



## Produced Water Working Group

Meeting Summary of Third Meeting, 10:30 am August 29, 2016

OWRB Board Room, 3800 N. Classen Blvd., Oklahoma City, Oklahoma

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### **ATTENDEES:**

#### ***Produced Water Group Members and representation (from Sign In and/or Introductions):***

J.D. Strong, OWRB, Chair	Jim Reese, OK Secretary of Agriculture
Tim Baker, OCC	Alan Riffel, OML
Mike Dunkel, CH2M	Jesse Sandlin, Devon/OKOGA
Bud Ground, EFO	Terry Stowers, COSMO
Mike Mathis, OP8A/Continental	Usha Turner, OG&E
Mike Ming, GE	Scott Thompson, DEQ
Mike Paque, GWPC	

#### ***OWRB Staff and Consultants:***

Owen Mills, OWRB	Anna Childers, CH2M
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#### ***Speakers:***

Saba Tahmassebbi, ODEQ	Tim Baker, OCC
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#### ***Others:***

Jared Boehs, Pure Water Services  
Joyce Boyd, OK Corp Com  
Jeff Everett, OG&E  
Lloyd Kirk, DEQ  
Nicole Sanders, EDF  
Adam Shupe, Burns & McDonnell  
Jana Slatton, OCC  
Terry Stowers, COSMO  
John Westerheich, GE OGTC  
Dan Yates, GWPC

## **Introductions and Goals for Today**

Mr. J.D. Strong, OWRB Executive Director and Produced Water Working Group (PWWG) Chairman, opened the meeting by welcoming the attendees, held introductions, provided a brief background of the Group's responsibilities and goals, and gave an overview of previous PWWG meetings held in March and June 2016. Mr. Michael Dunkel facilitated the meeting. He reviewed the agenda and logistics for the meeting, noting that the primary goal for today's meeting was to gain insights and ideas from PWWG regarding available data on produced water quality, volumes, production areas and potential end-users for the produced water.

Mr. Dunkel informed the PWWG that four subcommittee meetings would also be held. The four subcommittees include: 1) Agriculture; 2) Oil and Gas; 3) Water Users - Demand & Discharge, and 4) Regulatory, Legal and Challenges to reuse/recycling. The intent of forming these groups was to allow stakeholders to develop recommendations specific to their issues and better inform the PWWG study of their specific needs and concerns that should be considered. Mr. Strong emphasized that everyone was encouraged to join the subcommittee meetings if they had not already joined and would need to let Michael Dunkel know. The dates and times of the subcommittee meetings were as follows:

- Agriculture: August 30<sup>th</sup> at 8:30 am
- Oil and Gas: August 30<sup>th</sup> at 2:30 pm
- Water Users and Demand: August 31<sup>st</sup> at 10:30
- Regulatory, Legal and Other Challenges to use/recycling: August 31<sup>st</sup> at 2:20 pm

OWRB has a PWWG web page providing the group with easy access to meeting notes and other information that might be of interest. The page may be found at:

<http://www.owrb.ok.gov/2060/pwwg.php>

## **Information and Data Needs**

Mr. Dunkel emphasized the importance of obtaining valid data to initiate the work. Mr. Dunkel informed the group Charles Lord at OCC had provided him with the Arbuckle water injection volumes and geospatial information for each well. Mr. Lord is working on extracting total injection volumes. Using the data, Mr. Dunkel had calculated the total disposal volumes by county.

In order for the study to find economic ways to use produced water for reuse and recycling, Mr. Dunkel summarized the key data categories and some criteria for the types of data that would be beneficial to the study. Scott Thompson highlighted that it would be important to characterize the data, capture what we do not know, and to assess data gaps. He also emphasized that established regulatory standards do not exist for all applications and those need to be addressed by detail analysis later on. The member from the general audience recommended to use GIS to demonstrate the reuse potential.

Mr. Dunkel emphasized that identification of potential users of marginal quality waters was crucial to the study. Discussion ensued as to how best to find such users. He also expressed the problem of a continually changing landscape to keeping water recycling viable

## **Water Quality**

### Source water (supply)

- WQ is crucial for determining both cost and relative waste stream volumes.
- Salinity generally ranges from 40,000 to 300,000 ppm TDS but commonly found at 100,000-200,000 ppm in some plays.
- The Study will characterize general WQ by county if possible with a target of one dozen samples .
- Oil & gas firms offered to share blind water analyses data. ?? (Maybe OCC?) has complete water analysis from the O&G companies.
- Action item is for the project team to prepare request letter to oil and gas associations. Each company will contribute data in a tabular format that will be aggregated by the association, preserving the identity of the contributing company.
- Group mentioned other metadata is important such as when the sample was taken relative to the life of the well, as water quality usually changes over the first weeks of production.

