdiction



- Class I: industrial and municipal wastes
- **Class II: oil and gas injection (75%), disposal (24%), storage**
- **Class III: solution mining (brine mining)**
- Class IV: shallow injection (not used anymore)
- Class V: shallow injection, non-hazardous, remediation, pilot projects
- Class VI: CO₂ capture and storage



FORMS H-1/H-1A AND W-14

Which form do I file?



Form W-14:

- Disposal into a Non-Productive Formation - Statewide Rule 9

Form H-1 and H-1A:

- Injection/Disposal into a Productive Formation - Statewide Rule 46
- Multiple Zones: If a mix of Productive and Non-Productive
- Current or past production within 2 miles radius

Mail form and attachments to UIC in Austin and a copy to the district office

Permit Application Filing Fees



- Form W-14: **\$250** per wellbore
- Forms H-1 & H-1A: **\$500** per wellbore
- Exception Requests: **\$375** (additional) each request
- These fees include surcharges and are non-refundable
- Check or Credit (Central Records)
- Applications will not begin processing until paid

H-1 – Operator & General Location



APPLICATION TO INJECT FLUID INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS

1. Operator name _____ (as shown on P-5, Organization Report)	2. Operator P-5 No. _____
3. Operator Address _____	
4. County _____	5. RRC District No. _____
6. Field Name _____	7. Field No. _____
8. Lease Name _____	9. Lease/Gas ID No. _____

- Organization Information, Form P-5
 - Must have active P-5
 - Operator name, number and address
- General Location Information, Form P-4
 - Must have active P-4 (or be new drill)
 - Lease name and number
 - Field name and number

Determine the Field Name



H-1/H-1A Field Name:

- should be correlative to injection/disposal formation
- use deepest correlative formation if injecting into more than one formation or keep current Field Name if the well is already on proration schedule

W-14 Field Name:

- should be correlative to formation more than 2 miles away or correlative to the formation that is the source of disposal fluids

H-1 – Reservoir Data



- Geology
 - Formation Name, Lithology, Permeability, etc.

RESERVOIR DATA FOR A NEW PROJECT

11. Name of Formation _____ 12. Lithology _____
(e.g., dolomite, limestone, sand, etc.)
13. Type of Trap _____ 14. Type of Drive during Primary Production _____
(anticline, fault trap, stratigraphic trap, etc.)
15. Average Pay Thickness _____ 16. Lse/Unit Acreage _____ 17. Current Bottom Hole Pressure (psig) _____
18. Average Horizontal Permeability (mds) _____ 19. Average Porosity (%) _____

H-1 - Injection Project Data



- Purpose of Injection
- Waterflood, Disposal, etc.
- What will be injected
 - Salt Water, CO₂, Natural Gas, RCRA-exempt Waste, etc.

INJECTION PROJECT DATA

20. No. of Injection Wells in this application _____

21. Type of Injection Project: Waterflood Pressure Maintenance Miscible Displacement Natural Gas Storage
 Steam Thermal Recovery Disposal Other _____

22. If disposal, are fluids from leases other than the lease identified in Item 9? Yes No

23. Is this application for a Commercial Disposal Well ? Yes No

24. If for commercial disposal, will non-hazardous oil and gas waste other than produced water be disposed? Yes No

25. Type(s) of Injection Fluid:

Salt Water Brackish Water Fresh Water CO₂ N₂ Air H₂S LPG NORM

Natural Gas Polymer Other (explain) _____

H-1A – Injection Well Data



- Organization & Specific location
 - Operator, Field and Lease Name, etc.
 - Legal description & coordinates
- Well construction
 - Casing, tubing, packer description

INJECTION WELL DATA (attach to Form H-1)

1. Operator Name (as shown on P-5)				2. Operator P-5 No.				
3. Field Name				4. Field No.				
5. Current Lease Name				6. Lease/Gas ID No.				
7. Lease is _____ miles in a _____ direction from _____ (center of nearest town).								
8. Well No.	9. API No.	10. UIC No.	11. Total Depth	12. Date Drilled	13. Base of Usable Quality Water (ft)			
14. (a) Legal description of well location, including distance and direction from survey lines:								
(b) Latitude and Longitude of well location, if known (optional) Lat. _____ Long. _____								
15. New Injection Well <input type="checkbox"/> or Injection Well Amendment <input type="checkbox"/>				Reason for Amendment: Pressure <input type="checkbox"/> Volume <input type="checkbox"/> Interval <input type="checkbox"/> Fluid Type <input type="checkbox"/>				
Other (explain) _____								
Casing	Size	Setting Depth	Hole Size	Casing Weight	Cement Class	# Sacks of Cement	Top of Cement	Top Determined by
16. Surface								
17. Intermediate								
18. Long string								
19. Liner								

H-1A – Injection Well Data - 2



- Injection Interval
- Injection Volumes and Pressures
- Total Vertical Depth (TVD) vs Measured Depth (MD)
 - Injection Interval, TVD
 - Packer Depth, MD
 - Perforation Depths, MD
 - Put both on the form for all these if deviated or horizontal!

20. Tubing size	21. Tubing depth	22. Injection tubing packer depth	23. Injection interval _____ to _____	
24. Cement Squeeze Operations (List all)		Squeeze Interval (ft)	No. of Sacks	Top of Cement (ft)
25. Multiple Completion? Yes <input type="checkbox"/> No <input type="checkbox"/>		26. Downhole Water Separation? Yes <input type="checkbox"/> No <input type="checkbox"/>	<i>NOTE: If the answer is "Yes" to Item 25 or 26, provide a Wellbore Sketch</i>	
27. Fluid Type	28. Maximum daily injection volume for each fluid type (rate in bpd or mcf/d)		29. Estimated average daily injection volume for each fluid type (rate in bpd or mcf/d)	
30. Maximum Surface Injection Pressure: for Liquid _____ psig for Gas _____ psig.				



