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**Subject: Expression of Interest (Eol) for Technology Tie-up for Valves for Nuclear Power Plants**

**1) Introduction:**

This Expression of Interest (Eol) seeks response from prospective collaborators who are meeting the requirements of this Eol and are willing to be associated with BHEL through a License & Technology Collaboration Agreement (TCA) on long term basis to enable BHEL to design, engineer, manufacture, assemble, test, supply, erect, commission, retrofit, repair and service Gate, Globe, Check, Safety and Safety Relief Valves for Nuclear Power Plants as specified in this Eol.

**1.1) About Bharat Heavy Electricals Limited:**

BHEL is a leading state owned company, wherein Government of India is holding 63.17% of its equity. BHEL is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing organization in India, catering to the core infrastructure sectors of Indian economy viz. energy, transportation, heavy engineering industry, defense, renewable and non-conventional energy. The energy sector covers generation, transmission and distribution equipment for thermal, gas, hydro, nuclear and solar photo voltaic. BHEL has been in this business for more than 50 years and BHEL supplied equipment's account for more than 59% (approx. 190 GW) of the total thermal generating capacity in India. BHEL is also listed in both major Indian stock exchanges. BHEL has 16 manufacturing units, 4 power sector regions, 8 service centers, 3 overseas offices and 15 regional offices besides host of project sites spread all over India and abroad. The annual turnover of BHEL for the year 2018-19 was around USD 4.25 billion. BHEL's highly skilled and committed manpower of approx. 35000; state-of-the-art manufacturing facilities and latest technologies helped BHEL to deliver a consistent track record of performance since long. To position leading state owned companies as Global Industrial giant and as a recognition for their exemplary performance, Government of India categorized BHEL as "Maharatna Company" in 2013.

Our ongoing technology tie-ups with leading technology providers are GE Technology GmbH, Switzerland (for Once through Boilers and Coal Pulverisers); Siemens, Germany (for Steam Turbines, Generators and Condensers); Metso Automation Inc., Finland (for Control & Instrumentation); MHI, Japan (for Pumps); MHPS, Japan (for Flue Gas Desulfurization Systems); Vogt Power International, USA (for HRSG); OTO Melara, Italy (for SRGM); GENP, Italy (for Compressors); TLT Turbo GmbH, Germany (for Fans), Sheffield Forge Masters International, UK (for Forgings); ISRO, India (for space grade li Ion cells); BPE, USA (for SCR System), NANA O, Korea ( for SCR Catalyst); HLB Power Co. Ltd., Korea (for Gates and Dampers) and Kawasaki Heavy Industries Ltd., Japan (for Stainless Steel Metro Coaches & Bogies).

More details about the entire range of BHEL's products and operations are available at [www.bhel.com](http://www.bhel.com)



**1.2) About HPBP, Trichy High Pressure Boiler Plant (HPBP), Tiruchirappalli:**

High Pressure Boiler Plant (HPBP), established in 1965 at southern part of India at Tiruchirappalli in Tamilnadu state is one of the major manufacturing units of BHEL dedicated to production of various kinds of Steam Generators. HPBP not only manufactures pulverized coal fired boilers but also manufactures CFBC boilers, valves, oil field equipment and many other products of strategic importance for defense sector. HPBP has strong global reference base of various kind of boilers ranging from 30 MWe to 800 MWe. Valves division of HPBP manufactures valves for meeting power plant orders secured by BHEL. It also caters to the requirement of other thermal power plant manufacturers/other industrial requirements.

**2) Scope of cooperation:**

BHEL is seeking responses from reputed Original Equipment Manufacturer (OEM) of Valves for Nuclear Power Plants for technology transfer and collaboration on a long term basis to design, engineer, manufacture, assemble, test, supply, erect, commission, retrofit, repair and service the Gate, Globe, Check, Safety and Safety Relief Valves as specified in this Eoi for Nuclear Power Plants.

