

674693/2024/HEP-STE40100



NUCLEAR POWER CORPORATION OF INDIA LIMITED

(A Govt. of India Enterprise)

PROJECT : GORAKHPUR HARYANA ANU VIDYUT PARIYOJANA UNIT 1 & 2

TECHINCAL SPEC. NO. : GHAVP-1&2/PC/E/08002

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TECHNICAL SPECIFICATION FOR MAIN STEAM ISOLATION VALVE (MSIV)

BHARAT HEAVY ELECTRICALS LTD.				NPCIL'S ACCEPTANCE			
	NAME	SIGN	DATE		NAME	SIGN	DATE
PREPARED BY	ADNAN		17.08.2023	CHECKED BY	Nitin K. Singh Sr. EE (TG&SCS) Vishal Gite		21.08.2023
CHECKED BY	AMIT KUMAR		17.08.2023	REVIEWED BY	Venkat Vuppada DCE(TG&SCS)		21.08.2023
REVIEWED BY			17.08.2023	APPROVED BY	Balachandran AD(TG & SCS)		11.09.2023
APPROVED BY	SANJEEV KUMAR		17.08.2023				

(For Revisions See Revision Control Sheet)

FILE NAME: GHAVP-1&2_PC_E_08002_R0

<p align="center">NUCLEAR POWER CORPORATION OF INDIA LIMITED</p>	
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एन पी सी आई एल सांपत्तिक

इस दस्तावेज में गोपनीय एवं सुरक्षित सूचना शामिल है और यह न्यूक्लियर पावर कॉर्पोरेशन ऑफ इंडिया लिमिटेड की या निकाय द्वारा एनपीसीआईएल से लिखितकी बौद्धिक संपदा है। किसी भी व्य (एनपीसीआईएल) मेंपूर्व अनुमति किसी भी संपादकीय सामग्री को :तवेज के किसी भी अंश को मुख्यके बिना इस दस्ता, इसमें शामिल मौखिक एवं सांकेतिक चिह्नों व चित्रों को किसी भी रूप में या अब तक ज्ञात या आगामी आविष्कार होने वाले किसी भी इलेक्ट्रॉनिक, डिजीटल या मैकेनिकल माध्यमों, जिसमें फोटोकॉपी, स्कैनिंग, रिकॉर्डिंग शामिल है, के द्वारा या किसी सूचना भंडारण या रिट्रीवल प्रणाली के द्वारा पुनर्किया जाएगा। अनधिकृत त या प्रसारित या उपयोग या प्रकाशित या भंडारित नहींप्रस्तु : प्रयोग, प्रकटन या कॉपी करने की सख्त मनाई है और ऐसा करना एक गैरकानूनी काम होगा-, जिसके लिए कर्ता पर कानूनी कार्यवाही की जा सकती है।

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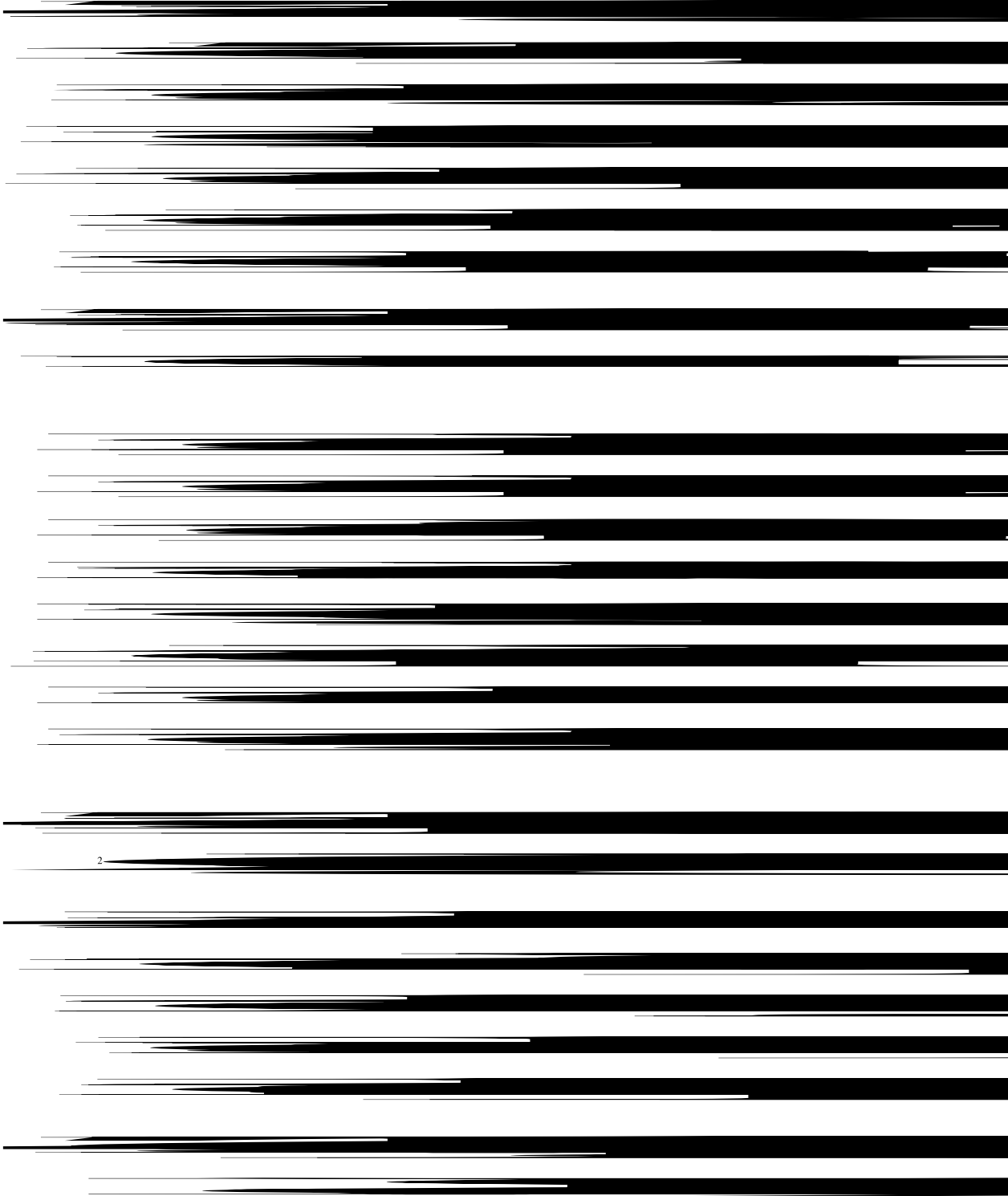
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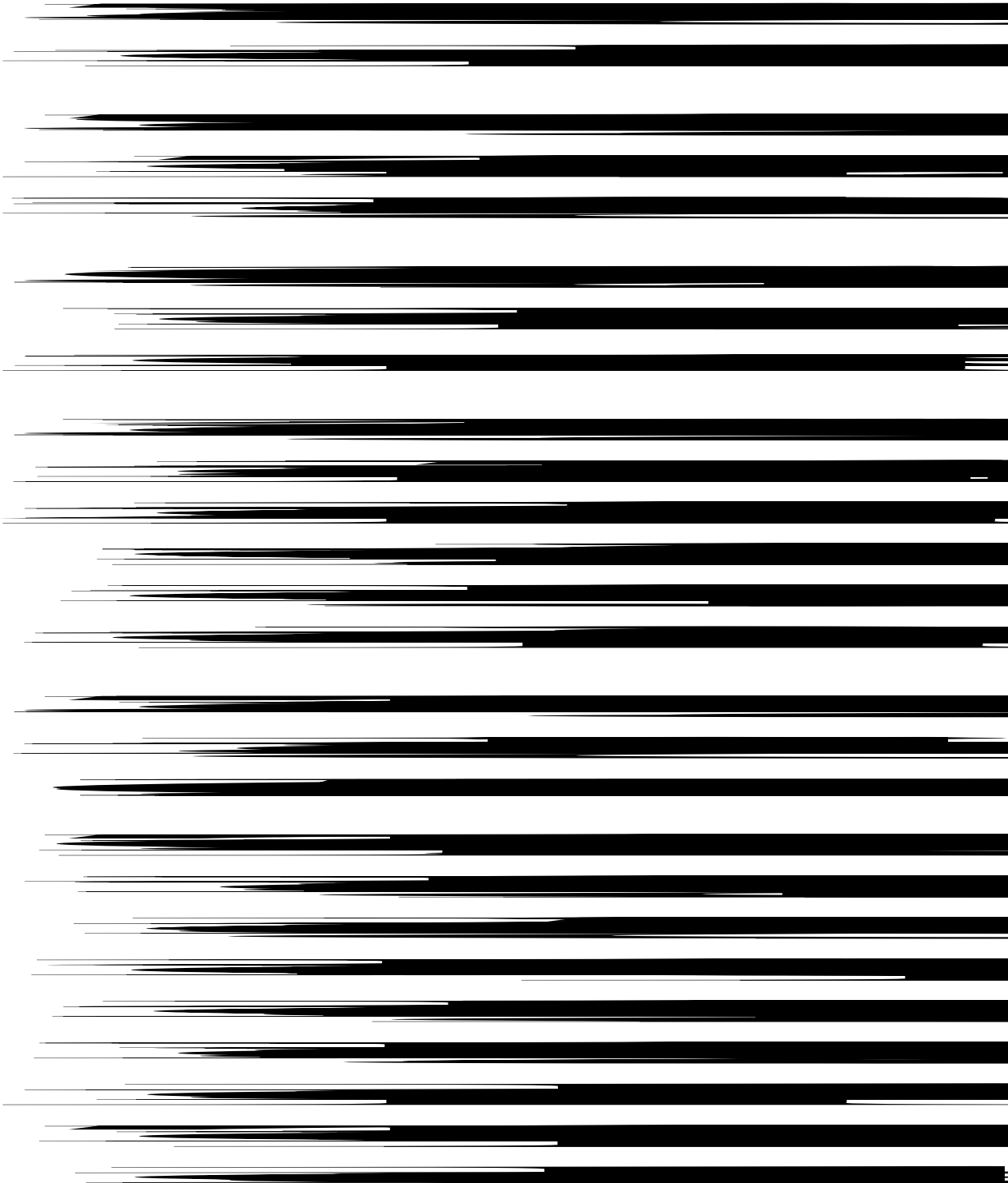
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S.NO.	DESCRIPTION	REFERENCE NO.
1	Technical specification for requirement of MSIV	PC-E/627/Rev no.1
2	Valve specification sheet	GHAVP-1&2/36113/8001/VSS
	Vendor list for Electrical Actuators	GHAVP-1,2/40000/ PROCUREMENT SPECIFICATION-MS-1 (SECTION-C-1-30)
	Floor response data at EL 116 m of control building	GHAVP-1&2/40000/ PROCUREMENT SPECIFICATION/MS-1 (SECTION-C PART -2

