OFFICIAL COORDINATION REQUEST FOR
NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 16 LWG 04 EAL testing at Lower Granite
COORDINATION DATE- April 12, 2016 UPDATED June 13, 2016 and June 22, 2016. Latest changes are in red.
PROJECT- Lower Granite
RESPONSE DATE- June 24, 2016

Description of the problem- The Corps is required by a 2014 Settlement Agreement (Case 2:13-md-02494-LRS filed 8/14/2014) with the Columbia RiverKeeper pursuant to the Clean Water Act to test the feasibility of switching from petroleum based grease to Environmentally Acceptable Lubricants (EAL).

The candidate EAL grease must be tested in a real world environment. This will require nighttime deviations from unit priority order to accumulate enough run time hours on unit 6 to evaluate the EAL performance. Based upon the compatibility testing, four representative units were selected for proof of concept testing (BON15, TDA1, MCN13, and LWG6). These units will be applied to the wicket gate's grease system. Monitoring of the EAL will be determined by installing transducers on the wicket gate stems, grease lines, servomotor drain lines, and the governor accumulator tank drain. The transducer will measure if the EAL has any adverse effects on the wicket gate system.

Type of outage required- EAL testing in unit 6 will require three outages. Deviations from unit priority order will be required for testing. Dates shown below may deviate but duration of outage is not expected to change.

The first outage is planned for June 23 - July 1. This outage does NOT require dewatering the unit but the unit will need to be locked out so that transducers can be installed on the wicket gate stems, grease lines, servomotor drain lines, and the governor accumulator tank drain.[der1] Initial testing - headgates will need to be lowered, the unit instrumented, wicket gates cycled, headgates lifted, then the unit brought up to temp all in day 1 of the test plan. This means the unit will be out of service for 5 days while the equipment is being installed. The unit may be ran at night to get the proper amount of run time.[der2] Following installation of instrumentation and unit water-up, baseline testing of existing grease will be conducted.

The work required during the second outage will be done concurrently with an existing maintenance outage already planned for August 29. This means Unit 6 will be out for maintenance and EAL testing from August 1 to 26. A dewatered unit is required in order to purge the grease lines of the non-EAL and measuring bushings.

The third outage is currently planned for October 2, 2017 [der3]and will require dewatering of the unit in order for the bushings to be measured. The unit will need to be dewatered for 10 working days, from October 2-13, 2017.

Impact on facility operation- Unit 6 will be unavailable for operation during the outage dates listed. Dewatering the unit will require Project support. Unit 6 will need to be operated to accumulate enough run time for baseline testing July 3-August 1 which requires a deviation from turbine unit priority order nightly from about 2130-0430 hours.

Dates of impacts/repairs- Testing is planned to begin in June 2016 thru December 2017 and planned to last up to 18 months.

First Outage: June 23 to July 1
Second Outage: Aug 1 to Aug 26 (dewatered unit)
Third Outage: 2 -13 OCT 2017 (dewatered unit)

Length of time for repairs- EALs will be not be applied during the first outage in June 2016 and the performance of equipment will be monitored for up to 18 months. The plan is to apply the EALs during the second outage

During fish passage season, all testing (baseline, periodic monitoring) will be within existing 1% limits. Testing / operation up to generator limits will only occur during periodic monitoring tests that fall during non-fish passage months.

Summary of Scheduled of Outages and Periodic Monitoring Tests as follows:

Description	**Date**	**Notes**
Unit Outage	23 June 2016- 1 July 2016	Instrumentation installation and Baseline Operational Testing
Unit Outage	1 Aug 2016 – 26 Aug 2016	Pre-Test Bushing Measurements
Periodic Monitoring Test	05 Sept 2016	No Unit Outage
Periodic Monitoring Test	06 Oct 2016	No Unit Outage
Periodic Monitoring Test	06 Dec 2016	No Unit Outage
Periodic Monitoring Test	08 Mar 2017	No Unit Outage
Periodic Monitoring Test	06 Sept 2017	No Unit Outage
Unit Outage	02-13 Oct 2017	Post-Test Bushing Measurements

Need FPOM approval for testing Unit 6 out of priority during baseline operational testing and periodic monitoring testing, to include 4-6 hour warm up operation. Based on the current forecast we will probably not have enough water to run Unit 6 while still

following Unit Priority. Our priority is 2, 3, and then 4-6 in any order. With best case 50K of flow, we would only have about 30K after mandatory spill to run through the PH.

The units first set of testing will take place during the outage requested. Two days are allotted for initial baseline testing; the first day for instrumentation, setup, and troubleshooting/calibration, and the second day for operational testing. One day of testing is allotted for the remaining periodic tests (months 0, 1, 3, 6, 12) with the new EAL grease.