BHEL intends to manufacture these Valves for Nuclear Power Plants under a long term licensing & technology transfer agreement which could be operationalized with transfer of technology. Interested parties/prospective collaborator meeting requirement of this Eoi are invited to respond to this Eoi.

Upon receipt of responses against Eoi from the OEM, BHEL will review the responses to ascertain suitability of the offer made by the Prospective Collaborators and shortlist the parties for further discussions. Detailed discussions on commercial and other terms and conditions to finalise the Technology Collaboration Agreement (TCA) shall be held with shortlisted parties/Prospective Collaborators. The detailed terms and conditions for such a paid-up license agreement shall be mutually agreed upon.

Indicative scope of technology transfer for Nuclear Valves are given in **Annexure-1**.

**3) Prequalification requirements (PQR):**

The Prospective Collaborator shall meet following qualification requirements as on the date of submission of this Eoi.

**3.1** Prospective Collaborator should have designed, engineered, manufactured, performance tested and supplied Gate, Globe, Check, Safety and Safety Relief Valves (as specified in Annexure II) applicable for primary package for Nuclear Power Plants within last twelve (12) years from closing date of Eoi.

AND

**3.2** At least one unit of such Nuclear Power Plant should have been in successful operation for a period not less than two (2) years as on the date of closing of Eoi.



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Prospective Collaborator to provide relevant certificate(s)/ document to substantiate the PQRs.

#### 4) **Brief Description of Eoi Process:**

The interested prospective collaborators shall ensure that their response along with following annexures are received by BHEL on or before **08.08.2019**:

**Annexure-1-** Indicative Scope of Technology Transfer

**Annexure-2-** Indicative technical features of Valves for Nuclear Power Plants for which the Transfer of Technology is sought

**Annexure-3-** Prospective Collaborator's experience in the field of Valves for Nuclear Power Plants

**Annexure-4-** Complete reference list of Valves for Nuclear Power Plants

The response shall necessarily be accompanied with details on

- I. Company background
- II. Technical features/product catalogue
- III. Reference list
- IV. Audited annual financial reports for last 3 (three) years including auditor's report etc.

In case any amendment/corrigendum issued to this Eoi, it shall be notified only at [www.bhel.com](http://www.bhel.com)

#### 5) **Schedule of Eoi & contact details:**

##### 5.1 Schedule of Eoi:

The schedule of Eoi shall be as follows -

Sl. No.	Description	Date
1.	Issue of Eoi document	11.07.2019
2.	Last date for submission of Eoi response	08.08.2019

##### 5.2 Contact Details:

The respondent shall submit their response with all annexures duly signed to the following official:

**Deputy General Manager (Technology Licensing)**  
**Corporate Technology Management**  
**Bharat Heavy Electricals Limited**  
**BHEL House, Siri Fort**  
**New Delhi – 110049, India**  
**Phone: +91 11 66337213 / 7339**  
**Fax: +91 11 26492974**  
**Email: [techeoi@bhel.in](mailto:techeoi@bhel.in)**



6) **Miscellaneous:**

**6.1 Right to accept or reject any or all Applications:**

- a) Notwithstanding anything contained in this Eoi, BHEL reserves the right to accept or reject any Application and to annul the Eoi Process and reject all Applications, at any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons thereof. In the event that BHEL rejects or annuls all the Applications, it may, at its discretion, invite all eligible Prospective Collaborators to submit fresh Applications.
- b) BHEL reserves the right to disqualify any Applicant during or after completion of Eoi process, if it is found there was a material misrepresentation by any such Applicant or the Applicant fails to provide, within the specified time, supplemental information sought by BHEL.
- c) BHEL reserves the right to verify all statements, information and documents submitted by the Applicant in response to the Eoi. Any such verification or lack of such verification by BHEL shall not relieve the Applicant of his obligations or liabilities hereunder nor will it affect any rights of BHEL.

**6.2 Governing Laws & Jurisdiction:**

The Eoi process shall be governed by, and construed in accordance with, the laws of India and the Courts at New Delhi (India) shall have exclusive jurisdiction over all disputes arising under, pursuant to and/or in connection with the Eoi process.

