

**BHARAT HEAVY ELECTRICALS LIMITED
BOILER AUXILIARIES PLANT
RANIPET-6**

QC – OFF LOADING INSPECTION

INSPECTION OF SUB – CONTRACTED ITEMS

QMI: 26
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RECORD OF REVISION

SL.NO.	ISSUE NO.	REV	EFFECTIVE DATE	DETAILS OF REVISIONS
01	01	10	20-08-1999	10 revisions made.
02	02	00	05-12-2001	Totally updated to Align with ISO 9001/2000.
03	02	01	17-02-2005	Sub-Contractors Performance Rating Modified.
04	02	02	09-08-2005	Raisal and disposal of NCR & performance Rating Changed.
05	02	02	06-02-2008	Reviewed and Re- Affirmed
06	02	03	05.02.2011	Sub-Contractors Performance Rating Modified.

1.0 SCOPE:

- 1.1. This work instruction details guidelines for carrying out inspection and activities to be performed by QC-OLI / AIA at sub contractor works.
- 1.1 QC-OLI / AIA shall ensure the following applicable documents and records are maintained by the subcontractors.
 - 1.2.1 Purchase order documents, Dimension Reports, Non conformance Reports, inspection Reports, Customer hold point Clearance, Calibration certificates, NDT Reports, Welders Qualification Records, all special process Reports, Part disposing orders, Raw material attestation cards, design change notes and all Quality documents etc., (Wherever applicable).

2.0 GUIDELINES:

- 2.1 Inspection of all items at subcontractors works shall be carried out by QC-OLI / AIA in accordance with purchase order and its amendments if any and contract/letter of Indent, relevant drawings, applicable quality documents like QCP, SQP & PRQA etc,. These applicable documents are forwarded to sub-contractors by ordering department.
 - 2.2 QC-OLI / AIA shall refer the List of applicable Quality Work instructions for carrying out inspection. These list shall be forwarded to QC/OLI personnel / AIA by QC/OLI.
 - 2.3 Inspection of the items will be carried out based on registration in logbooks at suitable vendor location / call letter.
 - 2.4 If Inspection by Customer's Authorized Inspection Agency is called for in PO/QP/based on information from QA/Commercial Dept., the sub-contractor shall raise inspection call letter for Customer / Customer's Authorized Inspection Agency duly signed by QC-OLI / AIA and forwarded to QC-OLI office.
 - 2.5 QC-OLI shall co-ordinate with customer / their Authorized Inspection agency for their final inspection.
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- 2.6 QC-OLI / AIA shall verify the following: -
- a) Calibration certificates for the instruments and gauges, which are maintained by the sub-contractors.
 - b) The Calibration status of the measuring instruments and gauges issued by BHEL to sub-contractors before use.
 - c) The details of instruments number and calibration status in DR.
 - d) Shall correlate the material specification, material code No. In GMS and drawing with issued material as detailed in MIV / gate pass.
- 2.7 If there is any change / substitution with respect to specification, code and size of the material, prior approval shall be obtained from Design. Such DCNs shall be verified by QC-OLI / AIA during inspection.
- 2.8 The subcontractors shall maintain a Dimension Report (DR) book at his works for all items and shall have entries / clearance, MIV Raw-material details to final inspection inclusive of all stage inspection records and other applicable document / record reference numbers.
- 2.9 During the final inspection respective QC-OLI / AIA shall verify the following
- a) All the stage inspection records, short supply advice, the Positive Recall Note (PRN if any) entries in the DR book as mentioned in clause 2.8.
 - b) Shall enter their comments in the DR book after completion of their inspection. Also completion of the rework suggested and acceptance of the same shall be entered including NCRs special requirements (if any) in the DR book after completion.
 - c) Shall indicate the inspection and test status of the inspected items in the Dimension Report (DR) as
 - i) Cleared and I.R raised.
 - ii) Deviation noticed and NCR raised
 - iii) Rejected and PDO raised as the case may be.
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2.10 The corrective / preventive actions are planned based on product committee meeting minutes, chronic/ respective SARs & NCRs and feedback from QA, shop,& customers after analyzing the probable causes.

