KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33 Attachment 14 Page 1 of 39

## American Electric Power Mitchell Station

Unit #2 TB #170X394

Advance Aero Steampath Replacement Fall Outage 2005

Inspection & Repair Services
General Electric International, Inc.
Pittsburgh Service Center
4930 Buttermilk Hollow Road
West Mifflin, PA 15122-1108
412.469.6080

## GE ENERGY TURBINE REPORT



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## GE ENERGY TURBINE REPORT



## **JOB SUMMARY**

This report documents the work performed for American Electric Power in the Pittsburgh Service Center during the Unit #2 fall 2005 outage at the Mitchell Power Station.

Work performed at the Pittsburgh Service Center as part of the Mitchell Station Unit #2 Advanced Aero Steampath Replacement included:

- 1. HP/RHT Turbine Rotor Advance Aero Bucket Replacement
- 2. HP Inner Shell Repairs and Modifications
- 3. N-1 / N-3 Packing Head Packing Installation
- New N-2 Packing Head Packing Installation
- 5. HP/RHT Diaphragms Repairs and Modifications
- 6. First Stage Nozzle Box Repairs and Modifications

This report is assembled from data collected from the following sources:

- John Bishop, Service Shop Manager
- Randy Stephenson, Power Generation Manager
- Jim Locklear, Turbine Engineering
- Bob Masters, Turbine Engineering
- Shop Craftsmen and Technicians



## HP/RHT Rotor Advanced Aero Bucket Replacement

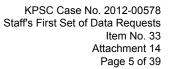
In Spring 2005, the American Electric Power spare HP/IP rotor was received and unloaded at the Pittsburgh Service Center to be modified as part of the Mitchell Station Unit # 2 Advanced Aero Steampath Replacement. After all the original buckets were removed from the rotor, initial inspections were performed (see attached data sheets). The rotor was then blast cleaned, and a magnetic particle inspection of the entire rotor was performed. No recordable linear indications were detected during the inspection. (See attached NDE report). A bore plug was manufactured and then installed in generator end of the rotor.

The 2<sup>nd</sup> through 6<sup>th</sup> stage diaphragm packing fits and 1<sup>st</sup> tooth on the N-2 packing lands were machined as part of the Advanced Aero Steampath. (See attached data sheets). According to GE recommendations, the T-1 journal was reconditioned due to an out-of-round state. The T-2 journal was polished in preparation for the multi-step low speed balance process.

A low speed balance of the rotor was performed with all original buckets removed and all other work completed except for the installation of the new Advanced Aero Buckets. Following the initial balance, the new Advanced Aero buckets for the middle stages of the rotor were installed and machined. A second low speed balance of the rotor was performed with only the middle stages of the new buckets installed. The final two end stages of the new Advanced Aero buckets were then installed and machined. A final low speed balance of the rotor was performed with the two end rotor stages of buckets installed. (See attached final balance report). The control was then installed and run-out inspections were performed. (See attached control rotor inspection report).

The rotor was prepared for transportation and shipped to Mitchell Station November 1, 2005.

SEE ATTACHED SUPPORTING DOCUMENTATION





## **GE Inspection Services**

MAGNETIC	PARTICLE E	XAMINAT	ION REPORT	-				☐ Nuclear	☑ Non-Nuclear	
To:						From:		Date:		
GE Service	Shop					Steve	Alger	0:	9/30/2005	
Project:										
Bucket cove	rs/rivets									
Purchase Order	No:				GEIS Job No	:				
				···				123 .		
ltem	Weld	Structural	Casting	Machinery	Mach. Parts	Pipe	N/A	Other:	-	
	Non-Weld	Plate	Pipe	Bar	Casting	Mach. Parts	N/A	Other		
Material	Sîze:		No. of Pieces		Base Metal CS	Type of Fills	er Material	Weld Smooth	☑ N/A ☐ As Welded	
Location		ı	Pittsburgh,P	A		System		Mitchell		
Acceptance						Procedure				
Standards			mer Specific				GE	IS QCP #50	0	
Type of Check	Initial	Plate Edge	In Process	Back Gouge	Root Pass	Repair	24 Hr.	7 Day	Final	
	☐ Longitu	udinal 🗸	Coil		DC Probe	<u> </u>	Continuous	Other:		
Type of	☐ Wet		Dry		Direct Contac	et 🔲 f	Residual			
Inspection									·	
	☑ Circula	r 🔲	AC Prod		Yoke		Other			
	MT Equipmen					Surface Prepar	ation Metho	d		
			lux Y-6 SN. N	1MP009				and blasted		
	Inspection Me		======			Demagnetization Method / Equipment				
		Circlesate	No. 778 Flo	ourescent		Magnaflux Y-6 SN. NMP009				
						F	Results of Ins	spection		
							Rucket or	were and rive	ts were examined	
									ntaining rivets.	
							on an		maning moto.	
							No report	table indicatio	ons were observed	
✓ Customer S	pecifications		Requested By:		Reported By	(Technician):		NDT Supervisor	r:	
✓ Accept	Reject		Matthew	Mcauire	,	Steve Alger		lo	e lubrant	

NOTICE:

THIS EXAMINATION REPORT IS A REPORT OF THE RESULTS OF THE NDT PROCEDURE ACTUALLY PERFORMED BY THIS COMPANY IT IS SUBJECT TO THE LIMITATIONS OF THE TESTING SPECIFICATIONS AND PROCEDURES WHICH WERE UTILIZED. BY FURNISHING THIS REPORT, GE INSPECTION SERVICES DOES NOT GUARANTEE ANY CONDITION OF THE TESTED SPECIMEN.



## **GE Inspection Services**

Steel	VISUAL EXA	MINATION	N REPO	)RT							☐ Nucl	ear	☑ Non-Nuclear
	To:			-				From:			Date:		· · · · · · · · · · · · · · · · · · ·
Sucket covers/rivets   Solicition   Solici	GE Service	Shop						Ste	eve Al	ger		09	9/30/2005
State   Stat	Project:												
Non-Weld   Plate   Pipe   Bar   Casting   Machinery   Mach. Parts   Pipe   N/A   Other	Bucket cove	ers/rivets											
Non-Weld	Purchase Order	No:					GEIS Job No:						
Non-Weld   Plate   Pipe   Bar   Casting   Mach. Parts   IVA   Other		· · · · · · · · · · · · · · · · · · ·					1			501	23		
Non-Weld	ltem	ł	_		Casting	_					Other:		
No. of Pieces   Type of Base Metal   Type of Filler Material   Weld   NA   Smooth   As Welded			_				Casting	Mach, Pa	arts	N/A	Other		
	in in the contract of	ļ <b>.</b>	<u>L</u>					<u> </u>	C = 111				
Location	Material	Size;						Type o		vlaterial	ľ		
Acceptance Standards  GEIS QCP #800  M/A Accept Reject	Location						<i>-</i>	System	IVA		I L SINO	oth I	As vveided
Accept Reject				F	Pittsburgh,P.	Α		3,500			Mitche	11	
N/A Accept Reject	Acceptance							Procedure	•				
Arc Strikes	Standards			GI	EIS QCP #8	00				GE	IS QCP :	#800	)
Arc Strikes													
Arc Strikes		i I	N/A	Acce	ept Reject				N/A	Accep	ot Rej	ect	
Type of Inspection			V			Joint Prepa	aration		V			J	oint Fit-Up
Type of Inspection Inspection Inspection Indications Inspection Indications Inspection Indications Indications Indications Inspection Indication Inspection Inspectio			v			Arc Strikes				V			•
Not Pass   Indications   Ind	Type of					Porosity							•
Pillet Size   Indications	in a difficulty and					•	forcement			•			
□ □ Joint Cleanliness □ □ □ Indications □ □ □ Other:  General conditon  Results of Inspection  Bucket covers and rivets were examined on all 5 buckets containing rivets.  No reportable indications were observed							101001110111						
Slag  General conditon  Results of Inspection  Bucket covers and rivets were examined on all 5 buckets containing rivets.  No reportable indications were observed							nliness						
General conditon  Results of Inspection  Bucket covers and rivets were examined on all 5 buckets containing rivets.  No reportable indications were observed							1111033						
Results of Inspection  Bucket covers and rivets were examined on all 5 buckets containing rivets.  No reportable indications were observed  Customer Specifications  Requested By:  Reported By (Technician):  NDT Supervisor:			Ľ	ш		Siay				v			
Bucket covers and rivets were examined on all 5 buckets containing rivets.  No reportable indications were observed  Customer Specifications  Requested By:  Reported By (Technician):  NDT Supervisor:					<del> </del>							<u>(-</u>	eneral conditon
on all 5 buckets containing rivets.  No reportable indications were observed   ☐ Customer Specifications  Requested By:  Reported By (Technician):  NDT Supervisor:									Res	ults of ins	pection		
No reportable indications were observed  ☐ Customer Specifications  Requested By:  Reported By (Technician):  NDT Supervisor:									В				
☑ Customer Specifications Requested By: Reported By (Technician): NDT Supervisor:										on all	5 bucket	s coi	ntaining rivets.
☑ Customer Specifications Requested By: Reported By (Technician): NDT Supervisor:													
									N	lo report	able indi	catio	ns were observed
	[] Customer S	Consideration -		<del></del>	Paguantad D.		Banart - J.D.	(Taaba:::::	1.		NOTO		
	✓ Customer S  ✓ Accept	Reject									אטו אוייי		

