OFFICIAL COORDINATION REQUEST FOR
NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 17 IHR 12 Ice Harbor Power Generation Lines Upgrade
COORDINATION DATE- ~~5 July 2017~~, Updated ~~31 October~~ 1 December 2017
PROJECT- Ice Harbor Lock and Dam
RESPONSE DATE- ~~13 July 2017~~, 14 December 2017

Description of the problem: The US Army Corps of Engineers is requesting to remove from service Ice Harbor's turbines, 1 and 2 for 12~~10~~ days, ~~20 to 29~~ 6 to 17 August 2018, to install a cut gap between the lines from turbine 1 and 2 and install the switch on line 1. The cut gap is needed to isolate turbine 1 so that it can provide power for dam operations, while the main power line upgrades are made from 1 September to 10 December 2018. We are requesting outage for this work at this time to assure contracting stays on schedule. The cut gap installation cannot be performed during the normal fishway outage as the work must be completed before the main upgrades are started, which need to occur during winter to accommodate other maintenance actions at the dam. The 18~~20~~ to 29 August time period was selected to produce the minimal impact on fish passage. Two days were added to the requested outage to include components originally scheduled for December of 2017. That work would prohibit heat in the powerhouse so the request is being made to add it to the outage already coordinated for August. The added work includes replacing the Unit 1 disconnect switch, installing new surge arrestor for line 1 and replacing the line 1 potential transformers. The work schedule will be changed from 10-hr days to 24-hr days to assure all work can be completed in the requested period.

Ice Harbor's current switch infrastructure for power generation is 40 years old and beyond its service life. The switches are manually operated and moving out of tolerance. The components of the system have been assessed as inadequate for safety, and need to be upgraded and/or replaced. Included in this upgrade is the installation of a cut gap to isolate turbine 1, so that it can continue to provide power for dam operations during the upgrade process and future operations. Also included are the replacement of switches, and installation of new surge arrestors on the lines coming off all the turbines. This work will require that the turbines be shut down and isolated, depending on what line is being worked on, in order to safely complete the work.

A cut gap between turbines 1 and 2 needs to be installed so that turbine 1 can provided power for dam operations, while keeping power isolated from other work areas. Failure to install the cut gap before the main upgrade begins risks losing all power to the dam, including pumps for the fish ladders, if a problem arises that cannot be isolated.

Following installation of the cut gap, the remaining line upgrades and surge arrestors installation will be completed from the first of September through 10 December 2018.

Type of outage required: Units 1 and 2 will be taken out of service for 12~~10~~ days, 18~~20~~ to 29 August 2018 to install the cut gap and line 1 switch. Units 4 through 6 will be on line and working normally.

Impact on facility operation: Removing units 1 and 2 from service will shift operations to units 4-6. No other changes in operation will be required.

Dates of impacts/repairs: ~~20 – 29~~ 6 to 17 August 2018.