H-1 – Certification Statement

- Sign & Date Certification Statement
 - Email address for quicker communication
 - Re-date so we can track the newest submission

johnsmith@xyz-operating.com

<p style="text-align: center;">CERTIFICATE</p> <p>I declare under penalties prescribed in Sec. 91.143, Texas Natural Resources Code, that I am authorized to make this report, that this report was prepared by me or under my supervision and direction, and that the data and facts stated therein are true, correct, and complete, to the best of my knowledge.</p>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-top: 1px solid black; width: 70%; padding: 5px;">Signature</td> <td style="border-top: 1px solid black; width: 30%; padding: 5px;">Date</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding: 5px;">Name of Person (type or print)</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding: 5px;">Phone _____ Fax _____</td> </tr> </table>	Signature	Date	Name of Person (type or print)		Phone _____ Fax _____	
Signature	Date						
Name of Person (type or print)							
Phone _____ Fax _____							



ADMINISTRATIVE REVIEW

Admin Review at a Glance



- Fees are paid
- Form is complete
- Application includes all necessary attachments
- Data entry into tracking system



RRC Data Match



Check Organization Report (Form P-5):

- Check for current P-5 on file
- Check corporation franchise taxes are paid

Check Certificate of Compliance (Form P-4):

- Verify that applicant is the operator of requested lease
- For a new lease, file Form P-4 with completion report

Check UIC Well Inventory:

- Is this application for a new or amended permit?

Notice of Application



Mail or deliver a copy of the application forms W-14 or H-1/H-1A, front and back, to the following parties:

- the surface owner of record (county deed)
- adjacent surface owners of record if application is for a commercial disposal well
- operators of active wells within a ½-mile radius of the proposed injection/disposal well
- county clerk
- city clerk if well is located within corporate city limits

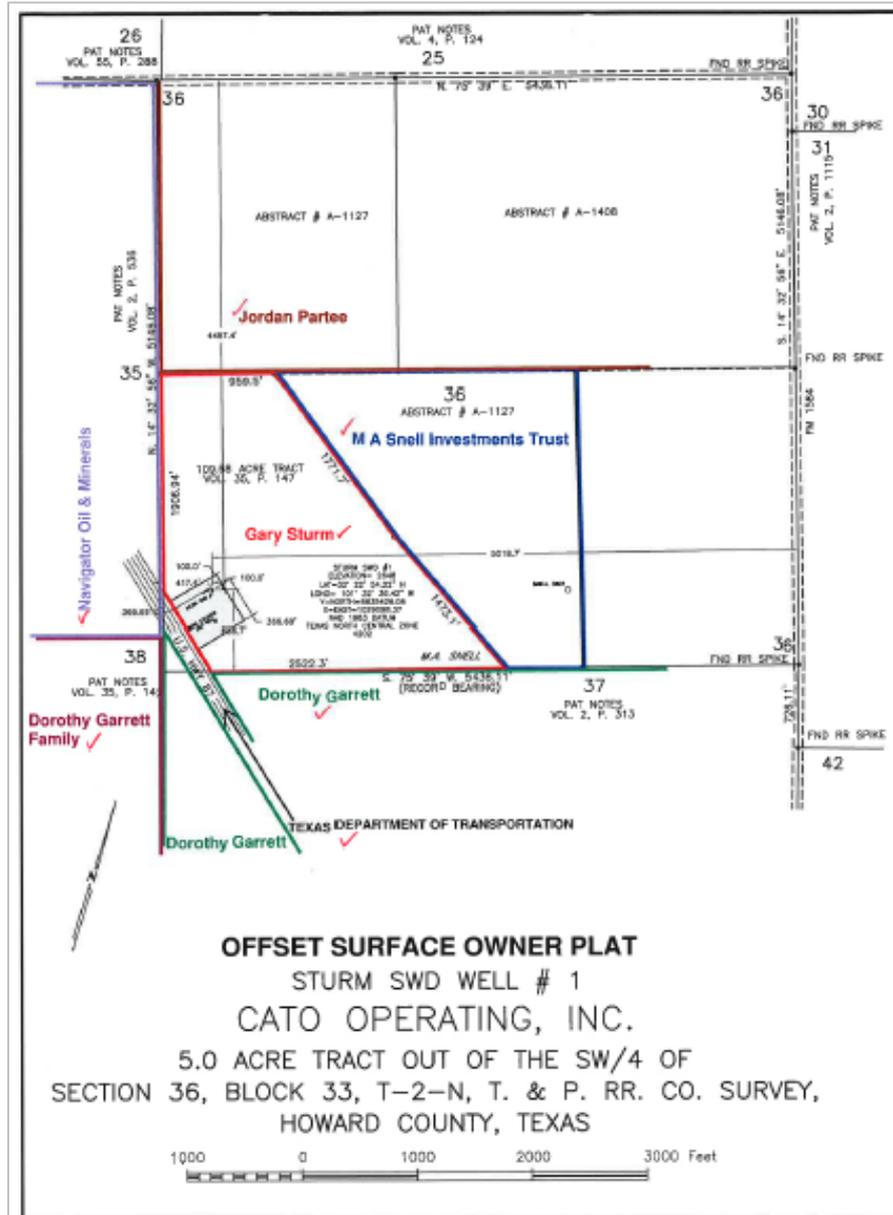


Notice Documents



- Labelled map showing the location of wells within ½-mile of proposed injection/disposal well
 - operators of wells must be notified unless the well is plugged and abandoned
- For a commercial disposal well, provide a plat showing the surface tract boundaries and all adjacent tract boundaries.
- List the names and addresses of:
 - surface owner(s), operators of wells within ½-mile radius, county clerk, city clerk, and adjoining surface owners if commercial
- Signed statement indicating the date that a copy of the application form(s), front and back, was mailed or delivered to everyone on the list.

