

Disposition of Oilfield Produced Water and Produced Water Rules

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NM Energy, Minerals, and Natural Resources
Department (EMNRD)

Water and Natural Resources Committee

Artesia, NM

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Outline

- Water and Energy Nexus
- Water Volumes in New Mexico Oil & Gas Operations
 - Crude Oil and Produced Water
 - Water Injection Volumes
 - Frac Fluid Volumes
- An OCD Produced Water Rule Being Developed
- Related Upcoming Activities
- Recoverable Water Initiative Under the Drought Task Force
 - Brackish Water Subcommittee and Work Group
 - Produced Water Subcommittee and Work Group

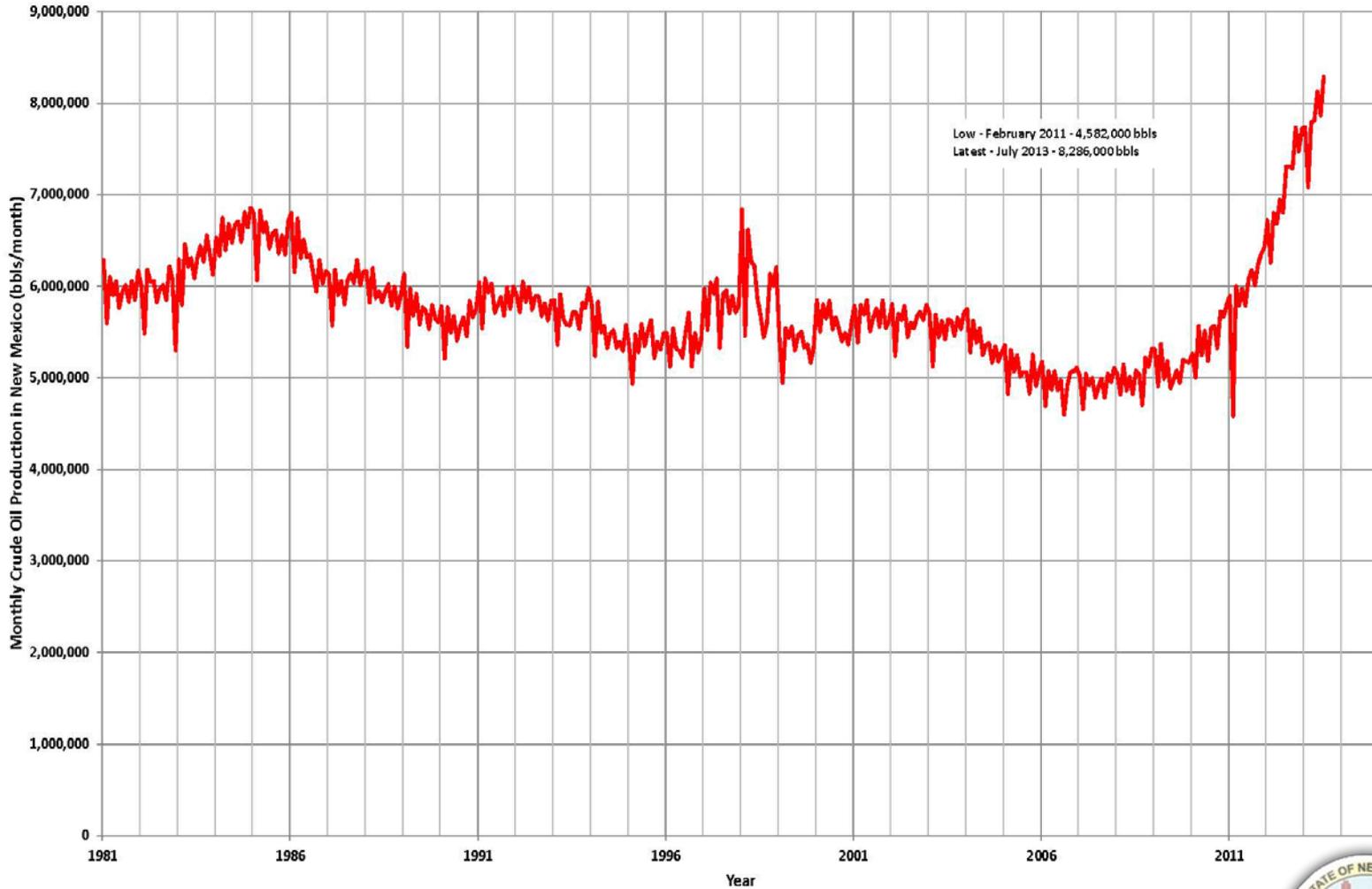
Water and Energy Nexus

- Water for Energy Development and Energy Needed for Water Development
- Public Concerns
 - Potential contamination of drinking water sources
 - Fresh water consumption
- Need for Treatment and Recycling Oilfield Produced Water
 - Initial focus on water for hydraulic fracturing
 - Revision of produced water rule to encourage recycling and reuse
 - Consideration of brackish water aquifers
- The Energy-Water Nexus will be part of a new Energy Policy and Implementation Plan for the State that is under development

