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# United States Department of the Interior

BUREAU OF RECLAMATION

Great Plains Region

Montana Area Office

P.O. Box 30137

Billings, Montana 59107-0137



October 19, 2009

## **FAXOGRAM: Water Order Change**

To: Chief, Power Supply and Billing Division, WAPA, Watertown, South Dakota  
Attention: F-6001  
Chief, Power Dispatching Branch, WAPA, Loveland, Colorado  
Attention: J-4120  
Facilities Manager, Hardin, Montana  
Attention: MT-300: Tom Tauscher  
Project Manager, Mills, Wyoming  
Attention: WY-4000, WY-4100, WY-6400  
Assistant Superintendent, National Park Service, Lovell, Wyoming  
Attention: Jim Staebler

From: Reservoir and River Operations, Billings, Montana

Subject: **Yellowtail Water Release Order - BHR No. 10-07**

### **CURRENT RESERVOIR CONDITIONS:**

Elevation: 3639.59; Storage: 1,064,892 acre-feet; River Release: 2,500 cfs; Inflow: 2,380 cfs;

### **GENERAL COMMENTS:**

Due to the cooler weather and shorter days, the heavy algae growth in the Bighorn River continues to decrease significantly. Power generation indicates actual river flows are much higher than anticipated. To adjust for the variation in flows and prepare for the leakage and seepage measurements this week, the following adjustments are required by applying a new shift of -1.0 to the river gage height.

As part of the routine inspection program at Yellowtail Dam, Reclamation plans to measure the leakage and seepage flow below the dam on Wednesday, October 21, 2009. The measurement will be made on this date to minimize the effects of fish spawning while providing water through the end of the irrigation season. At 0700 hour on October 17, releases from Yellowtail Afterbay Dam to the Bighorn River have begun to be gradually reduced from the current base flow of 3,300 cfs to 1,500 cfs at 2000 hour on October 20. It is believed that this will allow the fish to voluntarily move out of side channels and back into the main river prior to the major reduction in river flows from 1,500 cfs to 400 cfs. On October 21, flows will remain at 400 cfs for approximately 5-1/2 hours. Releases are tentatively scheduled to be returned to the current rate of 3,300 cfs in about 3-1/2 hours on October 21 and will remain at this rate until further notice. This will minimize the amount of time the river is at a critically low level. The following operations are required to accomplish the flow measurements.

**NOTE: This is the time period when fish are less affected by high levels of nitrogen gas super-saturation. Since mixing flows through the spillway gates and the sluice gates is not required at this time, it is still desirable to provide a mixing flow of approximately 75% through the spillway gates and 25% through the sluice gates whenever the level of the Afterbay allows for flows to be released through the spillway gates.**

### **October 19, 2009**

1. At 1600 hour on October 19, reduce powerplant turbine releases as necessary to reduce river flow to 2,250 cfs in preparation to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21. (*turbine release  $\approx$  2,180 cfs & generation  $\approx$  1,420 MW-hrs/day using 36.9 cfs/mw*)

**October 20, 2009**

1. At 0700 hour on October 20, reduce powerplant turbine releases as necessary to reduce river flow to 2,000 cfs in preparation to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21. (*turbine release  $\approx$  1,930 cfs & generation  $\approx$  1,255 MW-hrs/day using 36.9 cfs/mw*)
2. At 1900 hour on October 20 reduce powerplant turbine releases as necessary to reduce river flow to 1,750 cfs in preparation to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21. (*turbine release  $\approx$  1,680 cfs & generation  $\approx$  1,090 MW-hrs/day using 36.9 cfs/mw*)
3. At 2000 hour on October 20 reduce powerplant turbine releases as necessary to reduce river flow to 1,500 cfs in preparation to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21. (*turbine release  $\approx$  1,430 cfs & generation  $\approx$  930 MW-hrs/day using 36.9 cfs/mw*)
4. At 2100 hour on October 20, begin reducing river stage at a maximum rate of 100 cfs per hour until reaching a flow rate of 400 cfs at 0700 hour on October 21 and evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21. Maintain this rate for approximately 6 hours or less if measurements are completed ahead of schedule.

