

SCHEDULE-III (i)**TECHNICAL SPECIFICATION FOR REPAIR AND TESTING OF DAMAGED POWER TRANSFORMERS OF 33/11 KV RATING FROM 3.15 MVA TO 8.0 MVA AGAINST TN-2146**1. SCOPE:

This specification covers assessment and estimation for repairs involved in complete repairs, testing, delivery and safe custody of 3150 KVA, 5000 KVA & 8000 KVA rating of 33/11 KV copper wound power transformers of various makes, types and capacities lying damaged at various sites/circles stores of the Jaipur Vidyut Vitran Nigam Limited on Rate Contract Basis.

2. REPAIR WORK:

The repair work shall involve, opening of transformers cover, draining of oil, de-tanking of core and coil assembly, cleaning, washing of dust and dirt from all parts including core, tank and cooling tubes radiators etc. joint inspection for estimate, replacement of defective parts, providing locking arrangement as per enclosed drawing on all valves & plugs, assembly, stage inspection, re-tanking, filling fresh oil, oil filtration, marking and painting etc. and testing the repaired transformers for all the routine tests and heat run test as per IS:2026/1977 with latest amendments.

3. REPLACEMENT OF PARTS:

This will involve removal of damaged parts requiring replacement, supply of parts such as HV & LV leg coils, bushings, gaskets, breather, oil level gauge, tapping switch, oil drain and filter valves, cover bolts, plug cap and screws, transformer oil etc., fittings, fixings and making connections complete in all respect for satisfactory operations after repairs in normal working conditions.

4. WINDINGS:

4.1 The damage winding requiring replacement shall be replaced by windings identical to the original one in respect of cross section of conductor, No. of turns, diameter of coils, insulation material etc. and that all coil assemblies of identical voltage rating shall be interchangeable so that field repairs of the windings can be made readily without special equipment. The coils shall be supported, between adjacent section by insulation's, spacers and the barriers, bracing's and other insulation used in the assembly of the windings and shall be arranged to ensure free circulation of the oil and reduce hot spots in the winding.

4.2 The insulation of the coil shall be treated with suitable insulating varnish or equivalent compound under vacuum impregnation to develop the full electrical strength of the windings. All materials used in the insulation and assembly of the windings shall be insoluble, non catalytic and chemically

inactive in the hot transformer oil and shall not soften or otherwise be adversely affected under the operating conditions.

- 4.3 The winding shall be compact and symmetrical about the centre line of the core and shall be formed on suitable synthetic resin bonded paper sheets grade conforming to the requirement of BSS:1137/1949 or any amendment thereof and the size of sheets shall be identical to those used in the original transformers.
- 4.4 The HV & LV winding of all three phases will be as per original design of the transformer.
- 4.5 The conductor inner layer insulation shall be of suitable material conforming to relevant latest BSS of ISS and shall be of such sizes and material as provided in the original transformer. The leg coils shall be provided with oil ducts wherever required.
- 4.6 The number of coils per limb, the resistance and number of turns and dimensions of complete leg coils shall be exactly the same as that of the leg coil of the original transformer, so that electrical and mechanical characteristics of the repaired transformer shall remain same as that of the original transformers.
- 4.7 All threaded connections shall be provided with suitable locking devices. All leads from the winding to the terminals and bushings shall be rigidly supported to prevent damage due to vibration/transportation. It would be preferable to use sleeves/SRBP tubes wherever practicable on the leads taken out from windings to terminals and bushings.
- 4.8 The windings shall be clamped securely and placed so that they will not be displaced or deformed during short circuits. The assembled core and winding shall be vacuum dried in vacuum chamber and suitably impregnated with insulating varnish before removal from the treating tank. The tendered will specifically indicate, if he has got facilities and equipment for vacuum impregnation. The conductors used in the coil structure shall be best suitable to the requirements and all permanent current carrying joints in the windings and the leads shall be brazed/welded preferably rigidly clamped.

5. TAP CHANGING SWITCH:

Wherever off load tap changing switch requires replacement, it shall be provided on the HV windings matching to the requirements of power transformers in steps as provided originally on transformer. Charges of repair of OLTC for transformer of 3.15 MVA , 5.0 MVA & 8.0 MVA shall be indicated separately.

6. (A) CORE LAMINATION:

- 6.1 The core lamination required to be used, if any, shall be of high grade, non-ageing, low loss and high permeability cold rolled silicon steel laminations of

- proper grade and as far as possible shall be identical to the one used in the original transformer.
- 6.2 After being sheared to size the lamination shall be heat treated and provided with insulation which shall be inserted to the hot transformer oil. The nature of insulation of laminations shall be specified in the tender.
- 6.3 After clearing dust and dirt from the each leaf of laminations, the core shall be rigidly clamped and bolted to ensure adequate mechanical strength and to prevent vibrations during operation. The bolts used in the assembly of the core shall be suitably insulated and clamping structure shall be so constructed that eddy current will be minimum.
- 6.4 The core and the coil assemblies shall be so fitted in the tank that shifting may not occur and original clearance is maintained when the transformer is moved/transported or during the short circuit conditions.

6 (B) MAKES & FITTINGS OF ACCESSORIES REQUIRED TO BE REPLACED:-

The fittings & accessories wherever required to be replaced, the same shall be provided from the following makes only:-

| <i>S.No.</i> | <i>Fitting & Accessories</i> | <i>Makes</i> |
|--------------|---|--|
| 1 | <i>Buchholz relay</i> | <i>Atvus, Sukrat, Suvidha.</i> |
| 2 | <i>Winding Temperature Indicator/ Oil Temperature Indicator</i> | <i>OTI/WTI Model integrated RTD Scheme for ROTI/RWTI with remote indicator of M/s Preci Measure Control Pvt. Ltd./Thermal System</i> |
| 3 | <i>Magnetic type oil level gauge</i> | <i>Atvus, Sukrat, Instrument & Control</i> |
| 4 | <i>Radiator Valve</i> | <i>Hari Industries, Atvus, Vinayak, Vimal Techno, Petsun</i> |
| 5 | <i>Filter valve & Drain valve</i> | <i>Zolote, L&T, G.G., Leader</i> |

Radiator valves shall have clear & distinct OPEN/CLOSE indication embossed/ casted as well as painted on the both sides of main body of valve. Radiator valve should have zero leakage with cap remove.

