

Risk-Based Data Management System (RBDMS), FracFocus, Produced Water, and Related Initiatives

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Ground Water Protection Council

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National Energy Technology Laboratory
Resource Sustainability Project Review Meeting
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Agenda

- Who is Ground Water Protection Council (GWPC)
- What is RBDMS
- RBDMS Applications
- Current Project Highlights

Who is GWPC

The GWPC is

the national (U.S.) association of state ground water protection agencies including both water and oil and gas regulatory programs.

The GWPC Mission is

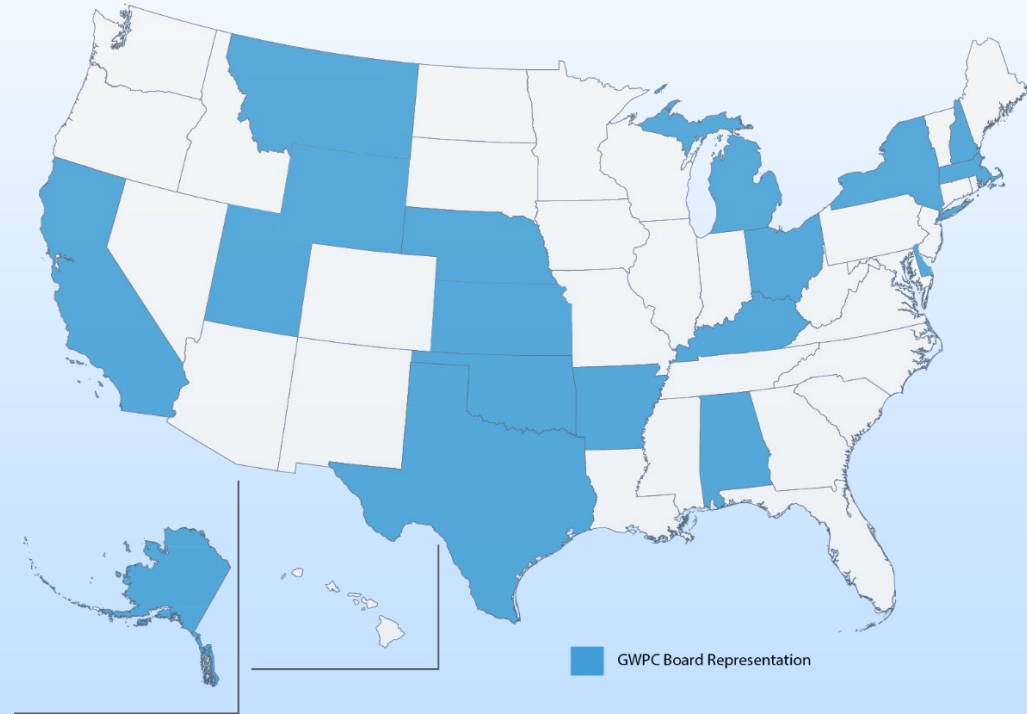
to promote the protection and conservation of groundwater resources for all beneficial uses, recognizing ground water as a critical component of the ecosystem. We provide an important forum for stakeholder communication and research in order to improve governments' role in the protection and conservation of groundwater.

The GWPC Board of Directors is

comprised of senior state agency managers including representatives of state regulatory agencies responsible for groundwater protection and underground injection activity.

The GWPC helps

states fulfill their ground water protection missions.

