

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

Turbine Serial Number	170X394
Generator Serial Number	180X394
Unit Out of Service	2/17/2012
Unit Release for Service	4/13/2012

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

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## 1. Summary

The unit was removed from service for inspection of the Low Pressure "A" and "B" turbines, all of the turbine valves and the FPT valves. The generator collector end was disassembled for investigation of the stator water system that was leaking during service. The T-11 bearing (steady bearing) was check for preload to try and correct vibration issues.

The low pressure diaphragms repairs were performed by CMS along with NDE inspection after repairs were completed. The information for work performed see CMS report.

A complete alignment was performed on the LP turbines including a long tightwire to check the positions of the T-5, T-6, T-7 and T-8 bearings. The packing cases for the LP sections were check for roundness, The N-6 and N-7 were found in usable condition, The N-8 and N-9 were remove and a attempt was made to round the case to within accept limits. Detail of were perform is include in section #2 of this report. The mid-standard support plates were removed to investigate a standard sticking problem that has been occurring during previous startups. Section #4 has the details of what was found and what was done to correct the issues with the standard.

The MSV's and RHTSV's were removed and inspected by RSO at plant site. The CV's and IV's were sent to CMS for inspection and repairs. The ventilator valves and the FPT valves were inspected by RSO at plant site. Details for all of these valves for inspection and repairs are included in Section 3 for the main turbine valves and Section 4 for the FPT valves. Details of work perform will be found in the report written by CMS.

The misc. work included cleaning the main turbine, stator water, hydrogen and FPT oil coolers. After cleaning was completed the heads stator water cooler was pressure tested and found to be in good condition. All cooler heads were installed with new gaskets and leak checked. The heads were removed from each of these coolers and contractor cleaned the cooler tubes. The stator water "Y" strainer was disassembled for inspection the strainer that had been in services was found damaged and was sent to CMS for new screen to be installed. The strainer that was used as backup was found to be very good condition and was moved to the running position. The strainer that was repaired by CMS was put in the backup position in the filter canister. The generator end 90° of crossover pipes that were remove for disassembly were sent to Pathway Inc. for replacement of the expansion joints. New support frames were manufactured to support the pipe during transportation. The pipes were returned to job site and installed with no issues present.

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### 2. LP A and B turbines

#### 2.1 Bearings and Oil Deflectors

The T-5, T-6, T-7 and T-8 low pressure turbine bearings were removed during the disassembly of the turbine. The bearings were cleaned and the bond was checked using U.T method. The bearings were bolted together and measurements were taken to compare to the spare rotor journals. All bearings were found to have acceptable clearance. The T-7 bearing was found with damage in the U/H and was sent to Cincinnati Babbitt for repairs. The T-5, T-6 and T-8 bearings required no other work other than hand cleaning and stoning of the joints before final installation.

The T-10 bearing was removed for access to the endwinding on the collector end of the generator. This bearing was inspected and found to be in good condition with no repairs required.

The T-4 bearing was removed during the alignment of the "B" coupling for a shim adjustment to correct the coupling alignment. The anti-rotation bolt for the lower center pad was found to be short by 1". A new bolt was taken from stock and installed. The bearing had been running in this condition since the 2005 outage. No damage was done to the bearing as the left and right pads had the correct anti-rotation bolt installed, these 2 pads keep the center pad in place and close to the proper position.

The T-2 and T-3 bearing were also removed to correct coupling alignments. These bearings were visually inspected with no problems found.

All of the oil deflectors were removed, cleaned and inspected. Several of the deflectors were found with more than 1 ½ times the design clearance or with damaged teeth that required repairs. All of the deflectors were repaired by Cincinnati Babbitt and returned to the plant. Before the installation of the oil deflectors they were measured to verify for desired clearance to the spare rotor.

The T-11 (steady bearing) was removed and inspected. The bearing was found in good condition with no repairs required. The oil deflectors were sent to CBI for replacement of the teeth and boring to correct clearance to the journals.

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The bearing was installed and deflector was checked and required a small, .004, adjustment to get the preload within design limits. This adjustment required an adjustment to the Alterrex to bring it into proper alignment. See coupling alignment section for details of alignment of the Alterrex.

### **2.2 Diaphragm and Packing Case Alignments**

All of the diaphragm and shaft packing was replaced; new straight tooth packing was installed. Steam turbine Alternative Recourses (S.T.A.R.) furnished the packing and performed the installation including machining the butts for clearance.

The N-8 and N-9 packing case were removed after roundness was taken on all of the packing cases. The N-8 and N-9 were found with as much as .175 out of roundness. These packing cases were clamped around steel discs and placed in an oven for stress relieving. After the stress relieving was completed the N-8 was within acceptable limits. The N-9 did not react to the stress relieve as did the N-8. Three rings of packing were machined to match the out of roundness of the N-9 packing case and installed. Only minor scraping was required after packing was installed.

### **2.3 Diaphragm Alignments and Turbine Clearances**

Opening clearances were taken on the running rotors, these rotors were removed and the spare rotors were installed for compatibility checks. The spare rotors were removed; all diaphragms were removed and sent to CMS for inspection and repairs. The 16<sup>th</sup> stage nozzles for LP A and B were left in for bench mark readings that were taken by CMS machinist; these readings were recorded along with the compatibility check readings and used to position machine the new nozzle for axial position. CMS machined the new nozzles per instructions from Jim Cable to hold the nozzles in the correct axial position to the desired axial position of the spare rotors.

After repairs were completed the diaphragms were aligned to desired elevations taken from the long tightwire readings taken. The desired readings

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were supplied by Jim Cable. All center pin and axial clearances were corrected during the alignment process. Final closing clearances were measured and recorded and are included in section 7 of this report.

New coupling spacers were machined and installed during the assembly to hold the rotor in the correct axial position, details of the spacer thickness and axial positions are included in this section part 2.5.

### **2.4 NDE and Repairs to Shells**

The inner shells were removed to clean the axial fits, no problems were had during the removal of lower half shells. The inner and outer shells were blast cleaned and NDE inspected. Only minor indications were found, with no work required.

The 20th stage diaphragm H/J bolts were replaced due to threads pulling out during the assembly of the turbine. The original thread was 1 1/4" X 6 thread socket head, the new bolts are 1 3/8" X 8 thread socket head bolts. During the next outage on this machine the joint bolts can be converted back to original design by inserting the diaphragm. This option was not available during this outage due to time constraints

### **2.5 Coupling Alignments and Radial Rotor Positions**

At assembly of the turbines the A, B, C and D couplings were checked and aligned with the exhaust hood off to within design limits. After the outer shells and exhaust hood were installed and tightened the couplings were checked and required small moves on the T-4, T-7 and T-8 bearing to bring the coupling back into acceptable limits. Final radial rotor readings were taken at the oil deflectors and the packing cases. These readings are included in the data section of the report.

The new coupling spacers were installed and final axial trams were taken at the turbine end of the LP-A and the generator end of the LP-B rotor to the standards. With the rotor hard against the generator side of the thrust bearing the final axial tram were as follows; LP-A 21.060, LP-B 16.837. The spacers

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and couplings at were aligned to with in design differential runouts and the coupling bolts were stretched to the desired amount.

### **2.6 Crossover Pipe Expansion Joints**

The generator end crossover pipe sections were removed and shipped to Pathway for replacement of the expansion joint bellows. The work was performed with the pipes being returned to the plant site where they were insulated and installed.

## **3. Valves**

### **3.1 Main Stop Valves**

The 4 main stop valves were removed and disassembled for cleaning and inspection. The insulation was removed from the valve bodies for a blast cleaning and NDE inspections on both the inside and outside, no indications were found. The #2 valve seat was found with crack indication in the satellite inlay of the seat. The lean ring bolts were removed by first drilling the heads of the bolts off then removing the lean ring. The remaining threaded part of the lean ring bolts were removed by drilling to tap drill size and picking the threads. The removal of the seal required cutting grooves thru the seat to relieve the fit to the valve body and using a hydraulic jack and puller rod. The new seat was machined with a clearance of .003 to the tightest place in the bore of the valve body.

The valve strainers were sent CMS for repairs to the fit areas for the head and the lean ring at the top and bottom of the strainers. Final sizes for these fits are included the data section of this report.

### **3.2 Control Valves**

The 4 control valves were removed and sent to CMS for disassembly, cleaning and inspection. See CMS report for details of the inspection and repairs to the valves.

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The valve bodies were stripped of insulation and blast cleaned for NDE inspections. The #3 valve seat was satellite inlay was from damaged and parts of the inlay missing. The seat was removed by RSO with tooling from CMS along with assistance from CMS machinist for the removal and installation of the seat pins. A drawing of the seat showing the final sizes is included in the data section.

The valves were installed and the stand studs were tightened using a torque value of 4000 ft lbs. The stand studs were measured using 2 different methods. The tool using the #196 dial test indicator work the best and showed that the 4000 ft. lb torque produced a stretch of .009 to .010 on the stand studs. Design required stretch was .008 to .010.

The reach rod from the actuator was set to acquire desired closed end over-travel and the tension rods were adjusted.

Final data sheets for these valves are included in section 7 of this report.

### 3.3 1<sup>st</sup> RHT Combine Valves

The 1<sup>st</sup> RHT combine valves were removed for cleaning and inspections. The intercept valves were shipped to CMS to perform these inspections, see CMS report for details of inspection performed. Data sheets for the intercept valves are included in data section of this report. The stop valves for the combine valves were disassembled, cleaned and inspected on site by the RSO personnel. The pressure seal head bushings required honing to bring the stem to bushing clearance within design limits. The stem to pressure seal head back seat on each of the valves was blue checked and lapped until a 100% contact was acquired. The pressure seal head to valve body gasket surface were lapped until acceptable contact was acquired. The valve were assembled and installed. During the installation the pressure seal head covered nuts were found bottoming on the end of the studs, an extra washer was added to each of the studs so that the nuts could be tightened to the required torque. Final data sheets for these valves are included in section #7 of this report.

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### **3.4 2<sup>nd</sup> RHT Combine Valves**

The 2<sup>nd</sup> RHT combine valves were removed from the valve bodies for disassembly, cleaning and inspections. The intercept section of each of these valves was shipped to CMS for the cleaning and inspections. See CMS report for details for work perform on these valves during the CMS inspections.

The stop valve section for these valves were disassembled, cleaned and inspected on site by the RSO turbine crews. Each of the 4 valves was disassembled and dirty stem to bushing measured. The stems were polished to bring them to design size. The pressure seal head bushings were honed until design clearance to the stems was acquired.

The stem to pressure seal head back seat for each of these valve was blue checked and lapped to acquire 100 % line contact. The gasket surface for the pressure seal head in the valve body was also lapped to acquire good contact between the pressure seal and the valve body gasket surface.

Data sheets for the final clearances acquired can be found in section #7 of this report. Extra ¼” thick washers were added to each of the pressure seal head stud so that the covered nuts would not bottom out during the tightening of the nuts to hold the pressure seal head in proper position.

### **3.5 Ventilator Valves**

The 1<sup>st</sup> and 2<sup>nd</sup> ventilator valves were removed, disassembled and inspected. The stems to bushing clearances were measured. The stems and bushings were cleaned to acquire design clearance. The valve plug and seat were cleaned and NDE inspected with no indications found. The plug to seat was blue contact checked on each of these valves; the seats were lapped until good contact was acquired. The air cylinders were disassembled with no problems found. New gaskets were installed in the air cylinder. The valves were assembled and installed with the stand studs tightened to the design torque for the stud diameter size. Data sheet for the final stem to bushing clearance is included in section #7 of this report.

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### **4. “A” Coupling Standard and 2<sup>nd</sup> RHT Turbine**

#### **4.1 Standard Support Plates**

The support plates were removed from under the mid-standard to investigate problems had during startups on this unit. The standard would have to be greased during each startup to get the standard to slide during growth of the turbine. The right side plates were found with shims; turbine end plates had .029 shims, the generator plates were found with .030 shims. The plates and shims were cleaned and reinstalled. The plates were measured and check for flatness before installing with no problems found. A master level, .0005 per foot calibration, was used to check the level position of the standard box. The standard box was found out of level front to back and left to right. The standard box was check for soft foot and the front right side was found not loaded properly. The shims were adjusted under the right side to level the standard box and eliminate the soft foot condition that was found during the checks on the standard box. A drawing showing the dimensions of the support plates as they were found during the checks on the standard. Final shims installed under the right side of the standard box to keep the standard level and loaded properly were as follows; TE right side .045, GE right side .025, no shims were required under the left side of the standard box. The grease lines were cleaned and the grease path for the standard was changed so that new grease could be pushed through the grease path and vented out so that the old grease would be pushed out and replaced with new each time the standard is greased.

#### **4.2 “A” and “B” Coupling Alignments**

The “A” and “B” coupling were broken down alignments were checked. The TE of the 2<sup>nd</sup> RHT was found high and the GE of this rotor had been found low during the checks made during the disassembly of the LP A. Adjustments were made to T-2, T-3 and T-4 bearings to bring the “A” and “B” coupling into acceptable limits. The final coupling alignment data sheets can be found in section #7 of this report.

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### **4.3 Radial Rotor Positions and 2<sup>nd</sup> RHT Shell Alignment**

Radial rotor positions were measured and recorded before adjustments were made to the standard or bearing for alignment. The radial rotors were again checked after couplings were aligned. The shell arm support keys and centerline gib keys were adjusted at this time to bring the 2<sup>nd</sup> RHT shell back to the alignment as left from the 2005 ADSP outage. Final radial rotor position checks are included in section #7 of this outage report.

## **5. Generator Inspection and Repairs**

### **5.1 Repairs to the Stator Water Line to the #5 High Voltage Bushing**

The UH bearing bracket, inner end shield and bushing box doors were removed to access the #5 high voltage bushing to make repairs. AGT was brought on site to locate and repair the stator water leaks. A copper elbow located on top of the #5 HVB was found to have a stress crack in it. AGT changed out the elbow and performed more leak inspections on the rest of the system inside the generator, only the elbow was found to be leaking.

### **5.2 Steady Bearing Preload and Alterrx Alignment**

The inspection of the T-11 bearing preload revealed excessive preload on bearing and the "E" coupling to be misaligned. The preload was adjusted to the proper setting. To obtain adjustment to the coupling alignment, the Alterex was shimmed to correct the elevation for proper alignment. During this process it was found that the Alterex had a soft issue which was corrected with elevation shims.

### **5.3 H2 Coolers**

The left side cooler heads were removed and the coolers were cleaned by an outside contractor, the cooler heads were cleaned and inspected. Epoxy repairs were performed to the heads that some of the coating had worn off. The cooler heads were re-installed, cooling water system set to run, a leak check on RS and LS cooler heads was performed, some adjustments

## **6. Feed Pump Turbine**

### **6.1 Thrust Bearing Replacement**

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The Boiler Feed Pump Turbine thrust bearing changed per request of plant personnel.

Due to the running thrust bearing operating at a high temperature, a system spare was installed

### **6.2 Control Valves**

Inspection of the valve rack assemblies was completed by RSO personnel and all grease fittings were flushed with new grease.

### **6.3 Stop Valve**

The BFPT stop valve was disassembled and inspected, a new stem was installed in the assembly during inspections. The stop valve seat NDE tested and blue checked for contact, results were unacceptable on the blue contact check, a lapping block was manufactured and the lapping was completed with 100% contact.

### **6.4 Coupling Alignment**

The BFPT-Boiler Feed Pump coupling was removed and NDE tested with no crack indications being found. The coupling was reassembled and a 16 point alignment was performed. Results of the alignment were unacceptable. A shim change was performed on the Feed Pump and another 16 point check was performed, with acceptable results.

