



US Army Corps of Engineers  
**BUILDING STRONG**

**Bonneville Lock & Dam**

**Annual Oil Accountability Report**

**14Aug2015 – 08Jan2016**

**1. Purpose:**

To provide results of monitoring and assessment for Bonneville Lock and Dam (“Project”) pursuant to the Oil Accountability Plan (OAP) that was adopted pursuant to the Settlement Agreement between USACE and Columbia Riverkeeper that was attached to the Order of Dismissal (E.D. Wash. No. 2:13-md-2494-LRS), dated August 14, 2014.

This Oil Accountability Report is provided for informational purposes only, and is not a final agency action within the meaning of the Administrative Procedure Act or any other applicable provision of law. Oil Accountability Reports are not intended to, and do not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

**2. Inspections (Monitoring):**

All oil filled operating equipment (55 gallons or greater), bulk oil storage containers and high risk equipment on project is subject to, at minimum, a monthly inspection. These inspections include equipment operating condition, fluid levels, addressing leaks and drips, and preventative maintenance. Equipment inspected includes; hydropower turbines including governor systems and wicket gates, hydraulic systems, lubricating systems, oil storage, compressors, transformers, and gearboxes.

The Project conducted 672 inspections during this reporting period. Each inspection encompasses numerous pieces of equipment listed in the table based on location of the equipment (for example, all equipment that needs a daily inspection is part of a single inspection).

**Inspection Frequency**

**Powerhouse I**

Main Units (MU) 1-10, Unit O

Equipment / System	Daily	Weekly	Monthly
MU 1-10 Governor System	X	X	
MU 1-10 Bearing Levels	X	X	
MU Farval Grease System	X	X	
Unit O Governor System	X	X	
Unit O Bearing Levels	X	X	
MU Coolers	X	X	
Compressors	X	X	
Transformers	X	X	X

Oil-Filled Breakers	X	X	
Bulk Oil Storage	X	X	
Used Oil / New Oil Satellite Storage (55 gal drums)	X	X	X
Oil Water Separator (Continuously Monitored w/ TD-4100)	X	X	
North Cell Sump (Continuously Monitored w/ TD-4100)	X	X	

**Powerhouse II**

MU 11-18:

Fish Units (FU) 1 & 2

Equipment / System	Daily	Weekly	Monthly
MU 11-18 Governor System	X	X	
MU 11-18 Bearing Levels	X	X	
MU Farval Grease System	X	X	
FU 1 & 2 Governor System	X	X	
FU 1 & 2 Bearing Levels	X	X	
FU Farval Grease System	X	X	
MU Coolers	X	X	
Headgate Hydraulic Oil System	X	X	
Compressors	X	X	
Transformers	X	X	X
Bulk Oil Storage	X	X	
Used Oil / New Oil Satellite Storage (55 gal drums)	X	X	X
Oil Water Separator (Continuously Monitored w/ TD-4100)	X	X	X
Unwatering Sump (Continuously Monitored w/ TD-4100)	X	X	X
Drainage Sump (Continuously Monitored w/ TD-4100)	X	X	X

**Navigation Lock II**

Equipment / System	Daily	Weekly	Monthly
Tainter Valve hydraulics	X	X	
Upstream Gates Farval Grease System	X	X	
Downstream Gates Farval Grease System	X	X	
Swing Bridge Hydraulics	X	X	
Compressors	X	X	

**Spillway (Main Dam)**

Equipment / System	Daily	Weekly	Monthly
Gearboxes	X		X
Hoist Fuel Reservoir	X		X

**Fishways**

Equipment / System	Daily	Weekly	Monthly
Valve Gearboxes	X		

An inspection may result in the need to do an assessment. The criteria for generating an assessment follows.

**3. Assessments:**

If equipment is found to have unusual high or low oil levels or alarms, (bearings, governor sumps, etc.), or a failure has occurred that requires repairs, then the Inspector will submit a Trouble Report (TR) in FEM. If the situation occurs after hours a TR is generated and the Mechanical Crew Supervisors and / or Maintenance Manager and Operations Superintendent are to be consulted to determine the best course of action.

An assessment is conducted to determine what caused the high / low condition and what volume of oil (run time) the oil catcher pumps have returned oil to the used oil tanks. An assessment is also used to identify any equipment that may be experiencing any unusual leaks or failures. If the equipment is found to be in proper working order and the loss of oil initiating the assessment is accounted for then a transfer of oil is allowed to proceed if necessary.

The Mechanical or Electrical Crews are responsible for implementing the assessment based on the submitted TR. Once the TR has been addressed the information is entered into the Facilities Equipment Maintenance (FEM) system. At a minimum the TR will be addressed and the Mechanical or Electrical Crew Supervisors will be informed of the assessment outcome. The Project Environmental Compliance Coordinator (ECC)/Spill Prevention,

Control, and Countermeasure (SPCC) Coordinator shall be informed of the assessment outcome if appropriate.

Bonneville Project conducted 1 assessment between August 14, 2015 and January 8, 2016. This assessment was associated with a thrust bearing oil circulation pump excessive leakage in MU7. The pump circulates thrust bearing oil leakage back to the dirty oil tank for purification. The pump is scheduled to be replaced. The leakage is contained in the oil collection system.

#### **4. Inventory:**

Bonneville Project maintains a small supply of lube oil and grease in our warehouse for maintenance purposes. This report only takes into account oils in use, stored, and disposed of once they have been checked out of the warehouse supply. Turbine and transformer oil will generally be purchased in bulk and placed into either the turbine oil bulk storage tanks for Powerhouse I & II or the individual transformer.

