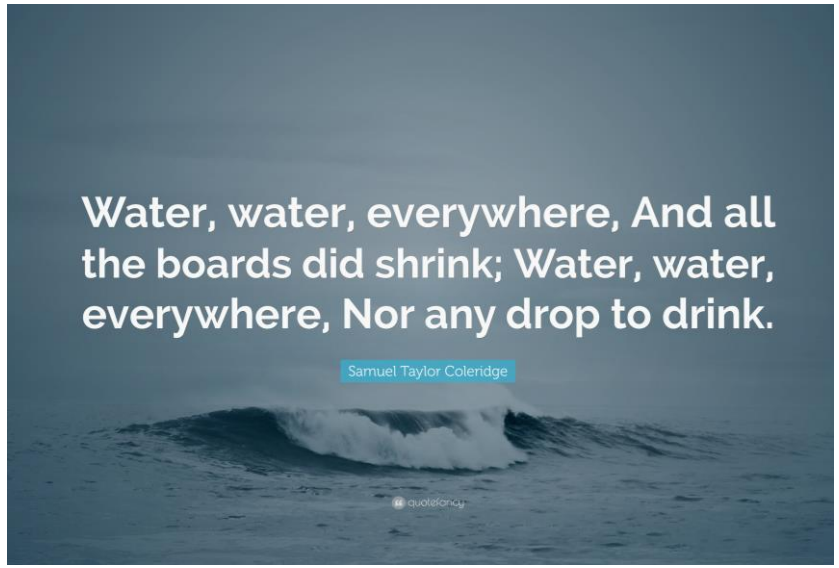
“Water, water everywhere..”

John T. Romero, Water Resource Allocation Program (WRAP) *and* Water Rights Division Director

Jerri L. Pohl, Statewide Projects Supervisor for WRAP

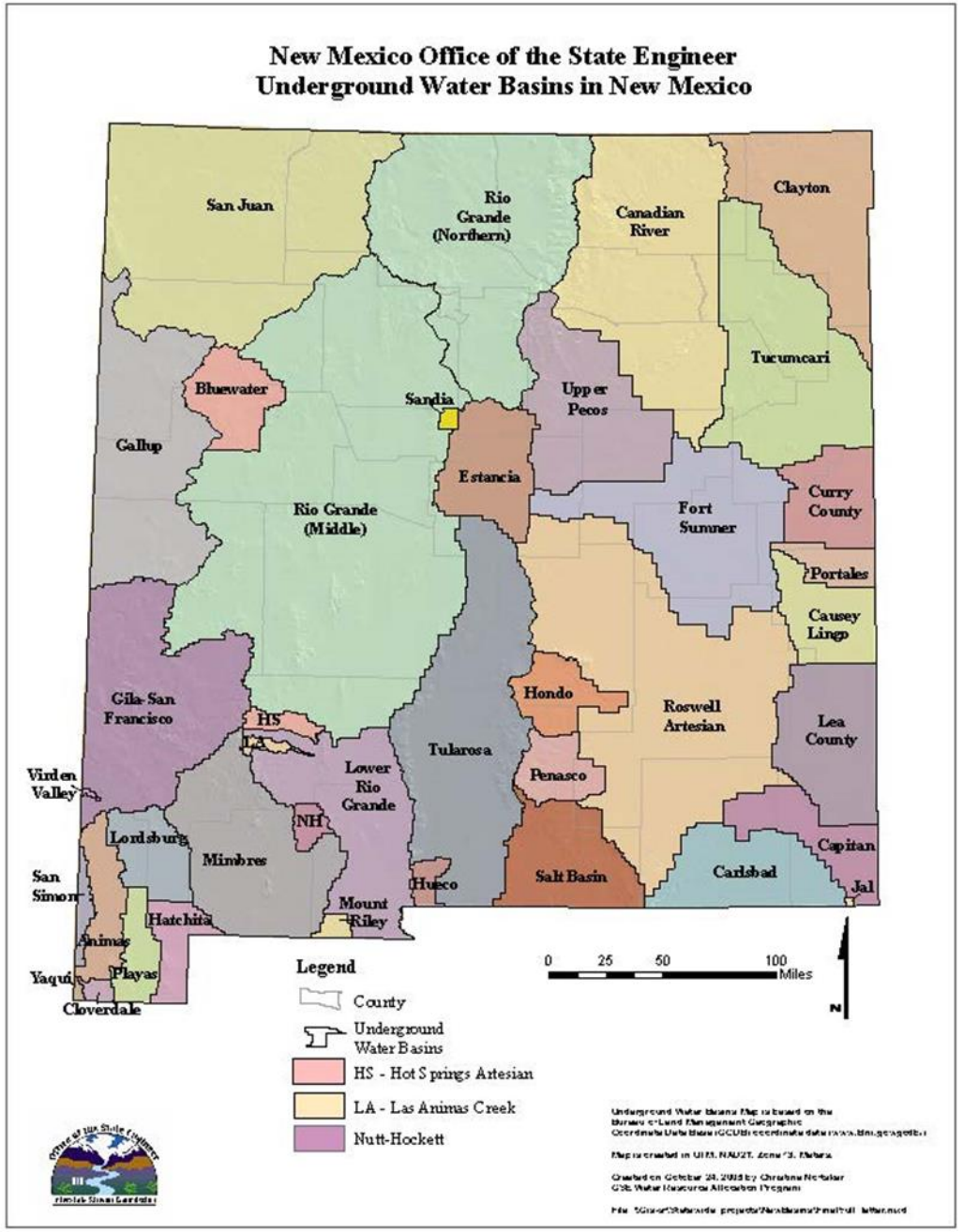
Office of the State Engineer
nm
Interstate Stream Commission



OSE MISSION STATEMENT

The Office of the State Engineer is charged with administering the state's water resources. The State Engineer has power over the **supervision, measurement, appropriation,** and **distribution** of all surface and groundwater in New Mexico, including streams and rivers that cross state boundaries.

NEW MEXICO DECLARED BASINS



STATE ENGINEER'S POLICY STATEMENT

The Interstate Stream Commission, of which the State Engineer is the Secretary, has the statutory duty …

"to investigate water supply, to develop, to conserve, to protect and to do any and all other things necessary to protect, conserve and develop the waters." NMSA 1978, § 72-14-3.

"New Mexico is at the forefront of addressing the challenges presented by climate change and increasing aridity of the Southwest."

Mike Hamman PE- 2022

Q & A

Q: Is there any hope in finding new sources of water?

