

URANIUM CORPORATION OF INDIA LIMITED
P.O. JADUGUDA MINES, JHARKHAND – 832102, INDIA

TENDER DOCUMENT – INDEX SHEET

REF : TENDER NO. PUR / 2 / 96 / 9676 / 576

ITEM : ROTARY DRYER

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URANIUM CORPORATION OF INDIA LIMITED
P.O. JADUGUDA MINES, JHARKHAND – 832102

TENDER OPENING SCHEDULE

REF: TENDER NO	PUR / 2 / 96 / 9676 / 576
ITEM	ROTARY DRYER
SUBMISSION OF TENDER	ON OR BEFORE 22.05.2013 BY 12.30 P.M
TENDER OPENING ON	22.05.2013
AT	3.00 PM
VENUE	PURCHASE DEPARTMENT, UCIL, JADUGUDA

SPECIFIC TERMS & CONDITIONS FOR SUBMITTING THE OFFER (Annexure-1)

- A. Description & Technical Specification as per Annexure-2A
 - B. Scope of work: - Design, supply, install and commission the rotary Kiln complete with all electrical, instrumentation, cabling, control panel, mechanical drives, structure work etc. required for the Rotary Kiln & accessories but excluding the room for housing control, panel & civil foundation. Foundation drawing of Civil structure required for erection of the dryer shall be submitted in the offer. Apart from the enclosed specification party shall also supply any other materials not mentioned in the proforma but required for smooth and safe operation of the Rotary Dryer.
 - C. Special Instruction:- **Drawing No. UCIL/TMD/PEROXIDE/FEED HOPPER/A, UCIL/TMD/PEROXIDE /COOLING FAN/B; UCIL/ TMD/PEROXIDE /C, UCIL/TMD/PEROXIDE/D, UCIL/TMD/PEROXIDE/E, UCIL/TMD/PEROXIDE/F** are enclosed for guidance only. You may inspect the site and then submit your offer along with drawings.
- 1) Style of Quotation : TWO PART SINGLE STAGE SYSTEM
 - a) The tender will be on two part system. Part-I consisting of techno-commercial part (except price) & Part-II consisting of price only as per enclosed format Annexure-6 (6A, 6B & 6C). After evaluation of the Techno commercial offers, the price part of the suitable parties will be opened.
 - b) Quotations are to be submitted in 'DUPLICATE' and to be typewritten or printed on vendor's letterhead. Any correction or over writing should be authenticated.
 - 2) Part-I, Techno Commercial Bid (Unpriced)
It shall contain
 - a) Technical details in all respect including GA drawings.
 - b) Dead weight of the Rotary Dryer unit, including mechanical, electrical & structural items.
 - c) Duly filled up proposal exhibit sheet as per Annexure – 2B, Annexure – 2C.
 - d) List of Insurance spares for Instrumentation scheme –Annexure – 2E.
 - e) Details of past supply of Rotary Kiln/ Dryer with Instrumentation and electricals, in last 5 years each of single value of minimum **Rs. 15,00,000/= (Rupees fifteen lakhs)** or a minimum two such jobs each of at least **Rs. 50,00,000/=** in the format Annexure – 7.
 - f) Drawing, Catalogue of all quoted items.
 - g) List of deviations from NIT (for Scope of Supply, Services, vendor list and Technical Specifications mentioned in the tender) are to be submitted items wise, as per Annexure – 9. In case there is no deviation from the tender than also it has to be specified in the Part-1 of the offer. Anything not specified in the offer or deviation will be considered to be as per NIT.
 - h) Earnest Money Deposit.
 - i) Commercial terms & conditions of sale
 - j) Blank (unpriced) price bid proforma. Price should be quoted as per our price format only (copy of your price part without price).
 - k) All documents in support of your credentials (see clause "CREDENTIALS" below).
 - 3) Part-II, Price Bid: This part shall contain "Price" as per enclosed price format 6 (6A, 6B, 6C) only.
 - 4) Mode of submission of tender
 - a) Both parts of the offer should be sealed and superscribed with tender reference no., due date, Part No. i.e. Part-I for techno-commercial bid and Part-II for price bid and bidder's name & address.
 - b) Personal delivery is recommended. Tenderers forwarding tender by mail shall do so at their own risk. Tender received after the due date & hour may not be entertained. All envelopes duly sealed should be addressed to the Dy. General Manager (Purchase), Uranium Corporation of India Ltd., P.O. Jaduguda Mines, East

Singhbhum, Jharkhand –832 102. Incomplete offers are likely to be rejected / ignored.

