Change Request Number: 11LGS003_30% to a Constant Spill Rate
Date: October 28, 2010
Proposed by: Doug Baus, Corps, NWD
Location of Change: On page LGS-6 add a new section titled: **"2.1.4 – Change from 30% Spill to a Constant Spill Rate"**
Proposed Change: 2.1.4 – Change from 30% Spill to a Constant Spill Rate. When forecast daily average inflows at Little Goose Dam (LGS) are 33 kcfs or less, for three consecutive days, and indicating a continued downward trend, change the 30% spill operation to spilling at a constant rate. The constant rate would be approximately 11.2, 9.3, or 7.5 kcfs. The rate selected should be the rate that will result in the daily spill average closest to 30%. These consistent spill levels are approximate and may vary depending on changing inflow, forebay and tailwater elevations, and other operational demands.

It is difficult for LGS to achieving 30% spill when inflows are less than 38 kcfs because it requires switching frequently between one and two unit operations. This operation is incompatible with the more constant discharge upstream at Lower Granite Dam (18 kcfs - 2010 Summer FOP Spill Operation) and downstream at Lower Monumental Dam (17 kcfs – 2010 Summer FOP). This causes both spillway and turbine discharge to vary considerably to maintain 30% spill within the 1-foot operating range, as total discharge must either be approximately 25 or 38 kcfs to meet 30% spill. It is also difficult to achieve the FOP prescribed spill level downstream at Lower Monumental Dam and maintain MOP operations at LGS.

Reason for Change: NOAA Fisheries' 2008 Biological Opinion Reasonable and Prudent Alternative Number 29 (Table 2. Initial Voluntary Spill Operations at Columbia and Snake River Dams) identifies the LGS Summer Operation (day/night) as 30%/30%. FOP's from 2008, 2009, and 2010 have all included 30% spill levels at LGS. In 2008, 2009, and 2010 (Attachment 1) the Corps struggled to achieve the 30% spill requirement at LGS during low flow periods because of the need to maintain MOP at LWG and LMN in addition to meeting FOP spill requirements at LGS and LMN. The difficulty in achieving the 30% spill during this low flow period is cause by switching between one unit (approximately 17 kcfs) and a two unit (approximately 25 kcfs) operation (Attachment 2). The differential of approximately 8 kcfs discharge between the two operations is significant because it may represent up to approximately 30% of LGW inflows and attempting to manage this significant rate of flow while maintaining a 1 foot operating range and meeting spill requirement is difficult.

The following excerpt is how the issue was described in the 2010 Summer FOP (http://www.nwd-wc.usace.army.mil/tmt/agendas/2010/2010_Summer_Ops_Fish.pdf):

> At Little Goose Dam, when daily average flows in the lower Snake River are ≤ 32 kcfs as a daily average, achieving 30% spill requires switching turbine operations between operating 2 units at the low end of the ±1% of best efficiency range to operating one unit at the high end of the ±1% of best efficiency range. This operation is incompatible with the more constant discharge upstream at Lower

Granite Dam. It is also often difficult to achieve the FOP prescribed spill level downstream at Lower Monumental Dam and maintain MOP operations. In 2009, through coordination with TMT during low flow periods, Little Goose spill operations changed from 30% to a flat spill level of approximately 7-11 kcfs to smooth out Little Goose discharges, meet Lower Monumental spill levels, and maintain the MOP operating range at Little Goose. For 2010, the Fish Passage Operations and Maintenance Team (FPOM) recommended removing the spillway weir from service for the season when river discharge is forecasted to drop below 32 kcfs for three days. Weir removal allows allow finer control of spill discharge during periods of low river discharge. If necessary in 2010, additional operational adjustments at Little Goose may be implemented during low flow periods after coordination with FPOM/TMT.

The Corps proposed to include this change in the 2011 FPP because: 1) It is consistent with low flow operations that were regionally coordinated and supported 2009, and 2010; 2) low flows at LGS occur annually and implementing this change will avoid unnecessary regional coordination to make these operational changes in the future, 3) improves the Corps ability to achieve multiple requirements (Lower Snake Spill and MOP) during low flow conditions when achieving these numerous objectives is difficult.