**Indicative Scope of Technology Transfer**

a)	License & transfer of technology relating to design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves as specified in this Eol for Nuclear Power Plants.
b)	Assistance during procurement of new machines, special tools, Jigs & Fixtures, setup of test facility etc. required for manufacturing and testing of Valves as specified in this Eol for Nuclear Power Plants at BHEL works and also assistance required during erection, performance test at site.
c)	Transfer of applicable and relevant knowledge and information/ Know-how and Know-why pertaining to design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves as specified in this Eol for Nuclear Power Plants.
d)	Preparation of manufacturing drawings for all components, sub-assemblies etc. required for Valves as specified in this Eol for Nuclear Power Plants.
e)	Preparation of Purchase Specification and Quality Plan for all applicable bought out items for Valves as specified in this Eol for Nuclear Power Plants, for which manufacturing drawings are not prepared by Prospective Collaborator.
f)	Transfer of all design, design calculations, manufacturing drawings (including 3D models), stress analysis and CFD, material specifications (mentioning international standards) for Valves as specified in this Eol for Nuclear Power Plants.
g)	Transfer of applicable computer programs including Logics & Source code for design and generation of manufacturing drawings of Valves as specified in this Eol for Nuclear Power Plants.
h)	Technical and quality surveillance assistance and supervision during design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves for Nuclear Power Plants as specified in this Eol.
i)	Transfer of typical documents of Valves (as specified in this Eol for Nuclear Power Plants) already supplied by Prospective Collaborator such as sectional arrangement drawing indicating bill of materials, quality assurance plan, welding procedures along with procedural quality records, heat treatment procedures, painting procedures, spare parts, special tools, actual performance test data (at manufacturer's works and at site).
j)	Transfer of improvements/modifications/developments/up gradations to be carried out by the Prospective Collaborator during the period of Technology Collaboration Agreement for taking care of new market requirements and obsolescence to design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves as specified in this Eol for Nuclear Power Plants. Subsequent updates required due to component obsolescence or updates implemented by Prospective Collaborator due to safety consideration would also be provided.
k)	Transfer of information regarding sub-vendors to enable BHEL to procure items for Valves as specified in this Eol for Nuclear Power Plants.
l)	Training of BHEL engineers to enable them to design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves as specified in this Eol for Nuclear Power Plants.
m)	Support through engineering services from Prospective Collaborator's design office / manufacturing facilities for design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service the Valves as specified in this Eol for Nuclear Power Plants.
n)	Deputation of Prospective Collaborator's experts to assist BHEL in absorbing the technology for design, engineer, manufacture, assembly, test, supply, erect, commission, retrofit, repair and service Valves as specified in this Eol for Nuclear Power Plants.

**(SIGNATURE)**

**Technical features of Valves for Nuclear Power Plants for which the Transfer of Technology is sought**

**1. Systems:**

- a) Primary Heat Transport (PHT)
- b) Moderator and Auxiliary System
- c) Fuel Handling System (FHS)
- d) Light Water System
- e) Compressed Air and Annulus Gas Monitoring System

**2. Standard:**

ASME Sec.III NB, NC, ND/ASME QME-1etc. as applicable for Nuclear Plants.

**3. Quality Requirements:**

- a) NDE (RT/UT/MPI/LPI) as specified for specific requirement.
- b) Compliance to leakage class based on the systems requirement.

**4. Types of Valve:**

**Category I**

**a) Gate Valve:**

- 1) Size Range NB 15 to NB 650
- 2) Operation Manual, Chain, Electrical, Air
- 3) Class C150 to C1500
- 4) Material F316L, A105, SA352 Gr. LCB, SA351 Gr.CF3M, SA216 Gr.WCB. and other applicable materials, class and size

**b) Globe Valve:**

- 1) Size NB10 to NB400
- 2) Operation Manual, Chain, Electrical, Air
- 3) Type Globe, Regulating, Bellow Sealed
- 4) Class C150 to C3000
- 5) Material F316L, F304L, A105, SA352 Gr.LCB, SA351 Gr.CF3M, SA216 Gr.WCB, SA 350 LF2 CL1 and other applicable materials, class and size

