

# Enabling States to Adapt to Emerging Industry Technologies & Challenges

[www.rbdms.org](http://www.rbdms.org)

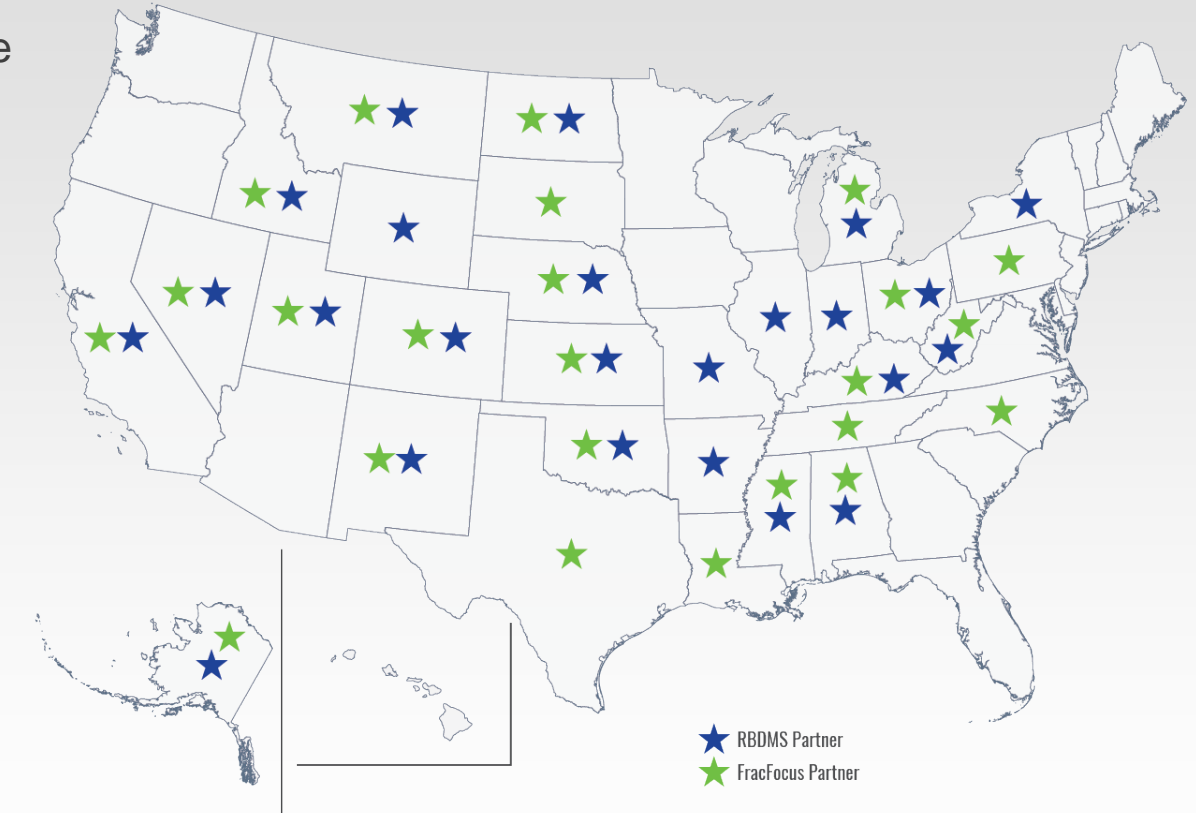


**RBDMS**  
Energy & Water Software | Data Solutions

# RBDMS

## What is RBDMS?

- A suite of integrated software products that assists state agencies in the effective regulation, oversight and management of oil, natural gas and underground injection control (UIC) facilities and activities.
- Developed by the GWPC and members states, in partnership with the U.S. Department of Energy.
- More than 25 years developing and improving new versions of RBDMS and related products.
- A System that is designed to meet the unique and evolving needs of each state's regulatory and statutory requirements.



PARTNER STATES

# State Regulatory Responsibilities

RBDMS provides solutions that allow state programs to more efficiently manage their mission critical activities and responsibilities. RBDMS products increase efficiency for state programs thereby increasing production (faster permitting etc.), reduce data errors, and ensure environmental protection.

