



Reclamation and Re-Use of Produced Water

NMOCD Presentation

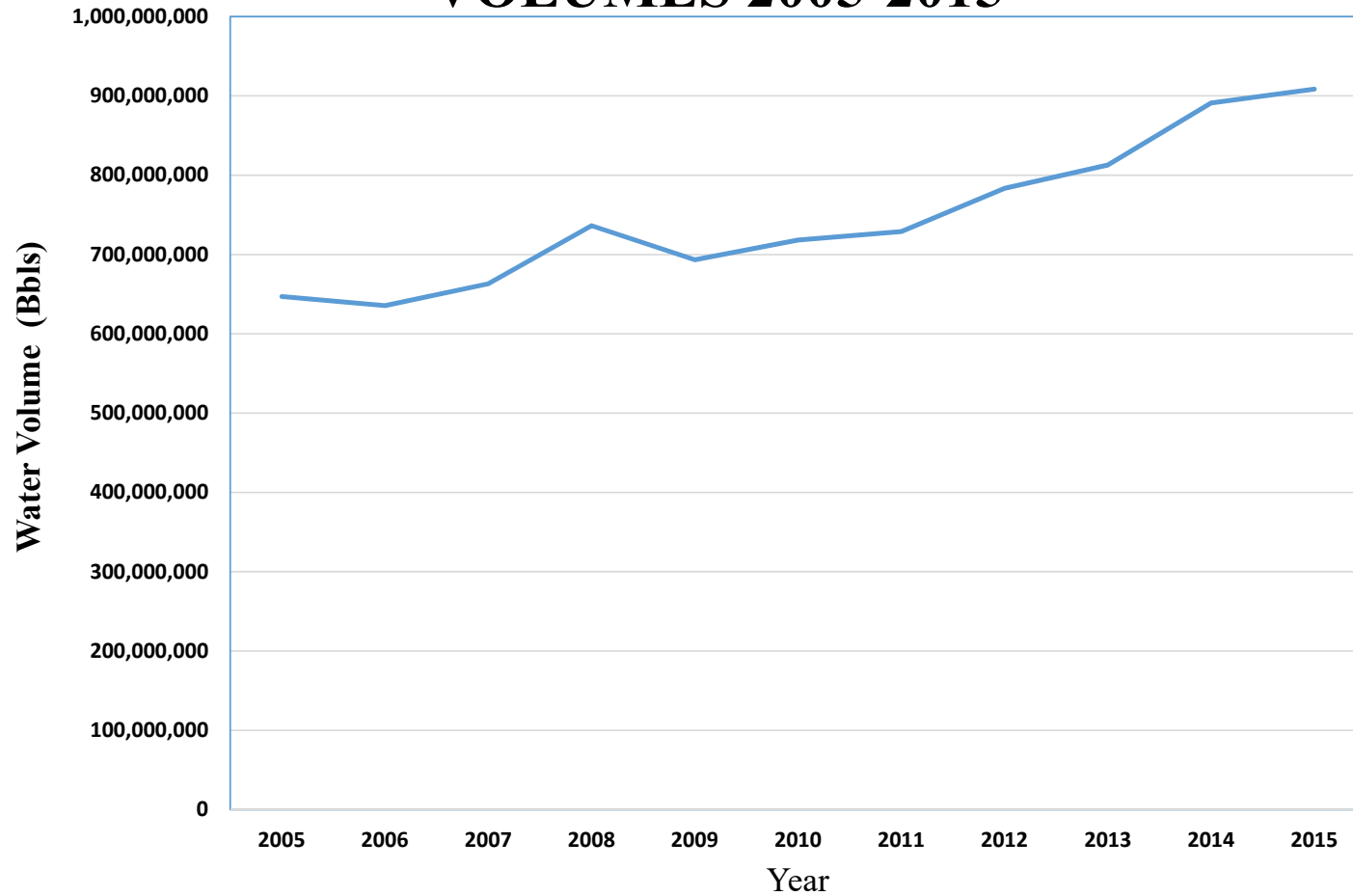
Water & Natural Resources Committee

October 28, 2016

What is Produced Water?

