

(UNDER JURISDICTION OF SINGRAULI COURT ONLY)

नार्दन कोल्डफिल्ड्स लिमिटेड
एक मिनी रत्न कम्पनी
सामग्री प्रबन्धक विभाग
पो० ओ० सिंगरौली कोलियरी
जिला सिंगरौली , म०प्र० ४८६८८९
Corporate Identification
No.U10102MP1985GOI003160
Tel: 07805 – 266481, Fax: 07805 – 266388
Website: www.ncl.nic.in



Northern Coalfields Limited
(A Mini Ratna Company)
PO- Singrauli Colliery,
Distt- Singrauli, MP- 486 889
Materials Management Wing
Corporate Identification
No.U10102MP1985GOI003160
Tel: 07805 – 266481, Fax: 07805 – 266388
Website: www.ncl.nic.in

SUPPLY ORDER

Ref. No. 63616075/115A1163/Pump Sets

Date: 04.10.2016

BY:E-MAIL/FAX, SPEED POST/REGD.POST

To
M/s Kirloskar Brothers Limited,
Yamuna S.No. 98/3 to 7,
Baner,
Pune – 411 045
Fax No.: 022 - 25289329

VENDOR CODE: K0476

Sub:- Our Tender No. NCL/SGR/MMD/Sec. I/Open/15-16/ 115A1163/146 dated 20.01.2016, Techno commercial bid opened on 25.02.2016, Price bid Opened on 07.09.2016 for procurement of Pump Motor Sets.

**Ref:- 1. Your Offer No. NRO/CTL/PS/NCL/001 dated 20.02.2016 submitted online on e-procurement portal and your subsequent e-mails, the last dated 24.09.2016.
2. Your Letter No. -- NRO/CTL/PS/NCL/PJ/1 dated 16.09.2016
3. Your Letter No. - NRO/CTL/PS/NCL/PJ/1 dated 22.09.2016
4. Your Letter No. - NRO/CTL/PS/NCL/PJ/1 dated 23.09.2016**

Dear Sirs,

With reference to the above, we hereby place our formal Supply Order on you for supply of Pump Sets complete with Electricals and all Accessories as per specification, prices, terms and conditions mentioned hereunder :-

Item Sl.No.	Item Description(Rs.)	Unit Basic Rates (Rs.)	Quantity (Set)	Extended Value (Rs.)
1	Pump Motor Set complete with 6.6 KV Electricals having Discharge 1100 Cu.M /Hr, Head- 150 M, Motor of 800 KW (min) and SD Starter and complete with all Accessories. Model: SCT 250/68	2155546.00	05	10777730.00

2	Pump Motor Set complete with 6.6 KV Electricals having Discharge 540 Cu.M/Hr, Head- 200 M, Motor of 500 KW (min) and DOL Starter and complete with all Accessories. Model: SCT 200/58-2	2069441.00	02	4138882.00
3	Pump Motor Set complete with 415 V Electricals having Discharge 250 Cu.M/Hr, Head- 100 M, Motor of 125 KW (min) and DOL Starter and complete with all Accessories. Model:- UP150/56/1	565000.00	01	565000.00
4	Pump Motor Set complete with 415 V Electricals having Discharge 40 Cu.M/Hr., Head- 30 M, Motor of 10 KW (min) and DOL Starter and complete with all Accessories. Model: DMS 65/20/2	140000.00	03	420000.00
5	Pump Motor Set complete with 6.6 KV Electricals having Discharge 1100 Cu.M/Hr., Head- 100 M, Motor of 500 KW (min) and DOL Starter and complete with all Accessories. Model: SCT 300/59/1	1926697.00	02	3853394.00
6	Pump Motor Set complete with 6.6 KV Electricals having Discharge 1100 Cu.M/Hr., Head- 200 M, Motor of 1000 KW (min) and DOL Starter and complete with all Accessories. Model: SCT 300/77/1	3100000.00	02	6200000.00
Total Basic Order Value (Rs.)				25955006.00

Note: The detailed Technical Specification shall be as per annexure –I enclosed

Total Basic Price:-Rs.2,59,55,006.00 (Rupees Two Crore Fifty Nine Lakh Fifty Five Thousand Six only).