Adjacent Surface Owner Plat





Commercial Facilities



- Injection well is commercial if:
 - waste is partially or wholly trucked in **and**
 - a disposal fee or other compensation is charged **and**
 - it is your primary business purpose
- Surface facility requirements: spill prevention and containment, restricted access, and additional financial security if you have pits

Published Notice



- Publish notice for one day in a newspaper with general circulation in the county
- Submit newspaper clipping with notarized affidavit of publication
- Publication and affidavit format available on RRC website - Injection Permitting Manual
- 15-day waiting period after notice and publication

Published Notice Text



- Match the application and the notice for:
 - direction and miles to center of nearest town
 - injection/disposal interval – for several wells publish the shallowest top and deepest bottom
- State that the application is for commercial disposal, H2S or NORM injection if applicable
- Legal authority for permit, Instructions to protest, RRC contact information (format available on RRC website)



TECHNICAL REVIEW

GAU Letters & Geologic Isolation



- RRC Groundwater Advisory Unit (GAU) issues the Groundwater Protection Determination (GW-2)
- Form H-1/H-1A: Form GW-2 stating the depth to which usable-quality water (UQW) and USDW must be protected
 - GW-1 Purpose of Filing must be H-1
- Form W-14: Submit GAU letter stating that the proposed injection will/will not endanger freshwater (UQW and USDW).

Geologic Isolation – SWR 46 & Pre-primacy



- SWR 46 injection/disposal wells must be isolated from usable-quality water by 250 total feet of low permeability strata and adequately separated from USDW
- Pre-primacy wells without adequate separation, if permitted, will have injection fluids limited to fluids produced from the same lease and formation



Electric Log



- Complete electric log with header that shows proposed zone and overlying strata
- If log is unavailable, submit a log from a nearby well (include plat showing both locations)
- If multiple wells are one Form H-1, only one well log is required if the log is representative of all wells
- Digital Well Log Submission – RRC Online

Electric Log Annotations



- Annotations will help confirm protection of freshwater
- Top and Bottom of Injection Interval
- Tops of formations
- Bases of freshwater (USDW and UQW)
- Isolating strata from freshwater
 - shale, clay, anhydrite

Area of Review (AOR)



- Provide scaled map of wells within ¼-mile
- Table of wells within AOR with:
 - lease name and number
 - API and well numbers
 - total depth and date drilled
 - current status (producing, shut-in, P&A'd, etc)
 - plugged wells, include plug date and Form W-3
- Confirm that wells are on the proration schedule, have been properly plugged, or do not penetrate the injection zone

Create AOR Map – Public GIS Viewer



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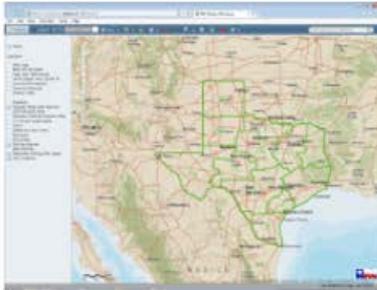
Public GIS Viewer (Map)

The Public GIS Viewer allows users to view oil, gas and pipeline data in a map view.

NOTICE:

If you experience an issue while using the survey and lease search features or the feature to identify wells in the Public GIS Viewer, clear your browser cache. If you are accessing the Public GIS Viewer using Internet Explorer, Google Chrome or Firefox; you can clear your browser cache by pressing Ctrl + F5. If you need further assistance, email RRC.mapping@rrc.texas.gov or call 512-463-6851.

Public GIS Viewer



Training Videos

The following training videos provide step-by-step instruction for new features of the Public GIS Viewer. The videos will open in a separate window, allowing you to toggle between the video and viewer. **Note: These videos do not contain audio.**

- [API# or Address Search](#)
- [Survey Search](#)
- [Locating Pipelines](#)
- [Viewing Coordinates](#)

Launch Public GIS Viewer

The Public GIS Viewer contains the combined functionality of the Legacy GIS Viewer and the newer appearance of the Enhanced GIS Viewer. In addition, the viewer has been improved with the addition of the following features and is updated nightly.

Commissioners



Chairman Wayne Christian



Commissioner Christi Craddock



Commissioner Ryan Siltcn

What We Do



Useful Links

What's Now at the RRC

[RRC Online Inspection Lookup](#)

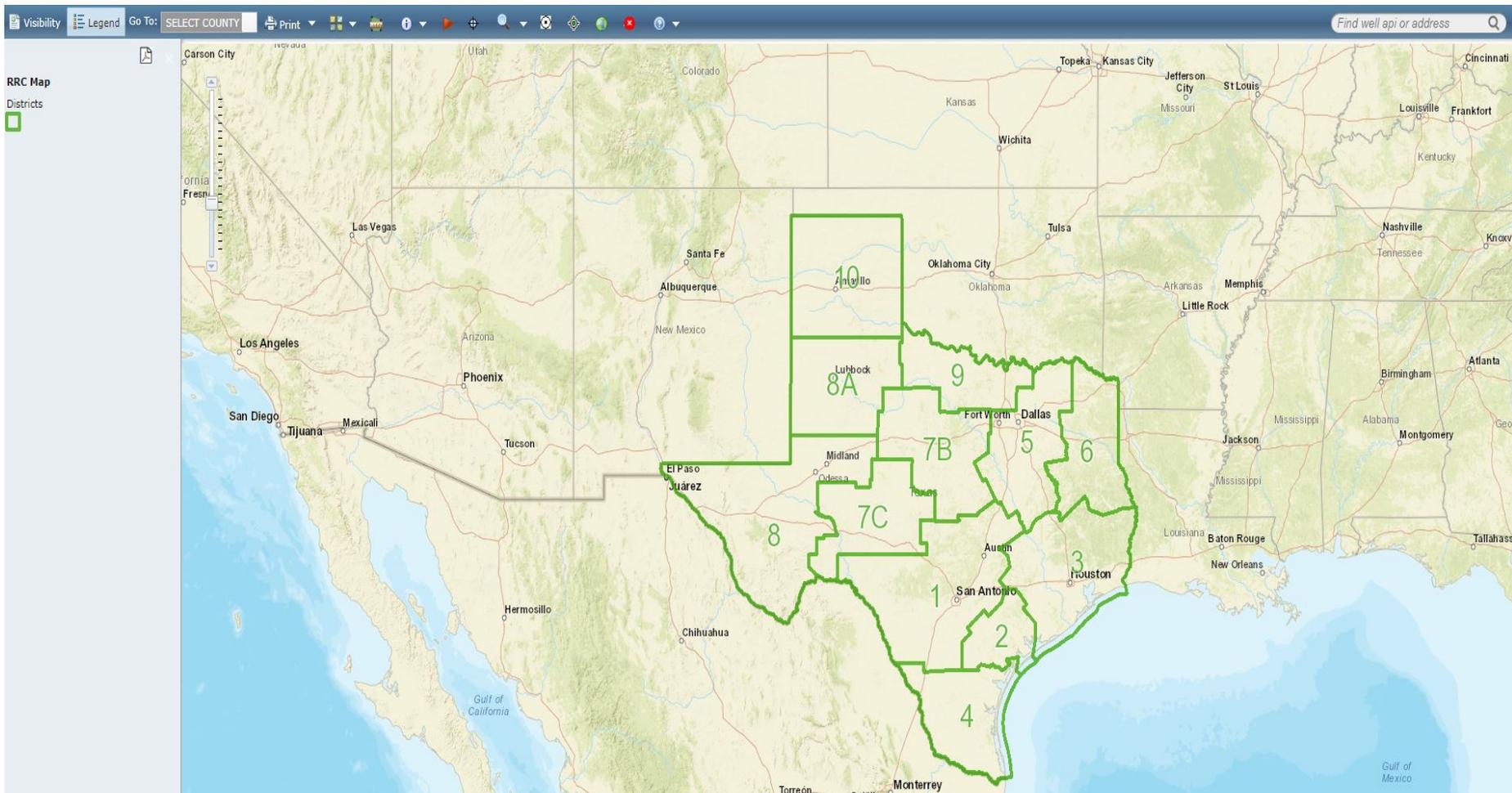
[Data - Online Research Queries](#)

