US Army Corps of Engineers
BUILDING STRONG

Lower Monumental Lock and Dam

Annual Oil Accountability Report

For August 14, 2015 to January 13, 2016

1. **PURPOSE:** To provide results of monitoring and assessment for Lower Monumental Lock and Dam ("Project") pursuant to the Oil Accountability Program (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 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 at the Project shall be periodically inspected for leaks and to ensure the oil level is in the normal operating range, as outlined in the below table.

Equipment	Frequency
Turbine Guide Bearings (6 each)	Monthly
Lower Guide Bearings (6 each)	Monthly
Upper Guide Bearings (6 each)	Monthly
Thrust Bearing (6 each)	Monthly
Governor System (Sump tank, Accumulator, blade & gate servos, oil head and piping) (6 each)	Weekly
Runner Hub	6 Year Maint
Wicket Gates Lubrication (Farval)	Monthly
Transformers Line (6 each)	Monthly
Transformers Station Service (2 each)	Monthly
Emergency Diesel Generator	Monthly
Emergency Diesel Generator Fuel Storage Tank	Monthly
Intake Gates Hydraulic Oil Tank	Monthly
Head Gate Cylinders (7 each)	Monthly
Turbine Oil Dirty Tank	Monthly
Turbine Oil Clean Tank	Monthly
Transformer Oil Clean Tank	Monthly
Transformer Oil Dirty Tank	Monthly
Portable Tank (100 Gallon)	Monthly
Gravity Oil Tank El 520	Monthly
Gasoline Storage Tank	Monthly
Tailrace Crane	Monthly
Intake / Spillway Crane	Monthly
Bridge Crane	Monthly
Spillway Gate Hoist 1st Gear Reducer (8 each)	Monthly

Equipment	Frequency
Spillway Gate Hoist 2nd Reducer (8 each)	Monthly
Spillway Diesel Generator	Monthly
Fish Ladder Water Supply Conduit Gate El 460 (regulating gate)	Monthly
Weld Shop Transformer	Monthly
STS Screen Gearboxes (19 each)	Annual
Fish Attraction Pump Gearboxes (3 each)	Monthly
South Fish Ladder Entrance Weir SSE-1	Monthly
South Fish Ladder Entrance Weir SSE-1	Monthly
South Fish Ladder Entrance Weir SSE-3	Monthly
North Fish Ladder Entrance Weir NSE-1	Monthly
North Fish Ladder Entrance Weir NSE-2	Monthly
JFF Transformer	Monthly
Barge Boom Hydraulics	Monthly
Downstream Gate Gearbox North Tower	Monthly
Downstream Gate Gearbox South Tower	Monthly
Downstream Bearing Plate Grease system	Monthly
Navlock Drain Tainter Valve HPU and Cylinder (2 each)	Weekly
Navlock Drain Tainter Valve Farval System (2 each)	Monthly
Navlock Fill Tainter Valve HPU and Cylinder (2 each)	Monthly
Navlock Fill Tainter Valve Farval System (2 each)	Monthly
Navlock Pumps (4 each)	Monthly
Navlock Upstream Gate Gearbox (2 each)	Monthly
Navlock Upstream Gate Seal Heater Oil system (2 each)	Monthly
Navlock Unwatering Pumps (5 each)	Monthly

Lower Monumental Project conducted 54 Oil Accountability related inspections from 14 August, 2015 to 31 December, 2015. Each inspection encompasses numerous pieces of equipment (for example, all equipment that is located in the powerhouse is included in one monthly inspection) listed in the above table based on location of the equipment; there is not a separate inspection for each individual piece of equipment. If an inspection indicates that there may be a discernible loss of oil, then the inspection is followed-up with an assessment as outlined below.

3. **ASSESSMENTS**: Leaks or observable changes in oil level that indicate a discernible loss of oil that is not associated with normal operations (not within the normal operating range) require an assessment. 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 staff will assess it to determine the severity. Any potential leak to the environment (i.e. to waterways) will be dealt with immediately. Other leaks that are not to the environment will be repaired as soon as possible. Small leaks are often deferred until the next time the equipment is scheduled to be out of service; however, steps are taken to capture any leaking oil such as placing drip pans or absorbent pads. These assessments are documented by utilizing Facilities Equipment Maintenance (FEM) work orders.

    a. Assessment Criteria. A work order is generated on the following:

        i. Any equipment with high or low levels or alarms.

ii. Malfunctioning automated grease systems.

iii. All class 2 and 3 leaks on identified equipment. Leaks are classified as follows:

Leak Severity

Class 1 – Wet, seepage of fluid, but not enough to form drops.
Class 2 – Seepage of fluid that forms drops.
Class 3 – Actively dripping.