Additional Information Supporting the Change Form: Attachment 2: Little Goose Dam Hourly Flow Data from 18-31 August 2010, provides the background data that supports this change form. The full month of data may be found at:
http://www.nwd-wc.usace.army.mil/ftppub/water_quality/spill/html/201008.html
Note the following key points discussed in this change form:
1) "Switching" between a one (approx 17K) and two unit (approx 25K) operation may be observed in the "Gen Flow kcfs" column from 08/18 0100 hours to 08/20 1200 hours.
2) Constant spill rates selected in 2010 proposed to be included in the 2011 FPP occurred on: 1) 08/20, 1300 hours, 11.2 kcfs; 2) 08/23, 1200 hours, 9.3 kcfs, and; 3) 08/28, 1400 hours, 7.5 kcfs.

Approximately 8 kcfs represents a rate of flow that is reallocated via spill or generation as a result of switching from between a one and two unit operation and vice versa. During low flow periods this rate of flow may represent up to approximately 30% of inflow at LGS. On an hourly basis the Corps is unable to manage such a significant percentage of change in total river discharge while attempting to meet multiple objectives (FOP prescribed spill and MOP) at multiple projects (LWG, LGS, LMN, IHR). Managing flow at LGS during low flow situations is imperative because it impounds the largest reservoir on the Lower Snake River (KSFSH: LWG, 108; LGS, 120; LMN 83; IHR, 96). If the Corps is unable to mange flow at LGS then it takes significant changes on the entire Lower Snake River as occurred in 2009 (spill curtailment at IHR and LWG) to revert back to FOP and MOP operations at all Lower Snake Projects.

Comments from others:
FPOM 12 August 2010 Meeting Notes:

6. **LGS spill pattern 4.00.00.** Wills asked for clarification on the operation at LGS, based on the FPP tables. He said he doesn't see a constant spill in the tables. Dykstra said correct, because it is in the Summer FOP, the "flat spill pattern" should really read "constant volume of spill". Dykstra said it is likely LGS will transition out of 30% spill into the constant spill volume. **Wills, Hevlin, Lorz, Kruger, BPA agreed with transitioning from 30% to a constant spill volume.**

USFWS- support. Wills asks that USACE touch base with Kiefer about this operation.
FPC- the criteria for when to switch to constant seems to be different in FOP and in the change form.

TMT 20 August Official Coordination Email (Attachment 2):
TMT members did not object to this operation.
FPOM may consider several low flow (between 30 and 40 kcfs) LGS operational changes (SW operation, LGS FBE increase of +0.5 ft from 633.0 – 634.0' to 633.5 - 634.5', Constant Spill vs. 30%) in the 2011 Fish Passage Plan (FPP). These operations are interrelated because they all converge on operational changes that may occur when flows are between 30 and 40 kcfs. Ensure the interrelated effects of all these actions are considered during the planning process so FPOM selects the best low flow operation for LGS in 2011. Doug Baus - Corps.

Record of Final Action: approved 21 January 2011.

Attachment 1: TMT Coordination RE: Little Goose 30% Spill to a Constant Rate in 2010

From: Barton, Steven B NWD
Sent: Friday, August 20, 2010 11:44 AM
To: Allgood, Tiffany; Barquin, Billy; Baus, Douglas M NWD; Brandt, Scott; Denny, Lytle; Hovenkotter, Joe; Kiefer, Russ; Kruger, Rick; LeFleur, Cindy; Litchfield, Jim; Lorz, Tom; Lovtang, Jens; Marotz, Brian; Norris, Tony; Ogan, John; Pavlik-Kunkel, Deanne; Roche, John; Rose, Bob; Sears, Sheri; Spurgin, Pat; Statler, Dave; Sue Ireland; Wagner, Paul; Wills, Dave; Bettin, Scott; Boyce, Ron; Dittmer, Kyle; Domingue, Rich; Haeseker, Steve; Haller, Greg; Hassemer, Pete; MacKay, Robyn; Mellema, Mary; Steve Smith

Cc: Kanbergs, Karlis NWD; English, Scott E NWD; Barton, James D NWD; Lear, Gayle N NWD; Peters, Rock D NWD; Feil, Dan H NWD; Dykstra, Timothy A NWW; Robin Gumpert; Erin Halton; Donna Silverberg

Subject: Official TMT Coordination: LGS Spill

TMT Members and Alternates:
The current spill operation at Little Goose follows the patterns within the 2010 Fish Passage Plan, within unit availability and subject to varying head. Total discharge at the project (approx 28 to 32 kcfs, day average) is within the range where units are switching frequently between one- and two-unit operations. This causes both spillway and turbine discharge to vary considerably to maintain 30% spill within the 1-foot operating range, as total discharge must either be approximately 25 or 37 kcfs to meet 30% spill.

