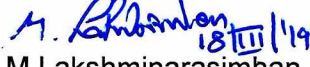


**Advanced Technology Product
High Pressure Boiler Plant
Tiruchirappalli – 620 014**

**Generic QAP for Plain Thrust Spherical Bearing Assembly
of Steam Generator's Vertical Support**

QAP Ref. No.: BHEL: QAP: SPH BRNG: 001/ R00

Contract :	Nuclear Power Corporation of India Limited (NPCIL)
Project :	Gorakhpur Haryana Anu Vidyut Pariyojna (GHAVP-1&2)
Work Order :	D157 to D160-001-1-93-171

BHEL / ATP - Engineering			NPCIL
Prepared by:  O R Nithin 14/03/19	Reviewed by:  Amit Roy 14/03/19	Approved by:  A Sundararajan 18/3/19	
 M Arunkumar 14/03/19	 M Lakshminarasimhan 18/03/19		

REVISIONS			
REVISION No.	DATE	DESCRIPTION	ORIGINATOR
00	14-03-2019	Initial Issue	M.ARUN KUMAR

Supplier's LOGO	Supplier's Name and Address		Quality Plan for Plain Thrust Spherical Bearing Assembly					Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No: To be filled				
			Item: Spherical thrust washer Material: 34CrNiMo6 (EN 10269:1.6582) Sub-system: Steam Generator		QP No.: To be filled by Supplier Rev. No.: To be filled by Supplier Date: To be filled by Supplier Page No: 1 of 3							
Sl. No	Component & Operations	Characteristics	Type of Check	Quantum Of check	Reference Document	Acceptance Norms	Format of Record		Agency			Remarks
									M	B	N	
1.	2.	3.	4.	5.	6.	7.	8.	D *	9. **			10.
1.0 Raw Material (forged rod):												
1.1	Verification of Documents	Chemical	T.C. Verification	Sample/ heat	As per approved specification no. BHE:700MWe:SPH BRNG:001	TC	√	P	W	R	Refer note-1	
1.2		Mechanical	T.C. Verification	Sample/ heat	As per approved specification no. BHE:700MWe:SPH BRNG:001	TC	√	P	W	R	Refer note-1	
2.0 Testing of raw material												
2.1	Ultrasonic testing of blanks	Material Integrity	NDE of metal	100%	As per BHE:700MWe:SPH BRNG:001 & approved procedure: (UT Procedure to be submitted)	RD	√	P	W	R	Refer note-5 & 7	
3.0 Bottom Washer :												
3.1	Machining of bottom washer	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
3.2	Drilling of central hole	Drilling	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
3.3	Grinding of spherical face	Grinding	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
3.4	Groove making for greasing	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
3.5	Threading for grease nipple	Threading	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: SUPPLIER B: BHEL, N: NPCIL/TPI P: PERFORM R: REVIEW W: WITNESS AND H: HOLD TC: TEST CERTIFICATE RD: RECORD HD: HISTORY DOCKET IR: INSPECTION REPORT												
Prepared		Reviewed & Approved		Reviewed & Approved		Reviewed & Approved						
SUPPLIER'S NAME: To be filled		BHEL		NPCIL								


17/03/19
(ENGR/ATP)