- c) Offer shall NOT be sent by E-mail or Fax.
- 5) DELIVERY SCHEDULE: Within 120 days from the placement of order, however party shall mention their earliest accepted delivery schedule.
- 6) PRICE: Your quotation should clearly indicate basic price, excise duty, concessional rate of sales tax, service tax, work contract tax, packing, freight, insurance if any separately as per the price format.
- 7) PRICE TERMS: Free delivery at Turamdih Stores on duly insured, unloaded at site basis.
- 8) FIRM PRICE: The price should be firm till execution of entire order quantity or one year from the date of purchase order.
- 9) PAYMENT TERMS:
- 80% of Design, Manufacturing, supply value less mobilisation advance with 100% of taxes and duties, freight and insurance will be paid within 30 days from the date of receipt & acceptance of material at our Stores, as per mutually agreed billing schedule.
 - 10% will be paid along with erection, testing & commissioning charges within 30 days of successful commissioning of the complete system, at our site by your Engineers. Erection & commissioning will be done within 90 days from the date of receipt & acceptance of material at our stores. If UCIL fails to install the equipment within 90 days of acceptance of material for any reason, the balance 10% shall be paid within 30 days after due period of erection and commissioning.
 - Balance 10% of the supply value will be released within 30 days of taking over from the bidder after submission of BG of equivalent value in the proforma as in Annexure –5, valid till defect liability period.
- 10) VALIDITY: The offer should remain valid for 180 days from the date of opening of the tender.
- 11) EARNEST MONEY DEPOSIT: As per our “Instructions to tenderer and general conditions of contract” (enclosed). The E.M.D amount shall be Rs. 4,00,000/- (Rupees four lakhs only).
- 12) SECURITY DEPOSIT: The successful bidder shall furnish a security deposit to the extent of 5% of the total value of the order within 15 days after the order is awarded. Such a deposit will be held by the Corporation until successful completion of the order/contract, and will bear no interest. It will be forfeited in the event of breach of contract. Security deposit may be in the form of a bank guarantee issued by/ counter guaranteed by an Indian nationalised bank in favour of URANIUM CORPORATION OF INDIA LTD.
- 13) BANK GUARANTEE (B.G)
- Bank guarantee should be as per our proforma & issued by an Indian nationalised bank.
 - They shall be valid for periods as under:
 - For Security : Till satisfactory completion of order.
 - For Warranty : Till end of warranty period.
 - Bank guarantee shall provide for claim period of 6 months after the expiry date.
 - If the bank guarantee is furnished with validity period less than as stipulated above or in the likelihood of the order not being executed within the stipulated delivery schedule, it will be your responsibility to arrange for extension of the

validity of BGs as necessary and furnish the same well in advance of the expiry of the bank guarantee failing which we will be at liberty to invoke the bank guarantee.

14) **CREDENTIALS & QUALIFICATION CRITERIA :**

- a) The Tenderer should have designed, supplied, erected and successfully commissioned at least 3 such type of systems after May 2008, comprising of Electrically heated Rotary Dryer/ Kiln system with Control and Instrumentation of capacity not less than 30 Kg/h, feed hopper, spiral feeder, cooling system, packing arrangement, etc., with dust leak proof system.
- b) Tenderer shall have successfully executed at least three such jobs, costing not less than **Rs. 15,00,000/= (Rupees Fifteen Lakhs)** each, or a minimum two such jobs each of at least **Rs. 50,00,000/= (Rupees Fifty Lakhs)** in the last five years.
- c) The average annual turnover during the last three financial years shall not be less than **Rs 60, 00,000/= (Rupees Sixty Lakhs)**.
- d) The Tenderer shall have positive net worth. The Tenderer shall have made profit before prior period adjustment for at least two out of last three financial years (2009-10, 2010-11, and 2011-12).