The Action Agencies propose, similar to 2009, to move from 30% spill to a flat spill of approximately 11.2 kcfs. The spill rate may be adjusted downward as flows recede throughout the remainder of August as not to adversely impact adult passage.

TMT Members are requested to respond with any questions, comments, or objections to this proposed action by 15:00 Pacific, today (Aug 20).

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Steven B. Barton, P.E.
Chief, Reservoir Control Center
Northwestern Division
U.S. Army Corps of Engineers
Portland, Oregon
Phone: 503-808-3945
E-mail: Steven.B.Barton@usace.army.mil

Attachment 2: Little Goose Dam Hourly Flow Data from 18-31 August 2010

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/18 01	30.2	17	7.5	0.3	24.8	634.1
08/18 02	30.1	17	7.5	0.4	24.9	634.1
08/18 03	30.1	17	7.5	0.4	24.9	634.1
08/18 04	30.1	17	7.5	0.4	24.9	634.2
08/18 05	30	17.1	7.5	0.4	25	634.2
08/18 06	30	18	7.9	0.4	26.3	634.2
08/18 07	28.9	25.8	11.2	1.8	38.8	634.1
08/18 08	30.1	25.7	11.2	0.3	37.2	634.1
08/18 09	30.4	25.3	11.2	0.4	36.9	634
08/18 10	30.4	25.3	11.2	0.3	36.8	633.9
08/18 11	30.3	25.4	11.2	0.4	37	633.9
08/18 12	30.3	25.4	11.2	0.4	37	633.8
08/18 13	30.4	25.3	11.2	0.4	36.9	633.8
08/18 14	30.2	25.3	11.1	0.4	36.8	633.8
08/18 15	30.2	25.2	11.1	0.5	36.8	633.7
08/18 16	30.3	24.8	10.9	0.3	36	633.7
08/18 17	30	16.9	7.4	0.4	24.7	633.7
08/18 18	30.1	16.8	7.4	0.4	24.6	633.7
08/18 19	30.1	16.8	7.4	0.4	24.6	633.8
08/18 20	30.1	16.7	7.4	0.5	24.6	633.9
08/18 21	30	16.8	7.4	0.5	24.7	633.9
08/18 22	30.2	16.9	7.5	0.4	24.8	634
08/18 23	30.5	24.9	11.1	0.4	36.4	633.9
08/18 24	30.4	25.3	11.2	0.4	36.9	633.8
08/19 01	30.4	25.4	11.2	0.3	36.9	633.9
08/19 02	30.2	25.5	11.2	0.4	37.1	633.8
08/19 03	30.4	25.3	11.2	0.4	36.9	633.8
08/19 04	30.4	25.3	11.2	0.4	36.9	633.8
08/19 05	29.9	25.2	10.9	0.4	36.5	633.8
08/19 06	29.6	17.2	7.4	0.4	25	633.8
08/19 07	28	17.2	7.4	1.8	26.4	633.8
08/19 08	29.6	17.2	7.4	0.4	25	633.9
08/19 09	29.6	17.2	7.4	0.4	25	634
08/19 10	29.6	17.2	7.4	0.4	25	633.9
08/19 11	29.6	17.1	7.4	0.5	25	634
08/19 12	29.6	17.7	7.6	0.4	25.7	634

