

|   |          |  |                                      |                  |
|---|----------|--|--------------------------------------|------------------|
|  | TITLE:   |  | SPECIFICATION NO. PE-SS-999-100-Q001 |                  |
|   | PREAMBLE |  | VOLUME                               |                  |
|   |          |  | SECTION                              |                  |
|   |          |  | REV. NO.                             | DATE: 26/08/2011 |
|   |          |  | SHEET                                | 1 OF 1           |

1.0 The tender document contains three (3) volumes. The bidder shall meet the requirements of all the three volumes.

#### 1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below:-

- Volume-IA : This part contains instructions to bidders for making bids to BHEL.
- Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
- Volume-IC : This part contains special conditions of contract.
- Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

#### 1.2 **Volume-II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume-II which comprises of :-

- Volume-IIA : General Technical Conditions
- Volume-IIB : Technical Specification including Drawings, if any.

##### 1.2.1 **Volume-IIB**

This volume is sub-divided into following sections:-

- Section-A : This section outlines the scope of enquiry.
- Section-B : This section provides "Project Information".
- Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
- Section-D : This section comprises of technical specifications of equipments complete with data sheet A, B and C.

**Data Sheet - A** Specifies data and other requirements pertaining to the Equipment.

**Data Sheet - B** Specifies data to be filled by the bidder (Data Sheet-B is contained in Volume-III).

**Data Sheet - C** Indicates data/documents to be furnished after the award of contract as per agreed schedule by the vendor (as applicable).

##### 1.2.2 **Volume-III (TECHNICAL SCHEDULES)**

This volume contains technical schedules and Data Sheets-B, which are to be duly filled by the bidder and the same shall be furnished with the technical bid.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D


**2X660MW SURATGARH STPP  
(STAGE-V, UNIT#7&8)**

**VOLUME – IIB**

**TECHNICAL SPECIFICATION  
FOR  
SPRING LOADED BYPASS VALVES  
SPECIFICATION NO. PE-TS-392-100-M009**




**BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR  
PROJECT ENGINEERING MANAGEMENT  
NOIDA, INDIA**

|   |   |  |                                      |                  |
|---|---|--|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION<br/>SPRING LOADED BYPASS VALVES<br/>2X660MW SURATGARH STPP<br/>(STAGE-V, UNIT#7&amp;8)</b> |  | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   |  | VOLUME : IIB                         |                  |
|   |   |  | SECTION:                             |                  |
|   |   |  | REV. NO.: 00                         | DATE: 11.04.2014 |
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|   |  |                                      |                  |
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|  | <b>TECHNICAL SPECIFICATION</b><br><b>SPRING LOADED BYPASS</b><br><b>VALVES</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |  | VOLUME : IIB                         |                  |
|   |  | SECTION: A                           |                  |
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## SECTION-A

### SCOPE OF ENQUIRY

|   |   |  |                                      |                  |
|---|---|--|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION<br/>SPRING LOADED BYPASS VALVES<br/>2X660MW SURATGARH STPP<br/>(STAGE-V, UNIT#7&amp;8)</b> |  | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   |  | VOLUME : IIB                         |                  |
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## SCOPE OF ENQUIRY

### 1. SCOPE

This enquiry covers the Design, Manufacture, Inspection & Testing at vendor's and/or his sub-vendor's works, proper packing and delivery to site of Spring loaded bypass valve complete with all accessories as per the requirements mentioned in different sections of the specification for 2X660MW SURATGARH STPP (STAGE-V, UNIT#7&8).


### 2. GENERAL TECHNICAL INSTRUCTIONS

- a) It is not the intent to specify herein all the details of design and manufacture. However the equipment shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing the required duties in a manner acceptable to Engineer/ Owner, who will interpret the meaning of drawing and specifications, and shall be entitled to reject any component or material, which in his judgement is not in full accordance herewith.
- b) The omission of specific reference to any component/ accessories necessary for the proper performance of Spring loaded bypass valve shall not relieve the bidder of the responsibility of providing such facilities to complete the supply of Spring loaded bypass valve at quoted prices.
- c) Design/ drawings/ data sheets etc. shall be subject to approval of BHEL as per specification, in the event of order.
- d) BHEL's / customer's representative shall be given access to the shop in which the equipment are being manufactured or tested and all test records shall be made available to him.
- e) The equipment covered under this specification shall not be despatched unless the same have been finally inspected, accepted and shipping release issued by BHEL.

|   |  |                                      |                  |
|---|--|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION<br/>SPRING LOADED BYPASS<br/>VALVES</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |  | VOLUME : IIB                         |                  |
|   |  | SECTION: B                           |                  |
|   |  | REV. NO.: 00                         | DATE: 11.04.2014 |
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## SECTION-B


### PROJECT INFORMATION

|   |   |                                      |                  |
|---|---|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION<br/>SPRING LOADED BYPASS VALVES<br/>2X660MW SURATGARH STPP<br/>(STAGE-V, UNIT#7&amp;8)</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   | VOLUME : IIB                         |                  |
|   |   | SECTION: B                           |                  |
|   |   | REV. NO.: 00                         | DATE: 11.04.2014 |
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## PROJECT INFORMATION

Project information will be provided later. The bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information provided in this section will be for general guidance and shall not be contractually binding on BHEL/OWNER. All relevant site data/information as may be necessary shall have to be obtained/ collected by the bidder.