6 (C) LOCKING ARRANGEMENTS:

To curb the theft of oil from power transformers, the following parts are either required to be blocked/ plugged or provided under provisions of locking:-

| <i>S. No.</i> | <i>Transformer Part</i> | <i>Mode of blocking</i> |
|---------------|--|--|
| 1. | <i>Conservator drain plug/ valve</i> | <i>Cap shall be provided as per drawing 'b'.</i> |
| 2. | <i>Both oil filtration valves</i> | <i>Cap shall be provided as per drawing 'a'.</i> |
| 3. | <i>Transformer Oil drain valve.</i> | <i>Cap shall be provided as per drawing 'a'.</i> |
| 4. | <i>Radiator drain plug (Bottom)</i> | <i>Cap shall be provided as per drawing 'c'.</i> |
| 5. | <i>Radiator Air release plug (Top)</i> | <i>Locking on top for which provision is to be provided by firm and informed to SE(MM) for approval.</i> |
| 6. | <i>Conservator filling hole.</i> | <i>To provide locking arrangement for which provision is to be provided by firm and informed to SE(MM) for approval.</i> |

| | | |
|----|---------------------------------------|---|
| 7. | <i>Air release plug on top cover.</i> | <i>To provide wire mesh cap arrangement so that only air can be released.</i> |
|----|---------------------------------------|---|

Drawing is enclosed.

7. FREQUENCY:

The repaired transformers shall be suitable for continuous operation with a frequency variation of plus minus 3% from normal frequency of 50 cycles per seconds without exceeding permissible temperature rise.

8. PARALLEL OPERATIONS:

The repaired transformers of the same capacity, type, Voltage ratio and vector group shall be suitable for parallel operation.

9. NO LOAD VOLTAGE:

The no load voltage ratio of the repaired transformers shall be same as that of the original transformer (33/11 KV) or otherwise will be specified/marked clearly.

10. HIGHEST SYSTEM VOLTAGE:

The highest system voltage may be as high as 36 KV on HT side and 12 KV on LT side. The repaired transformer shall be suitable for continuous operation with this voltage on the HV/LV side.

11. TRANSFORMER OIL:

Normally the fresh transformer oil for filling in the repaired transformers shall be made available by the Nigam and the quantity of new transformer oil, as may be required to be filled in, shall be as per the quantity mentioned on the name plate of the transformers. Transformer oil shall be supplied to the contractor by the Nigam. Filtration and filling of the oil in the transformer shall be done in the presence of Nigam's representative.

In the event of non-availability of the transformer oil with the Nigam the Superintending Engineer (MM), Jaipur shall authorise the contractor to use their own new transformer oil. The make of transformer oil shall be either RTS/ APAR/ SAVITA/ SARAVATI PETROCHEM/ RAJ LUBRICANTS/ LUBRICHEM, MUMBAI/ RAJ PETRO, MUMBAI/ PANAMA PETROCHEM, ANKLESHWAR/ TASHKENT OIL, BARODA/ COULMBIA. The transformer oil whenever provided by the contractor shall be tested oil and shall conform to the various test as per ISS:335/72. In case the testing facilities are not available with the contractor the sample of oil taken out be Nigam representative shall be got tested at Nigam's laboratory of RVPNL at HEERAPURA, Jaipur with any testing charges to be borne by the contractor.

The contractor shall furnish account of transformer oil to the consignee every month.

12. **TESTS:**

12.1 All the repaired transformers shall be subjected to all the routine tests as per IS:2026/1977 with latest amendments as detailed below :

- a) Measurement of winding resistance.
- b) Impedance voltage, short circuit impedance.
- c) Ratio polarity and phase relationship.
- d) Load losses.
- e) No load losses and no load current at normal voltages.
- f) Insulation resistance.
- g) Induced over voltage withstand test.
- h) Separate source voltage withstand test for HV and LV.
- i) Checking of repair work in confirmation to the Joint inspection report and approved estimate.
- j) The tenders will mention clearly that they have got requisite testing facility.

12.2 The fresh transformer oil filled in shall also be tested for its dielectric strength in accordance with IS:335/72 (amended upto date)

12.3 Temperature rise test on any transformer of any rating shall also be carried out by feeding measured losses converted to 75 degree centigrade.

12.4 The no load and load losses of transformers shall be measured either by power analyser or three watt meter method comprising of 3 watt meters, 3 voltmeters and 3 ammeters of appropriate class of accuracy. The load losses (copper losses) and the no load losses (iron losses) shall not exceed the maximum original value plus 15% tolerance after repairs.

12.5 The voltage ratio shall be subjected to a tolerance of plus minus 0.5%. The percentage impedance shall not exceed its original value plus tolerance as per ISS.

12.6 If the value of load losses, no load losses and voltage ratio of the repaired transformer are beyond the limits, the transformers will be declared un-economical and the contractor shall be at his liberty to remove the coils/parts provided by him and return the transformers to the respective consignees. However, no charges for repair of such transformer will be payable except for the charges fixed for un-economical transformers.

12.7 Induced over voltage withstand test and separate source voltage withstand test shall be carried out on 75% value of the original design value of the transformer. In case all HT or LT leg coils are changed in the transformer then both the tests shall be carried out on the 100% value of the original design value for HV or LV side respectively.

