

## MEMORANDUM FOR THE RECORD

**COORDINATION TITLE** - 16CGR01 Unit Outage Debris**COORDINATION DATE** - 28 January 2016**PROJECT** - Cougar Dam**RESPONSE DATE** - 11 February 2016**SUBJECT: If turbine units are not operational during adult fish collection at the Cougar Fish Facility there will be impacts to ESA listed fish species.**

**Description of the problem** - A significant amount of woody debris has accumulated in front of the Cougar temperature control tower and entered a portion of the tower leading into the penstock. This latest shutdown to both generating units caused by debris has been ongoing since early December. On 16 January, 2016, an inspection using a remotely operated vehicle (ROV) was conducted that examined the internal trashracks within the Cougar tower and found three, 3x5 foot bottom trashrack panels that were dislodged. The debris found in the units is likely entering through the large gaps in the wet well trashracks. The units will not be operable until these trashracks can be fixed.

**Type of operation required** - Both units will be offline until a path can be determined to operate units safely, thus, all flow must go through the RO. The reservoir will need to be drawn down to dewater the cul-de-sac area delaying refill of the reservoir. At this point, flow will be routed through the diversion tunnel. Further, the Portable Floating Fish Collector (PFFC) will need to be temporarily relocated during debris removal.

On 03 February, re-commissioning of the diversion tunnel will occur as this outlet will be required to pass discharge during repairs. There is an increased probability that deviations to down ramp rates detailed in the Biological Opinion will occur.

**Impact on facility operation** - This will impact both generation and attraction flow for the Adult Fish Collection Facility in the spring if not corrected (see attachment 'Special Operations Request for Coordination of Cougar Dam Debris Removal and Intake Tower Trashrack Repairs February 22, 2016' for additional details).

**Dates of impacts/repairs** - 07 December until debris is removed and units can be operated safely.

**Expected impacts on fish** - The Cougar Adult Fish Facility contains pumps that draw water from the river near the trap that provides the facility water supply (FWS) and auxiliary water supply (AWS) to the facility. Due to the configuration of the outlets at Cougar Dam, the generating unit outflow provides critical far field attraction to the adult facility. During past events when no generation flow was provided during spring Chinook passage season (May-October), the efficacy in adult collection was highly impacted.

In addition to this impact, when the generating units are off-line, flow is only provided via the regulating outlet (RO). The RO release channel is positioned on the south bank of the SF McKenzie River below the dam and flows into a channel that is separated by a spit of land from the Adult Trapping Facility. The RO channel and the main channel (north bank and location of Adult Fish Trap) converge downstream of the Adult Trapping Facility. Flows released through the RO can create false attraction to the RO (south bank) channel and away from the channel that provides access to the Adult Fish Trap and may encourage spawning in this area.

Spawning in the area below the RO channel is not optimal due to high levels of Total Dissolved Gas (TDG) that may result during RO use. When units are off-line and all flow is provided through the RO, TDG has been recorded at levels that may cause mortality of pre-emergent spring Chinook salmon. Levels of TDG were near 118% at the time of this MFR.

During re-commissioning of the diversion tunnel there may be potential impacts to fish related to flow decreases, however, efforts will be made to maintain down ramping criteria detailed in the Biological Opinion.

During dewatering of the cul-de-sac, a fish salvage may require capture, handling and release of some ESA-listed bull trout and other fish downstream of the dam as a result. Any fish collected during salvage will be visually observed for external marks and scanned for tags. If units are not able to be brought back online, operation of the Cougar Adult Fish Facility could be compromised this spring and summer by decreasing the ability to collect fish (e.g. spring Chinook salmon).

**Monitoring** - Reservoir conditions, discharge, and water quality (i.e. turbidity, temperature, and TDG) will be measured throughout repairs. Some monitoring of fish will occur utilizing ongoing RM&E efforts (e.g. active tag studies, screwtrapping).