### **6.5 Last Stage Blade Inspections**

Scaffold was installed to reach the LSB on BFPT, CMS arrived on site and performed NDE testing on turbine last stage blades, and there were no crack indications found.





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## Diaphragm Clearance Record LP B Final Closing

Date: 4/10/2012 Turbine Serial No. 170X394 Prepared by RF Spencer

STA NO.		Wheel Discharge Side Clearances						Wheel Admission Side Clearances						
		P(L)	P(R)	D	ZL	ZR	NL	NR			H	L'L	L'R	
21TE	A				0.304	0.266							1.208	1.203
	E	1.375	1.375		0.265	0.265							1.180	1.180
	D				0.039	0.001							0.028	0.023
20TE	A	0.790	0.780		0.078	0.088	1.182	1.130					1.221	1.214
	E	0.812	0.812		0.080	0.080	1.140	1.140					1.170	1.170
	D	-0.022	-0.032		-0.002	0.008	0.042	-0.010					0.051	0.044
19TE	A	0.775	0.780		0.081	0.086	1.027	1.004					1.237	1.229
	E	0.828	0.828		0.070	0.070	1.000	1.000					1.220	1.220
	D	-0.053	-0.048		0.011	0.016	0.027	0.004					0.017	0.009
18TE	A	0.845	0.861		0.129	0.124	1.009	1.004					1.188	1.177
	E	0.822	0.822		0.070	0.070	1.000	1.000					1.220	1.220
	D	0.023	0.039		0.059	0.054	0.009	0.004					-0.032	-0.043
17TE	A	0.938	0.940		0.123	0.122	1.042	1.038					1.088	1.072
	E	0.896	0.896		0.060	0.060	1.000	1.000					1.080	1.080
	D	0.042	0.044		0.063	0.062	0.042	0.038					0.008	-0.008
16TE	A	0.620	0.640		0.075	0.089	1.224	1.219					0.993	0.990
	E	0.862	0.862		0.060	0.060	1.190	1.190					1.000	1.000
	D	-0.242	-0.222		0.015	0.029	0.034	0.029					-0.007	-0.010
16GE	A	1.715	0.640		0.097	0.079	0.690	0.716					0.475	0.475
	E	1.799	1.799		0.060	0.060	0.690	0.690					0.480	0.480
	D	-0.084	-1.159		0.037	0.019	0.000	0.026					-0.005	-0.005
17GE	A	1.782	1.765				0.490	0.505					0.530	0.540
	E	1.708	1.708		0.060	0.060	0.480	0.480					0.560	0.560
	D	0.074	0.057				0.010	0.025					-0.030	-0.020
18GE	A	1.770	1.745		0.117	0.117	0.470	0.470					0.620	0.635
	E	1.634	1.634		0.070	0.070	0.480	0.480					0.700	0.700
	D	0.136	0.111		0.047	0.047	-0.010	-0.010					-0.080	-0.065
19GE	A	1.765	1.770		0.092	0.079	0.485	0.495					0.595	0.610
	E	1.766	1.766		0.070	0.070	0.480	0.480					0.700	0.700
	D	-0.001	0.004		0.022	0.009	0.005	0.015					-0.105	-0.090
20GE	A	1.615	1.615		0.112	0.076	0.695	0.716					0.680	0.685
	E	1.600	1.600		0.080	0.080	0.670	0.670					0.700	0.700
	D	0.015	0.015		0.032	-0.004	0.025	0.046					-0.020	-0.015
21GE	A				0.281	0.260							0.710	0.710
	E	2.000	2.000		0.265	0.265							0.730	0.730
	D				0.016	-0.005							-0.020	-0.020
	A													
	E													
	D													

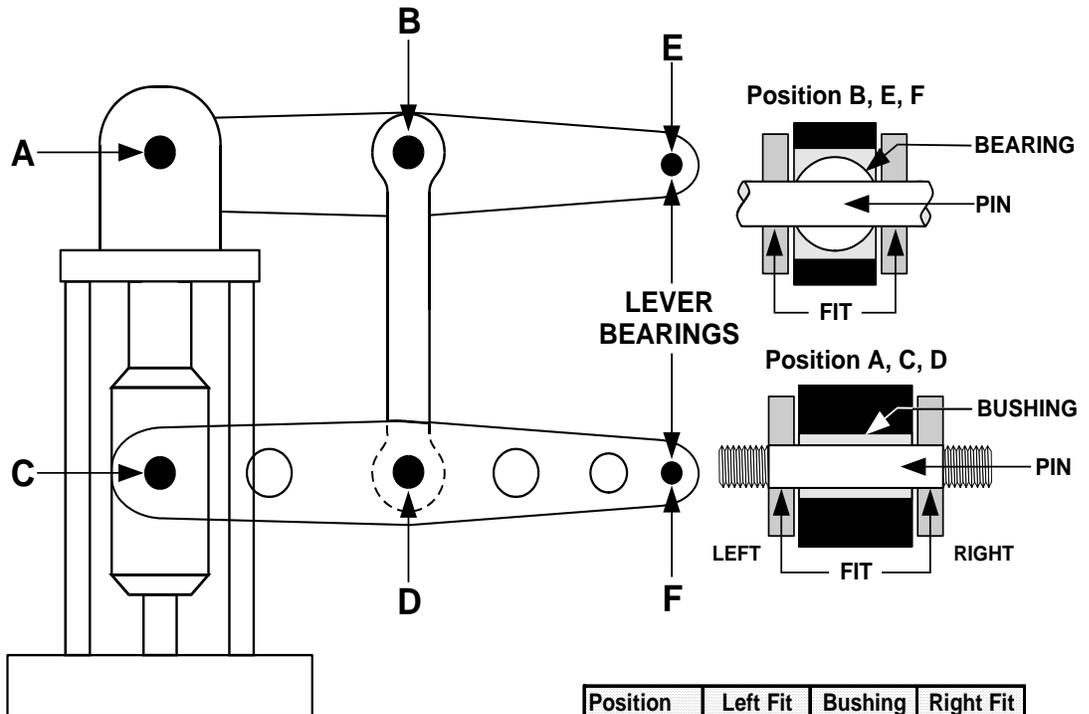
Comments:  
 Adjustments were made to wheel clearance and axial tram of 16.838 to move the rotor .035 toward the turbine end. LPB new axial tram to be 16.803 at "D" coupling left side to the standard.

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## Combined Intercept Valve Linkage

Date:(m/d/y) March 16, 2012 Turbine Serial No. 170X394 Prepared by Naz/Kenny



ST00139

Position	Left Fit	Bushing	Right Fit
D - I.D.	3.003	4.000	3.002
D Pin O.D.	2.999	3.994	2.999
Clearance	.004	.006	.003

Position	Left Fit	Bushing	Right Fit
A - I.D.		3.999	
A Pin O.D.	3.996	3.996	3.996
Clearance		.003	

### UPPER LEVEL

Position	Left Fit	Bearing	Right Fit
E - I.D.	2.252	2.250	2.251
E Pin O.D.	2.248	2.2480	2.248
Clearance	.004	.002	.003

Position	Left Fit	Bearing	Right Fit
B - I.D.	3.998		3.998
B Pin O.D.	3.997		3.997
Clearance	.001		.001

### LEFT LOWER LEVEL

Position	Left Fit	Bearing	Right Fit
F - I.D.	1.502	1.501	1.501
F Pin O.D.	1.499	1.499	1.499
Clearance	.003	.002	.002

Position	Left Fit	Bushing	Right Fit
C - I.D.	3.002		3.002
C Pin O.D.	3.000	3.995	2.999
Clearance	.002		.003

### RIGHT LOWER LEVEL

Position	Left Fit	Bearing	Right Fit
F - I.D.	1.501	1.501	1.501
F Pin O.D.	1.499	1.499	1.500
Clearance	.002	.002	.001

Comments
<b>CRV 1-1</b>

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## Main Stop Valve

Date(m/d/y) 02/26/12

Turbine Serial No. 170X394

Prepared by Stillwagoner / Reitter / Wright

INSPECTIONS & CHECKS				CODE
Seat Inspection	PT	Backseat Contact	X	X Work Carried Out
Disc Inspection	PT	Bypass Valve Inspection	X	N Not Done
Seat Contact Check	X	Lap PSH gasket fit	X	NA Not Applicable
Stem Inspection	PT			C See Comments
Pressure Seal Head	PT			V Visual Inspection
Stud Inspection	UT			MP Mag. Particle
Nut Inspection	V			UT Ultrasonic
Body Inspection	MP			PT Penetrant
Strainer Inspection	V			

Note: Stem and bushing diameters should be recorded both before and after cleaning. Try bar diameters must be recorded.

### Valve Clearance

		BEFORE CLEAN	AFTER CLEAN						
		B	B	C	C	E	E	H	H
VALVE # 1	Bushing ID	2.800		3.755		3.757		2.745	2.753
	Stem OD	2.728	2.728	3.736	3.737	3.736	2.736	2.728	2.727
TRY BAR DIA.	Clearance	0.072		0.019		0.021		0.017	0.026
VALVE # 2	Bushing ID	2.799	2.797	3.755	3.755	3.758	3.758	2.749	2.749
	Stem OD	2.728	2.728	3.739	3.737	3.737	3.737	2.728	2.728
TRY BAR DIA.	Clearance	0.071	0.069	0.016	0.018	0.021	0.021	0.021	0.021

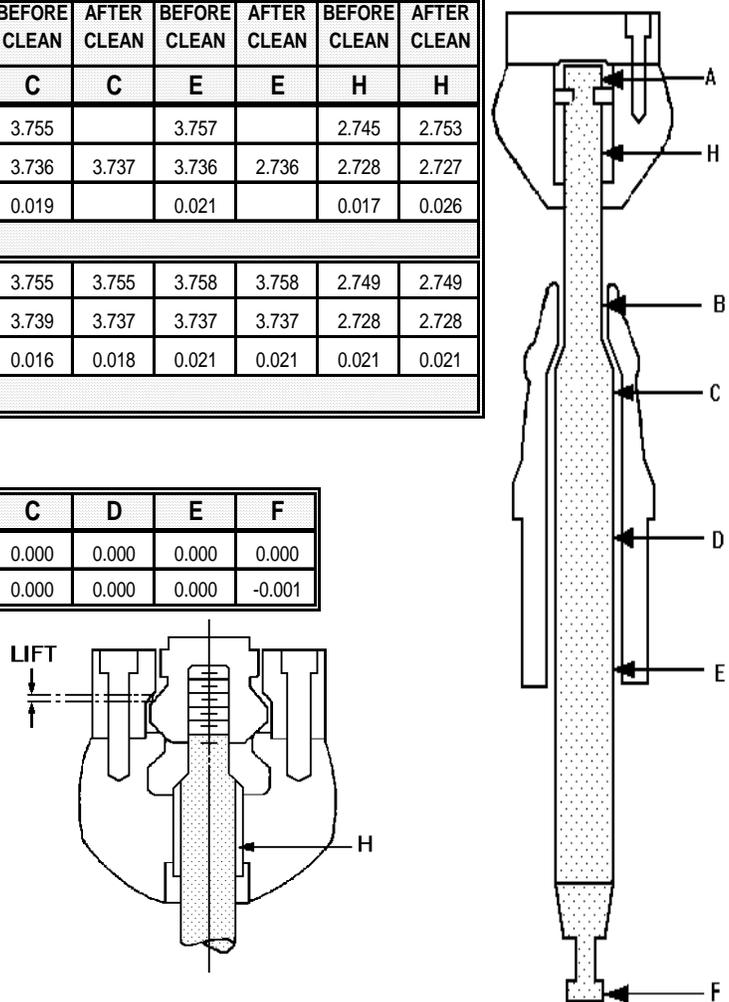
### STEM RUNOUT

		A	B	C	D	E	F
VALVE # 1		-0.001	0.000	0.000	0.000	0.000	0.000
VALVE # 2		0.002	-0.001	0.000	0.000	0.000	-0.001
STEM LENGTH			IN.				

### BYPASS VALVE

		LIFT
VALVE NO. # 1		
VALVE NO. # 2		.755 / .060 Z

Comments:

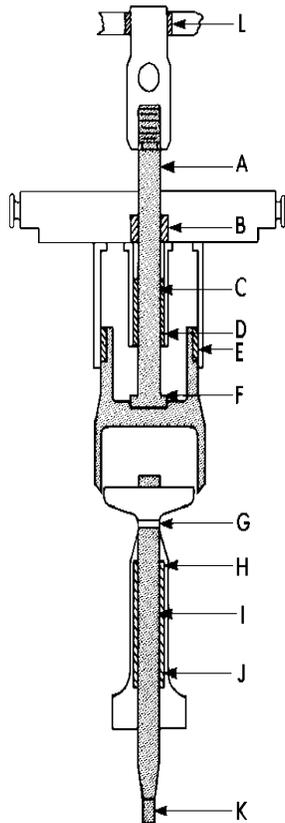


# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Combined Valve

Plant & Unit Mitchell U2 Prepared by Ralbusky / Jackson / Hill  
 Date(m/d/y) 2/28/2012 As Found / Final Data As Found Turbine S/N: 170X394

INSPECTIONS & CHECKS		CODE
Body Inspection	Reheat Stop Valve Disc	<b>X</b> Work Carried Out
Head Inspection	Outer Disc Contact Chk	<b>N</b> Not Done
Stem Inspection-Upper	Inner Disc Contact Chk	<b>NA</b> Not Applicable
Stem Inspection-Lower	Strainer Inspection	<b>C</b> See Comments
Stud Inspection	Linkage Inspection	<b>V</b> Visual Inspection
Nut Inspection	Equalizer Valve	<b>MP</b> Mag. Particle
Main Seat Inspection	Inspection of Equalizer	<b>UT</b> Ultrasonic
Intercept Valve Disc	Valve on #2 CRV	<b>PT</b> Penetrant
Pressure Seal Head		



### Valve Clearance

		LEFT (2-2)		RIGHT (2-4)	
		BEFORE CLEANING	AFTER CLEANING	BEFORE CLEANING	AFTER CLEANING
<b>L</b> TRY BAR.	Bushing ID	5.758		5.760	
	Crosshead OD	5.737		5.737	
	Clearance	0.021		0.023	
<b>B</b> TRY BAR	Bushing ID	3.256		3.257	
	Stem OD	3.237		3.237	
	Clearance	0.019		0.020	
<b>D</b>	Bushing ID	4.754		4.758	
	Stem OD	4.740		4.738	
	Clearance	0.014		0.020	
<b>H</b> TRY BAR	Bushing ID	5.120	5.130	5.131	5.131
	Stem OD	5.114	5.112	5.115	5.112
	Clearance	0.006	0.018	0.016	0.019
<b>J</b>	Bushing ID	5.130	5.130	5.128	5.130
	Stem OD	5.116	5.112	5.114	5.112
	Clearance	0.014	0.018	0.014	0.018
<b>E</b>	Balance	28.256		28.257	
	Seal Rings OD	28.224		28.223	
	Clearance	0.032		0.034	
	Ring				

### Stem Runout

	A	C	F	G	I	K
<b>LEFT</b>	0.000	0.000	0.001	0.003	0.000	0.000
<b>RIGHT</b>	0.000	0.000	0.003	0.000	0.000	0.000
<b>STEM LENGTH</b>		69.5	IN.	64.75		

Comments	
Try bar check good for both reheat stop valves	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Combined Valve