15) **AGREED LIQUIDATED DAMAGE:** Time shall be the essence of the contract. If successful tenderer fails to execute the order within the agreed delivery schedule, he shall be liable to pay as “agreed liquidated damages” a sum @ ½% of the contract value per week or part thereof of delay subject to a maximum of 5%.

16) **DEFECT LIABILITY PERIOD:** The equipment shall be warranted against defects in material, workmanship and performance for a period of 12 months from the date of taking over or 18 months from the date of supply whichever is later. In case of defects if any, the defects shall be rectified by repair or replacement of parts, free of cost on “free at our site” basis. This should be backed up by a bank guarantee for **10%** of the order value valid for the warranty period as per our proforma enclosed (Annexure-5). This shall be sent directly to us well in advance before claiming the last **10%** of the supply value.

17) **PURCHASE PREFERENCE:** Purchase preference to PSU's will be applicable as per Govt. guidelines in vogue.

18) **RISK PURCHASE:** In the event of order not being executed satisfactorily, we reserve the right to purchase material from alternative sources at your risk and cost.

19) **CANCELLATION OF ORDER:** It will be your endeavour to execute the purchase order to our satisfaction. In case of your failure to do so, the order is liable to be cancelled.

20) **ERECTION & COMMISSIONING:** The equipment along with spares after receipt and acceptance shall be erected and commissioned as per the agreed scheduled, by your service engineers upon written information from us. Guest House accommodation to one Engineer may be provided on chargeable basis subject to availability. Water and electricity at a single point will be provided free of cost.

21) **PERFORMANCE DEMONSTRATION AND TAKING OVER:**

The entire system shall be operated continuously for a period of three days successfully at the rated capacity and NIT conditions. The system will be deemed to have been taken over after successful performance demonstration.

22) **MOBILISATION ADVANCE:**

10% (ten percent) or floating whichever is higher, Interest bearing Mobilisation advance equivalent to **10%** of supply items value may be payable to the successful bidder against submission of bank guarantee of equivalent value in the enclosed format after the award of contract/LOI. The above bank guarantee shall be valid for one year. The mobilisation advance will be adjusted against payment of each supply value (please see clause no. 9 of annexure-1).

- 23) **TEST REPORT:** Manufacturers Test certificate should be furnished along with supply for raw material used such as stainless steel, gear/ sprockets, pumps, motors, gearbox, cables, electrical, instruments, etc.
- 24) **OPERATION AND MAINTENANCE MANUAL:** Five (5) sets each of operation and maintenance manuals with all relevant drawings, spare part list, part no., MOC, etc. of complete system including bought out items must be handed over before performance demonstration. The manual shall contain Trouble shooting, interlock details, etc.
- 25) **PRICE VARIATION CLAUSE:** Price variation only on account of changes in the existing Govt. levies & taxes & new imposition of levies / taxes will be considered.
- 26) **ASSURED SPARES AVAILABILITY:** The bidder shall confirm in writing that all spares & components of the equipment offered shall be made available for a minimum period of 10 years from the date of supply of the machine.
- 27) Other terms & conditions as in “Instructions to Tenderer & General Conditions of Contract” (enclosed) shall also apply.

DESCRIPTION & TECHNICAL SPECIFICATIONS OF ROTARY DRYER

Scope: Design, supply, installation and commission the rotary Kiln complete with all electrical, instrumentation, cabling, control panel, mechanical drives, structure work etc. required for the Rotary Kiln & accessories but excluding the room for housing control panel & civil foundation.

Duty: To heat fine power of uranium peroxide to remove oxygen.

Operating Temperature: 350°C (325°C – Max. 375°C).

Residence time: in heating zone 30 minutes.

