OFFICIAL COORDINATION REQUEST FOR
NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 20LGS16 Powerhouse Roof Repair
COORDINATION DATE- ~~August 13, 2020~~. ~~Updated October 20, 2020.~~ Updated 8 April 2022
PROJECT- Little Goose Lock and Dam
RESPONSE DATE- ~~August 27, 2020~~ ~~October 23, 2020~~ NA

Description of the problem

The powerhouse roof at Little Goose Dam has reached the end of its projected life cycle and needs to be replaced. The reroofing effort will include the complete removal of the old built-up asphalt roofing system followed the installation of a new 2-ply membrane roof.

Proper sealing of the roof requires that it be installed during the summer when temperatures are high enough to properly seal the roofing material. The timeline for repairs would be from early July through September 2022 . Performing the reroofing work at the Little Goose powerhouse is complicated by an electrical bus and 500 kVA power transmission lines that are located on the powerhouse roof structure directly above the proposed work area. The distance from the bottom of the bus structure to the surface of the roof averages 15 feet. The Corps requirement for safe clearance when working in the vicinity of power lines and bus supplying electrical power at a voltage of 500 kVA is 25 feet in any direction. Thus, the bus must be de-energized when performing the reroofing work.

To avoid shutting down all power generation for the duration of the reroofing project, Bonneville Power will cut the power to the bus and reroute it temporarily so that power is further than 25 feet from workers on the roof. This work to reroute the power is expected to take 4-5 days, to be conducted either between 18-22 April or between 26-30 June 2022 and would require that all powerhouse units be out of service. The date of the 4-day outage will be decided based on the anticipated water year; in April if spring flows are forecast to be below average, versus in June if spring flows are forecast to be average to above average. A determination will be made by FPOM in discussion with BPA and project staff no later than February of 2022. An additional 4-5 day shut-down of the powerhouse will be required 13-17 December 2022 to reconnect the power after roof replacement has been completed.

Type of outage required

Impact on facility operation. Power to the juvenile fish facility will be off requiring operation by generator during the first and last day of each line outage in April or June and December 2022 and the adult ladder cooling pump will also be out of service

during the first and last day of the line outage in June (Fish Passage Plan, Chapter 8, 2.4.2.14.). Attraction flow to the powerhouse fishway entrances via turbine units will also be reduced for the duration of each outage.

Impact on unit priority. All units will be OOS for 4-5 days in April or June and December (Fish Passage Plan, Chapter 8, Table LGS-5.) except for station service.

Impact on forebay/tailwater operation. None

Impact on spill. Spill will increase for 4-5 days in April or June and December while the powerhouse is OOS (Fish Passage Plan, App. E, 8.2.).

Dates of impacts/repairs. 18-22 April or 26-30 June 2022 and 13-17 December 2022 .

Length of time for repairs. Powerhouse will be OOS for 4-5 days in April or June and December 2022 . Roof repairs will occur 1 July-30 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;

   The 10-year average daily fish passage during 18-22 April is 8 adult Chinook salmon, <1 jack Chinook salmon, 410 steelhead, and during 26-30 June is 568 adult Chinook salmon, 173 jacks, 50 sockeye salmon and 25 steelhead. During 11-15 October, the 10-year average count is 162 adult Chinook salmon, 104 jacks and 2,273 steelhead.

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

   Projections for 2022 fish runs are not yet available.

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

   During 18-22 April, <0.1% of Chinook salmon and 0.3% of steelhead, on average, would be impacted. During 26-30 June, 4% of adult Chinook salmon, 5% of sockeye salmon and 0.7% of the steelhead run, on average, will be impacted. During 13-17 December <1% of adult Chinook salmon and adult steelhead will be impacted.

   Based on 2019 smolt index data from Little Goose Dam, 16,140 Chinook salmon smolts were passed during 26-30 June, represented about 0.6% of the total of roughly 2.5 million smolts. In 2020, the number was 44,748 smolts, or about 1.8% of the annual number passed in June and 1,532 smolts in April, <0.1% of the annual sample.

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.);

   Juvenile salmon passage will be minimally impacted. TDG levels may be higher in June from increased spill. Adult salmonids passage will likely be delayed for the 4-5 day periods from lack of attractive flow via turbine units to the fishway entrances and from poor tailrace flow conditions (back eddy) during the powerhouse outages.

Summary statement - expected impacts on:

Downstream migrants. Possible exposure to elevated TDG.

Upstream migrants (including Bull Trout). Up to 4 to 5 day passage delay during poor tailrace conditions.

Lamprey. Up to 4 to 5 day passage delay during poor tailrace conditions.

Comments from agencies;

From discussion at 13 August FPOM. There was general concern raised for a full powerhouse outage in late June because of the likelihood to create adult fish passage delay.

Scott Bettin, BPA asked if the outage work could be earlier in 2021 or even late 2020? Discussions with the PDT confirmed that this would leave only units 1-4 in operation.

From: Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>
Sent: Monday, August 24, 2020 9:52 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair

Chris,

I have a few questions on this MOC. NOAA is concerned with the duration and timing of the outage given adult passage history with high spill at LGS

Can another safety measure be put in place so the current clearance is considered safe? An example would be a temporary barrier between the power line and the roof. Can the outage period be reduced substantially by working extra crews overtime or nights? Can the majority of the temporary line be installed when minimal adults are passing with final work being done during the late June period?

-Trevor

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Monday, August 24, 2020 10:48 AM
To: Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; Tom Lorz <lort@critfc.org>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>; Ann <Ann.L.Setter@usace.army.mil>; Hockersmith, Eric E CIV USARMY CENWW (US) (Eric.E.Hockersmith@usace.army.mil) <Eric.E.Hockersmith@usace.army.mil>
Subject: RE: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair

Trevor,

I will contact the PDT about potential safety measures that may be possible. The question came up during FPOM if the 25 ft clearance is actually needed or can this be lessened. The PDT confirmed that this is not something that could be waived. It is a safety issue of course.

The outage period requested was 5 days. The PDT confirmed that they would likely get the work done in 4 days or possibly less. I will ask if night work would be possible. Again, this could be a safety issue.

We discussed the possibility of scheduling the outage during late 2020 or early 2021 when fewer fish are present. Once the jumpers have been installed, the powerhouse will be limited to units 1-4 operation. Having reduced powerhouse capacity during the spring runoff could impact the ability for the project to conduct the performance standard spill, depending on the water year and runoff timing. What are the relative risks?