Plant & Unit Mitchell U2

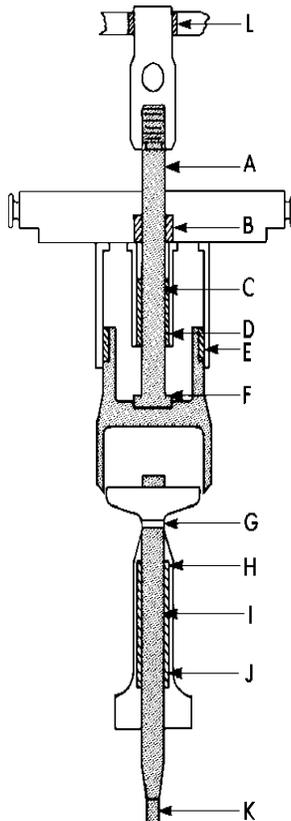
Prepared by Ralbusky / Jackson / Hill

Date(m/d/y) 2/28/2012

As Found / Final Data As Found

Turbine S/N: 170X394

INSPECTIONS & CHECKS		CODE
Body Inspection	Reheat Stop Valve Disc	<b>X</b> Work Carried Out
Head Inspection	Outer Disc Contact Chk	<b>N</b> Not Done
Stem Inspection-Upper	Inner Disc Contact Chk	<b>NA</b> Not Applicable
Stem Inspection-Lower	Strainer Inspection	<b>C</b> See Comments
Stud Inspection	Linkage Inspection	<b>V</b> Visual Inspection
Nut Inspection	Equalizer Valve	<b>MP</b> Mag. Particle
Main Seat Inspection	Inspection of Equalizer	<b>UT</b> Ultrasonic
Intercept Valve Disc	Valve on #2 CRV	<b>PT</b> Penetrant
Pressure Seal Head		



### Valve Clearance

		LEFT (2-1)		RIGHT (2-3)	
		BEFORE CLEANING	AFTER CLEANING	BEFORE CLEANING	AFTER CLEANING
<b>L</b> TRY BAR	Bushing ID	5.767		5.757	
	Crosshead OD	5.736		5.736	
	Clearance	0.031		0.021	
<b>B</b> TRY BAR	Bushing ID	3.260		5.257	
	Stem OD	3.237		5.237	
	Clearance	0.023		0.020	
<b>D</b>	Bushing ID	4.756		4.758	
	Stem OD	4.739		4.742	
	Clearance	0.017		0.016	
<b>H</b> TRY BAR	Bushing ID	5.131	5.131	5.130	5.130
	Stem OD	5.114	5.114	5.112	5.112
	Clearance	0.017	0.017	0.018	0.018
<b>J</b>	Bushing ID	5.129	5.130	5.128	5.130
	Stem OD	5.113	5.113	5.113	5.113
	Clearance	0.016	0.017	0.015	0.017
<b>E</b>	Balance	28.241		28.256	
	Seal Rings OD	28.230		28.224	
	Clearance	0.011		0.032	
	Ring				

### Stem Runout

	A	C	F	G	I	K
<b>LEFT</b>	0.000	0.000	0.001	-0.002	0.000	0.000
<b>RIGHT</b>	0.000	0.000	0.001	0.000	-0.001	0.001
<b>STEM LENGTH</b>	69.5	IN.	64.75			

Comments	
Try bar check good for both reheat stop valves	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Main Stop Valve

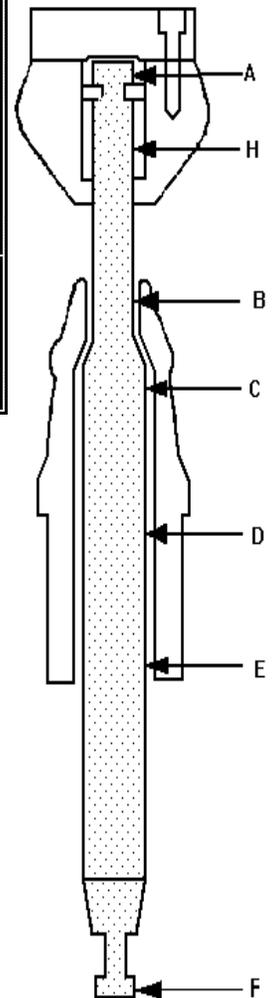
Date(m/d/y) 02/25/12 Turbine Serial No. 170X394 Prepared by Ralbusky

INSPECTIONS & CHECKS				CODE	
Seat Inspection	PT	Backseat Contact	X	X	Work Carried Out
Disc Inspection	PT	Bypass Valve Inspection	X	N	Not Done
Seat Contact Check	X	Lap PSH gasket fit	X	NA	Not Applicable
Stem Inspection	PT			C	See Comments
Pressure Seal Head	PT			V	Visual Inspection
Stud Inspection	UT			MP	Mag. Particle
Nut Inspection	V			UT	Ultrasonic
Body Inspection	MP			PT	Penetrant
Strainer Inspection	V				

Note: Stem and bushing diameters should be recorded both before and after cleaning. Try bar diameters must be recorded.

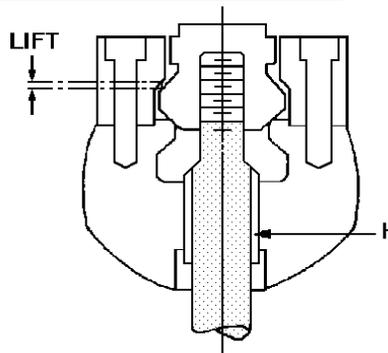
### Valve Clearance

		BEFORE CLEAN	AFTER CLEAN						
		B	B	C	C	E	E	H	H
VALVE	Bushing ID	2.806	2.820	3.758	3.757	3.758	3.757	2.752	2.750
# 3	Stem OD	2.729	2.728	3.738	3.738	3.738	3.737	2.730	2.729
TRY BAR DIA.	Clearance	0.077	0.092	0.020	0.019	0.020	0.020	0.022	0.021
VALVE	Bushing ID	2.808		3.758		3.757		2.754	2.750
# 4	Stem OD	2.727	2.727	3.737	3.737	3.735	3.738	2.728	2.728
TRY BAR DIA.	Clearance	0.081		0.021		0.022		0.026	0.022



### STEM RUNOUT

		A	B	C	D	E	F
VALVE	# 3	-0.003	0.000	0.000	0.000	0.000	-0.002
VALVE	# 4	0.004	0.000	0.000	0.000	0.000	0.004
STEM LENGTH			IN.				



### BYPASS VALVE

		LIFT
VALVE NO.	# 3	.745 / .054 "Z"
VALVE NO.	# 4	

Comments:



# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

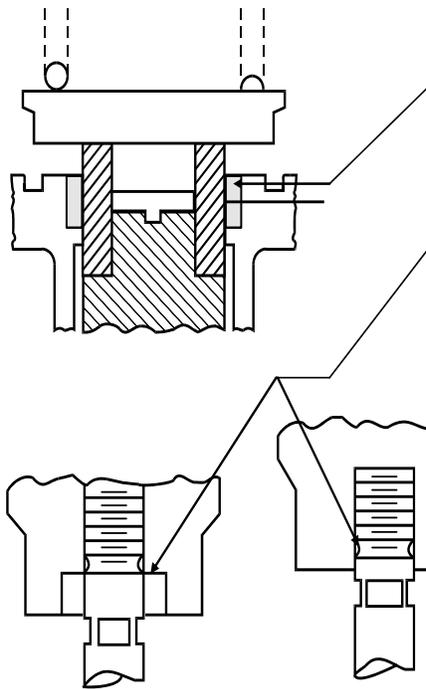
## Control Valves

### Crossheads and Discs

**DIRTY READINGS**

Date(m/d/y) February 25, 2012 Turbine Serial No. \_\_\_\_\_ Prepared by H. M.

INSPECTIONS & CHECKS		CODE
Seat Inspection	_____	X Work Carried Out
Disc Inspection	_____	N Not Done
Seat Contact Check	_____	NA Not Applicable
Stand Inspection	_____	C See Comments
Stud Inspection	_____	V Visual Inspection
Nut Inspection	_____	MP Mag. Particle
Stem Thread	_____	UT Ultrasonic
Previously Pinned	_____	PT Penetrant
Stem Torqued	_____	

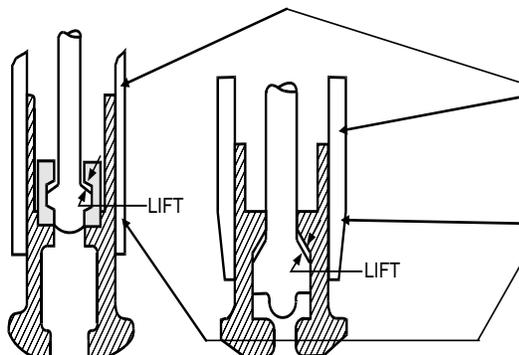


#### CROSSHEAD GUIDE & BUSHING

VALVE NO.	1	2	3	4
BUSHING ID	8.002	8.002	8.002	8.004
GUIDE OD	7.985	7.988	7.989	7.990
CLEARANCE	.017	.014	.013	.014

#### STEM TO CROSSHEAD

CROSSHEAD ID	2.481	2.476	2.480	2.484
STEM OD	2.478	2.471	2.476	2.479
CLEARANCE	.003	.005	.004	.005
Bushing? (Yes/No)	YES	YES	YES	YES



#### VALVE

VALVE NO.	1	2	3	4
SLEEVE ID	6.941	6.518	6.515	6.517
VALVE OD	6.925	6.503	6.498	6.502
CLEARANCE	.016	.015	.017	.015
SLEEVE ID	6.944	6.522	6.516	6.519
VALVE OD	6.925	6.501	6.497	6.500
CLEARANCE	.019	.021	.019	.019
LIFT				

ST00088

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Control Valves Stems and Bushings

**DIRTY READINGS**

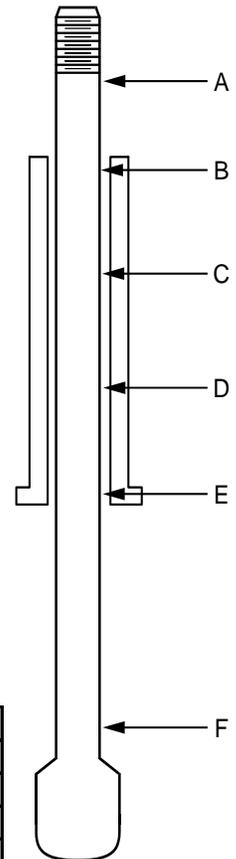
Date (m/d/y) Feb 25, '12 Turbine Serial No. \_\_\_\_\_ Prepared by HERMAN MCCALLISTER

INSPECTIONS & CHECKS		CODES	
Disc Inspection	_____	X	Work Carried Out
Stem Inspection	_____	N	Not Done
Bushing Inspection	_____	NA	Not Applicable
Stud Inspection	_____	C	See Comments
Nut Inspection	_____	V	Visual Inspection
Body Inspection	_____	MP	Mag. Particle
		UT	Ultrasonic
		PT	Penetrant

**NOTE:** Stem and brushing diameters should be recorded both before and after cleaning. Try bar diameters must be recorded.

### VALVE CLEARANCES

		BEFORE CLEAN	AFTER CLEAN	BEFORE CLEAN	AFTER CLEAN
		B	B	E	E
Valve # 1	Bushing ID	2.628"		2.630"	
	Stem OD	2.613"		2.616"	
	Clearance	15 Mils		14 Mils	
Valve # 2	Bushing ID	2.634"		2.628"	
	Stem OD	2.611"		2.612"	
	Clearance	23 Mils		16 Mils	
Valve # 3	Bushing ID	2.627"		2.635"	
	Stem OD	2.616"		2.616"	
	Clearance	11 Mils		19 Mils	
Valve # 4	Bushing ID	2.630"		2.626"	
	Stem OD	2.612"		2.612"	
	Clearance	18 Mils		14 Mils	
Try Bar Diameter					



### STEM RUNOUT (Mils)

Valve	A	C	D	F	Max	Bowed?
# 1	0.0020	0.0020	0.0010	0.0020	0.0010	OK
# 2	0.0060	0.0050	0.0050	0.0040	0.0020	OK
# 3	<b>0.0040</b>	<b>0.0010</b>	<b>0.0020</b>	<b>0.0030</b>	<b>0.0030</b>	OK
# 4	0.0010	0.0020	0.0010	0.0010	0.0010	OK
Stem Length	62	Inches		Max Allowable	0.002	Mils/Ft
Maximum Allowable TIR	0.0103					

**Comments**

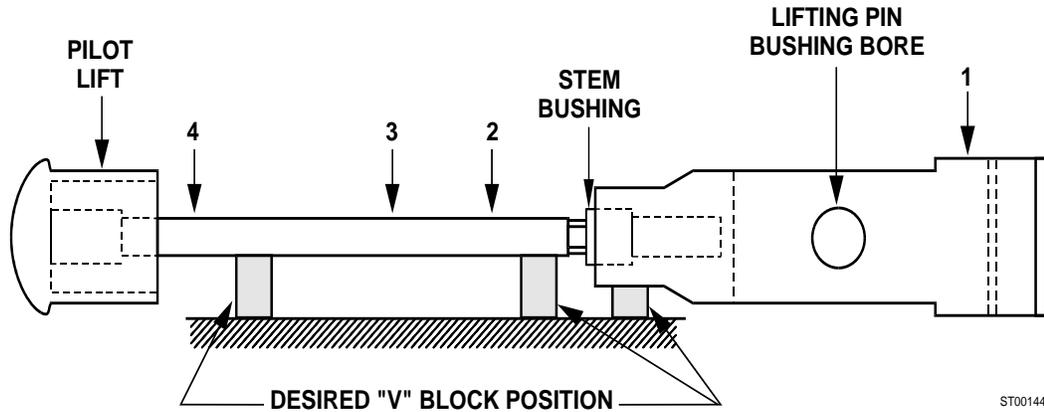
**#3 stem has a crack in the seat/pin area near the spline ( needs replaced ).**

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Control Valve Runouts

Date(m/d/y) 2/24/2012 Turbine Serial No. \_\_\_\_\_ Prepared by H.M

**DIRTY READINGS**



Valve #	Lift
1	
2	
3	
4	

(All measurements in mils, Torque in ft-lbs.)