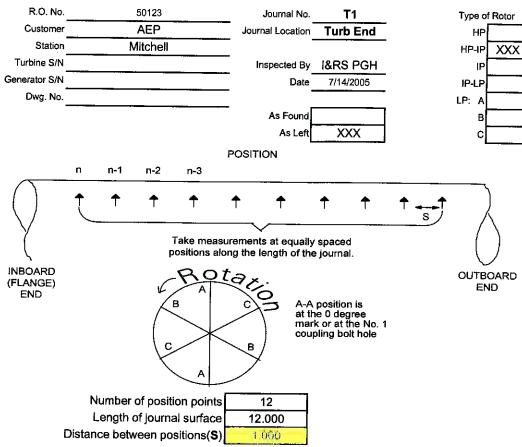
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## Steam Turbine Rotors33

Journal Dimering 14



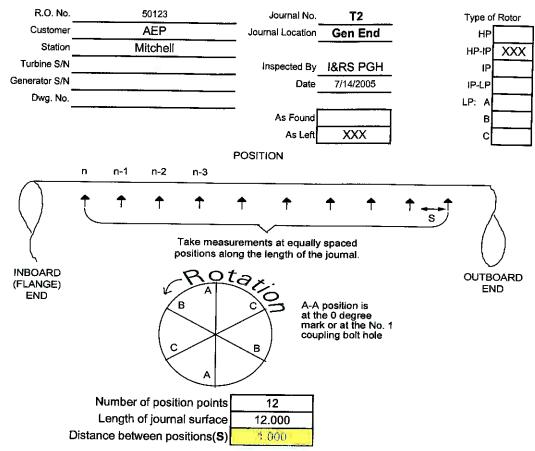


Position	90 Deg.	90 Deg.	0 Deg.	Lobe (Out of Round)		
1	15.9930	15.9930	15.9930	0.0000		
2	15.9930	15.9930	15.9930	0.0000		
3	15.9930	15.9930	15.9930	0.0000		
4	15.9930	15.9930	15.9930	0.0000		
5	15.9930	15.9930	15.9935	0.0005		
6	15.9935	15.9930	15.9935	0.0005		
7	15.9935	15.9935	15.9935	0.0000		
8	15.9935	15.9935	15.9935	0.0000		
9	15.9935	15.9935	15.9935	0.0000		
10	15.9935	15.9935	15.9935	0.0000		
11	15.9935	15.9935	15.9935	0.0000		
12	15.9935	15.9935	15,9935	0.0000		
Taper	0.0005	0.0005	0.0005	Diameter		
Avg. Dia.	15.9933	Jnl Dia. Dwg.		Variance		
Additiona	I Comments					

Steam Turbine Rotors3



Journal Dime



Position	90 Deg.	90 Deg.	0 Deg.	Lobe (Out of Round		
1	16.9660	16.9660	16.9650	0.0010		
2	16.9660	16.9655	16.9650	0.0010		
3	16.9660	16.9655	16.9655	0.0005		
4	16.9660	16.9655	16.9650	0.0010		
5	16.9660	16.9655	16.9655	0.0005		
6	16.9660	16.9655	16.9650	0.0010		
7	16.9660	16.9655	16.9655	0.0005		
8	16.9660	16.9660	16.9655	0.0005		
9	16.9660	16.9660	16.9655	0.0005		
10	16.9655	16.9660	16.9650	0.0010		
11	16.9655	16.9660	16.9655	0.0005		
12	16.9660	16.9660	16.9650	0.0010		
Taper	0.0005	0.0005	0.0005	Diameter		
Avg. Dia.	16.9656	Jni Dia. Dwg.		Variance		

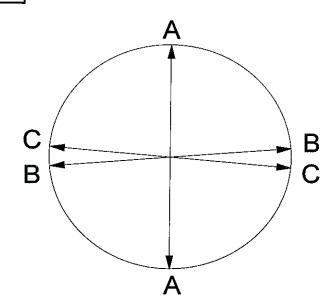
98)

R.O. No	50123	
Customer	AEP	
Station	Mitchell	

Turbine S/N	
Unit No.	1
Dwg. No.	
Deflector No	-

Inspected By_	I&RS Pittsburgh
Date_	5/17/2005

As Found As Left XXXX



Tooth	Oil Deflector Journal			Journal	Clearance			
Number	A-Dia	Dia   B-Dia   C-Dia		Dia	Average	Min.	Max.	
T-1				18.4970				
T-2				17.9910				

Comments:	$\neg$
Both fits on T-1 and T-2 were round and striaight with-in .001"	
Lite rubbing noted on both fits	





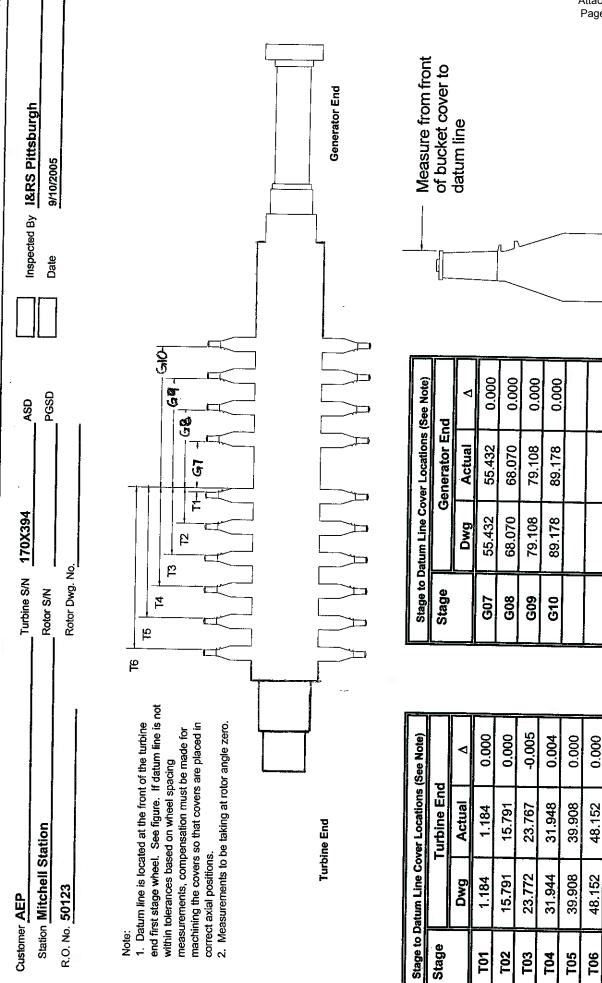
## KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33 Steam Turbine Rotors 14 Page 10 of 39

