

OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 21 IHR 15 – Unit 2 special generator testing

COORDINATION DATE- December 2, 2021, May 9, 2022

PROJECT- Ice Harbor Dam

RESPONSE DATE- December 16, 2021

Description of the problem – Special generator testing was attempted on unit 2 after the runner replacement was completed in 2018. However, the testing could not be completed because the exciter relays could not support the testing. The relays are currently being replaced and testing for unit 2 is scheduled to occur after unit 3 is returned to service, June August 2022. The testing will require unit 1 to be run at 5-10 megawatts to power unit 2. Unit 2 will usually be run at speed-no-load during the tests. Both units will technically be out of service for three weeks, to include 1 week for the equipment setup, one week to conduct the testing, and one week for equipment breakdown. The duration of the tests will range from 15 minute to several-hour increments per day, up to 22 hours of continuous testing per day. Units 1 and 2 will be idle between test periods and unit 3 will become the priority unit. ~~Due to contractor availability, test must occur July 18 to August 5. Testing was re-scheduled to start August 15 because of the delay in Unit 3 return to service.~~ Testing will occur six or seven days during the testing week.

Type of outage required

Impact on facility operation (FPP deviations)

Unit 1 and 2 will be out of service with priority shifting to unit 3. During the tests, units 1 and 2 will be run below the 1% operating efficiency range.

Impact on unit priority

Unit 3 will be the priority unit, followed by unit 6, 4, then 5.

Impact on forebay/tailwater operation

There should be no impact on forebay/tailwater elevations.

Impact on spill

There is not expected to be any increase in spill resulting from units 1 and 2 being out of service unless river flows are higher than normal for that time of year.

Dates of impacts/repairs

Unit 3 will provide station service for the dam while units 1 and 2 are out of service. Unit 3 runner replacement is scheduled to be completed in August June of 2022, so the special generator testing and equipment setup/breakdown would occur from July 18 to August 5 August 15 to September 3, 2022. ~~The contractor's test engineers are already booked up for later in the month of August.~~ Unit 1 is being used to power unit 2 before

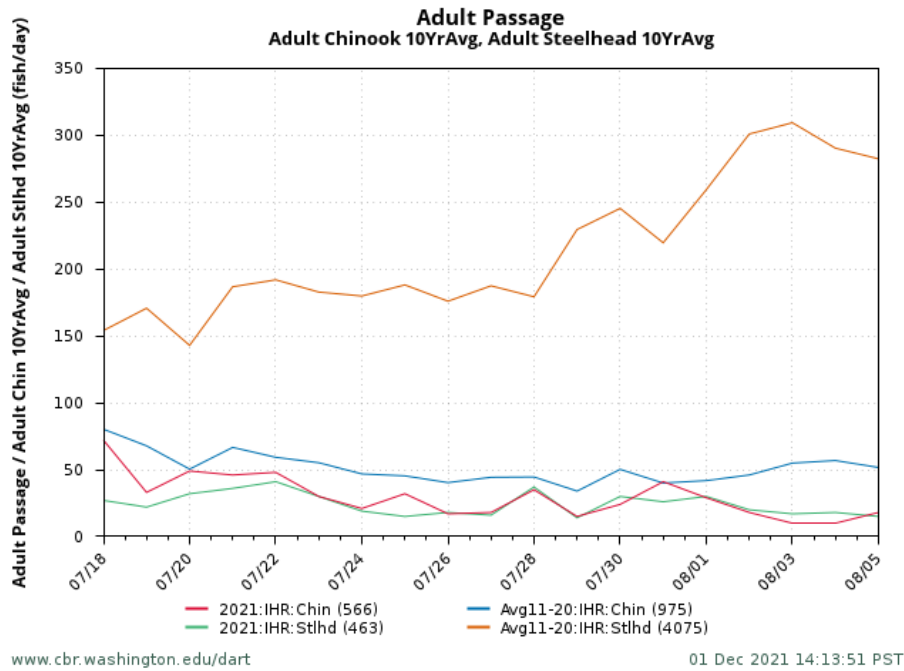
unit 1 is upgraded, in case there is any electrical damage sustained by unit 1 during the testing.