TERMS AND CONDITIONS:

- 01. BASIS OF PRICE:-** The above prices are inclusive of Packing, Forwarding, Freight and Transit Risk Insurance charges etc. on FOR Destination basis. Prices shall remain firm till completion of supplies
- 02. EXCISE DUTY:-** To be paid extra at actuals but not exceeding @ Rs. 152443.00, Rs. 136749.00, Rs. 42654.00, Rs. 12608.00, Rs. 132459.00 and Rs. 213634.00 for item sl. no. 1,2,3,4,5 and 6 respectively per set of complete pump set.

For availing CENVAT CREDIT by NCL, firm has to submit copy of CENVATABLE EXCISE invoice as per rule 11 of CENTRAL EXCISE Rule 2002 at the time of supply of materials along with the final bill(s) indicating therein Northern Coalfields Limited's ECC No., Range, Division & Commissionerate along with other details as detailed below:-

Clean Energy Cess Regn. No./ Excise Regn. No.	Range	Division	Commissionerate
AABCN4884HEM011	Waidhan-II	Rewa	Jabalpur

You shall have to submit the detailed breakup of prices of Pump + Motor + Base Accessories on which Excise Duty is applicable @ 6% and Starter and Valves on which Excise Duty is applicable at the rate of 12.5%.

You have to submit your Auditor's Certificate along with the bill confirming that refund/credit, if any, obtained against Excise Duty shall be passed on to Northern Coalfields Limited.

- 03. SALES TAX:-** Concessional CST shall be payable extra at actuals as applicable at the time of supply. For availing concessional rate of Sales Tax, requisite Sales Tax declaration form will be furnished by the Consignee. The present rate of CST is @ 2% against form "C".
- 04. ENTRY TAX:-** Payable extra to the M.P. State Govt. authority by NCL directly as applicable. Present rate of Entry Tax is @ 1% for supplies to Regional Store, Amlohri in MP.

Note:-However, if there be any statutory increase in the rate of Taxes & Duties during the extended Delivery period, NCL shall not pay the increase in the Taxes & Duties and shall be borne by you. In case there is any decrease, the same shall be passed on to NCL.

05. SECURITY DEPOSIT:-You are advised to submit Security Money for Rs.28,44,048.00 (Rupees Twenty Eight Lakh Forty Four Thousand Forty Eight Only) in the form of Bank Draft drawn in favour of Northern Coalfields Ltd. payable at SBI, Morwa Branch (Code : 3767), Singrauli (MP) or at any scheduled bank located at MORWA, Singrauli (MP), or in the form of Bank Guarantee of any Scheduled Bank / Nationalized Bank in the prescribed format of Bank Guarantee for Security Deposit i.e. Annexure-J of NIT, within 15 days from date of issue of this Supply Order.

The Bank Guarantee should be valid for a period of three months beyond the stipulated delivery period. In case you fail to deposit the security money, the supply order may be cancelled and the case shall be processed to order elsewhere and your performance will be kept recorded for future dealings with you. Security Money shall be refunded within 30 (thirty days) of satisfactory execution of the order. For unsatisfactory performance and/or contractual failure, the security money shall be forfeited.

06. Delivery Schedule:-

Within 08 (Eight) months from the date of this Supply Order. No materials should be supplied beyond the specified delivery period unless amendment for extension of delivery period is obtained from the purchaser i.e. NCL. Date of receipt of stores at consignee's premises will be taken as date of delivery.

07. PAYMENT TERMS:-

100% payment will be made by the Paying Authority of the Concerned Consignee within 21 days from the date of receipt and acceptance of materials or bills complete in all respect, whichever is later. Payment shall be made by "Electronic Fund Transfer" or e-payment. You are therefore requested to indicate EFT No. and other relevant details in your bill(s).