A: Desalination technology is proving to be very promising as a means to finding new sources of water. There is potential for potable water to be created from the state's estimated supplies of about 15 billion acre-feet of brackish water. Since about 4 million acre-feet is the amount of water used annually by current water users, this could provide an abundant water supply for the future when the cost of such technology becomes more affordable. An expansive desalination demonstration pilot program is already in the planning stages for the Tularosa Basin in southern New Mexico. It can only be accomplished by working in partnership with our national laboratories, universities, and congressional delegation.

NEW MEXICO WATER SUPPLY

Fresh water accounts for approx. **25%** of supply.

NM Bureau of Geology and Mineral Resources estimates **75%** of the available water is **unusable** without treatment.

(Open-File Report 583 – June 2016)

USGS DEFINITIONS

Freshwater - Less than 1,000 ppm

Slightly saline water - From 1,000 ppm to 3,000 ppm

Moderately saline water - From 3,000 ppm to 10,000 ppm

Highly saline water - From 10,000 ppm to 35,000 ppm

New Mexico Classification

"Nonpotable water", for the purpose of Sections 72-12-25 through 72-12-28 NMSA 1978, means water containing **not less than** 1,000 **parts per million** (ppm) **of** total dissolved **solids** (TDS).

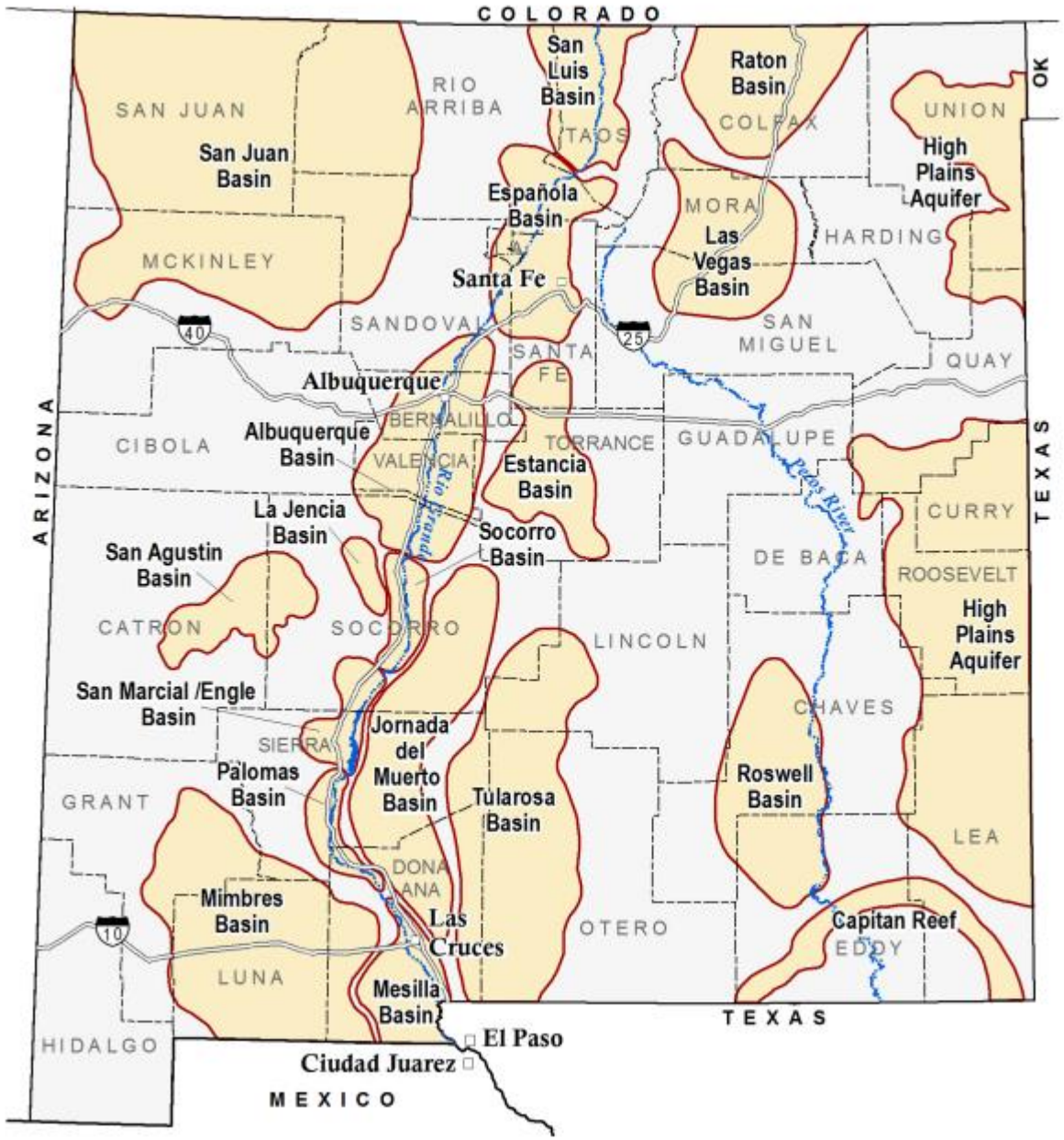
Potable Water < 1,000 ppm TDS.

Brackish – TDS in excess of acceptable limits for potable purposes. Treatable up to 10,000 mg/L TDS for drinking water. (USGS classifies as slightly to moderately saline)

Brine water – over 10,000 ppm TDS.

BRACKISH AQUIFERS

"The most saline water is found at shallower depths, and in some basins we observe an almost exponential decrease in dissolved solids at greater depths."



NMBGMR Open File Report 583, June 2016

Example of this in Taos area – San Luis Basin

New Mexico is still left with large data gaps across the state.

