

Minutes of the  
Yellowstone River Compact Commission  
Technical Committee Discussions  
Park Co. Courthouse  
Cody, WY  
April 16, 2008

1. Introductions

Sue Lowry called the meeting to order at 1:30 p.m. Introductions were made and a sign-in sheet was passed around. The list of those in attendance can be found at the end of these minutes.

2. Hydrologic Update from various sources

a. Montana and Wyoming United State Geological Survey (USGS)

Wayne Berkas, Montana USGS, handed out copies (see handouts [here](#)) showing the daily discharge from October 2007 – April 2008 for the following gages:

Yellowstone @ Corwin Springs  
Clarks Fork Yellowstone @ Edgar, MT  
L/BH River near Hardin, MT  
BH River above Tullock Creek near Bighorn, MT  
Tongue River @ State line near Decker  
Tongue River @ Miles City  
Powder River @ Moorhead, MT  
Powder River near Locate, MT

Kirk Miller, Wyoming USGS, handed out copies (see handouts [here](#)) showing the daily discharge from October 2007 – April 2008 for the following gages:

Bull Lake Creek above Bull Lake, WY  
Shell Creek above Shell Creek Reservoir, WY  
South Fork Shoshone near Valley, WY  
Tongue River near Dayton, WY  
Little Powder River above Dry Creek near Weston, WY – there are no data for this gage as there has been ice and equipment problems  
Data are currently not available for Middle Fork Powder River near Barnum, WY. There have also been problems with this station.

Chuck Dalby asked about how these gages compared to the median for 2004, 2006. Kirk was not sure.

b. Update on Indicator Gages

Kirk Miller showed the group the handouts of the work that he had done previously on these indicator gages. He stated that he got quite a few comments, most of them not positive ones.

Working from the comments he received, Kirk then developed a new method for the group to review. He passed out a handout (see handout [here](#)) showing the 6 gages that he used and how he calculated the annual mean percentile.

Kirk also showed a plot of “Day of year of initial spring streamflow pulse”. The initial spring streamflow pulse is the day when the cumulative departure is at a minimum. In this example, five stations were shown. Kirk mentioned that the Scripps Institute and the USGS has a paper out on the impact of earlier spring runoff. Kirk then showed the group a trend graph. This graph (see graph [here](#)) points out that the initial pulse is occurring sooner in the year.

### 3. 2008 Runoff forecasts and estimates

#### a. Roy Kaiser, Natural Resources Conservation Service (NRCS), Montana

Roy passed out [handouts](#) of the following:

- Tongue SWE - April 1 data from 1961 – 2007. This information is from snow courses and snotel sites. Roy mentioned that the “all years ave” line shown on all of the graphs is the average of all years combined.
- Powder SWE - April 1 data from 1961 - 2007.
- Tongue River Basin Streamflow forecasts - April 1, 2008. The seasonal volume forecast for Tongue River at Dayton is 104% of normal with a 50% chance of exceeding. Carmine LoGuidice mentioned that it has been a cool spring; Lake DeSmet is still frozen. The NRCS is forecasting normal runoff
- Powder River Basin Streamflow forecasts - April 1, 2008. The seasonal volume forecast for Powder River at Moorhead is 112% of normal with a 50% chance of exceeding. The NRCS is forecasting above average flows with average precipitation for this basin.
- Upper Yellowstone River Basin Streamflow forecasts - April 1, 2008. The NRCS is forecasting that most areas in this basin will have above average runoff.
- Lower Yellowstone River Basin Streamflow forecasts - April 1, 2008. The forecast for most areas in this basin is slightly above average.

Roy then passed out a handout showing the Yellowstone Basin Time Series Snowpack Summary. This summary includes all snotel sites in that basin. So far in 2008, the snowpack has not warmed up prematurely.

Roy also passed out a handout showing the Tongue Time Series Snowpack Summary and the Powder Time Series Snowpack Summary.

A Daily Guidance Streamflow Forecasts Using SNOTEL Data handout was passed around. This handout shows 10 gages for which volume forecasts are produced from April through July. This gives the NRCS an idea of how close the forecast that was put out is comparing to what is really occurring. This forecast was produced at the request of water users.

b. Lee Hackleman, NRCS, Wyoming

Lee passed out [handouts](#) of the following:

- Wind River Basin (April 2007)
- Wind River Basin (April 2008)

Currently, snotel sites in this basin are averaging 97%, varying from 88% to 111%. Loren Smith pointed out that the NRCS forecast for inflow into Boysen (685,000 af) is significantly higher than what the Bureau of Reclamation projected (500,000 af).