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/19 13	29.1	25.5	11.2	1.8	38.5	633.9
08/19 14	29.9	25.8	11.2	0.4	37.4	634
08/19 15	29.1	25.6	11.2	1.7	38.5	633.9
08/19 16	30.2	25.6	11.2	0.3	37.1	633.8
08/19 17	30.2	25.6	11.2	0.3	37.1	633.8
08/19 18	30	25.4	11.1	0.5	37	633.7
08/19 19	28.9	25.4	11.1	1.9	38.4	633.6
08/19 20	29	25.4	11.1	1.8	38.3	633.7
08/19 21	30	17.2	7.5	0.3	25	633.8
08/19 22	29.8	16.9	7.4	0.5	24.8	633.7
08/19 23	29.8	17	7.4	0.4	24.8	633.9
08/19 24	29.7	17.1	7.4	0.4	24.9	634
08/20 01	28.1	17	7.4	1.9	26.3	633.8
08/20 02	29.7	17.1	7.4	0.4	24.9	634
08/20 03	30.1	17	7.5	0.4	24.9	634.1
08/20 04	30	17.1	7.5	0.4	25	634.1
08/20 05	30.1	17	7.5	0.4	24.9	634.1
08/20 06	30	17.2	7.5	0.3	25	634.1
08/20 07	30	17.2	7.5	0.3	25	634.1
08/20 08	30	17.2	7.5	0.3	25	634.1
08/20 09	30	17.1	7.5	0.4	25	634.2
08/20 10	30.1	17	7.5	0.4	24.9	634.2
08/20 11	30	17.1	7.5	0.4	25	634.2
08/20 12	29.8	17.7	7.7	0.4	25.8	634.3
08/20 13	30.4	25.3	11.2	0.4	36.9	634.3
08/20 14	29.2	25.3	11.2	1.8	38.3	634.2
08/20 15	29.2	25.3	11.2	1.8	38.3	634.1
08/20 16	30.4	25.3	11.2	0.4	36.9	634.1
08/20 17	29.9	25.8	11.2	0.4	37.4	634.1
08/20 18	30.6	25	11.2	0.4	36.6	634.1
08/20 19	39.2	17.1	11.2	0.3	28.6	634.3
08/20 20	38.5	17.5	11.2	0.4	29.1	634.1
08/20 21	38.5	17.6	11.2	0.3	29.1	634.2
08/20 22	38.6	17.4	11.2	0.4	29	634.2
08/20 23	36.7	17.5	11.2	1.8	30.5	634.1
08/20 24	38.6	17.4	11.2	0.4	29	634.2
08/21 01	38.6	17.4	11.2	0.4	29	634.2
08/21 02	38.6	17.4	11.2	0.4	29	634.2

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/21 03	39.2	17	11.2	0.4	28.6	634.3
08/21 04	39.2	17	11.2	0.4	28.6	634.2
08/21 05	39.2	17	11.2	0.4	28.6	634.3
08/21 06	32.8	22.5	11.2	0.4	34.1	634.3
08/21 07	30.9	24.7	11.2	0.4	36.3	634.2
08/21 08	30.8	24.8	11.2	0.4	36.4	634.3
08/21 09	29.6	24.9	11.2	1.8	37.9	634.2
08/21 10	30.8	24.8	11.2	0.4	36.4	634.1
08/21 11	30.8	24.8	11.2	0.4	36.4	634.1
08/21 12	30.8	24.9	11.2	0.3	36.4	634
08/21 13	30.9	24.8	11.2	0.3	36.3	633.9
08/21 14	31	24.5	11.2	0.4	36.1	633.9
08/21 15	31.8	23.6	11.2	0.4	35.2	633.9
08/21 16	32.1	23.3	11.2	0.4	34.9	633.8
08/21 17	30.9	23.2	11.2	1.8	36.2	633.8
08/21 18	32.5	22.9	11.2	0.4	34.5	633.8
08/21 19	32.2	22.9	11.1	0.5	34.5	633.8
08/21 20	32.1	23	11.1	0.5	34.6	633.7
08/21 21	32.2	23	11.1	0.4	34.5	633.7
08/21 22	36.9	18.6	11.1	0.4	30.1	633.8
08/21 23	38.1	17.6	11.1	0.4	29.1	633.7
08/21 24	38.4	17.4	11.1	0.4	28.9	633.7
08/22 01	38.3	17.4	11.1	0.5	29	633.7
08/22 02	38.3	17.4	11.1	0.5	29	633.6
08/22 03	38.3	17.5	11.1	0.4	29	633.6
08/22 04	44.6	13.4	11.1	0.4	24.9	633.6
08/22 05	45.9	12.7	11.1	0.4	24.2	633.6
08/22 06	45.9	12.7	11.1	0.4	24.2	633.7
08/22 07	45.9	12.7	11.1	0.4	24.2	633.7
08/22 08	45.5	12.8	11.1	0.5	24.4	633.7
08/22 09	45.5	12.8	11.1	0.5	24.4	633.7
08/22 10	45.7	12.8	11.1	0.4	24.3	633.7
08/22 11	45.9	12.6	11.1	0.5	24.2	634
08/22 12	43.2	14.1	11.1	0.5	25.7	633.8
08/22 13	42.9	14.3	11.1	0.5	25.9	633.8
08/22 14	40.7	14.3	11.1	1.9	27.3	633.8
08/22 15	43.2	14.3	11.2	0.4	25.9	633.8
08/22 16	42.9	14.3	11.1	0.5	25.9	633.7

