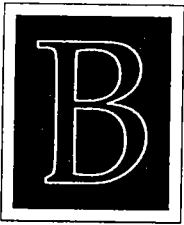


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AUG 19 1996

Department of Water Resources



**BROCKWAY**  
ENGINEERING  
P.L.L.C.

Hydraulics

Hydrology

Water Resources

Aug 15, 1996

Mr. Randall Brewer  
Rogerson, ID 83302

Subject: Devil Creek Measuring Device Survey and Water Measurement

Dear Randall:

This letter is to report the results of water measurements and measuring device evaluations on the Devil Creek watershed which were performed on July 18, 1995. Present during all or part of the site inspections and water measurements were: Randall Brewer, Preston Davis, Melvin Crowley, John Coleman, Tim Luke and Bryan Contor(IDWR) and Charles Brockway.

The weirs on the East and West branches of Devil Creek were visited. The East Branch weir was functioning properly and the nappe was aerating. The weir pool should be enlarged if possible to further reduce approach velocities. Since there is no weir on the Middle branch of Devil Creek, the discharge was measured with a current meter and the head was measured on the East and West branch weirs. Also, Devil Creek was measured with a current meter just downstream of the Patrick #1 diversion in the Crosscut ditch. No inflow was coming in from the Deadwood ditch. This station was chosen because no suitable section could be found in the creek near Three Creek Road where the measurement was made in April of 1996.. All water from all three branches was being diverted for irrigation according to Randall Brewer, so the difference between total inflow and outflow is an indication of surface return flow and subsurface reach gain from above the irrigated area to the road. The attached worksheet shows the discharge measurements and calculated reach gain for a total irrigation scenario. The calculated reach gain(loss) was -0.53 cfs for an inflow discharge of 2.56 cfs or about a 20.7 percent loss. This loss is not unexpected but keep in mind these are measurements at a single point in time and both the weirs and especially the current meter measurements are subject to some error.

Similar measurements should be repeated during another period when irrigation is occurring from all branches of Devil Creek in order to verify these results I am suggesting that a period during the last week in August would be suitable assuming that there will be a reasonable amount of water in the system. Please consider the possibility of Thursday, August 29 as a tentative date. By copy of this letter I am requesting Tim Luke of IDWR to set this date and John Coleman to contact the Watermaster and Cedar Mesa people.. Again, recall that the purpose of these evaluations is to determine the feasibility of utilizing inflow-outflow measurements

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NORTH

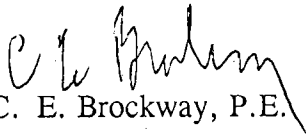
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to develop a procedure to allow some sort of evaluation of water use in lieu of measurement of individual irrigation diversions.

Sincerely,

  
C. E. Brockway, P.E.

Enclosures

Devil Creek water measurement worksheet

DEVIL CREEK WATERSHED  
 INFLOW OUTFLOW MEASUREMENTS JULY 18, 1996  
 EAST, MIDDLE, AND WEST CHANNEL INFLOW & OUTFLOW MEASURED BELOW THREE CREEK ROAD

## MIDDLE CREEK ABOVE UPPER DITCH DIVERSION CURRENT METERED

7/16/96 C.E. BROCKWAY, J. COLEMAN, MEL CROWLEY, ET AL  
 OTT METER 47966\* GAGE-NONE

SECT.	DIST.	DEPTH	REV .6-.2	REV .8	TIME SEC	ANGLE CORR.	VEL	DELTA AREA	DELTA Q	SUM Q
1	0.5	0.12	0		50	1	0.00	0.00	0.00	0.00
2	1.0	0.39	52		50	1	0.90	0.13	0.06	0.06
3	1.5	0.40	58		50	1	1.01	0.20	0.19	0.25
4	2.0	0.45	74		50	1	1.28	0.21	0.24	0.49
5	2.5	0.48	75		50	1	1.29	0.23	0.30	0.79
6	3.0	0.40	54		50	1	0.94	0.22	0.25	1.03
7	3.6	0.20	0		50	1	0.00	0.18	0.08	1.12