Expected impacts on fish passage- Operating outside of turbine unit priority to test unit 6 may impact adult fish passage for 4-6 hours on the dates listed above. Minimal impacts are expected for nightly testing from July 3-August 1. Unit 6 will be operated from 2130-0430 hours to minimize potential impacts adult fish passage. Average river flows June 23-July 1 are 77.2 kcfs with a ten year average of 659 adult chinook, 238 jack chinook, 19 adult steelhead, and 6 adult sockeye. Average river flows August 1-23 is 29.7 kcfs with a ten year average of 40 adult chinook, 13 jack chinook, 244 adult steelhead, and 3 adult sockeye. Average river flows September 5 is 26.1 kcfs with a ten year average of 361 adult chinook, 168 jack chinook, and 1290 adult steelhead. Average river flows October 6 is 21.6 kcfs with a ten year average of 309 adult chinook, 283 jack chinook, 3584 adult steelhead, and 120 adult coho. Average river flows December 6 is 22.6 kcfs with a ten year average of 2 jack chinook and 62 adult steelhead. Average river flows March 8 is 41.3 kcfs with a ten year average of 155 adult steelhead.

Below are 10 year average adult fish passage at Lower Granite and sockeye diel passage times.

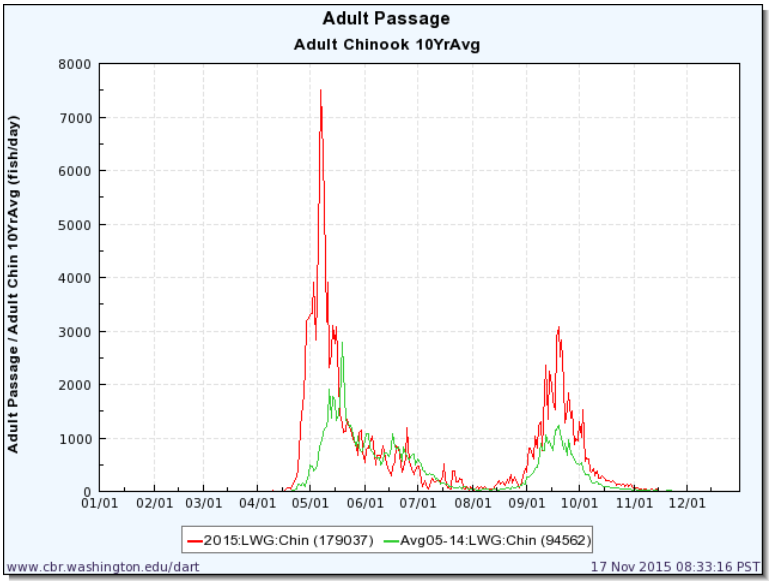

Figure 2. 2015 and 10 year average Chinook passage at Lower Granite.