08. CONSIGNEE:-

- (a) The Depot Officer, Regional Store, Amlhori Project, Northern Coalfields Limited, P.O.: Amlhori Colliery, Distt.: Singrauli (M.P.)-486 887:- For Item Sl. No.:- 1- 3 Sets, 2 & 3 only.
- (b) The Depot Officer, Regional Store, Khadia Project, Northern Coalfields Limited, P.O.: Khadia Colliery, Distt.: Sonebhadra (U.P.)-231 222:- For Item Sl. No.:- 1 – 2Sets, 4 and 5 only.
- (c) The Depot Officer, Regional Store, Kakri Project, Northern Coalfields Limited, P.O.: Bina Colliery, Distt.: Sonebhadra (U.P.)-231 220:- For Item Sl. No.:- 6 only.

09. PAYING AUTHORITY:-

- (a) The Area Finance Manager, Amlhori Project, Northern Coalfields Limited, P.O.: Amlhori Colliery, Distt.: Singrauli (M.P.)-486 887.- For Item Sl. No.:- 1- 3 Sets, 2 & 3 only.
- (b) The Area Finance Manager, Khadia Project, Northern Coalfields Limited, P.O.: Khadia Colliery, Distt.: Sonebhadra (U.P.)-231 222 - For Item Sl. No.:- 1 – 2Sets, 4 and 5 only.
- (c) The Area Finance Manager, Kakri Project, Northern Coalfields Limited, P.O.: Bina Colliery, Distt.: Sonebhadra (U.P.)-231 220 - For Item Sl. No.:- 6 only.

10. Your Banker's Name, Address and A/c No.:-

- a. Bank Name – HDFC Bank Limited
- b. Branch Name – Bhandarkar Road Branch
- c. Branch Place – Pune.
- d. Account Type-Current.
- e. Account No. – 00070310004038.
- f. IFSC Code /RTGS Code – HDFC0000007.

11. SUBMISSION OF BILLS:-

A. Following documents may be submitted to the Consignee:

- i) Consignment Note.
- ii) Delivery Challan in original.
- iii) One copy of the bill.
- iv) Warranty/Guarantee Certificate/Inspection Report wherever required.
- v) Manufacturers test certificate/Price Fall Clause Certificate.
- vi) Any other documents specified in the Supply order.

B. Following documents should be submitted to the Paying Authority:

- i) 100% bill in triplicate duly pre-receipted and stamped along with ED evidence.
- ii) Excise duty documentary evidence, wherever mentioned
- iii) Copy of the consignment Note Warranty/Guarantee Certificate/Copy of the Inspection Note wherever required.
- iv) Price Fall Clause Certificate.
- v) Any other documents specified in the Supply order.

12. INSPECTION:-Materials under supply shall be of the best quality and workmanship and shall be in accordance with the specification laid down in the supply order. Final inspection of materials will be carried out at the consignee's end by authorized representative of GM (E&M.), NCL.

13. PACKING:-

Packing of all the materials shall conform to the requirements of the Carriers

Stores should be properly packed and you will be held responsible for the stores not being sufficiently and properly packed for transport by road so as to ensure that they are free from loss or injury on arrival at their destination. The packing of the stores will be done at your expenses.

14. **MODE OF DESPATCH:-**By Road Transport: Full truck load consignments are to be despatched on Door Delivery basis. All consignment should be booked to consignee and not to selves.
15. **GUARANTEE/WARRANTY:-**You shall give a warranty for satisfactory performance of the supplied materials for a period of 12 months from the date of installation & commissioning or 18 months from the date of receipt and acceptance at consignee's end whichever is earlier.

You will be responsible for any defect that may develop under the conditions provided for by the contract and under proper use, arising from faulty materials, design or workmanship and shall remedy such defect at your own cost when called upon to do so. If it becomes necessary for you to replace or renew any defective part, such replacement or renewal shall be made by you 100% free of cost without any extra cost to Northern Coalfields Limited. The new goods should be supplied on FOR destination basis free of cost.