Valve No.	Guide Bushing Dia.	Guide Dia.	Clear.	Stem Bushing Dia.	Stem Dia.	Clear.	Runout Position 1	Runout Position 2	Runout Position 3	Runout Position 4	Stem To X-Head Torque
1	8.002	7.985	0.017	2.481	2.478	0.003	0.04				
2	8.002	7.988	0.014	2.476	2.471	0.005	0.016				
3	8.002	7.989	0.013	2.480	2.476	0.004	N/A- STEM BROKEN				
4	8.004	7.990	0.014	2.484	2.479	0.005	0.017				

**Comments**

**#3 Stem has a cracked area in the seat /pin area needs replaced**



# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Ventilator Valve #1

Plant & Unit Mitchell Unit 2

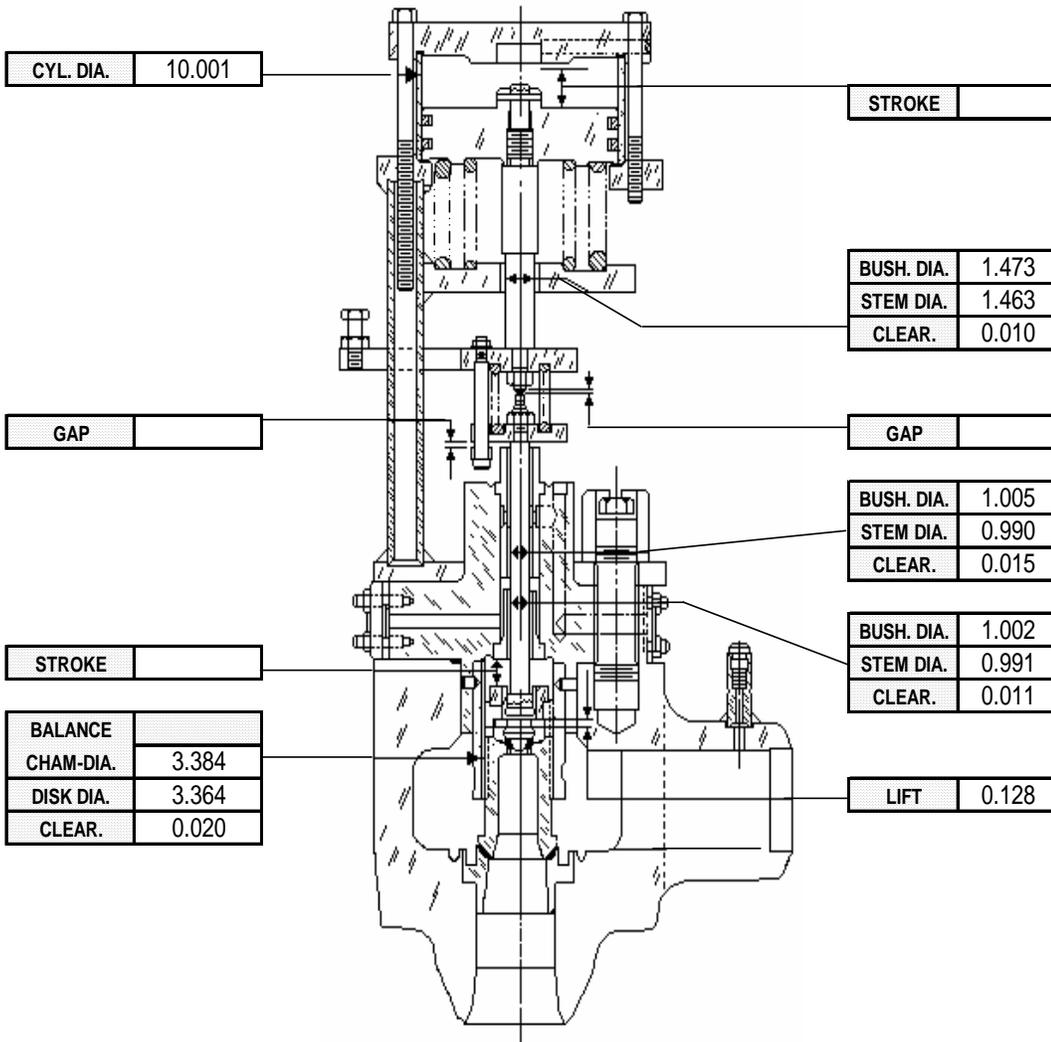
Prepared by McDade/McKown/Naz

Date(m/d/y) 3/3/2012

As Found / Final Data As Found

Turbine S/N: 170X394

INSPECTIONS & CHECKS		CODE	
Casing Inspection	Piston & Ring Inspection	X	Work Carried Out
Head Inspection	All Cylinder Inspection	IN	Not Done
Stud Inspection	Piston Rod Inspection	NA	Not Applicable
Nut Inspection	Piston Gasket Inspection	C	See Comments
Stem Inspection	Link. & Spring Inspection	V	Visual Inspection
Main Seat Inspection		MP	Mag. Particle
Internal Seat Inspection		UT	Ultrasonic
Main Disc Inspection		PT	Penetrant
Internal Disc Inspection			



Comments:

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Valve #2

## Ventilator Valve

Plant & Unit Mitchell Unit #2

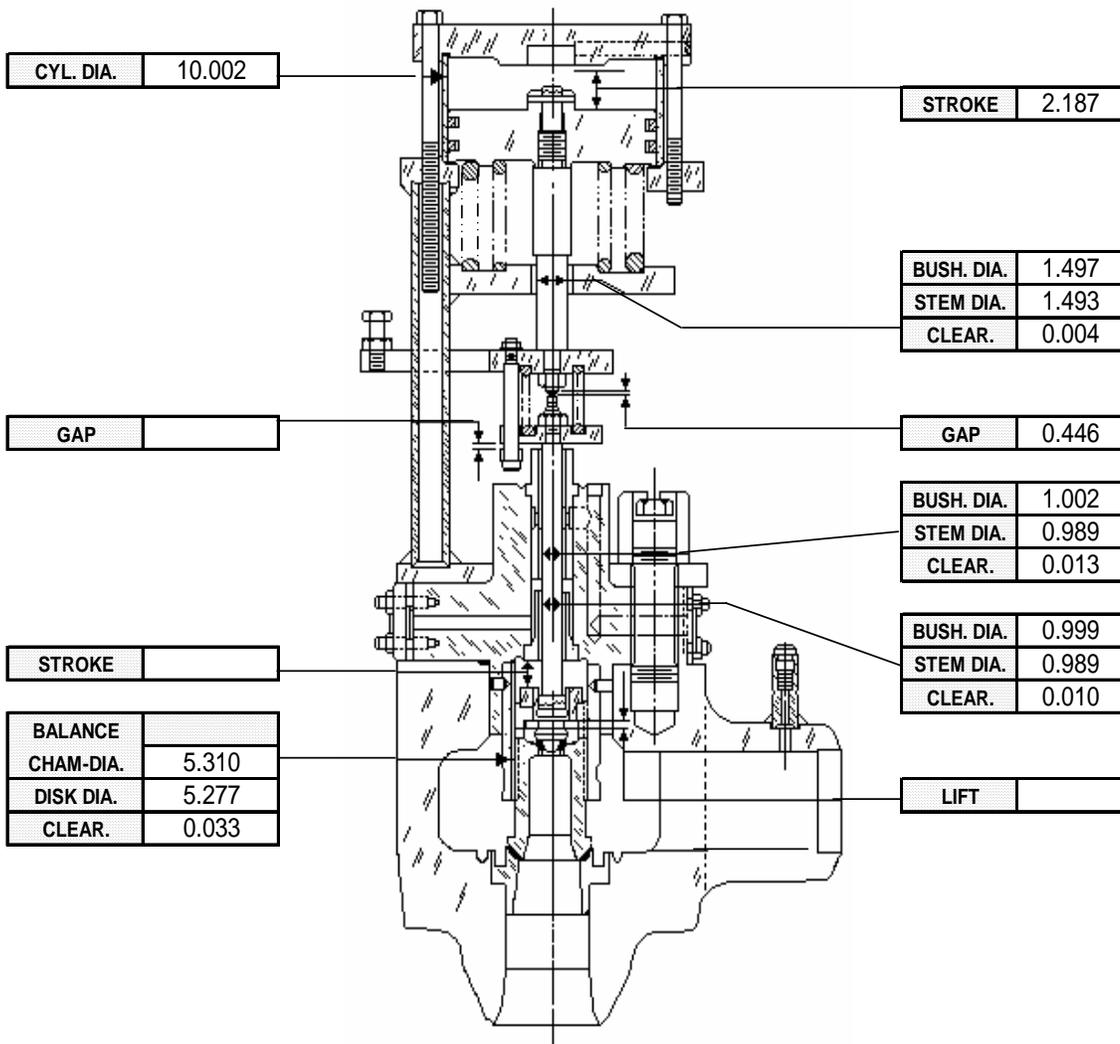
Prepared by Stillwagner/Wright

Date(m/d/y) 3/53/2012

As Found / Final Data As Found

Turbine S/N: 170X394

INSPECTIONS & CHECKS		CODE	
Casing Inspection	<input type="checkbox"/>	Piston & Ring Inspection	<input checked="" type="checkbox"/> X Work Carried Out
Head Inspection	<input type="checkbox"/>	Air Cylinder Inspection	<input type="checkbox"/> N Not Done
Stud Inspection	<input type="checkbox"/>	Piston Rod Inspection	<input type="checkbox"/> NA Not Applicable
Nut Inspection	<input type="checkbox"/>	Piston Gasket Inspection	<input type="checkbox"/> C See Comments
Stem Inspection	<input type="checkbox"/>	Link. & Spring Inspection	<input type="checkbox"/> V Visual Inspection
Main Seat Inspection	<input type="checkbox"/>		<input type="checkbox"/> MP Mag. Particle
Internal Seat Inspection	<input type="checkbox"/>		<input type="checkbox"/> UT Ultrasonic
Main Disc Inspection	<input type="checkbox"/>		<input type="checkbox"/> PT Penetrant
Internal Disc Inspection	<input type="checkbox"/>		

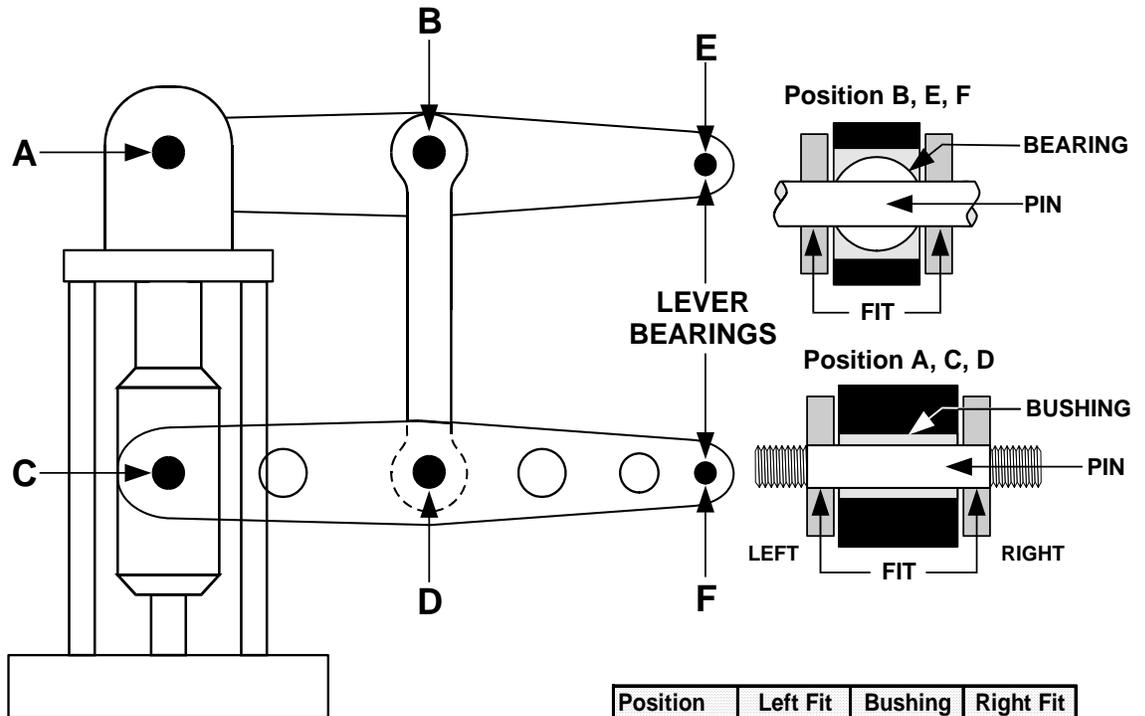


Comments:

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Combined Intercept Valve Linkage

Date:(m/d/y) March 16, 2012 Turbine Serial No. 170X394 Prepared by Naz/Kenny



ST00139

Position	Left Fit	Bushing	Right Fit
D - I.D.	3.002	3.999	3.002
D Pin O.D.	2.999	3.994	3.000
Clearance	.003	.005	.002

Position	Left Fit	Bushing	Right Fit
A - I.D.	4.000	4.000	4.002
A Pin O.D.	3.996	3.996	3.996
Clearance	.004	.004	.006

### UPPER LEVEL

Position	Left Fit	Bearing	Right Fit
E - I.D.	2.252	2.250	2.252
E Pin O.D.	2.247	2.2470	2.247
Clearance	.005	.003	.005

Position	Left Fit	Bearing	Right Fit
B - I.D.	3.999		3.998
B Pin O.D.	3.997		3.997
Clearance	.002		.001

### LEFT LOWER LEVEL

Position	Left Fit	Bearing	Right Fit
F - I.D.	1.501	1.500	1.501
F Pin O.D.	1.500	1.499	1.498
Clearance	.001	.001	.003

Position	Left Fit	Bushing	Right Fit
C - I.D.	3.000	3.998	3.000
C Pin O.D.	2.999	3.994	2.998
Clearance	.001	.004	.002

### RIGHT LOWER LEVEL

Position	Left Fit	Bearing	Right Fit
F - I.D.	1.502	1.500	1.502
F Pin O.D.	1.499	1.499	1.500
Clearance	.003	.001	.002

Comments
<b>CRV 1- 2</b>

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

FINAL

## Diaphragm Clearance Record

### LP-A Final Closing Clearances

Readings After Adjusting .026 toward the GE to correct axial positions.

Date: 4/9/2012 Turbine Serial No. 170X394 Prepared by RF Spencer

STA NO.	Wheel Discharge Side Clearances						Wheel Admission Side Clearances					
	P(L)	P(R)	D	ZL	ZR	NL	NR	H	L'L	L'R		
21TE	A	1.360	1.365		0.325	0.275					0.611	0.611
	E	1.375	1.375		0.265	0.265					0.660	0.660
	D	-0.015	-0.010		0.060	0.010					-0.049	-0.049
20TE	A	0.793	0.774		0.090	0.094	0.620	0.611			0.669	0.638
	E	0.812	0.812		0.080	0.080	0.620	0.620			0.650	0.650
	D	-0.019	-0.038		0.010	0.014	0.000	-0.009			0.019	-0.012
19TE	A	0.797	0.812		0.102	0.092	0.444	0.400			0.559	0.580
	E	0.828	0.828		0.070	0.070	0.440	0.440			0.660	0.660
	D	-0.031	-0.016		0.032	0.022	0.004	-0.040			-0.101	-0.080
18TE	A	0.909	0.968		0.080	0.086	0.413	0.426			0.575	0.590
	E	0.822	0.822		0.070	0.070	0.440	0.440			0.660	0.660
	D	0.087	0.146		0.010	0.016	-0.027	-0.014			-0.085	-0.070
17TE	A	0.883	0.847		0.091	0.076	0.435	0.437			0.487	0.499
	E	0.896	0.896		0.060	0.060	0.440	0.440			0.520	0.520
	D	-0.013	-0.049		0.031	0.016	-0.005	-0.003			-0.033	-0.021
16TE	A	0.830	0.831		0.110	0.075	0.601	0.607			0.410	0.406
	E	0.862	0.862		0.060	0.060	0.630	0.630			0.440	0.440
	D	-0.032	-0.031		0.050	0.015	-0.029	-0.023			-0.030	-0.034
16GE	A	1.038	1.033		0.095	0.100	0.729	0.740			0.482	0.499
	E	1.111	1.111		0.060	0.060	0.690	0.690			0.500	0.500
	D	-0.073	-0.078		0.035	0.040	0.039	0.050			-0.018	-0.001
17GE	A	1.106	1.060		0.075	0.081	0.559	0.575			0.626	0.629
	E	1.020	1.020		0.060	0.060	0.500	0.500			0.580	0.580
	D	0.086	0.040		0.015	0.021	0.059	0.075			0.046	0.049
18GE	A	1.041	1.056		0.095	0.077	0.554	0.519			0.747	0.725
	E	1.009	1.009		0.070	0.070	0.500	0.500			0.720	0.720
	D	0.032	0.047		0.025	0.007	0.054	0.019			0.027	0.005
19GE	A	1.056	1.089		0.095	0.093	0.548	0.550			0.711	0.708
	E	1.078	1.078		0.070	0.070	0.500	0.500			0.720	0.720
	D	-0.022	0.011		0.025	0.023	0.048	0.050			-0.009	-0.012
20GE	A	1.079	1.054		0.086	0.087	0.781	0.789			0.783	0.762
	E	1.000	1.000		0.080	0.080	0.710	0.710			0.740	0.740
	D	0.079	0.054		0.006	0.007	0.071	0.079			0.043	0.022
21GE	A	2.033	2.028		0.295	0.308					0.790	0.819
	E	2.000	2.000		0.265	0.265					0.780	0.780
	D	0.033	0.028		0.030	0.043					0.010	0.039
	A											
	E											
	D											

Comments:

"B" Coupling Gap - L= Right=

LPA axial tram L/S of "B" coupling = 21.070

8.