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NUCLEAR POWER CORPORATION OF INDIA LTD						
VALVE TYPE: POWER OPERATED VALVE - MSIV (GATE VALVE)				VALVE SPECIFICATION SHEET NO.		GHAVP-1&2/36113/8001/VSS REV NO. : 0 PAGE : 1 OF 3
GENERAL	SIZE	:	650 NB	ENVIRONMENT QUALIFICATION REQUIREMENT		
				TEST	REQUIREMENT	
				THERMAL	YES	
				RADIATION	N.A.	
				LOCA	N.A.	
				MSLB	N.A	
	APPLICABLE DESIGN CODES /STANDARDS			SEISMIC REQUIREMENT (COMPLETE VALVE ASSEMBLY)		
	DESIGN	ASME SEC.III.NC ANSI B 16.34		CONDITION	STRUCTURAL INTEGRITY	OPERABILITY
	TESTING	ASME QME-1				
	BUTT WELD ENDS	ANSI B 16.25		OBE	YES	YES
			SSE	YES	YES	
BODY	PRESSURE RATING	:	PN 100			
	END CONNECTIONS	:	BUTT WELDED TO ANSI B 16.25			
	MATERIAL	:	BODY	ASME SA-352 GR. LCB	LINING	NOT REQUIRED
			BOLTS	SA 193 GR B7	NUTS	SA 194 GR 7
	CONSTRUCTION FEATURES	:	-			
BONNET	TYPE	:	BOLTED / PRESSURE SEAL (AS PER MANUFACTURER'S PREFERENCE)			
	MATERIAL	:	ASME SA-352 GR. LCB			
	BONNET GASKET	:	SWG / GRAPHOIL			
	HAND WHEEL	:	REFER NOTE 10	MATERIAL	:	MALLEABLE IRON
	STEM PACKING	:	REQUIRED	MATERIAL	:	GRAPHOIL
	STEM	:	RISING TYPE	MATERIAL	:	13% Cr. STEEL
TRIM	DFM/DISC/BALL/ PLUG FORM	:	DISC	MATERIAL	:	ASTM A-352 GR. LCB STELLITED
	SEAT(SING./DOUBLE/ CAGE)	:	INTEGRAL	MATERIAL	:	STELLITED
	BACK SEATING	:	INTEGRAL	MATERIAL	:	STELLITED

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VSS NOS: GHAVP-1&2/36113/8001/VSS						REV NO: 00			PAGE : 2 OF 3						
SERVICE CONDITION	FLUID	:	STEAM												
	PRESSURE KG/CM² (g)	:	DESIGN	:	55	:	NORMAL	:	44						
	TEMPERATURE(°C)	:	MAX	:	262	:	NORMAL	:	255	MIN		:	-		
	FLOW (T/HR)	:	MAX	:	-	:	NORMAL	:	968.42	MIN		:	-		
	SP. GR. @ 15 °C	:	-			:	VISCOSITY @ 15 °C				:	-			
	ΔP (KG/CM²)	:	-												
	C _v	:	-												
VALVE CHARACTERISTICS	:	N.A.													
OPERATION	ACTUATOR	:	ELECTRICAL												
	ACTUATOR TYPE	:	MOTOR												
	OPERATOR ACTION	:	CLOSE AT	-			CLOSING TIME				120	SEC			
		:	OPEN AT	-			OPENING TIME				120	SEC			
SUPPLY FAIL POSITION	:	NO CHANGE													
TESTS	DESCRIPTION			PRESSURE [KG/CM ²(g)]			DURATION (MIN)			APPLICABLE CLAUSE OF SPECIFICATION			REMARKS		
	HYDROSTATIC BODY TEST (SHELL TEST)			150			10								
	VALVE CLOSURE TEST			110			3								
	AIR LEAK BODY TEST			-			-								
	AIR LEAK SEAT TEST			6											
	BODY HYDRO WITH BELLOW TEST			-			-								
	BACK SEAT LEAK TEST			110			3								
	PACKING LEAKAGE TEST			103											
	ACTUATOR PERFORMANCE TEST						YES								
	FUNCTIONAL QUALIFICATION TEST AS PER QME-1						YES								
ACCESSORIES															
LIMIT SWITCH		OPEN	YES	CLOSE	YES	INTERMEDIATE POSITIONS				YES					
HAND WHEEL		:	YES			FLOOR STAND	:				N.A.				
EXTN BONNET		:	N.A			SUPPORT LUGS	:				N.A				
FLANGES		:	N.A			OTHERS	:				REF. NOTE 10				
TORQUE SWITCH		:	YES												
OTHER DATA		:	MAXIMUM ALLOWABLE PRESSURE DROP ACROSS VALVE ASSEMBLY–0.15Kg/cm2												

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NUCLEAR POWER CORPORATION OF INDIA LTD			
VSS NOS: GHAVP-1&2/36113/8001/VSS		REV NO: 0	PAGE : 3 OF 3
NOTES:			
1	MSIV VALVES UNDER THIS SPEC. SHALL BE SEISMICALLY QUALIFIED. NATURAL FREQUENCY OF THE VALVE ACTUATOR ASSEMBLY SHALL BE ABOVE 100 Hz .		
2.	THE EQUIPMENT SHALL BE QUALIFIED FOR STRUCTURAL INTEGRITY AND FUNCTION DURING AND AFTER AN SSE.		
3.	THE INSERVICE TESTING PROCEDURE SHALL BE AS PER SECTION XI, ASME BOILER AND PRESSURE VESSEL CODE.		
4	FLOW INTERRUPTION TEST SHALL BE CARRIED OUT CONSIDERING THE FLOW CORRESPONDING TO MAIN STEAM LINE BREAK CONDITION. THE TEST SHALL DEMONSTRATE THAT THE VALVE OPERATES AND CLOSES SUCCESSFULLY WHEN THE HIGH FLOW UNDER MAIN STEAM LINE BREAK CONDITION FLOWS THROUGH THE VALVE & PIPE LINE."		
5.	FUNCTIONAL QUALIFICATION SHALL BE AS PER ASME QME-1		
6.	THE SEAT LEAKAGE LIMIT SHALL BE BETTER / EQUAL TO THE REQUIREMENTS SPECIFIED IN MSS-SP-61.		
7.	ALL ACCESSORIES AS REQUIRED HAVE TO BE SUPPLIED BY THE CONTRACTOR ALONG WITH THE EQUIPMENT.		
8.	ADDITIONAL INTERMEDIATE LIMIT SWITCHES AS REQUIRED FOR INSERVICE TESTING PURPOSE HAS TO BE PROVIDED BY BIDDER.		
9.	ACTUATOR – ELECTRIC MOTOR.		
10.	THE VALVES SHALL REMAIN FUNCTIONAL UNDER THE APPLIED END LOADING CONDITION AS PER ASME QME-1.		
11.	PROVISION SHALL BE MADE TO CLOSE AND OPEN THE VALVE MANUALLY IN CASE IT DOES NOT OPERATE WITH ELECTRIC MOTOR		
12.	ALL SWITCHES SHALL HAVE CHANGE OVER TYPE CONTACTS.		
13.	MSIVs ARE REQUIRED TO CLOSE REMOTE MANUALLY. MSIVS SHALL ALSO CLOSE ON AUTO SENSING EITHER ON HIGH CONTAINMENT PRESSURE OR LOW STEAM LINE PRESSURE.		
14.	ACTUATOR SHALL BE SIZED CONSIDERING MAXIMUM DIFFERENTIAL PRESSURE OF 45.0 KG/CM ² (a) ACROSS THE VALVE AND 80% OF RATED VOLTAGE.		
15.	VALVES ARE INFREQUENTLY USED AND NORMALLY KEPT OPEN.		
16.	MOTOR OPERATED VALVE ACTUATOR SHALL BE SUITABLE FOR OUTSIDE CONTAINMENT ACTIVE DUTY AND FOR STEAM BOUND CONDITION.		
17.	THE SIZE OF THE MSIV SHALL BE WITHIN THE DIMENSIONS AS INDICATED IN THE PIPING GA AND 3D MODEL SCREEN SHOTS OF ATTACHEMENT – 17.		
UNIT-1 VALVE TAG NOS	UNIT-2 VALVE TAG NOS	LINE NOS	FLOOR ELEVATION/BUILDING/ GRID
1-3611-EV-1251	2-3611-EV-1251	650-S-3611-1001	116M/CB-PCB/NEAR F GRID
1-3611-EV-1252	2-3611-EV-1252	650-S-3611-1002	116M/CB-PCB/NEAR F GRID
1-3611-EV-1253	2-3611-EV-1253	650-S-3611-1003	116M/CB-PCB/NEAR F GRID
1-3611-EV-1254	2-3611-EV-1254	650-S-3611-1004	116M/CB-PCB/NEAR F GRID

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TECHNICAL DATA TO BE FURNISHED BY BIDDER

1.0	<u>GENERAL</u>	
1.1	Quantity / Unit	
1.2	Type & Model No.	
1.3	Design Code	
1.4	Make & country of Manufacture	
2.0	TECHNICAL DATA	
2.1	Physical Data	
2.1.1	Valve Inlet size (OD X THK)	mm
2.1.2	Valve Outlet size (OD X THK)	mm
2.1.3	End to end dimensions	mm
2.2	Service Particulars	
2.2.1	Medium to be handled	
2.2.2	Design Pressure	Kg/cm ² (g)
2.2.3	Design temperature	°C
2.2.4	Design steam flow	T/h
2.2.5	Normal operating pressure	Kg/cm ² (g)
2.2.6	Normal operating temperature	°C
2.2.7	Normal operating steam flow	T/h
2.2.8	Pressure drop across valve at normal operating flow	Kg/sq.cm
2.2.9	Maximum flow through valve at which the function of closure can be achieved	

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3.1	Valve Type	
3.2	Ends	
3.3	Stem	
3.4	Bonnet/cap	
3.5	Disc	
3.6	Body seat	
3.7	Disc seat	
3.8	Back seat	
3.9	Type of actuator	Motor
3.10	Position indicator	
3.11	Actuation time	
3.12	Any other construction feature of valve offered.	
4.0	MATERIALS OF CONSTRUCTION	
4.1	Body	
4.2	Bonnet	
4.3	Yoke	
4.4	Disc	
4.5	Body seat	
4.6	Disc seat	
4.7	Back seat	
4.8	Gland packing	
4.9	Stem	
4.10	Cover	
4.11	Gasket	
4.12	Coupling	
4.13	Bolts & Studs	
4.14	Nuts	
4.15	Hand wheel	
4.16	Tag Plate	
4.17	Vendor shall include any other component based on the valve offered.	

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Sl. No.	Particulars	Details by BIDDER
5.0	TESTS	
5.1	Shell hydrostatic test pressure	Kg/cm ²
5.2	Seat hydrostatic test pressure	Kg/cm ²
5.3	Back seat leak test pressure	Kg/cm ²
5.4	Air leak seat test pressure	Kg/cm ²
5.5	Test code	
5.6	Duration of tests	
	Shell hydrostatic test	
	Seat Hydrostatic test	
	Back seat hydrostatic test	
	Air leak test	
5.7	Leakage rates for various tests	
5.8	Extent of NDT as specified	
5.9	Procedure and accepted standard for NDT	
5.10	Additional tests	
a)	Functional qualification as per ASME QME-1 whether proposed by test or by demonstration of design similarity.	
b)	In-service Testing on power	
c)	In-service leak tightness test, off power	
6.0	MISCELLANEOUS	
6.1	(a) End-to-end/face-to-face dimension of Valve (b) Total height of valve and actuator Assembly (c) Withdrawal space for actuator/ internals	Enclose sketch

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6.2	Weights	
	(a) Valve (b) Actuator (c) Total	
6.3	Whether the valves are designed as per the seismic qualification procedures as specified (furnish the details).	
6.4	Details of quality assurance programmed for design, manufacture, supervision of erection, testing etc. of the valves (furnish technical literature)	
6.5	Details of maintenance provisions incorporated for the valves	
6.6	Guaranteed design life of valves	
6.7	Whether the valves are designed as per the design and construction codes as specified	
6.8	Whether the valves are provided with all special requirements as specified	
6.9	Painting and corrosion protection details	
6.10	Whether limit switches for position indication provided	Yes/No
6.11	Equipment to be seismically qualified by analysis/test	Analysis/test
	What is the natural frequency of offered valves	
	Whether the offered valves had already been qualified	
	For what values of acceleration "g", the valves were qualified	
6.12	Name plate and tags provided as specified	
6.13	Hardness of body seat/back seat	
6.14	(a) Hardness of disc seat (b) Hardness of spindle	
6.15	List of nuclear power plants to which similar Valves have been supplied. (Indicate with details such as date of order, actual delivery period achieved, operating record, problems encountered during operation etc.)	