Warranty replacement should be completed within a reasonable period maximum within one month from the date of claim free of cost up to ultimate Consignee's end. All cases of warranty replacements will be decided on the basis of joint inspection of the failed goods held between the user's representative and the manufacturer's representative.

16. **PERFORMANCE BANK GUARANTEE:-** You shall have to submit performance guarantee for Rs. 28,44,048.00 (Rs. Twenty Eight Lakh Forty Four Thousand Forty Eight Only) to cover both satisfactory performance and warranty. The performance guarantee will be taken in the form of a Bank Guarantee in the prescribed Format of Performance Bank Guarantee. i.e. Annexure-K of NIT, valid for 21 months from the date of receipt and acceptance of the equipment/materials at site and the same shall be either released, if no claim is pending or extended thereafter, as deemed fit.

Security money/deposit may be converted in to performance guarantee. In case, Security Money has been submitted in the form of Bank Guarantee, the same may be converted in to performance bank guarantee (PBG) provided the validity is 21 months from the date of receipt and acceptance of materials at site.

17. **IDENTIFICATION MARKS/SYMBOL:-** The word "NCL" along with Manufacturer's distinctive identification mark / symbol as also the part no. must be clearly embossed / punched / engraved on each and every item, as far as practicable, at a visible place, which is not subjected to normal wear and tear, for convenience of identification any time. Apart from this a tag may be attached to each part / item giving identification mark, part no. description. However, for high precision items where embossing / engraving /punching is not possible shall be packed separately & packing cover / box / case shall be tagged with the Identical Mark or Identification Mark be put by Metal Marker.

18. PRICE FALL CLAUSE:- The price charged for the stores supplied against this Supply Order shall in no event exceed the lowest price at which you sell or offer to sell the stores of identical description to any other party during the said period.

If you at any time during the period of execution of supply against this contract reduce the sale price, sell or offer to sell such stores to any other organization at a price lower than the price chargeable under the contract, you shall forthwith notify such reduction of sale prices to NCL and the price payable under this contract for the stores supplied after the date of coming in force of such reduction in sale price, shall stand correspondingly reduced.

19. DELAYED DELIVERY AND LIQUIDATED DAMAGE:-

In the event of failure to deliver the stores within the stipulated date/period in accordance with the specifications mentioned in the supply order and in the event of breach of any of the terms and conditions mentioned in the supply order, NCL shall have the right:-

a) To recover from you, as agreed liquidated damages a sum not less than 0.5% (half percent) of the price of any store which you have not been able to supply as aforesaid for each week or part of a week during which the delivery of such stores may be in arrears limited to 10% (ten percent). Where felt necessary, the limit of 10% can be increased to 15% at the discretion of Head of Material Management Division of NCL

b) To purchase elsewhere after due notice to you on your account and risk, the stores not supplied or others of a similar description without cancelling the supply order in respect of consignment not yet due for supply. OR

c) To cancel the supply order or a portion thereof and if so desired to purchase the stores at your and risk and cost and also -

d) To extend the period of delivery with or without penalty as may be considered fit and proper. The penalty, if imposed shall not be more than the agreed liquidated damages referred to in clause (a) above.

e) To forfeit the security deposit fully or partly

f) Whenever, under this contract, a sum of money is recoverable from and payable by you, NCL shall be entitled to recover such sum by appropriating in part or in whole by deducting any sum or which at any time thereafter may become due to you in this or any contract should this sum be not sufficient to cover the full amount recoverable, you shall pay NCL on demand the remaining balance. You shall not be entitled to any gain on any such purchase.

20. RISK PURCHASE:- In the event of your failure to deliver the stores within the stipulated date/period of the supply order, or in the event of breach of any of the terms and conditions mentioned in the supply order, NCL has the right to purchase stores from elsewhere after due notice to you at your risk and cost. In the event of your failure as detailed above, the cost as per risk purchase exercise may be recovered from your bills against any supplies pending in NCL and also in any other Subsidiary companies/Coal India Ltd.