The plant site is located in Prabat Nagar, Suratgarh, Sriganganagar district, Rajasthan having latitude and longitude of 29°10' N and 74°01' E respectively.

|   |  |                                      |                  |
|---|--|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION</b><br><b>SPRING LOADED BYPASS</b><br><b>VALVES</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |  | VOLUME : IIB                         |                  |
|   |  | SECTION: C                           |                  |
|   |  | REV. NO.: 00                         | DATE: 11.04.2014 |
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## SECTION-C

### SPECIFIC TECHNICAL REQUIREMENTS



|   |  |  |                                      |
|---|--|--|--------------------------------------|
|  | <b>SPECIFIC TECHNICAL REQUIREMENTS</b> |  | SPECIFICATION NO. PE-TS-392-100-M009 |
|   | <b>SPRING LOADED BYPASS VALVES</b>     |  | SECTION C                            |
|   | <b>2X660MW SURATGARH STPP</b>          |  | REV. NO.: 00                         |
|   | <b>(STAGE-V, UNIT#7&amp;8)</b>         |  | DATE: 11.04.2014                     |
|   |  |  | Sheet 1 of 2                         |

# 1. GENERAL

1.1 The valves shall meet the technical requirements and conform to the standard technical specification and Data sheet A of Section D. In addition, the requirements of this Section-C shall also be complied with. However, wherever the details given in standard technical specification of Section-D and Data sheet A are different, the requirements of Data sheet A shall prevail. Similarly in the event of contradictions between Section -C & Section -D/ Data sheet A, Section -C will prevail.

1.2 The technical requirements for valves shall, in general, be as per the attached standard Technical specification for Valves and Data sheet A of Vol. II B Section D.

# 2. SCOPE OF SUPPLY

2.1 The valves complete with all accessories shall be supplied as per Data sheet A of Section D. For detail refer the same. Each valve (quantity and other details specified in Data Sheet-A) shall be complete with the following accessories.

- i) Lifting arrangement provision for handling i.e., lifting lugs, eye bolts etc.
- 2.2 Commissioning spares, if any.
- 2.3 Set of special tools and tackles if required for the maintenance, erection etc. of the equipment supplied.
- 2.4 Mandatory spares as applicable depending upon the project requirement.
- 2.5 Finish paints for touch-up painting of equipment after erection at site in sealed containers.
- 2.6 Various drawings, datasheets, operation and maintenance manuals etc., as specified in Data Sheet-C.

# 3. EXCLUSIONS:


Erection & Commissioning at site are excluded from the bidder's scope.

# 4. QUALITY ASSURANCE

The Quality Plans enclosed with this specification specify minimum quality control requirement. During contract stage vendor shall furnish these Quality Plans duly signed & stamped for their compliance. Quality plans shall be approved by BHEL and customer (If necessary). All inspection and testing shall be carried out by BHEL and CUSTOMER (if necessary). In case inspection is by both BHEL and CUSTOMER, then the inspection can be carried out jointly or separately, which will be informed later.

# 5. PAINTING REQUIREMENT:

Surface preparation shall be as per SSPC-SP-3/ Power Tool Cleaning followed by two coats of Heat Resistance Aluminium paint to IS 13183 Gr. I or equivalent, paint shade Aluminium and total DFT of paint will be equal to 80 microns minimum.

|   |  |  |                                      |
|---|--|--|--------------------------------------|
|  | <b>SPECIFIC TECHNICAL REQUIREMENTS</b> |  | SPECIFICATION NO. PE-TS-392-100-M009 |
|   | <b>SPRING LOADED BYPASS VALVES</b>     |  | SECTION C                            |
|   | <b>2X660MW SURATGARH STPP</b>          |  | REV. NO.: 00      DATE: 11.04.2014   |
|   | <b>(STAGE-V, UNIT#7&amp;8)</b>         |  | Sheet 2 of 2                         |

## 6 PACKING INSTRUCTIONS:

- a) Each valve shall be drained, cleaned, prepared and suitably protected in such a way so as to minimize the possibility of damage and deterioration during transit and storage.
- b) The valve has to be dispatched in total assembled form.
- c) Body ends shall be suitably sealed to protect them against damage during transit and storage.
- d) Valves with butt-welding ends shall be protected by means of polythene caps/rubber end protectors to prevent damage to ends & also to avoid foreign material entering the valve during shipment & storage.
- e) Valve Tag Nos. shall be incorporated in all the dispatch documents.
- f) Proper care shall be taken to avoid damage to the painted surface during transit.
- g) All the valves shall be packed suitably in wooden cases in order to avoid damage during transit and also during storage at site in tropical climate conditions for a period of 15-18 months.
- h) Spare parts shall be packed separately and clearly marked. Spares shall also be suitably packed for transit and long storage period at site.
- i) In case of foreign vendor supply, valve packing along with commissioning & mandatory spares should be sea-worthy.