Chris

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Tuesday, August 25, 2020 2:40 PM
To: 'Trevor Conder - NOAA Federal' <trevor.conder@noaa.gov>; 'Tom Lorz' <lort@critfc.org>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>; Ann <Ann.L.Setter@usace.army.mil>; Hockersmith, Eric E CIV USARMY CENWW (US) (Eric.E.Hockersmith@usace.army.mil) <Eric.E.Hockersmith@usace.army.mil>
Subject: RE: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair

Trevor,

I heard back from the Chief of Ops, Lee Holmes in response to your questions. He provided some information for the three questions you posed;

I talked this over with Chief of Maint and Tech and hopefully have answered the three questions.

1. Are there other safety measures that could be used during the construction work that would not require the outage?

No, this is 500 kV (500,000 volt) bus work. Links immediately below are demos of 230 kV and 345 kV. Like the number suggests, 500 kV can be that much worse.
https://www.youtube.com/watch?v=08JRDgMC-fw
https://www.youtube.com/watch?v=VrY_k_pdlCs

2. Can the outage period (4-5 days) be shortened by having crews work long days and/or at night?

Of course. Almost any work can be done on a 24/7 schedule. But the bus work is critical infrastructure that requires specialized crews, that you can't just throw a bunch of backyard welders on, and it's unlikely BPA would be able to support. You would also need to have 2 extra crane operators that are certified to handle man baskets and possibly a specialized crane.

3. Can the majority of the temporary line be installed when minimal adults are passing with final work being done during the late June period?

Lee repeated what I had mentioned below, that this would mean that the powerhouse would be limited to Units 1-4, likely during the spring spill season. The combined flow for units 1-4 at the upper end of the 1% range with 100 ft of head is 69.8 kcfs. Using mean daily flow from last May and June as a rough estimate, we would have had 21 days when the project would not have been able to maintain 30% spill with only units 1-4 operating. Adding unit 6, that dropped to 4 days with uncontrolled spill. Again, just a rough estimate.

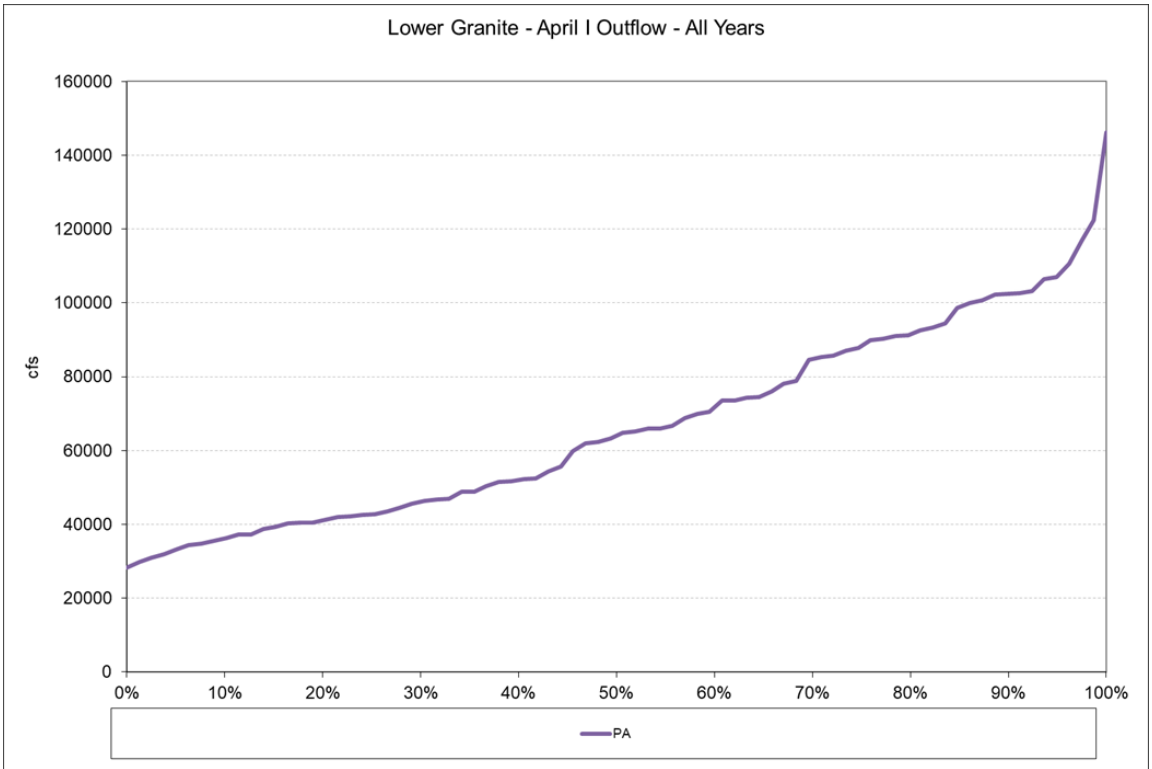
Let me know if you have any more questions.

