



State of Idaho

DEPARTMENT OF WATER RESOURCES

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April 11, 2008

C. L. "BUTCH" OTTER
Governor

DAVID R. TUTHILL, JR.
Director

RECEIVED

APR 14 2008

WATER RESOURCES
WESTERN REGION

COPY

Sierra Del Rio
Attn: Craig Baker
PO Box 127
Murphy, ID 83650

RE: FINAL EVALUATION OF CONTROLLED FILL EVENT

Dear Mr. Baker:

Enclosed you will find my evaluation memo for this years controlled fill event. As you are aware, we were not able to fill your reservoir during this year. I believe this is mainly due to the capacity of the delivery pipe from your diversion to the reservoir. In order to comply with the delivery instructions for these controlled fill events, we need to have your delivery system at the capacity that your water right allows or 6.00 cfs. I would like to urge you to consider upgrading this system as soon as possible.

If you have any questions or concerns please contact me at the above address.

Respectfully,

Daniel A. Nelson
Staff Hydrologist
Water Distribution Bureau
Idaho Department of Water Resources

Cc Mike Ihli – Murphy Flats Water Company
Chad Nettleton – Basin 57D watermaster
John Westra – Western Region Manager IDWR

TO: WATER DISTRICT 57D FILE

FROM: DANIEL A. NELSON

DATE: 4/11/08

SUBJECT: SIERRA DEL RIO/HULEY RESERVOIRS CONTROLLED FILL EVENT

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On February 25, 2008, the Idaho Department of Water Resources (Department) received a request for water from the Sierra Del Rio Ranch (SDR) in order to fill their senior storage water right on Sinker Creek. Hulet reservoir is upstream of the SDR reservoir, so this is a general practice for this creek.

On 3/5/2008, I visited the site and confirmed that approximately 137.5 acre feet of water was needed to fill the SDR reservoir. I requested that the Basin 57D watermaster, Chad Nettleton start releasing water from the Hulet reservoir. In review of past controlled fill events, when the amount of water required at the SDR reservoir is higher than 100 acre feet, we haven't been able to fill the reservoir within the 15 to 30 days available for the controlled fill event. This is mainly due to the undersized piping from the SDR diversion to the SDR reservoir. The creek can handle much higher flows, and the water rights allow a diversion to storage rate of 6.00 cfs or almost twice what the current system allows. The guidance for the controlled fill event was designed to use the full 6.00 cfs shown on the water rights to fill the SDR reservoir during a specific time frame of 15 days. The refusal of SDR to upgrade their delivery system to the amount allocated by their water rights have prevented the Department from filling the reservoir during the allotted time during those years when the reservoir needs more than 100 acre feet of water. Increasing the fill time by 10 to 15 days still makes filling over 100 acre feet of water a difficult task. The SDR delivery system capacity needs to be addressed for future time controlled fill events.

At 1:30 pm on 3/6/2008, the watermaster began releasing 10.74 cfs of water from the Hulet Reservoir. In previous controlled fill events, we released a smaller amount of water at the beginning. I decided to try releasing a larger amount of water at the beginning in hopes of getting the water to the SDR diversion as quickly as possible. My only concern was that it could wash out the undersized SDR diversion if a large amount of water hit it at one time.

On March 7, I visited the site to check on the initial releases, and to review procedures with the new watermaster. I would also like to state that the watermaster did an admirable job for his first time of performing a controlled fill event. During this visit, I found that 10.74 cfs was being released from the Hulet reservoir. I checked the water flowing into the reservoir, and there appeared to be ample water flowing into the Hulet reservoir. I was concerned that the weir measuring the flows into the Hulet reservoir had washed out 2 years ago, and still has not been replaced. This will need to be rectified by next irrigation season. I have spoken to Mike Ihli about this situation and instructed him that he needed to get the weir reinstalled as soon as possible.

On March 12, I visited the site again. During this visit, I found that the water had already reached the SDR headgate. In past years, it has taken a full 8 to 10 days for the water to reach the SDR diversion. The large release from Hulet reservoir allowed the water to reach the SDR diversion in under 6 days, which gave us an additional 2-4 days of fill time. The large release didn't cause any adverse affects to the SDR diversion system. During this visit I measured the SDR diversion at 3.63 cfs of water. This is approximately the maximum diversion possible for this diversion. The diversion varies somewhat between 3.50 cfs and 4.19 cfs, but generally the flow is stable at 3.63 cfs. I measured the reservoir at 2.26 feet or 124.2 acre feet of water needed to fill the reservoir. The overflow at the SDR diversion point was flowing at an estimated 0.99 cfs. I estimated this flow by measuring the head of 0.11 feet over the 10.3 ft board across the overflow using a variation of the broadcrested weir formulas (see attached table). I double checked the Joyce Ranch weir and it was staying steady at 10.74 cfs. I asked the watermaster to turn down the amount of water being diverted from the Hulet Reservoir to prevent wasting water past the SDR diversion. The watermaster cut the water flowing out of the Hulet Reservoir to 8.22 cfs.