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7.0	DRAWINGS & TECHNICAL LITERATURE	
7.1	(General arrangement and cross-sectional drawing of valve, indicating outline dimensions, clearance dimensions for assembly/disassembly and weight of valve with and without actuator, furnished	Yes/No
7.2	Technical literature/catalogue furnished.	Yes/No
7.3	Quality assurance plan for the offered valves:	Yes/No
7.4	Whether stress analysis of the equipment will be done by Contractor.	Yes/No
7.5	If "Yes" for "7.4" above then furnish the following details :	
	Whether the analysis will be done by consultants or in-house expertise exists with the Contractor?	
	The educational background and experience of the persons performing the analysis; details of the similar work done by company in the past and software /hardware facilities to be used for the analysis.	
7.6	List of special tools and tackles to be supplied for erection/maintenance of MSIVs.	
7.7	Various testing facilities available at shop for tests as called for in the specification.	
8.0	Handling arrangement	
8.1	Adequacy of handling arrangement	Yes/No
9.0	Spares	
9.1	Start-up Spares (to be consumed during initial erection and commissioning)	If required, furnish the list
9.2	Recommended Spares (Required for the life time operation of the valves)	If required, furnish the list

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10.0	<p>Reliability Requirements</p> <p>Vendors shall furnish following information on reliability parameters for Main Steam Isolation Valves (MSIV):</p> <ol style="list-style-type: none"> 1) Mean Time Between Failures (MTBF). 2) Test interval for MSIV if it is used as standby or not in operation during normal plant operation for achieving desired performance as per design intent. 3) Mean Time Between Inspections. 4) Apart from the normal functional requirement for operation, MSIVs will be operated 3325 times during the life of plant. Vendors shall note this and take care of this requirement during design of the valves. 5) Calibration frequency of these valves. <p>Vendors should furnish the above information along with supportive documents</p>	
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Data to be submitted for actuator

1.	Actuator make & model	
2.	Torque required by valve (Kg-m)	
3.	Rated torque of actuator (Kg-m)	
4.	Maximum pullout torque at 80% of nominal voltage supply (Kg-m)	
5.	RPM	
6.	Closing time (Seconds)	
7.	Overall Gear Ratio	
8.	Motor poles	
9.	Insulation class	
10.	Time rating at average load	
12.	Rated torque current (Amps)	

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13.	Average load current (Amps)	
14.	Normal Power required (KW)	
15.	Power factor	
16.	Efficiency (%)	
17.	Maximum actuation time (Seconds)	

Sl. No.	Particulars	
1.	Valve size (mm)	
2.	Pitch (mm)	
3.	No. of starts	
4.	Stem Dia. (mm)	
5.	Bore area (cm ²)	
6.	Differential pressure (Kg/cm ²)	
7.	Valve factor	
8.	Thrust Kg _f	
9.	Gland friction thrust (Kg _f)	
10.	Total thrust Kg _f	
11.	Stem factor	
12.	Required Torque Kg-m	
13.	Allowance for variation in mechanical efficiency at thread and gear box and torque switch setting (Kg-m)	
14.	Allowance for 20% voltage drop (Kg-m)	
15.	Any other allowance (Kg-m)	
16.	Rated torque of actuator (Kg-m)	
17.	Selected actuator size	
18.	Actuator motor rating (Kw)	

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ATTACHMENT - 2

SCHEDULE OF BIDDER'S GENERAL PARTICULARS

- 1.0 Name of the BIDDER :
- 2.0 Address of the BIDDER :
- 3.0 Telephone, fax number, e-mail address of the BIDDER:
- 4.0 Name and designation of the officer of the BIDDER to whom all references shall be made for expeditious coordination :
- 5.0 (a) Foreign/indigenous collaborator if any role of foreign/indigenous collaborator: (Furnish complete particulars of collaboration, including copies of Government approval of collaboration agreement with overseas agencies). Evidence of clearance from his government in case of foreign bidder/collaborator
- (b) Foreign / indigenous collaborations: Role of the BIDDER / collaborator / principal (as regards the extent & scope of the supply / services between BIDDER and his collaborator principal) shall be clearly brought out.
- (c) Modus operandi for executing this contract covering all aspects from Design and engineering to handing over including services during erection, testing commissioning and trial operation.
- (d) Evidence of clearance from his government in case of foreign BIDDER.
- (e) Blank format (i.e. without price) of the price schedule shall be included along with Part-I with (*) mark against the respective serial numbers for the Supply items, Services, statutory levies etc., considered for pricing.
- 6.0 Are all technical particulars called in the specification filled-up? Yes/No
- 7.0 Are all deviations pointed out in Schedule of Deviations? Yes/No

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COMPANY SEAL	SIGNATURE	_____
	NAME	_____
	DESIGNATION	_____
	COMPANY	_____
	DATE	_____

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ATTACHMENT – 3**SCHEDULE OF BIDDER'S EXPERIENCE**

The BIDDER shall furnish here with a list of similar jobs executed by him to whom reference may be made by the PURCHASER in case the PURCHASER considers such a reference necessary

Sl. No.	Name and Description of work, including scope of work	Value of work	Client	Purchase Order No. & Date	Period of construction commissioning and date of	Persons to -whom reference may be made

SIGNATURE

NAME

COMPANY SEAL

DESIGNATION

COMPANY

DATE

NUCLEAR POWER CORPORATION OF INDIA LIMITED	
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The following documents shall be furnished along with the BID.

- 1.0 Completely filled in DATASHEETS/ ATTACHEMENTS of the specification.
- 2.0 Detailed organization chart of the BIDDER and his collaborator indicating the list of personnel who will be deployed for the contract and at projects site if the contract is Awarded
- 3.0 All Quality assurance plans covering entire' scope of contract..
- 4.0 Technical literature / catalogues.
- 5.0 List of makes of actuator
- 6.0 Bidder's experience
- 7.0 General arrangement drawing covering all the features of valves as noted below based on specification:
 - a. Constructional features.
 - b. Detailed part list with material specification.
 - c. Overall dimensions with tolerance.
 - d. End connection details including edge preparation details.
 - e. Test pressures for hydraulic and seat air tests.
 - f. Details of operator including make and overall dimension.
 - g. Weight of assembly.
 - h. Details of accessories (locking arrangement, extension drive, chain arrangement etc.) where called for.

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ATTACHMENT – 5

SCHEDULE OF GUATANTEES

1.0 GUARANTEES

It is guaranteed that the material and workmanship of all components, installation, erection, commissioning and operation of the equipment supplied under this contract meet the requirements of these specifications.

- 2.0 With respect to the goods covered in the enquiry specifications the CONTRACTOR shall provide to the PURCHASE, guarantees:

Of Title

It is guaranteed that the goods are not subject to any security interest, lien or other encumbrance.

Against patent infringements

Except when the PURCHASER furnishes design specifications to the CONTRACTOR, the CONTRACTOR will at his own expense, defend and save the PURCHASE harmless from the expenses and consequences of any suit or procedure brought against the PURCHASER, so far as said suit or procedure is based on a claim that the goods furnished constitute an infringement of any patent in existence on the date of the order. In addition, the CONTRACTOR shall secure at his own expense a fully paid up license or licenses that will permit the PURCHASER to continue use of the goods furnished free of further free of further claim for infringement.

2.3 Of Quality

is guaranteed that the goods are new and free from defects in design, materials and workmanship for a period of twelve (12) months from the date of commercial operation of the unit with Reactor Steam.

- b) If within the expiry of the above stipulated guarantee period, the subject goods or any parts thereof are found defective because of design, workmanship or materials, it will be repaired or replaced. The guarantee period for the replaced parts or repair work shall be the same as above.

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- c) The guarantee period will be extended by the length of time required to make any adjustments, changes or repairs necessary to fulfil the guarantees.
- d) Similar guarantees will be obtained from each SUB-CONTRATOR, However, the overall responsibility will be with the CONTRACTOR.

It is guaranteed that the goods furnished are in full accordance with the requirements of this specification including codes and standards referred herein.

COMPANY SEAL	SIGNATURE	_____
	NAME	_____
	DESIGNATION	_____
	COMPANY	_____
	DATE	_____

NUCLEAR POWER CORPORATION OF INDIA LIMITED	
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ATTACHMENT – 6**SCHEDULE OF DEVIATIONS FROM TECHNICAL SPECIFICATIONS**

All deviations from the Specification shall be filled in by the BIDDER clause by clause in this schedule. BIDDER shall also indicate herein whether he would agree to withdraw the deviations if insisted upon by PURCHASER and whether such withdrawal would be at extra cost/no extra cost to PURCHASER. The extent of cost implications, if any, for withdrawal of deviations shall however be mentioned in Section E.

SL NO.	SECTION NO.	CLAUSE NO.	DEVIATION	WHETHER AGREEABLE TO WITHDRAW IF INSISTED BY PURCHASER (YES/NO.)

The BIDDER hereby certifies that the above mentioned are the only deviations from Technical specification of the enquiry.

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ATTACHMENT -7**SCHEDULE OF ERECTION AND MAINTENANCE TOOLS AND TACKLES**

The BIDDER shall give below the list of maintenance tools and tackles included by him in his quoted prices for carrying out complete disassembly/assembly/ overhauling of equipment offered. BIDDER shall confirm that the maintenance tools/kit are complete in all respects.

SL. NO.	PARTICULARS	QTY.

SIGNATURE

NAME

COMPANY SEAL

DESIGNATION

COMPANY

DATE

NUCLEAR POWER CORPORATION OF INDIA LIMITED	
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ATTACHMENT -8**SCHEDULE OF WEIGHTS AND DIMENSIONS**

The BIDDER shall state below the weights and dimensions of various packages for shipment comprising the complete scope

SL. NO.	DESCRIPTION	DIMENSION IN METRES)	WEIGHT (IN TONNES)

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ATTACHMENT - 9**SCHEDULE OF ACTIVITIES**

The BIDDER shall indicate the times for manufacture, delivery and other activities of each Equipment as shown below unit wise.

For GHAVP U-1

SL. No.	Equipment	Time from date of order to works test (weeks)	Time for works test, dismantling, packing and ready for dispatch from works (weeks)	Time required for shipment to site (weeks)	Total time from date of order to shipment to site (weeks)	Time required for erection, testing & commissioning (weeks)	Total time from date of order to commissioning and handing over, (weeks)

For GHAVP U-2

SL. No.	Equipment	Time from date of order to works test (weeks)	Time for works test, dismantling, packing and ready for dispatch from works (weeks)	Time required for shipment to site (weeks)	Total time from date of order to shipment to site (weeks)	Time required for erection, testing & commissioning (weeks)	Total time from date of order to commissioning and handing over, (weeks)

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We, the undersigned, hereby undertake to meet the above time schedule from the date of order.
(BIDDER shall submit the detailed bar chart covering complete scope of this package)

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NUCLEAR POWER CORPORATION OF INDIA LIMITED	
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ATTACHMENT – 10 (if required)

SCHEDULE OF PERFORMANCE AND EFFICIENCY TEST INSTRUMENTS

The BIDDER should indicate hereunder all necessary instruments to be loaned by him to the PURCHASER for performance and efficiency tests on the Equipment supplied by him.