21. LOWEST PRICE CERTIFICATE:- You shall furnish the following certificate to the consignee/paying authority along with the bill:-

“We certify that the prices charged by us against this supply order are the lowest and are same as applicable to other Government Departments/Undertakings/Other Organizations and are not higher than rates quoted/prices charged by us for the same/similar items to other Customers”.

22. MANUFACTURER’S TEST CERTIFICATE:- Manufacturer’s Test Cum Inspection Certificate must be enclosed along with supplies.

23. JURISDICTION OF COURT:- Any dispute arising out of or in respect of the contract will be subject to the jurisdiction of Singrauli Court only.

Apart from the above terms and conditions, the supplies will also be governed by the "General Terms & Conditions of Supplies of Stores" issued along with our "Invitation to Tender" and provisions of CIL Purchase Manual unless otherwise stipulated in this supply order.

The Contract is concluded with this acceptance. We enclose 2 copies of the Purchase Order, one of which should be returned to us duly stamped and signed by you as a token of acknowledgement and acceptance of this contract. In case no order acceptance is received within 15 days, it will be presumed that you have accepted the order.

Encl:-Annexure I: Technical Specification.
Annexure II: Integrity Pact.

Yours faithfully,
(For and on behalf of NCL)

(A.K. Giri)
Asst. Manager (Excv/MM.)

(M. A. Siddiqui)
Chief Manager (MM)

Copy to:-

The Chief Vigilance Officer, NCL, Singrauli
The Director (Tech.)/Oprn, NCL, Singrauli.
The Depot Officer, Regional Stores, Amlhori, Khadia and Kakri Project.
The Area Finance Manager, Amlhori, Khadia and Kakri Project.
The General Manager/SO(E&M): Amlhori, Khadia and Kakri Project
The General Manager (E&M)/ General Manager (Fin.), NCL, Singrauli.
The General Manager (Stores), NCL, HQ, Singrauli
The General Manager (MM), CCL/BCCL/ECL/SECL/WCL/MCL/CMPDIL.

Sri Sewa Ram, IAS (Retd.), 660, Sector – 26, Panchkula, Haryana – 134116.
Sri J.K. Khanna, IPS (Retd.), A-102, Sector - 55, Noida -201307.

This supply order is issued against the indents for procurement of Pump Sets for the following projects having BC No. NCL/HQ/C&B/Capital/ Other P&M E&M/2016-17/05 dated 30.09.2016 and FC No. NCL/HQ/FC/2016-17/Capital/ Other P&M E&M/04 dated 30.09.2016 for Rs.2,84,40,479.47 (Rupees Two Crore Eighty Four Lakh Forty Thousand Four Hundred Seventy Nine and Paise Fourty Seven Only). The purchase proposal has been concurred by Dir.(Fin), NCL and approved by CMD, NCL

Sl.No.	Projects	Indent No. and date	Sanction No. and date	Item description	
				Discharge (Cum/Hr.)	Head (Mtr)
1	Amlhori	Nil dated 06.11.2013	NCL/SGR/E&M/Sanction/2014/2523 dated 25.01.2014	1100	150
2	Amlhori	97 dated 30.11.2012	NCL/SGR/E&M/Sanction/2013/1534 dated 13.09.2013	540	200
3	Amlhori	Nil dated 01.12.2012	NCL/SGR/E&M/Sanction/2013/1231 dated 29.07.2013/06.08.2013	250	100
4	Khaida	Nil dated 12.01.2013	NCL/SGR/E&M/Sanction/2014/3078 dated 07.04.2014	1100	150
5	Khadia	Nil dated 12.01.2013	NCL/SGR/E&M/Sanction/2014/3078 dated 07.04.2014	1100	100
6	Khadia	Nil dated 12.01.2013	NCL/SGR/E&M/Sanction/2014/3078 dated 07.04.2014	40	30
7	Kakri	I-31 dated 09.01.2015	NCL/SGR/E&M/Sanction/2015/735 dated 14.09.2015	1100	200