## State Mission Critical Responsibilities

Permitting

Drilling & Completion

Production

Plugging & Abandonment

Inspection & Compliance

Facilities

Environmental Protection Through Well Life Cycle

## RBDMS Capabilities



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# RBDMS Product Benefits

- Streamlines permitting processes, reporting, and oversight; thereby facilitating energy development and economic growth
- Increases efficiency and accuracy of industry data reported to the states
- Facilitates access to state-held industry and regulatory data, thereby increasing transparency
- Facilitates exchange of ideas, technology advances, and innovative data management solutions from state to state
- Helps agencies reduce operating expenses while increasing efficiency

# State-Driven Solutions: The Products



## Core

Primary information storage system for agency oil, gas & UIC data



## Produced Water Tracker

Manages field observations and water sampling data



## Seismic Monitoring

Queries extensive data from multiple databases about specific underground injection wells and earthquakes



## eForms

eForm allows for electronic permitting and reporting



## WellFinder Application

Free, publicly-available mobile application (iOS & Android) displaying nearby oil, gas, and injection well information



## Field Inspection

(Coming Soon) – Allows agency field inspectors to make real-time critical decisions while performing a field inspection



## Data Explorer

Provides an interactive mapping interface and robust data exploration options



## WellBore Analysis

A visual add-on that generates cross-section diagrams of a well



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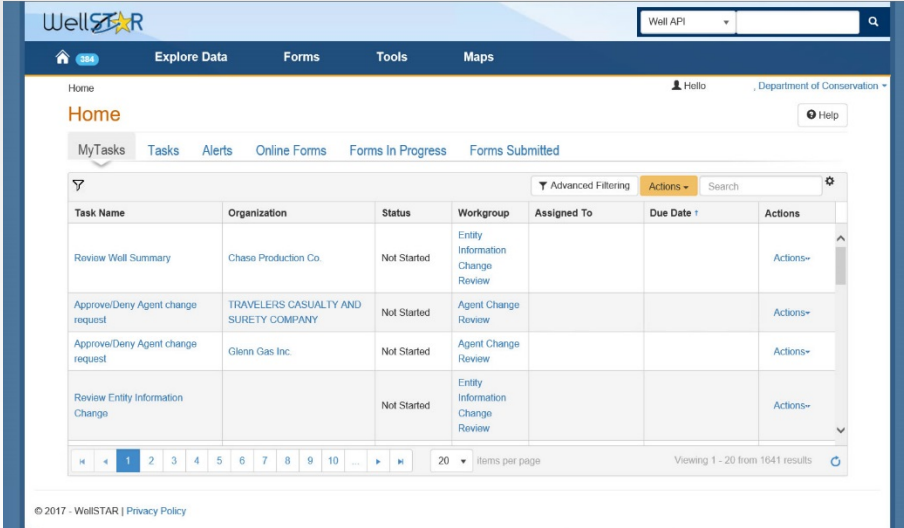
# Latest Updates

# RBDMS Core

- Primary information storage system for agency oil, gas and UIC data.
- Provides reliable and time-tested storage for the data needed to make informed decisions.
- RBDMS 3.0, a major upgrade to RBDMS Core will be web-enabled once complete and mobile friendly.

## Business to Government – RBDMS WellStar

- Web-based allows industry systems to talk to state systems directly
- Reduces personnel time and errors
- Increases efficiency of permitting and reporting
- Cyber security upgrades
- Faster permitting & reporting allows for more efficient production, directly impacting the economy.



The screenshot displays the WellStar web application interface. At the top, there is a navigation bar with the WellStar logo, a search bar, and menu items: Home, Explore Data, Forms, Tools, and Maps. Below the navigation bar, the user is logged in as 'Hello' and is in the 'Department of Conservation'. The main content area shows a 'Home' section with tabs for 'MyTasks', 'Tasks', 'Alerts', 'Online Forms', 'Forms In Progress', and 'Forms Submitted'. A table is displayed with the following columns: Task Name, Organization, Status, Workgroup, Assigned To, Due Date, and Actions. The table contains several rows of tasks, including 'Review Well Summary', 'Approve/Deny Agent change request', and 'Review Entity Information Change'. The bottom of the interface shows a pagination bar with '20' items per page and 'Viewing 1 - 20 from 1641 results'.