On March 17, the watermaster called me and voiced a concern that he might have cut the water back a little too far. The SDR diversion was still flowing at full capacity, but the water flowing through the Joyce Ranch had slowed considerably. I instructed the watermaster to increase the flows a little bit until he felt comfortable with the water flow in the creek. The watermaster increased the flow into the creek to 8.82 cfs

On March 24, I received a call from Mike Ihli voicing some concern over the amount of water flowing by the SDR diversion. I went to the site and checked all of the measurements. At the site, I discovered that on March 18th, Joyce Ranch started taking approximately 1/3 of the water for their irrigation uses, and took approximately 1/2 of the water on March 22nd. I had instructed the watermaster to increase the flow of the water once Joyce Ranch started irrigating to ensure that there was adequate water for the controlled fill event. The watermaster increased the flow on March 22nd to 10.50 cfs to adjust for this change in water use at the headgate. The watermaster informed me that Joyce Ranch was going to take the full flow of water for irrigation on March 26th. I checked the SDR diversion and found that the full 3.63 cfs was being diverted into the reservoir and that approximately 0.20 ft of water was flowing over the overflow. I estimated the overflow at 2.43 cfs. I asked the watermaster to turn the water down a little and see what happens. The watermaster turned the water down to 9.23 cfs. I then instructed the watermaster to turn the water up once Joyce Ranch takes all of the flows. I checked the SDR reservoir at this time and it was at approximately 1.04 feet from full or 57.3 acre feet from filling. I noticed that the water was starting to fill the portion of the reservoir on the other side of a lane that goes across the reservoir at the eastern most side of the reservoir. The area on the other side of the lane is a wide shallow spot in the SDR reservoir, and is generally dry throughout most of the year. This area is the most likely spot for increased seepage from the reservoir. I am assuming that this area accounts for most of the seepage attributed to this years controlled fill event.

On March 26th the watermaster turned the flows out of the reservoir up to 10.72 cfs. All of this water was being used by Joyce Ranch, so it was not charged to the Hulet Reservoir storage rights.

On March 27th, I received a call from Craig Baker informing me that the flows at the SDR diversion had dropped. I contacted the watermaster and he began increasing the flows a little at a time to prevent washing out the ditch that delivers the water from the Hulet reservoir to the creek. By March 28th, the watermaster had increased the flows to 12.96 cfs. Once again, all of this water was being run through the fields of Joyce Ranch, so it cannot be considered storage water out of the Hulet reservoir. Although this water is waste water from the Joyce Ranch, once it enters the creek it becomes live water open for appropriation. Therefore, the water being diverted after March 26th was part of the natural fill rights allocated to SDR.

On March 31st, I went to the site for my final measurements on the reservoir. I found that 0.58 feet was left to fill in the reservoir. This is approximately 31.9 acre feet short of filling the reservoir. I measured the SDR diversion and discovered that it was completely submerged, so it would be running at the highest possible flow capacity, which would be between 3.63 and 4.17 cfs.. I also noticed several spots along the pipeline that appeared to be leaking that weren't obvious earlier in the controlled fill event. I am not sure if this was from the increased amount of water or that the water from these leaks just finally surfaced from the buried pipeline. Leakage in the pipeline would add to the need to have the delivery system upgraded. There was 0.21 feet of water flowing through the overflow, which I estimated at 2.62 cfs.

CONCLUSION:

Unfortunately we failed to fill the SDR reservoir during this controlled fill event. According to my calculations, the reservoir was 31.9 acre feet from filling. There were several factors that I feel played a roll in this scenario.