Asst. Manager (Excv/MM.)
Singrauli

Chief Manager (MM)
Singrauli

Technical Specifications for Pump-Motor Sets

The detailed technical specifications are as under:-

- 1. Scope of Supply** : Pump-Motor Set complete with suitable electricals having discharge, head, motor rating and starter as mentioned above complete with all accessories. The requirement covers design, manufacture, supply and other requirements of split casing centrifugal pumps complete with suitable motor, starter, common bed frame and accessories to be used in Open cast Coal Mines for dewatering of mines, wholly or largely indigenous equipment complying with the requirements and standards of this specification.
- 2. Service Conditions**: The equipment covered by this specification shall be compact and of robust construction to withstand rough usage in mines. The equipment shall be capable of performing satisfactorily in heavy dust laden atmosphere, ambient temperature of 50 degree C, specific gravity up to 1.05 besides other conditions prevalent in Opencast Mines. The metallurgy of parts of the pumps shall be so chosen so as to withstand and deal with mine water having PH value 5-7.5 or as specified under particular requirement of tender and highly concentrated gritty mine water containing large particles (of 25 mm. size or so) of Coal & OB (Over Burden) and other service/operating condition normally encountered in large Opencast Mine, using draglines. The overall design of the pump shall be such that it can be easily dismantled and shifted from one place to another.
- 3. Workmanship**: The pumping set shall be of proven and reliable design and of best workmanship. All the parts of pumps shall be manufactured to close tolerances to standard manufacturing practice so as to ensure complete interchangeability of parts. All the parts & sub-assemblies of pumping set shall conform to their relevant Indian Standards (BIS) unless otherwise specified.
- 4. Construction and Equipment Requirements** : The pump shall be built as horizontally split with horizontal suction & delivery, depending on its design & capacity. Normally, material specification of the main parts of the pump shall be as under:
 - i) Casing: Close grained high tensile cast iron. ISS 210F.G.250 and above.
 - ii) Shaft: High tensile steel/C-40
 - iii) Bearings: Grease lubricated heavy duty antifriction
 - iv) Impellers: Phosphorous Bronze to IS:28
 - v) Stiffing box : Phosphorous Bronze to IS:28
 - vi) Lantern & Neck Rings : Phosphorous Bronze to IS:28
 - vii) Shaft sleeve & nuts : Phosphorous Bronze to IS:28.

It shall be sole responsibility of the manufacturer to ascertain suitability & compatibility of pump parts for the duty & service/operating conditions of the pumps. The pump shall be fitted with bearings of suitable design and shall be adequately rated to withstand the service requirements and heavy thrust loads. Bearings shall have provision for proper lubrication without external cooling. The oil level indicators, drain plugs and oil splasher rings shall be provided with bush type bearings. Suitable oil gauges shall be provided at driving & non driving end in case of Bush bearings. The motor shall be directly coupled to pump through a well designed PIN-type coupling. The motor & pump set along with coupling shall be supplied duly mounted on a common bed frame. Bed frame shall be heavy duty type, adequate strength and size matched to take the load of the pump coupled with the motor and withstand normal vibration and mis-alignment encountered in operation in opencast mines, where concrete/pucca foundations are normally not practical. Minimum size of main frame members shall be ISMB 150.

5. Duty requirement:

The pump set shall be designed to fulfill the duty parameters as given in the Technical parameters below:

- a) Total Suction Lift : Shall be 6M (20 ft. of WC) at an altitude of 300 M above sea level.
- b) Efficiency of the pump: The pump should have guaranteed efficiency as per the IS:5120 Class-I. However, for economic operation of the pump set, efficiency shall be minimum 70% for the normal operating range.
- c) Speed of the pump: 1480 rpm (Full load speed)
- d) The pump shall normally operate for 15 to 17 hrs. per day but shall be designed for 24 hours continuous operation.
- e) The pump shall not get damaged in case it is started on partially primed condition. Measures incorporated in the pump to avoid damage to the pump under such condition shall be spelt out specifically by the tenderer.
- f) The individual components of the rotating parts of the pump and therefore the rotating assembly shall be dynamically balanced and a certificate to this effect shall be furnished along with the supplies.
- g) Model wise rating of the pump sets shall be as below:-