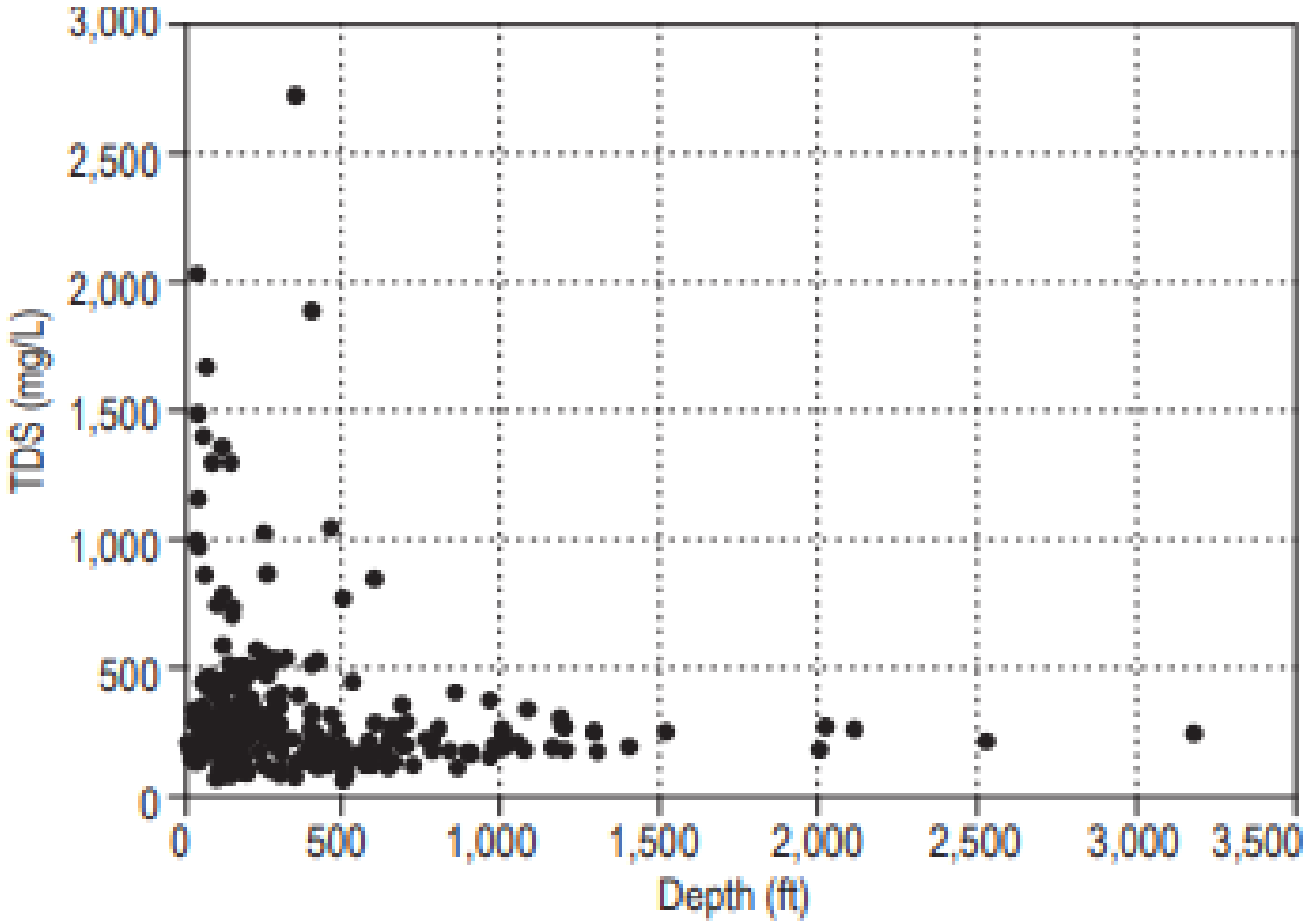


Figure 3A. San Luis Basin, Depth vs. TDS.

NMBGMR Open File Report 583, June 2016

PERMITTING

If the top of the Aquifer is less than 2,500 feet below ground surface (**bgs**) you must complete the normal groundwater appropriative process (pursuant to §72-12-3 NMSA) as all "shallow" basins have been declared.

If the top of the Aquifer is 2,500 feet **bgs** or greater *and* TDS is > 1,000 ppm – the deep aquifers are **not yet declared.** So, this well qualifies under §§ 72-12-25 thru 28 NMSA.

Appropriation from *less* than 2,500 ft bgs

All shallow GW Basins/Aquifers have been declared by the State Engineer.

A permit is required to appropriate or transfer a water right.

Applications are subject to **impairment analysis**, **public welfare** and **conservation** considerations and if approved, a completion of **proof of beneficial use**.

Appropriation from 2,500 ft bgs or greater

No Deep GW Basins/Aquifers have been declared by the State Engineer. Applicants must file **Notice of Intent (NOI)** to appropriate water with OSE.

Notice is given to the public via newspapers and protests must be filed in District Court.

Applicant must file an **Artesian Plan of Operation** and an **application to drill** the deep well. The well will be subject to **inspections** and approval of construction **prior to OSE authorization** to pump.

DEEP WELL NOTICE OF INTENT (NOI)

72-12-25. Declaration of basin; nonpotable deep aquifers.

A. An undeclared underground water basin having reasonably ascertainable boundaries that consists of an aquifer, the top of which aquifer is at a depth of two thousand five hundred feet or more below the ground surface at any location at which a well is drilled and which aquifer contains only nonpotable water, is subject to state engineer administration in accordance with Sections 72-12-25 through 72-12-28 NMSA 1978.

B. If the state engineer declares the type of underground water basin described in Subsection A of this section, all appropriations of nonpotable water from that basin for:

(1) oil and gas exploration and production, prospecting, mining, road construction, agriculture, generation of electricity, use in an industrial process or geothermal use shall remain subject to Sections 72-12-25 through 72-12-28 NMSA 1978; and

(2) all other uses shall be subject to Sections 72-12-1 through 72-12-24 NMSA 1978.

C. "Nonpotable water", for the purpose of Sections 72-12-25 through 72-12-28 NMSA 1978, means water containing not less than one thousand parts per million of dissolved solids.

File Number: _____
(For OSE Use Only)

NEW MEXICO OFFICE OF THE STATE ENGINEER

NOTICE OF INTENTION TO DRILL WELLS OR RECOMPLETE EXISTING WELLS TO APPROPRIATE NONPOTABLE GROUNDWATER FROM AN AQUIFER THE TOP OF WHICH IS AT A DEPTH OF 2500 FEET OR MORE PURSUANT TO NMSA 1978 §§ 72-12-26 and 27

1. **FILER OF NOTICE (required):**

Name: _____ Phone: _____
Contact: _____
Address: _____

Party on whose behalf the notice is being filed; required if different from filer **(required):**

Name: _____ Phone: _____
Contact: _____
Address: _____

2. **SOURCE OF WATER (required):**

Deep Nonpotable Underground Water Basin: _____
Target Aquifer(s): _____
Estimated depth to top of aquifer (feet): _____
Estimated total dissolved solids content (parts per million): _____

Please provide as "Attachment A" a description of the target aquifer and overlying confining strata, geologic cross sections of the target aquifer and overlying confining strata, and a map showing the lateral extent and depth of the target aquifer and overlying confining strata. Also include any other studies that form the basis for the contention that the target aquifer meets the criteria of 72-12-25 NMSA, addressing total dissolved solids content of the target aquifer groundwater, and hydraulic separation of target aquifer from shallower aquifer systems and surface water. "Attachment A" is required for this form to be complete and the NOI accepted for filing by the state engineer.