12.8 Magnetising current (no load current) of the repaired transformer when measured should not exceed 2% of full load current upto 3.15 MVA and 3% for 5MVA & 8MVA rating subject to tolerance of + 30% as per IS:2026 Part-I (latest).

12.9 STAGE INSPECTION: The stage inspection for repair of power transformers shall be carried out at the works of the repairer firm by the nominated officers of Nigam after the windings are assembled and before these are put in tank. While carrying out the joint inspection for estimation before repair, weight of the coils, conductor dia and ID/OD of the winding shall be taken/measured and same measurements shall also be taken during stage inspection and mentioned in the report. Both the measurements should be similar otherwise lower weight either in joint inspection or stage inspection shall be considered for payment. To carry out the stage inspection, the firm shall intimate to the Superintending Engineer (MM), Jaipur Discom, Jaipur, seven (7) days in advance for deputing the inspecting officer. In case inspecting officer does not reach to the Firm works for carrying out the inspection within the specified period the delay shall be on Nigam's account.

13. MARKING & PROVIDING ORANGE BAND ON REPAIRED TRANSFORMERS:

13.1 After satisfactory repair and testing the contractor shall have to provide non-detachable metallic plate with engraved following details of the repaired transformers for the purpose of identification.

- 1) Repaired by M/s.
- 2) CRC No. JPD/SE/MM/SPO-V/TN-2146/D. dt.
- 3) Rating KVA Tr. Sr. No. Make.
- 4) W/O. No. /CE(O&M)/ /Sec.6//F/TS/F/TR. /D. Dt.
- 5) Date of delivery/despatch
- 6) Delivered at stores
- 7) Date of expiry of GP Dt. of 1st re-repair.
- 8) Date of expiry of GP after 1st re-repair Dt. of 2nd re-repair.
- 9) Date of expiry of GP after 2nd re-repair Dt. of 3rd re-repair

The above details from Sr. No.1 to 9 shall also be punched/embossed on the cover of the transformer.

On every re-repair of transformer the date of repair and date of expiry of guarantee period shall have to engraved on rating plate by the contractor.

The original name plate of transformer will be retained on the repaired transformers.

13.2 For the transformers "Without name plate", concerning Chief Engineer/ Zonal Chief Engineer, Jaipur Discom shall allot a Sr. No. to such transformers before delivery to the repairer firm.

The following details shall be punched by the repairer on tank or embossed on a steel plate of 75 mm x 75 mm x 2.5mm permanently welded on the tank body below the middle HV bushing in clearly visible position.

“ JPD - CRC – TN - 2146”
 -----KVA Sr. No.-----
 Make ----- R. Firm name

- 13.3 A 100 mm wide orange band of paint all around the transformer and radiator on all the transformers repaired shall be provided invariably approximately at the middle of the sides of the tank of the transformer for identification of the repaired transformer easily. The shades of this orange paint shall be in canary orange colour of ISI/shade No.309. This paint will also be provided after proper treatment of the surface of the transformer, if the transformer is reported failed again after repairs, another 100 mm wide orange band will also be painted at 50mm above the surface of the first paint so as to identify clearly the second repair of the transformer. Similarly in case of future repairs each additional band in orange paint will be provided on subsequent repairs of the transformers. This orange band will be painted after final grey painting of the repaired transformer.

13.4 **Testing in the Nigam in House Laboratory (CTL):-**

- i) CTL testing will only be carried out on those transformer who have been tested in CTL at the Time of supply (supplied against TN-1892 and in subsequent TNs thereafter) or Transformers supplied under World Bank loan where one transformer selected for each DI was tested in CTL/ Santhala Power. The losses observed at the time of supply in CTL/ Santhala Power shall be the reference value for acceptance with allowable Tolerances.
- ii) The following tests after satisfactory Testing and repair at Firm’s work shall be carried out at CTL:
 - a) No Load Losses voltage and Magnetizing current will be measured at 100% of rated voltages.
 - b) Load losses by Resistance Calculation method.
 - c) Percentage Impedance.
- iii) XEn (CTL),JVVNL shall provide 2 Nos. Poly-carbonate Seals on diagonally opposite side of Transformer after successful testing in CTL as a token of proof that Transformers have been tested at CTL. If results found beyond acceptable limits , transformer will be declared un-economical and repairing firm at liberty to remove the coils/parts provided by them. However no charges for repair of such transformer will be payable except for the charges fixed for un-economical transformers.
- iv) Other Transformers will be accepted on the basis of successful testing at Firm’s works only.

SCHEDULE III (ii) TN-2146

CONDITIONS OF RATE CONTRACT FOR REPAIR OF POWER TRANSFORMERS.

1.0 INTRODUCTION:

- 1.1 Copper wound 33/11 KV Power Transformers approximately 200 in numbers of assorted makes, type and of capacities ranging from 3150 KVA to 8000 KVA are to be repaired.
- 1.2 These transformers are installed in various division of Jaipur Vidyut Vitran Nigam Ltd. After satisfactory repairs and testing, the transformer may be used in any area of Jaipur Discom.

