



NM Produced Water Research Consortium

Mike Hightower, Program Director

mmhightower@q.com, 505-859-1563

RADIOACTIVE AND HAZARDOUS MATERIALS COMMITTEE

Produced Water Issues In and Out of the Oil Field Panel

NMSU – Carlsbad - July 14, 2021



BE BOLD. Shape the Future.

NM 2019 Produced Water Act, HB 546

- Through the Act, statutory and regulatory authority for the reuse of produced water was modified:
 - Reuse inside oil and gas sector remains under the Oil Conservation Division (OCD) of the NM EMNRD,
 - **Reuse outside the oil and gas sector, was designated to the NM Environment Department (NMED).**
- The Act encourages produced water reuse outside oil and gas to:
 - enhance fresh water sustainability,
 - reduce or eliminate fresh water use in the oil and gas sector,
 - support new economic development opportunities,
 - maintain public and environmental health and safety.

**This regulatory transition is an emerging trend
in many western states – OK, TX, CA**

NM Produced Water Research Consortium



- Established through an MOU to support NMED
- Modeled after DOE and EPA Technology Verification Programs
- Currently 80 organizations, 150 participants

CONSORTIUM GOALS AND FOCUS AREAS

- Collaborate with health and resource management agencies, academia, industry, and NGOs and their technical experts,
- Conduct focused research, development, testing, and evaluation of innovative analysis and treatment technologies,
- Fill the science and technology gaps needed to address fit-for-purpose reuse of produced water for various applications - industrial, municipal, construction, water supply augmentation, mineral recovery, etc.
- Assure public and environmental health and safety through state-of-the-science risk and toxicology analysis and testing,
- Create new water supplies to support regional economic development
- **Establish Produced Water Data Portal of produced water quantity, quality, and temporal and spatial distribution**
- **Utilization of innovative water characterization and analysis technologies**
- **Independent 3rd party evaluation of the cost/performance of innovative pre-treatment, treatment, and disposal technologies**
- **Coordinate with EPA the development and use of innovative human and environmental risk and toxicology analysis and testing approaches**
- **Socio-economic and ecological modeling and analysis of produced water cost/benefits**

NM PWRC Produced Water Data Portal

Disposal Water Quality and Quantity data by 1/4 Township.

Data from OCD, USGS, NM Tech, NMSU, and NMPWRC

Four levels of data
 Tier 1 - General Public
 Tier 2 – Detailed Public
 Tier 3 – Application
 Tier 4 – Regulatory