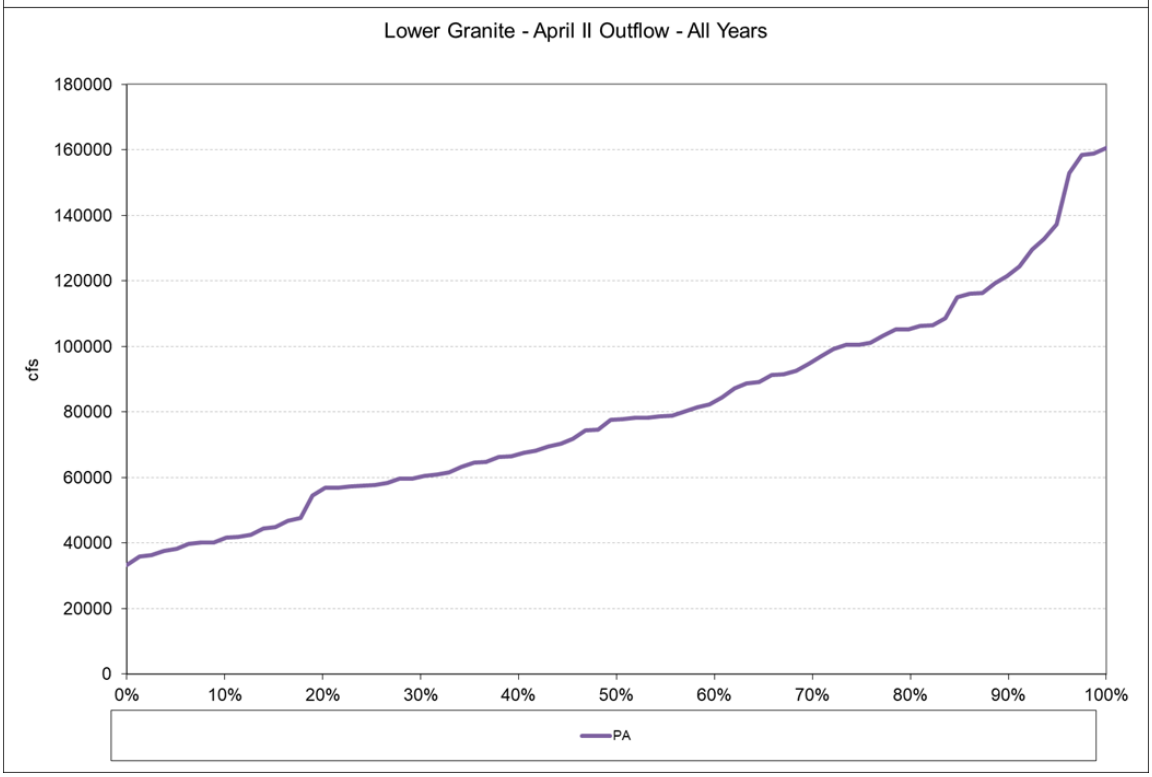
Chris

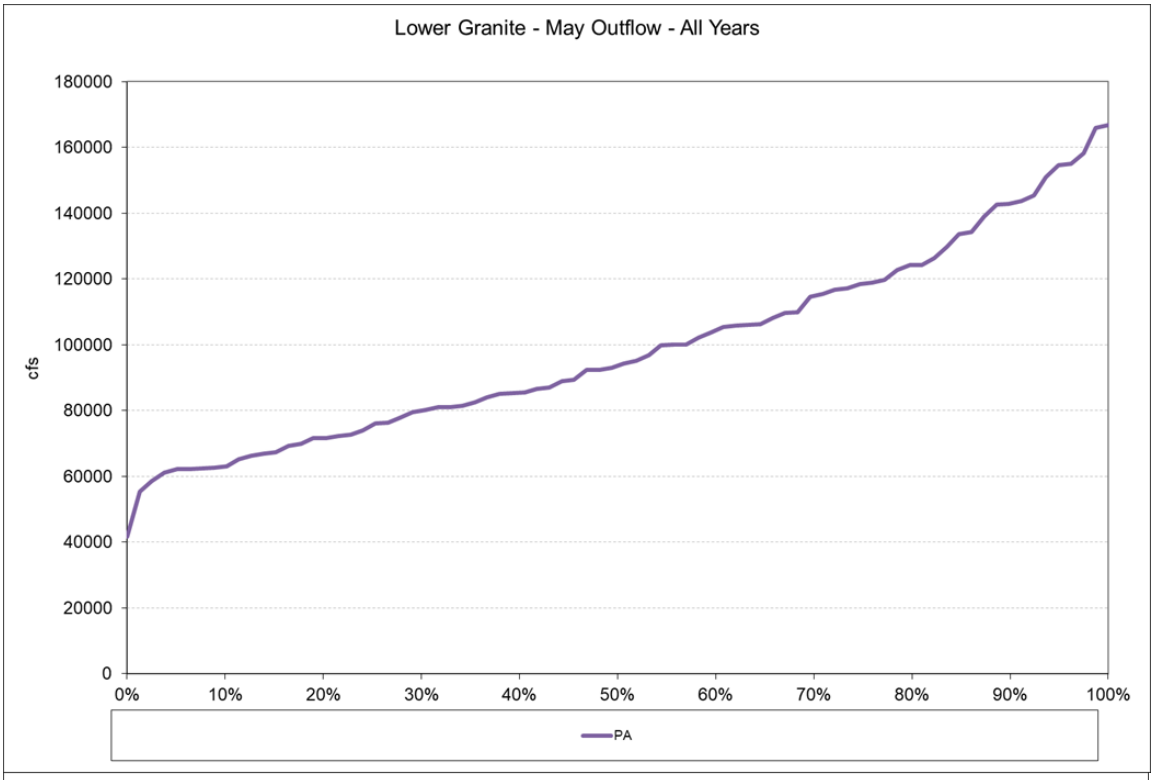
From: Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Sent: Tuesday, August 25, 2020 2:40 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Cc: Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>
Subject: [Non-DoD Source] LGS roof project flows

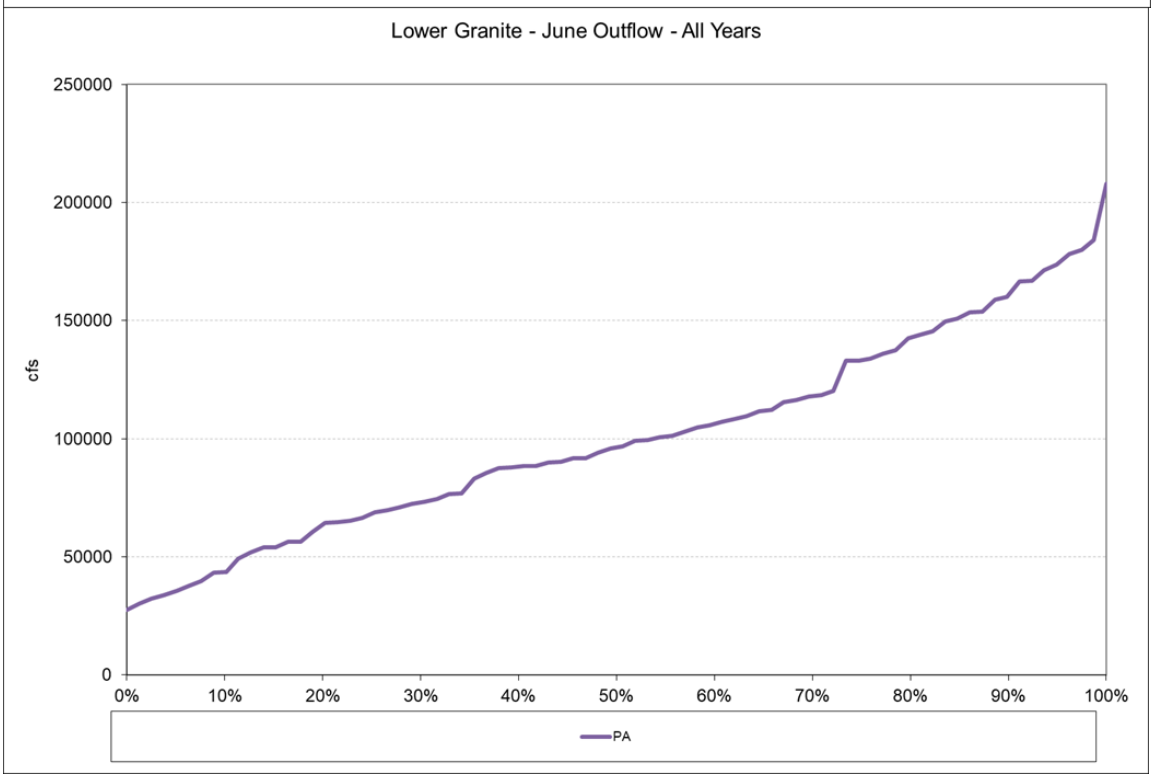
If July isn't acceptable for the four day complete powerhouse outage we could try doing it in early April. At that time all the spill could benefit juvenile fish and there are very few adults are passing. The only downside of doing it then is that the powerhouse would only have 4 units instead of 5 available. Unit 5 is down for another year so that's why it's only one less unit over the current situation. That would mean the powerhouse would be able to pass 100 kcfs (25 kcfs/unit) and approximately 80 kcfs more through the spillway during the 16 gas cap hours. During the 30% hours it would be able to pass 130 kcfs.