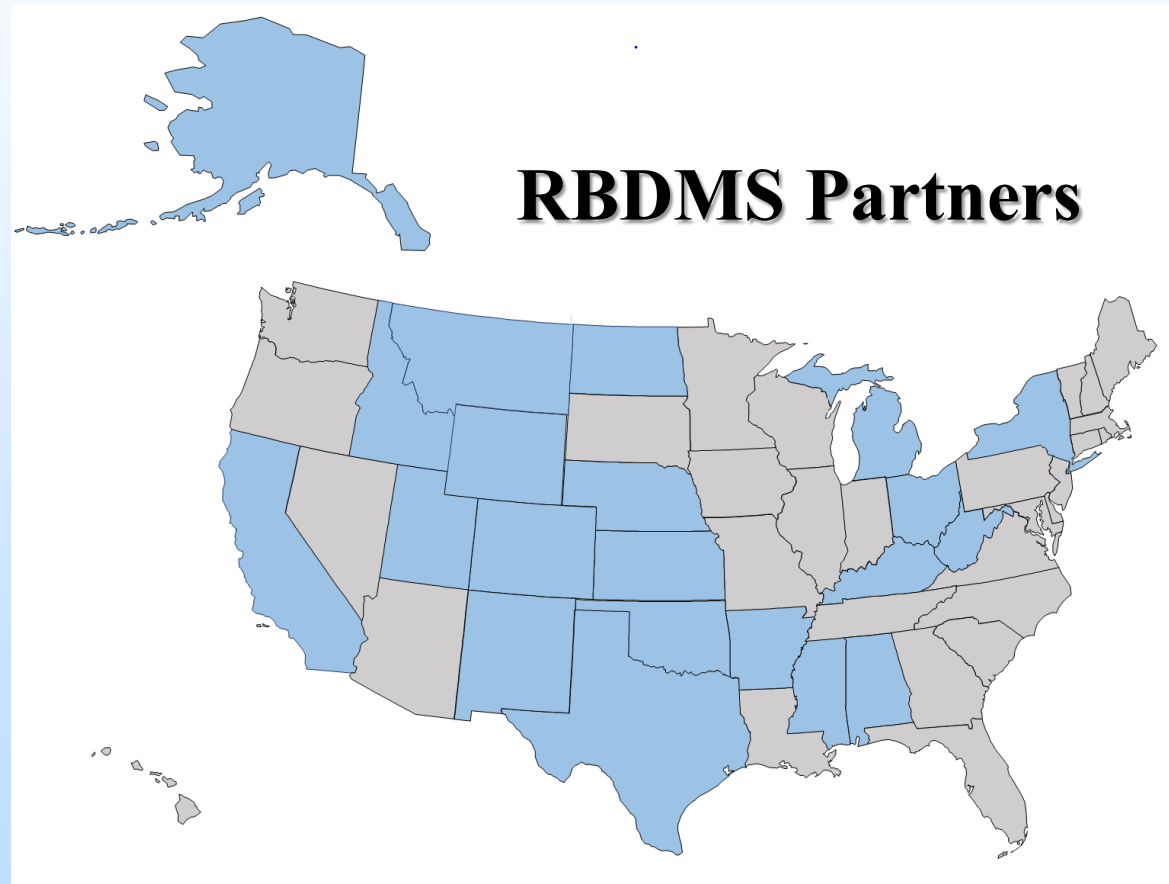


What is RBDMS

RBDMS

A suite of integrated modularized software products that assists regulatory agencies in the effective regulation, oversight and management of oil, natural gas and underground injection control (UIC), facilities, activities and related water quality/quantity data.

- Designed to meet the unique and evolving needs of regulators and industry
- Full well-life-cycle data management
- Public disclosure/transparency



RBDMS - Products



Core

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



WellFinder Application

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



eForms

eForm allows for electronic permitting and reporting between the industry and regulator



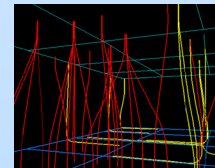
Data Explorer

Provides an interactive mapping interface and robust data exploration options for all stakeholders



WaterSTAR

Manages field observations, water sampling, and other matrix data



AOR: Calculates wells in AOR, displays directional in map interface

RBDMS – Products, con't



UIC Electronically tracks all aspects of UIC



Field Inspection

Allows agency field inspectors to make real-time critical decisions while performing a field inspection with industry representatives



Seismic Monitoring

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



GIS Interface

Map interface with all RBDMS products



Underground Gas Storage

Tracks compliance of UGS



Class VI (under development)