**NOTICE: It is absolutely necessary to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour on October 21 than to reduce river stage in accordance with the attached schedule. The level of the Afterbay must be closely monitored, as actual flow conditions may vary from that scheduled as a result of a varying shift.**

**October 21, 2009**

1. Evacuate Afterbay storage to elevation 3170.5 by 0700 hour on October 21 and discontinue all releases through the powerplant. See No. 4 above.
2. Maintain Afterbay level below elevation 3170.5 until 1300 hour (for 6 hours) while Reclamation and U.S. Geological Survey crews measure the flows below Yellowtail Dam.
3. No restrictions on Afterbay operations after 1230 hour.
4. At 1230 hour on October 21, resume releases through the powerplant turbines and begin increasing river stage at a rate of 0.50 foot instantaneously and approximately 0.40 foot every 30 minutes for the next three hours until reaching a stage of 61.60 feet (3,300 ft<sup>3</sup>/s) at 1600 hour. By 1600 hour on October 21, flows in the Bighorn River should be returned to the original previous flow rate of 3,300 ft<sup>3</sup>/s. (*turbine release  $\approx$  3,230 ft<sup>3</sup>/s & generation  $\approx$  2,100 MW-hrs/day using 36.9 cfs/mw*)

Personnel at the Casper Control Center will notify downstream landowners, water users, and the County Sheriff of these special operations, stressing the potential dangers when water is restored to the river on October 21.

**At the conclusion of the leakage and seepage measurement, the following operations shall resume:**

**TURBINE RELEASES:**

**At 1600 hour on Wednesday, October 21, 2009:**

*Increase and maintain average daily turbine release at 3,230 ft<sup>3</sup>/s ( $\approx$  2,100 MW-Hrs/day using 36.9 cfs/mw).*

**AFTERBAY RELEASE AND OPERATION:**

**At 1600 hour on Wednesday, October 21, 2009:**

*Maintain diversions to the Bighorn Canal at 0 cfs.*

*Increase and maintain river release at 3,300 ft<sup>3</sup>/s (gage height = 61.60 using shift of -1.00).*

*Increase and maintain total release from the Afterbay at 3,300 ft<sup>3</sup>/s cfs.*

/S/ Tim H. Felchle

**Note: The table below intends to display the approximate flow release schedule that is needed to adequately accommodate the leakage and seepage flow measurements conducted downstream of Yellowtail Dam and Powerplant.**

**BIGHORN RIVER FLOW SCHEDULE**

DATE	TIME	GAGE HEIGHT	SHIFT	FLOW CFS	ACTUAL GH W/NO SHIFT
10/16/2009	7:00	62.07	-1.47	3,300	60.60
10/17/2009	7:00	61.79	-1.47	2,900	60.32
10/18/2009	7:00	61.47	-1.47	2,500	60.00
10/19/2009	7:00	61.27	-1.47	2,250	59.80
	16:00	60.80	-1.00	2,250	59.80
10/20/2009	7:00	60.58	-1.00	2,000	59.58
	19:00	60.34	-1.00	1,750	59.34
	20:00	60.07	-1.00	1,500	59.07
	21:00	59.96	-1.00	1,400	58.96
	22:00	59.85	-1.00	1,300	58.85
	23:00	59.72	-1.00	1,200	58.72
10/21/2009	0:00	59.59	-1.00	1,100	58.59
	1:00	59.45	-1.00	1,000	58.45
	2:00	59.31	-1.00	900	58.31
	3:00	59.16	-1.00	800	58.16
	4:00	59.00	-1.00	700	58.00
	5:00	58.82	-1.00	600	57.82
	6:00	58.63	-1.00	500	57.63
	7:00	58.42	-1.00	400	57.42
	8:00	58.42	-1.00	400	57.42
	9:00	58.42	-1.00	400	57.42
	10:00	58.42	-1.00	400	57.42
	11:00	58.42	-1.00	400	57.42
	12:00	58.42	-1.00	400	57.42
	12:30	58.92	-1.00	650	57.92
	13:00	59.32	-1.00	900	58.32
	13:30	59.72	-1.00	1,200	58.72
	14:00	60.12	-1.00	1,550	59.12
	14:30	60.52	-1.00	1,935	59.52
	15:00	60.92	-1.00	2,400	59.92
	15:30	61.32	-1.00	2,900	60.32
	16:00	61.60	-1.00	3,300	60.60

**ATTENTION:** As we get closer to the actual date of the scheduled drawdown, the actual shift may vary from the current shift value of -1.00.

**NOTICE:** It is absolutely necessary to evacuate storage in the Afterbay to elevation 3170.5 by 0700 hour than to reduce river stage in accordance with the above schedule. The level of the Afterbay must be closely monitored, as actual flow conditions may vary from that scheduled as a result of a varying shift.