## 7 SPARES


- a) **Mandatory Spares:** These shall be as per Data Sheet-A.
- b) ~~**Recommended Spares:** List of recommended spares for 3 year reliable operation along with the unit price shall be indicated in the schedule of prices for recommended spares enclosed in Volume III. Cost of Recommended spares shall not be included in the base price.~~
- c) Order for the spares may be placed simultaneously or otherwise at the option of purchaser.

## 8 DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER

Bidder shall submit the following documents (enclosed in Vol III) duly filled, signed and stamped along with the bid:


- a) Compliance sheet
- b) Schedule of Deviations if any.
- c) Schedules of Price & Unit Price for each project.
- d) Schedule of declaration.
- e) Relevant information regarding the offered valve:
  - i) Standard governing the valve, design pressure/ temperature, rating
  - ii) Valve sizing calculations to justify selected seat area
  - iii) Discharge capacity of the valve at various set pressures
  - iv) BHEL's standard Quality Plan duly stamped & signed as token of acceptance
  - v) Hydraulic/air test pressure for body/seat and duration of test
  - vi) Standard to which the hydraulic and other test shall comply

The above are the only documents which will be used for technical evaluation unless other documents are asked for during technical clarifications. Any other technical document enclosed with the bid shall be ignored for the purpose of technical evaluation. All other documents attached with the specification are for information of the vendor and no comments shall be marked on these.

|   |   |                                      |                  |
|---|---|--------------------------------------|------------------|
|  | <b>TITLE:</b><br><b>TECHNICAL SPECIFICATION</b><br><b>SPRING LOADED BYPASS</b><br><b>VALVES</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   | VOLUME : IIB                         |                  |
|   |   | SECTION: D                           |                  |
|   |   | REV. NO.: 00                         | DATE: 11.04.2014 |
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## SECTION-D

### STANDARD TECHNICAL SPECIFICATION DATA SHEET – A QUALITY PLAN DATA SHEET – C

|   |   |  |                                      |                  |
|---|---|--|--------------------------------------|------------------|
|  | <b>STANDARD TECHNICAL<br/>SPECIFICATION FOR<br/>SPRING LOADED BYPASS VALVES</b> |  | SPECIFICATION NO. PE-SS-999-100-M009 |                  |
|   |   |  | VOLUME . II B                        |                  |
|   |   |  | SECTION D                            |                  |
|   |   |  | REV. NO. 02                          | DATE. 15.05.2012 |
|   |   |  | SHEET 1                              | OF 2             |

#### 1.0 GENERAL

This specification covers the design, materials, construction features, manufacture and testing of Spring Loaded Bypass valves at Vendor's or/ and sub-Vendor's works inclusive of painting and packing requirements.

#### 2.0 CODES AND STANDARDS:

- 2.1 The valves covered under this specification shall be of manufacturer's own proven design and shall be suitable for the required technical parameters mentioned in Data sheet A. However BS:759 and BS EN ISO 4126 shall be referred to wherever applicable.
- 2.2 In case of any conflict between the above Codes/Standards and this specification, the latter shall prevail and in case any further conflict in this matter, the interpretation of the specification by the Engineer shall be final & binding.

#### 3.0 DESIGN REQUIREMENTS

All valves shall be suitable for the service conditions i.e. flow, temperature and pressure under which they are required to operate and those performing similar duties shall be interchangeable with each other unless otherwise specified.

#### 4.0 MATERIALS

- 4.1 The materials of construction of main parts of valves shall be specified in Data sheet-A.
- 4.2 The materials of construction of the remaining parts shall be as per relevant code/ standard governing the valves and to suit the service conditions. These materials shall be subject to approval of the purchaser.
- 4.3 Materials used in manufacture of valves shall be of tested quality.


#### 5.0 CONSTRUCTION FEATURES:

- 5.1 All valves shall be globe type construction.
- 5.2 The seat and disc shall be easily removable and shall be suitable for easy relapping.
- 5.3 Valves shall have pressure seal bonnet / bolted bonnet construction and the adjusting screw shall be covered under a cap.
- 5.4 An arrow indicating the direction of flow shall be embossed on the body of the valves.
- 5.5 A metallic (stainless steel plate 2mm thick) nameplate shall be fitted on each valve. Nameplate inscription required for each valve shall be indicated at the contract stage. Inscriptions shall be engraved 1 mm deep filled with enamel paint.
- 5.6 Suitable lifting lugs and eye bolts shall be provided for valves of weight 500 Kg and above.