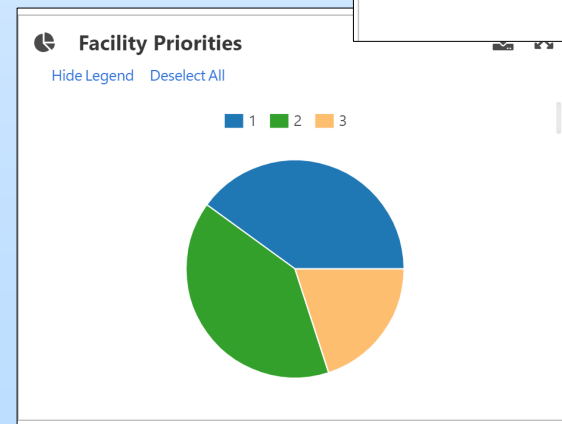
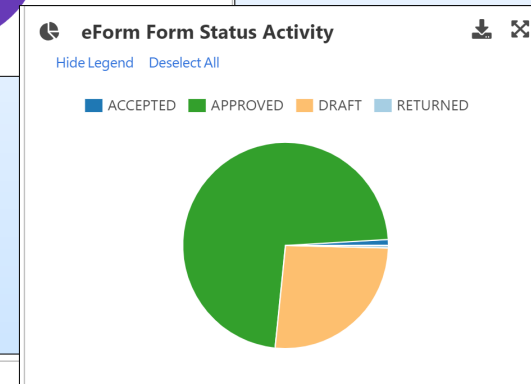
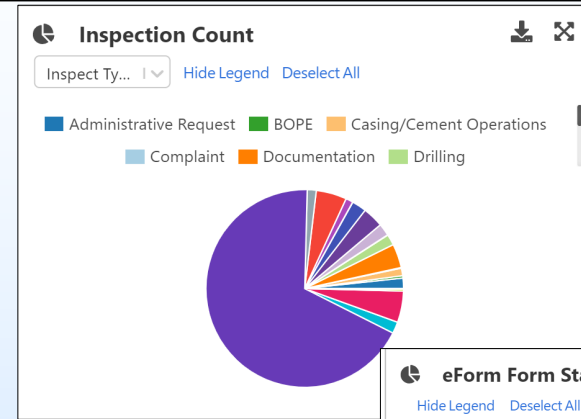
Permitting, compliance, inspection, monitoring, data visualization

Additional RBDMS Applications

- RBDMS Dashboard
- RBDMS plugging/reclamation module (under development)
- Class VI/CCUS under development
- WellBore Schematic/ Diagram Tool
- Directional Survey Import Tool
- Laterals and 3D visualization
- Field Inspection Prioritization
- Compliance tracking
- Security