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/22 17	43.4	14.3	11.2	0.3	25.8	633.9
08/22 18	43.4	14.3	11.2	0.3	25.8	633.8
08/22 19	43	14.3	11.1	0.4	25.8	633.7
08/22 20	41.2	14.3	11.2	1.7	27.2	633.9
08/22 21	43.2	14.3	11.2	0.4	25.9	633.8
08/22 22	43	14.2	11.1	0.5	25.8	633.8
08/22 23	43.6	14.1	11.2	0.4	25.7	633.9
08/22 24	41.3	14.1	11.2	1.8	27.1	633.8
08/23 01	43.7	14.1	11.2	0.3	25.6	633.8
08/23 02	43.6	14.1	11.2	0.4	25.7	633.9
08/23 03	43.7	14.1	11.2	0.3	25.6	633.9
08/23 04	43.6	14.1	11.2	0.4	25.7	633.9
08/23 05	43.6	14.1	11.2	0.4	25.7	633.9
08/23 06	43.6	14.1	11.2	0.4	25.7	633.9
08/23 07	43.7	14.1	11.2	0.3	25.6	633.9
08/23 08	43.7	14.1	11.2	0.3	25.6	634
08/23 09	43.6	14.1	11.2	0.4	25.7	634.2
08/23 10	43.1	14.4	11.2	0.4	26	634.3
08/23 11	39.4	16.8	11.2	0.4	28.4	634.3
08/23 12	33.9	17.9	9.4	0.4	27.7	634.2
08/23 13	28.7	22.7	9.3	0.4	32.4	634.2
08/23 14	27.8	23.6	9.3	0.5	33.4	634.4
08/23 15	28.1	23.3	9.3	0.5	33.1	634.2
08/23 16	28	23.4	9.3	0.5	33.2	634.1
08/23 17	28	23.5	9.3	0.4	33.2	634.2
08/23 18	28.1	23.4	9.3	0.4	33.1	634
08/23 19	27.4	22.9	9.3	1.8	34	634.1
08/23 20	33.8	17.8	9.3	0.4	27.5	634.1
08/23 21	33.8	17.8	9.3	0.4	27.5	633.9
08/23 22	32.2	17.8	9.3	1.8	28.9	634.1
08/23 23	33.8	17.8	9.3	0.4	27.5	634
08/23 24	33.8	17.8	9.3	0.4	27.5	634
08/24 01	32.2	17.8	9.3	1.8	28.9	634.1
08/24 02	33.7	17.9	9.3	0.4	27.6	634
08/24 03	33.8	17.8	9.3	0.4	27.5	634
08/24 04	33.8	17.8	9.3	0.4	27.5	634.1
08/24 05	33.8	17.8	9.3	0.4	27.5	634.1
08/24 06	33.8	17.7	9.3	0.5	27.5	634

