



**National Hydropower Association
Operational Excellence
Event Report**

Date of Report:

August 27, 2012

1) Submitting Organization: Redacted		2) Name of Preparer, Phone & Email: Redacted		3) Report Number (OE Internal Use): To Be Supplied Later	
4) Date & Time of Event: February 12, 2011, 13:20		5) Duration of Event: From 13:20 to 22:05		6) Functional Area: Environmental	
				7) Functional Area Subclass: Oil Release to Environment	
8) Classification Minor <input type="checkbox"/> Significant <input checked="" type="checkbox"/> Severe <input type="checkbox"/>		9) Impact of Event: Hydraulic Oil was release to the tail water below hydro plant		10) Human Performance: Was the event the result of inappropriate actions? No	

**PART I
REPORT OF EVENTS**

1) **DESCRIPTION OF EVENT** (For the event, what equipment or system(s) were involved and where did it occur, what work or activity was being done, what was the result, what or how did the event start or how was it found, and any other information you believe needs to be included. Use additional space or pages as needed.)

On 2/12/2011 at 1320 a fisherman notified the River Scheduling Center (RSC) that possible gas/oil sheen was located below the dam. At 1325 the Alpha Hydro Plant (AHP) Manager contacted plant personnel via cell phone and requested they investigate the possible gas/oil sheen. At 1455 after checking both the intake and tailrace the hydro plant technician contacted the plant manager and verified oil sheen in the tailrace.

At 1506 the plant manager contacted the Hydro Operations Center (HOC) to shutdown AHP Unit 1. At 1644 hydro plant manager contacted Environmental Support Staff.

At 1802, Environmental Technicians were dispatched to AHP to perform sample collection. Between 1805 and 2100 AHP Plant Technicians were checking trash intakes, condensing Unit 2 to surge the water flow by opening and restoring valve openings from 30% to 100% on AHP Units 1 & 2 to clean debris from the trash racks. The penstock butterfly valves for both units were cleaned up to stop oil flow from leaking into penstock drainage area, into the storm drains, through the tailrace and into the river.

By 2205 several samples were taken at various sample points. Between 2205 and 2316 all required contacts were made to management and governmental agencies.

On 2/18/2011
Oil/water separator had been identified to discharge into same storm drain piping and had a potential to contribute to oil sheen. The oil/water separator was pumped out and monitored to maintain no flow into the storm drain piping.



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2) **ACTIONS TAKEN** (Include any actions taken to restore equipment to service. Use additional space or pages as needed.)

Identify leak, clean area deployed oil adsorbents in tail race, Restore Unit 2 Butterfly valve to open to 100%, Value off Unit 1 Butterfly valve, Collect samples

**PART II
CAUSE ANALYSIS**

1) **Analysis Method & Findings** (The cause analysis is the methodology that provides a systematic approach to evaluating root causes, causal factors and contributing factors leading to the event. Use additional space or pages as needed).

Contributing Causes:

- Exposed to the weather ice build up on equipment when identified
- Poor design no oil containment or control around hydraulic operated cylinder.
- No PM or inspections on hydraulic operated cylinder 23+ years.

Apparent Cause:

- AHP Units 2 Penstock butterfly valve hydraulic operated cylinder front seal failure due degradation, and environmental conditions.

Discovery:

- Poor design and possible dysfunctional oil/water separator contributes to flapper valve being stuck.
- AHP Units 1 penstock butterfly valve hydraulic operated cylinder showing signs of degradation and some leakage.



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**PART III
CORRECTIVE ACTION PLAN**

1) **CORRECTIVE ACTIONS** (Provide list of corrective actions taken to prevent reoccurrence. Indicate here if further investigation is necessary. Use additional space or pages as needed.)

CA 1	Identify leak, clean area deployed oil adsorbents in tail race, Restore Unit 2 Butterfly valve to open to 100%, Value off Unit 1 Butterfly valve, Collect samples,	Complete 2/13/2011 Owner: Plant Manager
CA 2	Install Temporary Containment, Barriers and Controls to include Adsorbent Oil pads at Piston seals, Temporary Containment under butterfly valve, water flow control under butterfly valve, Divert water from butterfly valve piston drains, and Pump down oil water separator	Complete 2/18/2011 Owner: Plant Manager
CA 3	Removed Ice for equipment. Cleaned gutter to ensure water is diverted for piston	Complete 2/18/2011 Owner: Plant Manager
CA 4	Add to weekly Environmental inspection steps to inspect Butterfly Valve Piston Temporary Containment, Barriers and Controls to include Adsorbent Oil pads at Piston seals, Temporary Containment under butterfly valve, water flow control under butterfly valve, Divert water from butterfly valve piston drains.	Complete 2/18/2011 Owner: Hydro O&M Program Manager
CA 5	Mechanical Engineering Staff to investigate and prepare options and costs for a project or minor Design Control Notification to rebuild hydraulic cylinders in place on existing hydraulic operators or replace hydraulic operators with motor operators. (Reevaluate the head gate and compare cost option for modifications to enable head gates to operate and be used as primary control to stop flow in the event of emergency) Travis Simpson	Due Date 6/30/2011 Owner: Mechanical Engr Staff
CA 6	Civil Engineering to design controls for containment under Butterfly valve piston. Civil Engineering to prepare a project to replace and/or Inspection access to oil water separator to verify working properly	Due Date 6/30/2011 Owner: Mechanical Engr Staff



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CA 7	All sites review equipment that doesn't have secondary containment which could possibly result in an REE. Take appropriate action to add secondary containment (Work order, PER, Project, etc.)	Due Date 8/15/2011 Owner: Hydro O&M Program Manager
CA 8	Review Dam Safety Inspection and/or Other inspection reports for items that need to be addressed via work order. Finding which could possibly result in an REE	Due Date 9/30/2011 Owner: Dam Safety Program Manager
CA 9	Review Dam Safety Inspection and/or Other inspection reports for items that need to be addressed via PER or WO. Finding which could possibly result in an REE	Due Date 9/30/2011 Owner: Dam Safety Program Manager
CA 10	Review Inspection Reports for items that need to be addressed via work order. Equipment which could possibly result in an REE	Due Date 9/30/2011 Owner: Mechanical Engr Staff

2) **SEQUENCE & COMPLETION DATES FOR ACTION LISTED**

Refer to Table in Section 1 above.



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**PART IV
LESSONS LEARNED & RECOMMENDATIONS**

1)

LESSONS LEARNED

1. Do not assume previous inspections have identified all possible sources of oil or other substances that could harm the environment.
2. Oil seals should be replaced on a periodic basis in accordance with manufacturer's recommendations.

2) **RECOMMENDATIONS**

1. Perform a complete inspection of plant facilities for possible sources of oil or other substances that could be released to the environment. The inspection should be made separately by two individuals.
2. Remove possible sources if possible or build containment that will prevent release to the environment.
3. Include the equipment with possible sources into a weekly powerhouse inspection.
4. Incorporate environmental issues into the design of new facilities.



Alpha Hydro Plant

General view of Penstocks and Butterfly Valves



Unit 1 Penstock Butterfly Valve Foot and Oil Leakage into Storm Drains