

Summary - NWD Spare Bearing Survey

HDC, 8/30/2012

A spare bearing survey was conducted during July and August of 2012 to assess the availability and condition of spare bearings at NWP, NWW, and NWS district sites. The survey was completed in preparation for the development of a Bearing Refurbishment IDIQ contract for the specified districts.

In order to conduct the survey, a point of contact was identified by BPA at each project site. HDC contacted each POC and requested the data in a standardized form. Projects were asked to provide information on each spare bearing they possess and the condition of the bearing (working condition or in need of repair). All of the responses and data can be found in the spreadsheet attached below. The tables below show an overview of the sites with working condition bearings and the sites with bearings needing repair.

Sites With Bearings in Working Condition:

Albeni Falls	Cougar	Dexter	Green Peter	Little Goose
Big Cliff	The Dalles	Dworshak	Hills Creek	Lookout Point
Chief Joseph	Detroit	Foster	Libby	Lost Creek

Sites With Bearings Needing Repair

Bonneville	Lower Granite
Ice Harbor	McNary
John Day	

After the survey was completed, the PDT met in order to examine the data and suggest a path forward. As seen in the tables above, most of the project sites indicated that their spare bearings are in working condition. Only 5 out of the 20 sites indicated that repair work was needed on bearings. As shown in the spreadsheet attached below, some of the sites that indicated working condition bearings have recently refurbished bearings whereas other sites have original bearings still in packaging. Original bearings are recommended to be examined and have UT performed before being put into service.

Because of the limited need for refurbishment, the PDT decided that a Bearing Refurbishment IDIQ contract may not be the best avenue to accomplish these repairs. Rather than spending the time and resources to develop an IDIQ contract, it is thought that dealing with the sites on a case-by-case basis might be a more effective way of performing the necessary work. This recommendation is being brought to BPA to discuss the appropriate future for the Bearing Refurbishment IDIQ contract.

NWD SPARE BEARING SURVEY

HDC, 2012

<u>Project Sites</u>	<u>District</u>	<u>POC</u>	<u>Bearing Type</u>	<u>Response</u>	<u>Additional Comments</u>
Albeni Falls	NWS	Troy Vandenbark	Kaplan Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Working Condition (1 set) Working Condition (1 set upper, 2 sets lower) Working Condition (1 set)	The turbine guide and generator guide bearings are all original equipment spares. This means they are approximately 60 years old. An ultrasonic test to ensure the bearings are still bonded is recommended prior to placing these bearings in service. The thrust bearings were recently refurbished as part of our Hi lift installation.
Big Cliff	NWP	Bill Shaw	MU Kaplan Head, 20 MW Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Refurbished - Ready for install Refurbished - Ready for install Refurbished - Ready for install	One complete set for Big Cliff, all sets have been sent out and are ready for install.
Bonneville	NWP	Mike Adams	PH1 Turbine Guide Bearing Upper Gen Guide Bearing Lower Gen Guide Bearing Thrust Bearing Thrust Runner PH2 Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	U5-10, Currently being refurbished, 1 spare for U1 or 2 2 spares, U1-10, need refurbishment 2 spares for U3-10, 1 OK, 1 needs refurbishment 1 spare each for U1 and 2, both OK condition 24 thrust bearing shoes for MU1-10 U1-10, Thrust runner, 1 thrust runner for U0 1 set for U11-18, 1 set for FU1 or 2 (original) Does not exist 1 set of shoes for U11-18, shoes thicker than specs allow, scoring 1 set of shoes for FU 1 or 2, needs refurbishment	U10 is showing signs that it's turbine guide bearing may need to be refurbished soon. Re: MU11-18 thrust bearing shoes: Spare shoes are thicker than specs allow. Also need some hand working to remove scoring.
Chief Joseph	NWS	James Boag	Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Refurbished - Ready for install Refurbished - Ready for install Refurbished - Ready for install	We have spares for every kind of unit and they are all ready to go.
Cougar	NWP	Tom Voldbaek	Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Working condition Working condition Working condition	Cougar bearings all in working condition.
The Dalles	NWP	Mike Colesar	Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Believe to be in good shape Believe to be in good shape Believe to be in good shape	Believe to be in good shape.
Detroit	NWP	Bill Shaw	MU, Francis 50 MW Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Refurbished - Ready for install Refurbished - Ready for install Refurbished - Ready for install	One complete set for Detroit, all sets have been sent out and are ready for install.
Dexter	NWP	Tom Voldbaek	Turbine Guide Bearing Generator Guide Bearing Thrust Bearing	Working Condition	Having not found turbine or generator bearings.