[Frequently Asked Questions - FAQs](#)

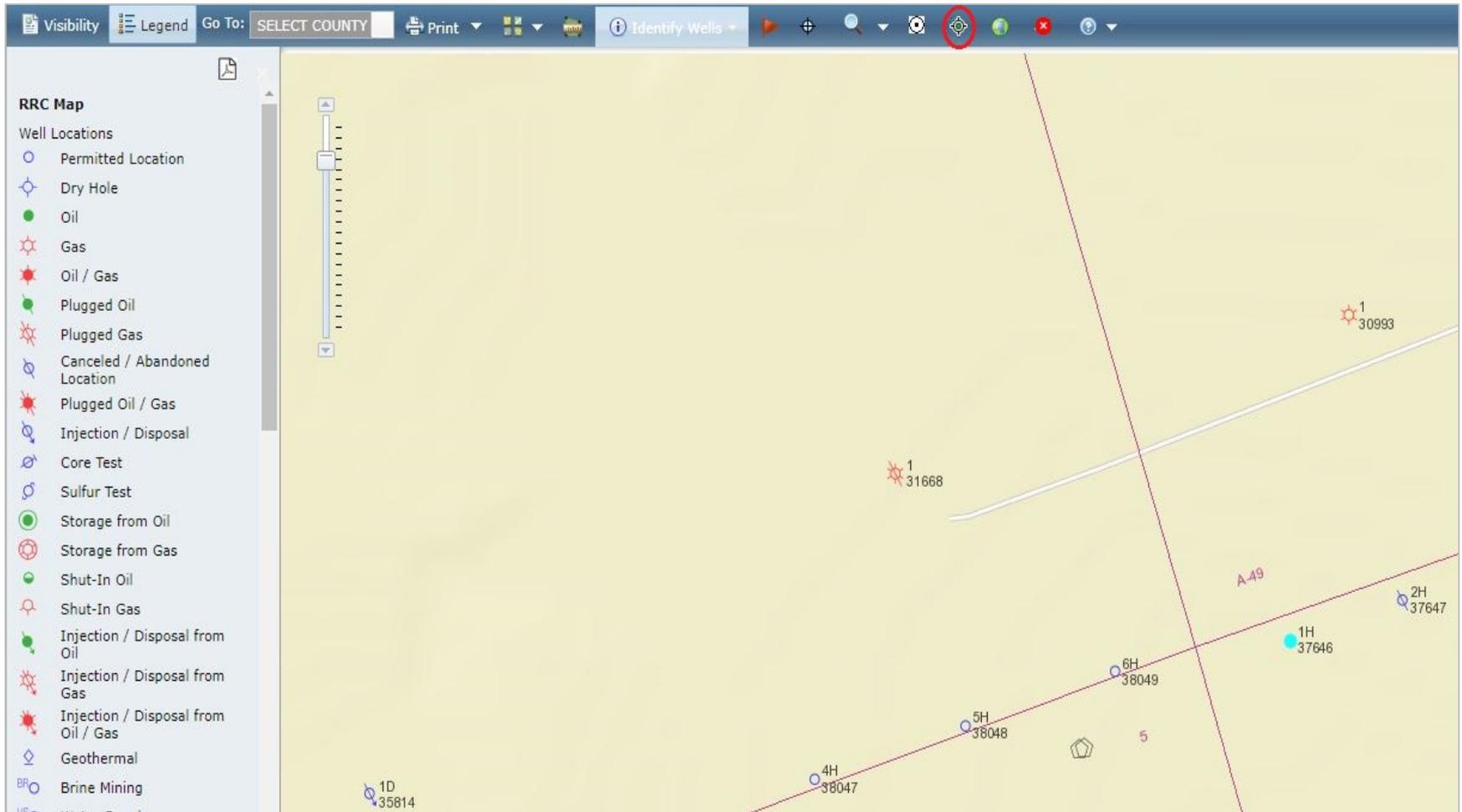
[Maps - Public GIS Viewer](#)



Create AOR Map - 1



Create AOR Map - 2



Create AOR Map - 3

- Click defined radius icon and select your well location. Click export to CSV for a excel spreadsheet of all the wells in the AOR.