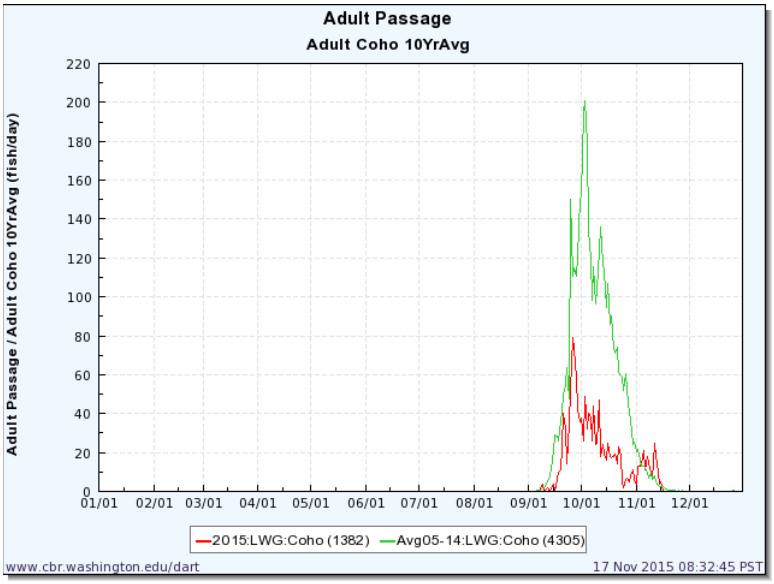

Figure 3. 2015 and 10 year average Coho passage at Lower Granite Dam

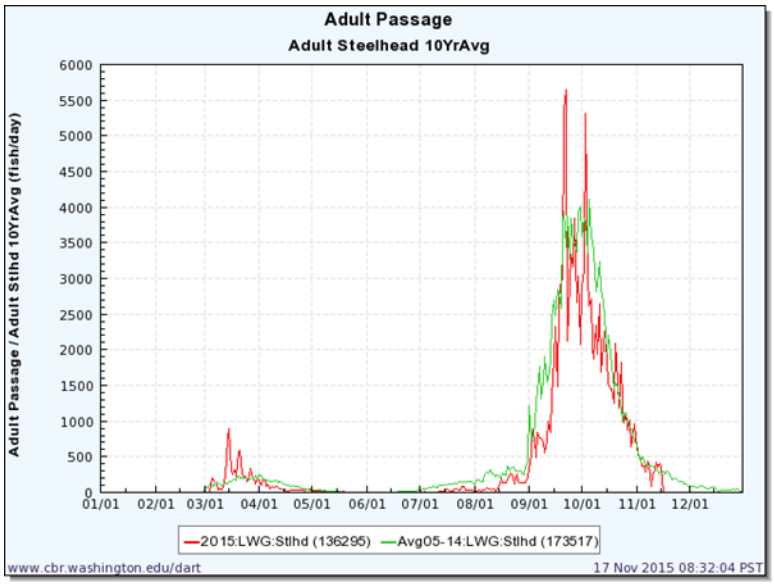

Figure 4. 2015 and 10 year average steelhead passage at Lower Granite Dam.

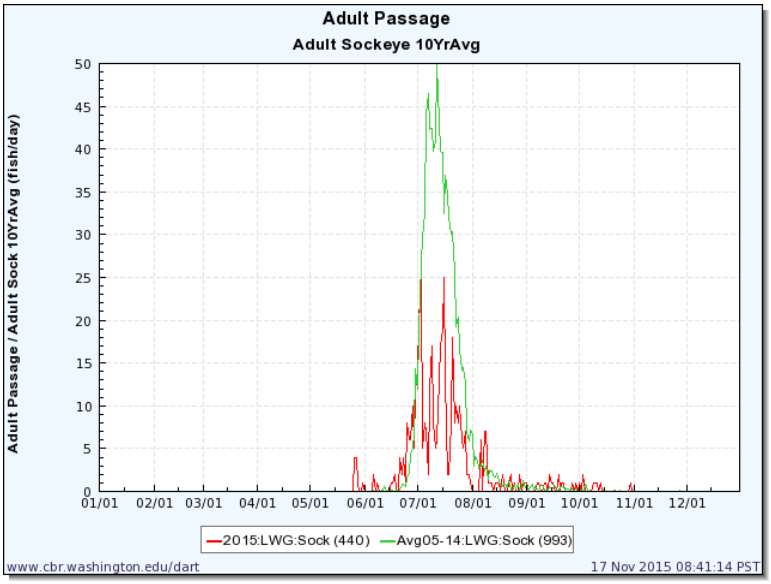

Figure 5. 2015 and 10 year average Sockeye passage at Lower Granite Dam

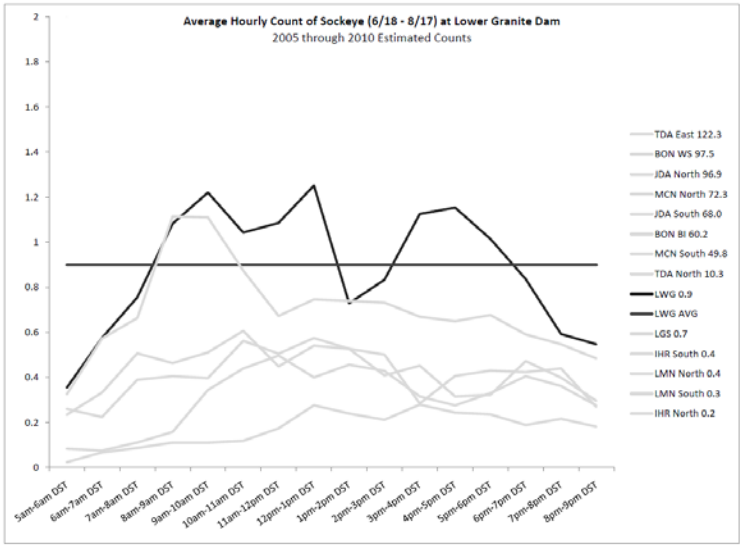

Figure 5. 2005-2010 Sockeye diel passage times at Lower Granite Dam

Comments from agencies

-----Original Message-----
From: Bill Hevlin - NOAA Federal [mailto:bill.hevlin@noaa.gov]
Sent: Thursday, June 16, 2016 3:35 PM
To: Moody, Gregory P NWW <Gregory.P.Moody@usace.army.mil>
Cc: Bill Hevlin - NOAA Federal <bill.hevlin@noaa.gov>
Subject: [EXTERNAL] Re: 16 LWG 04 EAL testing at Lower Granite - UPDATED

Hi Greg,

I have a couple questions about this coordination. The outages of unit 6 in June and August will be not problem for adult passage, unit six operation is low priority. During September and October, periodic operation of unit 6 may delay adult passage if river flow is low enough not to permit unit two operation at the same time. How many hours during the day will this be required? It would be best if unit 6 was only operated in the afternoon hours, so that unit 2 could be operated through the morning hours to noon for adult passage.

Thanks
Bill Hevlin
NOAA Fisheries.

Final results

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

Greg Moody
NWW Operations Division
509-527-7124
Gregory.P.Moody@usace.army.mil