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Custome					Stag	e			
	n Mitchell				Turbine S/	Ν			
R.O. No	o. <u>50123</u>				Inspected By I&RS PITTSBURGH				
					Dat	e 5/17/2005			
	XXX	As Found		As Left					
					A		<del></del>   A	<b> </b> _	
	8	1				_		T	
	Ĭ	<b>"</b>							
	+1	1		δ	Straddle Thrust	Runner $\langle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	Overhung Thro	ust Runner	
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1	/	\	'\			Dim	nensional Inspec	tion	
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6—\;	"" n+ n	n n m	<del>-i/-</del> -3			Inner	Mid	Outer	
	+m	" m-			0°	15.0070	15.0065	15.0065	
`	\  '''	/			900	15.0070	15.0070	15.0065	
	+!	_!			180° 270°	15.0070	15.0065	15.0065	
	5	4			270	15.0070	15.0070	15.0065	
				TE Fac	e Flatness				
	1 0 0000	2	3	4	5	6	7	8	
M	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
N N	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	
	JI 0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	
				GE Face Flatne	55				
		2	3	4	5	6	7	8	
L	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
M	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	
N	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	
						**			
Comments:									
ightly Scored									
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## KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33 Steam Turbine Rotors Page 11 of 39 Coupling Face Flatness & Male / Female Rabbet Interference

Customer <u>AE</u>									mobected b)	GE I&RS	<u>ı ırıanuıç</u>	<del>, , , , , , , , , , , , , , , , , , , </del>
Station Mit			<del>-</del>					<del></del>	Date	<b>5/20/2005</b>		
R.O. No. <u>50</u> 1	123			_	Turbine S/N			_	Unit No	·		_
				Coup	oling Location	Gene	rator End	_				
		MALE	RABBET						FEMAL	E RABBET		
		RABBET	FIT DIAS	=	i	₿╱▔	, D			RABBET	FIT DIAS	_
		As	As		ام		$\leq$			As	As	7
-		Found	Left	_	C		$\leq \mathcal{I}^{c}$			Found	Left	1
- ⊩	A-A				ı	$\sim$	$\mathcal{L}_{B}$		A-A	21.9980		]
<u> </u>	В-В				•	Ä			B-8	21.9980		ļ
I <del></del>	с-с								C-C	21.9975		6:
	D-D		<u> </u>				ates interferer		D-D	21.9975		l
	Avg.			L N	iegative nur	nber ind	icates clearan	ce.	Avg.	21.9978		
0	.O.R	0.0000	0.0000	<u>I</u>	Interfer	rongo (A	s Found)	1	0,0.R	0.0005	0.0000	
6		7 M ®	8 L M	<u>M</u> 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	interfo	arence (A	As Left)		6 L N N N	e N		
5		*N 0 4	<u>}</u>	<ul><li>L</li></ul>				(, @	N N N N N N N N N N N N N N N N N N N	N M		
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As I	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015	As Found M 0.0000 0.0000	FEMALE  N 0.0000 0.0000	N M 3	As Left	N
As I	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015 3 0.0015	As Found  M  0.0000  0.0000  0.0000	FEMALE  N 0.0000 0.0000 0.0000	N M 3	As Left	N
As I	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015 3 0.0015 4 0.0015	As Found  M  0.0000  0.0000  0.0000  0.0000	FEMALE  N 0.0000 0.0000 0.0000 0.0000	N M 3	As Left	N
As I	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015 3 0.0015 4 0.0015 5 0.0015	As Found  M  0.0000  0.0000  0.0000  0.0000	FEMALE  N 0.0000 0.0000 0.0000 0.0000 0.0000	N M 3	As Left	N
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As I	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015 3 0.0015 4 0.0015 5 0.0015	As Found  M  0.0000  0.0000  0.0000  0.0000	FEMALE  N 0.0000 0.0000 0.0000 0.0000 0.0000	N M 3	As Left	N
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As F	Found	M @	N N N N N N N N N N N N N N N N N N N	© L 2	N		2 0.0015 3 0.0015 4 0.0015 5 0.0015 6 0.0015	As Found  M  0.0000  0.0000  0.0000  0.0000	FEMALE  N 0.0000 0.0000 0.0000 0.0000 0.0000	N M 3	As Left	N

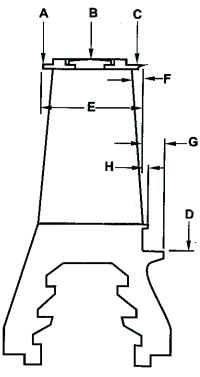




## Bucket and Cover Final Machining

Advanced Design Steam Path Installation

Date 9/10/2005 Turbine Serial No. 170X394 Prepared by I&RS Pittsburgh



Rotor Serial No. \_\_\_\_\_\_Rotor Asm. Dwg. No. \_\_\_\_\_

Stage	A. Dia.	B. Dia.	C. Dia.	D. Dia	III E	F	G	Н
T01			44.132	38.145	4.294	0.260	1.184	
T02	42.140	42.040	41.900	34.092	2.223	0.240	0.664	0.072
Т03	42.743	42.639	42.499	34.607	2.269	0.235	0.670	0.104
T04	43.540	43.440	43.300	34.607	2.418	0.225	0.720	0.154
T05	44.740	44.640	44.500	34.607	2.470	0.250	0.780	0.203
T06	47.340	47.099	46.500	35.488	2.957	0.300	0.899	0.311
G07	52.596		52.596	41.572	2.587	0.122	1.120	0.145
G08	54.718	54.478	54.477	41.572	2.348	0.158	1.358	0.376
G09	56.994	56.754	56.754	42.675	2.497	0.185	1.030	0.536
G10	59.140		58.476	42.675	2.352	0.140	1.149	0.675

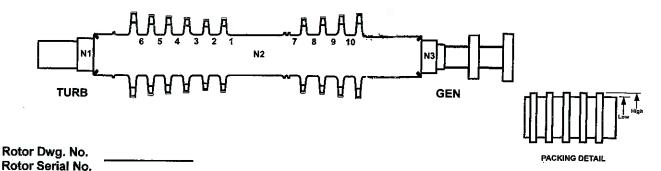


KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33

## HP / IP Rotor Packing Diameters

## Thrust in Mid Standard Advanced Design Steam Path Installation

Date 10/6/2005 Turbine Serial No. 170X394 Prepared by I&RS Pittsburgh



Diameter - High Diameter - Low Stage Actual Drawing Actual Drawing Condition of Lands N1-G1 19.978 19.724 N1-G2 19.978 19.722 N1-G3 27.995 27.748 N1-G4 27.993 27.746 N1-G5 27.994 27,746 N1-G6 27.994 27.746 N1-G7 27.993 27.746 6 26.980 26.730 5 26.980 26.730 26.980 26.730 26.980 26.715 26,980 26,730 N2-G1 28.162 27.918 N2-G2 28.162 27.918 N2-G3 28.165 27.918 N2-G4 28.162 27.918 N2-G5 28.165 27.918 N2-G6 28.165 27,918 N2-G7 28.162 27.918 N2-G8 28.162 27.918 8 9 10 N3--G1 25.994 25.745 N3-G2 25.993 25.743 N3-G3 25.995 25.745 N3-G4 20.976 20.726 N3-G5 20.975 20.726

## NOTE:

- 1. If packing diameters are original, record only high land diameters.
- 2. If packing diameters have been remachined, record both high and low diameters for remachined stages.
- Land Condition Codes: G-Good RC-Rounded Corners; U (upstream); D (downstream)
   E-Eroded HRC-Heavily Rubbed/Cut E-Other
- 4. Denote machined (not original) drawing diameters with asterisk (\*).
- 5. Use unit specific packing designations under "Stage" column.