Download Wells Within a Defined Radius

Number of Well Bottoms in Radius Area (Max 1000) : 5

Number of Well Surfaces in Radius Area (Max 1000) : 0

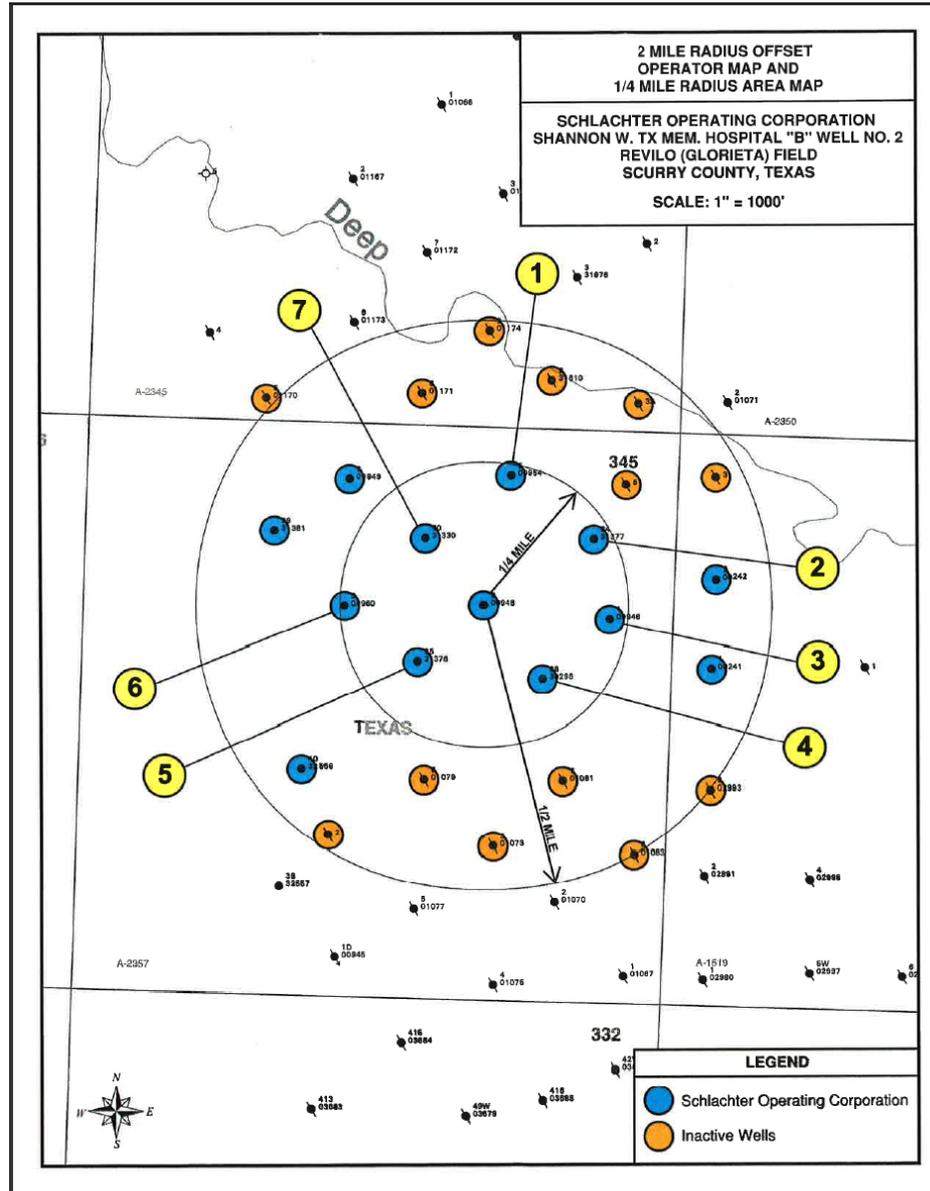
Enter Radius Distance (Max 2.5 miles) : 0.25

Zoom to desired area and single click on map to draw a radius area with given distance. Wait until the wells are highlighted in blue.

Export to CSV

API	Well_Num	Symbol_Desc	Symbol	Reliab	Location_Source	Lat27	Long27	Lat83	Long83
40130902	1	Plugged Oil Well		7	15 Commission's hardcopy map	32.07171	-94.61844	32.07188	-94.61865
40132053	1	Plugged Oil Well		7	15 Commission's hardcopy map	32.07732	-94.62261	32.07748	-94.62282
40132226	1	Plugged Oil Well		7	15 Commission's hardcopy map	32.07456	-94.60836	32.07473	-94.60857
40132265	1	Canceled / Abandoned Location		9	40 Operator reported location -	32.07578	-94.61146	32.07594	-94.61167
40132284	1	Plugged Oil Well		7	40 Operator reported location -	32.07576	-94.61049	32.07592	-94.61070
40132295	1	Plugged Oil Well		7	30 Operator reported location -	32.08058	-94.61323	32.08075	-94.61345
40132303	1	Dry Hole		3	40 Operator reported location -	32.0779	-94.61696	32.07807	-94.61717
40132306	1	Oil Well		4	50 U.S.G.S 7.5-min. quadrangle	32.08166	-94.60844	32.08182	-94.60866
40132307	1	Plugged Oil Well		7	40 Operator reported location -	32.08327	-94.61554	32.08343	-94.61577
40134142	1	Gas Well		5	40 Operator reported location -	32.07325	-94.61978	32.07341	-94.61999
40134379	1	Gas Well		5	55 Coordinates - Operator repo	32.08068	-94.61948	32.08085	-94.61969
40135381	1H	Gas Well		5	40 Operator reported location -	32.07523	-94.61596	32.0754	-94.61618
40135396		Horizontal Drainhole		86	Coordinates - Operator repo	32.07649	-94.61276	32.07665	-94.61297
40135416		Horizontal Drainhole		86	Coordinates - Operator repo	32.07524	-94.62328	32.0754	-94.62349
40135426	1H	Gas Well		5	40 Operator reported location -	32.07404	-94.61066	32.07421	-94.61088
40135429		Horizontal Drainhole		86	Coordinates - Operator repo	32.08087	-94.61959	32.08103	-94.61981
40135450	1	Permitted Location		2	55 Coordinates - Operator repo	32.07808	-94.61554	32.07825	-94.61576