3. **OWNER OF LAND ON WHICH WELL IS TO BE LOCATED (required):**

Name: _____ Phone: _____

If not the same as the filer or appropriator, the access agreement(s) granting the filer and/or the appropriator the right of entry and permission to construct the well(s) for which this Notice of Intention (NOI) is being filed must be submitted as "Attachment(s) B" to this form for this form to be complete and the NOI accepted for filing by the state engineer.

4. **LOCATION OF WELL (A, B, or C required, D and E required if known):**

A. X = _____ feet, Y = _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.
U.S.G.S. Quad Map _____

B. Latitude: _____d _____m _____s Longitude: _____d _____m _____s

C. East _____ (m), North _____ (m), UTM Zone 13, NAD __ (27 or 83)

D. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

E. Lot No. _____, Block No. _____ of Unit/Tract _____ of the _____ Subdivision recorded in _____ County.

Do Not Write Below This Line

File Number: _____
Trn Number: _____

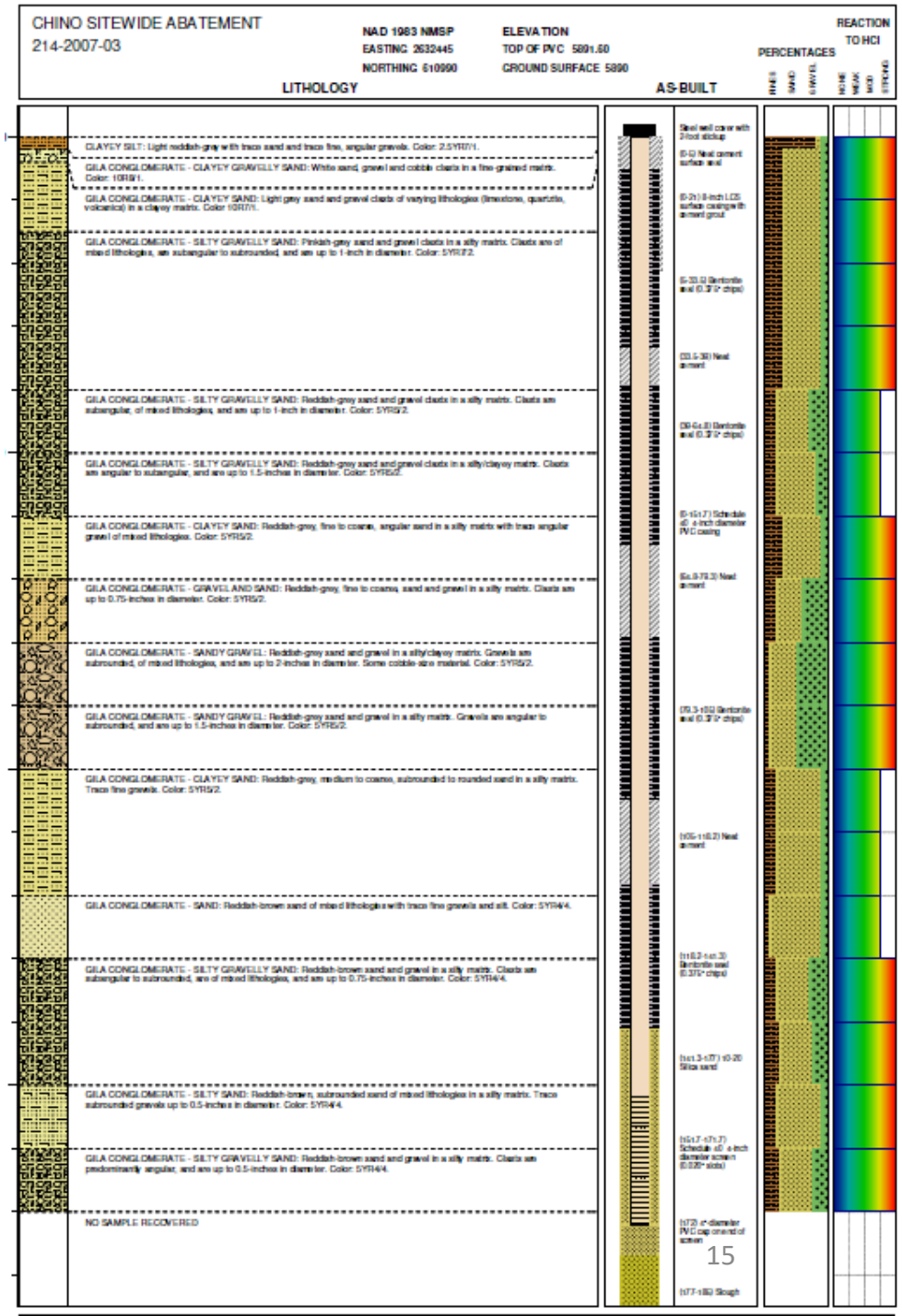
Page 1 of 6

Form: wr-30 Version: Oct. 12, 2021

DEEP WELL NOTICE OF INTENT (NOI)

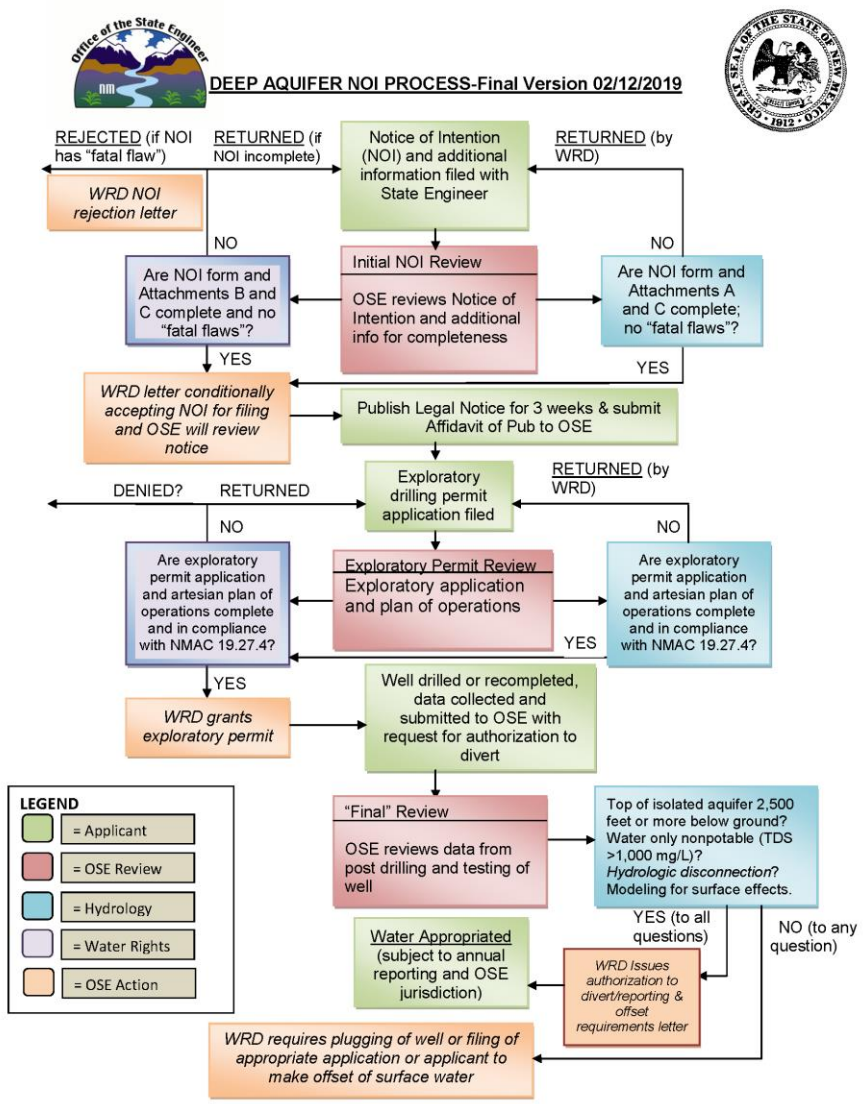
72-12-26. [Proposal to drill wells or recomplete existing wells; notice; depth and location.]