### **Comments from agencies**

-----Original Message-----

From: Stephanie Burchfield - NOAA Federal  
[mailto:stephanie.burchfield@noaa.gov]  
Sent: Thursday, February 04, 2016 10:16 AM  
To: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>  
Subject: [EXTERNAL] Re: Cougar Diversion Tunnel Re-commissioning

Hi Chris,

Thanks for the update. We are still working on comments on the MOC, and we appreciate the Corps' efforts to fix this issue as quickly as possible to avoid adverse effects to migrating juvenile and adult salmonids later in the year.

What kind of water quality monitoring are you doing as part of this tunnel opening, and then during reservoir drawdown and operation of the tunnel when the actual repair work will be done in the tower? Have you coordinated this monitoring with DEQ?

Stephanie Burchfield  
Fisheries Biologist  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
1201 NE Lloyd Blvd, Suite 1100  
Portland OR 97232

503-736-4720

-----Original Message-----

From: Tackley, Kathryn  
Sent: Thursday, February 04, 2016 11:11 AM  
To: Stephanie Burchfield - NOAA Federal  
<stephanie.burchfield@noaa.gov>; Walker, Christopher NWP  
<Christopher.E.Walker@usace.army.mil>

Subject: RE: [EXTERNAL] Re: Cougar Diversion Tunnel Re-commissioning  
(UNCLASSIFIED)

Classification: UNCLASSIFIED  
Caveats: NONE

We are monitoring for TDG, dissolved oxygen, turbidity, and water temperature.

-----Original Message-----

From: Spear, Daniel J (BPA) - PGB-5 [mailto:djspear@bpa.gov]  
Sent: Thursday, February 04, 2016 11:57 AM  
To: Tackley, Kathryn <Kathryn.L.Tackley@usace.army.mil>; Chane, Ian B  
NWP <Ian.B.Chane@usace.army.mil>; Mackey, Tammy M NWP  
<Tammy.M.Mackey@usace.army.mil>; Walker, Christopher NWP  
<Christopher.E.Walker@usace.army.mil>  
Subject: RE: [EXTERNAL] Re: Cougar Diversion Tunnel Re-commissioning --  
MOC?

Hello:

Do you guys need any sort of MOC or anything formal from BPA on all of this? There will be no issues from our side I just want to assure that there isn't a box that has been left unchecked.

Thanks,

Dan Spear

-----Original Message-----

From: Tackley, Kathryn  
Sent: Thursday, February 04, 2016 1:50 PM  
To: Stephanie Burchfield - NOAA Federal  
<stephanie.burchfield@noaa.gov>; Nancy Gramlich  
<gramlich.nancy@deq.state.or.us>  
Cc: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>;  
Hart, Salina N NWP <Salina.N.Hart@usace.army.mil>

Subject: Cougar Diversion Tunnel Re-commissioning and water quality data (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Stephanie/Nancy,

Water quality conditions during recommissioning were monitored using a Hydrolab. I've attached data from yesterday's test. The turbidity data is a bit sketchy...lots of missing/bad data, but it looks like there were a few notable spikes in turbidity (see hydrolab data tab in attached excel spreadsheet). I was told by the field crew that there was an initial pulse of turbid water that cleared up gradually. Apparently water was practically clear coming out of the diversion tunnel towards the end of the test.

The dissolved oxygen data looks pretty good (see hydrolab data tab in attached excel spreadsheet). There are no large drops in oxygen levels, so it doesn't appear that the turbidity was a big impact on oxygen levels. Good to see.

Total dissolved gas levels have been running high since all Cougar releases have been coming through the regulating outlets with the powerhouse shut down. The operation of the diversion tunnel actually degassed/diluted RO discharges a little bit, bringing TDG down from ~120% TDG to ~117% TDG (see TDG at USGS gage tab).

The project is having a hard time getting the other set of diversion tunnel gates open. Thus, no additional water quality data has been collected today.