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/24 07	34.1	17.6	9.3	0.4	27.3	634.1
08/24 08	34.1	17.6	9.3	0.4	27.3	634
08/24 09	34.1	17.6	9.3	0.4	27.3	634
08/24 10	34.1	17.6	9.3	0.4	27.3	634
08/24 11	32.4	17.6	9.3	1.8	28.7	634.3
08/24 12	33.9	17.7	9.3	0.4	27.4	634
08/24 13	34.1	17.6	9.3	0.4	27.3	634.1
08/24 14	33.9	17.7	9.3	0.4	27.4	634.2
08/24 15	32.3	17.7	9.3	1.8	28.8	634.1
08/24 16	34.1	17.6	9.3	0.4	27.3	634.1
08/24 17	33.9	17.6	9.3	0.5	27.4	634.1
08/24 18	34.1	17.6	9.3	0.4	27.3	634.1
08/24 19	34.1	17.6	9.3	0.4	27.3	634.1
08/24 20	33.9	17.6	9.3	0.5	27.4	634.1
08/24 21	33.9	17.7	9.3	0.4	27.4	634.1
08/24 22	34.1	17.6	9.3	0.4	27.3	634.1
08/24 23	32.4	17.6	9.3	1.8	28.7	634.2
08/24 24	32.4	17.6	9.3	1.8	28.7	634.1
08/25 01	34.1	17.6	9.3	0.4	27.3	634.2
08/25 02	33.9	17.6	9.3	0.5	27.4	634.2
08/25 03	34.1	17.6	9.3	0.4	27.3	634.1
08/25 04	33.9	17.7	9.3	0.4	27.4	634.2
08/25 05	33.9	17.6	9.3	0.5	27.4	634.2
08/25 06	33.9	17.7	9.3	0.4	27.4	634.1
08/25 07	34.1	17.6	9.3	0.4	27.3	634.2
08/25 08	33.9	17.7	9.3	0.4	27.4	634.2
08/25 09	33.9	17.6	9.3	0.5	27.4	634.2
08/25 10	32.4	17.6	9.3	1.8	28.7	634.2
08/25 11	34.1	17.5	9.3	0.5	27.3	634.2
08/25 12	34.8	17	9.3	0.4	26.7	634.2
08/25 13	34.6	17.2	9.3	0.4	26.9	634.2
08/25 14	34.3	17.4	9.3	0.4	27.1	634.3
08/25 15	34.6	17.1	9.3	0.5	26.9	634.3
08/25 16	32.9	17.1	9.3	1.9	28.3	634.2
08/25 17	34.7	17.1	9.3	0.4	26.8	634.1
08/25 18	33	17	9.3	1.9	28.2	634.3
08/25 19	34.8	17	9.3	0.4	26.7	634.2
08/25 20	34.7	17.1	9.3	0.4	26.8	634.2

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/25 21	34.7	17	9.3	0.5	26.8	634.2
08/25 22	33	17.1	9.3	1.8	28.2	634.2
08/25 23	34.7	17	9.3	0.5	26.8	634.2
08/25 24	34.7	17.1	9.3	0.4	26.8	634.2
08/26 01	34.7	17.1	9.3	0.4	26.8	634.2
08/26 02	34.7	17.1	9.3	0.4	26.8	634.2
08/26 03	34.7	17.1	9.3	0.4	26.8	634.2
08/26 04	34.6	17.1	9.3	0.5	26.9	634.2
08/26 05	34.6	17.1	9.3	0.5	26.9	634.2
08/26 06	34.4	17.2	9.3	0.5	27	634.2
08/26 07	34.6	17.2	9.3	0.4	26.9	634.2
08/26 08	34.4	17.2	9.3	0.5	27	634.1
08/26 09	34.6	17.2	9.3	0.4	26.9	634.2
08/26 10	34.6	17.2	9.3	0.4	26.9	634.1
08/26 11	34.6	17.1	9.3	0.5	26.9	634.2
08/26 12	33	17.1	9.3	1.8	28.2	634.2
08/26 13	34.7	17.1	9.3	0.4	26.8	634.1
08/26 14	34.7	17.1	9.3	0.4	26.8	634
08/26 15	34.7	17.1	9.3	0.4	26.8	634
08/26 16	34.7	17.1	9.3	0.4	26.8	634
08/26 17	34.8	17	9.3	0.4	26.7	634
08/26 18	34.8	17	9.3	0.4	26.7	634
08/26 19	33.1	17	9.3	1.8	28.1	634
08/26 20	34.7	17.1	9.3	0.4	26.8	634
08/26 21	34.7	17.1	9.3	0.4	26.8	634
08/26 22	34.7	17.1	9.3	0.4	26.8	634
08/26 23	34.7	17	9.3	0.5	26.8	634
08/26 24	34.7	17.1	9.3	0.4	26.8	633.9
08/27 01	34.6	17.1	9.3	0.5	26.9	634.1
08/27 02	34.6	17.1	9.3	0.5	26.9	634
08/27 03	34.6	17.1	9.3	0.5	26.9	634
08/27 04	34.6	17.2	9.3	0.4	26.9	634
08/27 05	34.6	17.2	9.3	0.4	26.9	634
08/27 06	34.7	17.1	9.3	0.4	26.8	634
08/27 07	33	17.1	9.3	1.8	28.2	634
08/27 08	34.6	17.2	9.3	0.4	26.9	634
08/27 09	34.6	17.2	9.3	0.4	26.9	634
08/27 10	34.6	17.1	9.3	0.5	26.9	634