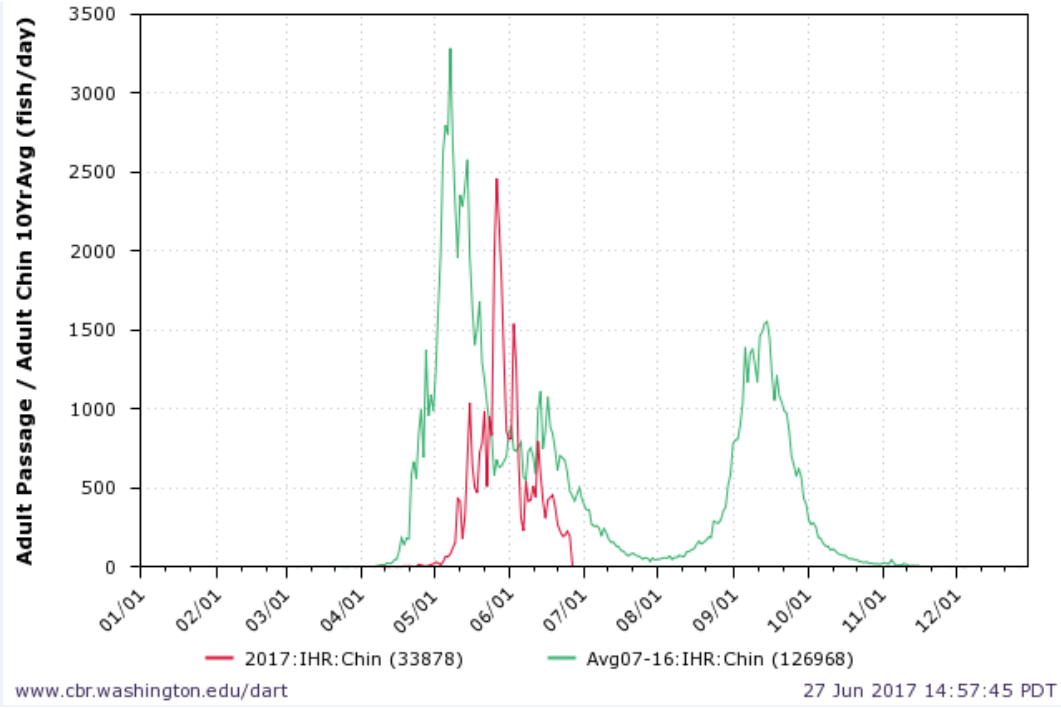
Length of time for repairs: Installation is expected to take ~~10~~ 12 days. Units 1 and 2 will be down the full 12~~10~~ days.

Expected impacts on fish passage: Turbine priority at Ice Harbor Dam during single unit operation is 1, 2, 6, 5. It is anticipated that unit 3 will be out of service at this time for scheduled repairs. If not, we will switch priority to unit 3. Otherwise priority will be for use of unit 6 during the 12 day work period. Switching operation to unit 6 may potentially reduce attraction to the south entrance of the south shore fishway, but the impact to fish passage is expected to be minimal. Both entrances to the south side fish ladder with be open, as well as the north shore fish ladder. Attractant flow to the north shore fish ladder and the north power house entrances will not be affected.

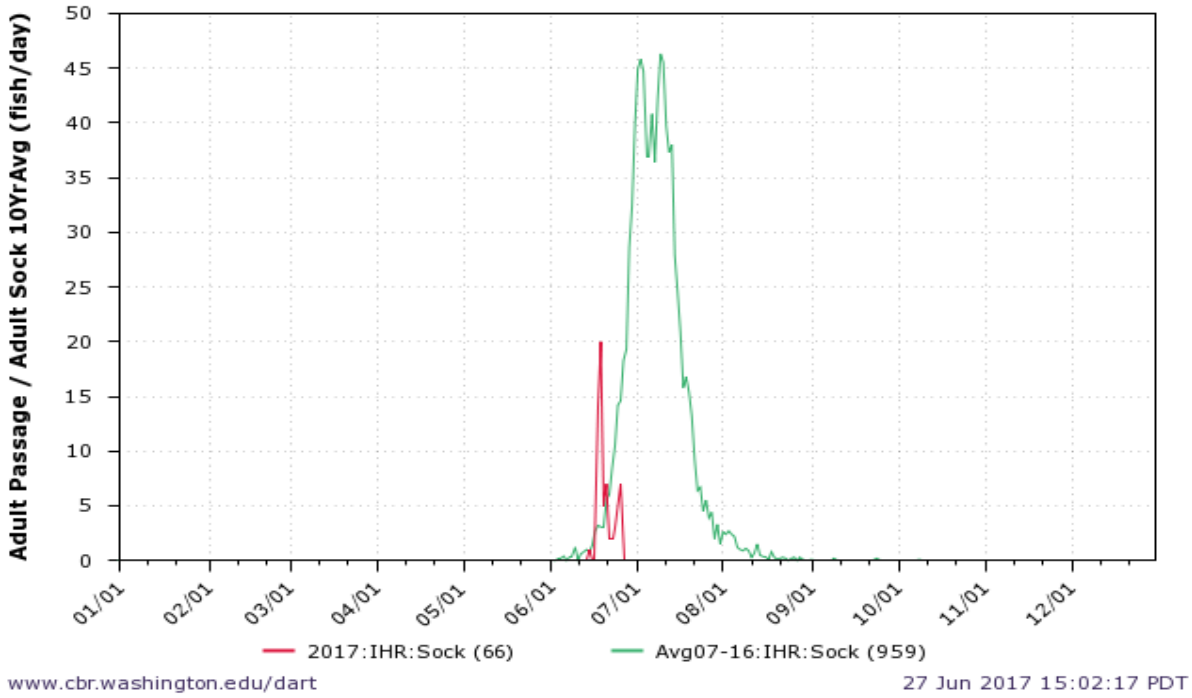
The 10 year average passage (see below) shows that by the 3rd week of August, sockeye salmon runs have ended, and will therefore should not be impacted by the action. Daily passage for Chinook salmon (~200 per day) and steelhead (~100 per day) in the south shore fishway represents about 60 to 65% of passage at the dam during this period.

