Groundwater Protection Determinations

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August 2019
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Who We Are

• Oil & Gas Division
  – Technical Permitting
    • Groundwater Advisory Unit (GAU)
    • Injection Permitting and Support
    • Environmental Permits and Support
    • Engineering Unit
What We Do

• Groundwater Determinations:
  – SWR 13: Set and cement sufficient surface casing to protect all usable quality water strata (BUQW)

• Geologic Isolation (H-1, W-14)
  – No injection is allowed in Underground Source of Drinking Water (USDW)*
  – Depth of confining clay or shale below BUQW/USDW
What We Do

• Cathodic Protection and Microseismic wells
  – CP (SWR 99) and MS (SWR 100)
  – Required if depth is >30 feet
  – W-1 required if CP/MS well exceeds protection depth
  – Submit well schematic of CP/MS well with W-1.
  – GW-1 for CP/MS wells cannot be used for other purposes

• Special Projects
  – Capitan Reef
  – BRACS/ASR – Texas Water Development Board (TWDB)
Water Classification

- Superior Quality Water (SQW) ≤ 1,000 ppm
  - Good tasting drinking water
- The Base of Usable Quality Water (BUQW) ≤ 3,000 ppm
  - Protection depth as defined by SWR 13
- Underground Source of Drinking Water (USDW) ≤ 10,000 ppm
  - No injection allowed in the USDW*

* Aquifer Exemption or EPA concurrence
Water Board Letters

• Why do we call them Water Board Letters?
• Texas Board of Water Engineers established 1913
• 1950 Order required operators to obtain a TBWE letter

RAILROAD COMMISSION OF TEXAS
OIL AND GAS DIVISION.

OIL AND GAS DOCKET NO. 108,
120, 123, 124, 125, 126, 128,
129, 132, and 146

IN RE: CONSERVATION AND PREVENTION
OF WASTE OF CRUDE PETROLEUM
AND NATURAL GAS IN THE
STATE OF TEXAS

Austin, Texas
November 14, 1950

SPECIAL ORDER
AMENDING STATEWIDE RULE 12(a), DIVISION ONE
OF OIL AND GAS CIRCULAR 16-B, DATED MAY 15, 1934

WHEREAS, After notice for the time and in the manner required by law, the
Railroad Commission of Texas held hearings at various times in Austin, Texas, in-
cluding the hearings held October 19 and November 14, 1950, for the purpose of
determining whether or not Statewide Rule 12(a), adopted and promulgated in Oil
and Gas Circular 16-B, dated May 15, 1934, as amended February 19, 1937, and
June 25, 1942, should be further amended; and

WHEREAS, From evidence adduced at the hearings held on October 19 and
November 14, 1950, the Commission is of the opinion and finds that said Statewide
Rule 12(a), as amended, should be further amended.
GAU Tools and Techniques

The GAU uses Geographical Information System (GIS)
- Operator Provided Information
- Other Government and NGO Web Resources
- Legacy Cloth Maps and Well Files
GAU Tools and Techniques

- Texas Water Development Board – Water Data Interactive
How do we Protect?

• Provide Depths for Surface Casing, Cementing, and Plugging
• Locate Geologic Isolation For Injection Wells (H-1, W-14)
  – Depth of confining clay or shale below USDW is required
  – 250’ Below BUQW with 100’ Contiguous confinement
• SWR 13 requires that surface casing protect groundwater as stated in Groundwater Advisory Unit (GAU) letter (Form GW-2)
  – Steel & Cement layers required for all oil and gas wells
  – Surface Casing
    • Protects usable-quality water from drilling/completion process
    • Extra protection against leaks during production
  – Cement
    • Prevents annular migration of fluids
    • Prevents corrosion of casing
    • Isolates formation
Application (Form GW-1)

• Requests for Groundwater Determinations can be made one of two ways
  – Use the RRC On-Line System
  – Download a .PDF form on the GAU Website
• Email the completed GW-1 form to gau@rrc.texas.gov
• Send the completed GW-1 form through regular mail
Menu and User Guide

- Application Status
  - Check application status
  - “draft” means not submitted
- New Application
- Search for previous filings
- User Guide
Reason for Filing

• Important for H-1 and W-14 because determination will include the USDW necessary for UIC permit application
Areal Extent

- Areal Extent
  - May request Radius, Section, Abstract, Lease...
  - Provide additional information in “Remarks” (ex: all wells on pad, specify wells to be P&A’d)
  - Depends on hydrogeology & topography?
Location Information

- GPS coordinates for surface location
- GIS tools for identifying wells and plotting coordinates
- Coordinates and survey calls consistent with other RRC filings (RRC GIS, W-1, H-1, W-14, etc.)
RRC GIS Public Viewer

- Revised GAU webpage - Using the RRC Public GIS

Navigating
You may instantly zoom to the location of an existing or permitted well by entering the eight digit API number into the search bar and clicking the search icon (magnifying glass). The map will zoom centered on the well, and the well will be highlighted in cyan (light blue).