Task Name	Organization	Status	Workgroup	Assigned To	Due Date	Actions
Review Well Summary	Chase Production Co.	Not Started	Entity Information Change Review			Actions-
Approve/Deny Agent change request	TRAVELERS CASUALTY AND SURETY COMPANY	Not Started	Agent Change Review			Actions-
Approve/Deny Agent change request	Glenn Gas Inc.	Not Started	Agent Change Review			Actions-
Review Entity Information Change		Not Started	Entity Information Change Review			Actions-

# WellFinder Mobile Application

## Purpose

- Displays nearby oil, gas, and injection wells.
- Used by members of the public, inspectors, emergency responders and others who must locate wells in their area and understand basic information about the well.
- Powered by the same data as the Oil and Gas Data Gateway which is a central location for public oil and gas data displayed in both map and tabular formats.

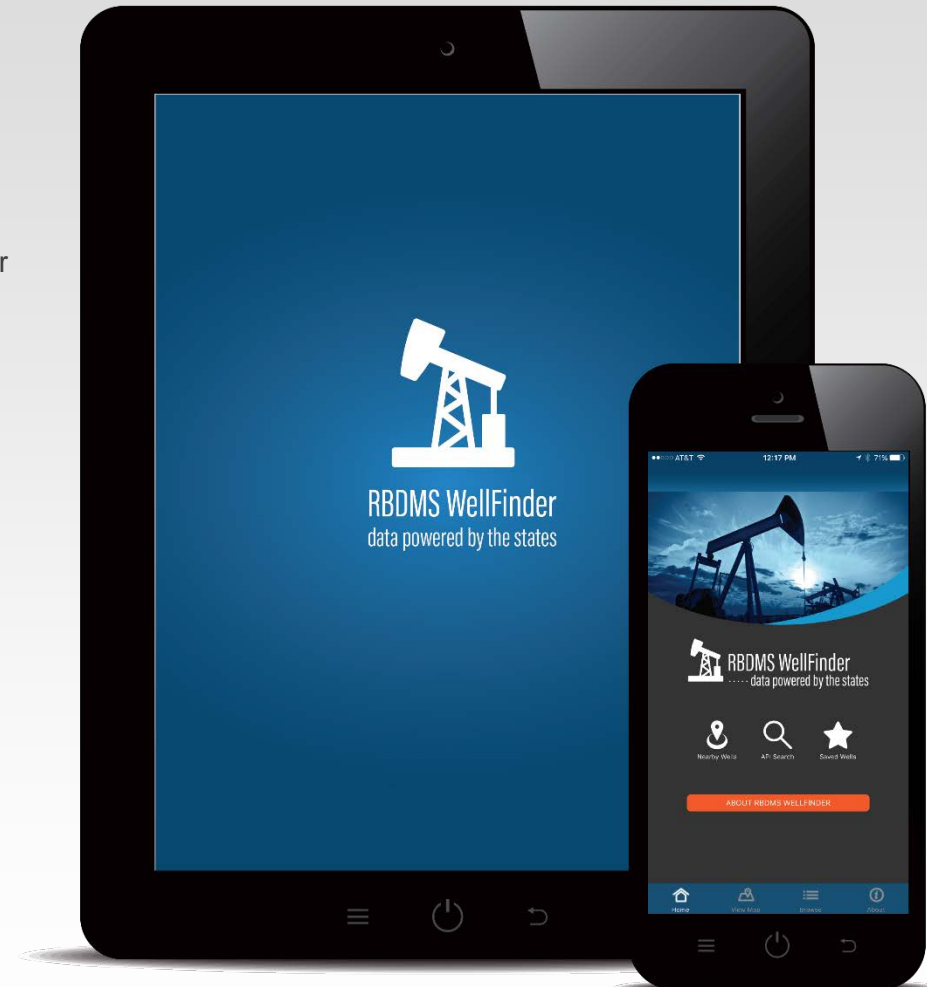
## Features

Search wells to display valuable data:

- API (permit) numbers
- Well type (oil, gas, injection, etc.)
- Well status (active or plugged)
- Operator contact information
- Recent & historical production data
- Regulatory agency contacts

## Usage

To date, WellFinder contains data for Oklahoma, Nebraska, New York, Arkansas, and Mississippi.





# Seismic Application

## Purpose

The Seismic Application queries data from multiple databases about specific underground injection wells and earthquakes. Agency staff enter search parameters to visualize well and earthquake data on a map, allowing for quick analysis and regulatory action.

