OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE – 22 LWG 04 T1 T2 Gasket Repair
COORDINATION DATE – 24 March 2022
PROJECT - Lower Granite Dam
RESPONSE DATE – 7 April 2022

Description of the problem- Granite is in the development process of replacing T1 and T2 transformer gaskets and oil recondition work to prevent an expected failure due to the equipment reaching operational life expectancy. This work is expected to take up to 12 weeks per transformer but can be divided into separate 4-week periods to cover each of the three phases (A, B, C) per transformer. There is no spare transformer available to replace a single-phase transformer at Lower Granite. The available spare was used at Little Goose after T2-C experienced a failure in 2021. It is recommended that LWG proactively complete this work to avoid a transformer failure similar to the one that occurred at LGO and to have the outage be in a controlled timeframe to minimize impacts to fish passage.

GSU transformer Banks T1 and T2 were manufactured by Westinghouse in 1975 and 1978 respectively. They are three winding, single-phase transformers. T1 is fed by Units 1 through 4 and T2 is fed by Units 5 and 6. The Army Corps has many transformers in their fleet, and the primary age groupings where transformer replacements are presently occurring are from 50 – 70 years. When a transformer reaches 60 years of age, it is highly recommended that plans are in-place for its replacement. Lower Granite's T1 has been in service for 46 years and T2 has been in service for 43 years. All transformers are leaking insulating oil into the containment with T1-A and T1-C being the most severe. Transformer T1-C also has elevated levels of dissolved gases in the oil. Additional transformer components have either exceeded their operational design life, are no longer supported by equipment manufacturers, and/or do not meet present industry standards.

Work must be performed during dry weather and when relative humidity is less than 60%, which precludes conducting the work during the typical maintenance period December-March. Because both transformers feed a single line out from the project, a full powerhouse outage (minus Unit 5 for station service) will be needed when working on all three phases for T1. T1 (Units 1-4) can be operated when work is being conducted on T2. The proposed schedule would be to start T2 work in July to avoid impacting unit priority order during sockeye salmon passage and then move to T1-C in August, complete T2 in September and October, T1-A November and complete the T1-B in November 2024. Starting with T2 would provide the contractor an opportunity to identify any unforeseen issues in preparation for the more critical T1 work.

Type of outage required- A full powerhouse outage will be needed while servicing T1. Units 5-6 will be out of service during T2 work.

Impact on facility operation (FPP deviations)- Work on T1 requires deviation for unit priority order.

Impact on unit priority- Units will be operated outside of priority order during the T1 outage.

Impact on forebay/tailwater operation- Operating outside of unit priority order will impact tailrace conditions and attraction flow.

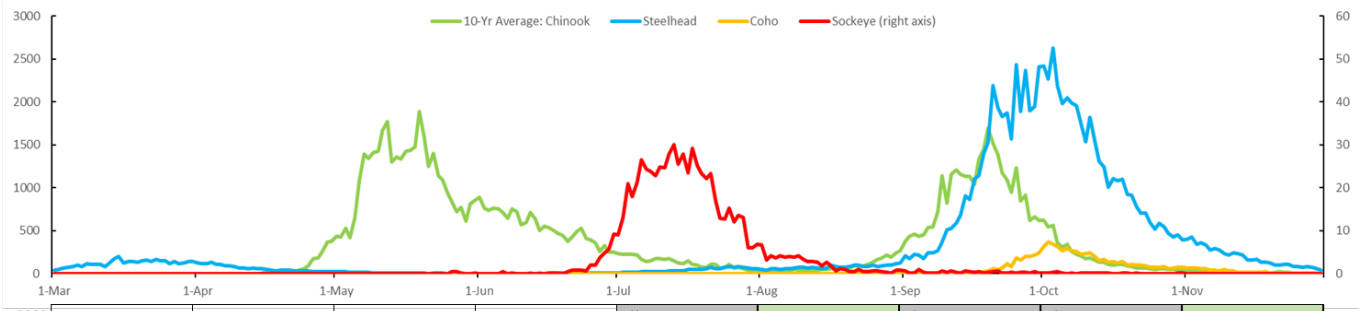
Impact on spill- N/A

Dates of impacts/repairs- Work will be completed July-November. Impacts to fish passage will occur during work on T1, primarily during August.

Length of time for repairs- 24 weeks total spread between 2023 and 2024.

Analysis of potential impacts to fish

1. The 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;



	% March	% April	% May	% June	% July	% August	% September	% October	% November
Chinook	0.0%	1.8%	37.2%	17.5%	4.2%	2.8%	30.2%	5.8%	0.5%
Steelhead	4.3%	2.1%	0.3%	0.1%	1.5%	2.7%	38.3%	44.3%	6.4%
Coho	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.1%	68.5%	9.4%
Sockeye	0.0%	0.0%	0.1%	4.4%	84.5%	9.1%	1.4%	0.4%	0.0%

The figure above shows the 10-year average fish counts at Lower Granite Dam and percent of each fish run per month. On average, less than 3% of Chinook salmon (2,666) and steelhead (2,388), no Coho salmon and 9.1% (65) of sockeye salmon pass Lower Granite Dam in August. In recent years, the late sockeye salmon passing Lower Granite Dam are primarily of upper Columbia River origin that have strayed into the Snake River, as determined from genetic analyses. During November, an average of 6.4% (5,628) of steelhead, 9.4% (718) Coho salmon, less than 1% (477) of Chinook and no sockeye salmon pass Lower Granite Dam.

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

Predictions for Chinook salmon and steelhead runs are similar to 2021 returns and below the 10-year averages. Sockeye salmon returns are predicted to be

200, significantly below the 10-year average of about 1,000 fish. Coho salmon run is predicted to be similar or higher than 2021 and significantly higher than the 10-year average.

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

   Percent of fish runs per month are shown above.

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.);

   Operating outside of unit priority order during August and November while servicing T1 will impact attraction flow and potentially result in fish passage delays.

Summary statement - expected impacts:

Downstream migrants: Increased juvenile salmonid attraction to the bypass system when unit 5 and 6 are in operation. T1 work will be scheduled outside of the peek juvenile migration period.

Upstream migrants (including Bull Trout): Adult passage, including bull trout, may be delayed passing Lower Granite Dam during August and November during T1 outage. To minimize impacts to adult passage T1 work will be scheduled after the sockeye passage season and outside the peak fall Chinook season.

Lamprey: Adult lamprey may be delayed passing Lower Granite Dam during August during T1 outage.

Comments from agencies:

Final coordination results:

After Action update:

Please email or call with questions or concerns.

Thank you,
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