



Rocky Reach NPDES Annual Oil and Grease Report 2024

DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE
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- PURPOSE:** In accordance with Condition S11.C of National Pollutant Discharge Elimination System Waste Discharge Permit WA0991033, to provide the annual results, from January 2024 thru December 2024, of monitoring and assessment of the locations, amounts, types, and uses of oils and lubricants at Rocky Reach Dam (“Project”) pursuant to the Hydro Project Oil Accountability Plan (OAP) submitted to the Washington Department of Ecology on April 24, 2024.
- INSPECTIONS:** All oil/grease-filled operating equipment (55 gallons or greater), bulk oil storage containers (55 gallons or greater), and high-risk equipment at the Project are periodically inspected for leaks and to ensure the oil level is in the normal operating range, as provided in Section 6.1 and Attachment 1 of the OAP. These inspections are outlined in the table below. In addition to these scheduled measurements the equipment is inspected daily during plant rounds performed by Operators, Mechanics, and Wiremen.

Equipment	Oil leak/level inspection frequency
GENERATION UNITS	
Governor System	Monthly
Thrust Bearing System	Monthly
Turbine Guide Bearing System	Monthly
TRANSFORMERS	
Main Transformers	Monthly
SS Transformers	Monthly
Spare Main Transformer	Monthly
RR Switchyard Station Service Feed	Monthly
FISH BYPASS SYSTEM	
SC HPU1	Monthly
SC HPU2	Monthly
IS HPU	Monthly
SF HPU	Monthly
Trash Rake Sumps/levels	Monthly
CRANES	
Intake Gantry Crane Main Hoist Gear Reducer	Monthly
STORAGE	
Clean Oil Room Storage Tanks	Monthly
Dirty Oil Room Storage Tanks	Monthly
Used Oil Storage Tanks	Monthly
Used oil transfer tank (Shrek)	Monthly



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GENERAL	
Spillway Emergency Diesel Generator	Monthly
Black Start Emergency Diesel Generator	Monthly

3. **ASSESSMENTS:** An assessment is made in accordance with the OAP when leaks or observable changes in oil level indicate a discernible loss of oil that is not associated with normal operations (i.e., not within the normal operating range). Oil levels on some equipment fluctuate within the normal operating range depending on oil temperatures and position of the equipment. When a leak is reported, maintenance assesses it to determine the severity. Any potential leak to the environment (waterways) is dealt with immediately. Other leaks that are not to the environment are repaired as soon as feasible. The repair of small leaks that are not to the environment may be deferred until the next time the equipment is scheduled to be out of service, however steps are taken to capture any leaks such as placing drip pans or absorbent pads.

An assessment is generated under the following circumstances:

- i. At the inspector's discretion, if the inspector feels there is sufficient possibility for damage to personnel, equipment, or the environment.
- ii. Any equipment with unexplainable high or low oil levels or alarms that were not false alarms or did result in any release of oil or lubricants to the environment.
- iii. Malfunctioning automated grease systems that result in excessive or leaking grease.
- iv. Any leak that has a high likelihood of escaping containment.

Summary of Work- Actions taken as a result of assessments with above criteria:

- i. Flygt Pump 23 – Replaced outer mechanical seal – after seal leakage
- ii. Flygt Pump 28 – Replaced pump – after seal leakage
- iii. Hydraulic pump – Replace hydraulic pump connection.

4. **INVENTORY:** There are design limitations within the oil systems (turbine, transformer, fish bypass, crane, and oil storage systems) that prevent the assessment of exact oil quantity data as outlined below. However, improvements have been made to increase the accuracy and improve the ability to quantify the amount of oil in our systems, such as increased measurements and calculations to develop a better assessment of overall quantity in the generating units, installation of additional or more accurate level transmitters. Additional improvements are ongoing. This inventory includes all equipment identified in the table in the Inspections section of this report.

- a. **Turbine Oil:** Inventory of turbine oil includes all oil used in in the generating units (governor, thrust oil) as well as the oil stored in the seven clean oil storage tanks and three dirty oil storage tanks. The full inventory is a best estimate as it is currently impossible to get exact amounts due to several factors that are outlined below.



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- i. The turbine/governor oil systems of each unit are dynamic systems. These systems consist of piping (both internal and external), oil sumps, accumulator tanks, gate and blade servos, oil/Kaplan head and turbine hub. The internal piping in many of these systems adds to inaccuracies, as well as the fact that many of these components are connected causing oil movement and fluctuations. There are level indicating devices on each oil sump/tank, but they are not designed to determine exact amounts of oil in the equipment, but to ensure that oil levels remain in safe operating ranges.
- ii. Rocky Reach currently is undergoing unit rehabilitations and have had several units in abnormal configurations. These abnormal configurations and stages of disassembly contribute to the difficulty in oil accounting due to frequent oil movements/transfers required for testing. This creates additional fluctuations in oil levels and oil volume accountability.
- iii. There are both clean and dirty oil storage tanks with piping running to all the units for draining and filling of oil. In addition to measurement inaccuracies, there is no way to measure the amount of oil in the piping. Therefore, during oil transfers, it is not possible to know exactly how much oil is needed to charge the line. In addition, when transferring oil to the dirty tank, it may take time for oil to drain via gravity into the tank, depending on oil temperature and the unit that is being drained. Therefore, there may be inaccuracies in the level measurements depending on when the oil readings are taken.
- iv. Rags and absorbents are routinely used during maintenance to clean up oil. These absorbents are placed so that they collect known oil leaks. The number of oil absorbent pads around the powerhouse at any one time will vary. These rags and absorbents are properly disposed of and replaced as needed, but the amount of oil/grease absorbed by these cannot be determined.
- v. Any oil seepage or loss from the turbine guide bearing systems will be pumped to the dirty side of the unwatering channel and then go through the oil water separator and ultimately to the used oil tanks.
- vi. There is potential for water and a certain amount of debris or sludge at the bottom of the dirty oil storage tanks. This can affect the actual amount of oil indicated.