\* CALIBRATION  $V=(REV/SEC)*C1+C2$  FT/SEC

LOOKUP TABLE

R	C1	C2
0	0.7872	0.062
0.68	0.8495	0.02
100	0.8495	0.02

AVG. VEL.	0.96 FPS
AREA	1.17 SQ FT
DISCHARGE	1.12 CFS A

## DEVIL CREEK EAST CHANNEL

WEIR- 24 INCH RECTANGULAR CONTRACTED WEIR WIDTH=1.96 FT

AERATING PROPERLY WEIR POOL NEEDS CLEANING-BOTTOM IS 5 INCHES BELOW WEIR CREST

STUCK WEIR H= 0.32 FT C.E. BROCK DISCHARGE= 1.14 CFS B

## DEVIL CREEK WEST CHANNEL

WEIR-RECTANGULAR CONTRACTED WIDTH=1.96 FEET

H= 0.13 FT BY TIM LUKE DISCHARGE= 0.30 CFS C

## DEVIL CREEK BELOW PATRICK #1 DIVERSION IN CROSSCUT DITCH

CURRENT METERED BY TIM LUKE AND BRYAN CONTOR, IDWR

SWOFFER 2100 CURRENT METER DISCHARGE= 2.03 CFS D

TOTAL INFLOW A+B+C	2.56
OUTFLOW= D	2.03

NET GAIN  $D-(A+B+C)=$  -0.53 CFS

PERCENT GAIN(LOSS) (20.77) %

State of Idaho  
 Department of Water Resources  
 Water District 43C

Meas. No. ....  
 Comp. by .....

Sta. No. .... DISCHARGE MEASUREMENT NOTES Checked by .....

Date *7-18-1976* Party *T. Luke, B. Combs, CRAMER* Cross cut

Width *165* Area *118* Vel. *G. H. N<sup>W</sup>* Disch. *2.03* CFs

Method *6/10* No. secs *17* in ... hrs. Susp. Meter No. ....

Method coef. .... Hor. angle coef. .... Susp. coef. ....

Type of meter *Surface* Date rated *4/77* Tag checked ...

Meter ... ft. above bottom of wt. Spin before meas. *OK* after *OK*

Meas. plots ... % diff. from ... rating. Levels obtained. ...

GAGE READINGS

Time	Inside	HM	Chart	Outside

WATER QUALITY MEASUREMENTS

No	Yes	Time
Samples Collected		
No		Time
Method Used		
EDI		Other
SEDIMENT SAMPLES		
No		Time
Method Used		
EDI		Other
BIOLOGICAL SAMPLES		
Yes		Time
No		Type

Weighted M.G.H. .... changed to ... at ...

G. H. correction ...

Correct M.G.H. ....

Check bar chain found ...

Wading, cable, ice, boat, upstr., downstr., side bridge. ... feet, mile, above, below gage.

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%); based on the following cond:

Flow. *Regular* *Access* *Station* *Bed* *Velocity*

Gross section *Sandy* *Firm* *Station* *Height* *Depth*

Control

Gage operating

Intake/Orifice cleaned

Record removed

Manometer N<sub>2</sub> Pressure Tank

CSG checked

Observer

Weather

Air °C@

Water °C@

Extreme Indicator: Max. Min. per min.

Feed

Stick reading

Angle cent	Dist. from initial point	Width	Depth	Observed velocity	Revolutions	Time in seconds	VELOCITY		Adjusted for hor. angle or	Area	Discharge
							At point	Mean in vertical			
	3.0										
	3.5	0.5	0.33				0			165	0
	4.0	0.45	0.40				0.24			118	0.04
	4.4	0.40	0.50				0.43			220	0.09
	4.8	0.40	0.50				0.57			220	0.12
	5.2	0.40	0.52				0.66			208	0.14
	5.6	0.40	0.60				0.65			24	0.16
	6.0	0.40	0.63				0.81			252	0.20
	6.4	0.40	0.63				0.62			252	0.16
	6.8	0.40	0.60				0.69			240	0.17
	7.2	0.40	0.60				0.65			240	0.16
	7.6	0.40	0.60				0.70			240	0.17
	8.0	0.40	0.60				0.75			240	0.18
	8.4	0.40	0.52				0.69			208	0.14
o	8.8	0.40	0.50				0.59			200	0.12
	9.2	0.40	0.37				0.55			148	0.08
	9.6	0.40	0.34				0.56			136	0.08
	10.0	0.35	0.20				0.33			07	0.02
	L. Edge	10.3									