2.11 The planned actions are forwarded to QC-OLI personnel, AIA, MSA & QA departments for their reference and inspection course correction and improvement.

3.0 **INSPECTION OF ATTESTED & CERTIFIED MATERIALS:**

3.1 Attested / product attested / certified materials will be identified in the drawing and GMS as “A”, “P” and “C” respectively in relevant column.

3.2 The following guidelines are common for both attested and product attested materials. Ensure identification on each piece of material issued to the sub-contractors.

- a) The Raw material attestation card No (RMA No)
- b) Material specification
- c) Melt No / heat No / cast No.
- d) Inspectors seal

In accordance with RMA card & MIV

3.3 For certified material ensure identification on each piece of material issued to the sub-contractors.

- a) Material specification
- b) Inspectors seal

3.4 Whenever the issued attested / certified material are cut into no. Of pieces & the off cuts identification on each piece of material to be transferred as per clause 3.2 & 3.3 respectively.

4. **INSPECTION OF SPECIAL PROCESS**

4.1 The processes shall be done based on the requirements of Design document / Quality Work Inspections / CONTRACT

4.2 by the BHEL APPROVED AGENCIES ONLY. The required processes shall be carried out

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- 4.4 The required processes shall be carried out by the BHEL APPROVED AGENCIES ONLY.
- 4.5 C-OLI / AIA shall verify the following:-
 - a) The completion of all the required operations before giving the clearance to carryout the special process.
 - b) The certificates for calibration of measuring instruments / equipments used in process.
- 4.6 After completion of required process QC-OLI / AIA shall verify the records / certificates and the Report / certificate No. in D.R.

5. INSPECTION OF WELDING

- 5.1 Welding shall be done based on the requirement of Design document QCP, SQP, PRQA/ etc.,
- 5.2 Sub-contractor shall qualify all their welders / welding machine operators in accordance with AWS for structural welding & ASME – SECTION IX / IBR for Fan rotating parts and Pressure parts.
- 5.3 Sub-contractors shall maintain records of such qualified welders / welding machine operators. Welding procedure specifications shall be qualified at sub contractors works if called for in the relevant code / customers requirements.
- 5.4 QC-OLI / AIA shall carryout surveillance checks on welding at sub-contractors works based on SITE / SHOP feedback.
- 5.5 If the welder's performance is found unsatisfactory, should not be allowed for further welding.
- 5.6 Such welders shall be allowed to do welding after re-qualification only.

6. INSPECTION OF NON – DESTRUCTIVE TESTING - NDT

- 6.1 NDT shall be carried out based on the requirements of Design documents, QCP, PRQA, SQP, CODE, NDT procedures.
 - 6.2 NDT shall be carried out by the BHEL AUTHORISED NDT AGENCIES only. However, sub-contractors qualified NDT personnel may be allowed to perform NDT after review of their certificates
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6.3 QC-OLI / AIA shall ensure the following:-

- a) The qualification of NDT personnel, validity of calibration status of NDT machinery and the expiry dates of NDT consumables like MPI POWDER, CLEANER, PENETRANT, DEVELOPER, X-RAY FILM etc.,
- b) Ensure that only BHEL approved brand of NDT consumable shall be used by the vendor and the same is to be recorded in the DR periodically.

6.4 QC-OLI / AIA will witness the NDT and will be countersigned by LEVEL –II NDT PERSONNEL OF BHEL / AUTHORISED INSPECTION AGENCIES.