## A Success Story: Seismic Application in Oklahoma

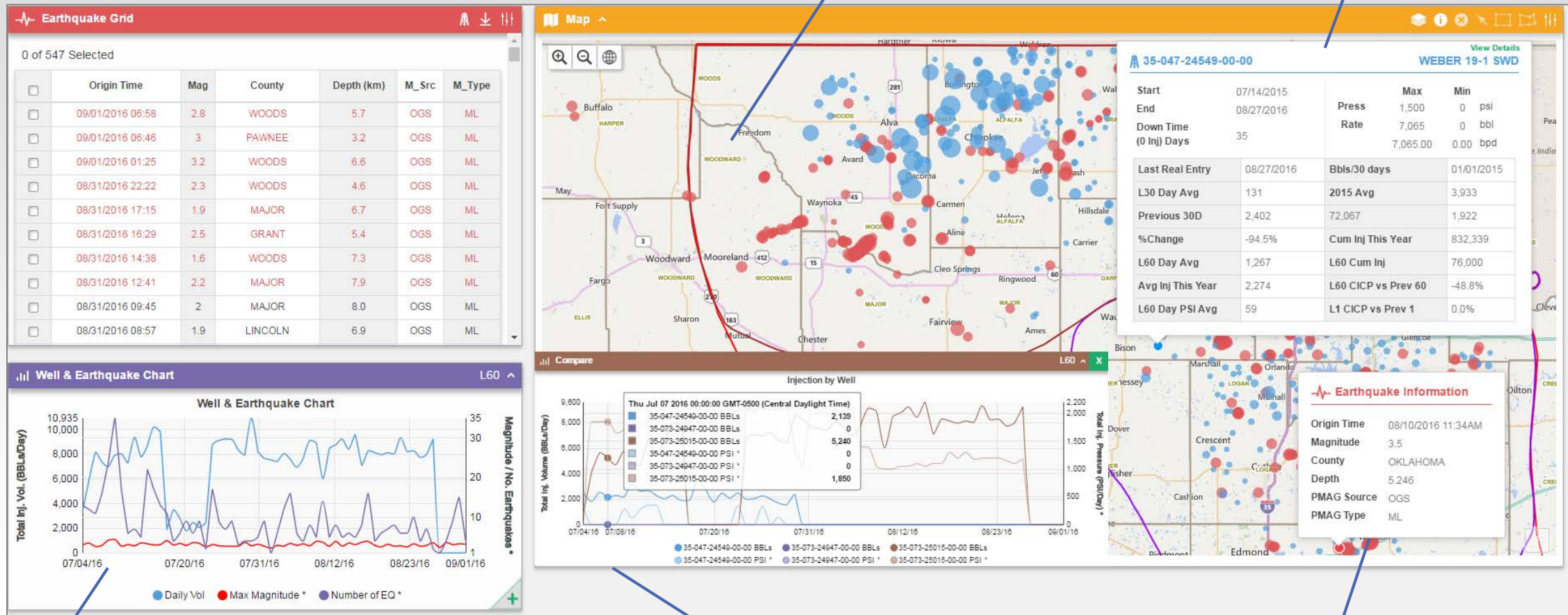
- In 2013, the state of Oklahoma experienced 109 magnitude 3+ earthquakes. In 2015, that number had increased by 732 percent to 907 magnitude 3+ earthquakes. In September 2014, Oklahoma Governor Mary Fallin formed the Coordinating Council on Seismic Activity. **The Council asked the GWPC to lead development of an application that would visualize data from injection wells and earthquakes on a map as well as isolate target wells and locations for analysis.**
- With the Seismic Application, Oklahoma Corporation Commission (OCC) staff have access to real-time data. [Work formerly taking 3 days now takes one staff member minutes, and serves as an essential tool for initial analysis of seismic concerns.](#)
- By reducing the amount of staff time necessary to analyze data, the OCC now has additional time for deeper analysis of present-day and historical seismic/production data, which helps to shape proactive and sound regulatory action if necessary, as well as to more easily verify operator compliance.
- As part of the RBDMS suite of products, the Seismic App is expanding its impact nationally. State regulatory agencies nationwide now have the opportunity to piggyback on Oklahoma's success by implementing the application in their programs.

# OK Seismic Application: Dashboard Features

Summary: Last 60 days\*  
547 Seismic Events

Graduated Symbols: Blue markers – Wells: Avg Daily Volume (60 days)  
Red markers – EQ Events: Magnitude

Well Volume Detail



# OK Seismic Application: Search Filters

Earthquakes listed in red text happened within 24 hours.

