



State of Idaho

DEPARTMENT OF WATER RESOURCES

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April 30, 2004

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Keith Waddoups
Board of Directors, Big Lost River Irrigation District
2078 North 3520 West
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Seth Beal
Advisory Board Chairman, Water District 34

DRAFT VIA FACSIMILE

Re: Accounting Procedures for Water District 34

Gentlemen:

The Idaho Department of Water Resources (IDWR) has received requests from members of the Water District 34 and Big Lost River Irrigation District advisory boards, and water users served by your organizations to provide written clarification of accounting procedures that should be used related to the following issues.

1. Requests of mitigation pursuant to IDAPA 37.03.12.050.
2. Requests to rotate non-deliverable natural flow rights at the beginning of the irrigation season under IDAPA 37.03.12.040.02.d.iii.
3. Assessing conveyance losses to storage deliveries under IDAPA 37.03.12.040.03.b.

Fulfilling and Accounting for Mitigation Requests

This issue is currently being reviewed by the Director and will be addressed in a separate letter.

Accounting Procedure for Requests to Rotate under IDAPA 37.03.12.040.02.d.iii

On April 30, 2004, Water District 34 received a request from several water right holders with points of diversion downstream of the Darlington Sinks. These water users requested that their water rights be rotated for credit as described in Rule 40.02.d.iii. Under this rule, water will be accrued in Mackay Reservoir, up to a maximum total of 3,500 AF, in a separate account that is controlled by the watermaster. Water in this account is to be used by the watermaster to make natural flow rights deliverable to points of diversion downstream of the Darlington Sinks at the beginning of the season.

The accounting procedure used by IDWR will track two storage accounts in Mackay Reservoir during the period that this rule is in effect. One account is impounded water owned by BLRID, the other is

impounded water controlled by the watermaster for the purpose of “charging the system”. Reservoir losses, including evaporation and seepage losses, will be assessed proportionally to each of these two accounts. Assessment of losses or gains to individual allocations within the BLRID account is the responsibility of the BLRID.

The following is an example of daily calculations for use when this rule is in effect and water is not intentionally being released from Mackay Reservoir.

- Assumptions:
1. Irrigation season has begun.
 2. General Provision 6a is in effect.
 3. Mackay Reservoir has not filled.
 4. The Big Lost River is dry downstream of the Darlington Sinks
 5. Water users downstream of the Darlington Sinks have requested that their water rights be filled by rotation for credit under IDAPA 37.03.12.040.03.b.
 6. Water is not intentionally being released from Mackay Reservoir.
 7. Water in the Big Lost River channel between Mackay Dam and the 2B gage is due to seepage losses from Mackay Reservoir.
 8. This example assumes all water rights have been called for and that all water right holders downstream of the Darlington Sinks have requested their rights be rotated for credit under Rule 40.02.d.iii.
 9. Actual numbers will vary depending on daily gage data, actual calls for water rights and the actual number of water rights requested to be rotated for credit.

Daily data:	2B gage reading	83.0 cfs
	Reservoir contents	32000 AF
	Prior day's reservoir contents	31940.1 AF
	Change in reservoir contents	59.9 AF (30.2 cfs-day)
	Sharp diversion reading	10.0 cfs
	Daily reservoir evaporation	9.92 AF (5.0 cfs-day)

Calculation of reservoir inflow:

$$2B + \text{CHANGE IN CONTENTS} + \text{SHARP} + \text{EVAPORATION} = \text{INFLOW}$$

$$83.0 \text{ cfs} + 30.2 \text{ cfs} + 10.0 \text{ cfs} + 5.0 \text{ cfs} = 128.2 \text{ cfs}$$

Determination of priority date at Mackay Reservoir:

Assuming all water rights are called for, 128.2 cfs corresponds to a last right filled
date of 40.4% of the 10/12/1884 water rights downstream of Mackay Reservoir.

Water delivered to storage accounts in Mackay Reservoir:

4.9 cfs (9.7 AF) diverted to BLRID storage account under WR 34-818 and 34-

811

69.7 cfs (138.2 AF) diverted to storage under IDAPA 37-03.12+040.02.iii
53.6 cfs to be passed through reservoir as natural flow for downstream users

Daily reservoir losses:

Evaporation loss	5.0 cfs-day
Seepage loss (2B + SHARP – REQUIRED DOWNSTREAM FLOW)	
	83.0 + 10.0 – 53.6 = 39.4 cfs-day
Total reservoir loss (EVAPORATION + SEEPAGE LOSS)	
	5.0 + 39.4 = 44.4 cfs-day = 88.1 AF

Accounting of impounded water:

BLRID account

Prior day's account balance	31,940.1 AF
Diverted to storage	<u>+ 9.7 AF</u>
Account balance w/o evaporation or seepage loss	31,949.8 AF
Reservoir losses (0.2746%)	<u>- 87.7 AF</u>
	31,862.1 AF

Watermaster's account

Prior day's account balance	0.0 AF
Diverted to storage	<u>+ 138.2 AF</u>
Account balance w/o evaporation or seepage loss	138.2 AF
Reservoir losses (0.2746%)	<u>- 0.4 AF</u>
	137.8 AF

Reservoir losses are $88.1 / (31,949.8 + 138.2) \times 100 = 0.2746\%$ of total

Determination of natural flow downstream of Mackay Dam:

Seepage losses from Mackay Reservoir are considered to be a gain to the natural flow in the reach downstream of the dam. This is a source of natural flow that is not available to water rights diverted into storage at the reservoir, thus the last right filled date for the reaches between Mackay Dam and the Darlington Sinks may be later than the last right filled date deliverable for diversion to storage in the reservoir.