6.5 In case of any defects are noticed during NDT the same shall be repaired and retested.

7. RAISING OF INSPECTION REPORT (I.R)

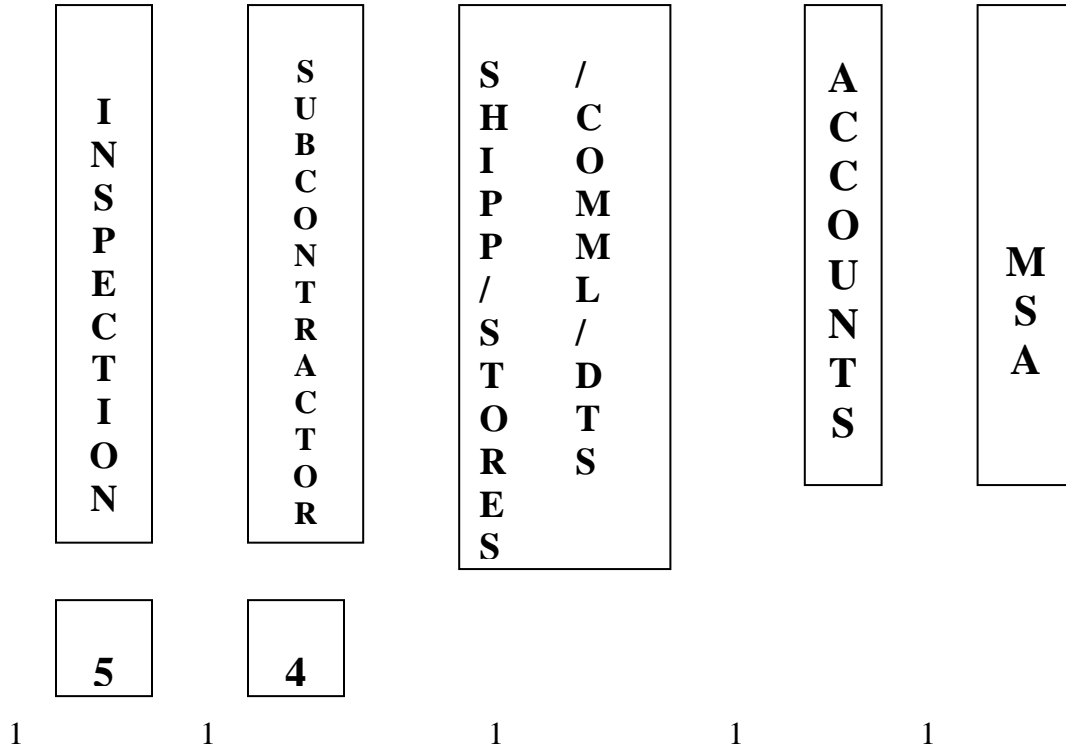
7.0 IR is raised at subcontractor's works and distributed as per the chart given below (7.4).

7.1 QC-OLI / AIA shall raise the Inspection Report (IR) for the items inspected and accepted.

7.2 QC-OLI / AIA shall verify the required entries as per Clause No.2.8 & clearances in the DR book before raising the IR.

7.3 In addition to the details printed in IR, other applicable details like RMA card, CHP and painting details etc., shall be indicated in the IR.

7.4 DISTRIBUTION CHART FOR IR



7.5 In case of change required in the IR issued, an AMENDMENT TO IR will be raised and distributed as per the original IR distribution chart.