#### 6.0 LUBRICATION:

- 6.1 Lubrication, if any, required for smooth and easy operation of valves shall be mentioned.
- 6.2 Choice of lubrication shall be based on ambient temperature condition of 50°C.
- 6.3 Type of lubricant to be used and its annual consumption (based on 100 operations per year) shall be indicated by the tenderer.



|   |   |  |                                      |                  |
|---|---|--|--------------------------------------|------------------|
|  | <b>STANDARD TECHNICAL<br/>SPECIFICATION FOR<br/>SPRING LOADED BYPASS VALVES</b> |  | SPECIFICATION NO. PE-SS-999-100-M009 |                  |
|   |   |  | VOLUME . II B                        |                  |
|   |   |  | SECTION D                            |                  |
|   |   |  | REV. NO. 02                          | DATE. 15.05.2012 |
|   |   |  | SHEET 2                              | OF 2             |

#### 7.0 INSPECTION AND TESTS:

- 7.1 The items covered under this contract shall be subjected to inspection, testing and quality surveillance. The Inspection Agency shall, at all reasonable times have access to Vendor's works, Quality Control records and all facilities as reasonably required for carrying out the inspection and testing efficiently, and these shall be provided by the vendor free of cost
- 7.2 Valves coming under the purview of IBR shall be inspected by Independent Inspecting authority approved by Indian Boiler Board and the test Certificate in IBR Form III-C duly countersigned shall be submitted. The Independent Inspecting Authority proposed by the vendor shall be informed in the offer.
- 7.3 The minimum NDT/testing and inspection requirements for valve shall be as per the attached Quality Plan. However, in case of order, final inspection and testing shall be carried out as per the final approved quality plan without any price implications.
- 7.4 Body of all valves shall be hydraulically tested at 1.5 times the design pressure for leak tightness.

#### 8.0 PAINTING


The surface preparation of all exterior and interior surfaces of valves shall include the following:

- a) Removal of oil, grease and dirt.
- b) Removal of rust and scale etc.,
- c) Sand blasting/ shot blasting.

All exterior surfaces of valves shall be painted with primer and finish coated with coating of min. 150 microns thickness. Color shade etc. shall be subject to BHEL/ Customer approval.

#### 9.0 CLEANING AND PROTECTION FOR DESPATCH


- 9.1 Suitable rust preventive shall be applied on machined exposed surfaces.
- 9.2 Valve ends shall be protected from external damage and sealed against the ingress of dirt by means of polythene caps/rubber end protectors.
- 9.3 Valve Tag Nos. shall also be incorporated in all the despatch documents.

|   |  |                                      |                  |
|---|--|--------------------------------------|------------------|
|  | <b>DATA SHEET-A</b><br><b>SPRING LOADED BYPASS VALVE</b><br><b>2X660MW SURATGARH STPP</b><br><b>(UNIT#7&amp;8)</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |  | VOLUME : IIB                         |                  |
|   |  | SECTION: D                           |                  |
|   |  | REV. NO.: 00                         | DATE: 17.07.2013 |
|   |  | SHEET 1 OF 3                         |                  |

**REQUIREMENT OF SPRING LOADED BYPASS VALVES**  
**BILL OF MATERIAL FOR MAIN & SPARES**

| DESCRIPTION                | QUANTITY (NOS)   |                      |                  |   |
|----------------------------|------------------|----------------------|------------------|---|
| SPRING LOADED BYPASS VALVE | MAIN VALVE(NOS.) | COMMISSIONING SPARES |                  | MANDATORY SPARES (COMPLETE ASSEMBLY WITHOUT COMMISSIONING SPARES) (NOS) |
|                            |                  | BONNET GASKET (NOS)  | CAP GASKET (NOS) |   |
| FDV-42                     | 2                | 2                    | 2                | 2   |


 11/04/2014

|   |   |  |                                      |                  |
|---|---|--|--------------------------------------|------------------|
|  | <b>DATA SHEET-A</b><br><b>DATA SHEET FOR SPRING LOADED</b><br><b>BYPASS VALVE ACROSS HP HEATERS</b><br><b>2X660MW SURATGARH STPP</b><br><b>(UNIT#7&amp;8)</b> |  | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   |  | VOLUME : IIB                         |                  |
|   |   |  | SECTION: D                           |                  |
|   |   |  | REV. NO.: 00                         | DATE: 11.04.2014 |
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## 1.0 GENERAL DESCRIPTION


3 nos. of HP Heaters (HPH-6, 7 & 8) on feed water side are installed in the regenerative feed cycle. Each heater is provided with motor operated gate valve at its inlet, outlet & bypass. A 100% capacity feed water bypass line is provided across the complete HP Heater bank with spring loaded bypass valve (SLBV) FDV-42 for facilitating isolation of one or more HP heaters due to any operational problem. The SLBV is sized to pass BMCR feed water flow and works on differential pressure across the valve.