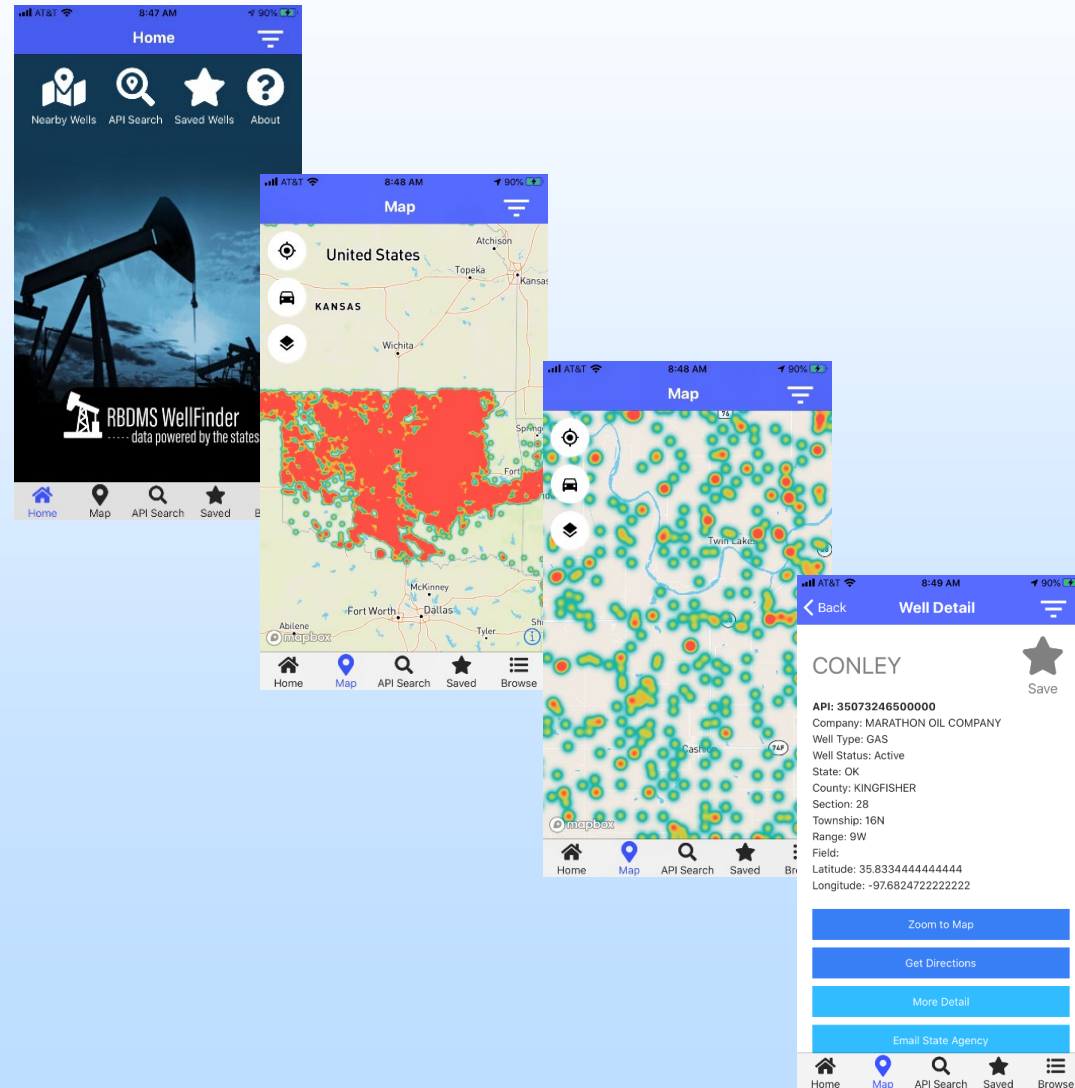
Related Products

- FracFocus
- WaterSTAR: stores and manages all state water quality and other matrix data
- RBDMS Training/Webinar series