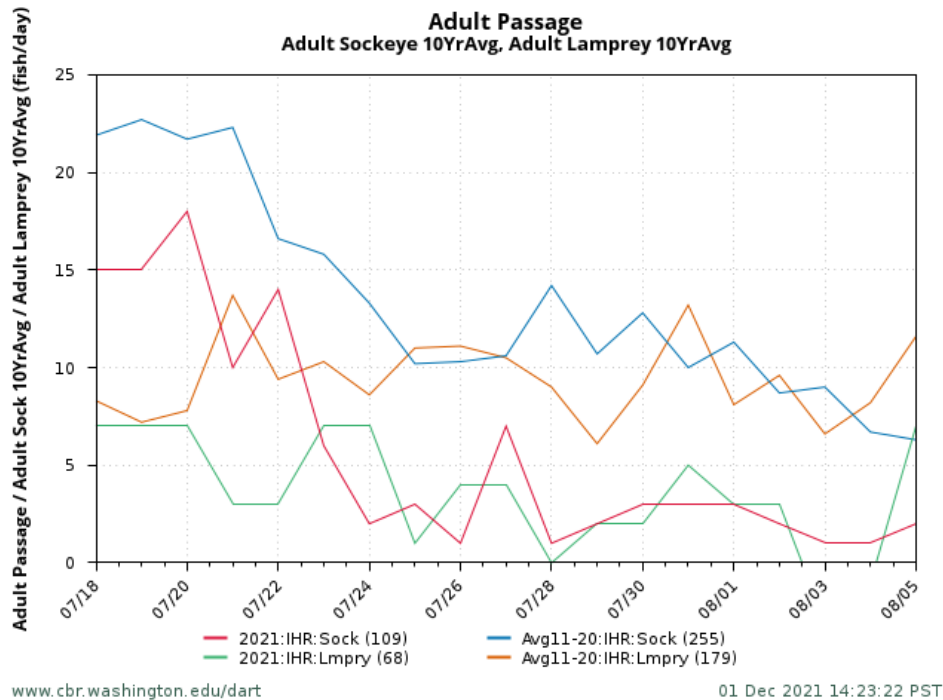
Length of time for equipment setup/breakdown and testing

Three weeks; ~~July 18 to August 5~~, ~~August 15 to 3 September~~, 2022.

Analysis of potential impacts to fish

1. 10-year average passage by run during the period of impact for adults and juvenile listed species, as appropriate for the proposed action and time of year;





As shown in the graphs above, total adult fish passage at the dam (past the count windows) is relatively low during the proposed work period. Steelhead numbers usually slowly start to rise in August. Sockeye numbers usually start declining in the middle of July. Lamprey are passing during the proposed period, with an average of 13 or fewer lamprey counted per day. The 10-year average total of bull trout counted during that period is 0 fish.

Juvenile fish passage is low in July and August, with subyearling fall chinook being the predominate species group present.

2. Statement about the current year's run (e.g., higher or lower than 10-year average);

Official fish run size forecasts for 2022 have not been released yet by Washington Department of Fish and Wildlife.

3. Estimated exposure to impact by species and age class (i.e., number or percentage of run exposed to an impact by the action);

The percentage of the 10-year average of adult fish passing (April 1 to October 31) exposed to the action would be 0.9% of chinook, 4.2% of steelhead, 24.9% of sockeye, and 28.3% of lamprey.

The percentages of the juvenile fish runs exposed will be small. Most juvenile fish are diverted away from the turbines by the submersible traveling screens, and go into the juvenile fish bypass, so they would not be subjected to the turbine environment of units 1 and 2 operating below the 1% operating efficiency range during the testing.

4. Type of impact by species and age class (increased delay, exposure to predation, exposure to a route of higher injury/mortality rate, exposure to higher TDG, etc.);

Adult fish may be delayed at finding the south shore entrance into the south fish ladder with no attraction flow or reduced attraction flow coming from unit 1. However, analysis of adult steelhead and chinook passage data from 2005 to 2013 indicates that there is no significant difference in their passage at the south fish ladder with either unit 1 or unit 3 operating singly (Trumbo et al, 2014¹). If unit 6 is also operating, there will be additional attraction flow at the north powerhouse entrance into the south fish ladder.

