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Produced Water Working Group

Meeting Summary of Fourth Meeting, 2 pm November 2, 2016

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

ATTENDEES:

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

Tim Baker, OCC	Kyle Murray, OGS
Julie Cunningham, OWRB	Mike Paque, GWPC
Mike Dunkel, CH2M	Jim Reese, OK Secretary of Agriculture
Jeff Everett, OG&E	Alan Riffel, OML
Fred Fischer, OPAIA	Jesse Sandlin, Devon/OKOGA
Bud Ground, EFO	Terry Stowers, COSMO
Mike Mathis, OIPA/Continental	Scott Thompson, ODEQ
Mike Ming, GE	

OWRB Staff and Consultants:

Owen Mills, OWRB	Anna Childers, CH2M
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Others:

Jared Boehs, Pure Water Services	Holly Pearen, EDF
Joyce Boyd, OCC	Nicole Sanders, EDF
Jayne Cox, Cimarex	Brad Schultz, ONEOK
Mike Erickson, Marathon Oil	Jana Slatton, OCC
Lloyd Kirk, ODEQ	Ed Steele, GE
Rick McCurdy, Chesapeake	Saba Tahmassebi, ODEQ
Jeff Myers, OCC	Ella Walker, OGS
	John Westerheide, GE OGTC

Introductions and Goals for Today

Ms. Julie Cunningham, OWRB Interim Executive Director and Produced Water Working Group (PWWG) Interim Chairman, opened the meeting by welcoming the attendees, held introductions, provided a brief update on OWRB's recent change of leadership and confirmed that she is going to see the PWWG effort into completion in her role both as the Interim Executive Director as well as the PWWG Interim Chairman. Ms. Cunningham reviewed the agenda and logistics for the meeting. She stated the primary goal for the meeting was to review the PWWG process thus far as well as discuss the ongoing data collection, data gaps and information coordination. Mr. Michael Dunkel led the meeting and started with overview of the previous meetings and subcommittee efforts.

Summary of Subcommittee Meetings and Conference Calls

Based on the feedback received from the previous meetings and coordination with PWWG subcommittees, a common theme emerged suggesting that some rules and regulations might be changed to simplify and incentivize potential PW uses. Some of the difficulties identified were a need for clarification including, water ownership, definition and liability of spills, classification of treated PW, regulatory authorities, infrastructure right-of-ways etc. It was suggested that incentives for reusing PW coupled with disincentives for not reusing PW may be necessary to jumpstart recycling today versus waiting for the market to force it to happen. While there was some agreement to this idea, there were no suggestions offered on how to implement. Additional subcommittee coordination will be needed. To this end, Mr. Bud Ground of EFO offered to communicate with other interested members to develop shell bills to advance PW use. The subcommittee will help to formulate issue / solution pairings. In addition, DEQ is considering request of delegation of EPA NPDES discharge permitting to OPDES delegation. DEQ must satisfy EPA criteria to obtain delegation of authority.

Needs Status of Water Quality Dataset

Mr. Dunkel discussed the ongoing water quality data collection effort. He stressed the need for water quality data for determining both cost and relative waste stream volumes. Rick McCurdy from Chesapeake voiced his concerns of including *all* of the water quality data, relating that inclusion of all the chemistry can reveal multiple substances of concern and yet be naturally occurring. The PWWG decided that there was no need to include anything the firms are not comfortable with reporting. Also, the PWWG agreed that in order to protect the identity of those providing water quality data, it is acceptable to include less specific spatial information for the wells. County level information at a minimum or truncated coordinates on the order of Township and Range should be sufficient. Determined further that there is no need to include API # and suggested to enter "N/A" rather than a 0 (zero) where the data is not known.

GIS data analyses of the produced water volumes, water quality and water users will be included in the draft report.

Produced Water and Potential User Data in Map Form

Mr. Dunkel provided a PowerPoint presentation on PW and potential user data. He summarized the approach of short-listing top 12 non-potable water use candidates in high PW volume counties. This presentation may be found on OWRB's [PWWG page](#).

After reviewing the presentation, the PWWG were provided an opportunity to ask questions and provide feedback on the preliminary findings and the approach. The group discussed the different water use categories and suggested that it would be helpful to define them in the report. The group had question about Osage Co. why that did not have any PW data. Ms. Anna Childers explained that most of the Osage Co. is in BLM in control and accessing data is challenging; however, the project team would look into accessing data for the county. If no data available, it was suggested to include an asterisk to recognize why the county blank in figures.

Speculation arose on using the Great Salt Plains as a potential site for receiving treated PW into the lake. since the lake levels drop dramatically every year and the water is moderately high on TDS (3,600). The general consensus of the group was the idea may not be a feasible option given its unique ecology and sensitive ecosystems.

The group members also discussed Aquifer Storage Recovery (ASR) as a potential option to store marginal quality water. Oklahoma is in the process of developing ASR guidelines however extensive studies may be required for source water compatibility with the local geochemistry and state standards.

Forced evaporation alternative was discussed and the challenges associated with this option, such as the seasonality; e.g., little evaporation in colder months), large volumes of solids disposal can be very difficult, icing issues such as on nearby powerlines and so forth.

Economic Case Development

Michael Dunkel reviewed the planned economic scenarios. He reminded that the current task is to assess how Oklahoma can reuse produced water most effectively. Scott Thompson indicated that existing state rules handle if PW is transferred to a power plant. Ed Steele reminded the group that an evaporation case is important. Mike Ming suggested ranking the options based on their practicality. Holly Pearin suggested reviewing what California is doing with PW re-use. Scott Thompson said that toxicity evaluation of water discharged will need to be assessed for a project. Jim Reese suggested that the Interstate Oil and Gas Commission may have information on water treatment.

The cost estimates will be developed for the study using the most viable scenarios. The goal is to develop preliminary cost estimates and cost scenarios: less than dozen will be developed.

The PWWG concluded that O&G reuse probably would be the lowest cost. However, it is difficult to evaluate oil-and-gas re-use due to the requirements for detailed company drilling plans that are often confidential and changing. This level of planning is being performed internally by many producing companies. The majority of the scenarios evaluated for this report involve more permanent water users that have long term water needs in one location.

CH2M will initiate development of cost per barrel of water upon receipt of water quality data and average cost estimates from treatment companies. The resulting treated water quality will depend on the intended end water use (clean brine, desalinated, evaporation) Also, infrastructure costs would be developed.

Mr. Jesse Sandlin from Devon suggested if a pilot analysis could be done at some point to get cost estimates for treatment. This could include e.g. 30 wells and certain pipeline lengths and configurations

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of the infrastructure to get “ballpark” / rough order of magnitude estimates. Those representing O&G industry would follow-up after the meeting and discuss the potential for the concept development.

Bud Ground shared that the proposed “shell” legislative bills are due between mid-November and December 9th and that PW ownership is important to clarify. Michael Dunkel committed to drafting a summary of the challenges to re-use for consideration in the draft bills. There was also a short discussion about writing a summary of the re-use process for oil-and-gas operations.

Timing for Draft Report

Prior to finalizing the report, the PWWG will meet to discuss the report findings and solicit comment and look for recommendations. At the time of this meeting the draft report was anticipated for end of January of 2017.

Action Items and Next Steps

To sum up actions to be taken by the staff:

- Set up next meeting using Doodle-Poll
- Post all meeting items in PWWG website (OWRB’s website)
- Distribute meeting summaries for the PWWG for review
- Complete cost analyses for selected scenarios
- Prepare draft report and distribute the PWWG members