The first and most important factor is the delivery pipeline from the SDR diversion to the SDR reservoir. This diversion was originally an open ditch that allowed 6.00 cfs of water to flow to the reservoir. A pipeline was installed that reduced the rate of flow to the reservoir down to 3.63 cfs or almost ½ of historic flows. Without a weir on the overflow at the SDR diversion it is difficult to determine the exact amount of water that was wasted past the diversion, but I estimated total amount of water that flowed past the diversion at approximately 50.58 acre feet of the water delivered to the SDR diversion. If SDR had the proper sized delivery system we could have kept the diversion out of the Hulet reservoir running at full capacity and delivered an additional 40 to 60 acre feet of water down to the SDR diversion. This problem was discussed in a meeting with Craig Baker of SDR and Mike Ihli representing Hulet on 11/13/2007, which would have given them ample time to remedy this situation. Unfortunately, nothing was done after that 11/13/2007 meeting. Without the proper tools allowed by the water rights to fill the reservoir, our abilities to fill the reservoir this year was not possible.

The second issue this year was that the reservoir was lower than normal. During typical controlled fill scenarios, the reservoir generally only needs 50 acre feet or less to fill. The dry year last year required SDR to carry over less water than normal. This caused increased seepage from the reservoir, which in turn required more water to fill the reservoir. Generally, the seepage from the reservoir is minimal, but this year it was approximately 34%. We delivered 160.28 acre feet of water to the reservoir, but only 105.6 acre feet of water was stored. This suggests that the reservoir may be losing the seal in the bottom of the reservoir when it is drawn down beyond a certain point. It may be beneficial to line the reservoir or maintain a higher minimum pool to keep the area on the other side of the lane saturated to reduce seepage.

The third issue was the irrigation of Joyce Ranch in the middle of the controlled fill scenario. This was actually quite interesting. Once Joyce Ranch started irrigating, the storage water from Hulet reservoir had to be reduced due to ditch capacity. The waste water that entered back into the creek from the Joyce Ranch irrigation provided adequate natural flows in the creek to supply all the water needed to fill the SDR pipeline. The irrigation by Joyce Ranch did reduce the flow rate at the SDR diversion for 2 or 3 days, but once the watermaster had flows regulated, this irrigation didn't seem to affect the flows at the SDR diversion. Any waste water in the creek is considered live water, and it is required to be diverted first before any storage water. Therefore, half of the water delivered this year is attributed to SDR's natural flow rights and not Hulet storage rights.

The concern with this years controlled fill is that adequate water was delivered to the SDR diversion and reservoir, but the delivery pipe simply could not handle the flows needed to fill the reservoir, and the reservoir was so low that it allowed increased losses of water to seepage. I recommend that before we invest the resources to perform this controlled fill in the future that adequate steps are taken by SDR to ensure that we can get adequate water to their reservoir and keep it there. Providing an adequate pipeline from the diversion to the reservoir will probably remedy all the problems encountered in this years controlled fill event. This also raises the question of whether the diversion to storage and a portion of the actual storage component itself may have been forfeited due to SDR reducing their diversion system. This is an issue that may need to be addressed on future controlled fill events. Another issue that might warrant investigation is that once Joyce Ranch begins irrigation, the natural flows in the creek at the SDR diversion due to the Joyce Ranch waste water may be adequate to fill the SDR reservoir when 25 acre feet or less is all that is needed to make the SDR reservoir whole. The Department should research this when lower amounts of water are required during future controlled fill events.

SEIRRA DEL RIO RESERVOIR CONTROL FILL DATA FOR 2008
 IDWR - WATER DISTRIBUTION
 PREPARED BY DANIEL A NELSON

HULET									NAHAS					
	ELAPSED TIME @ FLOW (IN HOURS)	OUT FLOW (CFS)	AF RELEASED	AF RELEASED (CULIMATIVE)	DIVERSION RATE OF WATER BY JOCYE RANCH (CFS)	JOYCE RANCH WATER DELIVERY IN VOLUME (AF)	JOYCE RANCH CUMULATIVE VOLUME RELEASE (AF)		INFLOW (CFS)	AF STORED	AF REQUIRED TO FILL	SPILL TO SNAKE RIVER (CFS)	SPILL TO SNAKE (AF)	SPILL TO SNAKE RIVER (CULIMATIVE AFA)
DATE	STARTED AT													
3/6/2008	1:30 PM			0.00			0.00				137.50			0.00
3/7/2008	24	10.74	21.30	21.30		0.00	0.00		0.56	1.11	136.39	0.00	0.00	0.00
3/13/2008	144	10.74	127.81	149.12		0.00	0.00		3.05	36.30	100.09	0.00	0.00	0.00
3/17/2008	96	8.22	65.22	214.33		0.00	0.00		3.63	28.80	71.29	1.00	7.93	7.93
3/18/2008	24	5.22	10.35	224.69	3.00	5.95	5.95		3.63	7.20	64.09	2.50	4.96	12.89
3/22/2008	72	5.25	31.24	255.93	5.25	31.24	37.19		3.63	21.60	42.49	2.50	14.88	27.77
3/23/2008	48	4.62	18.33	274.25	4.61	18.29	55.48		3.63	14.40	28.09	1.00	3.97	31.74
3/26/2008	72	0.00	0.00		9.23	54.92	110.40		2.50	14.88	13.22	0.00	0.00	31.74
3/28/2008	48	0.00	0.00		10.72	42.53	152.93		3.63	14.40	-1.18	1.00	3.97	35.70
3/31/2008	72	0.00	0.00		12.96	77.12	230.04		3.63	21.60	-22.78	2.50	14.88	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58
	0	0.00	0.00						0.00	0.00	-22.78	0.00	0.00	50.58