AOR Map Example



AOR Well Listing Example



**1/4 MILE RADIUS WELL TABULATION
SCHLACHTER OPERATING CORPORATION
SHANNON W. TX MEM. HOSPITAL "B" WELL NO. 2
REVILO (GLORIETA) FIELD
SCURRY COUNTY, TEXAS**

<u>MAP #</u>	<u>OPERATOR NAME LEASE NAME & WELL #</u>	<u>API #</u>	<u>FIELD NAME</u>	<u>DATE DRILLED</u>	<u>TOTAL DEPTH</u>	<u>STATUS</u>
1	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #5	415-00954	Revilo (Glorieta)	06/21/57	2878'	On Schedule - Producing
2	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #34	415-31377	Revilo (Glorieta)	08/23/79	2914'	On Schedule - Producing
3	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #1	415-00946	Revilo (Glorieta)	04/13/57	2893'	On Schedule - Producing
4	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #28	415-30296	Revilo (Glorieta)	04/09/74	2845'	On Schedule - Producing
5	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #35	415-31376	Revilo (Glorieta)	08/29/79	2928'	On Schedule - Producing
6	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #9	415-00960	Revilo (Glorieta)	07/18/57	2907'	On Schedule - Producing
7	Schlachter Operating Corporation Shannon W. TX Mem. Hospital "B" #30	415-31330	Revilo (Glorieta)	04/12/79	2900'	On Schedule - Producing

* Plugging reports attached hereto for all wells which are currently plugged as shown above.

Unknown Status or Improperly Plugged



- You may plug the well or enter the well to determine status if unknown
- Applicant may use a Pressure Front Calculation (PFC) to show USDW will not be contaminated
- PFC must be prepared by a Texas-Registered Professional Engineer

Surface Casing



- Base of usable-quality water (BUQW) determined by GAU
- Commercial and new injection/disposal wells must set and cement surface casing through the BUQW
- Wells converted from production are reviewed on a case-by-case basis. If permitted, additional requirements like:
 - annual mechanical integrity (MIT) testing vs 5 years
 - weekly tubing-casing annulus monitoring (TCAM)

Production Casing



- Cement must be adequate to confine fluids to the injection zone
- 600 feet of cement above injection interval if Top Of Cement (TOC) is based on volume calculation.
- 250 feet if TOC is based on temperature survey
- 100 feet if TOC is based on cement bond log and
 - At least 80% bond
 - No indication of channeling

Packer Setting Depth



- Form W-14, Statewide Rule 9: set within 100 feet of the permitted zone
- H-1/H-1A Statewide Rule 46:
 - Have a minimum of 200ft of cement above packer and it must be at least 150 ft below the BUQW.
 - Should have cement behind casing and no permeable zones between the packer and the top of the injection interval to protect natural resources



Injection Pressures



- Typical maximum is $\frac{1}{2}$ psi per foot of depth
- For coastal wells less than 2,000 feet, injection above Barnett Shale, and injection into Delaware formations pressure may be limited to $\frac{1}{4}$ psi per foot
- Fracture step-rate tests may justify a higher pressure or be required if formation fracture pressure is known to be low