Any person proposing to drill wells or recomplete existing wells to appropriate waters referred to in Section 1 [72-12-25 NMSA 1978] of this act shall file a notice of intention to drill or recomplete with the office of the state engineer in such form as the engineer shall prescribe, and shall publish a notice in a newspaper of general circulation in the county in which the proposed wells will be located, once a week for three consecutive weeks, stating the location and the proposed depth of such wells, the purpose for which the water shall be used and an estimate of the volume of water to be used. Said wells shall not be drilled or recompleted prior to ten days after the last publication of such notice.



Deep Non-Potable Aquifer NOI process 03/01/2019

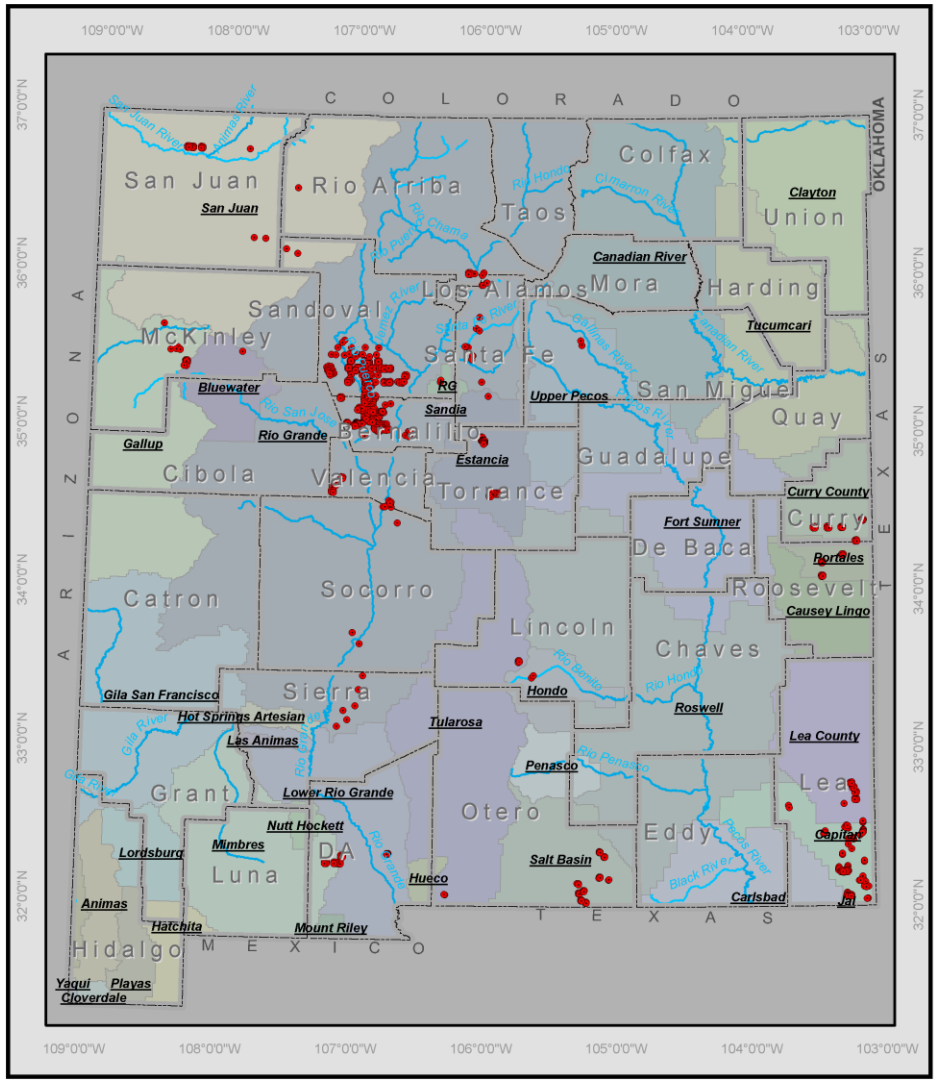
- Notice of Intention (NOI) and required additional information filed with State Engineer (19.27.1.72.A-E)
- Initial NOI Review - OSE reviews Notice of Intention and additional info for completeness (19.27.1.72.F)
- WRD letter conditionally accepting NOI for filing. WRD offers to review Notice of Publication.
- Applicant Publishes Legal Notice once a week for 3 weeks (19.27.1.72.G)
- Exploratory drilling permit application filed. Once 10 days past date of last publication, permit and Artesian Plan of Operations is approved.
- Exploratory Permit Review
- OSE reviews exploratory app/plan of operations (19.27.1.72.H)
- WRD grants exploratory permit
- Well drilled or recompleted, data collected and submitted to OSE
- Applicant submits a request for a "Final" Review and Letter of Authorization - OSE reviews data from drilling and water quality testing of well (19.27.1.72.L)
- **Top of isolated aquifer 2,500 feet or more below ground?**
- **Water only nonpotable (TDS >1,000 mg/L)?**
- **Hydrologic disconnection?**
- **Pumping scenarios calculated for 40 and 100 year intervals and surface effects are modeled.**
- If yes to all questions: WRD may issue authorization to divert/reporting requirements letter with offset to surface effects requirement.
- If no to any question: WRD requires plugging of well or filing of appropriate application (72-12-1 to 24) or requires applicant to purchase a surface water offset
- Letter of Authorization with offset requirements issued for Water Appropriation with reporting requirements (subject to reporting and continuing OSE jurisdiction) (19.27.1.72.M-P)