Produced Water Reuse

- Produced Water Currently Regulated as a Waste
 - RCRA-exempt
 - Commonly disposed by reinjection in deep wells
- Need to convert this waste into an asset
- Can Be Reused for Unconventional Production
- Can Replace Use of Fresh Water in Production Operations
- Can Provide a Consistent, Stable Water Resource
- Treatment Costs Now on a Par with Disposal Costs
- Need to Develop a Regulatory Environment that Encourages Recycling and Reuse of Oilfield Produced Water

Monthly Crude Oil Production in New Mexico Since 1981



NM Crude Oil & Produced Water Volumes

	<u>Oil, million bbls</u>			<u>Water, million bbls</u>		
	SE	NW	Total	SE	NW	Total
2008	53.4	0.99	60.1	605.2	2.95	735.2
2009	54.6	0.95	61.1	571.3	2.23	690.9
2010	59.7	0.87	65.4	604.4	2.92	713.7
2011	66.1	0.95	71.3	625.6	2.79	724.1
2012	79.8	1.10	85.2	671.8	3.56	775.8
2013	92.5	1.90	98.7	713.0	5.05	800.1

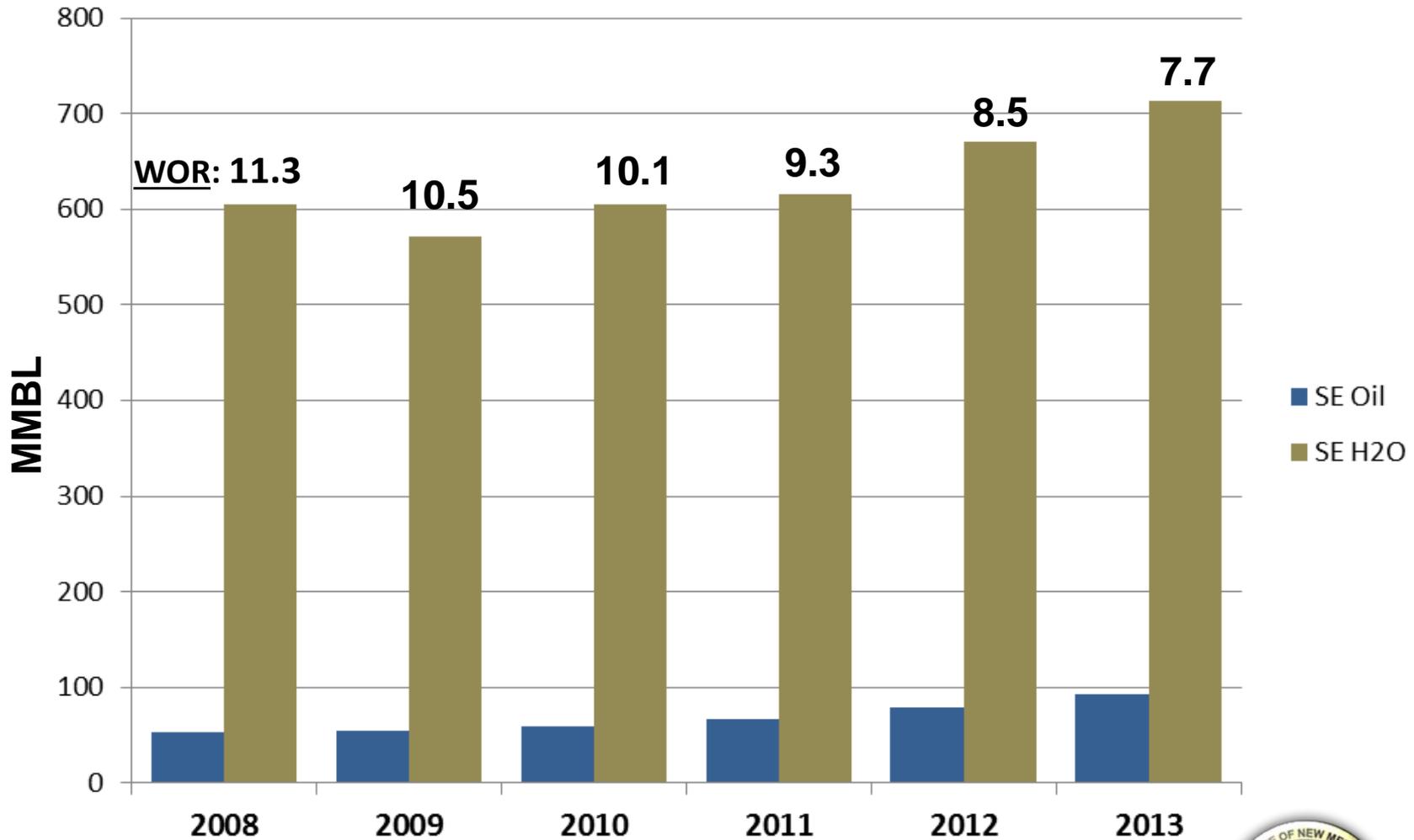
2013 SE Water–Oil Ratio (WOR)