Supplier's LOGO	Supplier's Name and Address		Quality Plan for Plain Thrust Spherical Bearing Assembly						Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No: To be filled			
			Item: Spherical thrust washer Material: 34CrNiMo6 (EN 10269:1.6582) Sub-system: Steam Generator		QP No.: To be filled by Supplier Rev. No.: To be filled by Supplier Date: To be filled by Supplier Page No:2 of 3							
3.6	LPE of bottom washer	Material Integrity	NDE of metal	100%	As per BHE:700MWe:SPH BRNG:001 & approved procedure: (LPE Procedure to be submitted)	RD	√	P	W	R	Refer note-5, 6 & 7	
3.7	Hardening	Heating and quenching	Verification of HT record.	100%	As per BHE:700MWe:SPH BRNG:001 & approved procedure: (HT Procedure/plan to be submitted)	TC	√	P	R	R	Refer note-4 & 8	
3.8	Hardness check	Hardness measurement	Hardness	100%	As per standard	IR	√	P	R	R	Refer note-5	
4.0	Top Washer :											
4.1	Machining of top washer	Machining	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
4.2	Drilling of central hole	Drilling	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
4.3	Grinding of spherical face	Grinding	Measurement	100%	Approved Drawing (Drawing to be submitted)	IR	--	P	R	--	Refer note-5	
4.4	LPE of top washer	Material Integrity	NDE of metal	100%	As per BHE:700MWe:SPH BRNG:001 & approved procedure: (LPE Procedure to be submitted)	RD	√	P	W	R	Refer note-5, 6 & 7	
4.5	Hardening	Heating and quenching	Verification of HT record.	100%	As per BHE:700MWe:SPH BRNG:001 & approved procedure: (HT Procedure to be submitted)	TC	√	P	R	R	Signed HT Chart shall be submitted (refer note -4)	
4.6	Hardness check	Hardness measurement	Hardness	100%	As per standard & Specification BHE:700MWe:SPH BRNG:001	IR	√	P	R	R	Refer note-5	

				LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: SUPPLIER B: BHEL, N: NPCIL/TPI P: PERFORM R: REVIEW W: WITNESS AND H: HOLD TC: TEST CERTIFICATE RD: RECORD HD: HISTORY DOCKET IR: INSPECTION REPORT
Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled		BHEL	NPCIL	


 14/03/19
 (Engr. / A.P.)

Supplier's LOGO	Supplier's Name and Address		Quality Plan for Plain Thrust Spherical Bearing Assembly								Project: GHAVP 1& 2 W.O.: D157 to D160-001-1-93-171 P.O No: To be filled	
			Item: Spherical thrust washer Material: 34CrNiMo6 (EN 10269:1.6582) Sub-system: Steam Generator	QP No.: To be filled by Supplier Rev. No.: To be filled by Supplier Date: To be filled by Supplier Page No:3 of 3								
5.0 Assembly of top and bottom washer :												
5.1	Lapping of bottom and top washer	Lapping	Visual check , Surface finish	100%	As per approved procedure (Lapping Procedure to be submitted)	IR	--	P	W	R	Refer note-5	
6.0	Type testing	Performance	Type test	1 per each melt of forged rod & each heat Treatment batch	As per approved procedure (Type testing Procedure to be submitted)	IR	--	P	H	W	The item subjected to type test, shall not be a part of supply.	
7.0	Packaging	Rigidity	Verification and Visual	100%	As per approved procedure (Packing Procedure to be submitted)	IR	--	P	R	R	---	
8.0	Documentation	Compilation of documents	Verification	100%	As per Tender document	HD	--	P	H	R	---	

Note:

- Co-related original material test certificate is acceptable. In the absence of co-related material test certificate, sample per lot (lot means, all material having same heat mark / material specification requirements) for chemical and physical test shall be drawn and witnessed by BHEL. All material verification reports and test reports as per material specification shall be submitted to NPCIL for checking / verification and clearance.
- Stamping of raw material and stamp transfer shall be done by BHEL.
- MSTP (Material Sampling Plan), MPP (Manufacturing Process plan), Heat Treatment Plan, Ultrasonic Test Procedure, Liquid penetrant examination procedure, lapping procedure, packing procedures etc. shall be submitted by supplier and the same will be subjected to both BHEL & NPCIL approval.
- Heat treatment shall be carried out in calibrated furnaces.
- Calibrated instruments shall be used for inspection, examination and testing.
- NPCIL approved chemicals for liquid penetrant examination shall be used.
- Nondestructive examinations shall be done by qualified personnel.
- Hardening of bottom washer shall be done, only if the material hardness is outside the range specified. Signed HT Chart shall be submitted in case of heat treatment.

				LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: SUPPLIER B: BHEL, N: NPCIL/TP1 P: PERFORM R: REVIEW W: WITNESS AND H: HOLD TC: TEST CERTIFICATE RD: RECORD HD: HISTORY DOCKET IR: INSPECTION REPORT
Prepared	Reviewed & Approved	Reviewed & Approved	Reviewed & Approved	
SUPPLIER'S NAME: To be filled		BHEL	NPCIL	


 14/03/19
 (Engr. / A T D)