Injection Fluids

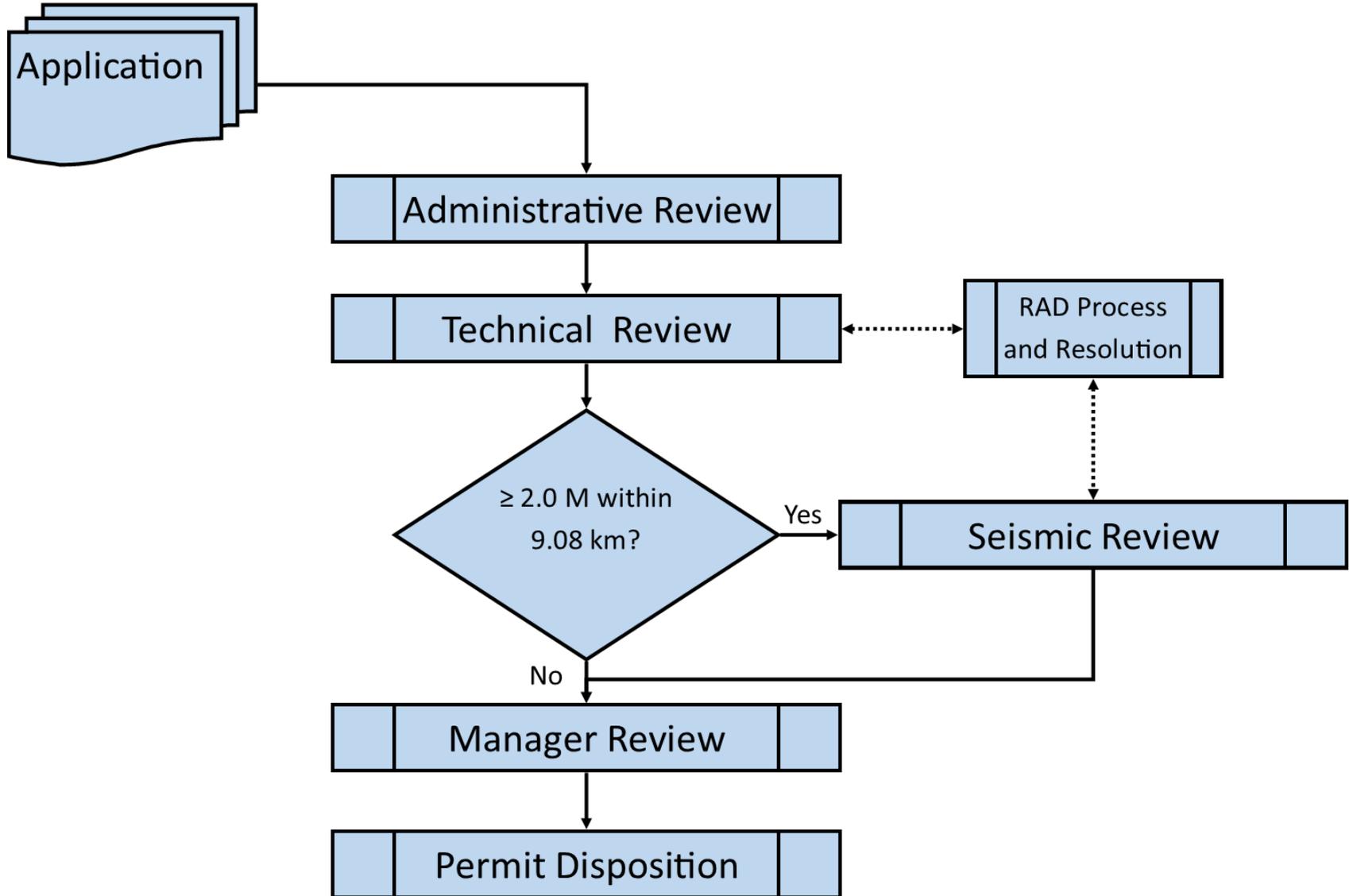


- Injection of Hydrogen Sulfide requires “well-specific” authority (SWR 36)
 - Must go through a public hearing
 - Admin approval from the District Office H2S Coordinator if already been through public hearing
- If freshwater is to be injected, you must submit the Fresh water questionnaire and the Form H-7 (unless fresh water is purchased)
 - Search for “questionnaire” in search box
 - plat of freshwater rights
 - chemical analysis of the fresh water



SEISMICITY REVIEW

UIC High-Level Processes



Seismic Activity Amendments

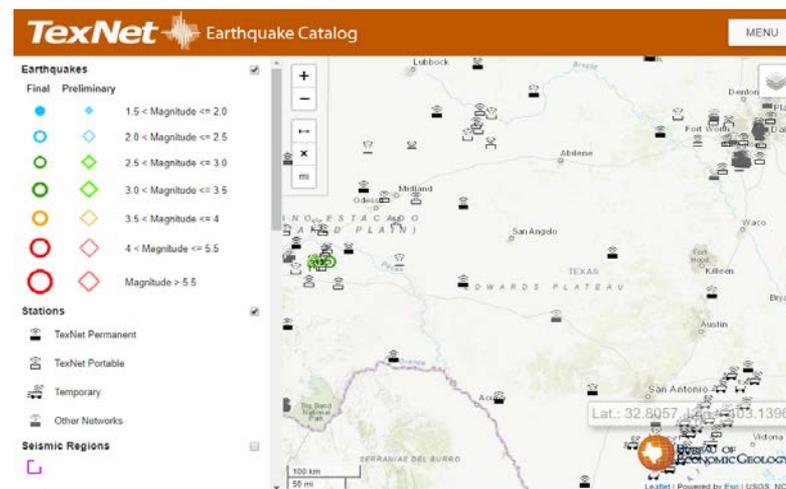


- Amendments to Rules 9 & 46 in 2014
 - RRC may modify, suspend or terminate a permit if disposal is likely to be contributing to seismic activity
 - Requires seismic information with disposal well applications
- Include a survey of seismic events from the USGS within 9.08 kilometers of the proposed well site
- USGS Earth Archive Search – use following link:
(<http://earthquake.usgs.gov/earthquakes/search/>)

Disposal Well Seismicity Screening



- An earthquake event of 2.0 M or greater within the 9.08 km area of interest (AOI) will trigger the seismic review
- RRC Staff will consider both USGS and TexNet catalogs in assessing the seismic trigger.
- <https://www.beg.utexas.edu/texnet-cisr/texnet/earthquake-catalog>



Seismic Event Survey



- USGS Earth Archive Search
- Enter the following parameters:
 - DATE & TIME: 1973-01-01 00:00:00
 - MAGNITUDE: Minimum: Enter 2
 - Advanced Options:
 - CIRCLE: Center Latitude and Center Longitude
 - CIRCLE: Outer Radius; Enter 9.08
- Include the map and the page depicting your inputs
- The map should display details about each event, including location, magnitude, and date



USGS Search – Basic Options



Basic Options

Magnitude

- 2.5+
- 4.5+
- Custom

Minimum

Maximum

Date & Time

- Past 7 Days
- Past 30 Days
- Custom

Start (UTC)

End (UTC)

Geographic Region

- World
- Conterminous U.S.¹
- Custom

Worldwide



USGS Search – Advanced Options



Advanced Options

Geographic Region

Decimal degree coordinates. North must be greater than South. East must be greater than West.

North	
<input type="text"/>	
West	East
<input type="text"/>	<input type="text"/>
South	
<input type="text"/>	

Circle

Center Latitude

Center Longitude

Outer Radius (km)

Depth (km)