## Data Feed

UIC Data is from OCC via once a week report.

Seismic Data is from the Oklahoma Geological Survey and is updated every 20 minutes.

The screenshot displays the OKUICWELL application interface. The top section is titled "Earthquake Filters" and shows a table of 153 earthquakes. The table has columns for Date/Time, Depth, Mag, M\_Type, M\_Src, and County. The entry for 04/08/2016 12:33 is highlighted in yellow. Below the table is a "Well & Earthquake Chart" showing Max Magnitude (red line) and Number of EQ (blue line) over time. The bottom section is titled "Cumulatives" and shows Min Vol (blue line), Max Vol (red line), Avg Vol (green line), and Cumulative Vol (purple line) over time. On the right side, there is a "Well Filters" panel with various input fields for Latitude, Longitude, Address/City/State/Zip, City, County, Well Name and/or Number, Operator Name, API, Injection Interval Top/Bottom, Packer Depth, Permitted Max Pressure/Daily Rate, Cumulative Injection This Year, Down Time (zero injection volume) Day Count, Average Daily Injection This Year (only non-zero days), and Cumulative Injection Change % vs Previous Day. A blue arrow points from the text "Each module has a long list of filters for narrowing the list based on location, type, size, etc." to the Well Filters panel.

Date/Time	Depth	Mag	M_Type	M_Src	County
04/07/2016 03:29	8	3.7	ML	OGS	MAJOR
04/07/2016 03:37	5	3.6	ML	OGS	OKLAHOMA
04/08/2016 18:24	6	3.6	ML	OGS	GARFIELD
04/08/2016 17:55	5	2.9	ML	OGS	OKLAHOMA
04/08/2016 12:33	4	2.6	ML	OGS	WOODS
04/05/2016 19:53	7	2.8	ML	OGS	WOODS
04/05/2016 14:12	4	3	ML	OGS	LINCOLN
04/04/2016 19:35	8	2.6	ML	OGS	WOODS
04/04/2016 19:31	4	2.9	ML	OGS	NOBLE
04/04/2016 13:48	6	2.7	ML	OGS	LOGAN
04/04/2016 10:24	6	3	ML	OGS	NOBLE
04/03/2016 15:16	7	2.5	ML	OGS	NOBLE
04/03/2016 12:58	5	2.9	ML	OGS	PAYNE
04/03/2016 11:38	5	2.9	ML	OGS	PAYNE
04/03/2016 11:32	5	2.9	ML	OGS	PAYNE
04/03/2016 03:30	6	2.7	ML	OGS	WOODS
04/03/2016 23:04	24	2.7	M	OGS	CHEFROKFF

Each module has a long list of filters for narrowing the list based on location, type, size, etc.

# RBDMS Field Inspection (Coming Soon)

## Purpose

RBDMS Field Inspection is a web-enabled product designed to assist field inspectors in managing their inspections by minimizing data entry and maximizing their ability to document site details and problems.

## Features

- Offline capabilities
- Secure login
- Available for use in the field on laptops and tablets
- Communicates directly with RBDMS giving supervisors instant results
- Includes a risk matrix to help inspectors prioritize high risk wells
- Access to multilateral and FracFocus data

## Usage

Pilot tested in Utah, Michigan and California



Field Inspection Screen Images: Secure Log in & Facility/Pit Inspection Form

A screenshot of the "Field Inspection Identity Server" login screen. The background is a photograph of an oil pumpjack in a field under a cloudy sky. Overlaid on the image is a white login form titled "Field Inspection". The form contains fields for "Username" and "Password", a "Remember My Login" checkbox, and a blue "Login" button.A screenshot of the "Field Inspection" form interface. The top navigation bar includes "Field Inspection", "Locations", "Inspections", and a "Login" button. The main content area is divided into several sections: "Facilities" (a list on the left with items like Pit 66, Pit 70, Tank 68, Well 67, Well 69), "Inspection for" (with details for Facility Name: Pit 66, Facility Type: Pit, Facility Location: Garfield 045 60W, Operator Name: Troy Web Inc., Field Name: 9991), "Associated Facilities" (listing Well 67, Tank 68, Pit 70, Well 69), and a "Previous Inspection:" dropdown. The main form area contains various input fields and dropdown menus for inspection details, including Type (Pit Type B), Lined (Yes), Liner Comment (Anchored well and in good shape), Netting Type, 2+ Feet Freeboard (Satisfactory), Evaporative System, Pit Leakage Observed (No), Evidence of overfill (No), Lat, Liner Type (PVC), Liner Condition (Adequate), Netting Condition (Satisfactory), Anchor Trench Present (Yes), Evaporative System Condition, Pit Leakage comment, and Netting Comment. A status bar at the bottom indicates "Your computer is connected to the internet".