Fish Passage Historical Data

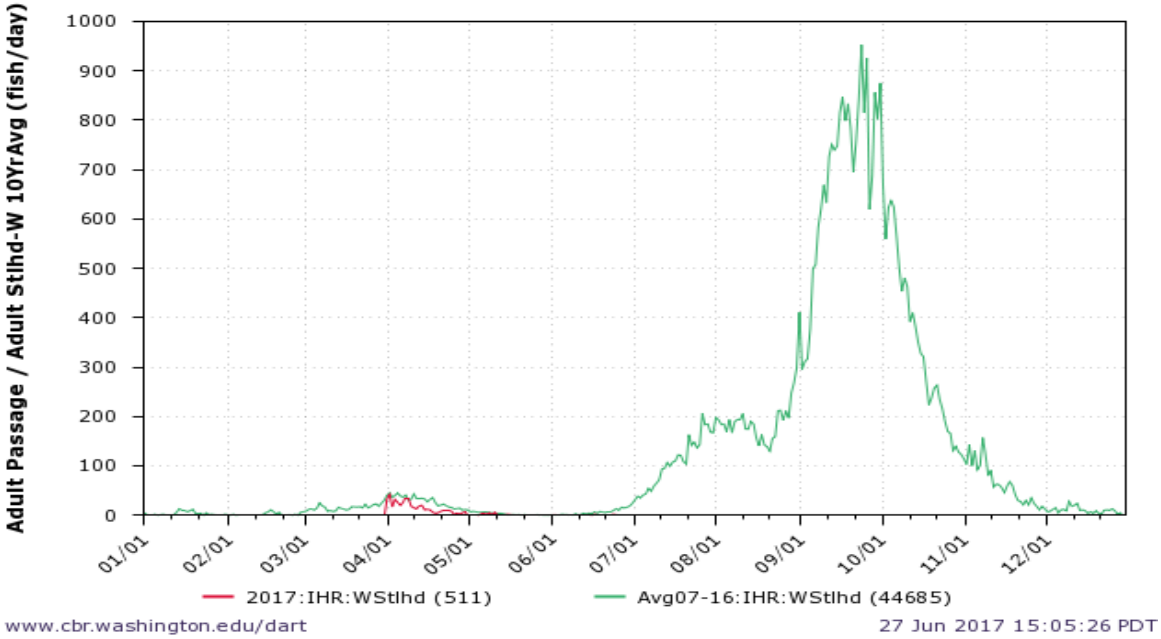
Chinook salmon Ice Harbor Fish Ladder Counts
Current Year and 10 Year Average



Adult Sockeye
Ice Harbor Fish Ladder Counts
Current Year and 10 Year Average



Steelhead
Ice Harbor Fish Ladder Counts
Current Year and 10 Year Average



2016 Adult Passage Daily Ladder Counts at Ice Harbor
08/20/2016 - 08/29/2016

Mean numbers and percent of Chinook salmon, steelhead and sockeye salmon counted in the north and south-shore fishways at Ice Harbor Dam, 6 to 17 August during 2013-2017.