Projected water available for reuse – 1-2 M bbl/day

Document was last saved: 50m ago

WaterSTAR: NM Produced Water Tier 1 Access

Quarter Township Explorer

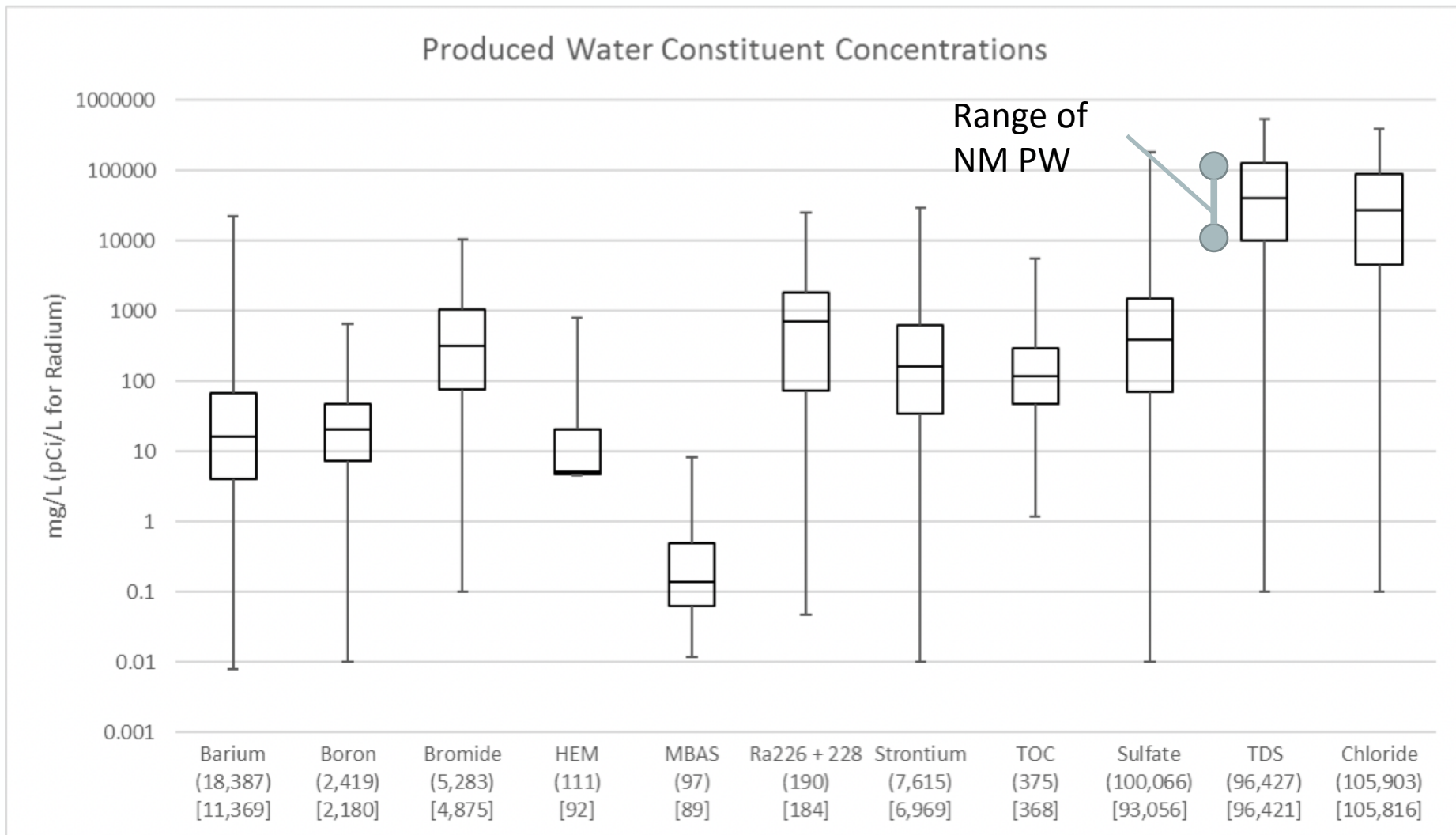
Applied Filters:

ID	Quantity Last Year (BBL)	Quantity Last Five Years (BBL)	Quantity Well Count
0125_034E_NE	1555	30169	
0145_033E_NE	76802	477097	
0155_033E_NE	1062950	5336320	
0155_037E_NE	7094794	46457787	
0165_032E_NE	437152	2892652	
0165_033E_NE	7520	260977	
0175_029E_NE	3213337	23152566	
0175_031E_NE	198779	1002584	
0175_036E_NE	3380979	21397731	
0175_038E_NE	1342179	13892090	
0185_027E_NE	6585503	47355896	
0185_028E_NE	1342671	10661504	
0175_029E_NE	3213337	23152566	7
0175_031E_NE	198779	1002584	3
0175_036E_NE	3380979	21397731	4
0175_038E_NE	1342179	13892090	2
0185_027E_NE	6585503	47355896	7
0185_028E_NE	1342671	10661504	6
0185_032E_NE	171590	660821	1
0185_034E_NE	84363	1011925	2
0185_035E_NE	237488	1337058	1