Global Power Generation Services

CouplingBoltHoles.xls

**5** 5 5 4

2.813 2.813 2.843

2.827

# Coupling Bolt Hole Diameters Advanced Design Steam Path Installation

> Prepared by Pittsburgh I&RS Coupling Space Rotor Drwg. No. Rotor Serial No. I GEN T BOLT HOLE DIAMETERS Generator End Turbine Serial No. 170X362 2.813 2.813 2.813 2.828 2.813 2.813 2.823 2.813 2.813 2.813 Ŧ Spacer Thickness Spacer Drwg. No. SPACER I I TURB Turbine End Generator 737e550 I Coupling Designation Date 8/26/2005 Rotor Drwg. No. Rotor Serial No. Coupling **Bolt Hole** Number 9 က 4 ĸ ဖ œ **O** /



## **S1 BALANCE**



## KPSC Case No. 2012-00578 Staff's First Set of Data Requests Steam Turbing NR otors Final Balanta Report

				····			
Customer	AEP				Dwg. No.		
Station	Mitchell St	ation			<del></del>	HP RHT	
R.O. No.	50123					GE I&RS P	Pittsburgh
Turbine S/N	170X394					7/21/2005	
	N	iote: All recorded	angles MUST be r	otor angles NOT			_
	Were bolt holes	shimmed to X	Yes	-			
	obtain identic	al bolt sizes	No		BALANCE	WEIGHTS	
				AS	FOUND	AS	LEFT
			Grv Radii	Weight	Rotor Angle	Weight	Rotor Angle
TE Coupling Balar	nce Groove						
TE Factory Balanc	e Groove		14.500	695gm	220	434gm	235
TE Field Balance (	Groove					<u></u>	
Midspan Factory E	Balance Groov	/e	15.625	547gm	240	450gm	260
Midspan Field Bal							
GE Factory Balanc			16.875	261gm	280	452gm	280
GE Field Balance							
GE Coupling Balar							
Note: Remove on	ly as instructe	d by engineeri	ng.				
LANCE READING		,		W	EIGHTS USED 1	TO OBTAIN L	OW SPEED BA
	mplitude or w	Rotor Angle			Bal. Groove	Weight	Rotor Angle
TE Journal					TE Journal	579gm	242
GE Journal					GE Journal	690gm	273
	ſ		MIDSPAN	RUNOUT	1		
			Maximum TIR	· <u> </u>	0.0040		
			tion (Rotor Ang		45		
DESOLVED I	WEIGHT DI AG		Location of Ru	nout	mid span		
Bal. Groove	WEIGHT PLACEMENT Weight Rotor Angle					ALANCE REA	
TE Location					Bal. Groove	Weight	Rotor Angle
Widspan Factory	340gm 450gm	380 260			TE Journal	9gm -	287
GE Journal	475gm				GE Journal	9gm	90
ote: Resolved we		280			Note: Readings	taken after t	rimming.
nformantion obtain		41					
John Control	ned from engi	neering					
comments:		· · · · · · · · · · · · · · · · · · ·					
ST STEP BALANCE							
							İ
							ı

## KPSC Case No. 2012-00578 Staff's First Set of Data Requests Steam Turbing Rotors

							ment⊣∓ Iå⁄n&e³Report
Customer	AEP				Dwg. No.		
Station	Mitchell St	ation				HP RHT	
R.O. No.	50123		·		_	GE I&RS P	ittsburgh
Turbine S/N	170X394			· · · · · · · · · · · · · · · · · · ·		9/6/2005	-ttobal gi.
		lote: All recorded	angles MUST be ro	otor angles NO			_
	Were bolt holes	[	Yes		· maonino angles		
	obtain identic		No No		RAI ANCE	WEIGHTS	
		<u> </u>		S2 F	BALANCE		) LEFT
			Grv Radii	Weight	Rotor Angle	Weight	Rotor Angle
TE Coupling Balar	nce Groove			g	1 I	rroight	Rotor Angle
TE Factory Balance			14.500	· ,,		120gm	40
TE Field Balance			1			120gm	40
Midspan Factory I	Balance Groov	'e	15.625			1259gm	176
Midspan Field Bal						1200gm	170
GE Factory Baland	ce Groove		16.875			365gm	185
GE Field Balance							100
GE Coupling Bala	nce Groove						
Note: Remove on	ly as instructe	d by engineerin	ng.		1		
ALANCE READING	S WITH WEIG	HTS REMOVED	p	V	VEIGHTS USED	FO OBTAIN L	OW SPEED BA
Bal. Groove	mplitude or w	Rotor Angle			Bal. Groove	Weight	Rotor Angle
TE Journal					TE Journal	405gm	165
GE Journal					GE Journal	1100gm	180
			MIDSPAN	RUNOUT			
			Maximum TIR		0.0040		
		Loca	tion (Rotor Ang	iles)	45		
	İ	Axial	Location of Ru	nout	mid span		
RESOLVED	WEIGHT PLAC	EMENT			FINAL E	BALANCE REA	ADINGS
Bal. Groove	Weight	Rotor Angle			Bal. Groove	Weight	Rotor Angle
TE Location	292gm	12			TE Journal	5.34gm	44
Midspan Factory	1259gm	176			GE Journal	13.3gm	165
GE Journal	520gm	184			Note: Readings	s taken after t	rimming.
Note: Resolved we							
nformantion obtai	ned from engi	neering					
Comments:						<del></del>	
ND STED BALANCE							I

## **S3 BALANCE**

## Steam Turbine Rotors Final Balance Report

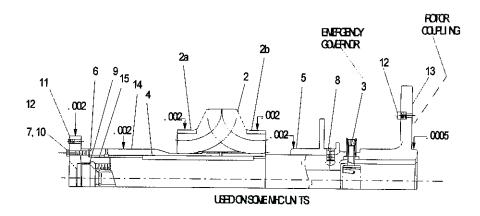
Custome	AEP				Dwg. No.		
Station	Mitchell St	ation		····	_	HP RHT	
R.O. No.	50123					GE I&RS P	ittsburgh
Turbine S/N	170X394					9/26/2005	
		lote: All recorded	angles MUST be re	otor angles NOT	— · machine angles		
			Yes	•	•		
	obtain identic	al bolt sizes	No No		BALANCE	WEIGHTS	
			<del></del>	\$3 B	ALANCE		S LEFT
			Grv Radii	Weight	Rotor Angle	Weight	Rotor Angle
TE Coupling Bala	nce Groove						
TE Factory Balanc	ce Groove		14.500	-		166gm	20
TE Field Balance (	Groove						
Midspan Factory 6	Balance Groov	/e	15.625				
Midspan Field Bal	ance Groove						
GE Factory Baland	ce Groove		16.875			199.5gm	15
GE Field Balance	Groove						
GE Coupling Bala	Note: All recorded angles MUST be rotor angles NOT recorded by the state of the sta	-1					
Note: Remove on							
			) 	W	EIGHTS USED	TO OBTAIN I	_OW SPEED BA
· · · · · · · · · · · · · · · · · · ·	mplitude or w	Rotor Angle			Bal. Groove	Weight	Rotor Angle
TE Journal					TE Journal	166gm	20
GE Journal					GE Journal	199.5gm	15
			MIDSPAN	RUNOUT			
			Maximum TIR		0.0040		
			tion (Rotor Ang		45		
			Location of Ru	nout	mid span		
	WEIGHT PLAC		I		FINAL	BALANCE RE	ADINGS
Bal. Groove	Weight	Rotor Angle			Bal. Groove	Weight	Rotor Angle
TE Location			'		TE Journal	14.9gm	355
Midspan Factory					GE Journal	12.5gm	50
GE Journal					Note: Reading	s taken after f	trimming.
Note: Resolved we						-/	
nformantion obtai	ned from engi	neering					
Comments:							
RD/FINAL STEP BALA	NCE						



