

FPP Change Request Form

Change Form # & Title:	16IHR005 – Low Flow Spill Patterns w/ No RSW
Date Submitted:	January 28, 2016
Project:	IHR
Requester Name, Agency:	Corps NWW
Final Action:	APPROVED – January 28, 2016

FPP Section: IHR 2.3.3.7. RSW Operating Criteria; and Table IHR-9.

Justification: The Ice Harbor RSW in Bay 2 spills a fixed rate of ~8.4 kcfs. As a result, the RSW must be closed when total spill is less than ~8.4 kcfs (i.e., during low flows). However, there are currently no patterns defined in the FPP for Ice Harbor spill w/ no RSW below 8.5 kcfs.

Low flow spill patterns were modeled at ERDC in October 2015. Based on the results, the recommendation is to close the RSW when total project outflow drops below 30 kcfs and go to the new low flow spill patterns with no RSW defined in Table IHR-9.

This change form adds new criteria to section 2.3.3.7 to close the RSW at total project outflow below 30 kcfs, adds new patterns to Table IHR-9 for spill with No RSW, and adds a footnote to the other spill pattern tables to include this new criteria.

Proposed Change:

2.3.3.7. Removable Spillway Weir (RSW).

- i. The RSW in spillbay 2 will be in the raised position and operational on the first day of spill for juvenile fish passage.
- ii. When the RSW is in operation, spill through Bay 2 is fixed at approximately 8.4 kcfs. ~~†~~The spillgate shall be raised to where it does not touch flow passing down the RSW.
- iii. When the National Weather Service forecasts Ice Harbor inflow to exceed 200 kcfs, initiate aggressive forebay debris removal so that RSW operation will not be impeded and coordinate with RCC and CENWW-OD-T.
- iv. When inflows exceed 260 kcfs, upstream river gauge flows are increasing, and the NWS forecasts Ice Harbor inflow to exceed 300 kcfs, complete RSW stow (complete rotation to the landing pad).
- ~~iv-v.~~ On or after June 21 (start of summer spill), when average daily total project outflow is less than 30 kcfs and forecasted to remain below 30 kcfs for three days or more on a declining hydrograph, the RSW will be closed and spill will be distributed in patterns for spill with no RSW in Table IHR-9.