	All Chinook			All Steelhead			All Sockeye		
	North	South	% South	North	South	% South	North	South	% South
8/6/2017	36.8	59	61.6%	114.8	174.8	60.4%	0.4	1.8	81.8%
8/7/2017	25.2	41.8	62.4%	62.8	176.4	73.7%	0.2	1.4	87.5%
8/8/2017	22.4	50.4	69.2%	70	196.6	73.7%	0	1.2	100.0%
8/9/2017	18	57	76.0%	66	219.6	76.9%	0.2	1	83.3%
8/10/2017	32.2	46.8	59.2%	98.2	166.4	62.9%	0.2	1	83.3%
8/11/2017	27.4	61.6	69.2%	68	180.6	72.6%	0.2	0.4	66.7%
8/12/2017	39.8	44.8	53.0%	91.6	160.4	63.7%	0.6	1	62.5%
8/13/2017	63.8	78.2	55.1%	73.8	263	78.1%	0.8	2	71.4%
8/14/2017	60	88.4	59.6%	66.6	213.2	76.2%	0	0.8	100.0%
8/15/2017	85.8	94	52.3%	77	209.8	73.2%	0.4	0.4	50.0%
8/16/2017	77.6	87.8	53.1%	107.4	218	67.0%	0.4	0.4	50.0%
8/17/2017	87.6	132.6	60.2%	82.6	270.4	76.6%	0	0.2	100.0%
Total	**577**	**842**	**59.4%**	**979**	**2449**	**71.4%**	**3**	**12**	**77.3%**

Average Head, Turbine Discharge, Spill and River Flow at Ice Harbor
6-17 August 2017

	Head (ft)	Turbine discharge kcfs	Spill kcfs	Flow kcfs
6-Aug	98	9.19	22.298	31.488
7-Aug	98	9.182	22.082	31.264
8-Aug	98	9.097	22.945	32.042
9-Aug	98	8.988	22.715	31.703
10-Aug	98	9.135	19.976	29.111
11-Aug	98	9.241	19.923	29.164
12-Aug	99	9.214	17.063	26.276
13-Aug	99	9.155	17.422	26.577
14-Aug	99	9.219	18.955	28.174
15-Aug	99	9.188	16.811	25.999
16-Aug	99	9.258	18.903	28.161
17-Aug	99	9.279	21.114	30.393

Comments from agencies

From 13 July FPOM meeting minutes;
NOAA suggests making unit 3 the priority if available otherwise unit 6 would become the priority. FPOM concurred with this action.

1November 2017

Phone conversation with Trevor Conder regarding the two day extension. He was okay with the change and asked for Units 6 a be put in operation while Uits 1,2 were down.

-----Original Message-----
From: Tom Lorz [mailto:lort@critfc.org]
Sent: Wednesday, November 01, 2017 2:16 PM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>
Subject: [EXTERNAL] RE: Unit priority at Little Goose for Stilling Basin Survey

Yah thanks for the call. I can live with this, not ideal but 4 and 6 should be ok for now.

Thanks

Tom Lorz

-----Original Message-----
From: Peery, Christopher A CIV (US)
Sent: Thursday, November 09, 2017 3:16 PM
Subject: FW: Ice Harbor Surge Arrester & 115kV Disconnect Upgrades - UNITS 1 & 2 TURBINE OPERATION DURING AUGUST 2018 WORK WINDOW

Yesterday at FPOM we discussed MOC 17IHR12 requested a longer outage for Turbines 1 and 2, see attached MOC for brief description of the work elements involved. The work requires tagging out the two units and so does not allow for intermittent operation until the work is completed. So regarding hours of operation, units 1 and 2 would not be out of service for the duration of the requested work window. This work was originally scheduled for 10 days, 20 to 29 August 2018. The new elements may still be completed in 10 days using 24 hour work days, but the project requested 12 days total, 18-29 August 2018, as a more realistic schedule.