With that capability the project could pass 150 kcfs with 8 hours at performance spill and 16 at max spill. Below are the month average graphs for flow through the Snake. During the month of April flows pick up a lot so that month has been split into two periods. -s









From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Tuesday, August 25, 2020 5:49 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) **Subject:** [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

Chris,
Thanks for the additional information. It would be helpful if a few additional question might be addressed prior to making a decision about this MOC. What is the potential for the temporary fix be made into a permanent fix to avoid repeat coordination issues in the future? Please be clear that the most recent suggestion deals with only the rerouting of the line to meet the 25 ft safety restriction and not the actual roof repair work that appears to require July 1 through September 30 (3 months). How is weather involved in the potential shift to April when this was advertised as requiring warm weather? What other efficiencies might be possible to ready the line fix in preparation for reenergizing? Some more details may be helpful.

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From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Wednesday, August 26, 2020 7:17 AM
To: 'Erick VanDyke' <Erick.S.VanDyke@state.or.us>
Subject: RE: 20LGS16 MOC Powerhouse Roof Repair Update

Erick,

You are correct, the suggested change to the MOC is to move the bus line reroute and powerhouse 4-5 day outage to earlier in the year (April?) when fewer fish are passing the dam but the roof repair would remain during July-September. The bus line work would not be restricted by weather as is the roof repair. The MOC requests up to 5 days for the powerhouse outage but they are pretty confident the work can be completed in 4 days. That is likely the best working scenario for this outage.

Did that answer your questions Erick or are looking for more details for the bus line reroute process?

Chris

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Wednesday, August 26, 2020 9:34 AM
To: Peery, Christopher A CIV USARMY CENWW (USA)
Subject: [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

Chris,

Mostly. Not noticing a response to my first question. Any information on the potential to make the fix to a safe distance of 25 ft a more permanent fix to avoid this restriction adding constraints in the future?
Erick

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Wednesday, August 26, 2020 10:43 AM
To: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Subject: RE: 20LGS16 MOC Powerhouse Roof Repair Update

Erick,

Sorry, I mis-understood that part of the question. From what I understand, because there is a single transmission line from the dam, that would be a multi-million dollar modification to the system. So possible but not likely in the near future. Scott Bettin may have a better explanation on this process.

Chris

From: Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Sent: Wednesday, August 26, 2020 10:02 AM
Subject: [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

No it is not possible to use the jumpers as a long term solution. It would take a complete rework of the bus and or another line from the substation into the project to give permanent clearance on the roof. The jumpers can only attach in such a way that units 1-4 will operate. If this solution was not introduced into the mix the outage would be around 100 days of spill during the day late June-Sept. So that is how we came to where we are of asking for input on whether or not to install them in April or June? -s

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Wednesday, August 26, 2020 10:36 AM
To: Scott Bettin <swbettin@bpa.gov>; Peery, Christopher A CIV USARMY CENWW
Subject: [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

Thanks Scott,
Thanks for the additional information and the effort to reshape the continuous 100 day outage to two periods (first 5 days the second 92 days) which as written would involve 97 days assuming no additional time is unreported for returning the line to the same route that ultimately impacted coordinated CRS management. I see the effort to fix reoccurring problems that have resulted in strained coordination as an important area to explore. There have been others that we have discussed recently that I hope to get better discussion around. However, what seems to be a more regular occurrence in recent coordination's is retention of inflexible layouts that are making out-of-water work more restrictive. What other actions might be possible to eliminate safety concerns like this one that effectively strain coordinated fish protection measures? Finding this solution seems

like a good potential for reducing the need for this type of coordination in the future. Which gets to the third question I posed originally "What other efficiencies might be possible to ready the line fix in preparation for reenergizing? This is where many could benefit from more discussion and clarity. I appreciate that you have been making efforts to provide this but hope more can be done.
Erick

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Wednesday, August 26, 2020 1:02 PM
To: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Cc: Baus, Douglas M CIV USARMY CENWD (USA) **Subject:** RE: 20LGS16 MOC Powerhouse Roof Repair Update

Eric,

I agree, there are concerns with the two options currently under consideration.

1. The 4-5 day powerhouse outage in late June (original MOC request) will create adult passage delays. Additional uncertainty is that flows may still be high enough at that time of year that TDG levels could be a concern.

2. If the powerhouse outage occurs earlier, such as April, the immediate impact to adult passage is reduced but there is the risk that the reduced powerhouse capacity (4 turbines) will result in periods in the following weeks when the 8 hrs of 30% performance standard spill is not possible leading to adult passage delays.

Since we do not know what the water year will look like it is not possible to weigh the relative risks. I feel option 1 has more of a known risk level while there is more uncertainty with option 2.

Is there another option to consider?