The USGS will be installing a real-time turbidity sensor at the USGS gage #14159500, "South Fork McKenzie River near Rainbow" tomorrow. This will be telemetered, so you will be able to track this data in real-time along with the TDG data. You will be able to access this data at the USGS website:

[http://waterdata.usgs.gov/or/nwis/inventory/?site\\_no=14159500](http://waterdata.usgs.gov/or/nwis/inventory/?site_no=14159500).

Continuous water quality conditions will be monitored from tomorrow through end of April (or whenever repairs have been completed and Cougar reservoir is refilled to normal levels).

Please let me know if you have any questions.

Thanks!

Kathryn

-----Original Message-----

From: Stephanie Burchfield - NOAA Federal

[mailto:stephanie.burchfield@noaa.gov]

Sent: Thursday, February 11, 2016 10:37 AM

To: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>;

Mackey, Tammy M NWP <Tammy.M.Mackey@usace.army.mil>

Subject: [EXTERNAL] Fwd: February 11th - WATER Steering Team Meeting

fyi - in case this doesn't get to you soon.

also, we are completing our comments on the Cougar debris MOC, but I'm wondering if you have any update regarding: a) use of diversion tunnel -- are you using it now?  
b) when you will start lowering reservoir?  
c) when you think work in the tower will begin?  
d) sounds like you are hoping it will be done by Apr 1 (per the news release) but we understand you won't have a good idea until after workers get in and inspect the damage, right?

thx.

Stephanie Burchfield  
Fisheries Biologist  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
1201 NE Lloyd Blvd, Suite 1100  
Portland OR 97232

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Original Message

From: Walker, Christopher NWP  
Sent: Thursday, February 11, 2016 10:59 AM  
To: Stephanie Burchfield - NOAA Federal  
Cc: Mackey, Tammy M NWP  
Subject: RE: [EXTERNAL] Fwd: February 11th - WATER Steering Team Meeting

Thanks Stephanie,

Regarding your questions:

a) use of diversion tunnel -- are you using it now? We re-commissioned it Feb 3, 4, observed limited turbidity, will use again when reservoir elevations decrease  
b) when you will start lowering reservoir? The plan is early March after we move the PFFC  
c) when you think work in the tower will begin? Begin moving debris early March and do repairs mid-March  
d) sounds like you are hoping it will be done by Apr 1 (per the news release) but we understand you won't have a good idea until after workers get in and inspect the damage, right? There is a lot of uncertainty, we are assuming we can keep the reservoir down and can get the units back up safely

I will be on the ST call to talk about this. Have a great Day.

Chris Walker  
US Army Corps of Engineers  
Operations Division  
Fish Biologist  
w: 503-808-4316  
c: 503-887-6452

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From: Stephanie Burchfield - NOAA Federal  
[stephanie.burchfield@noaa.gov]  
Sent: Thursday, February 11, 2016 12:48 PM

To: Walker, Christopher NWP; Casey, Joyce E NWP  
Cc: Mackey, Tammy M NWP; Ian Chane; Petersen, Erik S NWP; Eppard,  
Matthew B NWP; Spear, Daniel J - PG; Doumbia, Julie A (BPA) - KEWR-4;  
Christine Petersen; Ann Gray; Michael Hudson; Bernadette Graham Hudson;  
Steven Marx; James Ruff; Lawrence Schwabe; Tom Friesen; Fred Monzyk;  
Cameron Sharpe - OSU; Melissa Jundt - NOAA Federal; Kimberly Hatfield -  
NOAA Affiliate; Marc Liverman - NOAA Federal; Anne Mullan - NOAA  
Federal; Lance Kruzic - NOAA Federal; Keith Kirkendall - NOAA Federal;  
Gramlich.Nancy@deq.state.or.us <mailto:Gramlich.Nancy@deq.state.or.us>  
; MUCKEN Alyssa M  
Subject: Re: MOC - CGR Units (16CGR01)

Attached is a memo to Joyce from me, providing NMFS comments on the  
Cougar debris - trashrack repair MOC, 16CGR01. If you have questions,  
please contact Melissa Jundt at melissa.jundt@noaa.gov  
<mailto:melissa.jundt@noaa.gov> .