7.6 IR CONTROL NUMBER

XXX	XX	XXXX
VENDOR	YEAR	SERIAL NO
CODE	2001-2002 AS 12	with in firm

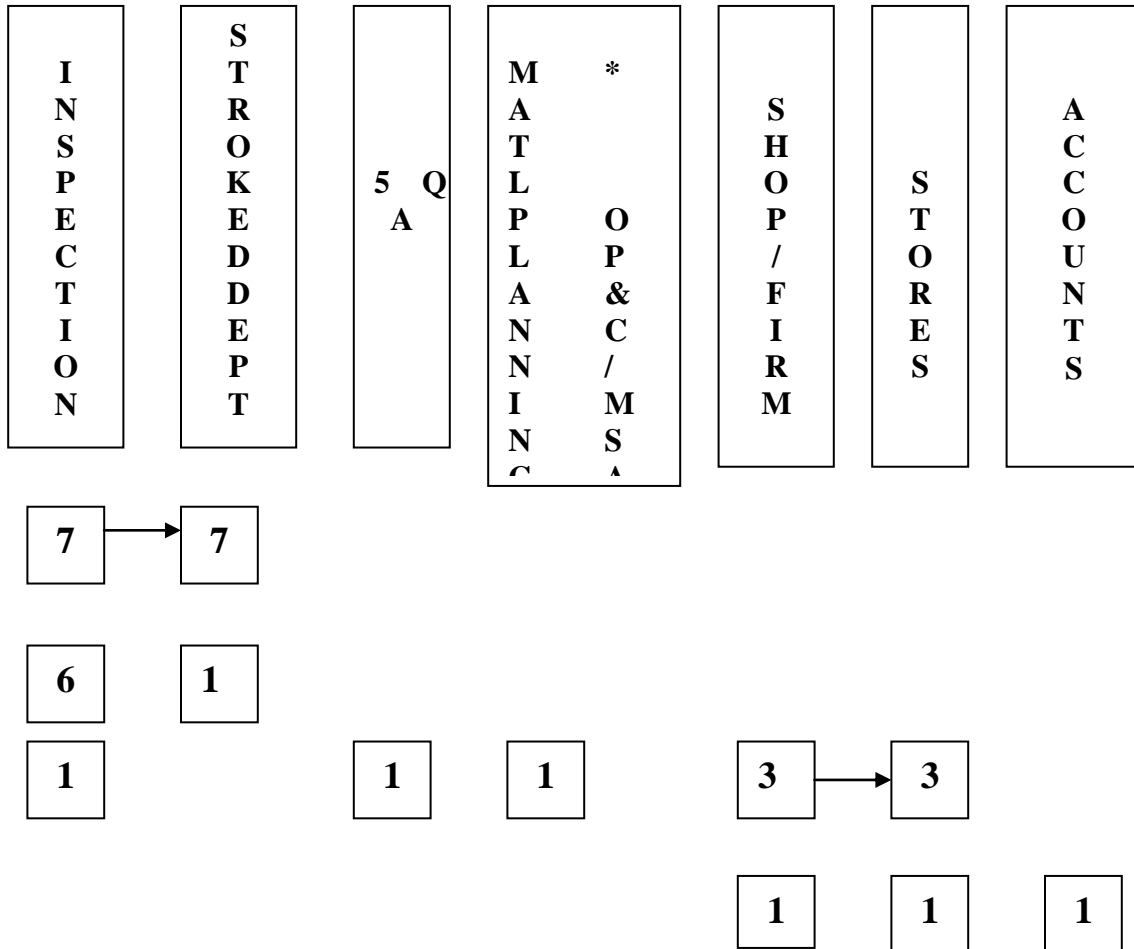
Ex: R99/12/0001

8. RAISING OF NON CONFORMANCE REPORT

8.0 Raisal and disposal of Non-conformance report (NCR) for components manufactured at subcontractor's works is in line with QMI:06.

9. RAISING OF PART DISPOSITION ORDER (P D O)

- 9.1 Raisal and disposal of part disposition order (P D O) at subcontractors is in line with SPR 2102.
- 9.2 QC-OLI / AUTHORISED INSPECTION AGENCY shall raise PDO whenever the items are rejected at sub-contractors works.
- 9.3 Distribution of PDO is as given below.



* Material Planning: For SD items

*MSA: For MSA items

- 9.4 PDO Control number
 XXX X XXXX
 FIRM CODE YEAR SERIAL NO. EX: R99/12/0001
 2001-2002 AS 1 with in firm

- 9.5 BHEL QC-OLI will give a separate serial no on all the PDO copies and distribute As per the above chart.