2. SCOPE OF WORK:

- 2.1 This specification provided for assessment and estimation of damaged transformer to be repaired at contractor's works involving opening of transformers, draining of salvage oil, de-tanking of core and coil assembly, cleaning and washing of dust and dirt from all parts including core, tanks and cooling tubes, joint inspection for estimate and stage inspection after assembly of windings, re-tanking after assembly of all parts after replacement or repairing of the damage parts, filling required of fresh oil, oil filtration and painting marking and testing as per ISS.
- 2.2 This specification also provides for supply of parts requiring replacement such as HV & LV leg coils, bushing, gaskets, breather, oil level gauge, tapping switch, oil drain and filter valve, fresh transformer oil, cover bolts, plugs, caps, screws and other sundry items necessary for complete repair of transformer.
- 2.3 After repairs the transformers shall be subjected to all the routine tests and heat run test as per IS-2026/1977 with latest amendments and the transformer oil shall also be subjected to the tests as per IS-335/72 (latest amendments). All the tests shall be carried out in the presence of an authorised Engineer / Officer of the Nigam in order to ensure that the repairs have been carried out satisfactorily and new transformer oil of proper quality has been filled in and the transformers can be used for efficient performance under the various operating and atmospheric conditions detailed elsewhere in these specifications.
- 2.4 After satisfactory repairs and testing, the contractor shall have to deliver the transformers to the authorised representative of the Nigam.
- 2.5 The facilities for labour and equipment etc. for loading/unloading and handling of transformer at the contractor's works for assessment of the repair work and at the time of receiving transformer and at the time of despatching transformers after satisfactory repairs and testing shall be arranged by the contractor at his cost and no extra charges shall be paid for this job.

Normally the to and fro transportation shall be arranged by the Nigam. But some times contractor may be required to arrange transportation for which necessary rates for transportation from stores to contractor's works and back shall be furnished in schedule of prices.

3. PRICES:

- 3.1 The tenderers are required to quote their prices as per price schedule appended herewith. The total repair charges of each rating of transformer will form the basis of rate contract for repair work. The rate contract shall not be for part of the repair works. However, the rate contract shall be operative for individual items of repair work as may be assessed at the time of estimation.
- 3.2 The rates for the items I, II-1(a), II-1(b) & II-11 (a) of "Schedule of Prices" should be quoted variable as per price variation formula enclosed at Schedule-III(A) without any ceiling and for the rest of items of the price schedule unit rates quoted shall be on 'firm' price basis and no price variation shall be allowed. For claiming payment of leg coils and transformer oil, the contractor shall certify that there is no negative price variation on the items II-1(a), II-1(b) & II-11 (a).
- 3.3 The bidder shall quote the prices separately for repair charges in case the transformer have minor defects and does not require replacement of HT coils. The guarantee for such transformer shall be limited to the replaced/repared parts only.
- 3.4 (a) (i) Excise duty : Excise duty and any other government levy on spare parts (Components/oil & other accessories) for the transformers repaired, which if legally applicable shall be paid extra at actual on production of necessary documents (excise gate pass in case of excise duty).

The prices shall be quoted by the tenderer after accounting for the benefits of MODVAT scheme and any other type of benefits as may be availed by them in future due to any modification/insertion of new financial rules by the government shall be passed on to the Nigam.

- (ii) However, tenderers must specify clearly the present rate of excise duty/levies to be charged by them on the prices mentioned in their quotations. In case it is not applicable at present to the tenderer, a clear mention to this effect should be made in the tender offer. The limit of contract value may also be mentioned to the extend up to which duties will not be charged.
- (b) (i) Sales Tax: Sales tax (Central or State) on the spare parts/components/oil/accessories of the transformers replaced by the contractor shall be paid extra at actual as legally applicable.
- (ii) However, tenderers must specify clearly the present rate of sales tax to be charged by them on the prices mentioned in their quotations. In case

taxes are not applicable at present, a clear mention to this effect should be made in the offer.

4. DELIVERY:

Due consideration in placing of the order against rate contract will be given to such successful contractor(s), who will quote higher rate (MVA/Month) of delivery for the repair of transformers. Tenderers must specify clearly repair rate of transformer in MVA/month and time to be taken in repair after receipt of work order. The transformer shall be repaired and offered for final inspection within 60 days of date of receipt work order or 15 days for the issue of oil whichever shall be later. 7 days advance notice shall given by the firm for deputing the inspecting officers by the Nigam. The requisition for the issue of oil shall also be given seven days advance. The time taken in deputing inspecting officer for stage inspection and final inspection are covered in above delivery period.

5. DELAY IN DELIVERY:

If the transformers are not delivered duly repaired within the specified delivery period, as mentioned in the delivery schedule, an amount at the rate of half percent per week or part thereof subject to maximum 5% of the security amount of the respective transformer shall be recovered form the contractor. The security amount of the transformers, rating wise, for working out such recovery shall be as under:

| S. NO. | Rating of the Trf. under repair | Security amount (in Rs.) |
|--------|---------------------------------|--------------------------|
| 1 | 3150 KVA | 12.0 Lac |
| 2 | 5000 KVA | 17.0 Lac |
| 3 | 8000 KVA | 22.0 Lac |

Such amount of penalty towards delay in delivery shall be deducted from the contractor's bills as would be preferred to the Sr. Accounts Officer (CPC) of JVVNL, Jaipur failing which the bill shall not be entertained. In case the transformers are not returned after repairs within a period of six months, the Nigam shall have the right to cancel the order and forfeit the security deposits and bank guarantee as available with them and to get the repair work done from some other party at the risk, cost and responsibility of the contractor. As the transportation of transformer is responsibility of the dept. the date of despatch clearance by the inspecting officer shall be the date of delivery for the purpose of penalty.

6. SECURITY DEPOSIT:

The successful tenderer shall have to furnish a bank guarantee for Rs.1,00,000.00 (One Lac) towards security deposit for faithful execution of rate contract from a scheduled bank executed on Rs.100.00 Rajasthan non-judicial stamp paper in favour of the Superintending Engineer (MM), JVVNL, Jaipur within 15 days of award of rate contract valid for a period of two years.