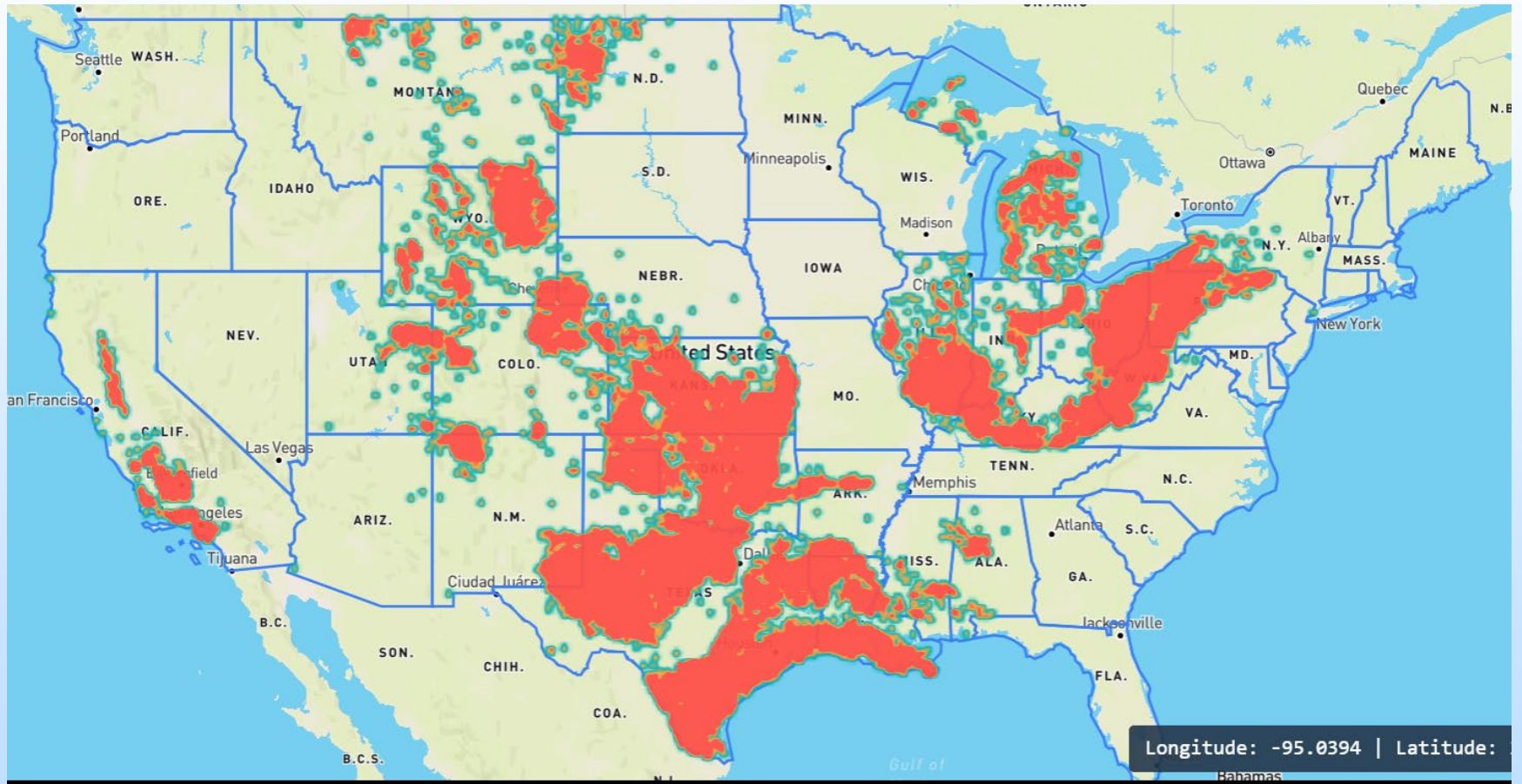


RBDMS WellFinder

- Mobile application available to Public, State agencies, and industry users
- Offline capability
- Links with State RBDMS system for more details
- Interfaces with FracFocus



WellFinder.net



FracFocus

National Hydraulic Fracturing Chemical Disclosure Registry

- National Program managed through single application
- Regulatorily required by 25 State Oil & Gas Agencies
- Public Transparency of Chemical Data Used during Fracturing
- Approaching 200K submissions since 2011
- Proposed Development to track Water Source data
- Provides for tracking Federal & Indian Wells
- Integrating with WellFinder
- Full Data Download available



WaterSTAR

Capabilities of WaterSTAR:

- Laboratory Information Management System
 - Track Pre- and Post-Clean up samples
 - Media: (Water, Soil, Air, +)
- Visualization Tool to Provide Transparency
 - GIS Interface
 - Dashboard Analysis of Data
 - Long-term monitoring as needed



Current Project Goals



Assist states to more effectively manage and utilize data to make timely and well-informed decisions



Improve agency and public access to state oil, gas, UIC, and carbon management data



Upgrade data management features providing for required regulatory functions such as; AoR, Production, Class II, and Class VI injection wells



Provide states, public, and operators with data visualization and data dashboard tools




Provide information and data exchange among and within state agencies




Upgrade and maintain FracFocus

Current Project Goals, con't

 Update and expand WaterSTAR data management tools

 Expand training for states and build state a capacity to implement, manage, and utilize RBDMS applications

 Aid states to fulling manage their individual RBDMS applications

 Convene and aid states to develop and implement policy and program goals

 Help states address emerging challenges such as hydrogen and CO₂ storage, managing increased use of geothermal resources, and managing water and laboratory data

Current Project Objectives



Upgraded Forms Creation – help states with the tools and skills to create their own forms and reduce the cost of form development across states and programs



Build capacity within states through training



Maintain FracFocus and provide user training on the new release



Address data management needs for carbon storage/Class VI UIC



Facilitates state water data management that encourages data sharing for water and energy decision makers