Date	Gallons of Oil in System
January 2024	108701
Added	0
December 2024	108810
Difference = Current - (initial + added)	109 (~.1%)

Note: The difference indicated is attributed to inaccuracies listed above.

- vii. Estimated Kaplan Generator Oil Loss: No losses to the environment identified.



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viii. Purchased Oil: No bulk governor or thrust oil was purchased in 2024.

- b. **Transformer Oil:** Inventory of transformer oil utilized in the generator step-up and station service transformers is a best estimate based on design volumes. These pieces of equipment have been tracked as a nominal volume (based on design values) – to ensure that volumes have stayed in the normal operating level. Regular inspections are also performed to ensure no oil loss. Secondary containment would capture any oil loss from the tanks

Date	Gallons of Oil in System
January 2024	143542
Added	0
December 2024	143542
Difference = Current - (initial + added)	0

i. Purchased Oil: No bulk oil was purchased in 2024.

- c. **Fish Bypass/Sampling Facility:** The equipment in this system uses an environmentally acceptable oil (EAL). Oil level readings in these systems can vary based on system configuration/pressurization. Efforts are made to configure the system each time readings are taken, as this can affect the oil levels shown. However, this is not always possible, particularly during the maintenance season. Oil may also be replaced in some equipment depending on oil sampling results or other maintenance needs. This system is inspected daily during the operational season to monitor for leaks. The small difference in oil volume reflected in the table below is due to the measurement inaccuracies described above.

Date	Gallons of Oil in System
January 2024	824
Added	35
December 2024	880
Difference = Current - (initial + added)	21 (~2.3%)

i. Purchased Oil: No bulk oil was purchased in 2024.



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d. Other Equipment: This is the equipment listed under the inspection section above that is not part of the turbine, transformer, or fish bypass systems.

Used Oil: This section includes the used oil transfer tank in the powerhouse and the two large used oil storage tanks located outside the powerhouse. The used oil transfer tank continually transfers used oil to the large used oil storage tanks as needed based on level in the tank. These tanks are used to dispose of oil from various locations and equipment and the contents include used oil from the Rocky Reach Powerhouse, Central Maintenance/Fleet facilities, the oil/water separator, and other miscellaneous equipment. The contents of these tanks may also include water and solids. Since oil in these tanks can come from various locations that cannot be tracked, it is not possible to accurately track the amounts added to these tanks. Contents of the two large used oil tanks are periodically disposed of by an outside firm as levels require. This amount is included in this calculation.

Date	Gallons of Oil in System
January 2024	3566
Added	1416
December 2024	5487
Difference = Current - (initial + added)	505(~9.2%)

Fuel: The equipment in this section includes the spillway emergency diesel generator and the black start emergency diesel generator. The emergency diesel generators have been tracked as a nominal volume (based on design values) – to ensure that volumes are within the normal operating levels. Since the fuel is burned, it is not possible to accurately track. Generators are regularly inspected to ensure there are no leakages.

Date	Gallons of Oil in System
January 2024	700
Added	0
December 2024	700
Difference = Current - (initial + added)	0



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Crane: The contents of the intake gantry crane main hoist gear reducer are tracked as a nominal volume (based on design values) – to ensure that volumes remain in the normal operating level. Regular inspections are performed to ensure no oil loss.

Date	Gallons of Oil in System
January 2024	171
Added	0
December 2024	171
Difference = Current - (initial + added)	0

i. Purchased Oil: No bulk oil was purchased in 2024.

e. **Disposed of oil:** Disposed of oil is not segregated by types of oil or its origin. All oil is combined into used oil tanks mentioned above and then disposed of by an outside firm. This amount is included in the net amount added in the Used Oil section.

Date	Gallons of Oil Disposed:
	No disposal in 2024

5. **OIL SPILL/LOSSES:** The following is a list and description of reportable oil losses that occurred in 2024. In all events, oil soakers, and oil booms were used to contain and clean oil.

- i. February 2024 - Flygt pump #23 mechanical seal failure – Estimated loss 1.6 gallons of Chevron Superla 35 seal oil.
- ii. February 2024 – Unit C-9 draft tube drain pump failure and inadvertent failure to close oil fill valve – Estimated loss <1 gallon governor oil (R & O 68).
- iii. September 2024 – Pump hose connection failure during Flygt pump maintenance – Estimated loss < 1 gallon Mobil SHC 626 bearing/gear oil.
- iv. September 2024 – Flygt pump #28 mechanical seal failure – Estimated loss < 1 gallon Chevron Superla 35 seal oil.

6. **EAL SUBSTITUTIONS:** Please refer to the Environmentally Acceptable Lubricants Report submitted under S11.B of the NPDES permit.