7. SECURITY DEPOSIT FOR SAFE CUSTODY OF TRANSFORMERS:

- 7.1 The contractor shall furnish bank guarantee for min. value of Rs.10.00 Lacs towards safe custody of damaged power transformers of assorted rating of the Nigam in favour of the Superintending Engineer (MM). The bank guarantee shall be from any scheduled bank and shall be furnished on a Rajasthan Government non-judicial stamp paper of Rs.100.00 in the prescribed proforma. At the initial stage, the bank guarantee shall be valid for a period of minimum 2 years with six (6) months grace period.
- 7.2 The safe custody bank guarantee of Rs.10.00 Lacs will cover power transformers of assorted ratings with total MVA rating limited up to 10MVA (including guarantee period failed transformers) to be given for repairing. The bank guarantee of Rs.5.0 Lacs shall cover power transformers of assorted ratings with total MVA rating of 5.0 MVA.
- 7.3 The contractor shall not be allowed to commence work of the repair and testing of damaged 33/11 KV power transformers at site or his factory premises till such time he furnishes security deposit and bank guarantee towards safe custody of transformers.
- 7.4 The rate contract will be deemed to be considered inoperative if the bank guarantee towards safe custody of transformers is not furnished within the time specified and security deposit/earnest money as available with Nigam shall be forfeited.

8. REPAIRS GUARANTEE:

- i) The repaired transformers shall be guaranteed for satisfactory performance for a period of **18 months** from the date of delivery of the transformer to the consignee after repairs. The period during which transformer remained defective/ failed will not be accounted in this repair guarantee period. The period of defective will be reckoned from the date of first intimation/ failure to date of delivery after repair. Any defects noticed during the period of guarantee shall be removed/repared free of cost by the contractor within a period of 45 days from the date of receipt of such damaged transformers at the firm's works failing which the delay in repair will be counted towards delay in delivery. Subsequent repair of such transformers on failure shall carry a further guarantee of six months from the date of receipt of such transformers after such repair or balance unexpired guarantee period whichever is later. Delay in repair shall also be counted in subsequent repairs beyond 45 days from the date of receipt of the damage transformers.
- ii) The transformers failed under guarantee period shall be repaired by the Contractors free of cost and will be accepted only after inspection by the

authorised representative of the Nigam. As such after due repair of the guarantee period failed transformers the same are to be offered for inspection to this office. The repaired guarantee period failed transformers shall be despatched only after due inspection/despatch clearance.

- iii) The repair works of guarantee period failed transformers is to be carried out expeditiously each time. In such repairs the time factor shall be considered as essence of the contract and therefore, the same shall be monitored by our stores officers/officials. As stipulated at Clause 8 (i) above the such repair works of guarantee period failed transformers shall be completed within a period of 45 days from the date the same is/are delivered at your works for repair. For every entry/receipt of any such transformer from our stores, you shall get a certificate, in respect of the transformer repaired from the stores officers depicting (i) useful service rendered (ii) Balance guarantee period as per contract and (iii) delay in repair amount to Rs..... worked out deposited vide C.R No... dated..... The copy of the certificate so received shall invariably be furnished to this office.
- iv) In case of guarantee period failure, the Nigam (Jaipur Discom) reserves the right to review the rate contract and if the rate of failure is found more than 15% Nigam may cancel the contract. The rate of failure shall be calculated after failure of two or more numbers of repaired transformers. Subsequent failure of same transformer under guarantee period shall be considered for evaluating failure rate.

9. PRICE FALL CLAUSE:

The price charged for the works executed and spare parts supplied under the contract by the contractor shall in no event exceed the lowest price at which the contractor execute the works and sells spare parts of identical description to any other person/firm during the period of contract.

If at any time, during the said period, the contractor reduces the prices for such works or sells such spare parts to any other person at a price lower than the price chargeable under the contract he shall forthwith notify such reduction of price to the Nigam and the price payable under the contract for the works executed and spare parts supplied after the date of such reduction shall stand correspondingly reduced. The contractor shall furnish certificates in the following form to ensure compliance of provisions of clause :

"I/We certify that the works executed or spare parts supplied of description identical to the works executed or spares supplied to the Jaipur Distribution Nigam under the rate contract No. JPD/SE/ MM/TN-2146 have not been sold by me/us during the period of supply/during the period from.....to..... any other person at the price lower than the price charged from the Nigam under rate contract".

10. PARALLEL CONTRACTS:

The Nigam reserves the right for entering into parallel rate contracts with other firms and to assign and specify the areas of operation of rate contract.

11. PAYMENTS:

95% payments shall be arranged by the Sr. Accounts Officer (CPC), JVVNL, Jaipur against presentation of bills duly verified by the respective ACOS towards repairs of transformers, based on the approved estimates/work orders after ascertaining return of salvages/scrap and taking into account any material supplied by the Nigam. However, the contractor shall not get 95% payment in absence of completion of contractual formalities such as furnishing of bank guarantees towards security deposit, safe custody of transformers and execution of contract agreement. Balance 5% payment shall be released by the Superintending Engineer (MM), Jaipur Discom after ascertaining satisfactory performance of the transformers upto expiry of performance guarantee period.

12. SUBMISSION OF BILLS:

The bills for repairs of transformers shall be supported by the following documents for arranging payments

- a) Copy of Joint inspection report.
- b) Approved estimate/work order of the concerned CE(O&M)/ZCE, Jaipur Discom.
- c) Inspection and despatch clearance reports of the Inspecting Officer.
- d) Receipted Challans of the consignee for the receipt of repaired transformers along with the receipt of salvages deposited.
- e) Proof of payment of excise duty and sales tax as claimed extra in the bills.
- f) Certificates that material/spares mentioned in the bills have been actually fitted/used on the transformers.

13. TRANSFORMER OIL:

13.1 As far as possible the salvage transformer oil will be drained out from the transformer whether usable or not before delivery at firms works for repairs. If the transformers are sent filled with oil due to insulation protection reasons the same shall be returned by the contractor to the concerned consignee, failing which recovery of the cost of the same shall be made 10% higher rate than the prevailing market rate for fresh transformer oil.