**c) Check Valve:**

- 1) Size NB25 to NB250
- 2) Operation Auto, Spring loaded
- 3) Type Swing, Lift
- 4) Class C150 to C1500
- 5) Material F316L, A105, SA351 Gr.CF3M, SA216 Gr.WCB and other applicable materials, class and size



**Category II**

**a) Safety Valve and Safety Relief Valves:**

- 1) Size NB15 to NB500
- 2) Operation Spring loaded, Pilot operated
- 3) Class C150 to C4500
- 4) Inlet x outlet Flange, threaded, welded
- 5) Material F316L, F316, A105, SA351 Gr.CF3M, CF8M, SA216 Gr. WCB, WC6, WC9 and other applicable materials

**5. Additional features:**

- 1) Requirement to meet Sodium service
- 2) Double gland packing & lantern ring with leak –off connection for tubing
- 3) Live loading arrangement for gland packing
- 4) Double-gasket body bonnet joint with inter-gasket leak off connection
- 5) Positive locking device for body bonnet joint fasteners
- 6) Bi-directional sealing of valve seat
- 7) Other applicable special requirements to meet nuclear applications

**(SIGNATURE)**

**Abbreviations Used:**

NDE: Non Destructive Examination  
RT: Radiographic Test  
UT: Ultrasonic Test  
MPI: Magnetic Particle Inspection  
LPI: Liquid Penetrant Inspection



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Annexure -3

Prospective Collaborator's experience in the field of Valves for Nuclear Power Plants

Sl. No.	Requirement	Prospective Collaborator's response YES/NO and remarks if any
a)	Whether the Prospective Collaborator is an OEM of Valves as specified in this Eol for Nuclear Power Plants.	
b)	Whether Prospective Collaborator has its own manufacturing facility for Valves as specified in this Eol for Nuclear Power Plants. If not, furnish details of where these are being manufactured.	
c)	Whether Prospective Collaborator has designed, engineered, manufactured, performance tested, supplied, erected and commissioned Valves for Nuclear Power Plants.	
d)	Whether Prospective Collaborator has designed, engineered, manufactured, performance tested and supplied Gate, Globe, Check, Safety and Safety Relief Valves (as specified in Annexure II) applicable for primary package for Nuclear Power Plants within last twelve (12) years from closing date of Eol.	
e)	Whether at least one unit of such Nuclear Power Plant is in successful operation for a period not less than two (2) years as on the date of closing of Eol.	
f)	Whether company background and its product profile along with technical details for Valves for Nuclear Power Plants being offered to BHEL under this Eol enclosed.	
g)	Whether Prospective Collaborator's detailed reference list as per Annexure-4 enclosed.	
h)	Whether Prospective Collaborator's audited annual financial reports including auditor's report for last 3 years enclosed.	
i)	Whether the Valves offered for technology transfer under this Eol is the latest being marketed by the Prospective Collaborator.	
j)	Whether Prospective Collaborator has provided relevant certificate/document to substantiate the PQRs.	
k)	Whether the Prospective Collaborator owns the Intellectual Property Rights for the technology being proposed for transfer under the Technology Collaboration Agreement (TCA) or have an unencumbered right from the owner of the Intellectual Property Rights to sub-license the technology, if applicable. If yes, whether list of such Intellectual Property Rights enclosed.	
l)	Whether Prospective Collaborator has any experience in establishing new manufacturing, testing and assembly facilities, if so please specify.	

(SIGNATURE)





Expression of Interest (Eoi) for Technology Tie-up for Valves for Nuclear Power Plants

Annexure -4

Reference list of Valves for Nuclear Power Plants supplied by Prospective Collaborator

Sl. No.	Project Name / Location	Customer & End user details	Type of Valves supplied for Nuclear Power Plants	Number of Valves of each type supplied	Technical parameters	Month and year of supply	Year of commissioning

(SIGNATURE)