RBDMS Core

Project Accomplishments & Active Development

Data management systems for agency oil, gas & UIC data

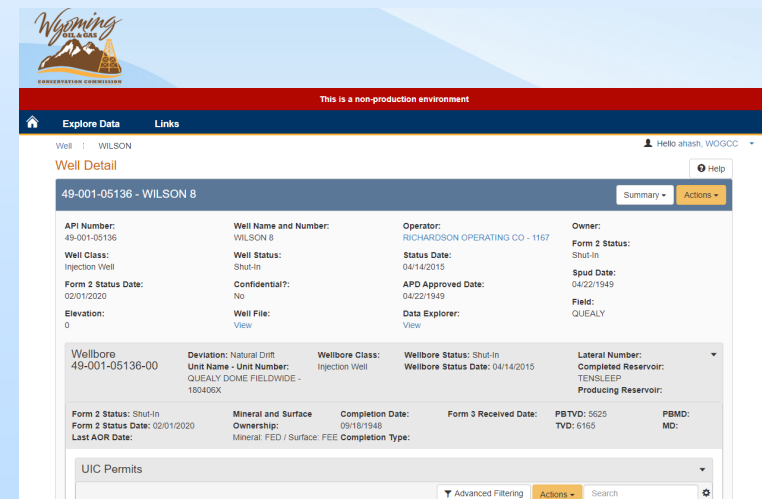
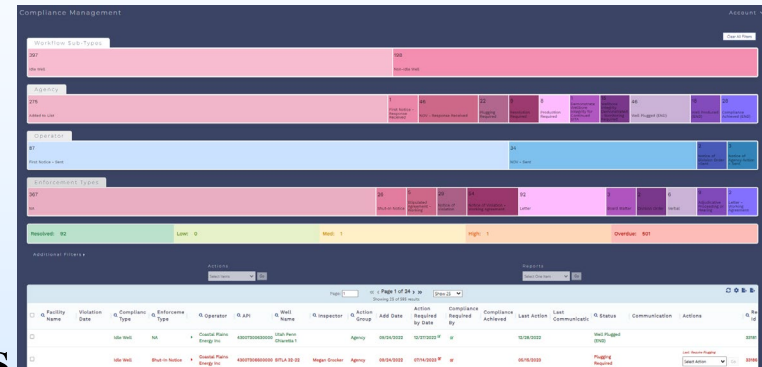
- RBDMS – Agency Data and Program Management System
 - Primary application for managing agency data
 - Enhancing & configuring for KEEC (KY); uses NOGCC (NE)'s version as the development base
- RBDMS Plugging Management – Orphan Well Management System
 - Ancillary application to manage the procedures associated plugging orphan wells and automatically generate the DOI report
 - Initially developed for KEEC (KY); enhanced & configured for WOGCC (WY) and ADEQ (AZ)
- RBDMS Editor – Agency Data Editing System
 - Expanded base application to include a separate module for editing well, operator, bond and other data which allows agency's to retire legacy Excel spreadsheets and GIS interface they have been using to date.

RBDMS Core, con't

Project Accomplishments & Active Development

Data management systems for agency oil, gas & UIC data

- RBDMS Workflow – Compliance Tracking System
 - Ancillary application to track and manage compliance matters, and prioritize the efforts related to compliance tasks
 - Enhancing for UDOGM (UT)
- RBDMS 3.0 – Agency Data Management System
 - Primary application for managing agency data
 - Enhancing & configuring for WOGCC (WY); uses DOGGR (CA)'s version as the development base



eForms

Project Accomplishments & Active Development

Electronic forms system for operator reporting and agency review

- eForm
 - Application Upgrade
 - WOGCC (WY): UIC Water Analysis Report & Enhanced APD
- Online Forms
 - MSOGB (MS): Production Report; uses AOGB (AL)'s Production Report as the development base
 - WOGCC (WY):
 - Updated Rig Schedule
 - Directional Survey; uses DOGGR (CA)'s UIC Permit as the development base
 - UIC Permit; uses DOGGR (CA)'s UIC Permit as the development base
 - Monthly Disposal Well Report; uses AOGB (AL)'s Disposal Report as the development base