13.2 All the repaired transformers shall be filled in with fresh/new transformer oil as detailed in the technical specification. The quantity of fresh transformer oil shall be filled in as per quantity mentioned on the transformer name plate of the original manufacturer or the actual, whichever, may be less. The repairer

will furnish the documentary proof of using fresh/new transformer oil to the inspecting officer when required by him.

13.3 The fresh transformer oil available with the Nigam will be supplied to the contractor as per the quantity mentioned on the nameplate of the original manufacturer. In that event only filtration charges shall be paid and 0.5% extra the Nigam on account for loss shall supply transformer oil during filtration.

14. TRANSPORTATION/CARRIAGE OF TRANSFORMERS:

14.1 The contracting agency may be required to arrange transportation of damaged power transformers from the stores to contractor's work and back to the stores (after satisfactory repairs and testing) for which the to and fro transportation charges shall be indicated separately for each rating in schedule-VIII.

14.2 Normally Nigam will deliver the transformers for repairs at their works and collect after repairs from their works. The handling facilities at their works will be provided free of cost.

14.3 For repair of transformers failed within guarantee period, the transportation shall be arranged by the Contractor. However, Nigam reserve right to deliver the damaged and lift repaired transformers by its vehicle and in that case transportation charges from circle stores/site to firm's works and back shall be to the firm's a/c. Necessary deduction/recovery shall be made from firm's balance payment. Such charges shall be as under till validity of the rate contract.

| <u>Sr.No.</u> | <u>Rating</u> | <u>To & Fro Transportation charges per unit.</u> |
|---------------|-------------------|--|
| 1. | 3.15 MVA to 8 MVA | Rs.14000.00 |

The necessary arrangement for loading and unloading of the G.P. failed transformer at store shall be arranged by the contractor/ repairer firm at his own cost.

15. ASSESSMENT/ESTIMATION OF REPAIRS:

15.1 All the failed transformers shall be deposited by field officers to their respective circle stores. At the level of circle stores guarantee period shall be ascertained and if transformer found failed beyond guarantee period, it will be deposited with ACOS, by circle stores as per directions passed by CE/ Zonal CE of the Nigam. Transformer received with ACOS, shall be sealed in their stores and as per authorisation given by the concerned CE(O&M)/ZCE, transformer shall be delivered at firm's works. Seal numbers shall be intimated to the concerned CE(O&M)/ZCE, JVVNL to respective firm.

- 15.2 A joint inspection by two Executive Engineers to be nominated by the concerned CE(O&M)/ZCE, JVVNL and the authorised representative of the contractor shall be carried out at contractor's works to assess and work out the details of the damaged parts to be replaced and repairs to be carried out on individual transformer. The seal shall be broken and transformer shall be opened in presence of both Inspecting Officers and representative of firms. The joint inspection report shall contain the complete details of the healthy/damaged HT & LT coils of each phase invariably indicating details of coils to be replaced such as, No. of coils, size of conductor, ID & OD and axial length of coil. The details regarding missing coils in each phase shall also be mentioned in the report, if any. Six (6) copies of the estimates for repair & testing of such damaged transformers indicating its make, serial No., year of manufacture, TN No., capacity and voltage ratio etc.. shall be prepared than and there at the time of Joint inspection and all the six copies of estimate shall be signed by the contractor and the Inspecting Engineer/Officer of the Nigam.
- 15.3 The joint inspection reports shall clearly indicate whether particular item being provided is against replacement of defective/damaged missing parts.
- 15.4 If any of the HV & LV coils are found damaged in a leg/limb all the HV & LV coils of the damaged transformers shall be replaced by the new coils.
- 15.5 All the damaged HV & LV coil scrap, salvage (insulation) shall be lifted by Nigam's Store organisation. Empty drums of oil and other scrap metal parts etc. shall also be lifted by the Store Officer of Nigam. Weight of damaged HV & LV coils and insulation shall be indicated separately in the joint inspection, however while making payment the weight of coil + weight of insulation shall be considered for payment.
- 15.6 The estimates shall be prepared in two parts. In first part cost to be incurred in repair work shall be worked out on the basis of rates of variable items prevailing on the one month prior to the date of tender opening. Claim of price variation on variable rate items shall be allowed after issue of price variation by SE(MM), Jaipur Discom, Jaipur.
- 15.7 In second part, the economic viability of repair work shall be worked out. The cost of salvages value of coils, transformer oil etc. prevailing one month prior to date of opening of tender shall be deducted from the estimate of repair worked out in first part.
- 15.8 The repair of transformer shall be economically viable in case the estimate of repairs after deducting salvage value excluding excise duty, sales tax & F&I is less than Rs.3,36,025.82 in case of 3.15 MVA Power Transformer, is less than Rs.5,58,746.74 in case of 5.0 MVA Power Transformer and is less than Rs.6,80,801.93 in case of 8.0 MVA Power Transformer.
- 15.9 The weight of new coils to be charged in the estimates for repairs shall be same as that of the oil burnt damaged coils taken out from the damaged transformers.

15.10 The contractor shall also ensure that his Engineer is always made available when called for Joint inspection and preparation of estimates in order to avoid un-necessary delay of repair works and detention of the Inspecting Officer of the Nigam. Any delay in commencement of joint inspection after reaching the inspecting officer shall be towards the contractor's account. Salvages shall be immediately despatched/delivered to the consignee after carrying joint inspection.

16. APPROVAL OF ESTIMATES:

16.1 The estimate of the repairs after getting signed by the committee as detailed in para 15.2 shall be submitted to the concerned CE(O&M)/ZCE, JVVNL in 6 copies. Three copies of the estimate duly approved shall be forwarded to the contractor by the concerned Chief Engineer/ Zonal Chief Engineer, JVVNL to enable commence the repair work on the transformers thereafter immediately.