## **AEP - Mitchell**

## Steam Turbine Rotors 19 of 39 Contol Rotor Inspection

Job No	50123	Turbine No.	170X394
Dwg. No <u>.</u>		Date	10/13/2005
Insp. by	I&RS Pittsburgh		



## RADIAL RUNOUT INSPECTION - WITH CONTROL ROTOR ON HP ROTOR AREA 45° 90° 135° 180° 225° 270° 315° INDICATED 2. IMPELLER 0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 a. wear ring .0000 .0000 .0005 .0000 .0000 .0000 .0000 .0000 b. wear ring .0000 .0000 .0005 .0010 .0005 .0000 .0000 .0000 5. BEARING COLLAR 0000 .0000 .0000 .0000 .0000 .0000 .0000 .0050 **11. RING** .0000 .0005 .0015 .0030 .0015 .0000 .0000 .0000 13. STUB SHAFT .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000 14. BUSHING .0000 .0000 .0000 .0000 .0000 .0000 .0000 .0000

		DIMENSIONAL INSP	PECTION	
AREA MEASURED	0°	45°	90°	
2. IMPELLER	12.495	12.495	12.495	
a. wear ring	8.7310	8.7305	8.7305	
b. wear ring	8.7300	8.7300	8.7300	
5. BEARING COLLAR	5.3710	5.3710	5.3710	
14. BUSHING	5.3120	5.3120	5.3120	_
RABBET	5.0470	5.0470	5.0470	Patch Ring
RABBET on HP	5.0470	5.0470	5.0470	After Machining

GE ENERGY TURBINE REPORT



## **HP/Inner Shell Repairs and Modifications**

The lower half inner shell was picked up at A.E.P. Central Machine Shop and transported to the Pittsburgh Service Center. Work on the lower half shell consisted of welding the "B" main steam inlet bore retaining ring groove area and 2<sup>nd</sup> stg pressure tap fit area. Upon completion of the welding the lower half was shipped to GE vendor (Highway Machine) for completion of the boring mill work.

Once the upper half shell was received from C.M.S. it was assembled to the lower, the joint bolts were stretched and set up on the V.B.M. All of the HP and RH diaphragm seal faces were skin cut .030". The crush pin side of the pockets was not cut. The nozzle box and N-2 packing case rabbet fits were trued up, the "B". Inlet bore was machined, the remaining main steam inlets, reheat steam inlets and cooling steam extraction bores were rounded out. Also while at the vendor the centering pins were removed bores rounded out, and the orfice block and piping was removed.

With all the machine work requiring a VBM complete, the halves were shipped back to the Pittsburgh Service Center. The remaining work completed in the shop consisted of installing centering pins, replace the 8<sup>th</sup> stage cooling steam inlet boss, orfice and piping, installed spring back keys, blended indications in the 2<sup>nd</sup> stg diaphragm ledge area and diaphragm pocket radius, removed 4 broken nozzle box hold down bolts, replace horizontal joint stud, and machine welded pressure tap fit area.

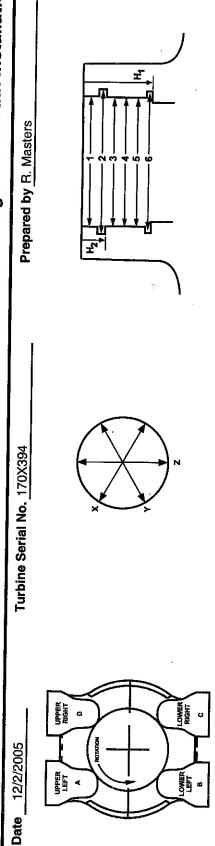
While in the shop the stationary components, including the 1<sup>st</sup> stage nozzle box, N-2 packing case, and diaphragms were installed in both halves of the shell to check proper clearances and locations. The nozzle box keys were fit and blue checked.

The lower half gib post was hand worked to remove taper. The upper half was shipped to the AEP Central machine Shop for machining of the gip post.

SEE ATTACHED SUPPORTING DOCUMENTATION

# Shell and Nozzle Box Seal Ring Bores

Advanced Design Steam Path Installation



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3																
4																
5																
9																
Taper (max-min)																
H1 + H2																į
Inner Shell	X	<b>X</b>	Z	0.0 R			K	900	^							
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2	19.775	19.777	19.781	9000	19.794	19.798	19.800	0.00	10.51	18.31/	19.317	0.000	19.335	19.336	19,336	0.001
3	19.324	19.325	19.325	0.001	19,310	19.310	19.310	0000	10.707	10.040	9.783	0.006	19.785	19.686	19.800	0.114
4	19.324	19.324	19.325	0.001	19,310	19.310	19.310	0000	10.340	10.210	10.010	0.000	19.323	19.323	19.323	0.000
æ	19.324	19.324	19.325	0.001	19.310	19.310	19310	0000	10.010	10.010	19.310	0.000	19.324	19.324	19.324	0.000
9										010.61	19.510	0.000	19.423	19.324	19.325	0.099
Taper (max-min)	ΑN	ΝΑ	₹		ΨV	ΔN	V N		SIZ							
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Nozzle	X	X	7	0 0 B		>	•				STATESTICS TO SECURISE SE					
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4												Î				
2																
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Taper (max-min)							1									
H						٠										



SP3010.xlsReheat- 1 BX.xls

Global Power Generation Services

Company Proprietary Information.

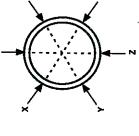
## Company Proprietary Information

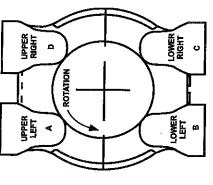
## Seal Rings Advanced Design Steam Path Installation

Date Nov. 30, 2005

Turbine Serial No. 170 X 394

Prepared by Vince Kollin





Outer diameters required for the outer seal rings. Inner diameters required for the inner seal rings.

Bi-Metallic X

Seal Ring Assy. Dwg. No: Outer Shell

က

Inner Shell Reheat

Nozzle

INNER RING OUTER SNOUT -NOZZLE BOX -INNER Stell -SHELL

Seal ring identification: Conventional ĸi

Numbering is in direction of steam flow.

SHELL		Upper Let Ring Dian	lt. neter	) 	Lower Left Ring Diam		<b>0</b>	Lower Rig			Upper Right	l =
INNER PINGS	X	Y	l ";	×	λ	2	ļ×	)  -		,	, y	5 7
1	17.495"	17 495"	17.495"	17.513*	17,513"	17 513"	17 509"	17 509"	17 500"	1007 47	12 1001	
ÇΙ	17 495"	17 495	17.495"	17 513	17.513	17,513	17 500	2 200	7 500	7 400	17.480	17.48
0 11 11	47/495	117 495	17 495"	17 512	17,512	47 540	2000	0000	800	17.480	17.480	17.48
4					2007	210.7	800	506 /	17,509	1 480	17.480"	17.48
i to				13						655 XX		
ယ												
OUTER RINGS	×	>	Z					>	1			
	19.324	19.324	19.324	19.308"	19 308	10 300	10000	10000	70,	\ \ \		7
64	19.323	19.323	19.323	19.308"	10 308"	10.300	19.308	19.308"	19.308"	19.323	19.323	19.32
i en				2000	200:-	13.300	9.300	19.308	19.308"	19.324	19.324	19.32
10												