Unit 3 at Ice Harbor is scheduled to be out of operation beginning in April 2018 for rehab (18 to 24 months), requiring unit priority to be shifted to 4, 5, 6. With Units 1, 2, 3 out of operation, there is no way to heat the powerhouse, which is why the request to move this work from December 2017 to August 2018. The work window was selected to have the least impact on adult fish passage.

Please let me know if you have any questions and comments on this.

Thank you,
Chris

-----Original Message-----
From: Philbrook, Cynthia M CIV USARMY CENWW (US)
Sent: Thursday, November 09, 2017 2:30 PM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>;
Morris, Benjamin W CIV USARMY CENWW (US) <Benjamin.W.Morris@usace.army.mil>
Cc: Thompson, Steven J CIV USARMY CENWW (US)
<Steven.J.Thompson@usace.army.mil>
Subject: Ice Harbor Surge Arrester & 115kV Disconnect Upgrades - UNITS 1 & 2 TURBINE OPERATION DURING AUGUST 2018 WORK WINDOW

Chris,

Just to confirm that the intent is to take Units 1 and 2 off line, 24 hours per day, during the August Work window. The original durations were calculated assuming 10 hour work days, daily, until the units were back on-line. Unit 3 will be out of service for replacement during the time of all work on this contract.

The additional days requested would also be 24 hours per day outages. I would anticipate it would require additional daily shifts to complete the work within the work window.

Please let me know if there is anything I can help with.

Cindy

-----Original Message-----
From: Erick VanDyke [mailto:Erick.S.VanDyke@state.or.us]
Sent: Monday, November 13, 2017 11:56 AM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>; Baus, Douglas M CIV USARMY CENWD (US) Subject: [EXTERNAL] RE: Ice Harbor Surge Arrester & 115kV Disconnect Upgrades - UNITS 1 & 2 TURBINE OPERATION DURING AUGUST 2018 WORK WINDOW

I don't see this as a simple shift in timing because it takes work for winter maintenance period and transfers it to the spill for fish passage season. I may be supportive of moving the effort to August 18-29 2018 if there is greater emphasis put of reducing the impacts on powerhouse passage rate (i.e., zero reduction in spill), or, better yet a commitment to enhance spill passage rate during the period. At a minimum ensuring that unit 4 or 6 is operated to the lower 1% of minimum generation range (9.4 kcfs) should be considered before this change can be supportable. If this cannot be conducted during the winter maintenance period (preferred) it should emphasize moving fish away from powerhouse passage.

-----Original Message-----
From: Peery, Christopher A CIV (US)
Sent: Monday, November 13, 2017 2:54 PM
To: 'Erick VanDyke' <Erick.S.VanDyke@state.or.us>;
Subject: RE: Ice Harbor Surge Arrester & 115kV Disconnect Upgrades - UNITS 1 & 2 TURBINE OPERATION DURING AUGUST 2018 WORK WINDOW

Erik,

Barring a flow emergency, we do not anticipate a significant change in spill or turbine operations other than the change in priority during the coordinated period. During late August of this year, for example, Ice Harbor had one turbine operating at about 9.2 kcfs and spill ranged from about 16 to 21 kcfs. Minimum operation for turbines 4 and 6 at Ice Harbor is 9.4 kcfs, as you pointed out.

Thanks,
Chris

-----Original Message-----
From: Erick VanDyke [mailto:Erick.S.VanDyke@state.or.us]
Sent: Monday, November 13, 2017 3:03 PM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.milSubject: [EXTERNAL] RE: Ice Harbor Surge Arrester & 115kV Disconnect Upgrades - UNITS 1 & 2 TURBINE OPERATION DURING AUGUST 2018 WORK WINDOW

Thanks Chris. I appreciate the observed information and would stress that units 1, 2, and 3 have a lower minimum generation range of 8.4, with usual caviots. Emphasis in 2018 could begin to incorporate operations that stress reducing powerhouse passage whenever possible by sending the ~1 kcfs over a more preferred route. As with most operational changes we will need to remain cognizant of what is actually being delivered.