Feed material: Free flowing powder of uranium peroxide containing about 6-7 % moisture, 0.5 – 1.0 % chloride, Average particle size of powder is about 3-6 micron.

Feed rate: 80 – 90 kg/hr.

Electrically heated rotary Kiln: The rotary Kiln, tubular in construction, shall be made of sufficient thick metal taking into consideration corrosion allowance. The shell of Kiln shall be of sufficient thickness & quality to resist any corrosion and deformation due to sudden stoppage during operation.

- **The rotary Kiln shall be provided with cooling system with air to restrict the temperature of shell near bearing as well as mechanical seal. A minimum free space of one metre shall be provided in the main tube carrying the product at the discharge end after heating zone. This part shall be provided with external cooling fins and the system shall be connected with a cooling fan to supply cold air and necessary ducting to carry the hot air away from the system.**
- The Kiln shall have replaceable spiral suitably installed at the feed end for pushing forward the feed material.
- The Kiln shall have replaceable lifters/spirals all along its length for mixing & movement of material for uniform drying. The lifters shall be push fit type for easy replacement.
- The drive of Kiln shall be through replaceable split type sprocket mounted on shell of the kiln, duplex chain, gear box/motor with VFD, etc., or girth gear and pinion drive with VFD.
- The kiln shall be supported on suitable end bearings (preferably split type) and must be able to withstand the kiln skin temperature or on tyre and roller assembly.
- The kiln along with the drive shall be of suitably supported from the floor either by structural steel or concrete columns, provision for adjusting the inclination for easy discharge of material.
- The kiln shall have provisions/outlet manifolds for exhausting the moisture inside the kiln during operation at the discharge end.
- **An exhaust duct to be connected with the above outlet manifold with an exhaust fan. There shall be one running & one stand by fan in the mentioned system with suitable isolation valves for separation of the fans. The suction pressure of the fan shall be such that only moisture of the kiln chamber is carried out of the system and not the valuable product. The duct shall have a provision for measurement of suction pressure of the system.**

The Kiln drive shall have facility to regulate the rotation of dryer up to 20% higher & lower than the designed speed.

The Kiln shall be provided with mechanical or pneumatic hammer at the feed end, which shall hammer the shell from a single point 2 to 3 times at equal periodic interval in a rotation to dislodge the sticky material from inner wall of Kiln. The hammer shall be of replaceable type. Preference will be given for mechanical hammer & electrically operated. The kiln surface shall be given metallic protection where the hammer is supposed to hit the body to prevent damaging the outer wall of the kiln.

Insulation: The Kiln shall be well insulated from all the sides with replaceable compressed ceramic fibreboard / ceramic lining of sufficient thickness so that the skin temperature of outer most covering remains less than 40 °C.

Details of heater: The heating elements shall be installed on the bottom and two sides of the kiln, such that the rotary dryer is heated uniformly. It shall have facility of easy replacement of individual heating coil, preferably without disturbing/dismantling the rotary Kiln. The heater shall be provided with thyristor and PID controller of reputed make to regulate the heating according to set temp. The set temperature may be varied between 250 °C to 375°C hence heater shall be capable to meet this variation at the desired feed rate of 80 to 90 kg/hr.

The electrical heater shall preferably be split into 3 or 4 separate individual segment with independent supply & shall be installed equally spaced in the periphery of rotary Kiln for uniform heating. There shall be digital display of temperature & Voltage of each of this individual segment of heater.

The heating element shall be made of Ni-chrome wire of sufficient thickness reputed make & shall be properly supported on suitable tube of ceramic/silica/ any other suitable material.

Suitable facility to measure the inside temperature of rotary Kiln near the entrance & exit, with its digital display at the control panel, shall be provided. Temperature measurement with digital display shall also be provided at two points in each heating segments of heater between heating coil & outer shell of rotary Kiln.

The electrical heater shall be designed such that it shall be operated at maximum 90% load at the maximum temperature requirement of 375°C at desired feed rate of 80-90 kg/hr. The element temperature of heater shall preferably not exceed 500 °C under any condition. Hence heater trip interlock with measured temperature shall be provided for every individual heating segment. The rotary Kiln shall be provided with replaceable mechanical seal at the entrance and exit for leak proof movement of material.