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/27 11	34.7	17.1	9.3	0.4	26.8	634
08/27 12	34.8	17	9.3	0.4	26.7	633.9
08/27 13	38.8	14.3	9.3	0.4	24	634
08/27 14	39.1	14.1	9.3	0.4	23.8	634
08/27 15	39.6	13.8	9.3	0.4	23.5	634
08/27 16	39.7	13.7	9.3	0.4	23.4	634
08/27 17	39.7	13.7	9.3	0.4	23.4	634
08/27 18	39.7	13.7	9.3	0.4	23.4	634
08/27 19	39.7	13.7	9.3	0.4	23.4	634
08/27 20	39.7	13.7	9.3	0.4	23.4	634
08/27 21	39.6	13.8	9.3	0.4	23.5	634
08/27 22	39.6	13.8	9.3	0.4	23.5	634
08/27 23	37.5	13.7	9.3	1.8	24.8	634
08/27 24	39.6	13.8	9.3	0.4	23.5	634
08/28 01	39.6	13.8	9.3	0.4	23.5	634
08/28 02	39.4	13.9	9.3	0.4	23.6	634
08/28 03	39.4	13.8	9.3	0.5	23.6	634.1
08/28 04	39.6	13.8	9.3	0.4	23.5	634.1
08/28 05	39.6	13.8	9.3	0.4	23.5	634.1
08/28 06	37.3	13.8	9.3	1.8	24.9	634.1
08/28 07	39.4	13.8	9.3	0.5	23.6	634.1
08/28 08	39.6	13.8	9.3	0.4	23.5	634.1
08/28 09	39.6	13.8	9.3	0.4	23.5	634.1
08/28 10	39.6	13.8	9.3	0.4	23.5	634.1
08/28 11	39.4	13.9	9.3	0.4	23.6	634.1
08/28 12	37.2	13.8	9.3	1.9	25	634.1
08/28 13	37.5	14.1	8.7	0.4	23.2	634.1
08/28 14	32.1	15.6	7.5	0.3	23.4	634.1
08/28 15	31.8	15.8	7.5	0.3	23.6	634.2
08/28 16	30	15.8	7.5	1.7	25	634.2
08/28 17	31.8	15.8	7.5	0.3	23.6	634.1
08/28 18	31.8	15.7	7.5	0.4	23.6	634.2
08/28 19	31.8	15.8	7.5	0.3	23.6	634.2
08/28 20	31.6	15.8	7.5	0.4	23.7	634.2
08/28 21	31.8	15.7	7.5	0.4	23.6	634.2
08/28 22	31.8	15.7	7.5	0.4	23.6	634.2
08/28 23	31.8	15.7	7.5	0.4	23.6	634.2
08/28 24	31.8	15.7	7.5	0.4	23.6	634.2