Summary statement - expected impacts on:

Downstream migrants

There will be negligible impacts on downstream migrants.

Upstream migrants (including Bull Trout)

Adult fish may be delayed at finding the south shore entrance although analysis indicates no significant impact is expected on migrating adult steelhead and Chinook salmon.

Lamprey

Adult lamprey may be delayed in finding the south shore entrance.

Comments from agencies

From: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Sent: Friday, December 03, 2021 12:43 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Cc: Josie Thompson - NOAA Federal <josie.thompson@noaa.gov>; Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; David Swank <david_swank@fws.gov>; Lorz, Tom <lort@critfc.org>; Jay Hesse <jayh@nezperce.org>; Charles Morrill <charles.morrill@dfw.wa.gov> <charles.morrill@dfw.wa.gov>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Tom Iverson <t.k.iverson@comcast.net>; Scott Bettin <swbettin@bpa.gov>
Subject: [Non-DoD Source] RE: 21 IHR 15 MOC Unit 2 Testing

Chris,

Thanks for sharing the summary of Ice Harbor unit testing. I continue to see that contracting issues are reducing fish passage mitigation planning and find this MOC a good example of how contracting misses continue to hamper summer fish passage operations. Is it possible to provide the output of the last 10 tests for each of the 6 units at Ice Harbor [6 units x 10 tests = 60 results]? It might be a more informative approach that better demonstrates how the proposed testing is expected to offer information of

¹ Trumbo, B. 2014. Ice Harbor test turbine fixed blade runner installation considerations for adult salmonid passage. USACE, Walla Walla District, Walla Walla, WA.

measured differences that have been observed? I don't believe it would be sufficient to simply offer the last time it was completed with the time before last that it was completed to characterize the trend or value of this testing. Any information you can share would be appreciated.

Erick Van Dyke
Oregon Department of Fish and Wildlife
Ocean Salmon and Columbia River Program
Fish Passage/Mitigation Technical Analyst
Office: 971-673-6068
Cell: 503-428-0773
erick.s.vandyke@odfw.oregon.gov

From: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Sent: Friday, December 3, 2021 2:56 PM
To: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Cc: Josie Thompson - NOAA Federal <josie.thompson@noaa.gov>; Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; David Swank <david_swank@fws.gov>; Lorz, Tom <lorz@critfc.org>; Jay Hesse <jayh@nezperce.org>; Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Scott Bettin <swbettin@bpa.gov>; St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>
Subject: RE: 21 IHR 15 MOC Unit 2 Testing

External Email

Erick,

Tests of this nature are needed after major repairs/rehab to make sure that unit is operating as intended. In this instance, testing is of particular importance because unit 2 has the new turbine runner. It has not been tested since coming online, as noted in the MOC and previous test results will not be relevant. While this timing is not ideal, we were able to push it later two weeks from what was originally scheduled by the contractor. Most Snake River sockeye pass Ice Harbor in the first half of July. The majority of sockeye passing later in July in recent years have been Columbia River fish straying into the Snake River, as determined from genetic analyses at Lower Granite Dam.

Regarding the summer operations, shifting priority from unit 1 to unit 3 may not have a significant impact on passage for Chinook salmon and steelhead, based on the analysis conducted by Brad Trumbo. We do not have comparable data for sockeye passage at Ice Harbor, which produces the greatest uncertainty for this operation. Again, not ideal, but I think shifting priority to unit 3 will not have a large impact to sockeye passage. Tracking fish count and PIT conversions between McNary and Ice Harbor dams will provide an indication if fish are being delayed during the test period.

Chris

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Monday, December 06, 2021 8:32 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>; VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Cc: Josie Thompson - NOAA Federal <josie.thompson@noaa.gov>; Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; David Swank <david_swank@fws.gov>; Lorz, Tom <lorz@critfc.org>; Jay Hesse <jayh@nezperce.org>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Scott Bettin <swbettin@bpa.gov>; St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>; Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Subject: [Non-DoD Source] RE: 21 IHR 15 MOC Unit 2 Testing

Thanks for the additional information you provided to Erick, Chris !