DEEP WELL NOTICE OF INTENT (NOI)

- 763 NOIs filed to date
- Over 60 wells have been drilled or recompleted through time
- All have been used by O&G so far
- Only a handful are pumping right now

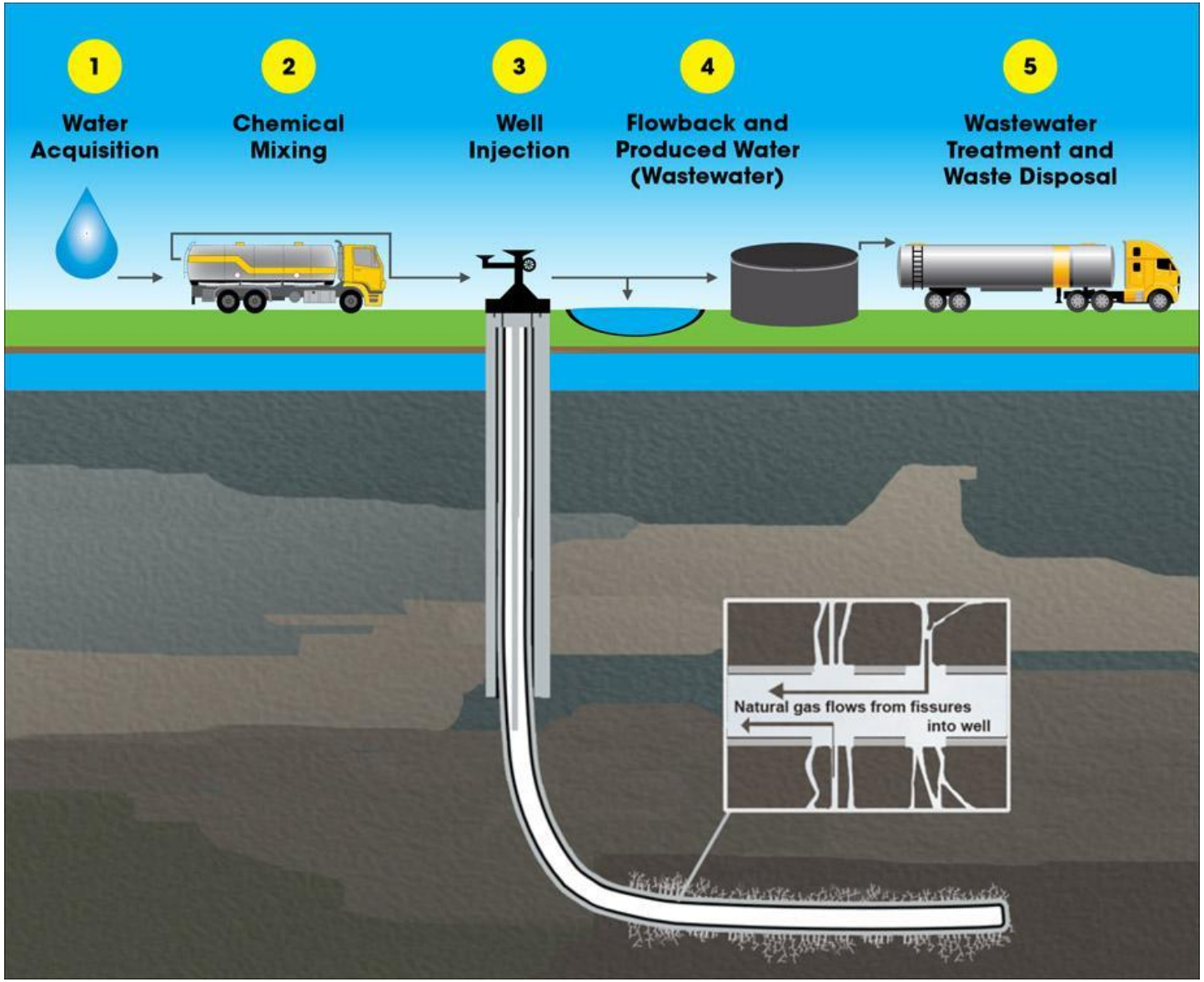
Deep Wells for the State of New Mexico, 2019



Created: 08/12/2019

PRODUCED WATER ACT

- Produced water currently may only be reused in the oil industry. **OCD** regulates (Oil and Gas Sector).
- In 2020, **HB 546**, which passed the **Produced Water Act, amending the Water Quality Act** and gives **NMED** jurisdiction over treatment and use of produced water for purposes **outside** the oil and gas sector.



PRODUCED WATER AND WATER RIGHTS NEXUS

Beneficial Use of water in New Mexico is the limit, measure and extent of a water right.

Produced Water **does not** establish a water right.

Recycling or reclaiming produced water for any other use is considered "**use by disposal**".

Produced water belongs to the **entity that is responsible for the disposal** of that water.

Commingling of produced water with fresh or saline water permitted by or under jurisdiction of the State Engineer must be **metered and accounted for to the OSE**.

HISTORY OF DESALINATION:

1958 United States authorized **Saline Water Conversion Act** funding the **Office of Saline Water**

REMARKS OF S. E. REYNOLDS AT THE GROUNDBREAKING CEREMONY FOR THE ROSWELL BRACKISH WATER DISTILLATION PLANT - JULY 10, 1962

This ceremony inaugurating a plant for demonstrating the feasibility of converting brackish water to fresh water marks another event in the pioneering tradition of our state. It is particularly in keeping with tradition that this plant is being constructed in New Mexico where the tremendous energy of the atom was demonstrated and in Roswell, where, by Professor Goddard's rockets, the feasibility of the exploration of space was demonstrated.

New Mexico reportedly has about 15-billion acre-feet of saline ground waters of a quality ranging from brackish water to concentrated brine. If only one-third of these saline waters could be mined, desalinized, and conveyed to places where water will be needed, we could double our present uses and supply the new demand for a thousand years. These salt-laden waters, which in the past have usually been considered a curse in this arid land, may yet become one of our greatest blessings.

ROSWELL RESEARCH WAS COMPLETED IN 1983

pubs.acs.org/doi/pdf/10.1021/ie50639a009?src=recsys

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Most Trusted. Most Cited. Most Read.

Search text, DOI, authors, etc.

Note: In lieu of an abstract, this is the article's first page.

Sludge technique, proved in lab and pilot stills, will get full size test at Roswell, N. M.