Additional RBDMS Applications

Project Accomplishments & Active Development

- Field Inspection – Field Inspection Management System
 - Developed for KEEC (KY); uses DOGGR (CA)'s version as the development base
- Data Explorer – Data Viewing System with GIS Component
 - Configured for ADEQ (AZ), AOGCC (AK), and OCC (OK)
- Dashboard / AOR – Aggregate Data Viewing System with GIS Components
 - Configured for ADEQ (AZ), MIOGMD (MI), OCC (OK), and WOGCC (WY)
 - Initial development of CarbonSTAR (Class VI)

Viewing Data in RBDMS

WellSTAR Field Inspection

Home Search Create Facility Backup & Restore **ONLINE** Login

Inspection Queue

Actions: Ready Mark All Inspections Ready

Search... Advanced Filtering Reset Filter Columns

Inspect	Ready	ID	P...	Inspect...	Form ...	Subject...	Type	Operat...	Name ...	Sec	Letter	CQ	County	Field	Lat/Long	Status	Last In...	Quadr...	Map
		3	104704			10057073 330000	Well	PARAGON TRADING CO, LLC	CARTER, CLINT HERS C/O	20	D	48	Cumberla nd		36,7726 / -85,5089	Plugged and Abandone	11/27/201	DUBRE	

Oklahoma Corporation Commission (OCC) Division of Oil and Gas Conservation Data Explorer

Inspect Search Map

Search: Well Filter Input...

API: Filter Input...

Well Name/No.: Filter Input...

Operator: Filter Input...

Well Type: 20 INJECTION

Well Status: Filter Input...

Lease Name: Filter Input...

Location: Filter Input...

Select Country: Filter Input...

Section: Filter Input...

Township: Filter Input...

Trap Dir: Filter Input...

Range: Filter Input...

Buffer: 5000

Select the features from the selected layers that are within 5000 of the currently selected features.

Buffer Cancel

Michigan - Production Information

Total Oil Production BBL: 4,570,946

Total Gas Production MCF: 61,101,320

Total Water Production: 39,623,513

Oil Production Map Gas Production Map Water Production Map

Production Grid Gas Production Grid Water Production Grid

Wyoming UIC AOR - Prod AOR Permit Details

UIC Permit Form ID	UIC Permit Operator	UIC Permit Type	UIC Permit Well Count	Application Type	Docket Number	Received Date	UIC Permit Approval Date
693	UNICORN DRILLING INC	Disposal	Individual	1	Hearing	03/13/2024	03/11/2024

CarbonSTAR - CO2 Plume

AOR Cross Section Tool

CO2 Saturation - Higher CO2 Saturation - Lower CO2 Saturation - Medium Injection Well Monitor Well Perforations

CO2 Saturation %

- 1st Percentile: 9.91432E-07 - 9.9928E-07
- 2nd Percentile: 9.9928E-07 - 9.9969E-07
- 3rd Percentile: 9.9969E-07 - 0.457461

AOR 3D Map

AOR Wellbores UIC Permit Wellbores Perforations Casing-Cement Injection Zones Other Zones AOR Elevation (Surface Hole)

AOR 2D Map

AOR Wells UIC Permit Wells AOR

AOR Wells

UIC Well API Number	AOR Well API Number	AOR Well Name	AOR Well Class	AOR Well Status	Distance from UIC Well (ft)	AOR Radius (ft)	In Iq Zone?	AOR Total Well Depth	SHE Sec	SHE Top	SHE Rpt	Review Date	Count of Pending Identified Actions
49-005-28884-00	49-005-21929-00	AZTEC-FEDERAL 33-4	Oil Well	Permanently Abandoned	1,715	5,000	Yes	9,591	35	48N	T0W	03/11/2024	2
48-005-10064-00	45-005-76261-00	7777AA 14-11	Oil Well	Permanently Abandoned	1,654	4,000	Yes	9,707	14	40N	T0W	03/11/2024	1

WaterSTAR

Project Accomplishments & Active Development

Laboratory Information Management System

- NDEE (NE): updating to include QA enhancements and a new form for adding sites in bulk
- WYDEQ (WY) WaterSTAR: enhancing to include injection volume and pressure data
- ALGSA (AL): enhanced and configured to include water level measurements; uses NDEE (NE)'s version as the development base
- COECMC (CO) WaterSTAR: enhancing and configuring to include additional matrices and laboratory data; uses ALGSA (AL)'s version as the development base
- WaterSTAR National: enhanced and configured to display NWIS water measurements
- CarbonSTAR (Class VI): developed prototype for Class VI-related data