16.2 Out of the 3 copies of the approved estimates received by the contractor, one copy shall be retained by him for his record and one copy along with the inspection clearance report shall be attached along with the bill's after satisfactory repairs and testing and shall be forwarded by the contractor to the consignee stores officer to facilitate the verification. The remaining spare copies of approved estimate along with a copy of Joint inspection report shall be handed over to the Inspecting Officer at the time of inspection and testing of the repaired transformers to facilitate checking and to ensure that the repairs have been done strictly in accordance with the approved estimates.

17. SUNDRY ITEMS:

Miscellaneous items not specified in the price schedule but are required for repairs and satisfactory operations of the transformers after repairs shall be provided by the contractor at the fixed rates given in the schedule of prices under title "SUNDRY ITEMS". These items may include packing of bushing rods, fresh silicagel, diaphragm of explosion vent, spindle wheels of valves, cover bolts, caps, screws, washers & insulation materials to be provided between HT and LT legs/coils and interchangeable legs/coils, minor repairs of tank and all other parts not specifically mentioned in price schedule including denting, welding etc. if required, which are necessary for satisfactory operation of the transformer after repairs.

18. STAGE INSPECTION:

The Nigam shall carry out stage inspection during the process of repair for checking the repair work in confirmation to the joint inspection report and approved estimate and also for the quality of workmanship and material used in repair.

19. TESTS AND TEST CERTIFICATES:

- 19.1 All the transformers after repairs shall be subjected to all the routine tests specified in the relevant ISS detailed in clause No.12 of the technical specification (Section-III) appended herewith. The transformers failed under guarantee period shall be repaired by the supplier and will be accepted only after inspection by the authorised representative of the Nigam.
- 19.2 Besides testing of transformers for the routine tests the inspecting officer of the Nigam shall be authorised for random checking of the coils and core assembly of the repaired transformers to check the actual repairs done and to examine the quality and make of raw material used and workmanship etc.. The contractor will ensure that the best quality ISI approved material is used as far as possible. The Nigam reserves the right to get conducted any test of reasonable nature at the contractors premises, or at site, in addition to the aforesaid tests and those included in the rate contract at the contractors expenses to satisfy himself that the spare parts supplied and repairs etc. carried out/completely with specifications. The contractor shall be required to rectify the defects, if any found in such tests at his own cost.
- 19.3 The contractor shall send copies of test certificates duly approved by Inspecting Officer to the concerned consignee(s) and to the concerned Chief Engineer/ Zonal Chief Engineer, JVVNL for each and every transformer.

20. INSPECTION & TESTING:

- 20.1 The contractor shall give at least 7 days notice to the concerned Chief Engineer/ Zonal Chief Engineer JVVNL for inspection of every lot of repaired transformers so that the Nigam may depute its representatives for inspection and testing of the same. No transformers shall be despatched without inspection and testing clearance by the Inspecting Officer.
- 20.2 The contractor shall record the following certificate on the invoice/packing list (challan) of each transformer.

"Certified that the power transformer of the rating KVA Make..... bearing Sr. No..... has been got tested and cleared. The test results were found to be within the values specified in the relevant ISS/contract as per true copy of test results enclosed".

Witness by Shri.....designation.....

21. MATERIALS:

- 21.1 All material used in the repairs/construction of the equipment forming the contract shall be of the best quality of its kind and except where modified by the specification, shall comply in all respect with the standard laid down by ISI or British Engineer Standard Associations wherever the Indian standard are not formulated.

21.2 The spars/equipment to be used in the repairs of the damaged equipment should comply with one consistence set of standards.

21.3 In order to avoid inconsistencies in electrical characteristics of HT/LT bushings, the broken/damaged bushings with metal parts shall be replaced by the bushing of the same class & make as those of found one in that transformer as far as possible, or the entire set of bushings of HT or LT shall be changed by a new set of bushings as per IS specifications, if required.

22. EXTRAS:

When asked in writing by the Concerned Chief Engineer/ Zonal Chief Engineer JVVNL to perform such extra work and supply such extra material, not cover within the scope of this specification as specified under various clauses of same, such work and material which of most necessity shall be got complied by the contractor and its charges shall be paid extra at the rate and terms to be mutually agreed upon. This shall however not exceed the economic limit of repairs.

23. ATMOSPHERIC CONDITIONS:

23.1 The transformers after satisfactory repairs/testing shall be suitable for operation in tropical climate and shall be able to withstand a wide range or temperature and climatic variations experienced in Rajasthan:

| | | |
|---------------------------------|---|-----------------|
| i) Annual rain fall (max.) | : | 100 Cms. |
| ii) Max. ambient temp. in shade | : | 50 degree cent. |
| iii) Max. relative humidity | : | 90% |
| iv) Min. temp. of air in shade | : | 0 degree cent. |
| v) Min. relative humidity | : | 10% |

23.2 The repaired transformers may be exposed to the direct sun and shall be suitable for satisfactory operations under erratic climatic condition. The damage porcelain bushings requiring replacement shall be replaced by such bushing keeping in view that these should have ample margin of safety as regards flash over in order sudden varying atmospheric conditions and trouble from dust.

24. PAINTING:

24.1 All metallic surfaces exposed to weather and requiring painting shall be given suitable priming coat after de-rusting and two furnishing coats of best paint of grey colour. Rates for one coat spray painting (without primer etc.) shall also be coated separately.

24.2 The inside of transformers shall be given suitable priming coat after de-rusting and two coats of best paint of zinc chromate or any other paint which may not cause any deterioration properties of the transformer oil by chemical reaction etc. Joint inspecting committee shall ascertain whether repainting on transformer is required or not.

25. DESPATCH INTIMATION:

25.1 After satisfactory repairs and testing the contractor is required to send telegraphic intimation to the consignee/stores officer under intimation to the Chief Engineer (MM), Jaipur Discom, Jaipur. The telegraphic intimation will contain information regarding quantity and the amount of the bill.