## 2.0 TECHNICAL REQUIREMENTS

|     |  |   |   |
|-----|--|---|---|
| 1.  | Tag No. & Quantity                               | : | FDV-42; 1 no./unit (i.e. 2 nos. for two units)  |
| 2.  | Type   | : | Globe type spring loaded bypass valve.  |
| 3.  | Size of valve                                    | : | To be decided by bidder based on sizing data.   |
| 4.  | a) End connection<br>b) Connecting pipe material | : | Butt welded.<br>SA 106 GrC  |
| 5.  | No. of Heater banks.                             | : | 1 no.   |
| 6.  | Pressure drop across each heater bank.           | : | 4.5 kg/cm <sup>2</sup> at 2110 T/Hr   |
| 7.  | Operating conditions.                            | : | Valve shall pass 2110 T/Hr of feed water at 193.6°C & 310 kg/cm <sup>2</sup> (a). Set pressure 5.0 kg/cm <sup>2</sup> . Fully opens at 10% over pressure. |
| 8.  | Set pressure range                               | : | Each valve shall be adjustable for opening when differential pressure settings are 4.5 to 5.5 kg/cm <sup>2</sup> .  |
| 9.  | Design pressure and temperature                  | : | 335 kg/cm <sup>2</sup> (g) and 310°C  |
| 10. | Valve body Material                              | : | ASTM A216 WCC   |
| 11. | Regulatory requirement                           | : | IBR certificate in form IIIC  |

**3.0** Testing, Mandatory spares and all other general requirements shall be as per contract.

**4.0** Bidders to offer the minimum size of SLBV meeting the above mentioned parameters in totality and note that the reducers for connecting this valve with the connecting pipe size will be taken care by BHEL itself, if required.

|   |   |                                      |                  |
|---|---|--------------------------------------|------------------|
|  | <b>DATA SHEET-A</b><br><b>SPRING LOADED BYPASS VALVE</b><br><b>2X660MW SURATGARH STPP</b><br><b>(STAGE-V, UNIT#7&amp;8)</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   | VOLUME-IIB                           |                  |
|   |   | SECTION : D                          |                  |
|   |   | REV. NO.: 00                         | DATE: 11.04.2014 |
|   |   | SHEET: 3 of 3                        |                  |

### MATERIAL OF CONSTRUCTION


| SNO | COMPONENT                               | MATERIALS  |
|-----|---|--|
| 1   | BODY, BONNET, CAP                       | ASTM A216 Gr. WCC  |
| 2   | STEM                                    | ASTM A182 Gr. F6a  |
| 3   | SPRINGS                                 | ALLOY STEEL  |
| 4   | BODY SEAT                               | ASTMA 105 Hard Faced (Stellite or Equivalent)                            |
| 5   | BONNET BUSH & LOCK NUT, ADJUSTING SCREW | PHOSPHOR BRONZE<br>(ASTM B139 / BS1400)                                  |
| 6   | BOTTOM & TOP SPRING PLATE               | STAINLESS STEEL<br>(BS970-420 / ASTM276-420)                             |
| 7   | BODY & CAP STUD                         | ASTM A193 Gr. B7   |
| 8   | BODY & CAP NUT                          | ASTM A194 Gr. 2H   |
| 9   | BONNET & CAP GASKETS                    | SPIRAL WOUND GASKETS   |
| 10  | VALVE HEAD                              | NICKLE CHROME ALLOY/ Seating Surface Hard Faced (Stellite or Equivalent) |
| 11  | VALVE GUIDE                             | NICKLE CHROME ALLOY  |