R. J. GAINEY C. A. THORP E. A. CADWALLADER

$CaSO_4$ SEEDING PREVENTS $CaSO_4$ SCALE

The Roswell, New Mexico, distillation plant for the conversion of brackish water is now near completion. Results of operation of this plant will be watched closely. Its success could change the pattern of land use in widely scattered parts of the world.

The Roswell plant depends on victory over calcium sulfate, which forms a heavy scale on heat exchange surfaces. A simple and effective tactic will be used—a sludge of the offending calcium sulfate will be maintained in the evaporators. The sludge particles will then act as seed for crystallization, preventing scale deposition on the metal surfaces. The technique has been shown to work in both laboratory and pilot plant evaporators. The Roswell plant represents another change of experimental size.

The most widely used method of obtaining potable water from sea water is distillation. Although this technique has been used for many years, the technology is rapidly improving as more operating experience and data become available from new commercial and military conversion plants, and as research and development studies provide process improvements. Much of this technology can be applied to distillation of brackish waters.

Not all of the problems of distilling brackish water are met in handling sea water. The salt contents are not the same, therefore scale-forming potential is different. Roswell brackish water, like many other such water sources, contains calcium sulfate at nearly the saturation concentration. No reasonable amount of water can be removed without heavy calcium sulfate scale deposition. When sea water is the source of supply, deposits of calcium carbonate and magnesium hydroxide are the scale problem. These can be rendered innocuous by the addition of acids or other chemicals to the feed water (*4, 7, 11, 14*). Calcium sulfate deposits are prevented by maintaining the brine concentration within the solubility limits of calcium sulfate.

The brackish water feed for the Roswell conversion plant will be drawn from artesian wells. Emerging at the well head it has an analysis as shown in Table I. Large amounts of similar water are available in the dry interior regions of the United States. Interior areas in Australia, Asia, and the Mid-East have large deposits of brackish water which may be recovered by distillation.

The artist's sketch below and the flowsheet on page 40 represent the world's largest distillation plant for conversion of brackish water. It will utilize a

Artist's sketch of the brackish water distillation plant, which will soon be in operation

PROPERTY NOW UP FOR SALE

https://www.krqe.com/news/new-mexico/roswell-looking-to-sell-saltwater-treatment-plant/

KRQE NEWS

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NEW MEXICO NEWS

Roswell looking to sell saltwater treatment plant

by: KRQE Media
Posted: Feb 13, 2020 / 04:44 PM MST
Updated: Feb 14, 2020 / 07:55 AM MST

SHARE

ROSWELL, N.M. (KRQE) – An old federal saltwater treatment plant in Roswell is on the market.

Aside from some small business use, the desalination facility has largely sat vacant since the city acquired it from the feds in 1984. Councilors signed off on a proposal in October to sell the property but the city has yet to receive a viable offer.

The facility has been appraised at $150,000.

DOI – OSW CHANGED TO OFFICE OF WATER RESEARCH AND TECHNOLOGY-- ABOLISHED IN 1982

- By 1980 Alamogordo (NM), Virginia Beach (VA), and Grand Isle (LA) had been selected out of a field of 37 as sites for federally supported demonstration plants. Under this program the Federal Government was to pay for the design and construction of the plants, as well as the first 3 years of their operation; State and/or local government agencies were responsible for providing on a cost sharing basis (of 15 percent to 35 percent) the land, utilities, feed water for desalination, and waste concentrate disposal. After 3 years the plants were to be deeded to the local agencies as part of their water supply systems. Plant design studies were initiated, but funding for this part of the program was withdrawn in 1981.
- The OWRT was restructured in 1981 and then abolished (along with most of its funding) by the Secretary of Interior in 1982. The remaining Saline Water Conversion Research and Development Program was transferred to the Bureau of Reclamation in the Department of the Interior, and management of the remaining test facilities at Wrightsville Beach, NC, and Roswell, NM, was turned over to the local governments in 1983.

DOI- BUREAU OF RECLAMATION – 2022 GRANTS

https://www.usbr.gov/newsroom/news-release/4328

News & Multimedia

News, Speeches, Fact Sheets and Multimedia from the Bureau of Reclamation

Reclamation > News & Multimedia > News Release > Reclamation Seeking New And Innovative Water Treatment Technologies For Research Funding

NEWS & MULTIMEDIA

- News & Multimedia
- News Releases
- News Stories
- Speeches
- Congressional Testimony
- Fact Sheet
- Leadership Bios
- Organization Chart
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Reclamation seeking new and innovative water treatment technologies for research funding

Media Contact: Peter Soeth 303.910.7473 psoeth@usbr.gov

For Release: Sep 13, 2022

WASHINGTON – The Bureau of Reclamation is seeking proposals to receive funding for desalination and water reuse research projects. The research projects should be innovative and seek to reduce water treatment costs. Universities, private industry, water utilities, and other research sponsors may submit proposals.

"Developing new technologies that can treat currently unusable water will help communities worldwide," said **Research and Development Program Manager Ken Nowak**. "These technologies have the potential to increase water supply flexibility under the risks of climate change and drought."

Up to $2 million is available for entities to submit proposals for laboratory-scale and pilot-scale research projects to increase water supplies by reducing the cost, energy consumption, and environmental impacts of treating impaired or otherwise unusable waters. Laboratory-scale projects are eligible for up to $250,000 in funding over two years, while pilot-scale projects are eligible for up to $800,000 in funding over three years.

A laboratory-scale project typically uses small flow rates to determine the viability of new processes, new materials or process modifications. A pilot-scale project uses larger flow rates to assess the practicality of implementing the technology at a larger scale and includes generating data to estimate operational and cost requirements.

To view this funding opportunity, please visit www.grants.gov and search for funding opportunity number R23AS00390. Applicants must submit their proposals by 4:00 p.m. MST on November 30, 2022.

Learn more about Reclamation's Desalination and Water Purification Research Program by visiting www.usbr.gov/research/dwpr.

Desalination and Water Purification Research Program Funding Opportunity Notice

DESALINATION- New Mexico TODAY……

U.S.News & WORLD REPORT NEWS » News Best Countries Best States Healthiest Communities Opinion Elections The Racial Divide Photos Events The Report

Home / News / Best States / New Mexico News / New Mexico City Moves Ahea...

ikehata.wp.txstate.edu/2019/10/29/city-of-alamogordo-brackish-water-treatment-facility/

MEMORANDUM
OFFICE OF THE STATE ENGINEER

To: New Mexico Drought Task Force
From: Desalination Pilot Project Workgroup
Date: April 15, 2021
Subject: Potential Desalination Pilot Project for Water Stressed New Mexico Communities

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Summary
The Desalination Pilot Project Workgroup (Workgroup), appointed by the Drought Task Force Chair at the February 8, 2021 meeting, has identified water stressed communities experiencing water supply and/or quality problems that could benefit from a potential pilot desalination project(s).