10.0 PERFORMANCE RATING OF SUB-CONTRACTORS:

- 10.1 AIA shall prepare monthly ie (15.XX.20XX to 14.XX.20XX) quality performance for each vendor as per the guidelines given in the Annexure and it is forwarded to QC/OLI office on 16th. Of every month.
- 10.2 QC-OLI shall compile the quality performance report every month after incorporating the demerit factor (DF).
- 10.3 When there is no inspection carried out during the period, marks will not be awarded for the vendors and the respective column will be indicated with (*).
- 10.4 QR(A) and Quality Rating QR shall be calculated as given below:

$$QR = QR (A) - QR (A) \times DF$$

The Demerit Factor DF will be calculated as given below: -

- DF for Shop Complaints = 10% of QR(A) for each complaints.
- Site Complaints = 10% of QR(A) for each complaints.
- NCR = 10% of QR(A) for each complaints.

This DF Percentage is restricted to a maximum of 25% Of QR(A)

i.e., $QR = QR(A) - QR(A) \times DF$

10.4.1	<u>Marks</u>	<u>Rating</u>	<u>Remarks</u>
	32.1 to 40.00	1	Excellent
	24.1to 32 .00	2	Very Good
	16.1 to 24.00	3	Good
	8.01 to 16.00	4	Fair
	0 to 8.00	5	Poor

- 10.4.2 QC-OLI shall forward the consolidated quality performance reports to MSA Department on 20 th of every month.
- 10.4.3 Rating 1 to 3 is acceptable. If the rating is more than 3, MSA will be advised to take suitable action.

11.0 PERFORMANCE RATING OF AIA

- 11.1 QC-OLI shall rate the performance of AIA once in year in line with procedure QC / OLI / 001
- 11.2 QC-OLI shall carryout the surveillance audit on AIA once in a year and advises them suitably if any corrective action is required.

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ANNEXTURE

Format for Sub-Contractor's Performance Rating - Firm code:

Insp. Call Reference	Date of IC	Time of IC	Date of Inspection	Time of Inspection	Delay in hours Beyond 24	Customer Number	PGMA	Stage	No of Du's	Qty Offered	Qty Accepted	Accepted with Deviation	Rework given	Rejected	Not Ready	Signature													
										Q	Q1	Q2	Q3/1	Q3/2	Q3/3	Firm QC	AIA/BHEL												
																	TOTAL												
$QR(A) = \left[\frac{\{Q1+0.75X(Q2)+OX(Q3/1+Q3/2+Q3/3)\}}{Q} \times 30 \right] + QSR$														$QR = QR (A) \times DF$															
<ul style="list-style-type: none"> Inspector shall award the following marks for QSR as applicable for the respective month after calculating QR (A). <table border="0"> <thead> <tr> <th>Criteria</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>01. Calibration</td> <td>- 2</td> </tr> <tr> <td>02. Workmanship</td> <td>- 2</td> </tr> <tr> <td>03. Accuracy of DR</td> <td>- 3</td> </tr> <tr> <td>04. Response</td> <td>- 2</td> </tr> <tr> <td>05. Storage</td> <td>- 1</td> </tr> </tbody> </table>														Criteria	Marks	01. Calibration	- 2	02. Workmanship	- 2	03. Accuracy of DR	- 3	04. Response	- 2	05. Storage	- 1	<p>Abbreviations used</p> <p>QR (A) : Quality Rating With QSR</p> <p>QR : Quality Rating With DF</p> <p>AIA : Approved Inspection Agency</p> <p>DF : Demerit Factors</p> <p>QSR : Quality System Requirement</p>			
Criteria	Marks																												
01. Calibration	- 2																												
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04. Response	- 2																												
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<ul style="list-style-type: none"> ✓ Demerit Factor Shall be suitably multiplied by QC-OLI based on the feed back from shop, site and NCR. 																													