| QUALITY PLAN |   |              |  | CUSTOMER: RRVUNL<br>BIDDER/VENDOR: |   | PROJECT: 2X680MW SURATGARH STPP<br>QP NUMBER: PE-QP-392-100-M012 |   | SPEC. NO.: PE-TS-392-100-M009<br>SPEC. TITLE: TECH. SPEC. SLBV                               |                                   |                     |           |     |                                 |                                 |        |  |
|--------------|---|--------------|--|------------------------------------|---|--|---|--|-----------------------------------|---------------------|-----------|-----|---------------------------------|---------------------------------|--------|--|
| S.NO.        | COMPONENT/<br>OPERATION   | SHEET 1 OF 3 | CHARACTERISTICS<br>CHECKED   | SYSTEM                             |   | FEED WATER   |   | EXTENT<br>OF CHECK   | REFERENCE<br>DOCUMENT             | ACCEPTANCE<br>NORMS | TEST CERT | 3/2 | SECTION-C                       |                                 |        | REMARKS  |
|              |   |              |  | CATE-<br>GORY                      | TYPE/METHOD<br>OF CHECK                                 | ONE/HEAT<br>/ HEAT<br>BATCH                                      | APPROVED<br>DRG./TECH.<br>SPEC.   |  |                                   |                     |           |     | APPROVED<br>DRG./TECH.<br>SPEC. | APPROVED<br>DRG./TECH.<br>SPEC. | AGENCY |  |
| 1.0          | MATERIALS   |              |  | MA                                 | PHYSICAL, CHEMICAL TESTS                                | ONE/HEAT / HEAT BATCH  | APPROVED DRG./TECH. SPEC.   | APPROVED DRG./TECH. SPEC.  | TEST CERT                         | 3/2                 | 2         | 1   |                                 |                                 |        | -CORRELATION REQUIRED FOR BODY, BONNET, CAP, DISC, SPINDLE |
| 1.1          | BODY, BONNET, CAP, SPINDLE, DISC, BODY SEAT, SPRING PLATES, FASTENERS |              | 1. PHYSICAL CHEMICAL PROPERTIES<br>2. DIMENSION<br>3. HEAT TREATMENT<br>4. SURFACE DEFECTS | MA                                 | MEASUREMENT<br>HT CHART REVIEW<br>VISUAL                | 100%<br>100%<br>100%   | -DO-<br>-DO-<br>MSS-SP-55   | -DO-<br>-DO-<br>MSS-SP-55  | -DO-<br>HT CHART<br>INSPN. REPORT | 3/2                 | 2         | 1   |                                 |                                 |        |  |
| 1.2          | BODY, BONNET, CAP, BODY SEAT  |              | 1. SURFACE DEFECTS<br>2. SUB-SURFACE DEFECTS   | CR                                 | PT/MT<br>RT/UT  | 100%<br>100%   | ASTME 165/<br>ASTME 709<br>ANSI B16.34/<br>TECH SPEC  | ASTME 165/<br>ASTME 709<br>ANSI B16.34/<br>TECH SPEC   | TEST CERT.<br>INSPN REPORT        | 3/2                 | 2         | 1   |                                 |                                 |        | -FILM REVIEW FOR RT & WITNESSING FOR UT                    |
| 1.3          | SPRING & VALVE GUIDE  |              | 1. PHYSICAL CHEMICAL PROPERTIES<br>1. CHEM PROPERTIES                                      | MA                                 | PHYSICAL, CHEMICAL TESTS<br>CHEM. TESTS                 | 100%<br>100%   | APPROVED DRG./TECH. SPEC.<br>APPROVED DRG./TECH. SPEC.  | APPROVED DRG./TECH. SPEC.<br>APPROVED DRG./TECH. SPEC.                                       | TEST CERT<br>TEST CERT            | 3/2                 | 2         | 1   |                                 |                                 |        | -CERTIFICATE OF COMPLIANCE TO BE FURNISHED                 |
| 1.4          | BONNET BUSH & ADJUSTING SCREW   |              |  | MA                                 |   |  |   |  |                                   | 3/2                 | 2         | 1   |                                 |                                 |        | -DO-   |
| 1.5          | SPRING  |              | 1. ENDURANCE<br>2. SPRING RATE<br>3. SCRAGGING<br>4. SURFACE DEFECTS                       | CR                                 | ENDURANCE TEST<br>LOAD TEST<br>FULL DEFLECTION<br>PT/MT | 1/BATCH<br>1/BATCH<br>100%<br>100%                               | RELEVANT SPEC./BS:759<br>APPROVED DRG./MFR. STANDARD<br>RELEVANT SPEC.<br>ASTME 165/<br>ASTME-709 | RELEVANT SPEC.<br>APPROVED DRG./MFR. STANDARD<br>NO PERMANENT SET IN 10 CYCLES<br>NO DEFECTS | -DO-<br>-DO-<br>-DO-<br>-DO-      | 3/2                 | 2         | 1   |                                 |                                 |        |  |


  

|                 |             |                                 |
|-----------------|-------------|---------------------------------|
| BHEL            | PARTICULARS | BIDDER/VENDOR                   |
| ARVIND BHARDWAJ | NAME        |                                 |
|                 | SIGNATURE   |                                 |
| 11/04/2014      | DATE        |                                 |
|                 |             | BIDDER'S/ VENDOR'S COMPANY SEAL |

|   |                      |                     |                         |                  |            |                                 |                 |                                  |                  |
|---|----------------------|---------------------|-------------------------|------------------|------------|---------------------------------|-----------------|----------------------------------|------------------|
|  |                      | <b>QUALITY PLAN</b> |                         | CUSTOMER: RRVUNL |            | PROJECT: 2X660MW SURATGARH STPP |                 | SPEC. NO.: PE-TS-392-100-M009    |                  |
|   |                      |                     |                         | BIDDER/VENDOR:   |            | QP NUMBER: PE-QP-392-100-M012   |                 | SPEC. TITLE: TECH. SPEC. SLBV    |                  |
| S.NO.   | COMPONENT/ OPERATION | SHEET 2 OF 3        | CHARACTERISTICS CHECKED | SYSTEM           | CATE- GORY | FEED WATER                      |                 | ITEM: SPRING LOADED BYPASS VALVE |                  |
|   |                      |                     |                         |                  |            | TYPE/METHOD OF CHECK            | EXTENT OF CHECK | REFERENCE DOCUMENT               | ACCEPTANCE NORMS |
|   |                      |                     |                         |                  |            |                                 |                 |                                  | P W V            |