Table IHR-1. Ice Harbor Dam Spill Patterns with No RSW. ^{a,b}

IHR Spill Patterns with No RSW - # Gate Stops per Spillbay										Total Stops (#)	Spill ^a (kcfs)
Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6	Bay 7	Bay 8	Bay 9	Bay 10		
	<u>CLOSE</u>								<u>1</u>	<u>1</u>	<u>1.7</u>
	<u>CLOSE</u>	<u>1</u>							<u>1</u>	<u>2</u>	<u>3.5</u>
	<u>CLOSE</u>	<u>1</u>						<u>1</u>	<u>1</u>	<u>3</u>	<u>5.2</u>
	<u>CLOSE</u>	<u>1</u>	<u>1</u>					<u>1</u>	<u>1</u>	<u>4</u>	<u>6.9</u>
	CLOSE	<u>1.5</u>	<u>1</u>		<u>1</u>			<u>1</u>	<u>1</u>	5	<u>8.75</u>
	CLOSE	<u>1.5</u>	<u>1</u>		<u>1</u>	<u>1</u>		<u>1</u>	<u>1</u>	6	<u>10.42</u>
	CLOSE	<u>1.5</u>	<u>1</u>		<u>1</u>	<u>1</u>	<u>1</u>	1	1	7	<u>12.1</u> 11.9
	CLOSE	<u>1.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1.5</u>	<u>1.5</u>	8	<u>13.86</u>
	CLOSE	<u>1.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1.2</u>	2	9	<u>15.64</u>
	CLOSE	<u>2.5</u>	<u>1</u>	<u>1.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	10	<u>17.30</u>
	CLOSE	<u>2.5</u>	<u>1</u>	<u>1.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2.4</u>	11	<u>19.0</u> 18.7
	CLOSE	<u>2.5.5</u>	<u>2</u>	<u>1.5.5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2.4</u>	12	<u>20.74</u>
	CLOSE	<u>2.5.5</u>	<u>2</u>	<u>1.5.5</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2.4</u>	<u>2.4</u>	13	<u>22.44</u>
	CLOSE	5.5		5.5				1.5	1.5	14	23.8
	CLOSE	5		5		5				15	25.5
	CLOSE	5		5		5			1	16	27.2
	CLOSE	5.5		5.5		5			1	17	28.9
	CLOSE	5.5		5.5		5.5			1.5	18	30.5
	CLOSE	6		6		6			1	19	32.0
	CLOSE	5		5		5		5		20	34.0
	CLOSE	5		5		5		5	1	21	35.7
	CLOSE	5.5		5		5		5.5	1	22	37.3
	CLOSE	5.5		5.5		5.5		5.5	1	23	39.0
	CLOSE	6		5.5		5.5		6	1	24	40.6
	CLOSE	6		6		6		6	1	25	42.1
	CLOSE	5	5	5		5		5	1	26	44.2
	CLOSE	5.5	5	5		5		5.5	1	27	45.8
	CLOSE	5.5	5	5.5		5.5		5.5	1	28	47.5
	CLOSE	5.5	5.5	5.5		5.5		6	1	29	49.1
	CLOSE	5.5	5.5	6		6		6	1	30	50.7
	CLOSE	6	6	6		6		6	1	31	52.2
	CLOSE	6	6	6.5		6.5		6	1	32	54.0
	CLOSE	6.5	6.5	6.5		6.5		6	1	33	55.8
	CLOSE	6	6	5	5	5		6	1	34	57.5
	CLOSE	6	6	5	5	6		6	1	35	59.1
	CLOSE	6	6	6	5	6		6	1	36	60.7
	CLOSE	6	6	6	6	6		6	1	37	62.3

IHR Spill Patterns with No RSW - # Gate Stops per Spillbay										Total Stops (#)	Spill ^a (kcfs)
Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6	Bay 7	Bay 8	Bay 9	Bay 10		
	CLOSE	6	6	6	6	7		6	1	38	64.1
	CLOSE	6	6	6	6	7		7	1	39	65.7
	CLOSE	6	6	6	7	7		7	1	40	67.4
	CLOSE	6	6	7	7	7		7	1	41	69.1
	CLOSE	6	7	7	7	7		7	1	42	70.8
	CLOSE	7	7	7	7	7		7	1	43	72.5
6	CLOSE	6	6	6	6	7		6	1	44	74.1
6	CLOSE	6	6	6	7	7		6	1	45	75.8
6	CLOSE	6	6	7	7	7		6	1	46	77.5
6	CLOSE	6	7	7	7	7		6	1	47	79.2
6	CLOSE	7	7	7	7	7		6	1	48	80.9
6	CLOSE	6	6	6	6	6	6	6	1	49	82.5
6	CLOSE	6	6	6	6	7	6	6	1	50	84.2
6	CLOSE	6	6	6	7	7	6	6	1	51	85.9
6	CLOSE	6	6	6	7	7	6	7	1	52	87.6
6	CLOSE	6	6	7	7	7	6	7	1	53	89.3
6	CLOSE	6	7	7	7	7	6	7	1	54	91.0
6	CLOSE	7	7	7	7	7	6	7	1	55	92.7

a. This table defines spill patterns in increments of one gate stop per row. Spill is calculated as a function of the total number of gate stops at forebay elevation 438.0 ft.

b. When total project outflow is < 30 kcfs, the RSW will be closed and spill will be distributed in patterns defined in this table (see section 2.3.3.7).

Add footnote to **Table IHR-10. 30% Spill** and **Table IHR-11. 45 kcfs/TDG cap Spill**:

c. RSW in Bay 2 = fixed spill of ~8.4 kcfs at forebay 438.0 ft. When total project outflow is < 30 kcfs, the RSW will be closed and spill will be distributed in patterns defined in Table IHR-9.

Comments:

1/28/16 FPP Meeting: clarified criteria to close RSW (highlighted). Same for LMN and LWG.

Record of Final Action: APPROVED at FPP meeting 1/28/2016.