Chris

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Wednesday, August 26, 2020 3:37 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) **Subject:** [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

Chris,
I am sure there are several options that should be considered, one of which I provided earlier that was addressed with some common responses. However, this could open topic discussions that may not be productive in this venue, so I am choosing not to go there. It seems clear that the actual reason for needing an outage (25 ft criteria) is not being addressed as directly as the potential result of the outage (zero generation). These criteria

or actions are what put measures that protect fish passage at risk. Until this hump is resolved we seem to be stuck reliving decisions with potential for equally undesired results. As I mentioned in my last email I am less willing to risk issues that might occur with the 6 plus month alternative (option 2) than the original 3 plus month alternative (option 1). I am aware that others may desire to apply risk differently. Given that this work is being planned with ample time it is less clear why necessary information to make an informed decision is not being considered before locking in a final decision and schedule. No doubt this one is ripe for a Lorz-type wager based on its likeliness to occur as advertised. Appreciate your efforts to keep thinking about alternatives.
Erick

From: Ebel,Jonathan <jonathan.ebel@idfg.idaho.gov>
Sent: Wednesday, August 26, 2020 4:17 PM
To: Erick VanDyke <Erick.S.VanDyke@state.or.us>; Peery, Christopher A CIV
Subject: [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

Ideally, we would wait on this decision this until we have a reasonable prediction for the water year. However, it appears that is not an option.

Given the two options on the table, Idaho prefers Option 1 (original MOC). The risk of delay is known, but of a defined duration.

Option 2 (outage occurs in early April) has very uncertain effects where the upper end of the impact spectrum — a high water year resulting in longer periods of uncontrolled spill and reduction in performance spill hours than we would have otherwise— may cause unacceptably long adult passage delays. On the other side of the flow spectrum — low water year with early onset of high temperatures — a known 4-5 day adult passage delay could be pretty harmful and it may be prudent to have an off ramp for a 4-5 day outageif such conditions set up.
-JDE

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Thursday, August 27, 2020 9:38 AM
To: Ebel,Jonathan <jonathan.ebel@idfg.idaho.gov>; Erick VanDyke <Erick.S.VanDyke@state.or.us>; Peery, Christopher A CIV USARMY CENWW
Subject: [Non-DoD Source] RE: 20LGS16 MOC Powerhouse Roof Repair Update

All,

I appreciate the dialogue and discussion points around this MOC.

There is imho no best option, however, that said, we would accept Option 1 as the ‘better’ option going forward.

Charlie

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Thursday, August 27, 2020 10:10 AM
To: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>; Ebel,Jonathan **Subject:** RE: 20LGS16 MOC Powerhouse Roof Repair Update

Thanks you Charlie and Jon for your input. I am trying to gain some more information on the timing needed to make the decision on the bus line work. I suspect because of the specificity of the work, the crews would need to be scheduled as soon as possible.

Chris

From: Tom Lorz <lort@critfc.org>
Sent: Thursday, August 27, 2020 10:19 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: 20LGS16 MOC Powerhouse Roof Repair Update

If we can get more information on the lead time on this that would be good. By February, March we have a good idea what kind of year we are going to have. Also what is the status of unit 6? If we only have unit 5 down then we are in situation that is not unlike most of the past years of missing one unit.

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Thursday, August 27, 2020 12:41 PM
To: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>; Ebel,Jonathan **Subject:** RE: 20LGS16 MOC Powerhouse Roof Repair Update

FYI,

I found this presentation by NOAA that suggests current information forecasts ~60% chance for La Nina conditions for the fall and ~55% for the winter, which would lead to above average precipitation. For what that might be worth.

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Monday, August 31, 2020 9:47 AM
To: FPOM **Subject:** RE: 20LGS16 MOC Powerhouse Roof Repair Update

FPOM,

BPA still needs to make a trip to Little Goose to complete the design for the bus line reroute needed to make the roof replacement and they are currently under travel restrictions until 24 September. Since there is some flexibility in the scheduling at this

time, I suggest we leave the comment period for this MOC open and discuss at the September FPOM meeting.

Chris

From: Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>
Sent: Wednesday, September 02, 2020 1:32 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: Re: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair

Chris,

I am still interested in shortening the duration of this outage using overtime, night work, or additional crews. As requested, this outage duration and impacts are too excessive for me to approve at this point. Also, would this outage even need to occur if they repaired the roof in kind?

-Trevor

Trevor,

We have posed the question about overtime work to the BPA transmission shop who will be responsible for the bus line work. They have not yet completed their design of the work because of travel restrictions so they are limited in the ability to provide definitive answers. My understanding is that the welding needed for this job has to be near perfect to work because of the voltage involved and there is a limited number of crew with the skills needed. This limits their ability to use multiple crews or have crews work double shifts. But again, until the design has been completed, we may not have a good answer to your question.

I also sent your question about if this work is in-kind replacement or not to the project manager. The structural engineers will likely be the ones to answer that. I will let you know as soon as I hear something.

I have asked members of the PDT to join us for the FPOM meeting to help answer folks questions.

Chris

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Tuesday, September 08, 2020 1:31 PM
To: Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>; Tom Lorz (lort@critfc.org) <lort@critfc.org>; Erick VanDyke <erick.s.vandyke@state.or.us>; Charlie Morrill <cfm97@me.com>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; David Swank (David_Swank@fws.gov) <david_swank@fws.gov>

Cc: Ann <Ann.L.Setter@usace.army.mil>; Hockersmith, Eric E CIV USARMY CENWW (US) (Eric.E.Hockersmith@usace.army.mil) <Eric.E.Hockersmith@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>
Subject: RE: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair

Trevor,

I can add some information here but I have asked members of the PDT to join the FPOM discussion Thursday to help better answer your questions.

Regarding working longer shifts and at night, the responses I have received are similar to Lee Holmes' initial response; theoretically it is possible if you have enough funds to pay for the added support crew, equipment, etc., but ultimately we have to learn from the BPA transmissions team, who are responsible for the welding work, if this is a realistic option. Do they have enough trained personnel to fill multiple shifts? Can they safely work at night and not impact work quality? I am hoping the PDT will be able to answer this.

Regarding the in kind question. The roof currently has two layers to it, the original when the powerhouse was constructed and a second layer put down in 1991. According to current building codes, replacing in kind is not really an option. This is the response I received;

> The current roofing system has 2 layers (the original roofing system – likely containing asbestos, and a recover layer in 1991). The following is from the Design Documentation Report for this project:
>
> "Per International Building Code (IBC) Section 1510.3.1., Item 3, a new roofing system is not allowed to be installed over the top of two or more existing roofing systems or layers. Removal of the top layer and recovering of the bottom layer of the existing roofing system carries a high likelihood of complications and is not recommended. "
>
> Therefore a complete tear-off and reroof is recommended. We may have a tight construction schedule as-is.