Erick

-----Original Message-----
From: Peery, Christopher A CIV (US)
Sent: Tuesday, November 14, 2017 10:16 AM
To: trevor.conder@noaa.gov; Lorz, Tom <lort@critfc.org>; 'Erick VanDyke' <Erick.S.VanDyke@state.or.us>
Subject: 17 IHR 12 MOC

Good morning,

I hoping to have some additional discussion on this MOC. I received comments from Erick with his concern on how unit priority may impact spill and juvenile passage. By the second half of August there are very few smolts moving in the system. So the most likely impact from using turbines 4 and 6 will be to attraction to fishways for adult Chinook salmon and steelhead. The dates selected, 18-29 August would typically be after the sockeye salmon run and during the period when fall Chinook salmon and steelhead are starting to ramp up. I would actually recommend moving the work window up to 1-12 August to reduce the potential overlap with early fall migrants.

10 year average passage during 1-12 August at Ice Harbor is 707 Chinook salmon and 7,082 steelhead, and 60% to 70% of these fish typically use the south shore ladder. So not an insignificant number of fish present. Cindy thought the contractors might be able to get the work completed in 10 days, but she really wanted 12 days because things rarely work as planned. Shifting some spill to the north could potentially improve use of the north fishway.

Thoughts?

Christopher Peery
Fish Biologist
Natural Resources Management
U.S. Army Corps of Engineers NWW
201 N 3rd Ave.
Walla Walla, WA 99362
509 527-7124

-----Original Message-----
From: Tom Lorz [mailto:lort@critfc.org]
Sent: Tuesday, November 14, 2017 2:49 PM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>
Subject: [EXTERNAL] RE: 17 IHR 12 MOC

I have no problem with it. Not excited about it but does not cause me great concern.

tom
-----Original Message-----
From: Trevor Conder - NOAA Federal [mailto:trevor.conder@noaa.gov]
Sent: Wednesday, November 15, 2017 9:19 AM
To: Peery, Christopher A CIV (US) <Christopher.A.Peery@usace.army.mil>
Cc: Lorz, Tom <lort@critfc.org>; Erick VanDyke <Erick.S.VanDyke@state.or.us>
Subject: [EXTERNAL] Re: 17 IHR 12 MOC

Chris,

Based on Chinook and steelhead counts I would support an earlier outage in early to mid August using the proposed unit 6 priority. At gascap spill this unit will likely be operated at the minimum 1% which won't leave any additional flexibility. To Erick's concern, based on juvenile migration behavior we have observed in the past, this could be a benefit for juvenile spillway passage since the fish that are in river will be attracted to unit 6 which is closer to the spillway than the typical unit priority. Our concern is primarily the compromise between delay of late running adult sockeye and early running fall Chinook. We should select a period that has the least impact on these species given that juvenile presence is typically very low during this period. Since this is an untested type of operation, we will have to monitor adult counts and PIT detections closely during this period to detect any undesirable passage conditions.

-Trevor

-----Original Message-----
From: Thompson, Seth J CIV (US)
Sent: Thursday, November 30, 2017 6:02 AM
To: Bawden, Rhett M CIV (US) <Rhett.M.Bawden@usace.army.mil>; Philbrook, Cynthia M CIV USARMY CENWW (US) <Cynthia.M.Philbrook@usace.army.mil>
Cc: Thompson, Steven J CIV USARMY CENWW (US) <Steven.J.Thompson@usace.army.mil>
Subject: RE: Ice Harbor Surge Arrester & 115kV Line Disconnect Upgrades - SWITCH REPLACEMENT SCHEDULE AUGUST 2018 LINE 1 OUTAGE (UNCLASSIFIED)

Prefer 8/6-17. Thanks.

Final results

Please email or call with questions or concerns.
Thank you,

Ben Morris
benjamin.w.morris@usace.army.mil
Environmental Compliance