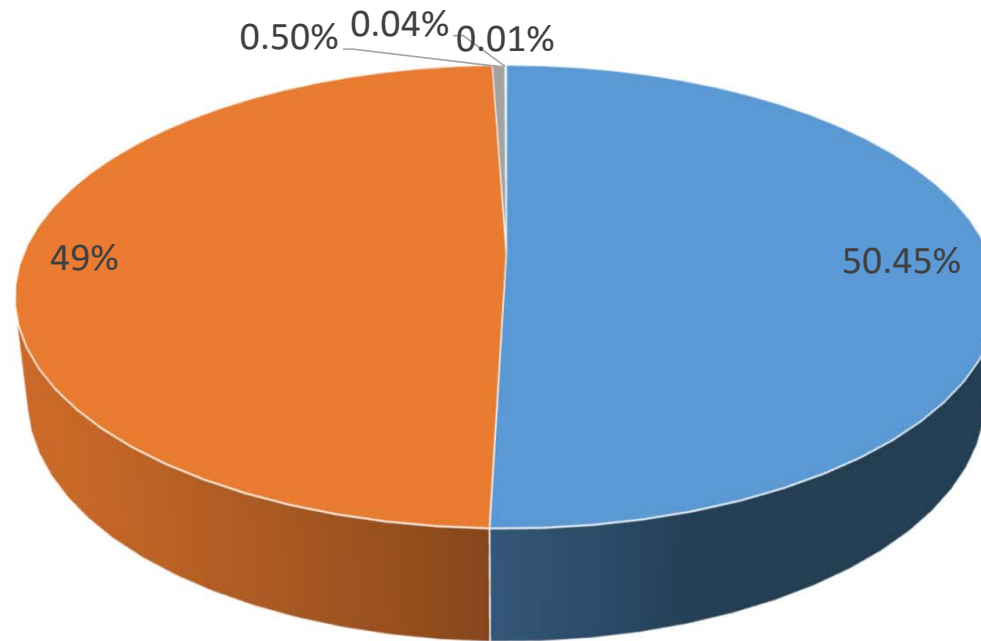
- **Water that appears as a byproduct of oil & gas production**
- **It's quality can vary from near fresh to extremely salty, based on formation of origin**
- **In New Mexico, 5 to 7 barrels of water is produced for every barrel of oil produced (Typically referred to as “Oil Cut”)**
- **That currently equates to 60 to 80 million barrels* each month**
(*2.5 to 3.4 billion gallons or 7,733 to 10,311 acre ft.)

NEW MEXICO PRODUCED WATER VOLUMES 2005-2015



***Latest Data
August, 2016:
74,066,331 Bbls***

Current Disposition of Produced Water



- Injection-Secondary Recovery Projects (50.45%)
- Injection-Produced Water Disposal Wells (49%)
- Re-Use in Drilling & Completions (0.50%)
- Evaporation (0.04%)
- Spills (0.01%)

NMOCD Regulatory Framework

- The regulations regarding produced water are contained in Title 19, Chapter 15, Part 34 of the New Mexico Administrative Code
- Rule 34 was amended in 2015 to promote the recycling and re-use of produced water while still being protective of fresh water, public health and the environment. Nearly all recycled produced water is currently used in the oil and gas industry for drilling and completion operations

NMOCD Regulatory Requirements

- **No permit or registration is required from the OCD for the disposition by use of produced water for drilling, completion, producing, secondary recovery, pressure maintenance or plugging of wells**
- **Any other disposition by use of produced water requires prior approval by the appropriate OCD district office on Form C-147. Approval requirements are determined by the district office based upon the proposed use**

Recycling Facilities & Containments

- **Except where recycling facilities are part of a permitted operation for the drilling, completing, producing or plugging of oil and gas wells, all recycling facilities & containments must be permitted or registered with the appropriate OCD district office**
- **Regulations for recycling containments include requirements for siting, design and construction, operation, closure and site reclamation & financial assurance**
- **Containments may be operated for 5 years, and can be extended on an annual basis**
- **Operators are required to file monthly reports indicating fluid-in and fluid-out volumes**

Permitted Facilities

- **Since Rule 34 was amended, 27 produced water recycling facilities have been registered or permitted by OCD (14 in the Permian Basin, 13 in the San Juan Basin)**
- **16 of those facilities remain active (11 in the Permian Basin, 5 in the San Juan Basin)**
- **To date, 4.5 million barrels of produced water have been recycled**
- **Maximum reuse within the oil & gas industry appears to be occurring**



Typical Recycling Containment-Permian Basin

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Produced Water Potential Uses

- Re-use of produced water in the oil and gas industry will likely be limited to drilling, completion & producing operations
- In order to realize maximum benefit of this resource, treatment will likely be required for these possible uses:
 - Agriculture
 - Road Construction
 - Industrial Use
 - Aquifer Recharge
 - Forced Evaporation
 - Discharge to Surface Water Courses

Produced Water Treatment

- **Various types of water treatment can be utilized in order to clean the produced water to a standard applicable to its proposed use. Treatment costs will increase depending on the degree of “clean-up” required**
- **Treatment processes include:**
 - **Oil Separation & Skimming**
 - **Filtration**
 - **Flocculation & Chemical Precipitation**
 - **Dilution (Mixing)**
 - **Reverse Osmosis**
 - **Distillation**

Projects Currently Being Proposed or Evaluated

- **Lea Soil & Water Conservation District has requested OCD assistance to determining regulatory requirements for produced water use in hydraulic fracturing and a non-food agricultural pilot study**

Potential Roadblocks to Expanded Use of Produced Water

- **The cost to dispose of produced water into a deep injection well is currently less expensive than treatment costs (depending on the degree of “clean-up”)**
- **Transportation of produced water from source sites to potential use sites will be a consideration, and may render projects uneconomic**
- **Cost of fresh water vs. treated water**

New Mexico Water Resources Research Institute

- **Authorized by the 1964 Water Resources Act**
- **Located on the campus of New Mexico State University**
- **Mission: Develop and disseminate knowledge that will assist the state and the nation in solving water problems**
- **Recently, the WRRI, Energy Minerals & Natural Resources Dept. and Dr. Jeri Sullivan Graham with Los Alamos National Laboratory collaborated on a report entitled “The Regulatory Framework Surrounding Produced Water in New Mexico and Impacts on Potential Use”**
- **Other reports available on WRRI website: <http://www.wrri.nmsu.edu>**

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