Seal Ring 3020Reheat.xls Page 1 of 2

Global Power Generation Services

## Advanced Design Steam Path Installation Seal Rings

SHELL Ring Diai NER RINGS X Y 1 10.995" 10.996" 2 10.996" 10.996" 3 10.997" 10.9977 4	liameter 2 10.996" 10.996" 6" 10.996" 77" 10.997"	The second secon	Lower Left					1 2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
10.995" 10.995" 10.997"		<b>,</b>	Ring Diame	ster	5	Lower Rigi Ring Diam		<b>)</b>	Upper Fig. Ring Diam	nt erer
			٨	_ Z	×	٨		×	,	•
		11.011"	11,011"	11.011"	11.011"	11 011=	11011	10007	400007	10000
		11 011	11 011	11 011	11011	11 011	1	10.937	1880	/880
8 6 6		11 011	11 011	11.014		* * * * * * * * * * * * * * * * * * * *		200	1880	10 88
9						0.	-	10.887	10.89	10.997
9										
OUTER RINGS X Y	X	×		k		À		<b>)</b>		
12.779" 12.778"	8" 12.779"	12.781"	12.780"	12.780"	12 779"	10.778	10 770 <sup>a</sup>	10 774"	10 77.4	7
<b>2</b> 12.776" 12.776"	6" 12.776"	12.779"	12.780"	12.779"	12 779"	12 770"	19 770"	10.775"	10.775"	12.775
3						2	15.113	12.773	12.775	12.775
4 12.776" 12.776"	6" 12.776"	12.778"	12.778"	12,778"	12.778"	12 778"	12 778"	19 77/1	10 774"	40.774
							12.77	12.114	12.114	12.114

MNNERFRINGS   X			Ring Diameter	3	Lower Let Fing Diam	eter	<b>3</b>	Lower <b>Right</b> Ring Diamet	E PR		Upper Filgfit Ring Diameter	nt eter
12.234         12.250         12.246         12.261         12.261         12.261         12.245         12.245           12.234         12.234         12.250         12.260         12.260         12.260         12.262         12.245         12.245           12.235         12.234         12.260         12.260         12.260         12.262         12.262         12.245           12.236         12.234         12.260         12.260         12.262         12.262         12.245           12.236         12.234         12.260         12.262         12.262         12.245           12.236         12.245         12.262         12.262         12.245           14.246         14.246         14.247         14.248         14.248         14.248           14.247         14.247         14.248         14.247         14.248         14.248           14.246         14.246         14.247         14.248         14.247         14.248           14.246         14.247         14.247         14.248         14.248         14.247		Y	Z	×	λ	2	×	λ	1	×	>	4
12.234         12.234         12.234         12.260         12.260         12.260         12.260         12.262         12.262         12.262         12.245           12.235         12.234         12.260         12.269         12.260         12.262         12.246         12.246           X         X         X         X         X         X         X         X           14.246         14.247         14.247         14.247         14.247         14.247         14.248         14.247         14.247         14.248         14.247         14.247         14.248         14.247         14.248         14.247         14.248         14.248         14.247         14.248         14.247         14.248         14.247         14.248         14.247         14.248         14.247         14.248         14.247         14.248         14.248         14.247         14.248         14.248         14.247         14.248         14.247         14.248         14.248         14.247         14.248         14.248         14.247         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248         14.248		12.250	12 234	12.260	12.261	12.261	12,262	12.261	12.961	12 24E	10 046	40.045
12.236         12.236         12.260         12.260         12.260         12.260         12.262         12.246           X		12.234	12.234	12.260	12.260	12 260	19 261	19.982	10 080	10004	40.040	0422
X         X	4	12.234	12 234	12.260	12 259	12.280	10 282	10.080	10 000	04000	12.243	2 244
X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         Y         Z         X         X         Y         Z         X         X         Y         Z         X         X         Y         Z         X		0.00					2	202.21	12.202	0.52.5	12.245	12.245
X         Y         Z         X         Y         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         Z         X         X         X         Z         X         X         Z         X	ın											
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14.247         14.246         14.248         14.247         14.247         14.247         14.248         14.248         14.248         14.248         14.248         14.247         14.247         14.248         14.247         14.247         14.248         14.247         14.248<	OUTER RINGS		Z	×	×	N	×	λ	7	×	>	*
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14.246         14.246         14.248         14.247         14.247         14.248         14.248         14.248         14.248	2 14.247	14.247	14.247	14.247	14.248	14.248	4 247	14 247	14 240	14.240	14.247	14.249
14.248		14.246	14.246	14 248	14 247	14 247	970	17.27	14.040	14.24/	14.248	14.248
	4					7.5	0.00	4.248	14,248	14.248	14.247	14.247

## KPSC Case No. 2012-00578 Item No. 33 Attachment 14 Page 24 of 39 0.0.R 0.000 0.001 0.00

14.262 15.640

15.639 14.249

15.639 14.249

14.26

14.261

008

0.0.R

14.249

14.249 14.249

0.006 0.001 0.001

15.641 14.250 14.250

14.262 15.640 14.250 14.250

14.261 15.635 14.249 14.249

0.001

14.262 15.655 14.250

15,654

15.653 14.249

15,641

15.642 14.249

15.641 14,261

Taper (mox-rain)

Nozzle

14.248 14.248 14.248

0.001 0.001 0.001

14.261

O.O.R. 0.001 14.249

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Taper (maxement)

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C. Lower Fight Bore Diameter

0.0.R.

B. Lower Left Bore Diameter

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0.0 H

A Upper Left Bore Diameter

×

Outer Shell

D Upper Right Bore Diameter

O.O.R.

15.008

5.008

X 15.008 14.789 12.776

0.0 H

14.790 12.776

14.914

14.914 12 781

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5.008

Inner Shell Taper (mux-min) H1 + H2

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O.O.R.

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12.774

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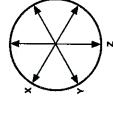
12.782 12.781

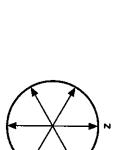
Advanced Design Steam Path Installation

Prepared by R. Masters

**Serial No.** 170X394

Shell and Nozzle Box Seal Ring Bores





	X	2
×		<b>×</b>

Date	rte 12/2/2005 Turbine S	UPPER UPPER RIGHT	NO TOTAL CONT.		LEFT RIGHT
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Company Proprietary Information

KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33

## Advanced Design Steam Path Installation Seal Ring Snout Pipe

Craig Schmotzer NOZZLE BOX INNER SHELL Prepared by\_\_ OUTER SHELL Snout pipe diameters recorded on this form. No flat spots allowed.
Tolerances: Taper .003", Out of Round .005". 170 X394 Reworked pipes from CMS Turbine Serial No. NOTE: ###### Date

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C Lower Right Sport Dismoter	חומת חומ	Z	10.500	10.500"	10.500"	10.500"	10.500	10.500	0000		7	10.999	10.999	10.999	10.999	10 999	10 000	0000	,	7	12.249	12.249	12.249	12.249	12 249	12 240	0000
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Lower Left		X	10.500"	10.500"	10.500"	10.500"	10.500"	10,500"		>		10.999	10.999	10.999	10.999	10.999	10.999	0.000	>	19 247	12.27	12.24/	12.247	12.247	12.247	12.247	0.000
B Lo		×	10.500"	10.500	10.500"	10.500"	10.500"	10.500"	0.000	×	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	10.999	10.999	10.999	10.999	10.999	10.999	0.000	×	12 247	40 047	12.24/	12.247	12.247	12,247	12.247	0.000
meter	0	O.O.R.								SOC									OOR								
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per Left	>	1 40 A A O B	10.420	10.420"	10.420".	10.420"	10.420"	10.420"		×	40 00E#	10.900	10.9855	10.985°	10.985	10.985"	10.985"		λ	12.220"	12 220"	42 220"	12.220	12.22U"	12.220"	12.220"	
AUP	×	40 430"	10.420	10.420	10.420"	10.420"	10.420"	10.420"		×	10 025"	10.00	10.905	10.985	C08.01	10.985"	10.985"		×	12.220"	12 220"	12 22011	12.220	12.220	12.220	12.220"	
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## Blow Down Pipe Dense Pack Steam Path Installation

Vince Kollin

Prepared by

170 X 394

Turbine Serial No.