- Big Horn Basin (April 2007)
- Big Horn Basin (April 2008)
- The snotel sites in this basin are averaging 100%, varying from 73% to 196%.
- Shoshone River Basin (April 2007)
- Shoshone River Basin (April 2008)

Currently, snotel sites are averaging 99%, varying from 7% to 113%.

Lee reported that the surface water supply index (SWSI) is 3.22. The SWSI is calculated using reservoir storage and streamflow forecast. The range of index is -4 (dry) to 4 (wet).

4. Reservoir operations and storage (Montana and Wyoming)

a. Special interest (brief reports)

1. Bighorn Reservoir Operations

Keith Kerbel passed out handouts that the long-term issues working group received from the Bureau of Reclamation dated April 8, 2008. Releases from Yellowtail Dam are 1900 cfs which will adversely impact the Bighorn River spawning for rainbow and browns once again. Lenny Duberstein will give a more detailed report tomorrow at the Commission meeting.

2. Buffalo Bill/Boysen Reservoirs/Bull Lake

Loren Smith reported that Buffalo Bill should fill and spill into the summer. Boysen is 61% full at 449,000 af. Bull Lake is projected to receive 130,000 af of inflow and is currently at 55,000 af of storage. A portion of this storage water (13,000 af) is associated with the Boysen water right.

3. Lake DeSmet

Mike Whitaker stated that with snowpack, all of the small mountain reservoirs should fill. Carmine LoGuidice had a meeting with the county coalition that operates Lake DeSmet. They made a decision to only bring the lake up about 2 feet. Nine-thousand to ten-thousand af will be stored as Lake DeSmet is under storage restrictions due to damage to the dam from a storm. The full capacity of Lake DeSmet is 236,000 af; approximately 55,000 af of capacity won't be filled. Runoff in the Powder River should be higher since there will be less storage and snowpack is good. Keith Kerbel asked when

irrigation on Clear Creek should start. Carmine indicated that the irrigators might be starting soon.

#### 4. Tongue River Reservoir

Art Hayes, President of Tongue River Water Users Association reported that the reservoir went into this past winter with 10,000 af additional storage. Storage held constant through the winter at 55,000 af. The reservoir will probably fill even though snowpack is low in that area. A fish ladder that was installed is working; walleyes and saugers are coming up from the Yellowstone River.

#### 5. Cooney and Glacier Reservoirs

Keith Kerbel reported that Glacier Reservoir is a high mountain lake. The capacity of this reservoir is 4,300 af, and usually fills in the early summer because of its location. The water is then released and the reservoir is emptied the first of August. This is determined by the commissioner on Rock Creek. The reservoir holds water for approximately 6 weeks.

Keith reported that Cooney Reservoir, which is on Red Lodge Creek, trib. Rock Creek, trib. Clarks Fork, began the water year with 18,000 af; the capacity of this reservoir is 32,000 af. There are contracts for 28,000 af. The snowpack in this area is low this year but should have no problem filling the reservoir this spring. There is a water commissioner that operates the reservoir and handles the contracts on the reservoir water.

Keith also reported that there is a privately owned reservoir on Ash Creek that services Wyoming water users. He stated that the privately owned reservoirs in Montana are not obligated to report end of year carry-over contents to the state of Montana. Montana has a database that lists privately owned reservoirs over 50 af. A question arose on whether or not these reservoirs should be reported to the Commission. Keith further stated that some of these reservoirs have multiple fills and that information doesn't show up on database. Wyoming is reporting to the Commission selected irrigation and municipal reservoirs. Sue Lowry stated that Wyoming would be interested in seeing a list of reservoirs, both pre-50 and post-50, that exist in Montana. It was decided that only those reservoirs that have a capacity of 100 af or greater with a use of irrigation and/or municipal need to be reported. Keith Kerbel will work on this task.

### 5. Coal bed Natural Gas (CBNG) Update

#### a. Montana

##### 1. Montana Department of Environmental Quality Update

Art Compton reported that CBNG development continues to creep along. In the CX Ranch development, 1600 wells have been drilled, with 880-900 producing. In the Coal Creek development, 236 wells have been drilled. Deer Creek North development has 184 wells drilled, Badger Creek development 103 wells drilled, Pond Creek development 78 wells drilled. Pinnacle has 132 wells planned in the Coal Creek complex (North and East of

Decker complex). This project is in the Waddle Creek drainage, trib. Hanging Woman. There is no information right now on the scope of the project. Three discharge permits for water management have been issued in Montana; 2 to Fidelity and 1 to Pinnacle. Keith Kerbel asked about injection wells. Art reported that the companies are not using this technology yet in Montana. Mike Whitaker asked about sub-surface drips, but Art did not have much information on that method of water disposal.