You can instantly zoom to any location for which you have GPS coordinates. To do so, click on the “Coordinates” tool, shown below, select the correct coordinate system, and enter the appropriate coordinate values.
Creating a Scaled Map

• Revised GAU webpage – Creating a Scaled Map
• Map is required with all application

Creating a Scaled Map

Requirements

At a minimum for a GW-1 application, the scaled map for a well should include:

• The surface location of the well – Please highlight the well or indicate in some way to make it easy to see relative to other wells on the map
• Two survey lines (of the section, abstract, league, etc.) to which the reference line measurements from the well are made

Though not required, we prefer a professional map to also include: North arrow, scale bar, lease lines, survey lines that are distinctive from lease lines, survey name and abstract number, measured distances of the well from survey lines, GPS coordinates of the surface hole location, lease name and well number, API number if available, operator information, county name, and ground elevation of the surface hole location.

Example of a Basic Map
Attachments for H-1 and W-14

• Additional info is required for H-1 & W-14
  – H-1: Include the Form H-1A
  – W-14: Include Form W-14 and a representative well log

• GAU issues “no harm” letter for W-14 in addition to the GW-2 Determination
Log Submission

• Four ways to submit well logs
  – Attach to application (Form GW-1)
  – Digital Well Log Submission*
  – Refer to log already available via RRC GIS*
  – email or snail mail in the hardcopy*

(* Note in GW-1 Remarks)
• Hit the “Next” button at the bottom of the page to accept the terms and pay.
• If “Save” – Return via Menu/My Applications/Draft
Payment

• Check the “Accept” box then the “Payment” button.
• Remember to “Return” to the Application after payment confirmation to submit.
“Print Confirmation” here (now or never!)
Hit “Return” to go back and finalize submitting GW-1
If an application is returned, “Edit and Resubmit” to make changes to the application and resubmit.
• Filing online helps expedite
• No Special Characters (!@#$%^&*) or Spaces
• Chrome Browser recommended
• Map/plat – Info consistent with GW-1/W-1
• More data favors the desired outcome
• Shout out for more data (shallow log data)
• Confidentiality
• Rig on Location!!! Call Us...
Special Projects

Where’s the Reef!

Capitan Reef
Capitan Reef

- Located in West Texas Permian Basin and South East New Mexico
- Present in Brewster, Culberson, Jeff Davis, Pecos, Ward, and Winkler Counties
Capitan Reef

- The Reef contains fresh water but no oil
  - Important Hydrogeologic formation of the Permian Basin
  - Classified by the TWDB as a Minor Aquifer of Texas
Capitan Reef

- Request logs (shallow data only) to help locate reef.

- Capitan Reef added to SWR 13 Geologic Formation List to be reported on Completions Reports (Forms G-1/W-2)
Areal Extent

- SCE available via GAU link to the Bureau of Economic Geology (BEG) website
- Prepared in cooperation with the RRC and TCEQ

Surface Casing Estimator

This website provides operators with an estimate of casing depths to assist in obtaining the Groundwater Protection Determination Letter (pdf).

All estimates derived from this website must be verified by the RRC Groundwater Advisory Unit Team and final recommendations will be provided in the Groundwater Protection Determination Letter.

Railroad Commission of Texas regulations require that anyone drilling for oil and gas or reentering an existing oil and gas well must have a plan for the well design that is approved by the RRC. Part of the plan must include use of surface casing and cement to protect fresh water (generally a salinity of less than 1000 mg/l TDS) and usable quality water (generally a salinity of less than 3000 mg/l TDS). Surface casing also helps protect the well from caving in and blowing out.

The well operator must have a letter from the RRC Groundwater Advisory unit, which is then provided to the RRC, which outlines where fresh and usable-quality water is located. The RRC uses the recommendations in the Groundwater Protection Determination Letter for designing well requirements.

For a full explanation of the procedures and available resources for obtaining the Groundwater Protection Determination Letter, please visit the RRC Groundwater Advisory Unit page that includes sample application forms, surface casing rules, expedited application procedures, and contact information.

To acquire surface casing information, click the map below:

Go to the Surface Casing Estimator >

This site is prepared in cooperation with the Railroad Commission of Texas and was financed through funds from the Railroad Commission of Texas and the Texas Commission on Environmental Quality.

Effective September 1, 2011, the Surface Casing Estimator project is coordinated through the RRC Groundwater Advisory Unit. Prior to September 1, 2011, the Surface Casing Estimator project was coordinated through the Texas Commission on Environmental Quality.
## GAU Contact Info

<table>
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Questions?