Nov. 30, 2005

Date

## HP Blow Down Pipe

**OUTER SHELL** INNER SHELL Mid Span Fit

		DIM	Chair			ZZUZ Z	ことに ひとしに				<b>OUTER SHELL</b>	SHELL		
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	3	303.5	3	2.5			3.300	3.300	100°0	Ξ	3.375	3.376	3.376	0.001
ပ	3.355	3.356	3.356	0.001	ᄔ		3.366	3.366 3.366	0.00	_	3.375	3.376	3376	0 004
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## Blow Down Ring Bores Dense Pack Steam Path Installation

Vince Kollin Prepared by 170 X 394 Turbine Serial No. Nov. 30, 2005

Outer Shell Fit

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ner St	45	6	⊢	<del>-</del>	╄		
To an indicate the second seco	0	5.138	5.139	+	⊢		-
7	OOR				-		
hell Fit	06	5.140"	5.765"	5.139"	5.138"	5.138"	
Outer She	45	5.142" 5.140"	5.765"	5.139"	5,138"		
	0	5.144"	5.765"	5.139"	5.138"	5.138"	(-
		-	2	3	4	5	r (max-min)



Date



## N-1 / N-3 Packing Head

Packing was installed, butt clearances checked and corrections made as necessary. The upper & lower halves were assembled for measurements of the hook fits. The hook fits were rounded out. Reroundable packing was supplied, installed, and adjusted to achieve a round and straight bore with proper clearances.

## **New N-2 Packing Head**

Packing was installed and butt clearances checked. Corrections were made as necessary.

The upper and lower halves were assembled and the teeth measured to insure proper size and clearances.

The centering pin was machined to correct side slip to inner shell.

The rabbet fit was machined to achieve the correct axial location and clearance to shell.

Machined the balance access hole (stock left in bore for field machining) to accommodate the new balance pipe.

Machined, installed, & seal welded a plug in the mid span eccentricity hole. The holes in the outer and inner shells had been previously plugged.

SEE ATTACHED SUPPORT DOCUMENTATION

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## General Electric Co.

Job Number:	29035	Date:	
Customer:	Mitchell	Page 1 of 1	

## N - 1 Packing Case - Butt Clearance

Location:	Dwg. Butt Clearance	As found Butt Clearance	Corrected Butt Clearance	Date completed and operator initials
N01 G03	0.012	0.012		
N01 G04	0.012	0.012		
N01 G05	0.012	0.011		
N01 G06	0.012	0.009		
N01 G07	0.012	0.012		

98	
<b>(66)</b>	

## General Electric Co.

Job Number:	29035
Customer:	AEP Mitchell

Page 1 of 1

## N - 2 Packing Case - Butt Clearance

Location:	Dwg. Butt Clearance	As found Butt Clearance	Corrected Butt Clearance	Date completed and operator initials
N02 G01	0.012	0.009		
N02 G02	0.012	0.002		
N02 G03	0.012	0		
N02 G04	0.012	0.031		
N02 G05	0.012	0.016		
N02 G06	0.012	0.01		
N02 G07	0.012	0:007		



## **HP/RHT** Diaphragms

Packing was installed in all diaphragms and butt clearances were checked. Corrections were made as necessary.

Centering pins were machined to set side clearances.

All diaphragms were set up on a vertical boring mill and steam seal faces were machined for fit up to the seal face ledges in the shell.

Crush pins on all diaphragms were sized for proper clearances to the shell.

The 8<sup>th</sup> stage diaphragm was spotted to the inner shell and set up on a horizontal boring mill and thermocouple wells were installed in line with corresponding centerline of thermocouple in inner shell within 0.005". The diaphragm was then assembled to the 7<sup>th</sup> stage. (Stacked)

## First Stage Nozzle Box

The customer's spare nozzle box was refurbished in the Albany Shop to meet the design conditions for the ADSP.

The halves were assembled and set – up on a horizontal boring mill rotary table to machine the axial locating female rabbet fit to achieve the correct axial location and clearance to shell.

The sealing rings were set- up machined and installed in the nozzle box prior to shipping.

SEE ATTACHED SUPPORT DOCUMENTATION

Q.e	
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## General Electric Co.

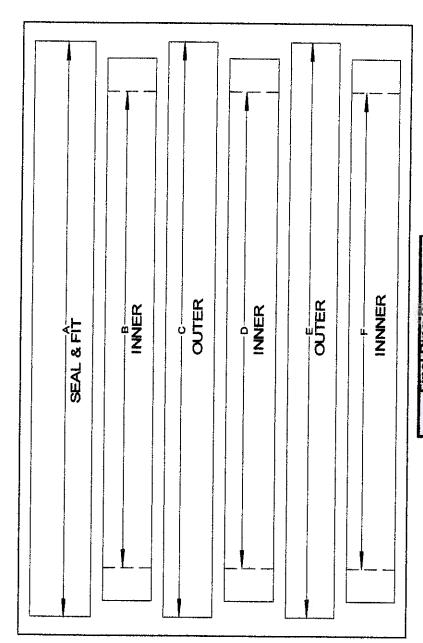
Customer: Mitchell Page 1 of 1	

## Diaphragm Packing - Butt Clearance

Location:	Dwg. Butt Clearance	As found Butt Clearance	Corrected Butt Clearance	Date completed and operator initials
Stg 2	0.012	0.014		
Stg 3	0.012	0.018		
Stg 4	0.012	0.036		
Stg 5	0.012	0.012		
Stg 6	0.012	0.018		
Stg 7 Stg 7 Seal	0.012 0.377	0.007 0.377		
Stg 8	0.012	0.011	:	
Stg 9	0.012	0.02		
Stg 10	0.012	0.01		

# Final Outer Shell Blow Down Ring Diameter Dense Pack Steam Path Installation

Vince Kollin Prepared by 170 X 394 Turbine Serial No. Nov. 30, 2005



	×	X	Z	0.0.R
V	5.138"	5.138"	5 138	
8	3.378"	3,378"	3.378	
ပ	5.136"	5.136"	5.136	
Ω	3.379"	3.379"	3.379	
Э	5.136"	5.136"	5.136"	
ш	3.378"	3.378"	3.378"	



Date

Pill in the Brank

Dense Pack Steam Path Installation
Prepaired By: Vince Kollin
Date: Nov. 30,2005

170X394  $\dot{\alpha}$ Turbine S/N Customer: AEP Mitchell Station: Unit # 2

Reheat Outer Shell

	٧	Upper Left	A Upper Left Ring Diameter	ter	00	Lower Left	B Lower Left Ring Diameter	*	C	Lower Righ	G Lower Right Ring Diameter	rter	۵	D Upper Right Ring Diameter	Ring Diamo	ig.
Outer Sheff	×	¥	Z	0.0.R.	x	À	Z	0.0.R.	×	٨	7	0.0.R.	×	<b>,</b>	Z	0.0.R.
4	19.337"	19.337"	19,337"		19.320*	19.320"	19.320		19.320"	19.320"	19.320"		19.337"	19.337"	19 337"	
m	19.327"	19,327"	19.327"		19.310"	19.310"	19.310"		19.310"	19.310"	19.310"		10 325	40.005#	40.006	
υ	19.327"	19.327"	19.327"		19.310"	19.310"	19.310"		19.310"	19.310"	19.340"		10 226"	19.020	19.000	
۵	19.327"	19.327"	19.327"		19.310"	19.310"	19.310"		10.310"	10.250"	40.940"		10.023	18,020	18.523	
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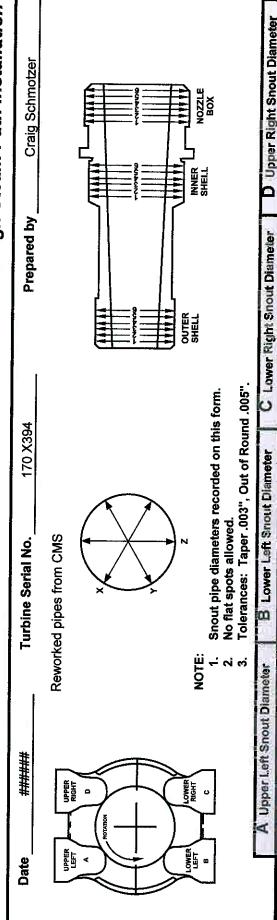