Settlement Discussions with Environmental Protection Agency (EPA)

An agreement has not yet been reached between the parties, although much was learned from each state's permitting program. The case will go forward in Federal district court in Cheyenne. Original complaints will have to be modified for EPA not disapproving Montana's 2000 and 2006 rulemaking. EPA has approved 2006 rulemaking, so complaints will have to be modified to challenge EPA's approval now instead of disapproval. Art stated that Montana is not anticipating additional rulemaking at this time.

Wyoming State Representative Pat Childers asked about EC and SAR. Art stated that CX Ranch EC is between 2000-2200, SAR 47, TDS is about 2/3 of EC.

## 2. Montana Bureau of Mines and Geology (MBMG) Monitoring and Studies

John Wheaton gave a PowerPoint presentation that can be found [here](#), showing a few wells and how they have varied with coal mining, CBNG development and recovery after ceasing production. Below are some of the highlights of the presentation:

CBNG Water and Gas production - Montana looking at ratio of water to gas - curve tends to decrease over time

- Water to gas ratio and well count (Montana) - much variability in water to gas ratio

Chuck Dalby asked about the spike at the beginning of gas production. John explained that the water produced when the well is first turned on is high and then tapers off over time.

- Groundwater flow: flows generally move toward center of basin and then towards Yellowstone River
- Producers are using mono-bores (drilling into multiple zones in one bore hole)
- Squirrel Creek - drawdown due to coal mining - shows almost no communication between sandstone and shale; infiltration pond helped recharge

Keith Kerbel asked how long you have to pump to pull the head down before gas is produced. John answered that is it variable and depends on the area. The Big George coal, for instance, has high pumping rates

- North of Tongue River dam – the sandstone above it showed no effect from pumping but strong response to natural variations (rain, drought)
- Canyon Coal - no vertical communication
- Hanging Woman Creek - drawdown in Anderson
- Canyon Coal - on state line a little further to the east - strong recovery trend

Art Compton asked if there is re-injection going on? John stated that in Montana, Pinnacle has injection into the Anderson coal seam. In Wyoming, Nance has some going on.

Chuck Dalby asked about water to gas ratio and decrease in gas but steady to increasing trends in water production.

Rich Moy asked about springs that are being monitored. John stated that because springs occur in outcrop of coals and sands, MBMG has long-term monitoring program on about 400 springs on Forest Service land to see if there is an effect from CBNG.

3. CBNG effects on sage grouse - Jeff Hebert - Montana Fish, Wildlife and Parks (MTFWP) - (on phone)

In 2004, 3 different petitions were received by the U.S. Fish and Wildlife Service (USFWS) to list sage grouse. The USFWS considered it range-wide, and made a decision in 2004 that a listing was not warranted. Judge Windmill remanded decision back to USFWS to re-review. USFWS has 12 months for reconsideration of new information. As Montana and Wyoming proceed with development of CBNG, both states have been working with the USFWS by updating them with different aspects of sage grouse and their habitat. The deadline for information to be gathered is the end of June. Assessments will be provided to the USFWS by mid-July and then peer reviewed. The USFWS will then make decision by December 2008.

Mary Sexton asked about the potential effect on CBNG if sage grouse is listed. Jeff stated that the federal processes would all be affected to some degree and would probably result in a significantly smaller footprint of CBNG development.

Ms. Sexton then asked about ponds and mosquitoes. Jeff stated that there will be chapter on West Nile virus as it relates to produced water. Southeast Montana and Northeast Wyoming will be addressed.

Sue Lowry handed out Executive Summaries on conservation plans on smaller geographic areas in Wyoming on sage grouse. She also passed out a summary from the Wyoming Game and Fish web page that details different work that is occurring on this subject.

Mary Sexton stated that if sage grouse is listed, it will impact lots of different activities in both states.

b. Wyoming

1. Wyoming Update - permitting development, legislation - Pat Tyrrell

A handout was passed around listing surface water reservoir permits in the Yellowstone River drainage. Mr. Tyrrell stated that questions have been asked of the State Engineer's Office surface water section concerning reclamation of reservoirs. Some of the reservoir permits are time-limited with reclamation requirements. Pat stated that several reservoirs have been reclaimed in the last few months. Pat compared the December 2007 report to April 2008 report.