Thanks for this opportunity to comment, and we look forward to working  
with you on this pressing issue.

Stephanie Burchfield  
Fisheries Biologist  
NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
1201 NE Lloyd Blvd, Suite 1100  
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From: Bernadette N Graham-hudson [mailto:bernadette.n.graham-  
hudson@state.or.us]  
Sent: Thursday, February 11, 2016 8:18 PM  
To: Stephanie Burchfield - NOAA Federal; Walker, Christopher NWP;  
Casey, Joyce E NWP  
Cc: MUCKEN Alyssa M; Ann Gray; Anne Mullan - NOAA Federal; GRAHAM-  
HUDSON Bernadette N; Cameron Sharpe - OSU; Christine Petersen;  
Spear, Daniel J - PG; Petersen, Erik S NWP; Fred Monzyk; Ian Chane;  
Doumbia, Julie A (BPA) - KEWR-4; ZILLER Jeffrey S; James Ruff; Keith  
Kirkendall - NOAA Federal; REIS Kelly E; Kimberly Hatfield - NOAA  
Affiliate; Lance Kruzic - NOAA Federal; Lawrence Schwabe; Marc Liverman  
- NOAA Federal; Eppard, Matthew B NWP; Melissa Jundt - NOAA Federal;  
Michael Hudson; Gramlich.Nancy@deq.state.or.us; MARX Steven D; Mackey,  
Tammy M NWP; Tom Friesen  
Subject: RE: MOC - CGR Units (16CGR01)

Chris,

ODFW offers the following comments on the MOC- CGR Units (16CGR01):

\* The 'Expected Impacts to Fish' section does not mention or  
discuss any impacts to downstream migrants. The Corps should provide  
information on what conditions might be for juvenile migrants during

the drawdown, while the reservoir is held down, and during refill. What outlets will be available to fish, at what depths, and what flows? What monitoring will be in place to determine if fish are passing through the diversion tunnel?

\* ODFW recommends the Corps discuss with the WATER teams the potential to implement an RME study to evaluate the drawdown and delayed refill. For example, the WATER teams might consider a release of PIT-tagged fish, even at small numbers, to provide some information about conditions during the drawdown.

\* Please provide more information on the likely timeframe for the drawdown, and potential scenarios if the repair takes longer than expected and operation of the adult trap is delayed. Given that operation of the trap will potentially be different once again this year, ODFW recommends continuing spawning surveys to determine success of any outplanted fish.

\* ODFW recommends the Corps continue to monitor water quality below Cougar Dam, including turbidity, and any potential impacts to redds below Cougar as the drawdown continues or if refill and temperature control are delayed.

\* Please consider adding a 'Monitoring' section to the template MOC form. It would be helpful for the Corps to provide the WATER teams with information on any planned monitoring they will do associated with this operation (or others requiring an MOC).

Please let me know if you have any questions about these comments. We look forward to continued coordination as you implement this operation and repair.

Thanks,

Bernadette

Bernadette Graham Hudson | Fish & Wildlife Operations and Policy Analyst

Oregon Department of Fish and Wildlife | West Region  
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-----Original Message-----

From: GRAMLICH Nancy [mailto:Gramlich.Nancy@deq.state.or.us]  
Sent: Friday, February 12, 2016 8:32 AM  
To: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>  
Cc: 'Stephanie Burchfield' <Stephanie.Burchfield@noaa.gov>; GRAHAM-HUDSON Bernadette N <Bernadette.N.Graham-hudson@state.or.us>; Tackley, Kathryn <Kathryn.L.Tackley@usace.army.mil>  
Subject: [EXTERNAL] RE: MOC - CGR Units (16CGR01)

Hi Chris, DEQ supports ODFW on the following water quality components:

\* ODFW recommends the Corps continue to monitor water quality below Cougar Dam, including turbidity, and any potential impacts to redds below Cougar as the drawdown continues or if refill and temperature control are delayed.