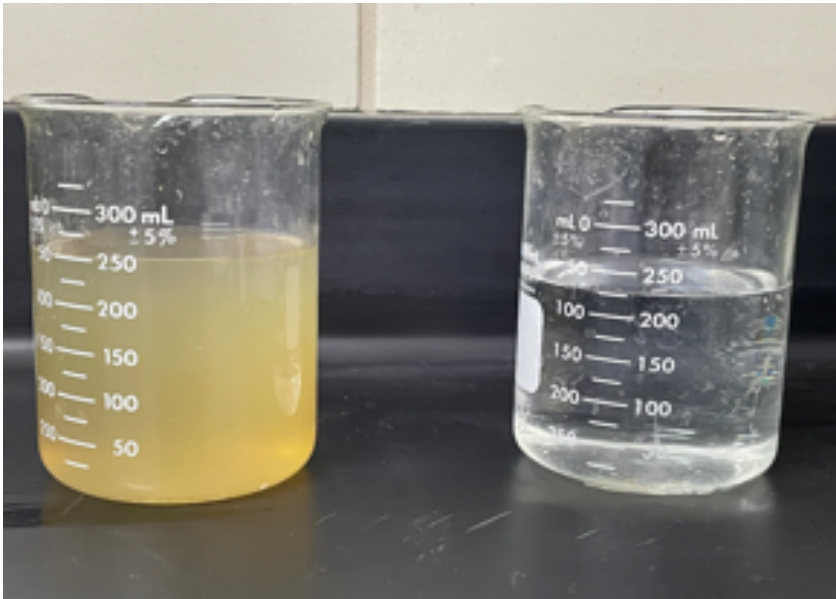
299 Total Results | Page 1 of 6

Go to page: 1 Show 50

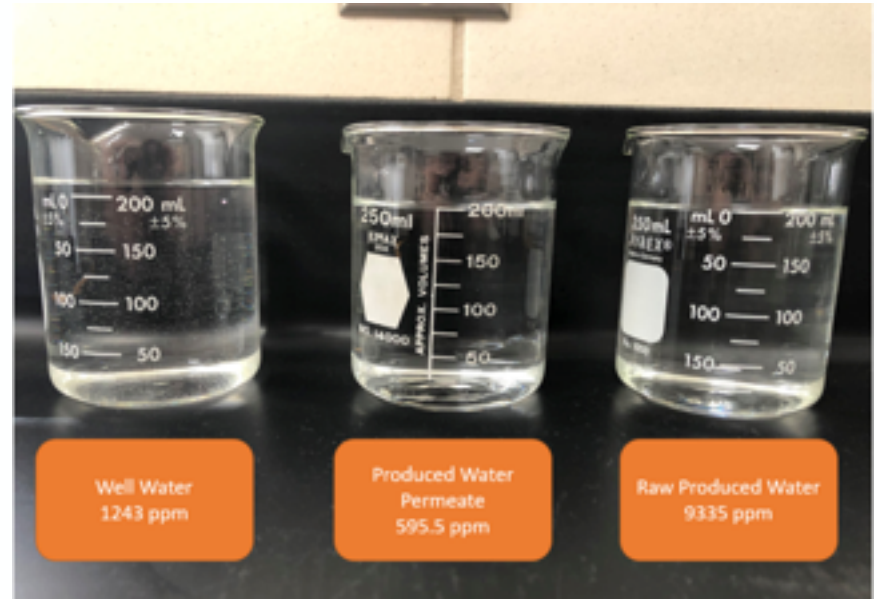
Produced Water Quality Varies Widely



Example NM Produced Waters with Treatment

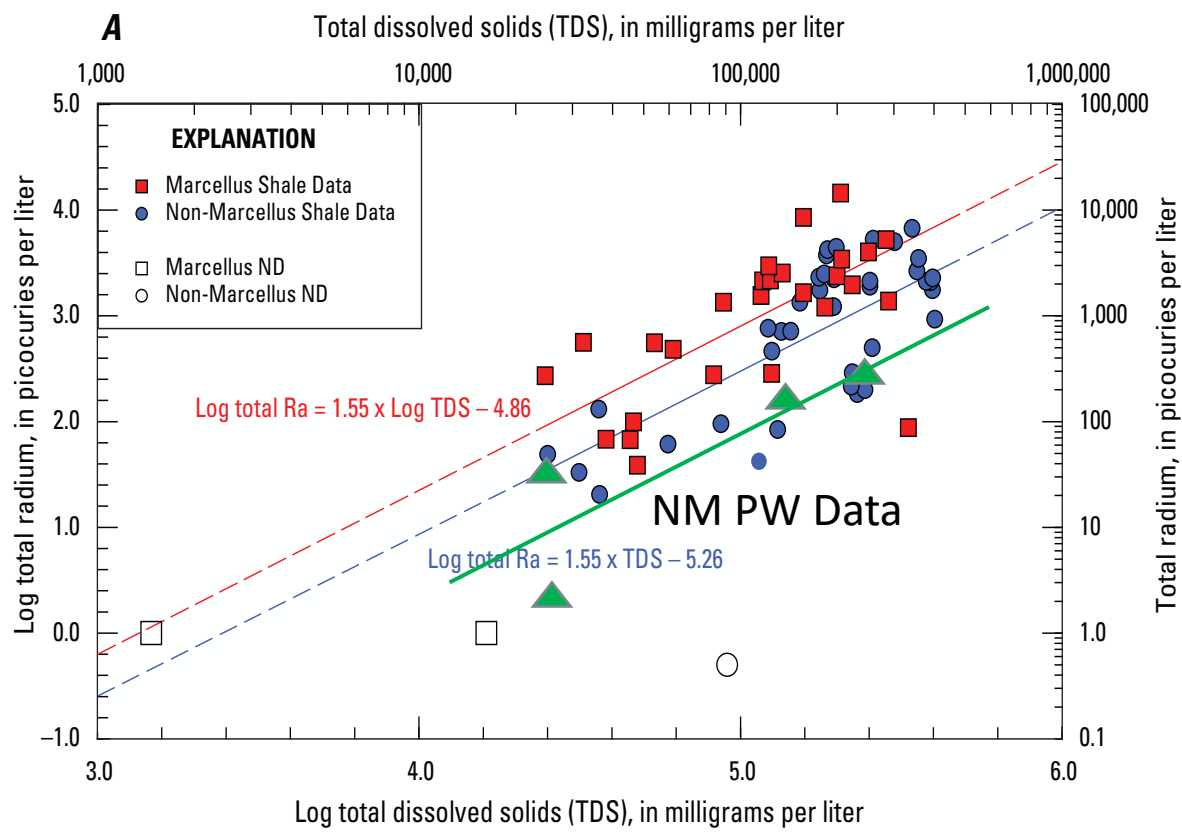


Permian Basin
100,000 TDS
SWD settling and filtration
Ultrafiltration for clean brine