In the initial call we had with the PDT, they went through the different alternatives considered for the roof replacement including putting off the work (roof will eventually fail and need emergency outages) or adding transmission work and bus lines so this type of outage would not be needed in the future (adds $7-10 million to the cost and that work would require multiple outages). All work to be done in prep and setup to minimize the outage have already been built into the work plan. Moving the bus line work to earlier in the year to reduce the impact of the 4 day outage is worth considering but requires

operating the powerhouse with 4 or 2 (really just one since unit 5 is down for the year) units for the duration the bus line jumpers are in place.

More to come Thursday,
Chrisc

Phone conversation between C. Peery and T. Condor, , 14 October 2020
Trevor Condor, NOAA, suggested scheduling outage for April and June and making decision which date to use based on forecast of water year early next year.

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Tuesday, October 20, 2020 11:52 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) Replacement - Update

Chris,
I appreciate the extra coordination effort on this operational constraint at Little Goose Dam. Oregon still sees the April date change as more risk for unplanned interruptions to fish passage operations and see the late June date as the better of two potentially disruptive scenarios. Moving to inclusion of redundancy actions, especially where there are none currently, still remain as the best alternative solution to these types of problems that have functioned to assure scenarios that involve only bad actions for fish passage.

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From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Tuesday, October 20, 2020 12:09 PM
To: Erick VanDyke <Erick.S.VanDyke@state.or.us>; Baus, Douglas M CIV USARMY
Subject: RE: 20 LGS 16 MOC Powerhouse Roof Replacement - Update

Erick,

I agree with your assessment, there is no perfect solution for the situation. This option at least provides the ability to assess the potential risk of an April vs. June outage with more information. By February we will have a better idea of snowpack and what the spring weather will look like.

Chris

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Tuesday, October 20, 2020 1:30 PM

To: Peery, Christopher A CIV USARMY CENWW (USA) Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Replacement - Update

Thanks Chris,
I appreciate your input and assessment, as well as your added effort to find an agreeable solution. However after tracking water supply predictions for quite a few years now February's prediction is highly variable such that even being on the correct side of the prediction interval has been less than dependable—often not coming into dependable view until June or later. It seems to me, Oregon's position is more about the likelihood of an un-planned operational risk(s) occurring, which in my experience has been by far more likely to occur. Therefore I am unwilling to endorse an approach that completely involves an operational constraint increasing the duration of potential time some series of events might interrupt fish passage more than the plan already does if planned for late June. Both options disrupt planned operations that impact some fragment of the tails of some aspect of one or more of the listed and unlisted fish that depend on the critical habitat function in the area. Discounting protection of all of these necessary functions is not something Oregon has been willing to endorse. I suspect some in this discussion may weigh risk differently than Oregon, however that will not alter the position being expressed on this issue and several others where fish passage is likely to be degraded.

As an aside so the record is clear, under no circumstances would stopping the larger river from flowing (water transit time) during any hour of these dates be tolerable, especially given the actual work doesn't even involve in-water restrictions. Again, I appreciate your efforts and do not intend the content I've provided to be misinterpreted as directed at you or your efforts.

Erick

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Tuesday, October 20, 2020 2:03 PM
To: Erick VanDyke <Erick.S.VanDyke@state.or.us>; Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Cc: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Replacement - Update

Erick, Chris,

Thanks for your discussion and consideration of possible options that would not pose risks to fish during the roof replacement.

I will add that WA shares OR's viewpoints and concerns and, that, sadly it does not appear there really is fish friendly solution …

Charlie

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Monday, October 26, 2020 10:33 AM
To: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>; Erick VanDyke <Erick.S.VanDyke@state.or.us>
Subject: RE: 20 LGS 16 MOC Powerhouse Roof Replacement - Update

Erick and Charlie,

The extended comment period of the latest version of this MOC ended Friday and yours were the only two comments received. We need to have decision on this and I wanted to confirm your positions.

Erick, you aid Oregon does not support the April date for the outage. Does this mean that you oppose approval of the MOC as currently written or you will oppose if FPOM decides in late February to proceed with the outage in April?

Charlie, you state below "..WA shares OR's viewpoints and concerns…". Same question to you?

Feel free to call me if you would like to discuss it further but we will also need a written response for the record.

Thanks,
Chris

From: Erick VanDyke <Erick.S.VanDyke@state.or.us>
Sent: Monday, October 26, 2020 11:26 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Cc: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Replacement - Update

Chris,
I opposed the April date because the risk to additional outages that may occur leading up to the work planned for July-September. I think that was the point I added early and often. I had hoped to recommend an alternative for this out-of-water work that didn't interrupt managed operations but that was rejected earlier in the process. So the outage in late June may be less risky as it relates to adding unplanned outages during managed spring spill period. Since the MOC I reviewed last continued to include April outage I guess the answer to that is yes if it includes an alternative that has an April (spring) outage. I doubt that this decision rests in the hands of two state FPOM representatives given these decisions have been driven by federal process, at least my experience has been that operators decide, participants recommend. I appreciate the process needs a

conclusion and that my recommendations have been noted, however I do not expect to elevate this issue when the federal operators decision is handed down.

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@state.or.us

From: Trevor Conder - NOAA Federal <trevor.conder@noaa.gov>
Sent: Thursday, March 03, 2022 1:38 PM
To: Peery, Christopher A CIV USARMY CENWW (USA)
Subject: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Chris,

NOAA supports this date change, and has a strong preference for the April outage if flows will allow. Thanks

-Trevor

From: Tom Lorz <lort@critfc.org>
Sent: Thursday, March 03, 2022 1:40 PM
To: Peery, Christopher A CIV USARMY CENWW (USA)
Subject: [Non-DoD Source] Re: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

CRITFC appreciates the action agency moving this work to a better time frame.

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Thursday, March 03, 2022 1:50 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) **Cc:** Morrill, Charles (DFW)
Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Thank you Chris !

I appreciate this roof repair being scheduled earlier given the discussions and concerns … not perfect but better than the original plan/proposed date …

Thank you !

Charlie

From: Swank, David R <david_swank@fws.gov>
Sent: Thursday, March 03, 2022 1:51 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [URL Verdict: Unknown][Non-DoD Source] Re: [EXTERNAL] 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Chris,

Early April would certainly be better than late June. And looking at the latest WSF for LGR, the NWRFC has it at 77% for April to July. That qualifies as below average in my book.