Sl. No.	Item Description	Pump Model	Discharge (in Cu. M./hr.)	Head (in m)	Motor Rating (in KW)	Efficiency (in %)
1	Pump Motor Set complete with 6.6 KV electricals, SD starter & all other accessories	SCT 250/68	1100	150	800	78
2	Pump Motor Set complete with 6.6 KV electricals, DOL starter & all other accessories	SCT 300/59/1	1100	100	500	83

3	Pump Motor Set complete with 6.6 KV electricals, DOL starter & all other accessories	SCT 200/58-2	540	200	500	76
4	Pump Motor Set complete with 6.6 KV electricals, SD starter & all other accessories	SCT 300/77/1	1100	200	1000	73
5	Pump Motor Set complete with 415 V electricals, DOL starter & all other accessories	UP 150/56/1	250	100	125	72
6	Pump Motor Set complete with 415 V electricals, DOL starter & all other accessories	DSM 65/20/2	40	30	11	70

6. **ELECTRICALS (Motor)** : The drive shall be from a continuously rated, foot mounted, TEFC Squirrel cage induction motor of rating as detailed above for operation with AC, 3 phase, 50 C/S, as per supply system with restricted earthed neutral.

The motor shall conform to IS:325 (latest) and other relevant IS specifications and shall be bi-directional. The motor shall have non FLP Cable boxes suitable for outdoor use and shall be suitable for 360° rotation. Motor shall be of continuous duty type, class of protection IP-55, Enclosure-TEFC, Thermistor/space heaters to be provided, class of insulation F with temperature rise up to class B. Motor terminal should be suitable for outdoor use and should have sufficient clearance from ground/foot level to allow cable entry without digging the floor.

7) **TECHNICAL SPECIFICATION OF STARTER** :

HT Starter: Suitable for outdoor use in mines with skid base for starting and operation of pumps. The electrical shall be suitably designed to meet voltage variation of -2% to +10% and frequency drop as low as 47Hz. The electricals shall also be subjected to frequent starts and stops due to power shedding and as such equipment shall be designed to withstand these conditions. Overall dimensions of the starter shall be as compact as possible & starter shall be of robust construction. All the Electricals shall conform to relevant BIS specification. The electricals shall also meet the requirement as laid down in the coal mines regulation, Indian Electricity Rules, as amended up date.

Vendor list for relay is limited to Areva T&D, ABB, E.R., JVS only and shall be solid state type.

Additional Accessories:

- i) Foot Valve (Cast Iron) : One
- ii) Non Return Valve (Cast Steel) : One
- iii) Sluice Valve (Cast Steel) : One

8. TECHNICAL SPECIFICATION OF STAR DELTA/DOL STARTER PANEL :

The requirement covers the technical details, operating requirements, constructional details and provides some guide lines for star delta /DOL starter panel for starting and operation of pumps for out door application in open cast coal mines.

STANDARDS TO BE FOLLOWED: The components involved in the making of the Star Delta/DOL panel shall conform to the relevant Indian Standard specification. In case of items not covered by B.I.S. specification it shall conform to International Standards. Some of the BIS standards are given below for reference:– IS-3427, IS-375, IS-3202, IS-3618, IS-2148, IS-3347, IS-7404, IS-2705, IS-1271, IS-2099, IS-2147, IS-4710, IS-3156, IS-2516, IS-3231, IS-3072, IS-2419 etc.

The design and operational features of the equipment offered shall comply with the provisions of the latest version of the following acts and statutory regulations: a) Indian Electricity Act 1910, b) Indian Electricity Rules 1956, c) Fire Insurance Regulations.

The manufacturer shall make suitable provisions in the equipment wherever necessary to comply with the above mentioned acts/rules/regulation. Wherever service conditions etc. mentioned here-in differ from those in Indian/International Standard specification, the conditions specified herein shall prevail.