# National Oil & Gas Gateway





# FracFocus



# FracFocus



The screenshot shows the FracFocus.org Home Page. At the top left is the FracFocus logo with the tagline "Chemical Disclosure Registry". To the right is a navigation menu with links for "HYDRAULIC FRACTURING", "GROUNDWATER", "CHEMICAL", "REGULATIONS", and "FIND A WELL". The main content area features a large banner for "FracFocus 3.0" with the text "IT'S ALMOST HERE..." and a list of improvements: "Expand the public's ability to search records", "Improve data accuracy", and "Provide extraction of data in a 'machine readable' format". Below this is a "FIND OUT MORE" button. To the right is a "Looking for information about a well site near you?" section with a map of the United States and a "FIND A WELL" button. Below the map is a search prompt: "Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process." A counter displays "TOTAL WELL SITES REGISTERED" as "112839". At the bottom left, there is a "Full Data DOWNLOAD now available" section with a "More About Chemical Data" button. At the bottom right, there is an "FAQs" section with a "1/3" indicator and a question: "Solving the most common problems encountered in FracFocus".

FracFocus.org Home Page



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# FracFocus Disclosure Form Example

## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/6/2016
Job End Date:	10/3/2016
State:	Louisiana
County:	Red River
API Number:	17-081-21502-00-00
Operator Name:	Vine Oil & Gas LP
Well Name and Number:	Blackstone Minerals 35-2BHC#1
Latitude:	32.14923459
Longitude:	-93.36000789
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	12,530
Total Base Water Volume (gal):	20,544,846
Total Base Non Water Volume:	67,019



### Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Supplied by Operator	Base Fluid					
			Water	7732-18-5	100.00000	99.64477	
			Water	7732-18-5	81.00000	0.01776	
			Water	7732-18-5	70.00000	0.01419	
			Water	7732-18-5	75.00000	0.00741	
			Water	7732-18-5	90.00000	0.00612	
			water	7732-18-5	50.00000	0.00999	
HTLB-3	FTSI	Gel breaker					
			Listed Below				
CS-250 SI	FTSI	Scale inhibitor					
			Listed Below				
B-10	FTSI	High pH buffer					
			Listed Below				
BXL-2	FTSI	Borate crosslinker					
			Listed Below				
FRW-200	FTSI	Friction reducer					
			Listed Below				
Pump Kleen	FTSI	Pump and hose flush					
			Listed Below				

BXL-3	FTSI	Crosslinker				
				Listed Below		
HVG-1 4.0	FTSI	Water gelling agent				
				Listed Below		
Items above are Trade Names with the exception of Base Water. Items below are the individual ingredients.						
			Copolymer of acrylamide and sodium acrylate	25987-30-8	33.00000	0.06571
			Petroleum distillate hydrotreated light	64742-47-8	30.00000	0.05974
			Acrylamide P/W acrylic acid, ammonium salt	26100-47-0	25.00000	0.04978
			Petroleum Distillate	64742-47-8	55.00000	0.03990
			Raffinates, Sorption Process	64741-85-1	55.00000	0.03990
			Guar gum	9000-30-0	55.00000	0.03990
			Ammonium Chloride	12125-02-9	12.00000	0.02390
			Surfactant	Proprietary	7.00000	0.01394
			Hydrotreated heavy paraffinic	64742-54-7	5.00000	0.00996
			Sorbitan, monooleadecanoate, poly(oxy-1,2-ethanediyl) Sorbitan, monooleadecanoate, poly(oxy-1,2-ethanediyl) derivs.	9005-67-8	5.00000	0.00996
			Potassium carbonate	584-08-7	48.00000	0.00973
			proprietary (borate) Salt	1319-33-1	40.00000	0.00799
			Alcohols (C12-C14), ethoxylated	68439-50-9	4.00000	0.00797
			Alcohols (C12-C16), ethoxylated	68551-12-2	4.00000	0.00797
			Alcohols (C10-C16), ethoxylated	68002-97-1	4.00000	0.00797