ARRIVAL OF WATER TO SIERRA DEL RIO (SDR) RESERVOIR
 WAS MARCH 6, 2008

According to my calculations the SDR reservoir should have filled, but was actually short by 31.9 acre feet of water. According to the delivery records, 160.3 acre feet of water was put into the reservoir, but only 105.6 acre feet of storage was retained. I am assuming that the difference of 54.7 acre feet came from seepage and evaporation losses or 34% losses. This is the lowest that the SDR reservoir has ever been during the time I have recorded the controlled fill, so these seepage and evaporation losses were factors that I haven't experienced.

Amount of water diverted from Hulet reservoir before irrigation season began = 274.25 acre-feet
 Amount of water diverted to Joyce Ranch for irrigation use = 230.04 acre-feet
 TOTAL DIVERTED = 504.29 acre-feet
 Amount of water diverted into SDR reservoir before the irrigation season = 160.3 acre- feet
 Amount of water flowing past SDR diversion. = 50.58 acre-feet
 Total amount of loss to seepage in the creek = 293.412 acre-feet

Typically we have approximately 294 to 297 acre feet in seepage losses to the creek. The amount lost to seepage in the creek seems to be typical of past years. This is interesting considering Joyce Ranch began irrigating half way through the controlled fill event without increasing the losses to the creek.

On 3/18/2008 Joyce Ranch began using some of the water diverted from the Hulet reservoir for irrigation per his natural flow irrigation rights. The wastewater from the Joyce Ranch maintained the flows at the SDR reservoir until entire flow was being used by the Joyce Ranch on 3/26/08. Additional water was run through the Joyce Ranch system, and the flows to the SDR reservoir only dropped for approximately 3 days. Therefore, only 249 acre feet of water was diverted from the Hulet reservoir, and the remainder of the water delivered to the SDR reservoir was from their natural flow rights. This creates a delima on this reservoir, since they may get adequate water for their reservoir if Joyce Ranch begins irrigation early. Considering half of the water delivered to the SDR reservoir between March 18 and March 26 was wastewater from Joyce Ranch and all of the water delivered to the SDR reservoir from March 26th on was Joyce Ranch wastewater, I am estimating that 61 acre feet of the water delivered to the SDR reservoir was part of their natural flow rights.

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ESTIMATED FLOW RATES FOR 10.3 FT BROADCRESTED DAM USING CALCULATION $[(h) ^ 1.5]$ (DAM WIDTH) 3.33
(please note used 2.64 under 0.2 feet.)

HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES	HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES	HEAD IN FEET	FLOW RATE IN CFS	FLOW RATE IN INCHES
0.01	0.03	1.36	0.65	17.97	898.71	1.25	47.93	2396.72
0.02	0.08	3.85	0.66	18.39	919.53	1.26	48.51	2425.53
0.03	0.14	7.06	0.67	18.81	940.51	1.27	49.09	2454.47
0.04	0.22	10.88	0.68	19.23	961.65	1.28	49.67	2483.51
0.05	0.30	15.20	0.69	19.66	982.94	1.29	50.25	2512.67
0.10	0.86	42.99	0.70	20.09	1004.38	1.30	50.84	2541.95
0.11	0.99	49.60	0.71	20.52	1025.98	1.31	51.43	2571.33
0.12	1.13	56.52	0.72	20.95	1047.73	1.32	52.02	2600.83
0.13	1.27	63.73	0.73	21.39	1069.64	1.34	53.20	2660.17
0.14	1.42	71.22	0.74	21.83	1091.69	1.35	53.80	2690.00
0.15	1.58	78.99	0.75	22.28	1113.89	1.36	54.40	2719.94
0.16	1.74	87.01	0.76	22.72	1136.24	1.37	55.00	2750.00
0.17	1.91	95.30	0.77	23.17	1158.74	1.38	55.60	2780.16
0.18	2.08	103.83	0.78	23.63	1181.39	1.39	56.21	2810.44
0.19	2.25	112.60	0.79	24.08	1204.18	1.4	56.82	2840.82
0.20	2.43	121.61	0.80	24.54	1227.12	1.41	57.43	2871.31
0.21	2.62	130.84	0.81	25.00	1250.20	1.42	58.04	2901.91
0.22	2.81	140.30	0.82	25.47	1273.42	1.43	58.65	2932.62
0.23	3.00	149.97	0.83	25.94	1296.79	1.44	59.27	2963.43
0.24	3.20	159.86	0.84	26.41	1320.29	1.45	59.89	2994.36
0.25	3.40	169.95	0.85	26.88	1343.94	1.46	60.51	3025.39
0.26	3.60	180.25	0.86	27.35	1367.73	1.47	61.13	3056.52
0.27	3.81	190.75	0.87	27.83	1391.65	1.48	61.76	3087.76
0.28	4.03	201.44	0.88	28.31	1415.71	1.49	62.38	3119.11
0.29	4.25	212.33	0.89	28.80	1439.91	1.50	63.01	3150.56
0.30	4.47	223.41	0.90	29.28	1464.25	1.51	63.64	3182.12
0.31	4.69	234.67	0.91	29.77	1488.72	1.52	64.28	3213.79
0.32	4.92	246.11	0.92	30.27	1513.33	1.53	64.91	3245.55
0.33	5.15	257.74	0.93	30.76	1538.07	1.54	65.55	3277.42
0.34	5.39	269.54	0.94	31.26	1562.94	1.55	66.19	3309.40
0.35	5.63	281.52	0.95	31.76	1587.95	1.56	66.83	3341.48
0.36	5.87	293.67	0.96	32.26	1613.09	1.57	67.47	3373.66
0.37	6.12	305.99	0.97	32.77	1638.36	1.58	68.12	3405.94
0.38	6.37	318.48	0.98	33.28	1663.76	1.59	68.77	3438.33
0.39	6.62	331.14	0.99	33.79	1689.29	1.60	69.42	3470.81
0.40	6.88	343.95	1.00	34.30	1714.95	1.61	70.07	3503.40
0.41	7.14	356.93	1.01	34.81	1740.74	1.62	70.72	3536.10
0.42	7.40	370.07	1.02	35.33	1766.65	1.63	71.38	3568.89
0.43	7.67	383.37	1.03	35.85	1792.70	1.64	72.04	3601.78
0.44	7.94	396.82	1.04	36.38	1818.87	1.65	72.70	3634.77
0.45	8.21	410.42	1.05	36.90	1845.17	1.66	73.36	3667.87
0.46	8.48	424.18	1.06	37.43	1871.59	1.67	74.02	3701.06
0.47	8.76	438.08	1.07	37.96	1898.14	1.68	74.69	3734.35
0.48	9.04	452.14	1.08	38.50	1924.81	1.69	75.35	3767.75
0.49	9.33	466.34	1.09	39.03	1951.60	1.70	76.02	3801.24
0.50	9.61	480.69	1.10	39.57	1978.52	1.71	76.70	3834.83
0.51	9.90	495.18	1.11	40.11	2005.56	1.72	77.37	3868.51
0.52	10.20	509.82	1.12	40.65	2032.72	1.73	78.05	3902.30
0.53	10.49	524.60	1.13	41.20	2060.01	1.74	78.72	3936.18
0.54	10.79	539.51	1.14	41.75	2087.41	1.75	79.40	3970.16
0.55	11.09	554.57	1.15	42.30	2114.94	1.76	80.08	4004.24
0.56	11.40	569.76	1.16	42.85	2142.59	1.77	80.77	4038.42
0.57	11.70	585.09	1.17	43.41	2170.35	1.78	81.45	4072.69
0.58	12.01	600.56	1.18	43.96	2198.24	1.79	82.14	4107.06
0.59	12.32	616.15	1.19	44.52	2226.24	1.80	82.83	4141.52
0.60	12.64	631.88	1.20	45.09	2254.36	1.81	83.52	4176.08
0.61	12.95	647.75	1.21	45.65	2282.60	1.82	84.21	4210.74
0.62	13.27	663.74	1.22	46.22	2310.95	1.83	84.91	4245.49
0.63	13.60	679.86	1.23	46.79	2339.43	1.84	85.61	4280.34
0.64	13.92	696.12	1.24	47.36	2368.01	1.85	86.31	4315.28

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