Feed Hopper: Interchangeable feed hopper for the Rotary dryer with suitable discharge spiral feeder to feed the Rotary dryer at the rate of 80 – 90 Kg/h, drive sprocket, discharge chute, pneumatic knife-edge gate valve, mechanical hammer etc., to be supplied. The top of the hopper must have an opening of about 300mm dia. With hinged type flange and bolting arrangement. Both the feed and discharge ends must be tightly sealed without leaks. The feed hopper shall be made of SS 316 with duly buffing polishing done (to ensure food grade quality) as per the drawing enclosed. There shall be two mechanical hammers electrically operated type with each hopper fitted on the slanting walls for dislodging the sticky material inside the hopper walls. The hopper surface shall be given metallic protection where the hammer is supposed to hit the body to prevent damaging the outer wall of the hopper.

Suitable stiffening, lifting hooks, and side-supported brackets to take a total load of about 2 MT must be provided. The feed hopper must be mounted on an MS angle/channel supported frame. The feed hopper and the supporting frame must be as per our Drawings No. UCIL/TMD/PEROXIDE/FEED HOPPER/A which is for guidance only. Ten nos. of the Feed hopper unit are required. A suitable motor with VFD, gearbox shall drive the discharge feeder to match the Rotary dryer output.

Discharge Spiral: The hot material from Kiln shall be discharged into a closed screw conveyor for taking into drum. The trough of the screw conveyor shall have jacketed water-cooling arrangement to bring down the temperature of material at its discharge to 50 °C or below. A one way fully enclosed discharge chute of 250mm diameter to be provided for final packing into 200 litres capacity plastic lined MS drums. The drum will be placed on platform scale

Material of construction of both the feed and discharge screw feeder shall be of SS 316.

The gearbox, sprocket & chain for feed hopper, Kiln screw feeder and discharge screw feeder shall be preferably of the same size, ratio and make.

Trolley: Manually operated Hydraulic jack trolley (Hydraulic pallet truck) to take a load of about 1.5MT is required for movement of feed hopper. The trolley shall be of reputed make; dimensions of the trolley shall be given by the bidder along with catalogues/ leaflets. Dimensions of the trolley wheelbase must be suitable for weighing on a 1.5m x 1.5m platform scale.

Cooling tower: Either ends of the heat zone of the kiln have to be sufficiently cooled to enable trouble free operations of the kiln supporting bearings/ girth gears. The product being discharged from the kiln has to be cooled to less than 50 °C for packing into plastic lined drums. The discharge spiral has to be through a water-cooled jacket. A cooling tower of sufficient capacity along with two nos. each of hot water and cold water pumps with suitable capacity have to be provided, one each will be a standby. Suitable motors and electrical shall be in the scope of supply. The cooling tower shall preferably be made of FRP and shall be compact in design.

Screw feeders:

All the screw feeders shall have a **pipe diameter of 150 mm (minimum)** and the **pitch of the screw shall be 100 mm**. The drawings of the screw feeders must be submitted along with offer.
M.O.C: SS-316