### Water use sectors (demand)

- Subcommittees will explore this in-depth for agriculture and oil and gas

## **Water Availability and Needs**

### Source water (supply)

- Interested in those counties that produce the most water: Bigger volumes, lower cost.
- Per OCC data: Arbuckle injection approx. 68% of total water injected in the state. Mr. Dunkel is working on getting the rest.
- OGS has data that includes some analysis data per county (not per well-basis) volume of water injected.

### Water use sectors (demand)

- Very important to identify potential users, those with who has major plans: e.g. industry, agriculture.
- OWRB has information on current self-supplied permitted water use and users.
- DEQ can identify potential water-users around the state via discharge permits. CH2M will work with DEQ to obtain the discharge permit data.
- Terry Stowers suggested that oil and gas reuse is preferential to recycling to another industry standard based on costs.
- Volume of produced water is so high that there is likely going to be more produced water than oil and gas can reuse for the foreseeable future.
- Power generation industry is the third largest user in the State and should be included in the Study analysis. Water quality is an essential consideration though.
- Water for 2060 (OWRB) final report has self-supplied water users by type; however, did not include individual industries that buy water from a municipality (e.g. Koch in Enid would not be included. Koch uses 5 mgd of Enid municipal waste water).

- Municipalities using non-potable water for irrigation of parks or golf courses should be a viable option for this marginal quality water. \
- The idea of basin to basin produced water transfer for oil and gas reuse was discussed.
- Discussion on wastestream volumes and fate is a necessary consideration of any reuse/recycle program. Must consider receiving and discharging water quality.

### **Water Treatment Technologies**

- No separate water treatment subcommittee set up.
- OWRB has received a lot of solicitations from many companies wanting to promote their product. After analyzing the source and user data, the project team will define scenarios for estimating water treatment costs.
- A number of members said that water treatment is complicated by the number of companies operating in this area.
- Mike Paque said that North Dakota hopes to establish a web site that has vetted water treatment companies.
- Mike Ming suggested that water treatment should be done after the baseline data have been gathered. Risk assessment need to be completed fist: need to address legal and regulatory issues. Need to consider what treatment options are available and needed.
- Michael Dunkel reminded of the current task to assess how Oklahoma can reuse produced water most effectively.

### **Economics**

- The cost estimates should be developed for the most viable scenarios for non-oil and gas industries.
- The goal is to develop preliminary cost estimates and cost scenarios: maybe less than dozen will be developed.
- Risk and risk mitigation will be included for qualifying different scenarios (e.g. regulatory analysis).

### **Timing**

- The project team reminded the group about the aggressive schedule for the project: the final report is targeted for the kick off of the OK legislative season in Feb. 2017.

## **Presentations:**

Next, invited speakers provided presentations on produced water management and treatment.

Saba Tahmassebi, Oklahoma Department of Environmental Quality, gave a PowerPoint presentation on ODEQ's Produced Water Management Survey of 26 States. The presentation emphasized the significance of the 98<sup>th</sup> Meridian where no discharge east of the line is allowed. The summary highlighted the various method of managing produced water. In addition, the study developed recommendations to help promote produced water reuse/recycling. It also identified possible next steps, including identification of potential reuse options ("Fit for use" –criteria); how to develop standards for intended use; identify obstacles regarding water rights/ownership/recommend actions (regulatory, statutory) to address obstacles, and work with federal agencies / counterparts in addressing produced regulatory issues. The PowerPoint presentation accessible on the OWRB's Produced Water Working Group website: <http://www.owrb.ok.gov/2060/pwwg.php>

Tim Baker, Oklahoma Corporation Commission, provided an overview about commercial recycling facilities classification and requirements. Commercial recycling was identified as a regulatory challenge by a few producing companies. Additional information is included in the PowerPoint presentation available on OWRB's website: <http://www.owrb.ok.gov/2060/pwwg.php>

The speakers each answered questions from the PWWG and other meeting participants through the course of their presentations.

## **Action Items and Next Steps**

Michael Dunkel will be contacting some PWWG members individually on data needs and share the meeting summaries and reports with the PWWG members and their representatives. Mr. Strong encouraged the PWWG for an early brainstorming of ideas and recommendations that they want to champion for. One group member suggested to use the policy, regulatory and legal recommendations to guide some the findings outlined in Mr. Tahmassebbi's presentation.

To sum up actions to be taken by the staff:

1. Set up next meeting using Doodle-Poll
2. Post all meeting items in PWWG website (OWRB's website)
3. Distribute meeting summaries for the PWWG for review
4. Data items:
  - a. Water Quality Data: Letters from OWRB/CH2M to industry groups will be prepared, including formatted table for input
  - b. Water Well Production: Expect to get additional data from OCC and/or Kyle Murray
  - c. Water users information: OWRB will provide water user information and identify water users and ODEQ
  - d. CH2M will provide GIS data analyses of the produced water volumes, water quality and water users: and present the data to PWWG