Dave

From: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Sent: Thursday, March 03, 2022 2:36 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) **Subject:** [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Thanks for the note Chris. My read of this MOC is simply reintroducing April preference with BPA finding time to schedule the work a week earlier. I don't see the reissue of this MOC as addressing the issues that I provided earlier in the discussion, so I do not expect it will change my earlier srespones. However, I wanted to ask a few questions to help weigh some other potential impacts of this MOC.

- Is this work considered routine or non-routine?
- If complications alter the date of implementation or planned operation will it be classified as a voluntary or involuntary operation?
- If Little Goose TDG % increases during the work period how will water quality agencies view the impacts as they relate to recent TDG modifications and GBT monitoring planning?
- How much of the roof repair is directly linked to in-water work?

I appreciate any information you may be able to share when it becomes available.

Erick Van Dyke

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, March 04, 2022 6:41 AM
To: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>; Scott
Subject: RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Erick,

You are correct, this updated MOC re-establishes the April outage and corrects the start date from 5 to 4 April (Monday of the week). All other aspects of the work are consistent with what have been previously coordinated. The point of including April and

June outage dates was to be able to accommodate for the flow conditions. Unfortunately, current predictions in April are below average, possibly even lagging behind where we were last year at this time. As noted in the MOC, the decision to use the April or June dates was to have been made in February and we can discuss this at next week's FPOM meeting. Regarding your other questions, this work is not routine. I am uncertain what you are referring to by voluntary/involuntary. To my knowledge there are no changes in what is planned for TDG and GBT monitoring this spring. I am uncertain by what you mean by in-water work.

Thanks,
Chris

From: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Sent: Friday, March 04, 2022 8:55 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>; Blane Bellerud (blane.bellerud@noaa.gov) <blane.bellerud@noaa.gov>; Charlie Morrill <cfm97@me.com>; David Swank <david_swank@fws.gov>; Jay Hesse <jayh@nezperce.org>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Lorz, Tom <lort@critfc.org>; Mackey, Tammy M CIV USARMY CENWP (USA) <Tammy.M.Mackey@usace.army.mil>; trevor.conder@noaa.gov; Laughery, Ryan O CIV USARMY CENWW (USA) <Ryan.O.Laughery@usace.army.mil>; Charles Morrill (charles.morrill@dfw.wa.gov) <charles.morrill@dfw.wa.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Jen Graham <jennifer.graham@ctwsbnr.org>; Tucker Jones <tucker.a.jones@state.or.us>
Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Thanks for the clarifying response Chris. The reference to voluntary or involuntary is related the differentiation between operations that are manageable to meet the routine planned operation (voluntary) or operations that can not be managed to fit the routine operation. Some examples are available in the 2022 Draft FOP (pgs 4, 5, 6); 2022 WMP (pgs 5,16, 26, 34, 49); 2022 FPP (pgs MCN-10, IHR-8, LMN-9, LGS-9, LWG-10, A-9, C-5) to name a few. The in-water work question was verifying if any part of the roof repair coordination was linked to work that would be expected to be completed during an established in-water work period. Hope this helps.

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, March 04, 2022 11:03 AM
To: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>; Scott Bettin <swbettin@bpa.gov>; Blane Bellerud (blane.bellerud@noaa.gov) <blane.bellerud@noaa.gov>; Charlie Morrill <cfm97@me.com>; David Swank <david_swank@fws.gov>; Jay Hesse <jayh@nezperce.org>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Lorz, Tom <lort@critfc.org>; Mackey, Tammy M CIV USARMY CENWP (USA) <Tammy.M.Mackey@usace.army.mil>; trevor.conder@noaa.gov; Laughery, Ryan O CIV USARMY CENWW (USA)

<Ryan.O.Laughery@usace.army.mil>; Charles Morrill (charles.morrill@dfw.wa.gov) <charles.morrill@dfw.wa.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Jen Graham <jennifer.graham@ctwsbnr.org>; Tucker Jones <tucker.a.jones@state.or.us>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>
Subject: RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Erick,

I believe the references you provided refer to voluntary vs. involuntary spill during routine and planned maintenance. As noted this is not routine but it is planned maintenance coordinated through the MOC. During the 4-5 day outage the powerhouse will only be passing station service flow of about 5 kcfs and the remainder spilled. Current flow predictions in the most recent STP forecast provided 28 February are for Snake River flows of 48-51 kcfs, equating to spill of about 43-48 kcfs. The estimate I saw for 125% maximum gas cap spill at Little Goose was 79 kcfs. All these values are estimates of course and subject to change but it appears that TDG will not exceed the gas cap during the planned April outage.

By in-water are you thinking of the winter maintenance period? If so, than there was no linkage to work that would have occurred during winter maintenance. There will be other maintenance work occurring at the project over the summer, but that work would have occurred regardless of the roof work. I hope this answers your questions. Let me know if additional clarification is needed.

Chris

From: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>
Sent: Friday, March 04, 2022 11:44 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>; Scott Bettin <swbettin@bpa.gov>; Blane Bellerud (blane.bellerud@noaa.gov) <blane.bellerud@noaa.gov>; Charlie Morrill <cfm97@me.com>; David Swank <david_swank@fws.gov>; Jay Hesse <jayh@nezperce.org>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Lorz, Tom <lort@critfc.org>; Mackey, Tammy M CIV USARMY CENWP (USA) <Tammy.M.Mackey@usace.army.mil>; trevor.conder@noaa.gov; Laughery, Ryan O CIV USARMY CENWW (USA) <Ryan.O.Laughery@usace.army.mil>; Charles Morrill (charles.morrill@dfw.wa.gov) <charles.morrill@dfw.wa.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Jen Graham <jennifer.graham@ctwsbnr.org>; Tucker Jones <tucker.a.jones@state.or.us>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>
Subject: [Non-DoD Source] RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Chris, Thanks again. Cause and effect has more to do with when in-water work period has been recommended, so is the planned work expected to interact directly or indirectly

with the water body around Little Goose Dam, or is it fully expected to occur above the water body? Appreciate your effort to address my questions.
Erick

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, March 04, 2022 11:50 AM
To: VANDYKE Erick S * ODFW <Erick.S.VANDYKE@odfw.oregon.gov>; Scott Bettin <swbettin@bpa.gov>; Blane Bellerud (blane.bellerud@noaa.gov) <blane.bellerud@noaa.gov>; Charlie Morrill <cfm97@me.com>; David Swank <david_swank@fws.gov>; Jay Hesse <jayh@nezperce.org>; Jonathan Ebel <jonathan.ebel@idfg.idaho.gov>; Lorz, Tom <lort@critfc.org>; Mackey, Tammy M CIV USARMY CENWP (USA) <Tammy.M.Mackey@usace.army.mil>; trevor.conder@noaa.gov; Laughery, Ryan O CIV USARMY CENWW (USA) <Ryan.O.Laughery@usace.army.mil>; Charles Morrill (charles.morrill@dfw.wa.gov) <charles.morrill@dfw.wa.gov>; Claire McGrath <claire.mcgrath@noaa.gov>; Jen Graham <jennifer.graham@ctwsbnr.org>; Tucker Jones <tucker.a.jones@state.or.us>
Cc: St John, Scott J CIV USARMY CENWW (USA) <Scott.J.StJohn@usace.army.mil>
Subject: RE: 20 LGS 16 MOC Powerhouse Roof Repair - Urgent response requested

Erick,

There is no in-water work occurring with the roof repair.