			modified polyacrylate	Trade Secret	1.00000	0.00020
			polyanionic cellulose	9004-32-4	1.00000	0.00020
			Acrylamide	79-06-1	0.10000	0.00020
			Acrylic Polymer	9003-04-7	0.90000	0.00018
			Polysaccharide	11138-66-2	0.20000	0.00004
			crystalline silica, quartz	14808-60-7	0.05000	0.00001
			sodium chloride	7647-14-5	0.00500	0.00000
			Ethane-1,2-Diol	107-21-1		
			Sodium Borate	1303-96-4		
			Proprietary	Proprietary		

\* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

\*\*\* If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)



# FracFocus (Coming Soon)

- New Design
- Live statistical information
- Easy to navigate
- Responsive to smart phones and tablets
- Each search to pull well information directly into site
- Ability to download more detailed PDF report on each well

The screenshot shows the FracFocus website homepage. At the top left is the FracFocus logo with the tagline 'Chemical Disclosure Registry'. To the right are navigation links: 'FIND A WELL', 'EXPLORE', 'LEARN', and 'FOR OPERATORS'. The main content area has a green background with a map. It says 'WELCOME TO FRACFOCUS' and 'The national hydraulic fracturing chemical disclosure registry.' Below this is a search box with the text 'Find a well in your area' and a 'SEARCH' button. The search box also contains the placeholder text 'Enter an address, city or state' and a dropdown menu for 'Search by API or CAS number'. Below the search box is a blue button that says 'FracFocus celebrates its 5th anniversary →'. At the bottom of the main content area are three statistics: '130,251 TOTAL WELL SITES', '29 TOTAL STATES REPORTING', and '1,292 UNIQUE OPERATORS'. At the bottom of the page is a dark blue section titled 'OUR STORY' with the text: 'Since 2011, FracFocus has been growing a database of chemical disclosures, and prides itself on providing a one-stop, easy-to-understand public resource for consumers wishing to explore this data.'

# RBDMS.org

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ABOUT | PRODUCTS | PARTNER SUCCESS | NEWS | EVENTS | OIL & GAS DATA | CONTACT

## RBDMS: POWERFUL DATA & ANALYTICAL TOOLS FOR EFFECTIVE STATE RESOURCE MANAGEMENT

[LEARN MORE](#)

### RBDMS PRODUCTS

The RBDMS suite of products provide tools for all aspects of managing regulatory data related to oil, gas, underground injection control (UIC), water, and associated environmental data.

Task Name	Organization	Status	Workgroup	Assigned To	Due Date	Action
Review Well Schedule	Crude Production Co.	Not Started	UIC			Action
Approval/Check Agent Change (UIC)	WELLS (OIL, GAS) (UIC) (UIC)	Not Started	Agent Change			Action
Approval/Check Agent Change (Water)	Water (UIC) (UIC) (UIC)	Not Started	Agent Change			Action
Review UIC Administration Change	Crude Production Co.	Not Started	UIC			Action

- RBDMS Core
- RBDMS eForms
- RBDMS Data Explorer
- RBDMS Environmental
- RBDMS WellBore
- RBDMS Seismic
- RBDMS WellFinder
- RBDMS Field Inspection
- [View All Products](#)

### RBDMS Benefits

Built from the bottom-up by the system's users, RBDMS integrates years of experience in multiple states with data management and program best practices to address the ever evolving needs of state regulatory programs.

- Comprehensive**  
We are familiar with the many complex tasks involved in regulatory tracking
- Consistent**  
Years of experience has allowed us to help states develop reliable software
- Consolidated**  
Our network connects oil and gas regulators from across the country
- Community**  
RBDMS states have a whole community of people from across the



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# Produced Water As A Resource

*Identifying Opportunities & Challenges*



# GWPC's Interest in Produced Water

- By identifying opportunities and challenges of using produced water and offering options for addressing them, the GWPC hopes to facilitate the development of produced water as a supplement to freshwater resources and fulfill a part of our mission “to promote the protection and conservation of groundwater resources for all beneficial uses.”