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

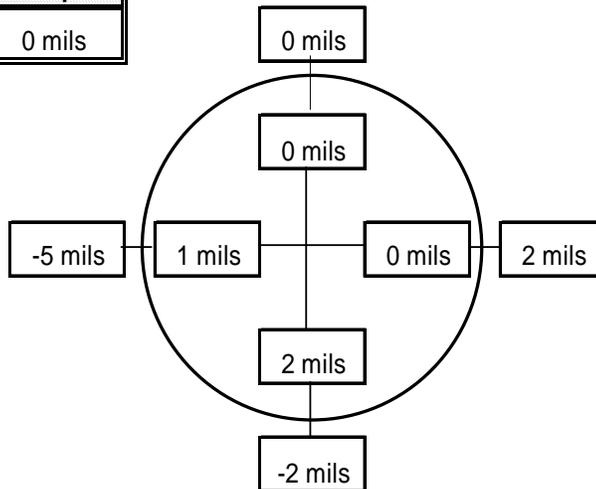
## Alignment Couplings

**FINAL**

Date 4/12/2012 Turbine Serial No. \_\_\_\_\_ Prepared by \_\_\_\_\_  
 Coupling "A" Sweep Diameter \_\_\_\_\_ Indicator Mounted on HP

### Alignment Readings

Position	Top	Left	Bottom	Right	Top
Rim (Mils)	0 mils	-4 mils	-2 mils	2 mils	0 mils
Face 0°	1.523"	1.525"	1.526"	1.523"	
Face 90°	1.525"	1.526"	1.526"	1.525"	
Face 180°	1.526"	1.524"	1.527"	1.525"	
Face 270°	1.526"	1.529"	1.530"	1.526"	
Average	1.525"	1.526"	1.527"	1.525"	
Relative	0 mils	1 mils	2 mils	0 mils	
Check	Face	Rim			
Top + Bottom=	2 mils	-2 mils			
Right + Left =	1 mils	-2 mils			
Difference=	1 mils	0 mils			



### Rim Recheck (If Necessary)

Position	Top	Left	Bottom	Right	Top
Rim (Mils)					

Comments:

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

LP A Final

LP "A"

**Tightwire Readings**

Date 4/9/2012 Turbine Serial No. 170X394 Prepared by \_\_\_\_\_

LOCATION	Distance from TE	Sag Mils	Raw Data Readings In Inches		Relative Position (Sag Corrected in mils)		True Position Elev Horz	
T-5 Oil Bore Set Point	22	5.1	0.000	0.003	0	3	-11	-2
				-0.015		-10		
N-6 GRV 1	32	7.0	0.300	0.300	0	0	20	0
				0.313		20		
N-7 GRV 3	43	9.0	0.300	0.307	0	7	14	-4
				0.308		17		
21 TE	67	12.5	0.399	0.406	0	7	31	-4
				0.421		35		
20 TE	83	14.3	0.460	0.464	0	4	5	-2
				0.453		7		
19 TE	97.5	15.4	0.366	0.360	6	0	-17	3
				0.331		-14		
18 TE	107	15.9	0.342	0.342	0	0	19	0
				0.345		19		
17 TE	115	16.3	0.349	0.356	0	7	18	-4
				0.354		21		
16 TE	123	16.5	0.517	0.501	16	0	18	8
				0.511		26		
16 GE	138	16.5	0.511	0.513	0	2	13	-1
				0.509		14		
17 GE	145	16.4	0.349	0.357	0	8	12	-4
				0.349		16		
18 GE	154.5	16.0	0.354	0.357	0	3	9	-2
				0.348		10		
19 GE	164.25	15.5	0.355	0.359	0	4	-1	-2
				0.340		1		
20 GE	179	14.4	0.451	0.451	0	0	16	0
				0.453		16		
21 GE	195.5	12.7	0.351	0.351	0	0	1	0
				0.339		1		
N-7 GRV 1	235.5	6.4	0.446	0.450	0	4	-3	-2
				0.439		-1		
N-7 GRV 3	246.5	4.1	0.448	0.453	0	5	3	-3
				0.449		5		
T-6 Oil Bore Set Point	255.5	2.1	0.007	0.000	7	0	19	4
				0.020		22		
Distance roller to roller in inches	264	0.0						



# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

Final Tightwire

LP "B"

*Tightwire Readings*

Date 4/5/2012 Turbine Serial No. 170X394 Prepared by \_\_\_\_\_

LOCATION	Distance from TE	Sag Mils	Raw Data Readings In Inches			Relative Position (Sag Corrected in mils)			True Position Elev Horz	
T-7 Oil Bore Set Point	21	4.8	0.000		0.008	0		8	12	-4
				0.011			16			
N-8 GRV 1	30	6.5								
N-8 GRV 3	41	8.5								
21 TE	65	12.0	0.406		0.403	3		0	4	2
				0.396			5			
20 TE	81.5	13.8	0.446		0.449	0		3	23	-2
				0.457			25			
19 TE	96.5	15.0	0.355		0.354	1		0	7	1
				0.347			8			
18 TE	103.5	15.4	0.348		0.352	0		4	11	-2
				0.346			13			
17 TE	111	15.7	0.301		0.297	4		0	6	2
				0.289			8			
16 TE	119	15.9	0.496		0.503	0		7	17	-4
				0.501			21			
16 GE	140	15.9	0.501		0.504	0		3	14	-2
				0.501			16			
17 GE	148	15.7	0.353		0.351	2		0	5	1
				0.341			6			
18 GE	154	15.5	0.347		0.350	0		3	18	-2
				0.351			19			
19 GE	163	15.0	0.358		0.358	0		0	7	0
				0.350			7			
20 GE	178	13.8	0.449		0.449	0		0	17	0
				0.452			17			
21 GE	194.5	12.1	0.404		0.408	0		4	0	-2
				0.394			2			
N-9 GRV 1	218	8.7								
N-9 GRV 3	229	6.7								
T-8 Oil Bore Set Point	235	5.6	0.008		0.000	8		0	-7	4
				-0.009			-3			
Distance roller to roller in inches	260	0.0								

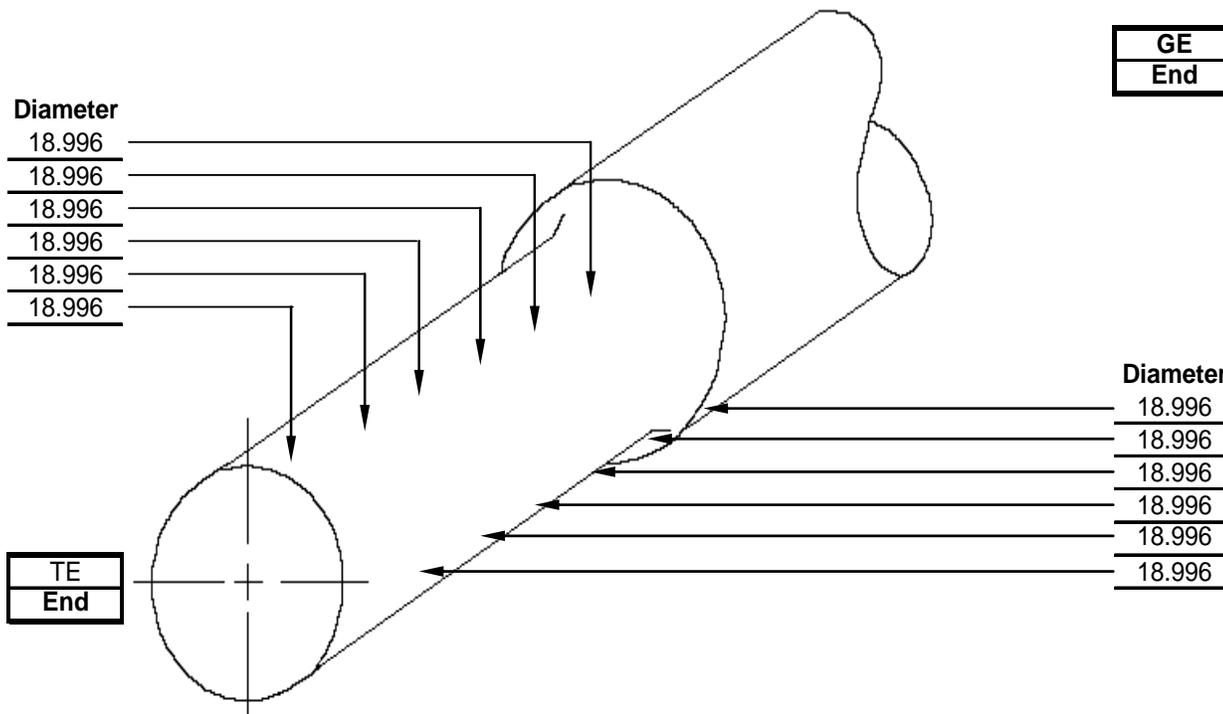
# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Rotor Journal Condition

Date: 2/15/12 Turbine Serial No. 170X394 Prepared by Stillwagoner/Ralbusky

Journal Number T-5

Note: Mark on sketch to show grooving, discoloration, carbon inclusions, or irregularities in the journal surface.



**Journal Sizes**

	0°	90°	All
Maximum			
Minimum			
Difference			
Average			

**Out of Roundness**

Diameters	Out of Round	
	0°	90°

Comments: \_\_\_\_\_

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

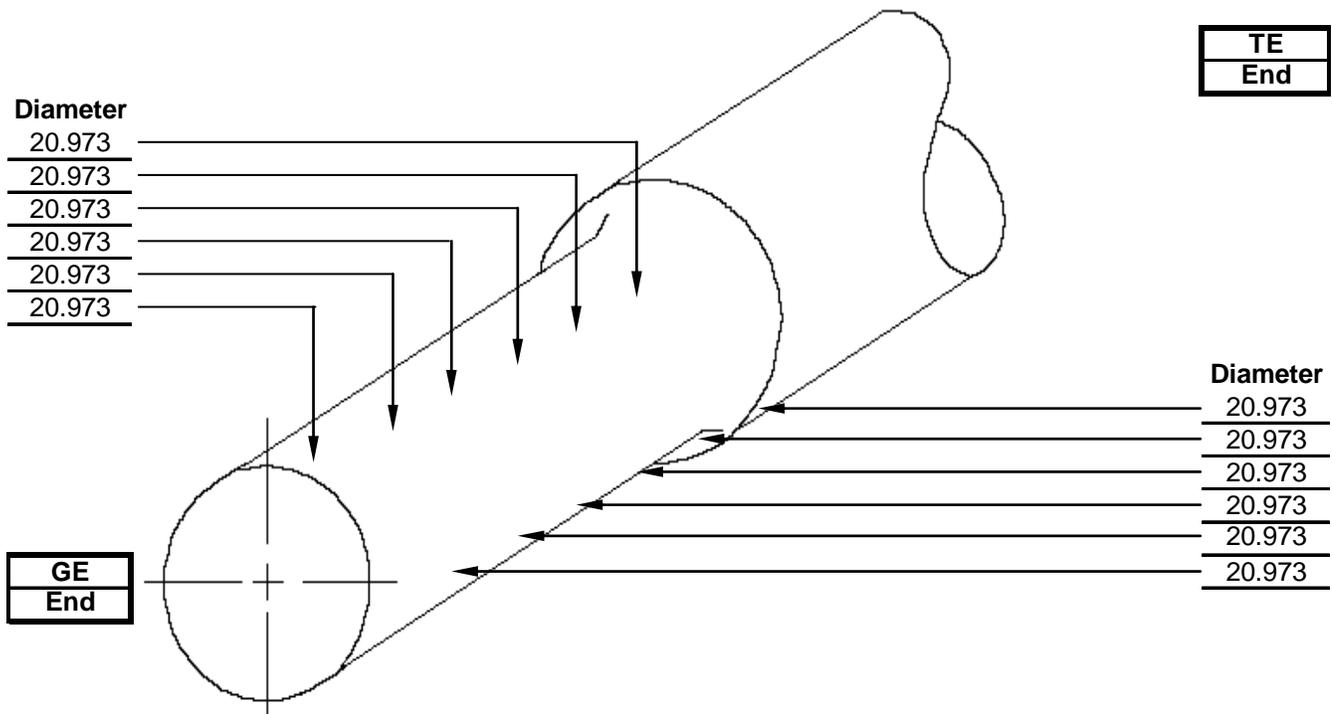
## Rotor Journal Condition

Date: ##### Turbine Serial No. 170X394

Prepared by Ruckman

Journal Number T-6

Note: Mark on sketch to show grooving, discoloration, carbon inclusions, or irregularities in the journal surface.



### Journal Sizes

	0°	90°	All
Maximum			
Minimum			
Difference			
Average			

### Out of Roundness

Diameters	Out of Round	
	0°	90°

Comments:	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

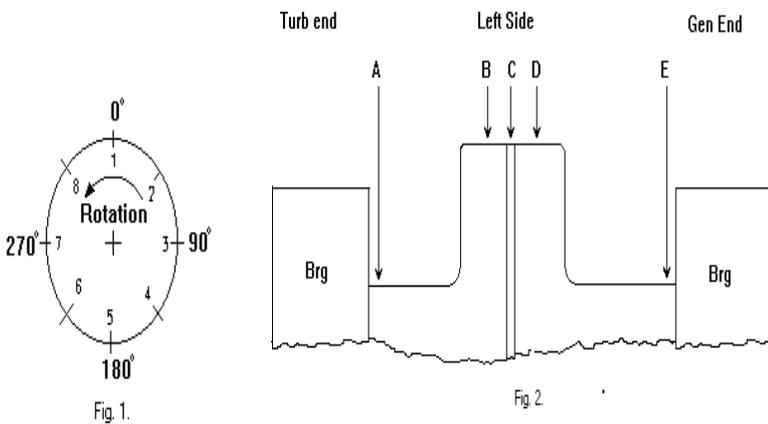
## Coupling Assembly Checks Without Integral Rabbets

Final

Date(m/d/y) 4/22/12 Turbine S/N: 170X394 Prepared by Barnette/Hill

Coupling   
 Data   
 (as found/final)

- NOTES:
- (1) For radial runout set indicator to read "0" at the number 1 position.
  - (2) Mark positions 1-8 to agree with factory stamped degree marks on rotor as shown on Fig. 1.