$$\frac{713.0}{92.5} = 7.7$$



Source: OCD

SE NM Crude Oil and Produced Water Volumes



Source: OCD



Total Water Injected,* million bbls

	SE	NW
2008	671.7	45.8
2009	639.0	38.7
2010	676.1	41.1
2011	654.2	36.5
2012	730.2	34.9
2013	740.3	33.7

10 AF = 77,584 bbls

*FW, PW, Frac FB

Source: OCD



2013 Frac Fluid Volumes

County	Wells	Fluid, bbls	Acre Ft	bbls/well
Eddy	883	22,897,026	2,951	25,931
Lea	460	15,956,755	2,057	34,689
Rio Arriba	93	870,719	112	9,363
San Juan	92	692,740	89	7,530
Sandoval	38	655,439	84	17,248
Other*	17	243,756	31	7,466
TOTAL		41,316,434	5,325	

* Other includes Chaves, McKinley, and Roosevelt Counties

Source: OCD



Revision of Rule 34

Proposed Draft

- Objectives:
 - Encourage recycling and reuse of produced water
 - Reduce fresh water consumption
- Recycling Containment:
 - Water storage using synthetic double liners with leak detection
 - Requirements for siting, design and construction, and operations
 - Closure and site reclamation requirements
- Financial Assurance
- Transportation of Produced Water, Drilling Fluids, and Liquid Oilfield Waste

Related Activities

- Upcoming Technical Meetings
 - Water Recycling & Reuse For Shale Plays – East, Sept. 30-Oct 2, 2014, Pittsburgh, PA
 - American Water Summit 2014, Oct. 23-24, 2014, Houston, TX
 - Water Management for the Permian Basin Summit, Jan. 27-28, 2015, Houston, TX
- Atlantic Council White Papers
 - “Sustainable Water Management in the Texas Oil and Gas Industry,” The Atlantic Council, Blythe Lyons and John James Tintera, July 2014
 - Proposal for a similar issue paper to the Texas White Paper for New Mexico

New Mexico Recoverable Water Initiative

NM Drought Task Force

Chair, State Engineer Scott Verhines

Recoverable Water Initiative

Chair, Secretary EMNRD, David Martin

Brackish Water
Subcommittee

Work Group

Produced Water
Subcommittee

Work Group

Dr. Jeri Sullivan Graham, Work Group Coordinator

Benefits of Brackish and Produced Water Treatment and Reuse

State & NM Citizens

- Reduced reliance on and depletion of fresh water aquifers and surface water sources
- Reduced truck traffic and wear and tear on roads, and improved road safety
- Clean water for various applications

Oil & Gas Operators

- Alternatives to fresh water
- Additional sources of water to support drilling & completion activities
- Minimize transportation and disposal of produced and frac flowback water
- Reduce trucking costs and disposal volumes

Oilfield Produced Water Subcommittee

Produced Water Subcommittee

- EMNRD
- NMED
- State Engineer
- Water experts from New Mexico universities and national laboratories

Produced Water Task Force

- Southeast NM Work Group
- Northwest Work Group
- Industry Advisory Group

Subcommittee Progress and Plans

- Work Groups formed and meetings held to focus on recycling of oilfield produced water and use of brackish water:
 - Methods to treat produced waters from oil and gas production; compile case history information, including economics
 - Compile data on brackish water aquifers to assess deliverability and sustainability
- Subcommittee will report findings and recommendations to the Drought Task Force and to the Governor
- Subcommittee will keep the appropriate legislative committees informed of progress

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