Note: Spills or releases to the environment are assessed immediately via a Project Spill Prevention Controls and Countermeasures (SPCC) plan. These are usually oil sheens discovered on water.

b. Lower Monumental Project conducted 535 assessments from 14 August, 2015 to 31 December, 2015.

i. 526 assessments were associated with class 2 or 3 leaks to areas inside the project but not to the environment. 5 assessments have been repaired. The remaining assessments are being prioritized into three categories, repair not requiring an equipment outage, repair during an annual equipment outage and repair during 6 year equipment outage. Temporary measures, such as drip pans, are in place to capture any oil on equipment awaiting scheduled maintenance.

ii. Two assessments were conducted as a result of a release to the environment and were reported publicly to the NRC: NRC #1136105, reported on 12/17/15and NRC #1136990 reported on 12/30/15.

4. **INVENTORY**: There are design limitations within the oil systems internal to the dam (turbine, transformer, head gate oil systems) that prevent the assessment of exact oil quantity data as outlined below.

i. The oil system is a closed loop system which consists of oil storage tanks, piping, and several oil sumps for each main unit. There are level indicating devices on each tank, and the sumps, although the devices were not designed to determine exact amounts of oil in the equipment. They were only intended to tell if the level was within normal safe operating levels. Rather, there is no method to determine how much oil is in the piping.

ii. Rags and absorbents are routinely used during maintenance to clean up oil. These rags and absorbents are disposed of but the amount of oil/grease cannot be determined.

a. Turbine Oil: The numbers provided below for turbine oil inventory that is utilized in the main units (generators) are a best estimate based on the data available and within the limitations discussed above.

Date	Gallons of Oil In System	Gallons Purchased Since Initial	Difference Difference = -1*(initial – current – purchased)
22 Sep, 2015 (initial)	54,285	N/A	N/A
03 Dec, 2015	54,255	0	-30

Note: The 30 gallons of unaccounted for oil is attributed to losses to rags/absorbents during maintenance and inaccuracies in the oil level indicating system. See section e below for explanation of waste oil disposal practices.

b. **Transformer Oil**: The numbers provided below for transformer oil inventory are a best estimate based on the data available and within the limitations discussed above.

Date	Gallons of Oil In System	Gallons Purchased Since Initial	Difference Difference = -1*(initial – current – purchased)
22 Sep, 2015 (initial)	85,950	N/A	N/A
03 Dec, 2015	85,950	0	0

c. **Head Gate Hydraulic Oil**: The numbers provided below for head gate hydraulic oil inventory are a best estimate based on the data available and within the limitations discussed above.

Date	Gallons of Oil In System	Gallons Purchased Since Initial	Difference Difference = -1*(initial – current – purchased)
22 Sep, 2015 (initial)	894	N/A	N/A
03 Dec, 2015	894	0	0

d. **Oil Used in Other Equipment**: This is the equipment listed under the Inspection section above that is not part of the turbine, transformer or head gate systems and the total amount of oil in those systems.

Date	Gallons of Oil In System	Gallons Purchased Since Initial	Difference Difference = -1*(initial – current – purchased)
14 Aug, 2015 (initial)	2115	N/A	N/A
18 Dec, 2015	2115		0

e. **Disposed of oil/grease:** Oil disposed of is not segregated by types of oil or its origin. All oil is combined into waste oil drums and then disposed of. The same applies to grease; various types of grease are all combined into a single drum for disposal.

No grease or oil was disposed during the auditing period of August through December 2015.

Date	Gallons of Oil Disposed of:
9/14/2015	0
Date	**Gallons of Grease Disposed of:**
12/31/2015	0

f. **Grease:** Grease beginning and ending inventories remain constant because of established warehouse min/max levels. Therefore, the amount purchased is typically the amount used. Grease is used to lubricate critical bearings/bushings and other equipment. It is either lost in rags during maintenance, disposed of as outlined in "Disposed of oil/grease' section above, or, for certain in-water equipment, considered non-recoverable.

i. **Amount purchased/used**: Lower Monumental purchased 200 Gallons of grease during this period

ii. A**utomatic lubrication systems (Farvals):** Grease for automatic lube systems (Farvals) is tracked by amount added to the system. Lower Monumental has 10 Farval systems. No data was collected on amount of grease used to fill the Farvals.