### Coupling Runouts (Readings are in Mils)

Area Indicated		Position Number														
		3	5	7	9	11	13	2	14	12	10	8	6	4	1	3
TE Journal	A	0.0	0.0	-0.5	-0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TE Cplg. Periphery	E B	0.0	-1.0	-1.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
Spacer	C	1.5	1.0	1.0	0.0	-0.5	-1.5	-1.5	-0.5	-1.5	-1.0	0.0	1.0	1.0	1.0	0.0
GE Cplg. Periphery	I D	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0
GE Journal	E	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0
<b>Differential Runouts</b>																
Journals	A-E	0.0	0.5	0.5	1.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	1.0	0.0	1.0	0.0
Cplg. Periphery	B-D	1.0	2.0	2.0	1.5	1.0	0.5	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
Spacer to Cplg	C-B	1.5	2.0	2.0	0.5	0.5	1.5	1.5	0.5	1.5	1.0	0.0	0.0	1.0	1.0	0.0
Spacer to Cplg	C-D	0.5	0.0	0.0	1.0	1.5	2.0	2.5	0.5	1.5	1.0	0.0	0.0	0.0	0.0	0.0

### Maximum Runouts

Area Indicated	Data Check	TIR Runout	TIR Check	
TE Journal	A	OK	1.0	OK
TE Cplg. Periphery	E B	OK	1.0	OK
Spacer	C	Check	3.0	OK
GE Cplg. Periphery	I D	OK	1.0	OK
GE Journal	E	OK	0.5	OK

### Maximum Differential Runouts

	Max. Diff.	Diff. Check	
Journals	A-E	1.0	OK
Cplg. Periphery	B-D	2.0	Check
Spacer to Cplg	C-B	2.0	OK
Spacer to Cplg	C-D	2.5	OK







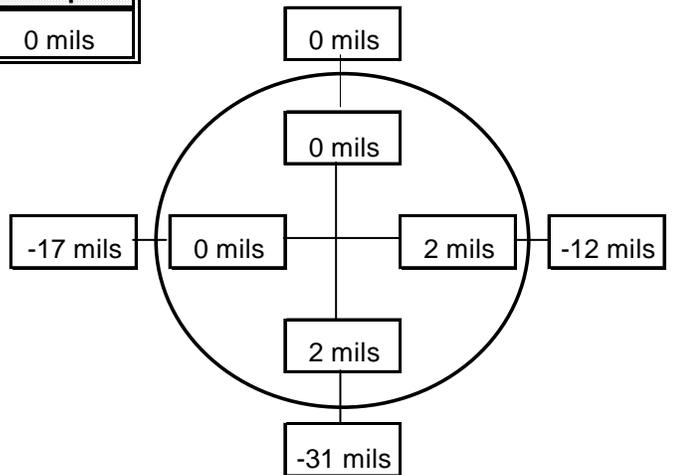
# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Alignment Couplings

Date 4/17/12 Turbine Serial No. 170X394 Prepared by \_\_\_\_\_  
 Coupling "B" Sweep Diameter \_\_\_\_\_ Indicator Mounted on 2nd RHT

### Alignment Readings

Position	Top	Left	Bottom	Right	Top
Rim (Mils)	0 mils	-17 mils	-31 mils	-12 mils	0 mils
Face 0°	1.565"	1.564"	1.564"	1.565"	
Face 90°	1.558"	1.560"	1.562"	1.561"	
Face 180°	1.538"	1.539"	1.541"	1.540"	
Face 270°	1.549"	1.549"	1.550"	1.551"	
Average	1.553"	1.553"	1.554"	1.554"	
Relative	0 mils	0 mils	2 mils	2 mils	
Check		Face	Rim		
Top + Bottom=		2 mils	-31 mils		
Right + Left =		2 mils	-29 mils		
Difference=		0 mils	-2 mils		



### Rim Recheck (If Necessary)

Position	Top	Left	Bottom	Right	Top
Rim (Mils)					

Comments:



# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Coupling Assembly Checks Without Integral Rabbets

5th check 4-28 Days

Final

Date(m/d/y) 04/28/12 Days

Turbine S/N: 170X394

Prepared by Hamilton/Hill

Coupling

Data

(as found/final)

**NOTES:**

- (1) For radial runout set indicator to read "0" at the number 1 position.
- (2) Mark positions 1-8 to agree with factory stamped degree marks on rotor as shown on Fig. 1.

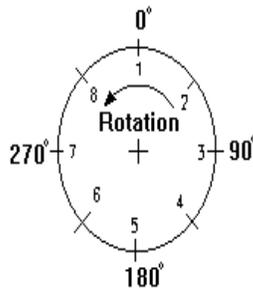


Fig. 1.

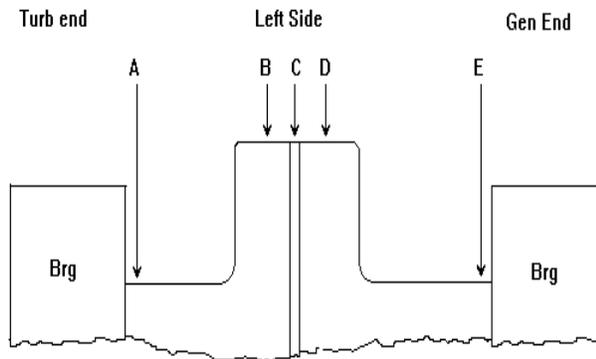


Fig. 2.

**Coupling Runouts**

(Readings are in Mils)

Bolt Hole No.	Coupling Bolt #															
	1	3	5	7	9	11	13	15	2	16	14	12	10	8	6	4
TE Journal A	0.0	-0.5	-0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TE Cplg. Periphery E B	0.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-0.5	-0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5
Spacer C	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.5	0.0	0.0	1.0	1.0	1.5	1.5	0.0
GE Cplg. Periphery I D	-1.0	-0.5	0.0	0.0	1.0	0.0	1.0	1.0	0.5	0.0	0.0	-0.5	-0.5	0.0	0.0	1.0
GE Journal E	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Differential Runouts**

Journals A-E	0.0	0.5	0.5	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cplg. Periphery B-D	1.0	0.5	0.0	0.0	1.0	1.0	2.0	1.5	1.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5
Spacer to Cplg C-B	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.5	1.0	0.0	0.0	1.0	1.0	1.0	1.0	0.5
Spacer to Cplg C-D	1.0	0.5	1.0	1.0	2.0	1.0	2.0	2.0	2.0	0.0	0.0	1.5	1.5	1.5	1.5	1.0

**Maximum Runouts**

Area Indicated	Data Chk	TIR Runout	TIR Chk
TE Journal A	OK	1.0	OK
TE Cplg. Periphery E B	Check	1.5	OK
Spacer C	Check	3.0	OK
GE Cplg. Periphery I D	OK	2.0	OK
GE Journal E	OK	1.0	OK

**Maximum Differential Runouts**

	Max. Diff.	Diff. Check
Journals A-E	0.5	OK
Cplg. Periph B-D	2.0	Check
Spacer to Cp C-B	1.0	OK
Spacer to Cp C-D	2.0	OK



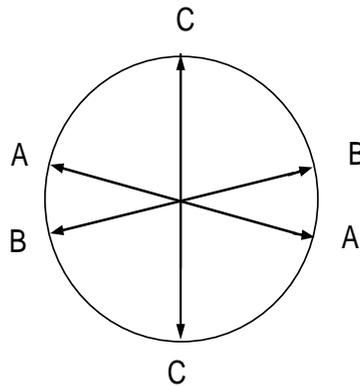
# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Packing Head

**Joints Tight After Heat treating    Out of Roundness**

Date(m/d/y) 4/9/2010 Turbine Serial No. 170X394 Prepared by Ruckman/Templeton

INSPECTIONS & CHECKS		CODE
_____	_____	<b>X</b> Work Ca Work Carried Out
_____	_____	<b>N</b> Not Done Not Done
_____	_____	<b>NA</b> Not Appli Not Applicable
_____	_____	<b>C</b> See Corr See Comments
_____	_____	<b>V</b> Visual In: Visual Inspection
_____	_____	<b>MP</b> Mag. Par Mag. Particle
_____	_____	<b>UT</b> Ultrasoni Ultrasonic
_____	_____	<b>PT</b> Penetrant Penetrant

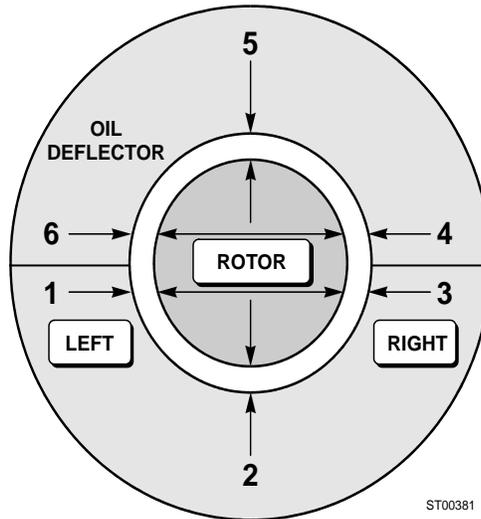


Location and Row	Packing Casing			Out of Round (V-H)	Horizontal Reading	
	A-Dia	B-Dia	C-Dia		Tightwire Adjustment	Unbolted
						U/H    L/H
N-8 GRV-1	27.472	27.477	27.520	0.046	set low by 0.023	
N-8 GRV-3	27.474	27.472	27.529	0.056	set low by 0.028	
N-9 GRV-1	27.441	27.444	27.562	0.120	set low by 0.060	
N-9 GRV-3	27.452	27.448	27.559	0.109	set low by 0.054	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Packing Alignment

Date (m,d,y) April 19, 2012 Turbine Serial No. 170X394 Prepared by Kinser / Van Dyke / Franzell



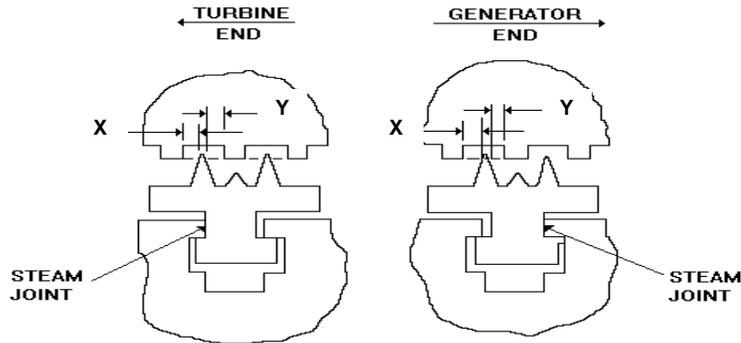
Packing Ring Location	POSITION (Mils)						CLEARANCE			IDEAL POSITION		
	1	2	3	4	5	6	Median	Min.	Max	Top	Bottom	Sides
N8G1	21	9	19	13	50	24	20	9	50	39	20	19
N8G2	25	16	22	13	50	19	20.5	13.0	50.0	44.0	22.0	19.8
N8G3	26	11	24	7	58	13	18.5	7.0	58.0	46.0	23.0	17.5
N9G1	25	23	25	20	37	20	24.0	20.0	37.0	40.0	20.0	22.5
N9G2	25	23	32	20	37	20	24.0	20.0	37.0	40.0	20.0	24.3
N9G3	30	27	25	20	37	20	26.0	20.0	37.0	42.7	21.3	23.8

<b>Comments</b>	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Packing Clearance Record

Date(m/d/y) 4/9/2012 Turbine Serial No. 170X394 Prepared by VanDyke/Clark



Packing Box or Casing No. N-6

Ring No.	Axial		Radial	
	X	Y	Left	Right
1			0.019	0.018
2			0.017	0.019
3			0.019	0.021

Diaphragms

Ring No.	Stage No.	Axial		Radial	
		X	Y	Left	Right
21TE				0.024	0.027
20TE				0.031	0.038
19TE				0.046	0.034
18TE				0.024	0.025
17TE				0.026	0.029
16TE				0.100	0.086
16 CT				0.025	0.028
16GE				0.092	0.094
17GE				0.027	0.032
18GE				0.029	0.028
19GE				0.037	0.032
20GE				0.038	0.031
21GE				0.032	0.026

Packing Box or Casing No. N-7

Ring No.	Axial		Radial	
	X	Y	Left	Right
1			0.025	0.025
2			0.029	0.021
3			0.029	0.021

Comments

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

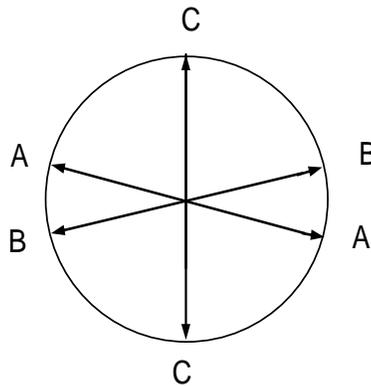
## Packing Head

**Joins Tight**

**Out of Roundness**

Date(m/d/y) 3/20/2012 Turbine Serial No. 170X394 Prepared by Ruckman/Templeton

INSPECTIONS & CHECKS		CODE	
_____	_____	<b>X</b>	Work Ca Work Carried Out
_____	_____	<b>N</b>	Not Done Not Done
_____	_____	<b>NA</b>	Not Appli Not Applicable
_____	_____	<b>C</b>	See Com See Comments
_____	_____	<b>V</b>	Visual In: Visual Inspection
_____	_____	<b>MP</b>	Mag. Par Mag. Particle
_____	_____	<b>UT</b>	Ultrasoni Ultrasonic
_____	_____	<b>PT</b>	Penetran Penetrant



Location and Row	Packing Casing			Out of Round (V-H)	Horizontal Reading		
	A-Dia	B-Dia	C-Dia		Tightwire Adjustment	Unbolted	
						U/H	L/H
<b>N-6 GRV-1</b>	27.483	27.487	27.518	0.033	set low by 0.017		
<b>N-6 GRV-3</b>	27.481	27.473	27.528	0.051	set low by 0.025		
<b>N-7 GRV-1</b>	27.487	27.489	27.520	0.032	set low by 0.016		
<b>N-7 GRV-3</b>	27.499	27.493	27.506	0.010	set low by 0.005		
<b>N-8 GRV-1</b>	27.416	27.468	27.567	0.125	set low by 0.063		
<b>N-8 GRV-3</b>	27.396	27.430	27.584	0.171	set low by 0.085		
<b>N-9 GRV-1</b>	27.438	27.462	27.554	0.104	set low by 0.052		
<b>N-9 GRV-3</b>	27.456	27.479	27.532	0.064	set low by 0.032		







# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Steam Turbine Rotors

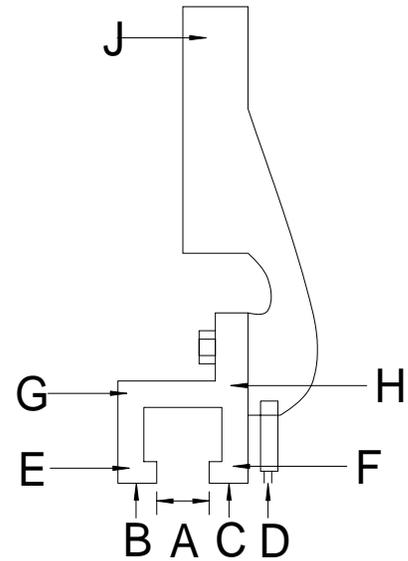
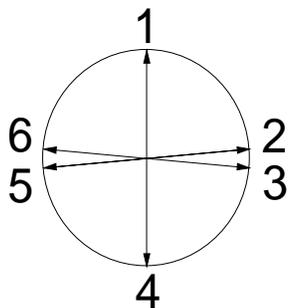
### Hydrogen Seal Casing Dimensional Checks

Plant Mitchell

Turbine S/N 180X394  
 Unit No. 2

Inspected By T Tidd  
 Date 3/14/2012

As Found   
 As Left



	Hook Opening ("A")					
	1	2	3	4	5	6
TE Seals						
CE Seals						

	1-4	2-5	3-6	Avg	Journal OD	Clearance
TE Deflector ("D")	19.878	19.882	19.880	19.88	19.836	0.044
CE Deflector ("D")	19.878	19.880	19.878	19.879	19.836	0.043

	1-4	2-5	3-6	Avg
TE Casing ("B")				
TE Casing ("C")				
CE Casing ("B")				
CE Casing ("C")				

Comments:

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

4/30/12 Days 12:22 PM

**Final**

Date 4/30/12

Turbine Serial No. \_\_\_\_\_

Prepared by \_\_\_\_\_

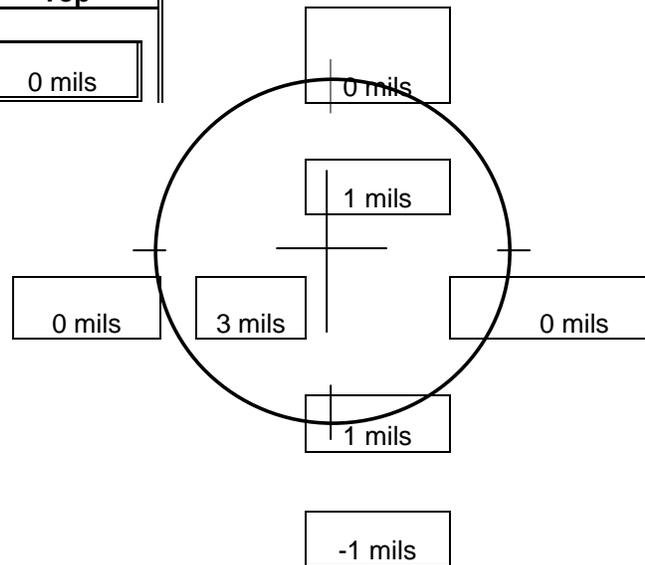
Coupling E

Sweep Diameter 21.3 "

Indicator Mount \_\_\_\_\_

**Alignment Readings**

Position	Top	Left	Bottom	Right	Top
<b>Rim (Mils)</b>	0 mils	0 mils	-1 mils	-1 mils	0 mils
<b>Face 0°</b>	1.701"	1.703"	1.702"	1.701"	
<b>Face 90°</b>	1.697"	1.700"	1.697"	1.695"	
<b>Face 180°</b>	1.672"	1.675"	1.673"	1.672"	
<b>Face 270°</b>	1.689"	1.691"	1.690"	1.688"	
<b>Average</b>	1.690"	1.692"	1.691"	1.689"	
<b>Relative</b>	0 mils	2 mils	1 mils	-1 mils	
<b>Check</b>		<b>Face</b>	<b>Rim</b>		
<b>Top + Bottom=</b>		1 mils	-1 mils		
<b>Right + Left =</b>		1 mils	-1 mils		
<b>Difference=</b>		0 mils	0 mils		



**Rim Recheck (If Necessary)**

Position	Top	Left	Bottom	Right	Top
<b>Rim (Mils)</b>					

Comments: \_\_\_\_\_

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage



# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Alignment

### Couplings

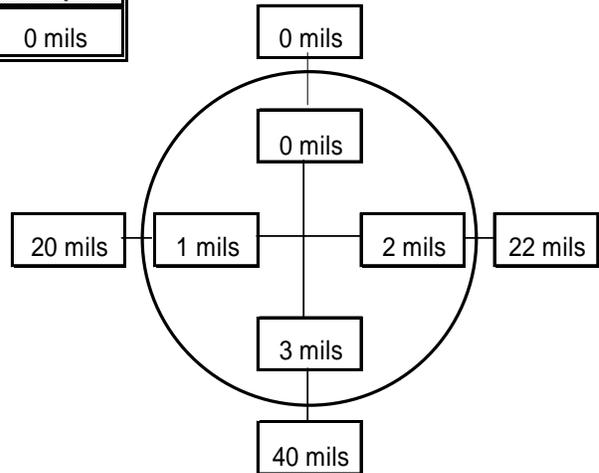
**FINAL**

Date 4/10/2012 Turbine Serial No. \_\_\_\_\_ Prepared by McDade

Coupling FPT to Pump Sweep Diameter \_\_\_\_\_ Indicator Mounted on Turbine

#### Alignment Readings

Position	Top	Left	Bottom	Right	Top
Rim (Mils)	0 mils	20 mils	40 mils	22 mils	0 mils
Face 0°	0.125"	0.126"	0.128"	0.126"	
Face 90°	0.124"	0.125"	0.128"	0.126"	
Face 180°	0.124"	0.126"	0.128"	0.128"	
Face 270°	0.125"	0.125"	0.127"	0.126"	
Average	0.125"	0.126"	0.128"	0.127"	
Relative	0 mils	1 mils	3 mils	2 mils	
<b>Check</b>		<b>Face</b>	<b>Rim</b>		
Top + Bottom=		3 mils	40 mils		
Right + Left =		3 mils	42 mils		
Difference=		0 mils	-2 mils		



#### Rim Recheck (If Necessary)

Position	Top	Left	Bottom	Right	Top
Rim (Mils)					

Comments:

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Alignment Couplings

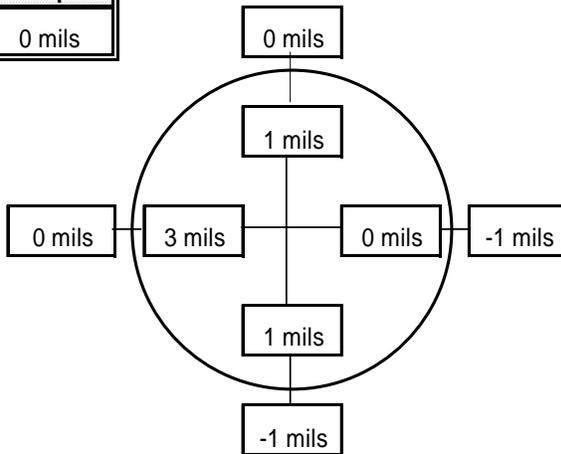
4/30/12 Days 12:22 PM **Final**

Date 4/30/12 Turbine Serial No. \_\_\_\_\_ Prepared by \_\_\_\_\_

Coupling E Sweep Diameter 21.3 " Indicator Mounted on \_\_\_\_\_

### Alignment Readings

Position	Top	Left	Bottom	Right	Top
Rim (Mils)	0 mils	0 mils	-1 mils	-1 mils	0 mils
Face 0°	1.701"	1.703"	1.702"	1.701"	
Face 90°	1.697"	1.700"	1.697"	1.695"	
Face 180°	1.672"	1.675"	1.673"	1.672"	
Face 270°	1.689"	1.691"	1.690"	1.688"	
Average	1.690"	1.692"	1.691"	1.689"	
Relative	0 mils	2 mils	1 mils	-1 mils	
Check		Face	Rim		
Top + Bottom=		1 mils	-1 mils		
Right + Left =		2 mils	-1 mils		
Difference=		-1 mils	0 mils		



### Rim Recheck (If Necessary)

Position	Top	Left	Bottom	Right	Top
Rim (Mils)					

Comments: \_\_\_\_\_

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Oil Deflector Clearances

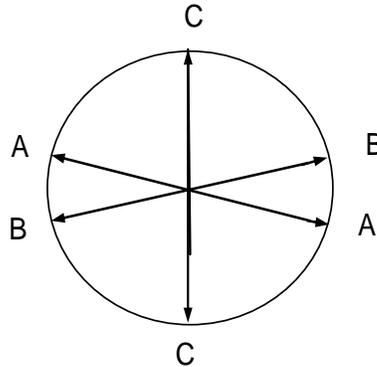
Closing

Date(m/d/y) 3/16/2010

Turbine S/N: 170X394

Prepared by \_\_\_\_\_ Block

INSPECTIONS & CHECKS				CODE	
Teeth Inspected	_____	_____	_____	<b>X</b>	Work Carried Out
Journals Inspected	_____	_____	_____	<b>N</b>	Not Done
	_____	_____	_____	<b>NA</b>	Not Applicable
	_____	_____	_____	<b>C</b>	See Comments
	_____	_____	_____	<b>V</b>	Visual Inspection
	_____	_____	_____	<b>MP</b>	Mag. Particle
	_____	_____	_____	<b>UT</b>	Ultrasonic
	_____	_____	_____	<b>PT</b>	Penetrant



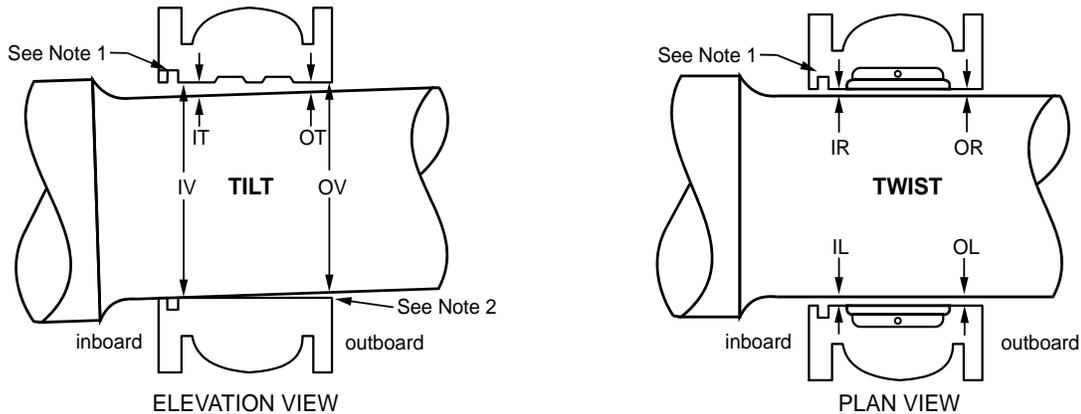
Location Number	Oil Deflector			Journal Dia	Clearance			Condition Comment
	A-Dia	B-Dia	C-Dia		Average	Min.	Max.	
T-3	18.937	18.937	18.950	18.911	0.030	0.026	0.039	OK
T-4	19.974	19.966	19.963	19.920	0.048	0.043	0.054	OK
T-5	22.014	22.019	22.016	21.975	0.041	0.039	0.044	OK
T-6 TE	21.863	21.859	21.859	21.824	0.036	0.035	0.039	OK
T-6 GE	22.039	22.038	22.034	21.999	0.038	0.035	0.040	OK
T-7 TE	22.040	22.040	22.042	21.997	0.044	0.043	0.045	OK
T-7 GE	22.036	22.034	22.036	21.993	0.042	0.041	0.043	OK
T-8 TE	22.038	22.037	22.035	21.995	0.042	0.040	0.043	OK
T-8 GE	22.047	22.044	22.044	21.995	0.050	0.049	0.052	OK
T/G TE	22.039	22.038	22.040	21.997	0.042	0.041	0.043	OK
T/G GE	22.040	22.040	22.042	21.998	0.043	0.042	0.044	OK
T-10 Inner	22.034	22.033	22.035	21.998	0.036	0.035	0.037	OK
T-10 outer	25.292	25.291	25.291	25.247	0.044	0.044	0.045	OK
T-11 TE	8.522	8.519	8.521	8.500	0.021	0.019	0.022	OK
T-11 GE	8.521	8.523	8.523	8.500	0.022	0.021	0.023	OK

Comments:	

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

## Bearing To Journal Alignment For Bearings With Ball Seats

Date(m/d/y) 3/22/2012 Turbine Serial No. 170X394 Prepared by Hill / Block



**NOTE:**

1. On most generator bearings, the end leakage groove is on the outboard end.
2. On hood bearings, the outboard end is set low to compensate for vacuum deflection.

**TILT**

Brg #	Section	Reading in Inches		Reading in Mils		Limits 0.0 To	Actual (Mils)	Tolerance Check
		IV	OV	IT	OT			
T-5		19.022"	19.023"	26.0 Mils	26.0 Mils	1.9 Mils	1.0 Mils	✓
T-6		21.011"	21.010"	34 Mils	31 Mils	2.1 Mils	2.0 Mils	✓
T-7		19.017"	19.017"	27 Mils	25 Mils	1.9 Mils	2.0 Mils	✗
T-8		21.029"	21.027"	39 Mils	37 Mils	2.1 Mils	0.0 Mils	✓
T-10	Gen	19.933"	19.933"	22.0 Mils	22.0 Mils	2.0 Mils	0.0 Mils	✓

**TWIST**

Brg #	Section	Readings in Mils				Limits	Actual	Tolerance Check
		IL	OL	IR	OR			
T-5		23.0 Mils	25.0 Mils	23.0 Mils	21.0 Mils	±5.7 Mils	2.0 Mils	✓
T-6		27.0 Mils	30.0 Mils	28.0 Mils	22.0 Mils	±6.3 Mils	4.5 Mils	✓
T-7		22.0 Mils	22.0 Mils	22.0 Mils	21.0 Mils	±5.7 Mils	0.5 Mils	✓
T-8		32.0 Mils	33.0 Mils	24.0 Mils	27.0 Mils	±6.3 Mils	-1.0 Mils	✓
T-10	Gen	27.0 Mils	26.0 Mils	27.0 Mils	22.0 Mils	±6.0 Mils	2.0 Mils	✓

**Comments**

# Mitchell Unit #2 spring 2012 Turbine/Generator Outage

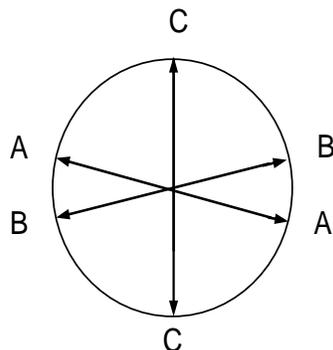
## Journal Bearings

### Closing

Date 3/13/12 Turbine Serial No. 170X394 Prepared by RF Spencer

INSPECTIONS & CHECKS		CODE
Ball Contact Check	_____	<b>X</b> Work Carried Out
Ball Pinch Check	_____	<b>N</b> Not Done
Ball Torque Check	_____	<b>NA</b> Not Applicable
Twist & Tilt Check	_____	<b>C</b> See Comments
Journal Inspection	_____	<b>V</b> Visual Inspection
Babbit Inspection	_____	<b>MP</b> Mag. Particle
Screens & Orifices	_____	<b>UT</b> Ultrasonic
T/C Calib.	_____	<b>PT</b> Penetrant

Bearing No.	Bearing Type	Forward or Turbine End			Aft or Generator End			Journal Dia.	Vertical Clearance	
		A-Dia	B-Dia	C-Dia	A-Dia	B-Dia	C-Dia		Mils	Mils/In
T-5	Elip	19.037	19.034	19.023	19.040	19.039	19.022	18.991	31	1.6
T-6	Elip	21.026	21.035	21.010	21.026	21.037	21.011	20.973	37	1.8
T-7	Elip	19.041	19.041	19.017	19.041	19.041	19.017	18.992	26	1.3
T-8	Elip	21.046	21.045	21.029	21.044	21.046	21.027	20.989	38	1.8
T-10	Elip	19.956	19.956	19.933	19.956	19.956	19.933	19.905	28	1.4



Shim

Leadwire

#### Ball Seat Pinch Fits

Bearing Number	Pinch* Mils	Bearing Number	Pinch* Mils
T-5			
T-6			
T-7			
T-8			
T-10			

\* Pinch equals wire thickness minus shim

Comments: T-7 damage in U/H overshot area.

## **Mitchell Unit #2 spring 2012 Turbine/Generator Outage**

### **8. Misc. Work Performed**

#### **8.1 Main Turbine Oil Coolers**

The upper and lower cooler heads were removed, tube bundles were cleaned by an outside contractor and a complete inspection was performed on the oil cooler units with minor issues found. The cooler heads were reinstalled with new gaskets in place, the system energized and checked for leaks

#### **8.2 Stator Water Coolers**

Stator Water cooler heads were removed and inspected with no issues found. The cooler tubes were cleaned by an outside contractor and vacuum checked for leaks. The cooler heads were reinstalled, the system energized and checked for leaks with no issues found.

#### **8.3 Stator Water Twin Strainer**

The "Y" strainer was disassembled for inspection. The running strainer was removed and inspected, about 60% of the fine mesh screen had eroded away. The strainer was sent to Central Machine Shop for installation of new fine mesh screen. The spare "Y" strainer was placed in service and the repaired strainer placed stand by canister.

MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Page Attachment 9  
Page 63 of 76

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3/27/12 WIO #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: 1/4 Outer Shell Welds  
S/N: \_\_\_\_\_ A+B L.P.

TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

EQUIPMENT:

Coil  Prods  Yoke  Clamps

CURRENT TYPE:  AC  DC AMP TURNS: 3000

INSPECTION PROCEDURE: MI-1-S-2.3

INSPECTION SPECIFICATIONS: MI-1-S-2.3

INSPECTION RESULTS / DETAILS: List according to components section per example below

Example: Stage 1

- MAG Results =
- Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

"B" ENDS ONLY 3 CRACKS IN WELD ADMISION SIDE OF  
20" STAGE GEN END

CENTER SECTION - OK

"A" ENDS + CENTER SECTION - OK

VISUAL: "B" 1/4 ENDS + CENTER SECTION - OK

"A+B" ENDS NEAR CENTER <sup>LEFT</sup> FEMALE FIT BOTH SIDES  
RIGHT FEMALE FIT TURB END ONLY

THESE FITS HAVE ALOT OF PULLED METAL

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3/27/12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

ULTRASONIC TEST REPORT  
AMERICAN ELECTRIC POWER  
CENTRAL MACHINE SHOP  
3100 MacCorkle Avenue, Building 309  
South Charleston, WV 25303

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
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WORK ORDER NO. \_\_\_\_\_

DATE 3/27/12

1. IDENTIFICATION:

Facility MITCHELL  
PC/SN UNIT 2

Item BFP SHAFT

2. TECHNIQUE:

Straight Beam     Angle Beam  
 Search Angle -  90°     45°     60°

Frequency -  1 MH     2.25 MH     5 MH  
 Single Transducer     Dual Transducer

Type of Couplant ULTRA GEL    Test Unit K-B

3. CALIBRATION - REFLECTOR TYPE:

Drilled Hole     V. Notch     IIW Block     Other \_\_\_\_\_

4. INSPECTION PROCEDURE: MI-1-5-2-4

5. INSPECTION SPECIFICATIONS: MI-1-5-2-4

6. TYPE OF INDICATION:

1. Crack     2. Lamination     3. Corrosion/Erosion     4. Internal Voids     5. Linear

7. SKETCH/DESCRIPTION:

THE SHAFT WAS INSPECTED  
IN PLACE

NO CRACKS WERE FOUND

8. INSPECTION PERFORMED BY: (AEP Level II UT Inspector)

Signature J COBB

3-27-12  
DATE

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

# MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

KPSC Case No. 2012-00578  
First Set of Data Requests  
Item No. 33  
Attachment 9  
Page 65 of 76

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

## IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3/27/12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: \*L.P. A+B PACKING CASES  
S/N: \_\_\_\_\_

## TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

## EQUIPMENT:

Coil  Prods  Yoke  Clamps

CURRENT TYPE:  AC  DC AMP TURNS: 3000

INSPECTION PROCEDURE: MI-1-S-2-3

INSPECTION SPECIFICATIONS: MI-1-S-2-3

## INSPECTION RESULTS / DETAILS: List according to components section per example below

- Example: **Stage 1**
- MAG Results =
  - Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE PACKING CASES WERE INSPECTED  
AFTER BRAST CLEANING  
NO CRACKS WERE FOUND

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3/27/12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

# LIQUID PENETRANT AND VISUAL INSPECTION REPORT

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

## IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3/27/12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: H.P + 1ST RHT BYPASS  
S/N: \_\_\_\_\_ VALVE SEATS

## TECHNIQUE:

Visible Dye  Water Washable  Fluorescent

## MATERIAL:

Ferrous  Nonferrous

INSPECTION PROCEDURE: MI-1-5-2-2

INSPECTION SPECIFICATION: MI-1-5-2-2

TYPE OF INDICATION:  Crack  Linear  Inline Porosity  Rounded  Other: \_\_\_\_\_

## INSPECTION RESULTS / DETAILS: List according to components section per example below

- Example: Stage 1
- P/T Results =
  - Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE SEATS WERE INSPECTED AFTER  
BLAST CLEANING

NO CRACK FOUND

(Continued on back of sheet)

## INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3/27/12

## APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

ULTRASONIC TEST REPORT  
AMERICAN ELECTRIC POWER  
CENTRAL MACHINE SHOP  
3100 MacCorkle Avenue, Building 309  
South Charleston, WV 25303

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Attachment 9  
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WORK ORDER NO. \_\_\_\_\_

DATE 3/27/12

1. IDENTIFICATION:

Facility MITCHELL  
PC/SN UNIT 2

Item COUPLING BOLTS

2. TECHNIQUE:

Straight Beam     Angle Beam  
 Search Angle -  90°     45°     60°

Frequency -  1 MH     2.25 MH     5 MH  
 Single Transducer     Dual Transducer

Type of Couplant ULTRAGEL    Test Unit K.B

3. CALIBRATION - REFLECTOR TYPE:  Drilled Hole     V. Notch     IIW Block     Other \_\_\_\_\_

4. INSPECTION PROCEDURE: MI-1-5-2-4

5. INSPECTION SPECIFICATIONS: MI-1-5-2-4

6. TYPE OF INDICATION:

1. Crack     2. Lamination     3. Corrosion/Erosion     4. Internal Voids     5. Linear

7. SKETCH/DESCRIPTION:

B+D COUPLING BOLTS  
C #'s 5, 6, 7, 8, 11, 13, 15 & 16

No Cracks Were Found

3. INSPECTION PERFORMED BY: (AEP Level II UT Inspector)

Signature J COSO

3/27/12  
DATE

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_

DATE \_\_\_\_\_

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3-13-12 W/O #: \_\_\_\_\_

Facility/Unit: MITCHELL 2 Description: M.S. + CV SEATS

S/N: \_\_\_\_\_

TECHNIQUE:

Visible Dye  Water Washable  Fluorescent

MATERIAL:

Ferrous  Nonferrous

INSPECTION PROCEDURE: MI-1-5-2-2

INSPECTION SPECIFICATION: MI-1-5-2-2

TYPE OF INDICATION:  Crack  Linear  Inline Porosity  Rounded  Other: \_\_\_\_\_

INSPECTION RESULTS / DETAILS: List according to components section per example below

Example: Stage 1

- P / T Results =
- Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE SEATS WERE INSPECTED AFTER  
BLAST CLEANING

M.S. # 2 3" RADIAL CRACK AT 3:00

C.V # 3 STELLITE MISSING

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3-13-12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
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AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3/13/12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: 1<sup>ST</sup> + 2<sup>ND</sup> RHT VALVES  
S/N: \_\_\_\_\_

TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

EQUIPMENT:

Coil  Prods  Yoke  Clamps

CURRENT TYPE:  AC  DC AMP TURNS: \_\_\_\_\_

INSPECTION PROCEDURE: MI-1-5-2-3

INSPECTION SPECIFICATIONS: MI-1-5-2-3

INSPECTION RESULTS / DETAILS: List according to components section per example below

Example: Stage 1

- MAG Results =
- Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE SEAS + STEAM DAM AREAS WERE  
BLAST CLEANED PRIOR TO INSPECTION

NO CRACKS WERE FOUND

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3/13/12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3-13-12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: VALVE STEM SEAT AREA  
S/N: \_\_\_\_\_

TECHNIQUE:

Visible Dye  Water Washable  Fluorescent

MATERIAL:

Ferrous  Nonferrous

INSPECTION PROCEDURE: MI-1-5-2-2

INSPECTION SPECIFICATION: MI-1-5-2-2

TYPE OF INDICATION:  Crack  Linear  Inline Porosity  Rounded  Other: \_\_\_\_\_

INSPECTION RESULTS / DETAILS: List according to components section per example below

Example: Stage 1

- P / T Results =
- Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE STEMS LISTED WERE INSPECTED

<u>M.S.</u>	<u>1-4</u>
<u>1<sup>ST</sup> RHT</u>	<u>1-2</u>
<u>2<sup>ND</sup> RHT</u>	<u>1-4</u>

NO CRACKS WERE FOUND

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3-13-12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Page Attachment 9  
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AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3-13-12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: MS PRESSURE SEAL HEADS  
S/N: \_\_\_\_\_ ALSO 1ST + 2ND RHT

TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

EQUIPMENT:

Coil  Prods  Yoke  Clamps

CURRENT TYPE:  AC  DC AMP TURNS: \_\_\_\_\_

INSPECTION PROCEDURE: MI-1-S-2-3

INSPECTION SPECIFICATIONS: MI-1-S-2-3

INSPECTION RESULTS / DETAILS: List according to components section per example below

Example: Stage 1

- MAG Results =
- Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE GASKET AREA WAS JUST CLEANED PRIOR TO INSPECTION

# 1, 3 + 4 CRACKED IN RADII

# 2 OK

VISUAL: 1ST + 2ND RHT RADII AREA  
NO CRACKS

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J. Cobb DATE 3-13-12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 3/13/12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: MS + CV BODIES  
S/N: \_\_\_\_\_

TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

EQUIPMENT:

Coil  Prods  Yoke  Clamps  
CENTRAL CONDUCTION

CURRENT TYPE:  AC  DC AMP TURNS: 3000

INSPECTION PROCEDURE: MI-1-5-2-3

INSPECTION SPECIFICATIONS: MI-1-5-2-3

INSPECTION RESULTS / DETAILS: List according to components section per example below

- Example: Stage 1
- MAG Results =
  - Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

THE BODIES WERE BLAST CLEANED  
PRIOR TO INSPECTION

STEAM DAM IN MS 1 + 3 CRACKED AT  
BOTTOM IN WELD  
NO OTHER CRACKS FOUND

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 3-13-12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_

ULTRASONIC TEST REPORT  
AMERICAN ELECTRIC POWER  
CENTRAL MACHINE SHOP  
3100 MacCorkle Avenue, Building 309  
South Charleston, WV 25303

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Attachment 9  
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WORK ORDER NO. \_\_\_\_\_

DATE 3-13-12

1. IDENTIFICATION:

Facility MITCHELL  
PC/SN Unit 2

Item PRESSURE SEAL HEAD BOLTS

2. TECHNIQUE:

Straight Beam     Angle Beam  
 Search Angle -  90°     45°     60°

Frequency -  1 MH     2.25 MH     5 MH  
 Single Transducer     Dual Transducer

Type of Couplant ULTRA GEL

Test Unit K.B

3. CALIBRATION - REFLECTOR TYPE:  Drilled Hole     V. Notch     IIV Block     Other \_\_\_\_\_

4. INSPECTION PROCEDURE: MI-1-5-2-4

5. INSPECTION SPECIFICATIONS: MI-1-5-2-4

6. TYPE OF INDICATION:

1. Crack     2. Lamination     3. Corrosion/Erosion     4. Internal Voids     5. Linear

7. SKETCH/DESCRIPTION: THE FOLLOWING PRESSURE SEAL HEAD BOLTS WERE INSPECTED

1ST RHT - 1-2

2ND RHT - 1-4

NO CRACKS FOUND

8. INSPECTION PERFORMED BY: (AEP Level II UT Inspector)

Signature J COBB

APPROVED BY: (NDE Supervisor)

3-13-12  
DATE

Signature \_\_\_\_\_

DATE \_\_\_\_\_

ULTRASONIC TEST REPORT  
AMERICAN ELECTRIC POWER  
CENTRAL MACHINE SHOP  
3100 MacCorkle Avenue, Building 309  
South Charleston, WV 25303

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Attachment 9  
Page 74 of 76

WORK ORDER NO. \_\_\_\_\_

DATE 3-13-12

1. IDENTIFICATION:

Facility MITCHELL  
PC/SN UNIT 2

Item VALVE BOLTS

2. TECHNIQUE:

Straight Beam     Angle Beam  
 Search Angle -  90°     45°     60°

Frequency -  1 MH     2.25 MH     5 MH  
 Single Transducer     Dual Transducer

Type of Couplant ULTRA GEL    Test Unit K-B

3. CALIBRATION - REFLECTOR TYPE:  Drilled Hole     V. Notch     IIV Block     Other \_\_\_\_\_

4. INSPECTION PROCEDURE: MI-1-5-2-4

5. INSPECTION SPECIFICATIONS: MI-1-5-2-4

6. TYPE OF INDICATION:

1. Crack     2. Lamination     3. Corrosion/Erosion     4. Internal Voids     5. Linear

7. SKETCH/DESCRIPTION: THE BOLTS LISTED WERE INSPECTED

MAIN STOP - 1-4  
CONTROL - 1-4  
1ST RHT - 1+2  
2ND RHT - 1-4  
H.P. & 1ST RHT BYPASS

NO CRACKED BOLTS WERE FOUND

8. INSPECTION PERFORMED BY: (AEP Level II UT Inspector)

Signature J CoBB

3-13-12  
DATE

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_

DATE \_\_\_\_\_

ULTRASONIC TEST REPORT  
AMERICAN ELECTRIC POWER  
CENTRAL MACHINE SHOP  
3100 MacCorkle Avenue, Building 309  
South Charleston, WV 25303

KPSC Case No. 2012-00578  
Staff's First Set of Data Requests  
Item No. 33  
Attachment 9  
Page 75 of 76

WORK ORDER NO. \_\_\_\_\_

DATE 3-13-12

1. IDENTIFICATION:

Facility MITCHELL  
PC/SN UNIT 2

Item BEARINGS

2. TECHNIQUE:

Straight Beam     Angle Beam  
 Search Angle -  90°     45°     60°

Frequency -  1 MH     2.25 MH     5 MH  
 Single Transducer     Dual Transducer

Type of Couplant ULTRA GEL    Test Unit K-B

3. CALIBRATION - REFLECTOR TYPE:  Drilled Hole     V. Notch     IIV Block     Other \_\_\_\_\_

4. INSPECTION PROCEDURE: MI-1-5-2-4

5. INSPECTION SPECIFICATIONS: MI-1-5-2-4

6. TYPE OF INDICATION:

1. Crack     2. Lamination     3. Corrosion/Erosion     4. Internal Voids     5. Linear

7. SKETCH/DESCRIPTION:

THE BEARINGS LISTED BELOW WERE  
INSPECTED FOR BABBITT BOND  
T-5, T-6, T-7, T-8, T-10 + T-11  
ALL WERE 100% BONDED

8. INSPECTION PERFORMED BY: (AEP Level II UT Inspector)

Signature J COBB

3-13-12

( ) APPROVED BY: (NDE Supervisor)

DATE

Signature \_\_\_\_\_

DATE

MAGNETIC PARTICLE AND VISUAL INSPECTION REPORT

AMERICAN ELECTRIC POWER  
Central Machine Shop  
3100 MacCorkle Avenue, Building 309  
South Charleston, West Virginia 25303

in Shop  
 in Plant

IDENTIFICATION

CMS Number: \_\_\_\_\_ Date: 2/22/12 W/O #: \_\_\_\_\_  
Facility/Unit: MITCHELL 2 Description: L-O BLADE O.J BFFT  
S/N: \_\_\_\_\_

TECHNIQUE:

Dry Powder  Wet Fluorescent  Non Fluorescent

EQUIPMENT:

Coil  Prods  Yoke  Clamps

CURRENT TYPE:  AC  DC AMP TURNS: \_\_\_\_\_

INSPECTION PROCEDURE: MI-1-5-2-3

INSPECTION SPECIFICATIONS: MI-1-5-2-3

INSPECTION RESULTS / DETAILS: List according to components section per example below

- Example: Stage 1
- MAG Results =
  - Visual Results =

Note: For each indication list the type (Crack, Linear Surface, Linear subsurface, Undercut, Non-Relevant)

STAGES B+C WERE INSPECTED WITH THE ROTON INSPECTION

NO CRACKS WERE FOUND

VISUAL: ALL LOOK GOOD BUT DIRTY

(Continued on back of sheet)

INSPECTION PERFORMED BY: (AEP Level II MT Inspector)

Signature J COBB DATE 2-22-12

APPROVED BY: (NDE Supervisor)

Signature \_\_\_\_\_ DATE \_\_\_\_\_