Viewing Data in WaterSTAR

The image displays several key components of the WaterSTAR interface:

- Map Explorer:** A central map showing a distribution of sampling points color-coded by nitrate concentration. A pop-up window for a specific well provides details:

Clearinghouse Number:	8282
DNR Registration Number:	G-03923
DNR Link:	View
Well Depth (Feet):	245
Well Type:	Irrigation
Sample Count:	4
Last Sample Date:	2014/07/25
Nitrate Overview	
Min:	5
Max:	15
Mean:	9.1
Median:	8.1
- Details Panel:** Provides comprehensive information for a selected sampling point, including location, facility details, and measurement history.

Sampling Point	Location
RIBOMS ID: 1483172	County: Travis
Sampling Point Name: WVS-039-040 INJECTATE	Township/Range/Section: 47N17W04
Sampling Point Type: Inflow Injection	Latitude (NAD83): 41.512471
UIC Well Class: 1	Longitude (NAD83): -112.93922
State V Subclass: National Aquifer	
Program: 0304	
Well Depth (Feet): 0.1	
National Aquifer:	
Facility Information	Sample Overview
Facility Name: WMTT (Pilot Plant Injection Well System)	Sample Count: 1752
Facility Number: WVS-039-040	Last Sample Date: 2022/10/24
Facility Type: Unknown or Unspecified	
Facility Permit Number: 15-370	
Pressure Volume Overview	MIT Overview
Measurement Count: 38	MIT Count: 1
Total Injection Volume to Date: 0	Last MIT End Date: 2020/05/13
- Water Level Chart:** A time-series plot showing depth to water (ft) from 0.04 to 18.04 over the period 07/19/1993 to 11/09/2019. It features multiple data series for wells BAL-2, BAL-3, and BAL-5, with a vertical dashed line indicating a measurement date of 09/21/2010.
- Site Explorer:** A table listing various sites with their respective details:

GSA ID	Site Type	County	Applied Filters is NQWMA = Yes, Wa	Section Township Range
BAL-2	Observation	Lee		27 18N 25E
BAL-2	Observation	Baldwin		11 9S 4E
BAL-3	Observation	Baldwin		11 9S 4E
BAL-5	Observation	Baldwin		29 7S 4E
CHO-1	Observation	Choctaw		11 11N 5E
COL-1	Observation	Colbert		30 3S 10W
COV-1	Agricultural	Covington		4 1N 15E
DLE-1	Observation	Dale		30 5N 25E
DLE-2	Domestic	Dale		13 7N 24E
GEN-1	Observation	Geneva		11 2N 21E
GRE-3	Observation	Greene		33 22N 2E
HAI-1	Observation	Hale		16 20N 5E
HOU-1	Observation	Houston		28 1N 30E
JAC-2	Observation	Jackson		29 4S 6E
JEF-1	Observation	Jefferson		29 18S 3W
JEF-2	Observation	Jefferson		24 16S 1W
LAW-1	Observation	Lauderdale		33 2S 11W
LIM-4	Observation	Limestone		5 5S 4W
MAD-2	Observation	Madison		13 4S 1W
MAR-1	Observation	Marion		24 18N 2E
MAR-1	Observation	Marion		32 12S 13W
- Table Explorer:** A table listing groundwater samples with columns for Facility Permit Number, Sampling Point Type, National Aquifer, Township, Range, and Section.

Facility Permit Number	Sampling Point Type	National Aquifer	Township	Range	Section
	Groundwater Sample	25N	61W	31	
	Groundwater Sample	Alluvial aquifers	23N	94W	2
	Groundwater Sample	49N	89W	8	

Other Projects & Reports

- Modern Oil & Gas Development: 2023 Update
- Produced Water Report: Regulations & Practices Updates (2023)
- State Oil & Natural Gas Regulations Designed to Protect Water Resources (4th Edition)
- Produced Water Volumes and Management Practices
- Characterization of Elements of Interest in Subsurface Brines, Oilfield Produced Waters, and Waste



Do you have any questions?

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