\* Please consider adding a 'Monitoring' section to the template MOC form. It would be helpful for the Corps to provide the WATER teams with information on any planned monitoring they will do associated with this operation (or others requiring an MOC).

Thank you for coordinating with DEQ and the group overall.

Sincerely, Nancy

-----Original Message-----

From: Stephanie Burchfield - NOAA Federal  
[mailto:stephanie.burchfield@noaa.gov]  
Sent: Friday, February 12, 2016 8:35 AM  
To: GRAMLICH Nancy <Gramlich.Nancy@deq.state.or.us>  
Cc: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>;  
GRAHAM-HUDSON Bernadette N <Bernadette.N.Graham-hudson@state.or.us>;  
Tackley, Kathryn <Kathryn.L.Tackley@usace.army.mil>; Mackey, Tammy M  
NWP <Tammy.M.Mackey@usace.army.mil>  
Subject: [EXTERNAL] Re: MOC - CGR Units (16CGR01)

Chris,

NMFS agrees with these comments on water quality and adding a "Monitoring" section to the MOC template. We had asked about water quality monitoring earlier, and then forgot to include in our memo sent yesterday!

Stephanie Burchfield  
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NOAA Fisheries West Coast Region  
U.S. Department of Commerce  
1201 NE Lloyd Blvd, Suite 1100  
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503-736-4720

-----Original Message-----

From: Hudson, Michael [mailto:michael\_hudson@fws.gov]  
Sent: Friday, February 12, 2016 12:11 PM  
To: Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>  
Cc: [several recipients]

Chris,

Thank you for the opportunity for review and comment on the subject MOC. USFWS has a couple of comments:

\* The MOC states "during dewatering of the cul-de-sac, a fish salvage may require capture, handling and release of some ESA-listed bull trout and other fish downstream of the dam as a result." We are concerned that this disposition action does not fall in line with

previous guidance provided to the Corps regarding disposition of bull trout captured through operation of the PFFC. We recommend that any bull trout (adult or juvenile) captured during fish salvage efforts covered under this MOC be released back to the reservoir. However, should the drawdown under this MOC extend beyond the expected schedule, we recommend the Corps coordinate with the Upper Willamette Bull Trout Working Group for disposition guidance as reservoir temperatures may climb more rapidly under an extended drawdown scenario.

\* We recommend the Corp work with the WATER-RME team to identify opportunities for any additional RME projects related to extended drawdown/delayed refill in Cougar Reservoir during this unique operational situation.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Michael Hudson  
Fish Biologist/Region 1 Climate Change Coordinator  
USFWS-Columbia River Fisheries Program Office