Chuck Dalby asked about the inspector position in Division II and whether Wyoming had a good handle of the number of reservoirs in the basin. Pat

explained that the Legislature provided funding for an inspector position and another one will be hired in July with additional funding.

Mike Whitaker explained that David Schroeder goes into a drainage and maps all of the reservoirs in that drainage, not just CBNG reservoirs. The Division II office is using mapping products to help with this effort. Second inspector position will help with this work.

A handout was then provided to the group on groundwater permits that have been issued. Pat pointed out that the handout reflects the groundwater applications that have been received statewide. The groundwater division is currently receiving about 200-300 applications per month.

Legislation - Pat introduced Pat Childers. Mr. Childers is the Wyoming State Representative for House District 50 and chairman of the Minerals committee. Pat Tyrrell described the legislation that came out of CBNG Task group. One recommendation was natural channel legislation. This legislation would allow the State Engineer to order in a channel but the legislation did not pass during budget session. An attempt will be made to bring this bill before the legislature again during the general session. It is not yet clear in which committee (Agriculture or Minerals) this bill will originate. Mr. Childers stated that the Management Committee will determine which committee will be assigned the bill.

Rich Moy asked why bill died. Pat stated that it could have been any number of reasons. Most of it was just a lack of understanding and education. Pat stressed that the State Engineer's Office (SEO) needs to provide more education on this subject to the legislators and the public. Further, the time tables that were set in the legislation were going to be hard to meet by the SEO.

The other task force recommendations were to develop a process to look at wells that are producing water but little or no gas. The SEO is now placing limitations on the groundwater permits stating that when the water to gas ratio drops below 10bbl/mcf, the permit will be canceled. The SEO also started issuing "show cause" statements to producers that are producing water and no gas. There are currently 296 permitted wells that are showing production of water but no gas.

Pat further reported that the Legislature passed a mandatory water well drilling and licensing bill. Beginning in July of 2009, drillers will need to be registered with the SEO. CBNG wells are exempt, but all other wells will be required to be drilled by a registered driller. The revenue stream of increased application fees will help fund the licensing board.

2. Wyoming State Geological Survey (WSGS) - Ron Surdam, Director - "Coal bed Natural Gas Production vs. Water Production in the Powder River Basin"

Ron Surdam gave a PowerPoint presentation that can be found [here](#). Wyoming now has 10 years of production history which means the state is probably about halfway through total CBNG production. Trends have been showing that CBNG wells last approx. 5-10 years. There are 338 wells in

WYOMING that never produced water but produced gas. These wells are located near coal mines.

There are 851 wells in Wyoming that only produce water, no gas (wells are at least 2 years old). These wells fall along linear features. The average water to gas ratio is 1.83 bbls/mcf and that average is dropping.

The CBNG play in the basin has moved from east to west. The majority of recharge in the basin is from the Bighorn Mountains. As development moves from east to west over the next ten years, the wells will go from shallower to deeper and water quality will decline due to higher water temperatures and longer residence time between water and rock formations.

The trends show salinity increases in gradient from east to west and that SAR values follow a similar trend. The Smith/Big George Coal produces poor water quality where the Felix coal has good water quality.

A 3D model in the Powder River Basin (PRB) has been developed that shows the depth of coal in a specific location, the lateral distribution of the coals, and the different constituents of the water in the basin.

John Wagner, Administrator, Water Quality Division of the Wyoming Department of Environmental Quality, is working with the WSGS to divide between the producers the assimilative capacity that is available in the Powder River Basin. Currently, there are 75 companies producing in the basin.

3. Wyoming Department of Environmental Quality (WYDEQ) - John Wagner

John discussed CBNG discharge permits and stated that some of the water is being stored in pits and ponds. There is about 5-10% of the water being injected. John added there has been lots of interest in sub-surface drip systems.

The WYDEQ established a watershed based permitting system. This type of permit is issued for a general discharge permit in a watershed. In several basins as soon as the permit was advertised, it was appealed by both industry and environmental groups. The appealed permits will now go before the Environmental Quality Council for resolution.

6. Tongue River USGS monitoring network

a. John Kilpatrick, Montana United States Geological Survey (MT USGS)

1. John provided two handouts to the group. The first handout described the changes in the Tongue River network operations for WYO8. Funding for data collection was about \$300K less than required to maintain the same level of collection as in the original network design. Two stations were discontinued from the network, real-time specific conductance monitoring was discontinued at 2 stations, and real-time estimation of SAR was discontinued at four stations.