SL. No.	Measurement point	Measured variable	Instrument required	Quantity required	Remarks

The BIDDER shall furnish 'all instruments with calibration certificates or otherwise as required for performance evaluation of complete plant as specified in this contract.

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ATTACHMENT -11

SCHEDULE OF PLACES OF TESTS AND INSPECTION

The BIDDER shall indicate the item of equipment supplied, name of the MANUFACTURER or SUB-CONTRACTOR and place of test and inspection as shown below:

SL. NO.	Item / equipment	Manufacturer or subcontractor	Place of test or inspection

COMPANY SEAL

SIGNATURE _____
NAME _____
DESIGNATION _____
COMPANY _____
DATE _____

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ATTACHMENT 12**SCHEDULE OF SUB CONTRACTORS & SUB VENDORS**

The BIDDER shall indicate the details of SUB- CONTRACTORS. Details of each SUB- CONTRACTORS shall be provided in following format.

SL. No.	Item/equipment	Name of sub vendor /sub-contractor	List of plants where equipment supplied	Rating of plant where equipment / system supplied / service provided	Complete address, telephone numbers, e-mail ID	Location of works	Remarks

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ATTACHMENT – 13 (if required)**SCHEDULE OF ERECTION EQUIPMENT**

The BIDDER shall furnish herein the details of all erection equipment and tools as required for the execution of the contract .

SL. NO.	Item	Details of quantity, capacity , etc.	Remarks

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ATTACHMENT – 14**DOCUMENT DISTRIBUTION SCHEDULE**

SL. No.	Item	OWNER's OFFICE	OWNER's SITE OFFICE
1.0	Correspondence	O+1	1
2.0	Minutes of meeting	1	1
3.0	Contract drawing / documents		
	a) Preliminary	1	1
	b) Final	1	1
	c) As built (Including 2 CD)	1	1
4.0	Test Certificates	O + 1	1
5.0	Progress report	1	1
6.0	All Photographs	1	1
7.0	Instruction manuals		
	(Final instruction manual on soft copy in MS office copied into CD)		
	a) Preliminary	1	1
	b) Final (including 2 CD)	1	1

O-Original

ATTACHMENT -15

TYPICAL QUALITY ASSURANCE PLAN FOR MAIN STEAM ISOLATION VALVES

1. SCOPE AND PURPOSE:

The purpose of this typical Quality Assurance Plan is to describe general practices and sequences of activities (such as inspection, testing, control, etc.) to be performed during the manufacture of the equipment. This is a typical QAP and should be tailored by suitable modifications keeping in mind tender specification requirements, codes, standards and vendor/sub-vendor good practices.

2. ABBREVIATIONS AND DEFINITIONS:

P – PERFORMED BY	W – WITNESSED BY	R – REVIEWED BY
1 – NPC QS	2 – VENDOR QC	3 – EXTERNAL NPCIL APPROVED LABORATORY OR SUB VENDOR QC.

WHEREVER CHP IS MENTIONED, IT IS A CUSTOMER HOLD POINT.

CLASS OF CHECK:

MINOR -	The characteristic of a component, process or operation whose failure neither materially reduces the usability of the product in operation, nor does it affect the aesthetic aspects.
MAJOR -	The characteristic of a component, process or operation whose failure may cause operation failure which can not be readily corrected at site or cause substandard performance, increased erection and maintenance cost, reduced life or seriously affect aesthetics.
CRITICAL	The characteristic of a component, process or operation whose failure will surely cause operation failure or intermittent troubles which is difficult to rectify at site or render the unit unfit for use or cause safety hazard.

NOTE: THIS INDICATIVE QA PLAN IS ENCLOSED WITH TENDER SPECIFICATION FOR BIDDERS REFERENCE AND TO GIVE THEM AN IDEA OF INTENDED SCOPE OF QS ACTIVITIES TO BE UNDERTAKEN DURING EXECUTION OF THIS CONTRACT. IT IS TO BE NOTED THAT THIS IS NOT A COPY OF FINAL QA PLAN. THE FINAL QA PLAN IS TO BE PREPARED BY SUCCESSFUL BIDDER AND GOT APPROVED PRIOR TO THE EXECUTION OF CONTRACT.

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
1	Body & Bonnet	(a)Cast & stamp body and test bars (minimum two numbers)	Major	Verification of records for casting and material identification	100%	Order	Order	Report	2	2	1 & 2	
		(b) Chemical Composition	Critical	Verification of Chemical composition	Sample / Heat	Material specification	Material specification	Report	3	3	1 & 2	
		© Heat treatment	Critical	Time / Temperature monitoring	100%	Approved procedure	Approved procedure	HT Chart	2 / 3	2	1 & 2	
		(d) Mechanical Properties	Critical	Verification of mechanical properties	Sample / Heat	Material specification	Material specification	Report	3	2	1 & 2	
		(e) Impact test	Critical	Verification of Impact strength	Sample / Heat	Applicable standard / Approved procedure	Applicable standard / Approved procedure	Report	2/ 3	1& 2	1 & 2	
		(f) Radiography	Critical	NDE	100%	Approved procedure	Approved procedure	Report	2/ 3	1& 2	1 & 2	CHP

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S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(g) Foundry visual and dimensional inspection including wall thickness	Major	Verification of Dimensions & general quality of casting	100%	Order / drawings	Order / drawings	Report	2 / 3	2	1 & 2	
		(h) Overall Integrity of castings	Critical	Verification of integrity by Volumetric examination (RT)	100%	Applicable standard & approved procedure	Applicable standard & approved procedure	Report & RT films	2	2 / 1	1 & 2	
		(i) Soundness of surface / sub-surface of casting	Critical	NDT (WFMT/ LPT) to check for surface / sub-surface defects	100%	Applicable standard & approved procedure	Applicable standard & approved procedure	Report	2	2 / 1	1 & 2	
		(j) Soundness of Weld repair	Critical	NDT (RT/WF MPT) of weld repaired & stress relieved areas	To cover material & thickness of casting	Applicable standard / code & approved procedure	Applicable standard / code & approved procedure	Report, WPS & PQR	2	1 & 2	1 & 2	
		(k) Stress relieving repairs	critical	Review of procedure / report	100%	Approved procedure	Approved procedure	HT chart	2 / 3	2	1 & 2	

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AUGUST, 2023

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TECHNICAL SPECIFICATION FOR MAIN STEAM ISOLATION VALVE (MSIV)

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(l) Final inspection in foundry including wall thickness	Critical	Verification of Dimensions	100%	Order / approved drawings	Order / approved drawings	Report	2 / 3	2 / 1	1 & 2	
		(m) Machine shop stage inspection	Critical	Verification of Dimensions	100%	Order / approved drawings	Order / approved drawings	Report	2	2	1 & 2	
		(n) Weld seats or Hard facing / corrosion resistant deposition operation.	Critical	Review of procedure and qualification record	100%	Applicable standard / code & approved procedure	Applicable standard / code & approved procedure	Report	2	2	1 & 2	
		(o) seat weld preparation and adjacent 25mm.	Critical	Report review	100%	Approved procedure	Applicable standard & approved procedure	Report	2	2	1 & 2	
		(p) Machine shop final inspection including wall thickness	Critical	Verification of Dimensions	100%	Order / approved drawings	Order / approved drawings	Report	2	2	1 & 2	
		(a) Cast & stamp body and test bars (minimum two numbers)	Major	Verification of records for casting and material identification	100%	Order	Order	Report	2	2	1 & 2	
	2	Disc										

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(b) Chemical Composition	Critical	Verification of Chemical composition	Sample / Heat	Material specification	Material specification	Report	3	3	1 & 2	
		(c) Heat treatment	Critical	Time / Temperature monitoring	100%	Approved procedure	Approved procedure	HT Chart	2 / 3	2	1 & 2	
		(d) Mechanical Properties	Critical	Verification of mechanical properties	Sample / Heat	Material specification	Material specification	Report	3	2	1 & 2	
		(e) UT	Critical	NDE	100%	Approved procedure	Approved procedure	Report	3	2	1 & 2	
		(f) Foundry visual and dimensional inspection including wall thickness	Major	Verification of Dimensions & general quality of casting	100%	Order / drawings	Order / drawings	Report	2 / 3	2	1 & 2	
		(g) Overall Integrity of castings	Critical	Verification of integrity by Volumetric examination (RT)	100%	Applicable standard & approved procedure	Applicable standard & approved procedure	Report RT film	2	2 / 1	1 & 2	

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		DATE: 17/08/2023	

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(h)Soundness of surface / sub-surface of casting	Critical	NDT (WFMT/ LPT) to check for surface / sub-surface defects	100%	Applicable standard & approved procedure	Applicable standard & approved procedure	Report	2	2	1 & 2	
		(i)Final inspection in foundry including wall thickness	Critical	Verification of Dimensions	100%	Order / drawings	Order / drawings	Report	2 / 3	2 / 1	1 & 2	
		(j)Machine shop stage inspection	Critical	Verification of Dimensions	100%	Order / drawings	Order / drawings	Report	2	2	1 & 2	
		(k) Soundness of hard facing and adjacent areas (25 mm)	Critical	NDT (WFMT/ LPT) to check for surface / sub-surface defects	100%	Approved procedure	Applicable standard & approved procedure	Report	2	2	1 & 2	
		(l)Stress relieving hard facing	Critical	Review of procedure / report	100%	Approved procedure	Approved procedure	Report	2 / 3	2	1 & 2	
		(m) Hardness test of hard facing material	Critical	Verification of hardness	100%	Order	Order / specification	Report	2 / 3	2	1 & 2	Hardness not to be less than 350 BHN

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AUGUST, 2023

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(n)Machine shop final inspection including wall thickness	Critical	Verification of Dimensions	100%	Order / drawings	Order / drawings	Report	2	1 & 2	1 & 2	
3	Seat	(a) Cast & stamp body and test bars. (minimum two no.s)	Major	Verification of records for casting and material identification	100%	Order	Order	Report	2	2	1 & 2	
		(b) Chemical Composition	Critical	Verification of Chemical composition	Sample / Heat	Material specification	Material specification	Report	3	3	1 & 2	
		(c)Heat treatment	Critical	Time / Temperature monitoring	100%	Approved procedure	Approved procedure	HT Chart	2 / 3	2	1 & 2	
		(d) Mechanical Properties	Critical	Verification of mechanical properties	Sample / Heat	Material specification	Material specification	Report	3	2	1 & 2	
		(e)Foundry visual and dimensional inspection including wall thickness	Major	Verification of Dimensions	100%	Order / drawings	Order / drawings	Report	2 / 3	2	1 & 2	

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
4	Bonnet Bolting / studs	(k)Stress relieving hard facing	Critical	Review of procedure / report	100%	Approved procedure	Approved procedure	HT chart	2 / 3	2	1 & 2	
		(l) Hardness test of hard facing material	Critical	Report review	100%	Order	Order / specification	Report	2 / 3	2	1 & 2	Hardness not to be less than 350 BHN
		(m)Machine shop final inspection including wall thickness	Critical	Verification of Dimensions	100%	Order / Approved drawings	Order / Approved drawings	Report	2	1 & 2	1 & 2	
		(a)Verification of records	Critical	TC verification and Correlation w.r.t. TC for Chemical & Mechanical	One sample per heat	Applicable code / standard	Applicable code / standard	Report	2	2	1 & 2	
		(b)Soundness of surface / sub-surface	Critical	NDT (WFMT/ LPT) to check for surface / sub-surface defects	100%	Approved procedure	Approved procedure	Report	2	1 & 2	1 & 2	
		(c) Dimensional & Visual examination	Major	Verification of Dimensions	100%	Approved drawing	Approved drawing	Report	2	2	1 & 2	