25.2 In addition to above the contractor shall be required to send the monthly statement to the concerned CE(O&M)/ZCE JVVNL and SE (MM), Jaipur Discom, Jaipur of quantities of the transformers of various makes, types and capacities received from various consignees, and delivered back by 7th of every next month.

26. RESPONSIBILITY FOR SAFE CUSTODY OF TRANSFORMERS DURING THE REPAIR PERIOD:

The contractor shall be entirely responsible for the safe custody of transformers from the day damaged transformers received at his works from the consignee/stores officer upto the time of delivery back and will fully responsible against any loss causes due to damage/theft/fire/floods etc.

27. STATEMENT OF TRANSFORMERS REPAIRED & DELIVERED TO CONSIGNEE:

The contractor will be required to send the following details of the transformers repaired by him to the concerned Chief Engineer/ Zonal Chief Engineer, JVVNL, Jaipur and Superintending Engineer (MM), Jaipur Discom, Jaipur.

- a) A copy of invoice pertaining to the particulars of transformers repaired by him immediately after delivery of the same to the concerned indenting/demanding officer's.
- b) A statement of transformers received, repaired and delivered in the proceeding month should be furnished in the following proforma, so as to reach by 7th of every month.

| Sr. No. | Rating | Make | Transformer Sr.No. | Dt. of receipt of Transformer | Joint Inspection No. & Dt. |
|--------------------------|-------------------|-----------------|-----------------------|----------------------------------|-------------------------------|
| 1. | 2. | 3. | 4. | 5. | 6. |
| | | | | | |
| Work Order No. & Date | Dt. of Inspection | Dt. of Despatch | B.G.P./G.P | Programme of repair/Remarks | |
| 7. | 8. | 9. | 10. | 11. | |

Beside above, monthly information about transformer failed under guarantee period and sent for repair, shall also be furnished by the repairing firms in the following proforma.

| Sr. No. | Rating | Make | Transformer Sr.No. | Work Order No. & Date | Date of repair |
|-----------------|--------|-----------------------------------|-----------------------|--------------------------|---------------------------------|
| 1. | 2. | 3. | 4. | 5. | 6. |
| Date of failure | | Date of receipt Of transformer | | Date of repair | Programme of repair/ remarks |
| 7 | | 8 | | 9 | 10 |

28. RESPONSIBILITY OF CONTRACTOR AND COMPLETENESS:

28.1 The contractor shall be entirely responsible for the satisfactory execution of this contract in accordance with the terms of the rate contract laid down herein.

28.2 Approval of the contracts/sub contracts, test certificates or of tests carried out by the repairer or the representative of the Nigam shall not relieve him from any of his obligations to meet out all the requirements of these specifications from the responsibilities for the satisfactory repairs and working of transformers for the guarantee period.

29. INTERCHANGEABILITY:

All parts shall be made accurately to standard gauge as far as possible so as to facilitate the replacement and repairs. All corresponding parts of similar make, type and capacity of transformers including the spare parts shall be interchangeable.

30. RATE CONTRACT WITHOUT PREJUDICE:

The rate contract shall be without prejudice to any of the term of specification or the purchase order of the Nigam or any rate contract's of DGS&D or purchase department of any other Govt./Semi Govt. undertaking or of the other rate contract of Nigam what so ever it might be.

31. NUMBER OF QUANTITY TO BE CONTRACTED FOR:

The approximate number of transformers to be got repaired are around 200 (two hundred) nos. of various sizes. The orders for the repairs of the damaged power transformers shall depend on their capacity, delivery quoted, performance workmanship, financial status of the contractor, pending orders in hand, firm's performance in executing pending orders apart from the rates quoted for such items as mentioned under schedule of prices.

The Nigam reserves the right to place order for any quantity for undertaking the repairs by the rate contracting firms during the period of the contract, It also reserves the right of placing any supply order of articles or repairing the failed/damaged unit provided that is included in the contract. If the total amount of repairs is expected to exceed more than the estimated amount of the order at the time of taking job on actual repairs, this shall be intimated to

the concerned CE(O&M)/ZCE, Jaipur Discom in advance who as an exceptional case may convey approval but limited to the economical limit or repair. In case it is found that the contractors are not in a position to supply/execute the specific quantities or number/works within the period in which repairs/supplies/works are required to be completed the job will be got lifted from the firm's premises and shall be got repaired departmentally or through any other firm after imposing the due penalties as per stipulations arrangements for procurement of raw material in time to deliver repaired transformers within specified time.

32. PARTIES TO THE CONTRACTS:

Nigam and its demanding officer aforesaid shall be deemed to be parties to the contract. The Superintending Engineer (MM), Jaipur Discom, Jaipur shall award the rate contract to the successful tenderers on behalf of Jaipur Discom, Jaipur. All disputes pertaining to the supplies/works under the contract shall be referred to the concerned circle S.E of respective zone. **Parties having their works outside the jurisdiction of Jaipur Discom, shall not be considered for awarding Rate Contract.**

33. PERIOD OF RATE CONTRACT:

- a) The rate contract shall be valid for a period of 2 years from the date of award of contract and can be extended further for a period of one year or part thereof on mutual consent. All orders placed within this period shall be got executed by the contractor even though the delivery of the repaired equipment or spares supply order falls beyond the expiry of the rate contract period.
- b) Nigam reserves the right to discontinue the repair work of power transformers in case the failure rate of repaired power transformer is observed more than 15%. The failure rate shall be worked out for minimum failure of two transformers. Subsequent failure of some transformers shall be counted in failure rate.

IMPORTANT NOTE:-

- i) Repair of Power Transformers shall not be carried out more than twice after expiry of original guarantee period even if repair cost is within economical limit.
- ii) Power Transformers not having original name plate, will not be repaired.
- iii) **Damaged Power transformers manufactured prior to year 2000 shall not be repaired.**
- iv) Transformers of obsolete design shall not be repaired.