9) OPERATING REQUIREMENTS:- The ambient conditions under which the SD/DOL panel shall be required to perform are given below:

- a) Maximum Ambient Temperature : Up to 50 degree C.
- b) Relative Humidity: Up to 98%
- c) Heavy Coal Dust laden atmosphere.
- d) Vibration/shocks due to heavy blasting in open cast mines.
- e) Heavy lightning prone area.

10) DESIGN FEATURES AND CONSTRUCTIONAL DETAILS:-

CUBICLES: Each unit shall be housed in a sheet steel cubicle having the bus bars, CT's main & control cable terminations, transformer, contactors, protection and indication equipment etc. disposition of salient components in the cubicle are indicated below: a)

Isolators Top (Front) b) Relays & Indication Top (Front) c) Cable entries Top (Left & Right) d) Bus-Bar Top e) Contactors – Top f) CT & PT – Top Above dispositions are preferred ones. The cubicle shall be made of 3 mm. sheet-steel with SKID BASE and lifting hooks. It shall be weather, dust and vermin proof. A lockable lift off type front door shall close the cubicle from front. A similar door in upper front compartment shall carry the control switches, test switches, indicating instruments and relays. All the indications and buttons shall be visible/approachable from the front with the cubicle door shut. A mechanical emergency trip shall be available for operating through the cubicle door. An interlock shall be provided to prevent inadvertent closing of the starter when isolator is in earthed position.

11) MAIN COMPONENTS:

Bus-Bars: The bus-bars shall be made of good quality electrical grade copper & shall have epoxy coating. The rating of bus-bars shall be 400 A (minimum).

TRIPLE POLE, OFF LOAD ISOLATORS: Suitable rated (not less than 400 A), mechanically interlocked with front cover so that front cover cannot be opened when the isolator is ON & vice versa. The isolator shall be electrically interlocked with the contactors to avoid ON LOAD breaking-one Number.

POTENTIAL TRANSFORMERS: The P.T. shall be of core type resin cast having secondary voltage-110V. Class of accuracy P. The P.T. shall be efficiently bonded to the earth. The HV windings of the P.T. shall have easily replaceable HRC fuses.

CURRENT TRANSFORMERS: Suitably rated epoxy cast CT's of two cores each – one for metering and the other for protection. Class of accuracy 1 & 5 P10 respectively. Secondary amps. 5 A – 3 No.

VACUUM CONTACTORS: Three triple pole vacuum contactors suitably rated for continuous operation as per AC-3 duty. The contactors shall have inherent under voltage release.

HRC FUSES: Three nos. of suitably rated HRC fuses for back up short circuit protection.

12) PROTECTIVE DEVICES IN STARTER:

i) **EARTH LEAKAGE RELAY:** Solid state (static) earth leakage relay with epoxy cast suitable ratio core balance transformer for operation within 50-800 MA, complete with test/re-set buttons & trip indications – one set.

ii) **Overload protection and short circuit protection** Solid state relays range: a) 50 to 200% for over load. b) 400 to 1600% continuously adjustable for short circuit protection. All the relays shall be solid state type and self powered.

iii) **SINGLE PHASE PREVENTOR** – For protection of motor against single phasing.

iv) AMMETER & VOLTMETER To match the secondary of CT's & P.T. with three phase selector switches, Ammeter shall have a RED mark on full load level.

13) MISCELLANEOUS:

- a) ON/OFF/Trip indication lamps in different colours.
- b) Timers for starting with reduced voltage.
- c) Thermostat controlled space heaters & toggle switches.
- d) Lamps fitted with holder for 110 V to lighten inside the panel.
- e) Cable entry boxes for incoming, outgoing cables and through going with cable glands.
- f) Bus-Bars, earthing & wiring etc. as required.
- g) Start/stop and Test buttons.

(A.K. Giri)
Asst. Manager (Excv/MM.)

(M. A. Siddiqui)
Chief Manager (MM)