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
5	Stem	(a) Verification of records	Critical	TC verification and Correlation w.r.t. TC for Chemical & Mechanical	One sample per heat	Applicable code / standard	Applicable code / standard	Report	2	2	1 & 2	
		(b) Machine shop stage inspection	Critical	Verification of Dimensions	100%	Approved drawing	Approved drawing	Report	2	2	1 & 2	
		© UT	Critical		100%	Approved procedure	Approved procedure	Report	2	1 & 2	1 & 2	
		(d) Overall Integrity	Critical	Verification of integrity by Volumetric examination (UT)	100%	Approved procedure	Approved procedure	Report	2	1 & 2	1 & 2	
		(e) Soundness of surface / sub-surface	Critical	NDT (WFMT/ LPT) to check for surface / sub-surface defects	100%	Approved procedure	Approved procedure	Report	2	1 & 2	1 & 2	
		(f) Machine shop final inspection	Critical	Verification of Dimensions	100%	Approved drawing	Approved drawing	Report	2	2	1 & 2	

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(g) Dimensional & Visual examination	Major	Verification of Dimensions	100%	Approved drawing	Approved drawing	Report	2	2	1 & 2	
6	Other bought out items like gaskets etc.	(a)Verification of records	Critical	TC verification and Correlation	100%	Applicable code / standard	Applicable code / standard	Report	2	2	1 & 2	
		(b) Dimensional & Visual examination	Major	Report review	100%	Approved drawing	Approved drawing	Report	2	2	1 & 2	
7	Actuator assembly	(a)Verification of records	Critical	TC verification and Correlation w.r.t. TC	One sample per heat	Applicable code / standard	Applicable code / standard	Report	2	2	1 & 2	
		(b)Assembled actuator testing as specified	Critical	Report review	100%	Approved procedure	Approved procedure	Report	2	1 & 2	1	
		(c)Painting	Major	Report review	100%	Approved procedure	Approved procedure	Report	2	2	1	
		(d)Final inspection	Critical	Report review	100%	Approved drawing	Approved drawing	Report	2	2	1	
8	Valve assembly	(a) Verification of dimensions	Critical	Report review	100%	Approved drawing	Approved drawing	Report	2	1	1 & 2	
		(b) Assemble valve for pressure testing	Major	Report review	100%	Approved drawing	Approved drawing	Report	2	2	2	

S NO	COMPONENT & OPERATION	CHARACTERISTICS / ACTIVITY	CLASS	TYPE OF CHECK	QUANTOM OF CHECK	REFERENCE DOCUMENT	ACCEPTENCE NORM	FORMAT OF RECORDS	AGENCY			REMARKS
									P	W	R	
		(c)Tests: 1) Visual examination. Body hydro test. 2) Valve closure test 3) Back seat test. 4) Seat pneumatic test 5) Packing leakage test	Critical	Report review	100%	Approved procedure	Approved procedure	Report	2	1 & 2	1 & 2	CHP
		(d)Functional testing (Cold cyclic, Hot cyclic & Pipe reaction end loading) of Fully assembled valve / actuator assembly with instruments mounting as per QME-1	Major	Report review	100%	Approved drawing / Approved procedures	Approved drawing / Approved procedure	Report	2	1 & 2	1 & 2	CHP
		(e)Seismic test (static equivalent test – ref. QME-1)	Critical	Report review	Type test	Approved drawing / Approved procedures	Approved drawing / Approved procedure	Report	2	1 & 2	1 & 2	CHP

674693/2024/HEP-STE40100		NUCLEAR POWER CORPORATION OF INDIA LIMITED	
700MW e GORAKHPUR HARYANA ANU VIDYUT PARIYOJANA-UNIT 1 & 2		PAGE NO.: PAGE 63 OF 70	
TECHNICAL SPECIFICATION FOR MAIN STEAM ISOLATION VALVE (MSIV)		REV NO.: 00	
		DATE: 17/08/2023	

- 4) DETAILED QAP TO BE PREPARED BY VENDOR SHALL COVER ALL REQUIREMENTS AS SPECIFIED IN THIS PROCUREMENT SPECIFICATION.
- 5) RT SHOOTING SKETCH TO BE ESTABLISHED BY FIRST CASTING OF EACH SIZE AND RATING.
- 6) FOR STAINLESS STEEL PARTS PICKLING AND PASSIVATION SAHLL BE DONE AS PER PROCEDURES APPROVED BY NPCIL.
- 7) SPARES WILL ALSO BE SUBJECTED TO SAME TESTS AND EXAMINATIONS AS REQUIRED FOR CORRESPONDING PARTS IN MAIN EQUIPMENT.
- 8) REPRESENTATIVE OF PRIME SUPPLIER AUTHORISED TO WITNESS THE TEST SHALL HAVE REQUIRED EXPERIENCE AND KNOWLEDGE OF ACTIVITIES BEING INSPECTED. HE SHALL BE EMPLOYEE OF PRIME SUPPLIER ONLY.
- 9) WELD REPAIR SHALL BE CARRIED OUT WITH PROIR APPROVAL OF PURCHASER.
- 10) ALL FINISHED MATCHINED SURFACES OF STEM , DISC AND SEAT SHALL BE 100% EXAMINED BY MP/LP.

PC/E/08002

AUGUST, 2023

NOT FOR UNATHORISED PUBLICATION / PRESENTATION OUT SIDE NPCIL
ISSUED BY BHEL - BHOPAL

ATTACHMENT-16

Control building floor response spectra at elevation 116 m.

CB 116M

Freq	OBEY_2%	OBEY_3%	OBEY_5%	OBEY_2%	OBEY_3%	OBEY_5%	SSEX_2%	SSEX_3%	SSEX_5%	SSEY_2%	SSEY_3%	SSEY_5%	SSEZ_2%	SSEZ_3%	SSEZ_5%
	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)	Spa(g)
0.1	0.00575	0.00564	0.00546	0.00539	0.00522	0.00495	0.00403	0.00394	0.00381	0.01142	0.01122	0.01086	0.01075	0.01041	0.00987
0.105	0.00636	0.00623	0.00602	0.00592	0.00574	0.00541	0.00436	0.00428	0.00413	0.01266	0.0124	0.01198	0.01177	0.01141	0.01075
0.11	0.00711	0.00696	0.0067	0.00658	0.00637	0.00598	0.00493	0.0048	0.00457	0.01416	0.01386	0.01334	0.01312	0.0127	0.01193
0.116	0.00817	0.00795	0.00756	0.00756	0.00729	0.00684	0.00561	0.00543	0.00511	0.01627	0.01584	0.01508	0.01454	0.01365	0.01117
0.122	0.00894	0.00865	0.00817	0.00841	0.00812	0.00759	0.00608	0.00587	0.00551	0.0178	0.01722	0.01625	0.01675	0.01615	0.01509
0.128	0.00967	0.00937	0.00888	0.00889	0.00856	0.00802	0.00649	0.00626	0.00586	0.01927	0.01866	0.01768	0.0177	0.01704	0.01597
0.134	0.01045	0.01015	0.00972	0.00943	0.00911	0.00868	0.00683	0.00655	0.00614	0.02077	0.02018	0.01935	0.01881	0.01817	0.01773
0.141	0.01167	0.01126	0.01071	0.01048	0.01019	0.00971	0.00754	0.00729	0.00691	0.02317	0.02235	0.02131	0.0209	0.02031	0.01934
0.148	0.01342	0.01285	0.01207	0.01184	0.01147	0.01094	0.00857	0.00822	0.00779	0.02667	0.02554	0.02401	0.02359	0.02284	0.02178
0.155	0.01493	0.01429	0.01347	0.01333	0.01286	0.01211	0.00962	0.00915	0.0086	0.0297	0.02844	0.02681	0.02654	0.02559	0.02412
0.163	0.01719	0.01625	0.01504	0.01576	0.01483	0.01361	0.01111	0.01052	0.00972	0.03416	0.03233	0.02994	0.03125	0.02939	0.02713
0.171	0.01937	0.01859	0.01731	0.01697	0.01621	0.01534	0.011252	0.01188	0.01101	0.03852	0.03695	0.03439	0.03382	0.03236	0.03058
0.18	0.02057	0.01989	0.0189	0.01841	0.01791	0.01723	0.0129	0.01256	0.0121	0.04088	0.03956	0.03759	0.03669	0.0357	0.03434
0.189	0.02128	0.02093	0.0205	0.02021	0.01972	0.01913	0.01387	0.01357	0.01311	0.04232	0.0416	0.04076	0.04028	0.0393	0.03814
0.198	0.024	0.02375	0.02319	0.0227	0.02237	0.0218	0.01513	0.01494	0.0145	0.04772	0.04724	0.04611	0.04528	0.04463	0.04348
0.208	0.02864	0.028	0.02686	0.02708	0.0264	0.02531	0.01809	0.01765	0.01683	0.05697	0.0557	0.05342	0.05403	0.05266	0.05045
0.218	0.03315	0.03218	0.03044	0.03134	0.03038	0.02877	0.02111	0.02045	0.01926	0.06596	0.06402	0.06056	0.06249	0.06058	0.05733
0.229	0.0377	0.03605	0.03355	0.03506	0.03392	0.03191	0.02461	0.02313	0.02152	0.07499	0.07168	0.06675	0.0699	0.06762	0.0636
0.241	0.07854	0.04517	0.04024	0.07526	0.0445	0.03881	0.03367	0.03111	0.0274	0.15656	0.09009	0.08029	0.1502	0.08885	0.07753
0.253	0.07854	0.0571	0.06554	0.07526	0.05599	0.048	0.04323	0.03934	0.0336	0.15656	0.11406	0.13058	0.1502	0.11179	0.09586
0.265	0.07854	0.0666	0.06554	0.07526	0.06297	0.05358	0.0494	0.04442	0.03714	0.15656	0.13265	0.13058	0.1502	0.12557	0.10686
0.279	0.07854	0.07148	0.06554	0.07526	0.06797	0.05841	0.05247	0.04781	0.04108	0.15656	0.14241	0.13058	0.1502	0.13566	0.11639
0.293	0.07854	0.07184	0.06554	0.07526	0.06899	0.06191	0.05252	0.049	0.04364	0.15656	0.1432	0.13058	0.1502	0.13769	0.12311
0.307	0.07854	0.07184	0.06554	0.07596	0.07059	0.06308	0.05372	0.05019	0.0447	0.15656	0.1432	0.13058	0.15161	0.14081	0.12536
0.323	0.08708	0.08071	0.0723	0.08204	0.0755	0.06662	0.0576	0.05314	0.04722	0.17347	0.16057	0.1436	0.16307	0.15009	0.13261
0.339	0.11553	0.10407	0.08935	0.10692	0.09326	0.07752	0.07645	0.06812	0.05658	0.23026	0.20712	0.1777	0.22138	0.18607	0.15467
0.356	0.12581	0.11486	0.10081	0.11485	0.10349	0.08774	0.08256	0.07492	0.06405	0.25081	0.22892	0.20051	0.22941	0.20683	0.1752
0.373	0.13142	0.1204	0.10646	0.1228	0.11228	0.09606	0.08482	0.07777	0.06853	0.26219	0.24016	0.21169	0.24533	0.22428	0.19181
0.392	0.14735	0.1384	0.12253	0.13291	0.12405	0.10861	0.09085	0.08484	0.07518	0.29365	0.27567	0.24394	0.26519	0.24744	0.21653
0.412	0.30316	0.25883	0.13926	0.24883	0.21478	0.12092	0.17183	0.15063	0.08241	0.60462	0.51608	0.27673	0.4961	0.4279	0.24085
0.432	0.30316	0.25883	0.14599	0.24883	0.21478	0.12397	0.17183	0.15063	0.09058	0.60462	0.51608	0.29016	0.4961	0.4279	0.24742
0.454	0.30316	0.25883	0.17236	0.24883	0.21478	0.14764	0.17183	0.15063	0.103	0.60462	0.51608	0.34257	0.4961	0.4279	0.29431
0.476	0.30316	0.25883	0.20294	0.28024	0.21478	0.17403	0.17183	0.15063	0.12354	0.60462	0.51608	0.40417	0.55829	0.4279	0.34626
0.5	0.30316	0.25883	0.20294	0.28024	0.21478	0.17961	0.17183	0.15063	0.12894	0.60462	0.51608	0.40417	0.55829	0.4279	0.35767
0.525	0.30316	0.25883	0.21922	0.28024	0.21478	0.17961	0.17183	0.15329	0.13355	0.60462	0.51608	0.43584	0.55829	0.4279	0.35767
0.552	0.31614	0.28141	0.23704	0.28024	0.24867	0.2112	0.18793	0.17175	0.15303	0.63044	0.56125	0.47075	0.55829	0.49553	0.42067
0.579	0.32158	0.29441	0.25698	0.28024	0.25595	0.22507	0.19224	0.18044	0.16424	0.64052	0.58627	0.50887	0.55829	0.50977	0.44845
0.608	0.33669	0.31209	0.2769	0.28024	0.25946	0.23732	0.2073	0.19562	0.17891	0.66811	0.61909	0.54934	0.55829	0.51703	0.47286
0.639	0.42322	0.37866	0.31572	0.34459	0.30667	0.25792	0.25289	0.22921	0.20388	0.83926	0.75075	0.62703	0.68557	0.60962	0.51273
0.67	0.56197	0.47139	0.36459	0.42708	0.36705	0.30027	0.30648	0.26935	0.22893	1.11118	0.93194	0.72106	0.84962	0.72844	0.59596
0.704	0.64916	0.53387	0.40879	0.45027	0.3775	0.30698	0.36416	0.31249	0.25498	1.2798	1.05152	0.80333	0.89511	0.74996	0.60823
0.739	0.68337	0.59036	0.47237	0.48915	0.42294	0.34661	0.37719	0.33619	0.28058	1.3433	1.16066	0.92671	0.97276	0.83907	0.68643
0.776	1.27906	1.04771	0.53462	0.88396	0.48196	0.40078	0.79788	0.65993	0.34333	2.46873	2.02315	1.04496	1.74848	0.95386	0.7923
0.815	1.27906	1.04771	0.59322	0.88396	0.57543	0.45584	0.79788	0.65993	0.40685	2.46873	2.02315	1.16165	1.74848	1.13946	0.90135
0.856	1.27906	1.04771	0.70667	0.88396	0.63	0.5002	0.79788	0.65993	0.452	2.46873	2.02315	1.36984	1.74848	1.24432	0.98729
0.899	1.27906	1.04771	0.78299	0.88396	0.73199	0.56042	0.89456	0.76036	0.50713	2.46873	2.02315	1.51339	1.74848	1.44829	1.10678