I understand the difficulties in seeking to schedule the testing and minimize impacts. And yes we can monitor passage trends before, during and after testing.

I suspect this will come up for discussion at FPOM for Thursday.

Thanks Chris

Charlie

From: Tom Lorz <lorz@critfc.org>
Sent: Tuesday, December 07, 2021 10:05 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: Re: [Non-DoD Source] Re: 21 IHR 15 MOC Unit 2 Testing

I guess I should weigh in as well. Could we just move this until the end of August, early September if the contractors are available then? Did a quick look at past 5 years has been mostly dry for the first couple weeks of September. The project is already behind schedule so a couple more weeks is not going to make things much worse. As NOAA noted Sockeye had a poor run of it last year and trying not to impact them again would be preferred.

Lastly I am sure this was thought of but could unit 2 be synced with unit 3 instead of 1 or is that not possible or is currently not set up that way. Could it be?

Thanks, I am sure more conversations this Thursday

Tom Lorz
CRITFC

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Wednesday, December 08, 2021 8:17 AM
To: Tom Lorz <lor@critfc.org>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>
Subject: RE: [Non-DoD Source] Re: 21 IHR 15 MOC Unit 2 Testing

Tom,

Thanks for the input. I have asked these questions to the project manager before the MOC went out. I will pass this on but this what they told me;

The contractor is not available until late in the year. Waiting that long would delay the start of rehabbing unit 1 which further delays unit 4 rehab. As you noted, we are already behind schedule and delays are significantly increasing costs.

They are using unit 1 instead of unit 3 because there is a risk of damaging the synched unit during testing and we would like to not blow up the newly rehabbed unit 3. Unit 1 will be going out of service for rehab next so lower risk to the project.

Chris

The purpose of Unit 2 testing was asked about during 9 December 2021 FPOM meeting. Below is information provided from team engineers;

These tests determine fundamental generator characteristics that can be used to define the generator. The characteristics have a great many uses, but are primarily used to refine protection/control settings and model the generator. Additionally, the losses test verifies a contract requirement (Section 48 13 16.00 26, para 2.3) that the new losses not exceed the original.

Ultimately, the data gets reported and replaces your existing Generator Test Report which includes the same type of values.

Strictly speaking, no, these tests are not a NERC/WECC requirement. The results from these tests can be used to affirm or corroborate NERC test results, but they are not required for the NERC model. In lieu of other data or testing the special field test values can be used to approximate a NERC model, but that would be unusual for NWW.

Special field testing are used to develop an IEEE generator model, which is different from the NERC model, and supports the protections/controls settings selection.

Without the data, settings are determined on a more trial-and-error basis. The trial is based on what is typical for similar units or the original generator test report. This is how

the unit is set presently and has been operating since commissioning. The error, as up might expect, shows up in miscoordination of settings that might result in a nuisance alarm or trip. This unit has been operating with the existing settings for some time without nuisance alarms/trips. With a lack of data, settings tend to be more conservative to err on the side of caution, so there is the possibility that the existing settings are somewhat limiting the unit's range of safe operation.

The final consideration I would offer is that this unit is unique, in the powerhouse, but also in the nation. We have a brand new turbine type driving a largely original generator, but with a stator winding that is rated over 10% higher than any other unit component. Additionally, we have just commissioned brand new exciter controls on this unit, which, until January, is the only of its kind in the USACE fleet (to my knowledge, at least). All this to say, chances of the generator characteristics changing from original are good, which would likely change the protection settings.

Final coordination results

After Action update (After action statement stating what the effect of the action was on listed species. This statement could simply state that the MOC analysis was correct and the action went as expected, or it could explain how the actual action changed the expected effect (e.g., you didn't need to close that AWS valve after all, so there was no impact of the action). List any actual mortality noted as a result of the action)

Please email or call with questions or concerns.

Thank you,

Ken Fone
Fishery Biologist
Ice Harbor Dam

kenneth.r.fone@usace.army.mil