3:10 PM  
 L. Edge  
 7/18/96 2:48 PM

outside, in well

Remarks *MEAS. FOR DWL I.E. Intakes - outlet*

GPS LAT/LONG

G.H. of zero flow ... ft. Sheet No. ... of ... sheets

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APR 30 1996

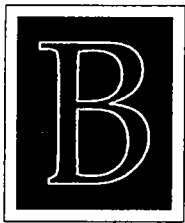
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APR 30 1996

Department of Water Resources

April 26, 1996

Mr. John Coleman  
P.O Box 525  
Twin Falls, ID 83303-0525



**BROCKWAY**  
ENGINEERING  
P.L.L.C.

Hydraulics

Hydrology

Water Resources

Subject: Devil Creek Measuring Device Survey and Water Measurement

Dear John:

This letter is to report the results of water measurements and measuring device evaluations on the Devil Creek watershed which were performed on April 16, 1995. Present during all or part of the site inspections and water measurements were: Randall Brewer, Rolland Patrick, Preston Davis, Melvin Crowley, John Coleman, Tim Luke(IDWR) and Charles Brockway.

The weirs installed in the diversions from the Cross Cut ditch were examined. These weirs were installed downstream of the Calco gate outlets which are not being used as measuring devices. Also, the measuring devices on Cedar Creek and the Crosscut ditch were inspected. The following table lists the measurements and/or observations on each of the structures:

Patrick #1 Diversion	Rectangular contracted weir 24 inch at bottom and 25 inch at top. No flow	Weir pool needs cleaning and deepening. Stick weir for head measurement
Patrick #2 Diversion	Rectangular contracted weir- 24 inch. Weir plate is on downstream side of bulkhead. No flow	Weir pool needs cleaning. Replace weir plate on upstream side of bulkhead so the nappe will spring free. Bulkhead could be replaced. This weir may submerge at high flows since ditch downstream is shallow.
Weir in Deadwood Ditch west of Devil Creek.	Weir head was 0.5 feet.	Weir pool needs cleaning and willow removal. Weir not functioning at this time.

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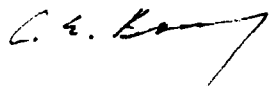
Weir in Deadwood Ditch at landfill	5 ft Rectangular Contracted weir. h=1.04(CEB) Discharge = 16.9 cfs h=1.03(T. Luke) Discharge=16.7 cfs	Weir functioning properly
Cedar Creek broad crested weir upstream of Three Creek Road	6 ft wide concrete ramped broad crested weir. h=0.85 Discharge=16.48 cfs Maximum head at high water mark was $\pm 1.75$ ft Discharge=47.2 cfs	Device functioning properly, no spill over embankment in creek.
House Creek broad crested weir	8 ft wide concrete ramped broad crested weir. Not inspected during this visit.	Reported to be functioning properly by M. Crowley
Reynolds spring broad crested weir	Reservoir water surface elevation was submerging the structure	Structure needs to be moved upstream to a point just downstream of the big tree. Weir not functioning at this reservoir level.

The weirs on the East and West branches of Devil Creek were visited. Randall Brewer indicated they had some problem with the weirs washing but they were functioning at the time of the visit. Some maintenance should be performed on the weir pools, but they do function reasonable well at this time. There is no weir on the Middle branch of Devil Creek which has the highest discharge. Measurements were obtained on the East and West branch weirs and the Middle branch was measured using a current meter. Also, Devil Creek was measured with a current meter just downstream of the Three Creek road. No irrigation diversions were occurring so the difference between inflow and outflow is an indication of the reach gain from above the irrigated area to the road. The attached worksheet shows the discharge measurements and calculated reach gain for a no-irrigation scenario. The calculated gain was 0.6 cfs for an inflow discharge of 6.18 cfs or about a 10 percent gain. The gain is not unexpected but keep in mind these are measurements at a single point in time and both the weirs and especially the current meter measurements are subject to some error.