Thanks,
Chris

From: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Sent: Thursday, March 31, 2022 12:39 PM
To: Subject: Little Goose Roof Repair Outage - Update

FPOM,

We received word that Little Goose Dam experience a ground fault Monday night. They have been troubleshooting the cause since then but have been unable to identify the cause. Currently the project operating unit 6 only (unit 5 is OOS for long-term repairs) and the JFF is operating on the emergency generator. Unfortunately, because we have not ben able to identify the problem, we are forced to cancel the bus linkage work that was planned for next week that was intended for the roof repair work later this year. The situation is evolving and it is likely that a powerhouse outage will still be needed to make a deeper investigation of the transmission system. I will provide further updates as information becomes available.

Chris

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Thursday, March 31, 2022 4:05 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Cc: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Subject: [Non-DoD Source] RE: Little Goose Roof Repair Outage - Update

Sigh … lets hope a simple solution presents itself …

Charlie

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Thursday, March 31, 2022 4:17 PM
To: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Subject: RE: Little Goose Roof Repair Outage - Update

Yes. This is very disappointing after all the work it took to arrange the outage. We will see what they come up with.

Chris

From: Tom Lorz <lort@critfc.org>
Sent: Friday, April 01, 2022 8:38 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: Little Goose Roof Repair Outage - Update

please add to FPOM agenda if you do not resolve prior to the meeting. So can the work be done in tandem, ie linkage work and running the ground fault issue to well ground? So are we going to have to look for another date to the roof repair work? That will be fun

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, April 01, 2022 11:02 AM
To: Tom Lorz <lort@critfc.org>
Subject: RE: Little Goose Roof Repair Outage - Update

Tom,

This will be on the agenda. There is a reason why they cannot be investigating the ground fault with the bus linkage cut. One is that they need to be able to pass power through the lines at times as they test parts (technical term) of the system and they cannot work on the linkage with power, but also they need the system whole while looking for the ground fault.

If the fault is fixed quickly they hope to be able schedule later in April. If nor quickly, we would be looking to find another 4-day period sometime this year or postpone the work one more year. Because the contract is already in place, postponing has big cost penalty.

Chris

From: Swank, David R <david_swank@fws.gov>
Sent: Tuesday, April 05, 2022 10:51 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL] Little Goose Roof Repair Outage - Update

Chris,

I assume no update since this email means that they are still working to id the cause. I'm wondering if this means that we may be looking at having to push the full PH outage at LGS to late June?

Dave

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Tuesday, April 05, 2022 11:00 AM
To: Swank, David R <david_swank@fws.gov>
Subject: RE: [EXTERNAL] Little Goose Roof Repair Outage - Update

Dave,

Correct, they are still troubleshooting the cause. I think our best option is to see if we can get the outage later in April since flows are projected to stay low into May. If that is not possible, we can discuss the June outage date, although NOAA does not like that option. If not that, we would need to postpone to next year.

Chris

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, April 08, 2022 10:43 AM
To: Subject: Little Goose Roof Repair Outage - Update - 040822

FPOM

Little Goose has completed troubleshooting for the cause of the T1 ground fault and we are confident that the source is with Inland Power and Light systems. They are working on returning T1 back to service, possibly sometime today.

The project and BPA would like to reschedule the bus linkage outage for the roof repair 18-22 April. Flow is projected to be 48-50 kcfs that week. So far 4 Chinook salmon have been counted at Little Goose and the number will increase over the next two weeks. Chinook salmon counts at Bonneville are a little above average to date.

Let me know of your questions and comments and we will also discuss at next week's FPOM meeting.

Chris

From: Morrill, Charles (DFW) <Charles.Morrill@dfw.wa.gov>
Sent: Friday, April 08, 2022 10:57 AM
To:
Subject: [Non-DoD Source] RE: Little Goose Roof Repair Outage - Update - 040822

Thanks Chris,

Given all the previous discussions and concerns … my thoughts are sooner is better than later …

Charlie

From: Swank, David R <david_swank@fws.gov>
Sent: Friday, April 08, 2022 11:27 AM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: [EXTERNAL] Little Goose Roof Repair Outage - Update - 040822

Chris,

That's some good news. Two questions:

1. What is the "Inland Power and Light Systems"?
2. If they are able to do the bus linkage work on the 18-22 April, would that shift everything back by two weeks from the (April) dates in the last MOC?

Dave

From: Peery, Christopher A CIV USARMY CENWW (USA)
Sent: Friday, April 08, 2022 11:49 AM
To: Swank, David R <david_swank@fws.gov>
Subject: RE: [EXTERNAL] Little Goose Roof Repair Outage - Update - 040822

Dave,

Inland Power is a power company that is fed directly from Little Goose Dam. So something on their side of the power line feed is cause the ground fault and that can be isolated from our system to reduce the risk of damage.

The roof work would still occur on schedule since it is not supposed to start until July. April is just when we wanted to get the linkage put in so the outage occurred when fish numbers were low.

Chris

From: Tom Lorz <lort@critfc.org>
Sent: Friday, April 08, 2022 12:41 PM
To: Peery, Christopher A CIV USARMY CENWW (USA) <Christopher.A.Peery@usace.army.mil>
Subject: [Non-DoD Source] Re: Little Goose Roof Repair Outage - Update - 040822

thanks for the update, I think that timing should work unless something dramatic happens. Can discuss more at next weeks FPOM.

Tom Lorz
CRITFC

Final coordination results Approved. Consensus reached on 3/3/22 Modification

After Action update

T1 and units 1 through 4 returned to service at approximately 14:45 hrs and Unit 1 was in operation at approximately 15:00, 21 April 2022.

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