This memo documents the approach used by the Workgroup to develop the list of water stressed communities, as well as the method utilized to select two communities for a pilot desalination project.

Published 5:04 a.m. MT Feb. 18, 2022

View Comments

PARTNERING WITH COMMUNITIES

Cuba counts on new facility to treat its brackish aquifer water

BY THERESA DAVIS / JOURNAL STAFF WRITER

SUNDAY, AUGUST 30TH, 2020 AT 10:44PM

Levi Casaus Jr., an operator for Cuba's water department, sits near a tank at the village's main water filtration plant. (Theresa Davis/Albuquerque Journal)

https://theknewco.com/about/

KNeW COMPANY

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About KNeW

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We provide resource solutions.

Born out of a passion to help communities thrive, the KNeW Company, LLC (KNeW Process®) was created to solve one of the world's most critical problems-**access to food and clean, fresh water.**

We transform resources to create and provide fertilizers, water, and economic solutions to communities around the world.

We use proprietary and patented, environmentally responsible, processes to transform brackish water and acid mine drainage into valuable fertilizers and other plant nutrients and clean, fresh water.

We are committed to solving the water/food stress nexus.

Because the water/food stress nexus jeopardizes the future of our children and generations to come, we must act now to find solutions

news.mit.edu/2019/brine-desalianation-waste-sodium-hydroxide-0

Massachusetts Institute of Technology

MIT New

ON CAMPUS AND AROUND THE W

Turning desali

Process developed at
chemicals, making des

David L. Chandler | MIT News
February 13, 2019

optimistdaily.com/2020/06/new-desalination-technology-turns-brine-into-valuable-chemicals/

Today's Solutions: October 13, 2022

The Optimist daily

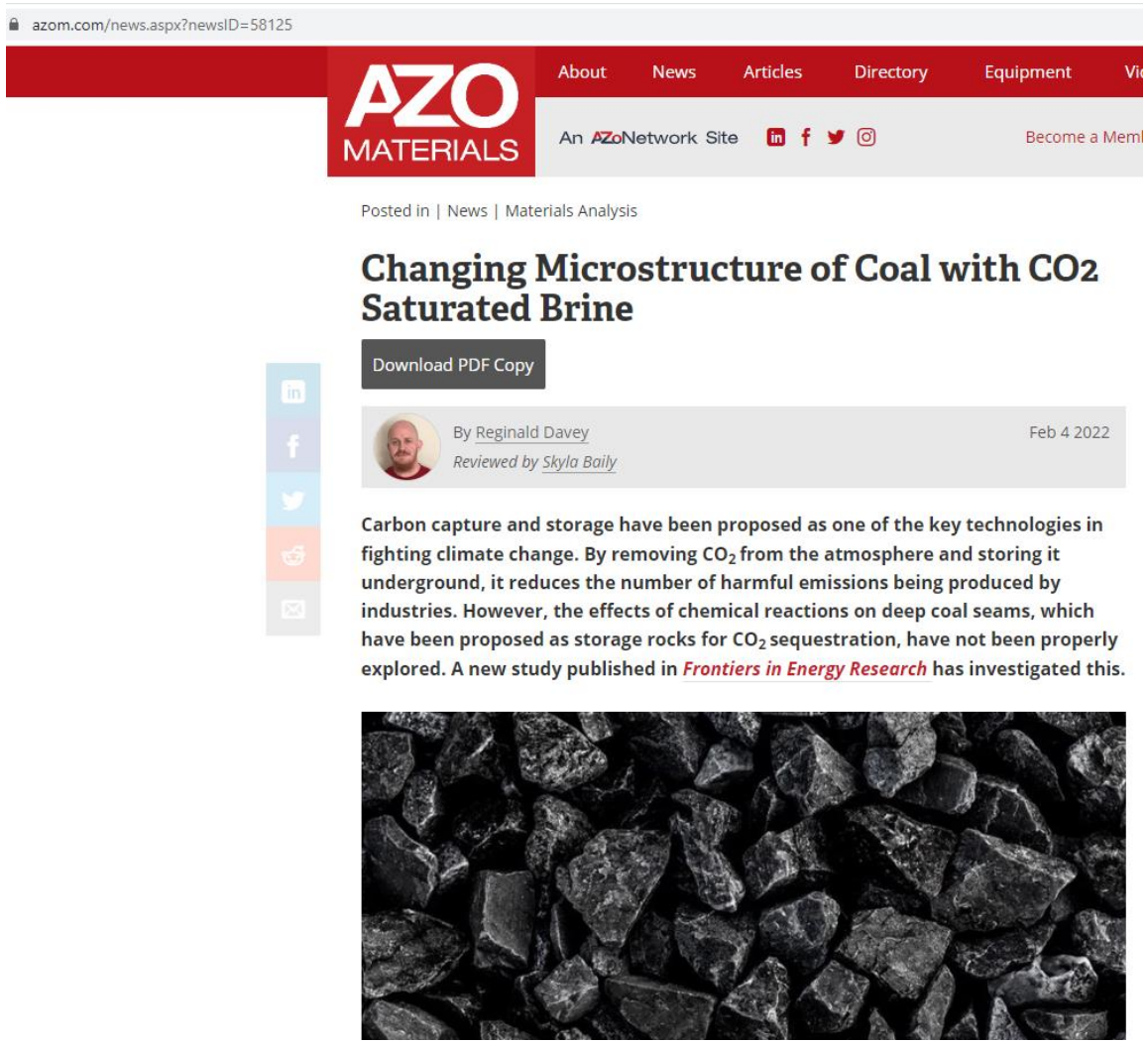
Environment Science Business Politics Education Health

Home » Science » Technology » New desalination technology turns brine into valuable chemicals

New desalination technology turns brine into valuable chemicals

BRINE AS A SOLUTION!!!

- **Carbon capture and storage have been proposed as one of the key technologies in fighting climate change.**
- **Perhaps the future is brighter after all.**



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Changing Microstructure of Coal with CO2 Saturated Brine

Download PDF Copy

By Reginald Davey

Reviewed by Skyla Baily

Feb 4 2022

Carbon capture and storage have been proposed as one of the key technologies in fighting climate change. By removing CO_2 from the atmosphere and storing it underground, it reduces the number of harmful emissions being produced by industries. However, the effects of chemical reactions on deep coal seams, which have been proposed as storage rocks for CO_2 sequestration, have not been properly explored. A new study published in *Frontiers in Energy Research* has investigated this.

QUESTIONS??

Contact us at:
505.827.6120

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Jerri.Pohl@ose.nm.gov