Minimum

Maximum

Azimuthal Gap

Minimum

Maximum

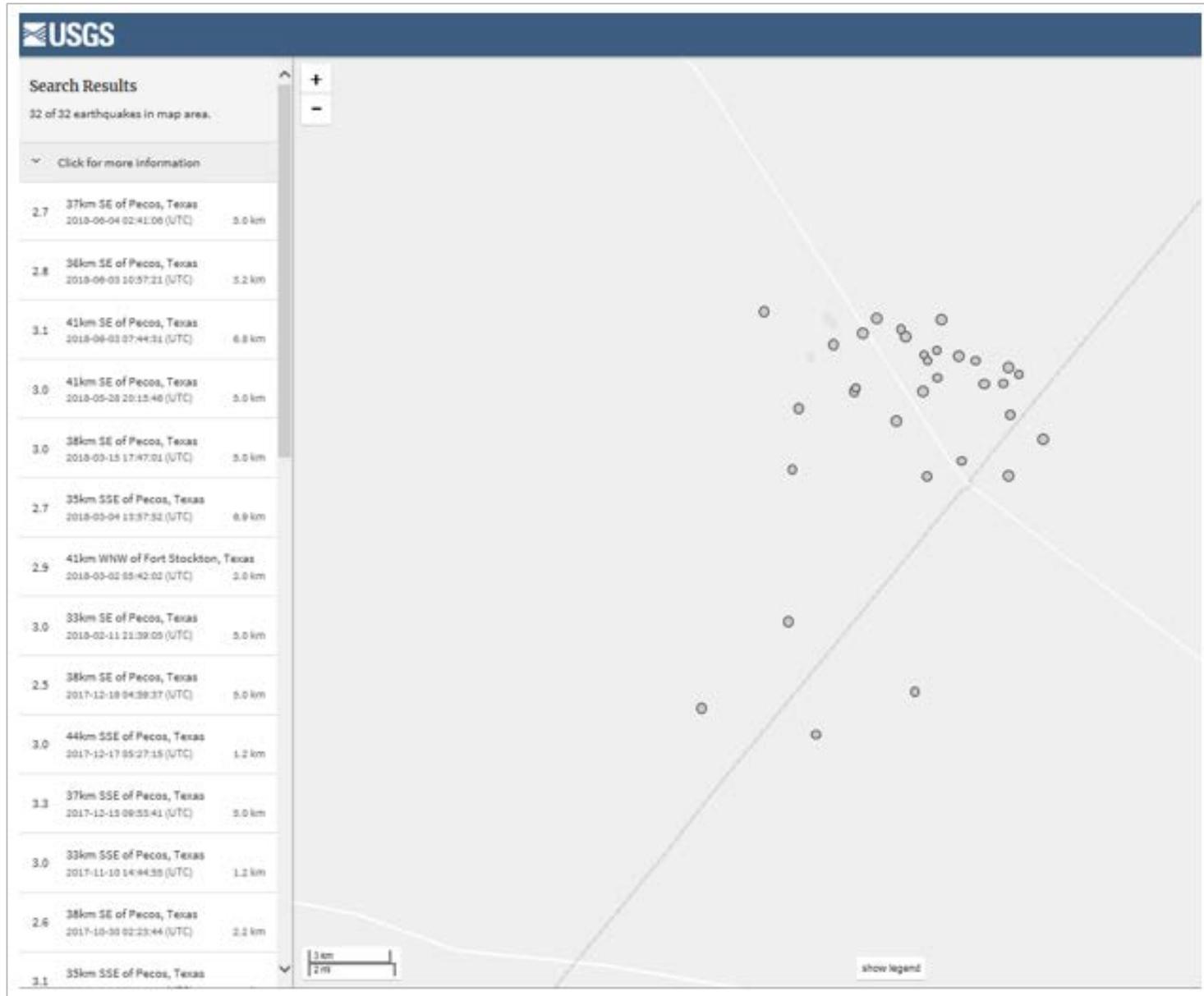
Review Status

Any

Automatic

Reviewed

USGS Search - Results





If seismicity screen is positive, supplemental information is required to assess the state of the disposal zone and adjacent strata:

- Structure map(s)
- Isopach map(s)
- Cross-sections
- Fault hazard analysis may be required.
- You may also submit other relevant information to assist with scoring



- **The purpose of the supplemental information is to enable staff to conduct the seismic review.**
- The seismic review is a scoring system that considers:
 - Faulting and Seismicity Factors (8)
 - Operational Factors (2)
 - Reservoir Factors (3)

Permit Conditions



- Max Daily Injection Volume limit
- Daily Records (volume, max pressure)
- Initial Static Bottom-hole Pressure Test
- Step Rate Test
- Seismologist Review and Approval with Additional Conditions as Necessary

Mitigation Opportunities



Disposal wells scored as may be authorized to inject an **additional 10,000 bpd, up to 30,000 bpd**, provided:

- Operator actively implementing a **seismic monitoring plan** that augments the open public data network, *and*
- Operator develops and implements a **seismic event response plan** (submitted to RRC)

Seismic Monitoring Plan



- Implement a seismic monitoring plan that provides for the **contribution of data to an existing public seismic network** (e.g., TexNet).
- Monitoring to **contribute to the body of public knowledge** available to better resolve earthquake locations, especially depth.
- Include method of monitoring, type of instrumentation, reporting of data analysis, and an archive of the data in a public seismic database.



PERMIT AMENDMENTS, APPLICATION DECISIONS, PROTESTS & HEARINGS



Permit Amendments



- File Form W-14 or H-1/H-1A with filing fee
- Filing requirements vary with purpose of amendment
- Some amendments (like injection interval amendments) will require an entire application as if it were new (for example, well log, groundwater letter, AOR, notice, etc.)



After Permit



- Perform a Mechanical Integrity Test (MIT, Form H-5) before injection
- File completion report (Form W-2/G-1)
 - Filing online greatly reduces processing time
 - Lease numbers for new leases are assigned after final processing/approval of completion report
- File annual Form H-10 upon due date
 - You will receive a letter indicating when H-10 is due
 - Filing online greatly reduces processing time

Application vs Completion



- The well must be constructed and operated as proposed and permitted
- Significant changes will require permit amendment, or may result in enforcement or permit cancellation
- Permit-required remedial action must be done **before** injection begins

Permit Denied



- If application remains incomplete after two additional submittals, it is returned
- Applications will be administratively denied if lease is under severance or seal-in. (This does not apply to permit amendment applications that return well to compliance.)
- Unsatisfactory well completion or operating proposal
 - Modify the application to allow for administrative approval, or
 - Request a hearing

Protested Applications



- Staff may not administratively issue a permit if it has a valid protest
- Protests must be filed within 15 days of the date of notice, the date of publication or the date that the application is filed with UIC department, whichever is later
- Protests received after the 15-day window will **not** be considered. If the application was already protested validly, it may be possible to join the hearing once docketed

Withdraw or Hearing



Options for applicant:

- Withdraw the application
- Obtain a withdrawal letter from the protestant, or
- Go to Hearing:
 - The application must be administratively complete
 - Pre-hearing and/or hearing will be held
 - Protest is dismissed and remanded to UIC for administrative processing, or the Commission rules on the application

Team Leads



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