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/29 01	31.8	15.7	7.5	0.4	23.6	634.2
08/29 02	31.8	15.7	7.5	0.4	23.6	634.2
08/29 03	31.8	15.7	7.5	0.4	23.6	634.2
08/29 04	31.9	15.7	7.5	0.3	23.5	634.2
08/29 05	31.8	15.7	7.5	0.4	23.6	634.2
08/29 06	31.8	15.7	7.5	0.4	23.6	634.2
08/29 07	31.8	15.7	7.5	0.4	23.6	634.2
08/29 08	31.8	15.7	7.5	0.4	23.6	634.2
08/29 09	31.8	15.7	7.5	0.4	23.6	634.2
08/29 10	31.9	15.7	7.5	0.3	23.5	634.2
08/29 11	31.8	15.7	7.5	0.4	23.6	634.2
08/29 12	31.9	15.7	7.5	0.3	23.5	634.2
08/29 13	31.9	15.7	7.5	0.3	23.5	634.2
08/29 14	31.8	15.7	7.5	0.4	23.6	634.2
08/29 15	31.8	15.7	7.5	0.4	23.6	634.3
08/29 16	31.8	15.7	7.5	0.4	23.6	634.2
08/29 17	31.8	15.7	7.5	0.4	23.6	634.5
08/29 18	30.1	15.7	7.5	1.7	24.9	634.2
08/29 19	30.1	15.7	7.5	1.7	24.9	634.3
08/29 20	31.8	15.7	7.5	0.4	23.6	634.3
08/29 21	31.8	15.7	7.5	0.4	23.6	634.3
08/29 22	30.2	15.6	7.5	1.7	24.8	634.2
08/29 23	32.1	15.5	7.5	0.4	23.4	634.3
08/29 24	32.2	15.5	7.5	0.3	23.3	634.3
08/30 01	32.2	15.5	7.5	0.3	23.3	634.4
08/30 02	32.1	15.5	7.5	0.4	23.4	634.3
08/30 03	30.9	16.4	7.5	0.4	24.3	634.3
08/30 04	30.7	16.6	7.5	0.3	24.4	634.4
08/30 05	30.6	16.6	7.5	0.4	24.5	634.3
08/30 06	30.6	16.6	7.5	0.4	24.5	634.3
08/30 07	30.4	16.9	7.5	0.3	24.7	634.4
08/30 08	30.1	17.1	7.5	0.3	24.9	634.3
08/30 09	30.1	17	7.5	0.4	24.9	634.3
08/30 10	30.1	17	7.5	0.4	24.9	634.3
08/30 11	30.1	17	7.5	0.4	24.9	634.3
08/30 12	30.2	17	7.5	0.3	24.8	634.3
08/30 13	30.2	17	7.5	0.3	24.8	634.3
08/30 14	30.2	16.9	7.5	0.4	24.8	634.3

Date LGS 2010	% Spill	Generation Flow Kcfs (1 Unit Approx 17K, 2 units approx 25K)	Spill Flow kcfs	Misc Flow kcfs	Total Flow kcfs	FB Elev feet
08/30 15	30.2	16.9	7.5	0.4	24.8	634.3
08/30 16	28.6	16.9	7.5	1.8	26.2	634.3
08/30 17	30.2	16.9	7.5	0.4	24.8	634.3
08/30 18	30.4	16.9	7.5	0.3	24.7	634.3
08/30 19	28.7	16.9	7.5	1.7	26.1	634.2
08/30 20	30.2	17	7.5	0.3	24.8	634.3
08/30 21	30.2	16.9	7.5	0.4	24.8	634.3
08/30 22	30.4	16.9	7.5	0.3	24.7	634.3
08/30 23	30.4	16.8	7.5	0.4	24.7	634.2
08/30 24	28.7	16.9	7.5	1.7	26.1	634.2
08/31 01	30.7	16.5	7.5	0.4	24.4	634.2
08/31 02	28.8	16.7	7.5	1.8	26	634.2
08/31 03	31	16.3	7.5	0.4	24.2	634.2
08/31 04	31.1	16.3	7.5	0.3	24.1	634.2
08/31 05	31	16.3	7.5	0.4	24.2	634.2
08/31 06	31	16.4	7.5	0.3	24.2	634.2
08/31 07	30.4	16.8	7.5	0.4	24.7	634.3
08/31 08	30.6	16.6	7.5	0.4	24.5	634.2
08/31 09	29	16.6	7.5	1.8	25.9	634.2
08/31 10	31.4	16	7.5	0.4	23.9	634.2
08/31 11	30.6	16.7	7.5	0.3	24.5	634.2
08/31 12	30.2	16.9	7.5	0.4	24.8	634.2
08/31 13	30.4	16.9	7.5	0.3	24.7	634.2
08/31 14	30.2	16.9	7.5	0.4	24.8	634.2
08/31 15	30.2	16.9	7.5	0.4	24.8	634.1
08/31 16	30.2	16.9	7.5	0.4	24.8	634.2
08/31 17	30.4	16.8	7.5	0.4	24.7	634.2
08/31 18	28.7	16.9	7.5	1.7	26.1	634.2
08/31 19	30.2	16.9	7.5	0.4	24.8	634.2
08/31 20	30.2	16.9	7.5	0.4	24.8	634.2
08/31 21	30.2	16.9	7.5	0.4	24.8	634.2
08/31 22	30.4	16.8	7.5	0.4	24.7	634.1
08/31 23	31.2	14.7	7.5	1.8	24	634.2
08/31 24	M	M	M	M	M	M