As was discussed at the Cedar Mesa Reservoir and Canal Company annual meeting and also at the field meeting on April 16, similar measurements should be repeated during periods when irrigation is occurring from all branches of Devil Creek. In discussions with Tim Luke of the Department of Water Resources, it was suggested that the measurements be repeated about June 15 and sometime in August during lower flow periods. I will coordinate this with Tim Luke and Mel Crowley, Watermaster 47-C as they indicated they would like to be present if possible. Recall that the purpose of these evaluations is to determine the feasibility of utilizing inflow-outflow measurements as an indicator of depletion due to irrigation in lieu of measurement of individual irrigation diversions.

The most current need for Cedar Mesa Canal and Reservoir Company is to perform maintenance on the Deadwood Ditch weir and move the Reynolds Spring broad crested weir upstream.

Sincerely,



C. E. Brockway, P.E.

cc: T. Luke

Enclosures

Devil Creek water measurement worksheet

Letter from T. Luke re current meter measurement

**DEVIL CREEK WATERSHED**  
**INFLOW OUTFLOW MEASUREMENTS APRIL 16, 1996**  
**EAST, MIDDLE, AND WEST CHANNEL INFLOW AND OUTFLOW MEASURED AT THREE CREEK ROAD**  
**MIDDLE CREEK AT UPPER DITCH DIVERSION CURRENT METERED**

4/16/96  
 OTT METER 47966\* C.E. BROCKWAY, J. COLEMAN, MEL CROWLEY, ET AL  
 GAGE-NONE

SECT.	DIST.	DEPTH	REV .6-.2	REV .8	TIME SEC	ANGLE CORR.	VEL	DELTA AREA	DELTA Q	SUM Q
1	0.3	0.00	0		50	1	0.00	0.00	0.00	0.00
2	1.0	0.95	48		50	1	0.34	0.33	0.14	0.14
3	1.5	1.03	55		50	1	0.95	0.50	0.44	0.58
4	2.0	1.20	47		50	1	0.82	0.56	0.49	1.08
5	2.5	1.31	38		50	1	0.67	0.63	0.47	1.54
6	3.0	1.26	53		50	1	0.92	0.64	0.51	2.05
7	3.5	1.27	53		50	1	0.92	0.63	0.58	2.63
8	4.0	1.12	50		50	1	0.87	0.60	0.53	3.17
9	4.5	0.83	38		50	1	0.67	0.49	0.37	3.54
10	5.2	0.00	0		50	1	0.00	0.29	0.10	3.64

\* CALIBRATION V=(REV/SEC)\*C1+C2 FT/SEC

LOOKUP TABLE

R	C1	C2
0	0.7872	0.062
0.68	0.8495	0.02
100	0.8495	0.02

VG. VEL 0.78 FPS  
 AREA 4.66 SQ FT  
 DISCHAR 3.64 CFS A

**DEVIL CREEK EAST CHANNEL**

WEIR- 24 INCH RECTANGULAR CONTRACTED WEIR

AERATING PROPERLY WEIR POOL NEEDS CLEANING-BOTTOM IS 5 INCHES BELOW WEIR CREST

STUCK WEIR H= 5.25 INCHE C.E. BROCK DISCHARGE= 1.84 CFS B

**DEVIL CREEK WEST CHANNEL**

WEIR-RECTANGULAR CONTRACTED WIDTH=1.95 FEET

H= 0.23 FT BY TIME LUKE DISCHARGE= 0.70 CFS C

**DEVIL CREEK AT HIGHWAY BRIDGE**

CURRENT METERED BY TIM LUKE, IDWR AND C.E. BROCKWAY

SWOFFER 2100 CURRENT METER DISCHARGE= 6.78 CFS D

TOTAL INFLOW A+B+C 6.18  
 OUTFLOW= D 6.78

NET GAIN D-(A+B+C)= 0.60 CFS