# Seal Rings Advanced Design Steam Path Installation

INNER	⋖	Upper Left Ring Diameter	eter	œ	Lower Left Ring Diameter	eter	ပ	Lower Right Ring Diameter	hrt ete	Q	Upper Right Ring Diameter	int eter
INNER RINGS	×	χ	Z	×	٨	2	×	٨	Z	×	>	2
	10.995"	10 396	10,996"	11 011"	11.011"	11.011"	11.01	11 011"	11.011"	10 997"	10.997"	1.266.01
2	10 996	10.996"	10.998"	11 011	11 011	11.011	11.011"	11 011	11.011	10 997	10 897	10 007
က	10.997	10.997"	10.997"	11011	11.011	11 011	11.011"	11 011	11 011	10 997	10 997	10 007
4												2000
9												
9												
OUTER RINGS	×	λ	Z	×	<b>\</b>	Z	×	<b>\</b>	Z	×	>	
ļ	12.779"	12.778"	12.779"	12.781"	12.780"	12.780"	12.779"	12.778"	12.779"	12779"	19.779	12770
2	12.776"	12.776"	12.776"	12.779"	12.780"	12.779"	12.779"	12.779"	12.779"	12.779"	12 779"	15 770
3												21.1.2
4	12.776"	12.776"	12.776"	12.778"	12.778"	12.778"	12.778"	12.778"	12.778"	12.774"	12.774"	12 774"
		9										
NOZZI E	A	Hanner LeR		α	Pouror Logs		Ç	Towns Office		2	STORES CONTRACTOR	100
	•			3	OWE LON	III	,	LOWER KILDE		2	Upper Right	

NOZZI E BOX	∢	Upper Left Ring Diameter	eter	æ	Lower Left Ring Diameter	eter	O	Lower Right Ring Diameter	nt. ster	Q	Upper Right Ring Diameter	hit eter
INNER RINGS	×	*	Z	X	γ	Z	×	<b>&gt;</b>	2	×	>	7
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2						-						
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4												
(O)												
9												
OUTER RINGS	×	À	7	×	,	7	×	>	7	×	>	7
												1
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4												

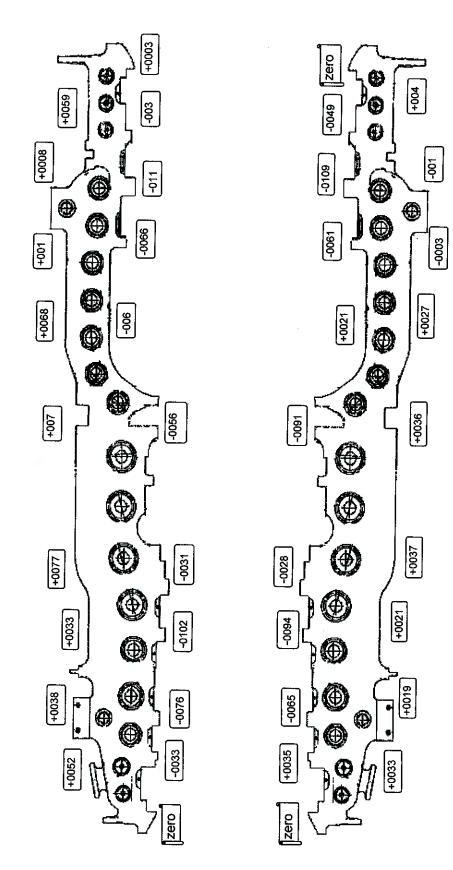
# Seal Ring Snout Pipe Advanced Design Steam Path Installation



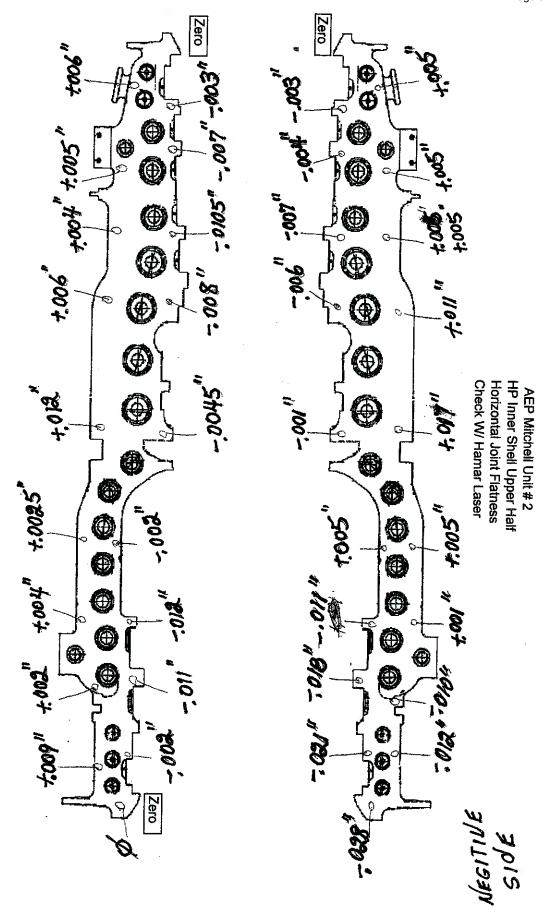
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Lower Right Snout Diameter	>	200	00001	0.500	0 500	10,500	10.500"	10.500"	0.000	<u> </u>	10 000	000	0.9	10.999	10.999	10.999	10.999	0.000	>		2.249	12.249	12.249	12.249	12 249	12 249	000
် ပ	×	TO CO	00001	10.500	10,500	10,500	10.500	10.500		×	10 999	10 000	10.333	10.999	10.999	10.999	10.999	0.000	×		12.249	12.249	12.249	12.249	12.249	12.249	200
meter	900		0.00	0.000	0.000	0.000	0.000	0.000		OOR	0000	0000	9	0.000	0.000	000.0	0.000				3	0.000	0.000	00:00	00000	0000	
Snout Diameter		200	2	10.500	10.500	10.500	10.500	10.500	0.000	2	10 5190	10 509		10.5188	10.999	10.999	10.999	0.000	_	40.00	12.24/	12.24/	12.247	12.247	12.247	12.247	0000
B Lower Left	>	1003	200	0 200	10.500	10.500	10.500	10.500		٨	10.999	10 999		10.999	10.999	10.999	10.999	0.000	>	470.07	12.24	12.24/	12.247	12.247	12.247	12.247	000
8	×	10 500	00.00	10.500	10.500"	10.500"	10.500"	10.500"	0.000	×	10.999	10,999		10.339	10.999	10.999	10.999	0.000	×	15 247	12.241	12.24/	12.247	12.247	12.247	12.247	ט טטט
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pper Left	۶	10 420"	200	10.420	10 420	10.420	10.420	10.420	UL CONTRACT	<b>,</b>	10.985"	10.985"	10 085"	C06.01	10.985	10.985"	10.985"	0	λ	12 220"	10000	12.220	12.220	12.220"	12.220"	12.220"	
PΥ	×	10000	000	10450	10 420	10 420	10.420	10.420		×	10.985"	10.985"	10 085"	10.303	10.985	10.985"	10.985"		×	12 220"	10 220"	12.220	12.220"	12.220"	12.220"	12.220"	
	Outer Shell	,	,	7	2	4	2	9	I aper (max-min)	Inner Shell		2	3		4	2	9	íaper	Nozzle		2	•	2	4	5	9	aper



H P Inner Shell Mitchell Unit # 2 Laser Horizontal Joint Flatness Check



Readings taken at AEP CMS Charleston W.Va. 09-27-05 by Vince Kollin & Craig Schmotzer



KPSC Case No. 2012-00578 Staff's First Set of Data Requests Item No. 33 Attachment 14 Page 39 of 39

End of Report