All lube oils checked out of the warehouse will be considered in Powerhouse storage per drum until put in use and disposed of; this normally applies to small gearboxes where oils are replaced on a preventative maintenance cycle.

Greases are tracked in 2 different ways:

- Any grease checked out of the warehouse for wire rope, friction points, gearboxes and any other over or near water applications will be considered used and non-recoverable.
- Farval greasing systems are used on Powerhouse II wicket gates and Navigation Lock II gate operating mechanisms. Powerhouse II Farval grease is either: recovered in the turbine pit wicket gate pockets and disposed of as Used Oil with greater than 10% water, lost to rags, or for lower wicket gate bushings, considered non-recoverable. Farval grease used on the Navigation Lock II gate operating mechanisms is considered non recoverable.

Bonneville considers our turbine oil distribution system as a closed loop system and will be reporting as such. Powerhouse I & II turbine oil systems are similar in design and operation as described below:

Turbine oil is received in a bulk shipment by tank truck and transferred by piping to a clean oil tank in the bulk oil storage room of each Powerhouse. Both Powerhouses have installed piping within the facility that distributes oil to the turbine and equipment; this is done by direct pumping (Powerhouse (PH) I & II) or gravity feed from a tank installed at a higher elevation (PHI). The installed piping is visually inspected daily on Operator's rounds for levels and leaks. Installed piping delivers oil to the desired location such as a bearing, governor system, Kaplan runner, or other equipment, once complete the volume of oil transferred is recorded. The governor system distributes oil automatically based on air pressure and lubrication needs from the governor oil cabinet to the actuator tanks, blade servo, wicket gate servo, and oil head. Oil catcher pumps are installed in turbines to collect leakage resulting from normal operation of the blade servo or oil head. This returned oil is considered "dirty" and automatically pumped to a dirty turbine oil tank in the oil storage room; dirty oil is purified then returned to the clean oil tanks for reuse.

Used Oil disposal / recycling will be reported in 2 ways:

- Oil with less than 10% water includes turbine oil, transformer oil, hydraulic oil and lube oils.
- Oil with greater than 10% water includes water contaminated turbine oil, oils recovered from the oil water separator and wicket gate pockets containing water and grease.

### Inventory

**Turbine Oil** includes bulk storage, turbines, bearings, Kaplan runners, governors and distribution system.

**Transformer Oil** consists of main transformer oil only.

**Headgate System** consists of hydraulic oil in tanks and piping used to control headgate height

**Misc / Stored** Includes hydraulic, lube oil, greases, electrical breaker, and oil water separator recovered oils.

### Powerhouse I

Source	Turbine Oil	Transformer Oil	Misc/Stored
In-Use August 14, 2015	64,015	80,151	1,685
+ New Oil Received	0	0	0
- Disposed Used Oil (<10% water)	55	0	110
- Disposed Used Oil (>10% water)	990	0	55
- Reported Discharges to the Environment	0	0	0
In-Use January 1, 2016	62,970	80,151	1,520

Difference (between beginning and ending of reporting period)	-1,045	0	-165
Reason for difference	1100 gallons (primarily water) was disposed		Maintenance on oil filled equipment resulted in disposal of 165 gallons

### Powerhouse II

Source	Turbine Oil	Transformer Oil	Headgate System	Misc/Stored
In-Use August 14, 2015	58,581	53,000	5,267	920
+ New Oil Received	0	0	0	6
- Disposed Used Oil (<10% water)	55	0	0	130
- Disposed Used Oil (>10% water)	110	0	0	0
- Reported Discharges to the Environment	0	0	0	0
In-Use January 1, 2016	58,416	53,000	5,267	790

Difference (between beginning and ending of reporting period)	-165	0		-130
Reason for difference	165 gallons (primarily water) was disposed			Maintenance on oil filled equipment resulted in disposal of 130 gallons

**Navigation Lock II**

Source	Oil / Grease
In-Use August 14, 2015	938
+ New Oil or Grease Received	0
- Disposed Used Oil (<10% water)	0
- Disposed Used Oil (>10% water)	0
- Reported Discharges to the Environment	0
In-Use January 1, 2016	938

Difference (between beginning and ending of reporting period)	0
Reason for difference	NA

**Spillway (Main Dam)**

Source	Oil / Grease
In-Use August 14, 2015	560
+ New Oil or Grease Received	60
- Disposed Used Oil (<10% water)	0
- Disposed Used Oil (>10% water)	0
- Reported Discharges to the Environment	0
In-Use January 1, 2016	620

Difference (between beginning and ending of reporting period)	+60
Reason for difference	Grease and oil used in Spillway Hoist lubrication and gearboxes.

## Fishways

Source	Oil / Grease
In-Use August 14, 2015	33
+ New Oil or Grease Received	0
- Disposed Used Oil (<10% water)	0
- Disposed Used Oil (>10% water)	0
- Reported Discharges to the Environment	0
In-Use January 1, 2016	33

Difference (between beginning and ending of reporting period)	0
Reason for difference	NA

## Other (spills, garage, mobile equipment maintenance, etc.)

Source	Oil / Grease
In-Use August 14, 2015	2,500
+ New Oil or Grease Received	1
- Disposed Used Oil (<10% water)	0
- Disposed Used Oil (>10% water)	0
- Reported Discharges to the Environment	0
In-Use January 1, 2016	2,501

Difference (between beginning and ending of reporting period)	+1
Reason for difference	1 gallon new oil checked in from warehouse.