| 2.0 | IN PROCESS CONTROL  | 1. DIMENSIONS                       | MA | MEASUREMENT                 | 100% | MFG DRG   | MFG DRG.  | INSPN. REPORT                     | 3/2 | 2   | 1 |  |
|-----|---|-------------------------------------|----|-----------------------------|------|---|---|-----------------------------------|-----|-----|---|--|
| 2.1 | MACHINING OF BODY, BONNET, CAP, DISC, BODY SEAT, SPINDLE, SPRING PLATE ETC. | 2 SURFACE FINISH                    | MA | VISUAL                      | 100% | -DO-  | -DO-  | -DO-                              | 3/2 | 2   | 1 |  |
| 2.2 | SS DEPOSIT ON DISC/BODY SEAT  | 3. SURFACE DEFECTS (PRESSURE PARTS) | CR | PT/MT                       | 100% | ASTME 165/ASTME 709                             | ASTME 165/ASTME 709                             | -DO-                              | 3/2 | 2   | 1 |  |
| 2.3 | WELD DEPOSIT  | 1. HARDNESS                         | MA | VISUAL                      | 100% | INTERNAL STANDARD                               | INTERNAL STANDARD                               | LOG BOOK                          | 3/2 | 2   | 1 |  |
| 2.4 | DISC SEAT, BODY SEAT & VALVE GUIDE  | 2. CONTACT PATTERN                  | MA | HARDNESS TEST BLUE MATCHING | 100% | APPROVED DRAWING/ TECHNICAL SPEC                | APPROVED DRAWING/ TECHNICAL SPEC                | TEST CERT.                        | 3/2 | 2   | 1 |  |
| 3.0 | SPINDLE   | 3. SURFACE DEFECTS                  | CR | PT/MT                       | 100% | ASTME 165.                                      | NO DEFECTS                                      | -DO-                              | 3/2 | 2   | 1 |  |
|     |   | 1. SURFACE DEFECTS                  | CR | PENETRANT TEST              | 100% | ASTME 165                                       | NO DEFECT                                       | TEST CERT.                        | 3/2 | 2   | 1 |  |
|     |   | 2. HARDNESS                         | MA | MEASUREMENT                 | 100% | APPD DRG.                                       | APPD DRG.                                       | INSPN REPORT                      | 3/2 | 2   | 1 |  |
|     | ASSEMBLY TESTING  | 1. DIMENSIONS                       | MA | MEASUREMENT                 | 100% | APPD DRG.                                       | APPD DRG.                                       | INSPN REPORT                      | 3/2 | 2,1 | - |  |
|     |   | 2. BODY LEAK TIGHTNESS              | CR | HYDRAULIC                   | 100% | APPD DRG.                                       | APPD DRG.                                       | TEST CERT. & IIR III-C TEST CERT. | 3/2 | 2,1 | - |  |
|     |   | 3. SEAT LEAK TIGHTNESS              | CR | HYDRAULIC                   | 100% | -DO-  | NO LEAKAGE                                      | -DO-                              | 3/2 | 2,1 | - |  |
|     |   | 4. PRESSURE SETTING                 | CR | HYDRAULIC                   | 100% | SMOOTH OPERATION, VALVE TO OPEN AT SET PRESSURE | SMOOTH OPERATION, VALVE TO OPEN AT SET PRESSURE | -DO-                              | 3/2 | 2,1 | - |  |

|                                 |  |               |  |
|---------------------------------|--|---------------|--|
| BHEL                            |  | BIDDER/VENDOR |  |
| NAME                            |  |               |  |
| SIGNATURE                       |  |               |  |
| DATE                            |  |               |  |
| BIDDER'S/ VENDOR'S COMPANY SEAL |  |               |  |


|   |                      |                     |                         |                  |            |                                 |                 |                                  |                  |                  |
|---|----------------------|---------------------|-------------------------|------------------|------------|---------------------------------|-----------------|----------------------------------|------------------|------------------|
|  |                      | <b>QUALITY PLAN</b> |                         | CUSTOMER: RRVUNL |            | PROJECT: 2X660MW SURATGARH STPP |                 | SPEC. NO: PE-TS-392-100-M009     |                  |                  |
|   |                      |                     |                         | BIDDER/VENDOR:   |            | QP NUMBER: PE-QP-392-100-M012   |                 | SPEC. TITLE: TECH. SPEC. SLBV    |                  |                  |
| S.NO.   | COMPONENT/ OPERATION | SHEET 3 OF 3        | CHARACTERISTICS CHECKED | SYSTEM           | CATE- GORY | FEED WATER                      |                 | ITEM: SPRING LOADED BYPASS VALVE | SECTION-C        | VOLUME- IIB      |
|   |                      |                     |                         |                  |            | TYPE/METHOD OF CHECK            | EXTENT OF CHECK |                                  |                  |                  |
|   |                      |                     |                         |                  |            |                                 |                 | REFERENCE DOCUMENT               | ACCEPTANCE NORMS | FORMAT OF RECORD |
|   |                      |                     |                         |                  |            |                                 |                 |                                  |                  |                  |