Dworshak	NWW	Lucian Stewart	U3: 231,579 KVA, 128.5 RPM, Allis-Chalmers		Currently we have a complete tear-down of U3 planned in 2013. As part of this, all spare bearings will be refurbished if required and installed in the unit during the reassembly process. The bearings currently installed in the unit will be removed, refurbished and be kept on site as spares.
			Turbine Guide Bearing	Will be refurbished in 2013	
			Generator Guide Bearing	New as of 8/2012	
			Thrust Bearing	Will be refurbished in 2013	
			U1/U2: 94737 KVA, 200 RPM, Allis-Chalmers		All bearings appear to be in good condition.
			Turbine Guide Bearing	Working condition	
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	
Foster	NWP	Greg Barrowcliff	10 MW Kaplan		All are in original shipping containers.
			Turbine Guide Bearing	Working condition	
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	
Green Peter	NWP	Greg Barrowcliff	MU, 48 MW Francis		All are in original shipping containers.
			Turbine Guide Bearing	Working condition	
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	
			FU, 1500 KW Pelton "Fish Unit"		All are in original shipping containers.
			Turbine Guide Bearing	Working condition	
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	
Hills Creek	NWP	Tom Voldbaek	Turbine Guide Bearing	Working condition	
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	
Ice Harbor	NWW	Seth Thompson	Units 1-3		Turbine bearing in need of repair. Photo sent.
			Turbine Guide Bearing	New, 1 spare on site	
			Generator Guide Bearing	New, 12 upper and 12 lower	
			Thrust Bearing	New with runner, 1 set	
			Units 4-6		
			Turbine Guide Bearing	1 Spare, in need of repair	
			Generator Guide Bearing	No spares, upper and lower	
			Thrust Bearing	1 complete set with runner	
John Day	NWP	David Mackintosh	GE Generator/BLH 311.5" Turbine		Bearings for our 16 units are the same as for 3 units at each of 3 NWW plants. There was originally one set of spares shared between JD and NWW. An additional set was purchased for JD, manufactured by PME. The PME one-piece thrust runner and original spare two-piece runners both need repair. Two sets of thrust bearing shoes need repair. One generator upper guide bearing set needs repair, the other is good. Both generator lower guide bearing sets are good. The PME turbine guide bearing here is good. The original spare turbine guide bearing is at Lower Granite, condition unknown.
			Turbine Guide Bearing	One good spare at JD	
			Generator Guide Bearing	Upper: one good, one needs repair. Lower: two good.	
			Thrust Bearing	Shoes: Two need repair. Runners: two need repair	
Libby	NWS	Josh Erickson	Turbine Guide Bearing	Working Condition	We have 3 "strategic replacement" sets of bearings. They are from 3 units that were never installed. We do not consider the "extra" bearings that we have spares simply because of their asset class. We consider them strategic replacements and they would only be used if there was a critical need for replacement.
			Generator Guide Bearing	N/A	
			Thrust Bearing	Working Condition	
Little Goose	NWW	Martin Evans	Turbine Guide Bearing	Crated and wrapped runner-believed in working condition	Have 2-piece thrust bearing runner only, believed to be for Units 4-6.
			Generator Guide Bearing		
			Thrust Bearing		
Lookout Point	NWP	Tom Voldbaek	Turbine Guide Bearing	Working condition	All the bearings are being refurbished during the rehab.
			Generator Guide Bearing	Working condition	
			Thrust Bearing	Working condition	

Lost Creek	NWP	Robert Turk	Allis-Chalmers Generator, Boving Turbine (2 each)		Generator upper guide bearing: 1 set of 8 Generator lower guide bearing: 1 set of 6
			Turbine Guide Bearing	No spares	
Lower Granite	NWW	Chuck Weatherspoon	Units 1-3 - Westinghouse Generator, Baldwin-Lima-Hamilton Turbine		I was informed that we have the upper and lower generator guide bearings at Lower Granite. The generator upper guide bearings are in working condition and were refurbished. The lower guide bearings are in working condition and are in their original packaging.
			Turbine Guide Bearing	Working condition (refurbished)	
			Generator Guide Bearing	Working condition (upper-refurbished, lower-original packaging)	
			Thrust Bearing	Working condition (runner and shoes)	
Lower Monumental	NWW	Joseph Chandler	Units 4-6		Unit 4 Turbine Guide Bearing will need to be repaired after it has been replaced. The unit 4 turbine guide bearing is planned to be replaced during the fall of 2012.
			Turbine Guide Bearing	Need of repair	
			Generator Guide Bearing	Not at lower granite, not sure where they are at	
McNary	NWW	Ryan Bliss/ Danielle Stephens	Units 1-12		Lower Monumental does not have spares. In fact, 2 weeks ago during dobel testing, we discovered a failed bearing we are working to replace/repair.
			Turbine Guide Bearing	2 sets of TGB U1-14, both need repair, depending on U14 work coming up	
			Generator Guide Bearing	1 set upper GGB, 1 set lower GGB, condition unknown	
Lower Monumental	NWW	Joseph Chandler	Units 13-14		Lower Monumental does not have spares. In fact, 2 weeks ago during dobel testing, we discovered a failed bearing we are working to replace/repair.
			Turbine Guide Bearing	2 sets of TGB U1-14, both need repair, depending on U14 work coming up	
			Generator Guide Bearing	1 set thrust runner and segments, condition unknown	
McNary	NWW	Ryan Bliss/ Danielle Stephens	Units 13-14		Lower Monumental does not have spares. In fact, 2 weeks ago during dobel testing, we discovered a failed bearing we are working to replace/repair.
			Turbine Guide Bearing	2 sets of TGB U1-14, both need repair, depending on U14 work coming up	
			Generator Guide Bearing	1 set thrust runner and segments, condition unknown	
Lower Monumental	NWW	Joseph Chandler	Units 13-14		Lower Monumental does not have spares. In fact, 2 weeks ago during dobel testing, we discovered a failed bearing we are working to replace/repair.
			Turbine Guide Bearing	2 sets of TGB U1-14, both need repair, depending on U14 work coming up	
			Generator Guide Bearing	1 set thrust runner and segments, condition unknown	