AUGUST, 2023

NUCLEAR POWER CORPORATION OF INDIA LIMITED

0.915	1.27906	1.04771	0.79288	0.88396	0.741	0.58497	0.89456	0.76036	0.50775	2.46873	2.02315	1.5304	1.74848	1.46188	1.15298	1.74519	1.48116	0.98591
0.943	1.27906	1.04771	0.81698	0.91854	0.78959	0.6292	0.89456	0.76036	0.53261	2.46873	2.02315	1.57711	1.80579	1.55201	1.23535	1.74519	1.48116	1.03335
0.991	1.27906	1.05458	1.03374	1.29974	1.12384	0.91272	0.89456	0.76036	0.6039	2.46873	2.41437	1.98075	2.52947	2.18857	1.78089	1.74519	1.48116	1.17756
1.04	1.50836	1.05528	1.03374	1.29974	1.12384	0.91272	0.89456	0.76036	0.61221	2.86095	2.41437	1.98075	2.52947	2.18857	1.78089	1.74519	1.48116	1.19459
1.092	1.50836	1.20469	1.03374	1.29974	1.12384	0.91272	0.96484	0.85079	0.70902	2.86095	2.41437	1.98075	2.52947	2.18857	1.78089	1.88266	1.66074	1.3847
1.127	1.50836	1.2617	1.03374	1.29974	1.12384	0.91272	0.97984	0.87708	0.7379	2.86095	2.41437	1.98075	2.52947	2.18857	1.78089	1.91307	1.71371	1.44234
1.147	1.50836	1.26171	1.03374	1.29974	1.12384	0.91272	1.3221	1.09367	0.74878	2.86095	2.41437	1.98075	2.52947	2.18857	1.78089	2.60606	2.15555	1.46473
1.17	1.50836	1.26171	1.03374	1.29974	1.12384	0.91272	1.38976	1.11795	0.84734	2.86095	2.41437	1.98075	2.52947	2.18857	1.78089	2.7391	2.20542	1.67116
1.204	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.38976	1.11795	0.84734	4.2235	3.44744	2.54705	3.99627	3.27332	2.44065	2.7391	2.20542	1.67116
1.264	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.38976	1.11795	0.84734	4.2235	3.44744	2.54705	3.99627	3.27332	2.44065	2.7391	2.20542	1.67116
1.327	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.38976	1.11795	0.84734	4.2235	3.44744	2.54705	3.99627	3.27332	2.44065	2.7391	2.20542	1.67116
1.394	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.38976	1.11795	0.84734	4.2235	3.44744	2.54705	3.99627	3.27332	2.44065	2.7391	2.20542	1.67116
1.45	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.59736	1.32846	1.00425	4.2235	3.44744	2.54705	3.99627	3.27332	2.44065	3.16591	2.63221	1.98809
1.464	2.27056	1.85526	1.36963	2.12218	1.73829	1.29446	1.59736	1.32846	1.00425	4.2235	3.44744	2.54705	3.99627	3.27332	3.0662	3.16591	2.63221	1.98809
1.537	2.27056	1.85526	1.36963	2.87091	1.70653	1.67273	1.32846	1.37846	1.00425	4.2235	3.44744	2.54705	4.99526	4.01387	3.0662	3.71809	2.63271	1.98809
1.614	2.15375	1.76555	1.35189	2.86637	2.25914	1.70653	1.65746	1.36234	1.00425	4.03521	3.31069	2.515	5.07703	4.01387	3.0662	3.28834	2.70246	1.98809
1.694	2.15375	1.76555	1.19643	2.86637	2.25914	1.70653	1.65746	1.36234	1.00425	4.03521	3.31069	2.29368	5.07703	4.01387	3.0662	3.28834	2.70246	1.98809
1.751	2.15375	1.76555	1.12675	2.86637	2.25914	1.70653	1.65746	1.36234	1.03512	4.03521	3.31069	2.16432	5.07703	4.01387	3.0662	3.28834	2.70246	2.05303
1.779	2.05735	1.36417	1.06857	2.86637	2.25914	1.70653	1.95108	1.53064	1.04736	3.89245	2.62175	2.0507	5.0827	4.01387	3.0662	3.86822	3.0261	2.07673
1.836	1.48404	1.18151	0.98254	2.86637	2.25914	1.70653	1.95108	1.53064	1.18835	2.873	2.28081	1.8879	5.0827	4.01387	3.0662	3.86822	3.0261	2.34716
1.868	1.48404	1.18151	2.86637	2.25914	1.6851	1.95108	1.53064	1.53064	1.18835	2.873	2.28081	1.79333	5.0827	4.01387	3.01023	3.86822	3.0261	2.34716
1.961	1.48404	1.18151	0.90503	2.86637	2.12009	1.52419	1.95108	1.53064	1.18835	2.873	2.28081	1.74147	5.0827	3.93061	2.824	3.86822	3.0261	2.34716
2.059	1.48404	1.18151	0.8701	2.74148	2.12009	1.35977	1.95108	1.53064	1.18835	2.873	2.28081	1.69246	5.0827	3.93061	2.824	3.86822	3.0261	2.34716
2.167	1.48404	1.18151	0.86772	2.74148	2.12009	1.20938	1.95108	1.53064	1.18835	2.873	2.28081	1.67642	5.0827	3.93061	2.824	3.86822	3.0261	2.34716
2.27	1.48404	1.18151	0.83388	2.74148	2.12009	1.14344	1.95108	1.53064	1.18835	2.873	2.28081	1.62173	5.0827	3.93061	2.824	3.86822	3.0261	2.34716
2.384	1.265	0.7281	0.63391	1.09043	0.97652	0.83379	1.67011	1.47132	1.18835	2.48997	2.10493	1.23664	2.0918	1.86868	1.59066	3.09114	2.9087	2.34716
2.503	1.265	0.70931	0.6091	1.04612	0.913	0.76444	1.67011	1.2253	1.135	2.48997	2.10493	1.1857	2.02956	1.76025	1.4603	3.09114	2.41583	1.82431
2.547	0.84026	0.70931	0.60257	1.03345	0.90388	0.76174	1.67011	1.2253	1.135	1.64721	1.38496	1.16908	1.992	1.73771	1.45351	3.09114	2.41583	1.81054
2.628	0.84026	0.70931	0.5902	0.99607	0.85145	0.73433	1.56801	1.2253	0.90646	1.64721	1.38496	1.14527	1.94284	1.63598	1.40575	3.09114	2.41583	1.77802
2.76	0.84026	0.70931	0.5902	0.99607	0.81073	0.69741	1.56801	1.2253	0.90646	1.64721	1.38496	1.14527	1.94284	1.5752	1.33361	3.09114	2.41583	1.77802
2.898	0.84026	0.70931	0.58179	0.99607	0.81073	0.6677	1.48205	1.15159	0.89755	1.64721	1.38496	1.14527	1.94284	1.5752	1.28169	2.91912	2.24792	1.77802
3.043	0.84026	0.70931	0.58179	0.99607	0.81073	0.6677	1.45676	1.15159	0.89755	1.64721	1.38496	1.14527	1.94284	1.5752	1.28169	2.85639	2.24792	1.77802
3.195	0.84026	0.70931	0.62398	0.99607	0.81073	0.66834	1.45676	1.203	0.92815	1.64721	1.46023	1.19076	1.94284	1.5752	1.28593	2.85639	2.35743	1.81282
3.355	0.84026	0.70931	0.62398	0.99607	0.81073	0.67359	1.61297	1.30303	0.99656	1.64721	1.46023	1.19076	1.94284	1.5752	1.32052	3.12271	2.51066	1.92032
3.486	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	1.65805	1.41146	1.09109	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	3.21536	2.74139	2.09658
3.522	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	1.69194	1.42881	1.12072	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	3.25361	2.74846	2.14276
3.698	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	2.65894	2.14525	1.59041	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	4.67949	3.79288	2.81421
3.883	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	2.65894	2.14525	1.59041	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	4.67949	3.79288	2.81421
4.077	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	2.65894	2.14525	1.59041	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	4.67949	3.79288	2.81421
4.281	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	2.65894	2.14525	1.59041	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	4.67949	3.79288	2.81421
4.495	1.03358	0.85613	0.65572	1.14191	0.9324	0.71499	2.65894	2.17201	1.65457	1.89546	1.57541	1.20714	2.12837	1.73859	1.34498	4.67949	3.79288	2.81421
4.72	0.59538	0.82174	0.64603	0.67712	0.62616	0.5643	2.83967	2.35582	1.75542	1.12476	1.03819	0.94468	1.28045	1.17274	1.05854	4.67949	3.80077	2.86302
4.956	0.58355	0.51046	0.45925	0.63844	0.5729	0.51551	2.83967	2.35582	1.75542	1.09899	0.98231	0.86719	1.23648	1.09017	0.96689	4.67949	3.80077	2.86302
5.204	0.58355	0.51046	0.45391	0.63844	0.5729	0.51551	2.83967	2.35582	1.75542	1.09899	0.98231	0.86719	1.23648	1.09017	0.96689	4.55371	3.80077	2.86302
5.464	0.58355	0.51046	0.43805	0.78848	0.67778	0.57211	2.83967	2.35582	1.75542	1.09899	0.98231	0.82111	1.36841	1.19125	1.01325	4.55371	3.80077	2.86302
5.737	0.58355	0.51965	0.43805	0.80813	0.69593	0.58231	2.83967	2.35582	1.75542	1.09899	0.98231	0.79614	1.39567	1.20815	1.0292	4.55371	3.80077	2.86302
6.024	0.58355	0.51965	0.43805	0.80813	0.69593	0.58231	2.83967	2.35582	1.75542	1.09899	0.98231	0.79614	1.39567	1.20815	1.0292	4.55371	3.80077	2.86302
6.325	0.58355	0.51965	0.43805	0.80813	0.69593	0.58231	2.83967	2.35582	1.75542	1.0819	0.95056	0.79614	1.39567	1.20815	1.0292	4.55371	3.80077	2.86302
6.642	0.58288	0.51965	0.43805	0.80813	0.69593	0.58231	1.04274	0.96661	0.86313	1.02026	0.9185	0.79714	1.39567	1.20815	1.0292	1.82939	1.67913	1.4832
6.974	0.58288	0.51965	0.43805	0.80813	0.69593	0.58231	0.86057	0.80804	0.75125	1.02026	0.9185	0.79714	1.39567	1.20815	1.0292	1.54403	1.4343	1.31656

