FPP Change Request Form

Change Form # & Title:	15IHR008 – Low Flow Spill Patterns w/ No RSW
Date Submitted:	July 9, 2015; REVISED Aug 10, 2015
Project:	IHR
Requester Name, Agency:	Corps NWW
Final Action:	WITHDRAWN (will be revised/resubmitted for 2016) – 8/13/2015

FPP Section: Table IHR-9.* Spill Patterns w/ No RSW.

**[Note: this table was previously numbered IHR-8, but shifted up by one when new Table IHR-7 was added May 14, 2015]*

Justification for Change: When spill is less than ~8.4 kcfs, the RSW in Bay 2 must be closed and spill passed via other bays. Currently, FPP spill patterns with no RSW in Table IHR-9* are defined as low as 8.5 kcfs. However, during extreme low flow conditions, lower spill rates may be required.

This situation occurred August 22-31, 2013, and patterns were defined and implemented through in-season coordination with TMT. Considering this situation is likely to re-occur this year, patterns have been developed for the FPP to optimize egress conditions.

Proposed Changes: New patterns in track changes for Total Spill 1.7–10.2 kcfs.

Table IHR-89. [*pg 1 of 2*] Ice Harbor Dam Spill Patterns with No RSW. [a]

IHR Spill Patterns with No RSW - Gate Stops (#) per Spillbay										Total Stops	Total Spill
Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6	Bay 7	Bay 8	Bay 9	Bay 10	(#)	(kcfs)
	CLOSE	1								**1**	**1.7**
	CLOSE	1							1	**2**	**3.4**
	CLOSE	1		1					1	**3**	**5.1**
	CLOSE	1		1		1			1	**4**	**6.8**
	CLOSE	~~5~~2		1		1			1	**5**	**8.5**
	CLOSE	~~5~~2		2					1	**6**	**10.2**
	CLOSE	5						1	1	**7**	**11.9**
	CLOSE	5						1.5	1.5	**8**	**13.6**
	CLOSE	5						2	2	**9**	**15.4**
	CLOSE	5		5						**10**	**17.0**
	CLOSE	5		5					1	**11**	**18.7**
	CLOSE	5.5		5.5					1	**12**	**20.4**
	CLOSE	5.5		5.5				1	1	**13**	**22.1**
	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**

IHR Spill Patterns with No RSW - Gate Stops (#) per Spillbay										Total Stops	Total Spill
Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6	Bay 7	Bay 8	Bay 9	Bay 10	(#)	(kcfs)
	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**
	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. Table defines spill patterns in increments of one gate stop per row. "Total Spill" is calculated as a function of total gate stops at forebay elevation 438.0 feet. Patterns in real-time are automatically interpolated as necessary to target the desired spill rate at the observed forebay elevation.

Comments from others:

7/9/2015 FPOM: There were concerns about not having model data at these low spill rates to evaluate the proposed changes. Hevlin proposed a model trip in October. Wright asked for comments. FPOM was reasonably willing to test something this summer but wanted a commitment to a model trip in October. Van Dyke would like to see a flat pattern. He will send comments to Wright.

7/15/15 email to FPOM:

From: Wright, Lisa NWD
Sent: Wednesday, July 15, 2015 8:26 AM
Subject: FPOM: FPP Change Forms - Update on LWG, LMN, IHR low flow spill patterns
Good morning FPOM -

At last week's FPOM meeting, we discussed three FPP change forms to add lower spill patterns at Ice Harbor (15IHR008), Lower Monumental (15LMN004), and Lower Granite (15LWG004). FPOM supported the need for these lower spill patterns given this year's low flow conditions, and were in general agreement with the uniform patterns proposed for Lower Granite. There were concerns that the patterns proposed for IHR and LMN may need to be more uniform, but there are no modeling data to evaluate patterns at these low spill rates (1.7-6.8 kcfs). FPOM requested more time to review and provide comments on the low flow spill patterns for IHR and LMN in the event they need to be implemented this year.

Currently, low flow conditions are requiring Lower Granite spill below 10.3 kcfs. As such, the low flow spill patterns defined in change form 15LWG004 are being implemented during those hours when Lower Granite total outflow is less than approximately 28.6 kcfs (assuming Unit 1 min gen is ~18.3 kcfs). These flow conditions were first met yesterday, July 14, at 10:00.

The lower spill patterns for IHR and LMN will be required if total project outflow drops below ~20 kcfs. The current STP indicates inflow in the range of 20-23 kcfs in late August, so there may be some hours when these lower spill patterns are required. Therefore, it is requested that FPOM representatives review the low flow spill patterns proposed in change forms 15IHR008 and 15LMN004, and provide comments for discussion and finalization at the August 13th FPOM meeting.

7/15/15 email from Hevlin:

Hi Lisa, With regard to LoMo and Ice projects, the RSWs should be closed at these low flows, and spill spread evenly across the spillway, that is unless Trevor has a different opinion. And like at granite we could really benefit from looking at these models at ERDC with river flow at 25 kcfs, I don't think we ever have. Bill Hevlin

8/10/15 emails from NOAA:

From: Trevor Conder - NOAA Federal
Sent: Monday, August 10, 2015 1:03 PM
Greg and Ryan,
Please modify IHR-9 spill pattern table at the current flows to reflect the uniform spill pattern suggestion that Bill has described [*below*]. This will be a useful reference as flows decrease this year and for ERDC modeling. Will we need to do something similar in the near future at LMN? -Trevor

On Mon, Aug 10, 2015 at 11:09 AM, Bill Hevlin - NOAA Federal wrote:
Hi Trevor,
I just gave Greg and Ryan input on a low flow spill pattern at Ice Harbor. I said that if they have 6 stops, open bays 3 and 5 two stops each and bays 7 and 10 one stop each. And at 5 stops spill, reduce bay 5 to one stop, and at 4 stops, reduce bay 3 to one stop. So that at 4 stops total, bays 3, 5, 7, and 10 are all one stop. We can model this and other alternatives in October at ERDC.

8/13/15 FPOM: Lorz said he would like to look at patterns in the model before changing the patterns in the FPP. Moody said R. Laughery observed the patterns at the project and thought they looked great. These proposed patterns are ok for this year but need to be looked at with the model before making any changes to the FPP tables.

Record of Final Action: 8/13/2015 WITHDRAWN. A new change form will be submitted for 2016 FPP pending results of the ERDC model trip in October 2015.