Industrial Water Demand Technical Work Group Meeting
Conference Call Summary

January 16, 2013 from 10 am - 12 pm CST

The following summary was prepared by CDM Smith and is intended to capture the general topics, and discussion that was held and is not intended to be a verbatim transcription of the conference call. The following individuals participated in the call:

Participants:
Jamie Burr – Tyson
Lynn Cornelius – FutureFuel
Roland Greaves –Southwest Energy
Mike Guess – ANRC
Jay Hansen – Arkansas Oil and Gas Commission
Amber Houston – BHP Billiton Petroleum
John Newton – XTO Energy
Tim Snell – TNC
Chris Soller – ANRC
Rick Brown – CDM Smith
Bill Davis – CDM Smith
Mitch Horrie – CDM Smith

The meeting began at 10 am CST time and followed the agenda.

Overall Conclusions drawn from the Meeting

- The ANRC Water-Use Registration Database (WUDBS) provides a good foundation for establishing baseline self-supplied water use. However, it is noted that sub-threshold water use (those without the ability to withdrawal 50,000 gallons per day of groundwater or 1 acre-foot annually of surface water) is not captured in this database.
- The group generally supported the approach of using short-term employment projections extrapolated to 2050 to drive self-supplied industrial, commercial, and mining (not include shale gas) water demand. The general approach of looking at employment and employment trends and tying them to industry sub-sectors is a reasonable approach to start with; however the group also indicated they would like to see the preliminary results to ensure that plausible results are being achieved.
- It was agreed that employment is not an appropriate metric to drive future shale gas water demand. Therefore, CDM Smith plans to meet with a shale gas sub-group to discuss methods and approaches to characterizing current and future water demand for shale gas activities.
- The regional nature of the Arkansas Department of Workforce Services employment projections will allow the projected growth in large industries drawing workers from multiple counties to be captured in the employment rates of growth that will drive future water demands.
- CDM Smith will pursue contacting the Arkansas Geological Survey to identify possible emerging mineral development activities that have the ability to significantly affect future water demand.
- The source of supply will be identified in the forecast. It is important to identify any planned changes to source of supply so that those changes can be captured in the water demand forecast.

- CDM Smith will move forward with further data collection and analysis and will share preliminary results with the group as we progress.

Opening Remarks/Review of December 17th Meeting:

- CDM Smith noted we are in the preliminary phase of data collection and analysis. The Water Demand Methodology white paper that was provided at the December 17th meeting is a preliminary outline of the forecasting approach based upon a preliminary analysis of available data and this information has been condensed to the 6 page outline that was sent to facilitate today's conference; it was noted that both documents would be referenced during the call. CDM Smith highlighted the goals/purpose of the call and noted that this call will help the group to understand the drivers of the demand forecast and how those drivers and data availability will affect the approach. In many cases drivers of the demand forecast are both quantitative and qualitative and the work group can be especially helpful in areas where there are professional judgment calls.

Schedule

- A draft demand forecast will be available by early summer (May/June). We are working with several demand sectors to put that together.
- We anticipate communication between now and May will be primarily through conference calls and emails, however, we have worked in resources for a face-to-face meeting if it is necessary.
- As we get into the data, we plan to share progress and information using an iterative process. We plan to do some one-on-one outreach as we encounter issues we want to discuss.
- Once we have developed preliminary draft forecasts that have been reviewed by the work groups, we plan to hold public information and stakeholder involvement meetings throughout Arkansas to share the results. Concurrently we will be developing the water supply methodology.

Initial Approach/Assumptions

Municipal vs. Self-supplied Water Use:

- Municipally-supplied non-residential water uses can be identified within the WUDBS at a broad level. The municipally-supplied database identifies deliveries to "industrial", "commercial", "mining", "agriculture", and "irrigation" customers. Uses are not identified by North American Classification System (NAICS) code.
- We will try to identify and account for municipal system water losses using available data. We will not be able to get down to the individual system level for the forecast. It is likely that a county percent water loss rate will be used.

Statewide vs. Local planning:

- The goal is to use a consistent methodology to objectively look at water demand over a long period of time. Therefore, we try to strike a balance between localized and more regional planning. This involves looking at broader trends (e.g., is source of supply sufficient to meet long-term needs?). Forecasted demands will be associated with a source of supply to identify potential supply short-falls. The challenge is that we lose detail regarding specific challenges that particular industries may be encountering. To the extent we can, we want to use work group to help us identify subtle individual challenges to blend broad approach with some local concerns.

Driving Factors:

- The goal is to connect a driver of economic activity to water use. Employment can be used to measure/estimate economic activity. In some of our past water planning efforts we have also tried to tie production to water use but production and water use information is typically business confidential or proprietary.
    - Strengths of using employment: Consistent. Allows for a comparable way of looking at employment, productivity, and water use.
    - Weakness – Doesn't allow for us to capture changes in production, emerging sectors.
- We believe we should get a fairly accurate regional look at employment from the projections. If there are any unique county specific factors based on your local knowledge please share that information so we can factor that into our approach.
- For shale gas, employment may not be the best driver. We will have a follow-up meeting with shale gas representatives. The goal of the meeting is to get a handle on how shale gas will grow. We are seeking to get a better understanding of the major water demand associated with bringing a gas well into production (i.e., site development, well development, gas production). That is an area we will explore in a little more detail. Will report back to the group.
    - CDM Smith will provide the group with two reports we have identified that speak to the potential for shale gas development in Arkansas. These are: the STRONGER Hydraulic Fracturing Review and the U.S. Energy Information Administration (EIA) Energy Outlook reports.
- For other mining (i.e., non-shale gas) we want to identify if there any mining or mineral development activities that are reasonably foreseeable that are not identified in past trends.
    - Recommended to follow up with Ed Ratchford at the Arkansas Geological Survey.

Baseline Water Use:

- WUDBS is a good foundational data set to look from. Shale gas water use is hard to extrapolate due to large annual variation in withdrawals and relatively short record of withdrawals. We will look at data to determine what a typical water demand year looks like.
- The WUDBS is not capturing sub-threshold water use but this may not be critical for planning and we are looking for your input on this as well. Is there water use that is sub-threshold that we should be aware of and include to ensure that future water needs are met?
    - 1 acre-foot annually is the threshold for withdrawal registration. Capability to withdrawal 50,000 gallons per day is the threshold for groundwater withdrawal registration.

Employment Projections:

- Arkansas Department of Workforce Services projections are regional and go through 2018. Extending them requires assumptions and extrapolation.

Shale Gas Water Use:

- On the water registration form, it says that captured surface water does not need to be registered annually. That would lead to diffused water not being reported annually. Diffuse water is exempt from registration. Thus, the registration system may leave areas where there are holes in reporting.
    - This is something the shale gas group will look into to see if these volumes are significant enough to make a difference in forecasting.