7.322	0.58288	0.51965	0.43805	0.80813	0.69593	0.58231	0.78303	0.73058	0.68466	1.02026	0.9185	0.79714	1.39567	1.20815	1.0292	1.36916	1.26736	1.19842
7.689	0.58288	0.51965	0.43805	0.80813	0.69593	0.58231	0.68636	0.6643	0.63888	1.02026	0.9185	0.79714	1.39567	1.20815	1.0292	1.19282	1.15529	1.11463
8.073	0.54073	0.46943	0.4169	0.45737	0.41711	0.39379	0.61661	0.6082	0.5969	1.02026	0.8905	0.79714	0.86259	0.78584	0.73822	1.08704	1.06873	1.04727
8.477	0.54073	0.46943	0.40232	0.45737	0.41711	0.38645	0.61257	0.58876	0.56713	1.02026	0.8905	0.79714	0.86259	0.78584	0.71653	1.08133	1.03919	0.99695
8.901	0.50836	0.38306	0.35808	0.45737	0.40314	0.3745	0.55391	0.5437	0.53207	0.98024	0.73079	0.79714	0.86259	0.7583	0.69511	0.97681	0.95044	0.93442
9.346	0.50836	0.38306	0.34482	0.45737	0.40096	0.36571	0.5501	0.52263	0.49596	0.98024	0.73079	0.6553	0.86259	0.75543	0.68353	0.97334	0.91284	0.88659
9.813	0.50836	0.38306	0.34214	0.45737	0.40096	0.36571	0.5501	0.52263	0.49596	0.98024	0.73128	0.6553	0.86259	0.75543	0.68353	0.97334	0.91284	0.87279
10.303	0.42401	0.38306	0.33789	0.43624	0.40096	0.36571	0.5501	0.52263	0.47721	0.81203	0.70152	0.64783	0.8282	0.75543	0.68353	0.97334	0.91284	0.84707
10.819	0.42401	0.38306	0.33644	0.43624	0.40096	0.36571	0.5501	0.52263	0.46763	0.81203	0.70102	0.6446	0.8282	0.75543	0.68353	0.97334	0.91284	0.83818
11.36	0.39545	0.3658	0.32907	0.43624	0.40096	0.36571	0.5501	0.52263	0.46317	0.76049	0.70102	0.63628	0.8282	0.75543	0.68353	0.97334	0.91284	0.83818
11.928	0.39545	0.3658	0.32907	0.43624	0.40096	0.36571	0.50745	0.48382	0.44752	0.76049	0.70102	0.63628	0.8282	0.75543	0.68353	0.92692	0.87984	0.8076
12.524	0.39545	0.3658	0.33031	0.43624	0.40096	0.36571	0.50745	0.48382	0.43297	0.76049	0.70102	0.63628	0.8282	0.75543	0.68353	0.92692	0.87984	0.77148
13.15	0.39545	0.3658	0.31484	0.43624	0.40096	0.36571	0.50745	0.48382	0.43136	0.76049	0.70102	0.63628	0.8282	0.75543	0.68353	0.92692	0.87984	0.76845
13.808	0.39545	0.3658	0.3137	0.40039	0.3824	0.35835	0.45146	0.44141	0.42948	0.76049	0.70102	0.63628	0.75532	0.71964	0.672	0.80865	0.78774	0.76845
14.498	0.39545	0.3658	0.3137	0.40039	0.3824	0.35835	0.45146	0.44141	0.41989	0.76049	0.70102	0.63628	0.75532	0.71964	0.672	0.80865	0.78774	0.74658
15.223	0.36826	0.34001	0.3137	0.40039	0.3824	0.35835	0.45146	0.44141	0.41382	0.70979	0.6515	0.59875	0.75532	0.71964	0.672	0.80865	0.78774	0.73761
15.984	0.36826	0.34001	0.3137	0.40039	0.3824	0.35835	0.45146	0.44141	0.40704	0.70979	0.6515	0.59875	0.75532	0.71964	0.672	0.80865	0.78774	0.72393
16.783	0.36826	0.34001	0.3137	0.35111	0.34197	0.33152	0.40937	0.4053	0.4007	0.70979	0.6515	0.59875	0.66054	0.64254	0.62054	0.73181	0.72334	0.71332
17.622	0.36826	0.34001	0.3137	0.34968	0.33849	0.32552	0.40937	0.4053	0.40048	0.70979	0.6515	0.59875	0.65506	0.63219	0.60652	0.73181	0.72334	0.71332
18.504	0.33547	0.31683	0.30198	0.34828	0.33849	0.32552	0.4076	0.40172	0.39612	0.64601	0.60862	0.57666	0.65196	0.63219	0.60652	0.73159	0.71898	0.70741
19.429	0.33547	0.31683	0.30198	0.34828	0.33849	0.32647	0.40731	0.40127	0.39456	0.64601	0.60862	0.57666	0.65196	0.63219	0.60908	0.73159	0.71613	0.70296
20.4	0.33547	0.31683	0.30198	0.34828	0.33849	0.3277	0.39716	0.39304	0.38941	0.64601	0.60862	0.57666	0.65196	0.63219	0.61041	0.73159	0.70403	0.69518
21.42	0.32539	0.30928	0.29203	0.34828	0.33849	0.3265	0.39051	0.38635	0.38413	0.62396	0.59336	0.55483	0.65196	0.63219	0.60862	0.73159	0.69009	0.68503
22.491	0.32539	0.30928	0.29203	0.34828	0.33849	0.3265	0.39051	0.38635	0.38277	0.62396	0.59336	0.55483	0.65196	0.63219	0.60862	0.70076	0.69009	0.6816
23.616	0.31102	0.30108	0.29203	0.34828	0.33849	0.32747	0.38871	0.38568	0.38239	0.59391	0.57309	0.55483	0.65196	0.63219	0.61001	0.69629	0.68929	0.6816
24.797	0.31102	0.30108	0.29203	0.3404	0.33042	0.32619	0.38252	0.38151	0.3801	0.59391	0.57309	0.55483	0.63642	0.61613	0.60768	0.68406	0.68106	0.67744
26.036	0.31102	0.30108	0.29203	0.3404	0.32701	0.32358	0.37974	0.37817	0.37702	0.59391	0.57309	0.55483	0.63642	0.61023	0.60339	0.67856	0.67519	0.67234
27.338	0.31102	0.2788	0.29203	0.32834	0.32221	0.31975	0.37974	0.37817	0.37676	0.59391	0.57309	0.55483	0.61466	0.6094	0.59558	0.67856	0.67519	0.67234
28.705	0.28134	0.27843	0.27682	0.32834	0.32099	0.31903	0.37604	0.37581	0.37539	0.53302	0.52803	0.52482	0.61466	0.6094	0.59553	0.67244	0.67116	0.67023
30.14	0.28087	0.27843	0.27594	0.32834	0.32099	0.31903	0.37604	0.37498	0.37436	0.5329	0.52803	0.52297	0.61466	0.6094	0.59553	0.67244	0.6701	0.66823
31.647	0.28087	0.27858	0.27551	0.32834	0.32441	0.32091	0.3752	0.37391	0.37309	0.5329	0.52842	0.52235	0.61466	0.6094	0.599	0.66968	0.66676	0.66531
33.23	0.28233	0.27807	0.2753	0.32834	0.3258	0.32171	0.3752	0.37391	0.37287	0.53346	0.5277	0.52112	0.61466	0.6094	0.60086	0.66968	0.66676	0.66464
34.891	0.28233	0.27807	0.2753	0.32834	0.32351	0.32006	0.37301	0.37263	0.37212	0.53302	0.52418	0.52025	0.61466	0.6094	0.59696	0.6664	0.66556	0.66405
36.636	0.28233	0.27835	0.27624	0.32834	0.31579	0.31366	0.37301	0.37263	0.37188	0.53302	0.52418	0.52025	0.61466	0.6094	0.58575	0.6664	0.66556	0.66376
38.468	0.28233	0.27975	0.27679	0.32834	0.3155	0.31144	0.37442	0.37305	0.37188	0.53302	0.52715	0.52151	0.61466	0.6094	0.58158	0.66905	0.66633	0.66376
40.391	0.28233	0.27947	0.27679	0.31798	0.3155	0.31111	0.37327	0.37215	0.37169	0.53391	0.5292	0.52151	0.59428	0.58927	0.5802	0.66785	0.66548	0.664
42.41	0.28233	0.27947	0.27685	0.31798	0.3155	0.31111	0.37168	0.37127	0.37104	0.53391	0.5292	0.52198	0.59428	0.58927	0.5802	0.66349	0.66274	0.66232
44.531	0.28233	0.27947	0.27685	0.31798	0.3155	0.31241	0.37163	0.37115	0.37086	0.53391	0.5292	0.52198	0.59428	0.58927	0.5831	0.66302	0.66206	0.66162
46.758	0.28204	0.27954	0.27733	0.31798	0.3155	0.30932	0.37163	0.37115	0.37064	0.53391	0.5292	0.52393	0.59428	0.58927	0.57735	0.66302	0.66206	0.66145
49.095	0.28204	0.27705	0.27609	0.31798	0.3155	0.30754	0.3727	0.3716	0.37064	0.53391	0.5292	0.52048	0.59428	0.58927	0.57227	0.66521	0.6631	0.66145
51.55	0.28204	0.27678	0.27511	0.31798	0.3155	0.30754	0.37206	0.37131	0.37075	0.53391	0.5292	0.52045	0.59428	0.58927	0.57227	0.66525	0.66337	0.6623
54.128	0.28204	0.27678	0.27489	0.31104	0.30909	0.30754	0.3715	0.37109	0.37062	0.53391	0.5292	0.52045	0.57944	0.57575	0.57227	0.6642	0.66301	0.66203
56.834	0.27979	0.27478	0.27381	0.31104	0.30909	0.30757	0.37149	0.37109	0.37062	0.52136	0.52018	0.51825	0.57944	0.57575	0.57317	0.6642	0.66301	0.66203
59.676	0.27979	0.27478	0.27381	0.3175	0.31017	0.30809	0.37142	0.37108	0.37072	0.52136	0.52018	0.51825	0.59413	0.57769	0.57355	0.66359	0.66311	0.66209
62.66	0.27979	0.2774	0.27507	0.3175	0.31017	0.30843	0.37142	0.37093	0.37045	0.52909	0.5244	0.51977	0.59413	0.57769	0.57517	0.66334	0.66208	0.66091
65.793	0.27979	0.27598	0.27416	0.3175	0.31066	0.30985	0.371	0.37043	0.36996	0.52577	0.52178	0.5181	0.59413	0.58007	0.57834	0.6618	0.66074	0.65977
69.082	0.27979	0.27389	0.2718	0.3175	0.31488	0.31184	0.36985	0.36994	0.36915	0.52398	0.51885	0.51397	0.59413	0.58845	0.58222	0.66041	0.65935	0.65843
72.536	0.27979	0.27289	0.27158	0.3175	0.31256	0.31124	0.36985	0.36934	0.36882	0.51792	0.51605	0.51339	0.59413	0.58328	0.58073	0.66041	0.65935	0.65843
76.163	0.27361	0.27289	0.27158	0.3175	0.31191	0.3106	0.36985	0.36934	0.36882	0.51721	0.51587	0.51324	0.59413	0.58261	0.57991	0.66048	0.66007	0.65911
79.971	0.27361	0.27295	0.27168	0.3175	0.31137	0.30891	0.37049	0.36968	0.36904	0.51721	0.51587	0.51324	0.59413	0.57926	0.57556	0.66226	0.66064	0.6596