Natural Flow at 2B Gage = 2B Gage + Sharp Diversion

Natural Flow at Leslie Gage = Leslie Gage + all diversions between dam and Leslie gage

Assessing Conveyance Losses to Storage Deliveries

According to IDAPA 37.03.12.040.03.b, the conveyance loss assessed to storage deliveries in each reach of the river should be determined by the watermaster on a daily basis, using daily streamflow gage readings and diversion data.

“ Conveyance losses in the natural channel shall be proportioned by the watermaster between natural flow and impounded water. The proportioning shall be done on a river reach basis. Impounded water flowing through a reach that does not have a conveyance loss will not be assessed a loss for that reach. Impounded water flowing through any river reach that does have a conveyance loss will be assessed the proportionate share of the loss for each losing reach through which the impounded water flows. To avoid an iterative accounting procedure, impounded water conveyance loss from the previous day shall be assessed on the current day. ”

IDAPA 37.03.12.040.03.b.i adds that

“ An exception is made for impounded water delivered through the Beck and Evan diversion. Conveyance losses for this impounded water will be assessed the conveyance loss of the Leslie reach, if any, and the additional conveyance loss to the Beck and Evan diversion but not the conveyance loss of the entire Moore reach. ”

The following is an example of daily accounting procedures for the assessment of conveyance losses in accordance with this rule. The river reaches are defined in IDAPA 37.03.12.025.01.

Daily data:	Change in Mackay Reservoir contents	353 cfs
	Reservoir evaporation rate	10 cfs
	Sharp diversion rate	8 cfs
	2B gage reading	580 cfs
	Diversions from 2B to Leslie	96 cfs
	Leslie gage reading	472 cfs
	Beck diversion	16 cfs
	Other diversions from Leslie to Moore	223 cfs
	Big Lost River below Moore diversion	0 cfs
	Exchange well injections in Eastside Canal	28 cfs
	Eastside return flow	73 cfs
	Diversions from below Moore to Munsey	61 cfs
	Big Lost River below Munsey diversion	0 cfs
	Diversions below Munsey	0 cfs
	Arco gage reading	0 cfs

Reach gain/loss calculations:

Reach gain for Mackay Reservoir to 2B gage
 2B + SHARP + CHANGE IN CONTENTS + EVAPORATION
 $580 \text{ cfs} + 8 \text{ cfs} + 353 \text{ cfs} + 10 \text{ cfs} = 951 \text{ cfs (gain)}$

Reach gain between 2B gage and Leslie gage
 OUTFLOW – INFLOW + DIVERSIONS
 $472 \text{ cfs} - 580 \text{ cfs} + 96 \text{ cfs} = -12 \text{ cfs (loss)}$

Reach gain between Leslie gage and BLR below Moore diversion
 OUTFLOW – INFLOW + DIVERSIONS – EXCHANGE + ES RETURN
 $0 \text{ cfs} - 472 \text{ cfs} + 238 \text{ cfs} - 28 \text{ cfs} + 73 \text{ cfs} = -189 \text{ cfs (loss)}$

Reach gain between Moore and Munsey diversions
 BLW MUNSEY – BLW MOORE – ES RETURN + DIVERSIONS
 $0 \text{ cfs} - 0 \text{ cfs} - 73 \text{ cfs} + 61 \text{ cfs} = -12 \text{ cfs (loss)}$

Calculation of percent loss by reach

Mackay Reservoir to 2B gage
 No conveyance loss in this reach on this day

2B gage to Leslie gage
 $\text{LOSS/TOTAL INFLOW} = 12/580 \times 100 = 2.07\%$

Leslie gage to below Moore diversion
 $\text{LOSS/TOTAL INFLOW} = 189/472 \times 100 = 40.0\%$

Below Moore diversion to below Munsey
 $\text{LOSS/TOTAL INFLOW} = 12/73 \times 100 = 16.4\%$

Assessment of conveyance loss to storage water deliveries

Storage water delivered above 2B gage
 No conveyance loss on this day

Storage water delivered between 2B gage and Leslie gage
 Conveyance loss = 2.07%

Storage water delivered to Beck diversion
 Conveyance loss = 2.07% (without an additional stream gaging station potential losses between the Leslie gage and the Beck diversion cannot be determined)

Storage water delivered to other diversions in the Moore reach
 $\text{Conveyance loss} = (1 - (1 - 0.0207) \times (1 - 0.400)) \times 100 = 41.2\%$

Storage water delivered below Moore diversion

$$\text{Conveyance loss} = (1 - (1 - 0.412) \times (1 - 0.164)) \times 100 = 50.8\%$$

If you have any questions regarding this letter please contact me at 208-327-7871 or Tim Luke at 208-327-7864.

Respectfully,

Jennifer Berkey
Water Distribution Section

cc: Bob Shaffer, Big Lost River Irrigation District

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