1211 SE Cardinal Ct - Ste 100  
Vancouver, WA 98683-9658  
360-604-2575

-----Original Message-----

From: Bernadette N Graham-hudson [mailto:bernadette.n.graham-hudson@state.or.us]  
Sent: Friday, February 19, 2016 4:56 PM  
To: Tackley, Kathryn <Kathryn.L.Tackley@usace.army.mil>; Helwig, Lance A NWP <Lance.A.Helwig@usace.army.mil>; Wells, Elizabeth R NWP <Elizabeth.R.Wells@usace.army.mil>; Hart, Salina N NWP <Salina.N.Hart@usace.army.mil>; Craig, Matthew NWP <Matthew.Craig@usace.army.mil>; Fortuny, William B NWP <William.B.Fortuny@usace.army.mil>; Boag, James NWP <James.M.Boag@usace.army.mil>; Hanson, Matthew D NWP <Matthew.D.Hanson@usace.army.mil>; Britton, Jeremy P, NWP <Jeremy.P.Britton@usace.army.mil>; Askelson, Sean K NWP <Sean.K.Askelson@usace.army.mil>; Bengtson, Dustin E NWP <Dustin.E.Bengtson@usace.army.mil>; Petersen, Erik S NWP <Erik.S.Petersen@usace.army.mil>; Sawka, Mark J NWP <Mark.J.Sawka@usace.army.mil>; Griffith, David W NWP <David.W.Griffith@usace.army.mil>  
Cc: Naidu, Anil NWP <Anil.Naidu@usace.army.mil>; GRAHAM-HUDSON Bernadette N <bernadette.n.graham-hudson@state.or.us>; Welton, Brent C NWP <Brent.C.Welton@usace.army.mil>; Humphrey, Christopher C NWP <Christopher.C.Humphrey@usace.army.mil>; Walker, Christopher NWP <Christopher.E.Walker@usace.army.mil>; Ramirez, Dan E NWP <Dan.E.Ramirez@usace.army.mil>; Bardy, David M NWP <David.M.Bardy@usace.army.mil>; Spear, Daniel J - PGB-5 <djspear@bpa.gov>; Carlsen, Elisa NWP <Elisa.Carlsen@usace.army.mil>; Fred Monzyk <fred.monzyk@oregonstate.edu>; Saldana, Gail <gail.l.saldana@usace.army.mil>; Taylor, Gregory A NWP <Gregory.A.Taylor@usace.army.mil>; Barrowcliff, Gregory J NWP <Gregory.J.Barrowcliff@usace.army.mil>; Chane, Ian B NWP <Ian.B.Chane@usace.army.mil>; Sedey, Jeffrey Allen NWP

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<Tina.J.Teed@usace.army.mil>; Tom Friesen <tom.friesen@oregonstate.edu>  
Subject: [EXTERNAL] RE: (Correction) Please respond: Cougar Dam Debris  
Removal and Intake Tower Trash Rack Repairs - Special Operations  
Coordination (UNCLASSIFIED)

Hi Kathryn,

Thank you for the Special Operations Request for Coordination (SOR) for  
the Cougar Dam Debris Removal and Intake Tower Trashrack Repairs. ODFW  
offers the following comments:.

\* In general, ODFW supports the USACE plan for reservoir  
drawdown, debris removal, and wet well trashrack repairs.

\* On page 5 of the SOR, the text mentions that fish salvage  
will occur to remove ESA-listed bull trout that may be dewatered. We  
would also expect ESA-listed Chinook salmon (yearlings and fry) to be  
present in the area. In addition, other native fish species may be  
present. All native fish present in the cul-de-sac should be salvaged  
and returned to the main body of the reservoir.

\* ODFW requests regular updates on the drawdown operation.  
These updates should include any deviations from the drawdown schedule  
or plan provided in the SOR, as well as regular reports of water  
quality monitoring, and specifically, if any state water quality  
standards are violated during the drawdown. If water quality  
degradation reaches levels that may affect fish egg survival or angling  
conditions below the dam, ODFW requests the Corps discuss contingency  
measures with the ODFW district biologists.

\* ODFW requests that any large woody debris removed from the  
tower be either placed downstream of the dam or stockpiled for  
restoration projects in the McKenzie Basin.

If you have any questions on these comments, please let me know.

Thank you,

Bernadette

Bernadette Graham Hudson | Fish & Wildlife Operations and Policy Analyst

Oregon Department of Fish and Wildlife | West Region

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bernadette.n.graham-hudson@state.or.us

**Final results** - Work will commence after contract award with the goal to complete debris removal/repairs and begin refill of Cougar Reservoir April 1.

Please email or call with questions or concerns.

Thank you,

Chris Walker

NWP Operations Division Fishery Section

Willamette Fish Operations Coordination Biologist

503.808.4316

[Christopher.E.Walker@usace.army.mil](mailto:Christopher.E.Walker@usace.army.mil)