

OSAG

From: Cooper, Richard D
Sent: Tuesday, November 15, 2005 1:20 PM
To: OSAG; Buhr, Thomas A; Thompson, Phil (Osage Plant)
Cc: Scott, Jeffrey T; Witt, Warren A; Hogg, Jerry F
Subject: Taum Sauk Volume control

Staff Exhibit No. 32
Case No(s) ES-2007-0474
Date 8/2/07 Rptr MW

I don't know where we'll have the gates set when we go home. Currently the small gate is at 100% and the big gate is at 75%. There is a lot of water entering and leaving the lower reservoir. It is currently raining, still.

The Osage operators will need to watch total volume overnight tonight. Our goal is naturally to end up at 4800 to 4850 acre feet total volume. But just as it took hours to get where we are currently, 5800 acre feet, we want to take approx. the same number of hours to get to 4800 to 4850 acre feet. If you can pull up the trend of "Gate Pos - Total Vol" you will be able to see how the total volume has risen over the last 8 hours. You can put that trend in live mode and monitor it as the time passes.

We shouldn't raise the big gate to 100% to get rid of the excess volume rapidly. That would cause more flooding down stream than what would have normally occurred if the dam was not there. We are supposed to operate the gates to release water at the same rate it is coming into the lower reservoir from the river and creeks. Due to the lag in seeing changing volume and our easing of the big gate open we delay the increase in flow down stream and end up continuing excess water release from the lower reservoir after the inflow to the lower reservoir begins slowing down. So we are presently trying to stop the increase of total volume (matching inflow to outflow). At that point if we don't get too much additional rain the total volume should start decreasing as the inflow starts dropping off. It's kind of a guessing game of how much to move the big gate going up and going down. The flows into the lower reservoir lag the actual time of the rain fall and continue to climb after the rains stops. It depends on how saturated the ground is, where up the valley the rain is falling and a host of other factors that I'm sure we're not aware of.

So my best advice is to check the total volume about every 30 minutes. If it's raining heavily that may not be soon enough. But for tonight I'd suggest the 30 minute interval since I expect the total volume to be going down overnight. If you look at the trend going up this morning try your best to match it going down. It looks like at the steepest part of the curve (0600 to 0930 hours) the rate was 171 acre feet per 30 minute interval. So if you can let the total volume fall somewhere between 150 to 175 acre feet (maximum) per 30 minute interval that would be fine. If the rate of decrease is above 175 acre feet in 30 minutes then you need to pinch off the big gate some to slow the rate down. This is easily seen if you bring up the trend and put it in live mode. If you close the big gate too much but the volume continues to fall at a rate lower than 150 acre feet in 30 minutes, no harm done. Just leave it there and wait another 30 minutes. Eventually the inflow will fall off and rate will increase again. We want to get rid of the excess volume, but at a controlled rate.

How much do you move the big gate at a time? That's a good question. Flows thru the big gate change with the lower lake levels. With all the information we do have like reservoir levels, volumes, gate positions, etc. it is still kind of a feel. You don't have to wait 30 minutes to take readings you can do it as often as you like. If it was me I'd probably move the big gate 10% each time when the rate of decrease in volume requires the big gate to be adjusted. If that wasn't enough to bring the rate down below the 175 acre feet rate then add another 5%. Like I said it's a feel and each rain fall event is

different.

Once again if you put the above trend in live mode it's easy to see the effects of your gate adjustments on the rise and fall of total volume.

As always I'll be home if you have questions.

Rick