|     |                                |                                |    |                      |      |                                   |                                   |               |     |   |   |  |
|-----|--------------------------------|--------------------------------|----|----------------------|------|-----------------------------------|-----------------------------------|---------------|-----|---|---|--|
| 4.0 | END CONNECTION (FOR B.W. ENDS) | 1. DIMENSIONS                  | MA | MEASUREMENT          | 100% | APPROVED DRAWING/ TECHNICAL SPEC. | APPROVED DRAWING/ TECHNICAL SPEC. | INSPN. REPORT | 3/2 | 2 | 1 |  |
| 5.0 | FINAL INSPECTION               | 2. SURFACE DEFECTS             | CR | PENETRANT TEST       | 100% | ASTME 165                         | NO DEFECTS                        | TEST CERT.    | 3/2 | 2 | 1 |  |
| 6.0 | PAINTING                       | CLEANLINESS AND COMPLETENESS   | MA | VISUAL               | 100% | APPROVED DRAWING/ TECHNICAL SPEC. | APPROVED DRAWING/ TECHNICAL SPEC. | INSPN. REPORT | 3/2 | 2 | 1 |  |
| 7.0 | PACKING                        | QUALITY AND THICKNESS OF PAINT | MA | VISUAL & MEASUREMENT | 100% | -DO-                              | -DO-                              | -DO-          | 3/2 | 2 | 1 |  |
|     |                                | AS PER TECHNICAL SPECIFICATION | MA | VISUAL               | 100% | TECHNICAL SPEC.                   | TECHNICAL SPEC.                   | -DO-          | 3/2 | 2 | 1 |  |

#### ABBREVIATIONS

CR = CRITICAL CHARACTERISTIC  
MA = MAJOR CHARACTERISTIC  
P = PERFORMED BY  
= BHEL/THIRD PARTY INSPECTION AGENCY  
W = WITNESSED BY  
= VENDOR  
V = VERIFIED BY  
3 = SUB VENDOR

|                 |  |             |  |                                 |  |
|-----------------|--|-------------|--|---------------------------------|--|
| BHEL            |  | PARTICULARS |  | BIDDER/VENDOR                   |  |
| ARVIND BHARDWAJ |  | NAME        |  |                                 |  |
| 11/04/2014      |  | SIGNATURE   |  |                                 |  |
|                 |  | DATE        |  | BIDDER'S/ VENDOR'S COMPANY SEAL |  |

|   |   |                                      |                  |
|---|---|--------------------------------------|------------------|
|  | <b>TECHNICAL SPECIFICATION<br/>SPRING LOADED BYPASS VALVES<br/>2X660MW SURATGARH STPP<br/>(STAGE-V, UNIT#7&amp;8)</b> | SPECIFICATION NO. PE-TS-392-100-M009 |                  |
|   |   | VOLUME : IIB                         |                  |
|   |   | SECTION: D                           |                  |
|   |   | REV. NO.: 00                         | DATE: 11.04.2014 |
|   |   | SHEET 1                              | OF 1             |

### **DATA SHEET - C**

Drawings/documents distribution schedule to be followed by the successful bidder:

1.0 The successful bidder shall submit the following drawings/documents within two weeks after award of contact.

- 1.1 Relevant drawings/leaflets for the valves showing following information.
  - i) Complete cross sectional arrangement of the valve.
  - ii) Binding dimensions, dismantling clearances & weights.
  - iii) Bill of material incorporating all the materials of construction of various parts along with BS/ASTM/IS standards to which the materials conform to.
  - iv) Special features, if any, as called for in the specific requirement
  - v) Type of oil/Grease wherever required and its annual consumption.
- 1.2 Relevant catalogue/leaflet of the actuators
- 1.3 Torque calculations of actuator selected.
- 1.4 Actuator data sheet with Wiring Diagram.
- 1.5 Quality Plan duly signed & stamped with bidder's seal.
- 2.0 The following shall be submitted within the stipulated time period as per vendor's drawings/ documents schedule, but not later than one month before first dispatch.
  - a) Drawings of components & details as deemed necessary.
  - b) Instruction manual for erection, operation and maintenance.
  - c) Storage instructions.
- 3.0 Before dispatch of the equipment the vendor shall furnish the following.
  - a) Material Test certificates.
  - b) Shop test reports and certificates.
- 4.0 Distribution of drawings / documents for all projects:  
After award of the contract the successful bidder shall furnish drawings/ documents as per following distribution schedule.

| Sl. No. | Type of Document                       | No of Hard copies | No. of Soft copies |
|---------|--|-------------------|--------------------|
| 1       | Documents submitted for Approval       | 2 Nos.            | 1 Nos.             |
| 2       | Final Distribution(Approved Documents) | 12 Nos.           | 1 Nos.             |
| 3       | O&M Manuals                            | 12 Nos.           | 2 Nos.             |