John went on to review the request for FY09. There are two components to this request: monitoring network and data analysis and reporting. The site locations are as follows:

- 12 sites in the Tongue River watershed in MT and WY
- 5 sites in the Powder River watershed in MT
- 2 sites in the Rosebud Creek watershed in MT

John Wagner asked who put request together and decided what would be the scope of the project. Chuck Dalby stated that it was a request specifically from the Montana DNRC, coordinated with others who had worked previously on the earmark, such as the Montana Bureau of Land Management involved in CBNG monitoring, a local watershed group and Northern Plains. The earmark was added while Senator Burns served on the Appropriations Committee.

John Wagner asked if the WYDEQ was involved. Chuck stated that he did not believe that they were and that could have been an oversight.

The original Burns earmark asked for sites in the Tongue River watershed in both Montana and Wyoming. The Yellowstone River Compact Commission (YRCC) was not involved in the original Burns request.

Sue Lowry asked if the request had gone to the Montana legislative delegation. Mary Sexton stated that it had gone to the delegation and Sen. Tester has taken the lead to use one of his earmarks, but all three Montana legislators will work on this.

Pat Tyrrell had a question on what part the YRCC is to play in this request. Pat stated that he is looking at project justification.

Mary Sexton asked about if there had been any YRCC involvement in the last request. There was none.

Chuck Dalby brought up the letter that Pat Tyrrell and Mary Sexton signed in December of 2006 that was addressed to Sen. Max Baucus.

Mary also stated the BLM support for this network had decreased and was a driver in this request.

Rich Moy asked about matches. Chuck Dalby stated that that is unclear, but it can't be matched through the USGS Coop program. Rich asked Pat in which gages Wyoming would be interested.

Pat asked what the value is for Wyoming in this network as it relates to the YRCC.

Kirk Miller stated that Tongue River at Monarch and Prairie Dog at Acme are now 100% funded by WYDEQ.

Sue asked which gages were added purely by Burns amendment. Those gages are:

Tongue at Monarch - no sites had real-time SAR and specific conductance

Tongue River below dam - no water quality data

Tongue at Birney – no water quality data

Tongue River at T and Y diversion

Rich asked what the intent of \$1.1 million request is; is it to estimate a trend analysis? Chuck stated no, it would be just to collect more data after CBNG development occurred. The funding request is asking for a 1 year data collection period and a 1 year data analysis period.

Sue asked John Wagner about the relationship of this funding request to the settlement agreement on water quality between Montana and Wyoming. John stated that there is no relationship between the two.

Mary stated that this request was a refinement of original the Burns request.

Sue elaborated on how Interstate Council on Water Policy (ICWP) and others are working on nationwide NSIP funding (approx. \$3 million request) and how it would be hard for Wyoming to support this request for almost \$1 million for gages in one basin in the U.S.

Wayne Berkas asked Bill Horak to explain how funding decisions are made within the USGS during continuing resolutions.

## 7. State Adjudications and Water Rights

### a. Montana

#### 1. Montana Tongue River Adjudication

#### 2. Crow Compact Update - Chris Tweeten – Montana Attorney General Office

Mr. Tweeten works with the reserved water rights compact commission. An 1868 water right was established for tribe. The detailed provisions of Compact are outlined in the Montana code. The status of preparation for federal legislation is as follows: Montana is involved in discussions with tribes to get compacts ratified this session in Congress. The provisions of bill are worked on by state and tribes and looked at by the congressional delegation. The bill is then introduced just like any other bill. The commission would like to have process completed before fall recess.

## 8. Discussion of website for the Commission and archiving of meeting minutes and PowerPoint presentations

Bill Horak suggested that item 7.a.1, Montana Tongue River Adjudication, be tabled until tomorrow's meeting. He also elaborated on item 8, discussion of website. Sue asked about PowerPoint presentations and 508

compliance and how that should be handled. Bill will get some additional information and add it as a short agenda item to tomorrow's meeting.

The YRCC website address is: <http://yrcc.usgs.gov/>. The website is supported by the USGS archival service.

9. Public comment

There was no public comment.

10. Next meeting

The date and location of the next meeting will be discussed at the full commission tomorrow. Discussion took place on the possibility of the technical meeting and full commission meeting being separated in the spring and fall.

Keith Kerbel passed out a handout from Sally Springer who is with the National Weather Service in Billings, MT.

Yellowstone River Compact Committee Technical Meeting  
 April 16, 2008  
 Cody, WY  
 Attendee sign-in sheet

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