Cuba Basin
10,000 TDS
SWD settling and fine filtration
RO treatment

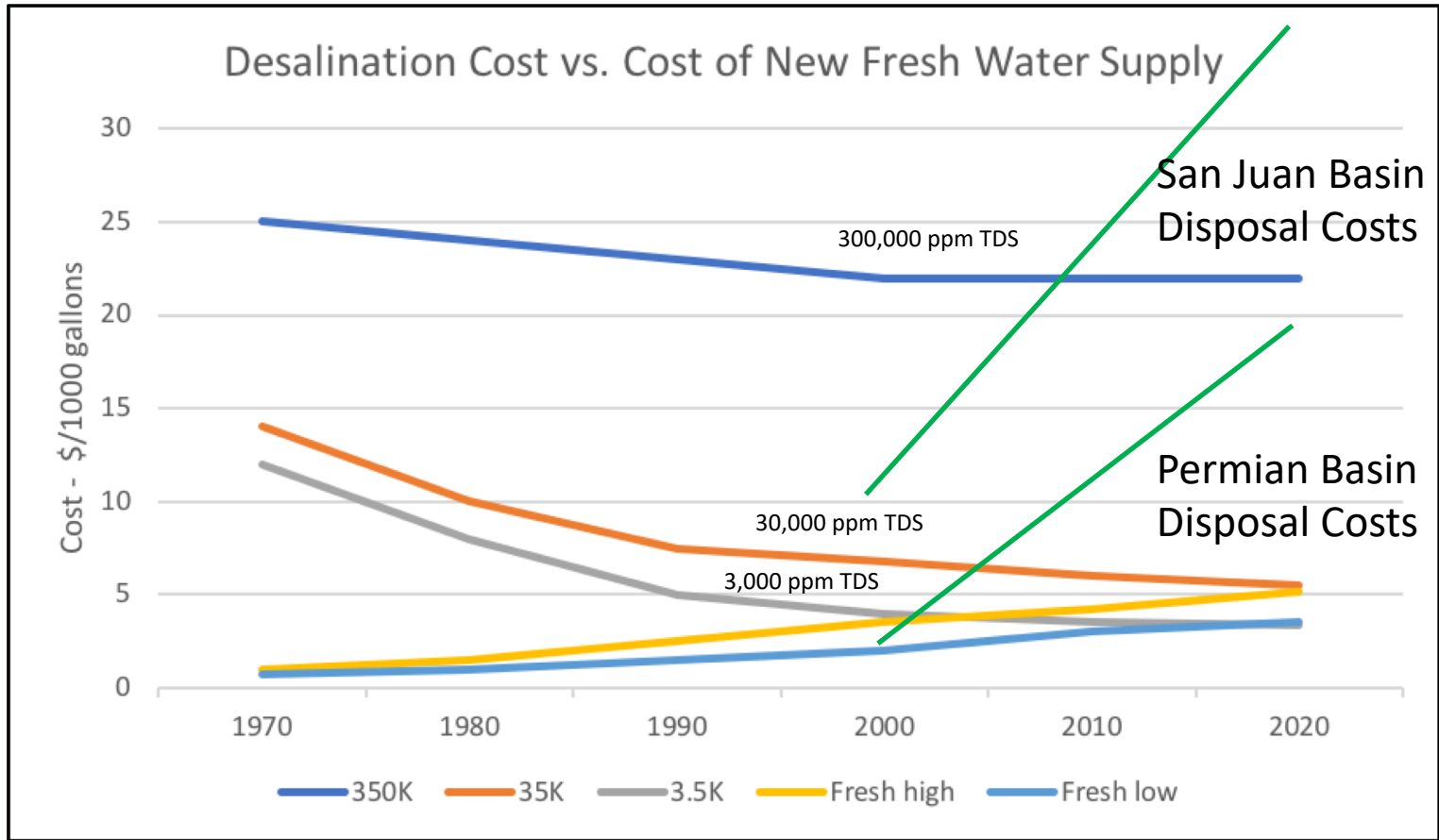
NM Produced Water Radiological Issues



NORM	Typical NM Surface Water Concentration	Typical NM Ground Water Concentration
Uranium mg/L	0.005-.020	0.005-1.0
Total Radium pCi/L	0.5-1.5	0.5-8.0

NORM easily removed by both thermal and membrane desalination technologies, risk issue is generally the handling the concentrated NORM from these treatment processes

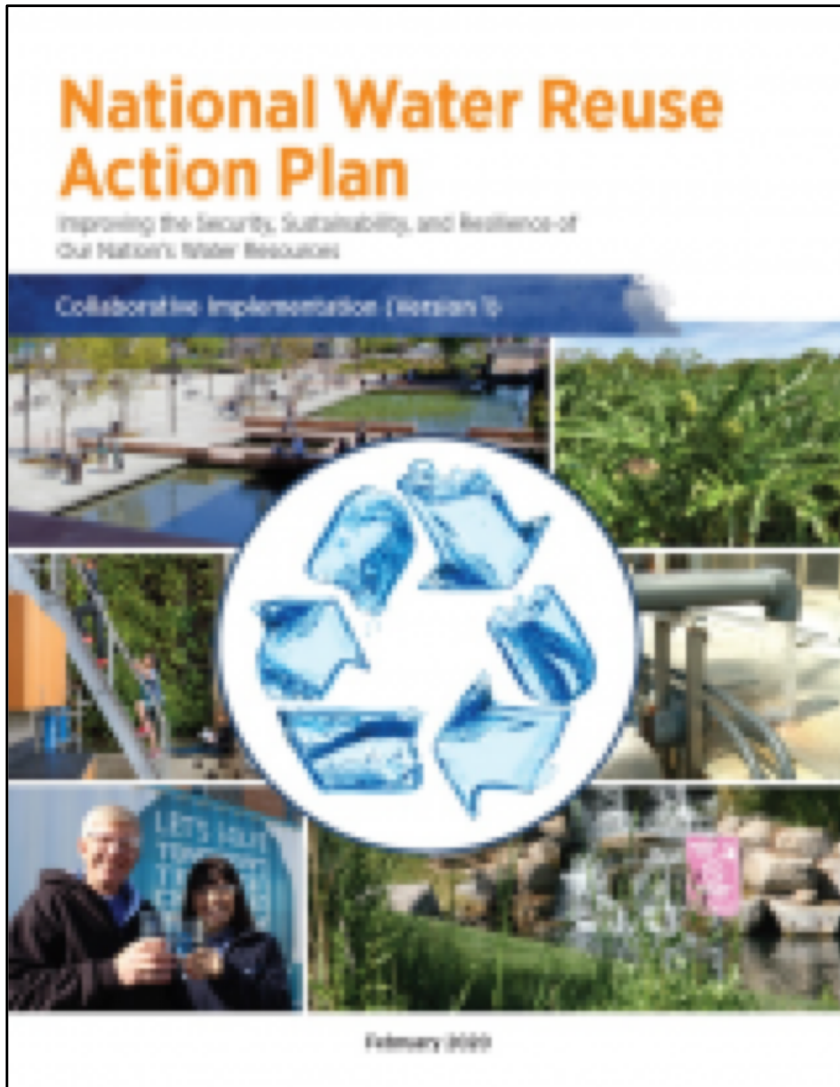
Increasing Produced Water Disposal Costs vs Treatment



(EWRI Hightower 2018)

2000 NM Produced Water Disposal costs \$2-10/1000 gal **2020 NM Produced Water Disposal costs \$20-50/1000 gal**

EPA National Water Reuse Action Plan



- Focuses on a national effort to treat and reuse waste waters to supplement fresh water supplies
- Focus areas are:
 - Thermo-electric cooling water
 - Agricultural waste water
 - Municipal waste water
 - Storm water
 - Produced water
- **NM Produced Water Research Consortium** and the Ground Water Protection Council selected to lead national efforts on produced water reuse research and implementation