# Produced Water Working Group

- Multi-stakeholder
- Goals:
  - To identify opportunities and challenges associated with utilizing produced water as a resource
  - To provide suggestions that policy makers, researchers, regulators and others can use to address these opportunities and challenges
- Timeline:
  - Project began mid 2017
  - Draft report to GWPC Board of Directors by early spring 2019



# A Unique Collaboration

- State Oil & Gas Regulatory Officials
- State Water Quality Regulatory Officials
- Environmental NGOs
- Industry
- Academics
- Others





# Developing Solutions: Modular Approach

## MODULE 01

### Regulatory & Legal Frameworks

This module describes the current legal and regulatory frameworks that address produced water. It also addresses changes that may need to occur to facilitate the use of produced water.

**Leadership:**

John Baza, Utah Division of Oil, Gas & Mining  
Shellie Chard, Oklahoma DEQ, Water Quality

## MODULE 02

### Produced Water Use in the Oilfield

This module describes the current uses and potential future uses of produced water inside the oilfield. It defines the existing constraints of use and identifies the opportunities and challenges of expanded use.

**Leadership:**

Tom Kropatsch, Wyoming Oil & Gas Commission  
Scott Kell, Ohio Department of Natural Resources

## MODULE 03

### Produced Water Use & Research Needs Outside the Oilfield

This module describes current and potential use of produced water outside the oilfield and identifies the research needs that will need to be addressed to facilitate expanded use.

**Leadership:**

Ken Harris, California Department of Conservation  
Nichole Saunders, Environmental Defense Fund



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## MODULE

# 01

## Regulatory & Legal Frameworks

This module describes the current legal and regulatory frameworks that address produced water. It also addresses changes that may need to occur to facilitate the use of produced water.

### Leadership:

John Baza, Utah Division of Oil, Gas & Mining  
Shellie Chard: Oklahoma DEQ, Water Quality

# Module 1

- **Regulatory Oversight – oil and gas activities for the most part are regulated at the state level either through state law or cooperative federalism based on state implementation of CWA, UIC, NPDES etc**
  - E&P wastes are exempted from RCRA – Resource Conservation and Recovery Act
  - Regulatory Framework – 2 regulatory programs most often historically associated with management of produced water are the NPDES and UIC permit programs
- **Regulatory Involvement throughout the Oil and Gas Water Cycle**
  - Ownership of water – state water rights
  - Transportation of water – trucks, pipelines, etc
  - Water storage
  - Hydraulic fracturing
  - Disposition of produced water
  - Beneficial use of produced water
- **State Regulations Relating to Produced Water Management vary from state to state as does data availability**
- **Legal and Policy Challenges to Beneficial Use**
  - Surface discharges under NPDES
  - Subsurface injection under UIC
  - Ownership when going from waste to resource
  - Water rights laws – what does/doesn't apply to produced water?
    - Riparian vs prior appropriation

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**Leadership:**

Tom Kropatsch: Wyoming Oil & Gas Commission  
Scott Kell: Ohio Department of Natural Resources

## Module 2

- Current water management practices – processing, storage, transportation, UIC disposal, treatment, reuse, solids management
- Challenges and opportunities related to water management – storage and ponds, transport (truck, pipe, right of way), water compatibility for various uses, water ownership and liability, regulatory hurdles, residuals management
- Current and evolving business models and trends – water management choices / decision tree, trend toward multi-company sharing, emergence of mid-stream companies for water, access to local and mobile treatment options and/or centralized treatment
- Research needs to facilitate faster growth of use – current tech, emerging tech, next gen tech for recycling; treatment and pre-treatment technologies, potential products: lithium, iodine, etc that can be pulled out of produced water
- Policy initiatives that have or can facilitate faster growth of use – regulatory improvement, public data gaps, research needs

# MODULE 03

## Produced Water Use & Research Needs Outside the Oilfield

This module describes current and potential use of produced water outside the oilfield and identifies the research needs that will need to be addressed to facilitate expanded use.

### Leadership:

Ken Harris: California Department of Conservation  
Nichole Saunders, Environmental Defense Fund

## Module 3

- The most complicated and forward looking piece
- Some small scale efforts exist
- Moving with caution
- Research needs on all fronts – environmental impact

# Questions?

## Annual Forum: New Orleans – Sept. 10-13



- Produced Water Track – Three sessions focusing on legal & regulatory frameworks and use inside AND outside the oilfield
- Federal updates
- Water quality/quantity monitoring and “big data”
- Emerging groundwater contaminants
- Preliminary agenda now online
- Registration coming soon!