NUCLEAR POWER CORPORATION OF INDIA LIMITED															
700MWe GORAKHPUR HARYANA ANU VIDYUT PARIYOJANA-UNIT 1 & 2 TECHNICAL SPECIFICATION FOR MAIN STEAM ISOLATION VALVE (MSIV)												PAGE NO.: PAGE 67 OF 70 REV NO.: 00 DATE: 17/08/2023			

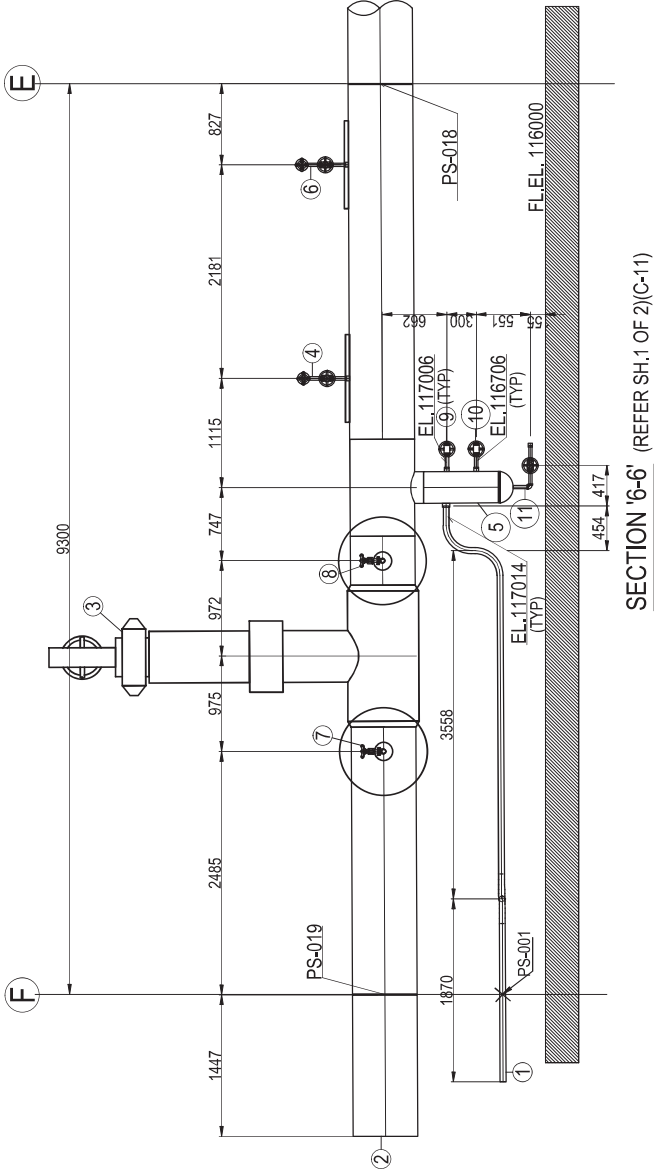
83.97	0.27361	0.27265	0.2712	0.30974	0.30892	0.3082	0.36937	0.36905	0.36853	0.51718	0.51422	0.51126	0.57642	0.57499	0.57333	0.66064	0.65999	0.65889
88.168	0.27388	0.27265	0.2712	0.30928	0.30807	0.30688	0.36853	0.36821	0.3679	0.51718	0.51422	0.51126	0.57516	0.57259	0.5704	0.65864	0.65815	0.65749
92.577	0.27284	0.27209	0.27091	0.30606	0.30492	0.30436	0.36733	0.36723	0.36716	0.51614	0.51464	0.51224	0.57184	0.56949	0.56648	0.65606	0.65601	0.65592
97.206	0.27087	0.2705	0.26981	0.30531	0.30465	0.3039	0.36733	0.36713	0.36703	0.5122	0.51143	0.51005	0.56789	0.56655	0.56515	0.65579	0.65556	0.65516
102.066	0.27052	0.27012	0.26944	0.30417	0.30377	0.30351	0.36733	0.36713	0.36703	0.51069	0.51002	0.50872	0.56677	0.566	0.56514	0.65579	0.65556	0.65516

PC/E/08002

NOT FOR UNATHORISED PUBLICATION / PRESENTATION OUT SIDE NPCIL
ISSUED BY BHEL - BHOPAL

AUGUST, 2023

ATTACHMENT - 17



(TYP FOR LINE NO.2-650-S-3611-1001,2-650-S-3611-1003
2-650-S-3611-1002,2-650-S-3611-1004) (REFER TABLE NO.6)

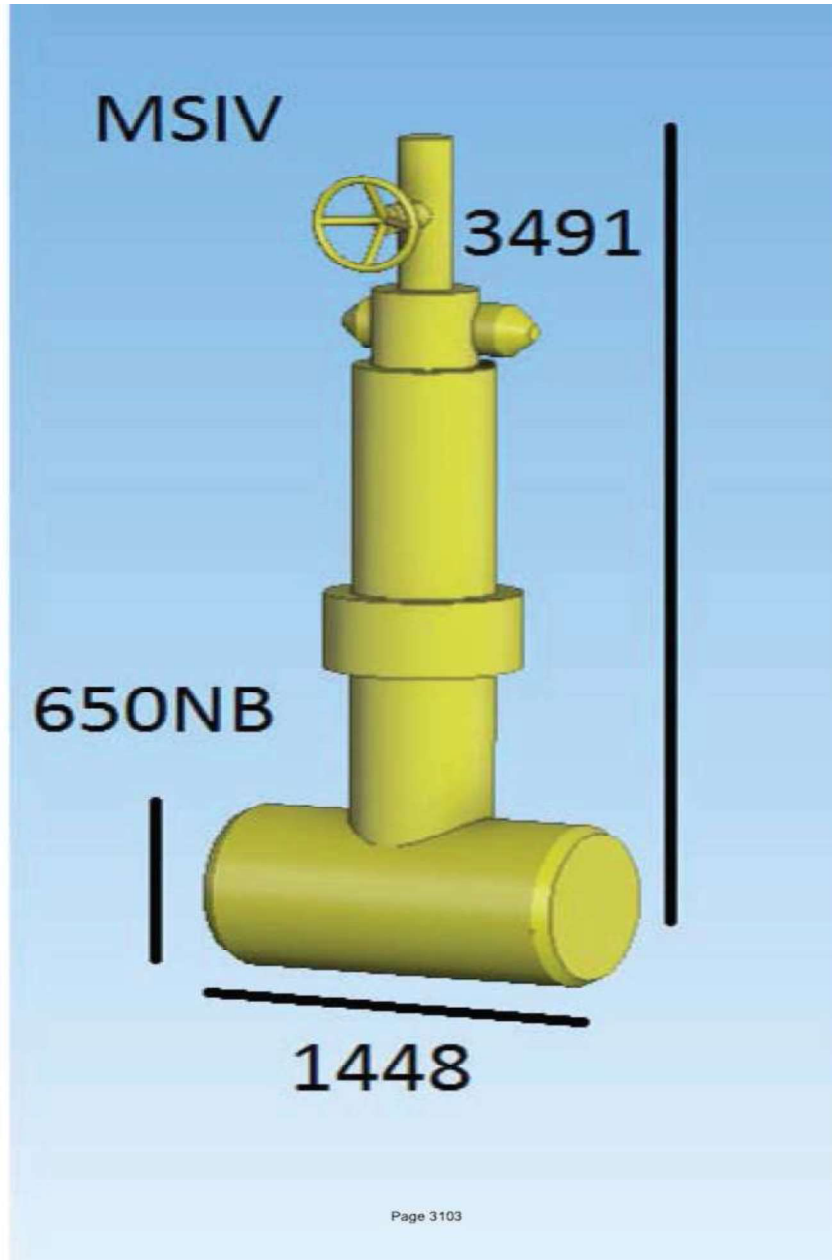
TABLE NO.6

LINE NO. ①	LINE NO. ②	VALVE NO. ③	VALVE NO. ④	LINE NO. ⑤	VALVE NO. ⑥	VALVE NO. ⑦	VALVE NO. ⑧	VALVE NO. ⑨	VALVE NO. ⑩	VALVE NO. ⑪
2-50-W-4521-6511	2-650-S-3611-1002	2-3611-EV-1252	2-3611-V-6680	2-300-W-4521-6510	2-3611-V-6678	2-3611-V-1328	2-3611-V-1327	2-4521-V-6507	2-4521-V-6508	2-4521-V-6905
2-50-W-4521-6505	2-650-S-3611-1001	2-3611-EV-1251	2-3611-V-6664	2-300-W-4521-6504	2-3611-V-6662	2-3611-V-1326	2-3611-V-1325	2-4521-V-6501	2-4521-V-6502	2-4521-V-6901
2-50-W-4521-6508	2-650-S-3611-1003	2-3611-EV-1253	2-3611-V-6673	2-300-W-4521-6507	2-3611-V-6670	2-3611-V-1330	2-3611-V-1329	2-4521-V-6504	2-4521-V-6505	2-4521-V-6903
2-50-W-4521-6514	2-650-S-3611-1004	2-3611-EV-1254	2-3611-V-6688	2-300-W-4521-6513	2-3611-V-6686	2-3611-V-1332	2-3611-V-1331	2-4521-V-6510	2-4521-V-6511	2-4521-V-6907

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