ANNEXURE-2B**PROFORMA FOR PROPOSAL EXHIBIT SHEET****FOR ROTARY DRYER ESSENTIAL ITEMS**

SUBJECT	DESCRIPTION (UNIT)	ROTARY DRYER DETAILS	
		SPECIFIED	OFFERED
General Rotary kiln	Numbers provided Location / Service Make Weight: Kiln (Kg.): Mechanical items : Electrical items : Insulation : Others (specify) : Total Shell rpm – Design Shell rpm – Maximum Shell rpm – Minimum	One Uranium Peroxide Plant	
Duty condition	Capacity (Kg/h) Operating temperature Residence time in heating zone Feed material size Feed material inlet temperature Product outlet temperature Feed Material Bulk density Moisture content of feed Impurities of feed Product free oxygen content	80-90 250 °C –375 °C 30 minutes 3 – 6 microns Ambient Less than 50 °C Uranium peroxide ~1.5 MT/ Cu M 6 – 7 % 0.5 – 1.0% chloride Zero	
Screw Feeder at Kiln inlet	Capacity MOC Speed - rpm Spiral Plate thickness – mm Spiral length No of spirals OD of spiral Spiral pitch Loading efficiency Spiral inclination to horizontal End Sealing arrangement Type of bearings Coupling: Motor to G/B : Make : Service factor Drive Motor-Type & make -Class of protection -Rating (KW) / Voltage(V) -Insulation class -Speed (rpm) Gear box Type Reduction ratio	80 – 90 Kg/h SS 316 150mm 100mm Mechanical dust leak proof SKF/FAG, sealed, life time greased Tyre coupling Unique/Fenner TEFC, Sq. cage 1400 Radicon Worm & worm reducer	

	Lubrication Transmission G/B to feeder Chain & sprocket Make Sprocket MOC	Oil immersed Chain & sprocket Rol Kobo CS 1030 Gr. II, flame hardened to 300 BHN	
Kiln Shell	Design standard Shell MOC Shell plate thickness (mm) ± Shell diameter (mm) ± Type of construction No. of joints if any Test standard for the shell Tolerance in shell Straightness Trueness. Roundness Shell length – (mm) Total Heat zone length Feed end length Discharge end length Pneumatic/ mechanical hammer	SS 310 or any other suitable material. 500 Seamless 2 – 3 strikes / revolution	
Kiln Drive Motor	Motor type & make Class of protection Rating (Kw) / Voltage (V) Speed (rpm)	TEFC	
Kiln drive Gear box	Type of gears Make/ size Reduction ratio Lubrication Service Factor	Horizontal foot mounted, Worm & worm reducer Radicon Oil immersed	
Kiln drive Couplings	Coupling Motor to G/B : Make : Service factor Transmission G/B to feeder Chain & sprocket Make Sprocket MOC	Tyre Unique / Fenner Chain & sprocket Rol Kobo CS 1030, Gr. II, flame hardened to 300 BHN	
Kiln end support	Type	Bearing/ roller	
	Bearing - Type - Make - Lubrication	Taper Roller SKF Life time greased	
	Metallic tyre and roller - Tyres - Type - Make	Split, replaceable, bolted --Two nos. Replaceable liner type	

	<ul style="list-style-type: none">- Roller- No. of rollers- Rollers bearings- Lubrication- MOC of tyre and roller	Four SKF Life time greased	
Kiln Drive	Type	Girth gear/ sprocket	
	Girth gear <ul style="list-style-type: none">- Type- Make- Mounting details- No. of teeth- Pitch- Width- PCD- MOC- Material hardness- Lubrication- Girth gear guard	Spur Split, bolted Fully contained with leak proof lubrication collection box/ tray	
	Pinion <ul style="list-style-type: none">- Type- Make- Mounting details- No. of teeth- Pitch- Width- PCD- MOC- Material hardness- Lubrication- Pinion shaft MOC- Shaft dimensions L&↓- Bearing details	Spur Shaft mounted with key EN 8	
	Sprocket Drive & driven <ul style="list-style-type: none">- Type- Make- Mounting details- No. of teeth- Pitch- Width- PCD- MOC- Material hardness- Chain length- Lubrication	<u>Drive</u> Duplex Rol Kobo Split, Bolted CS 1030, Gr. II Flame Hardened to 300 BHN	<u>Driven</u> Duplex Rol Kobo Shaft & key CS 1030, Gr. II Flame Hardened to 300 BHN
Spiral/ Lifter	Spiral/lifter type MOC Height Thickness	Push fit SS 310 S 50 mm 5 mm	

Heating coil	Ni-Chrome Make Product temperature No of segments Max coil temperature Heating coil details <ul style="list-style-type: none"> - Full length - Turns/meter - Coil wire gauge - Coil diameter - End connection details - Power rating (Kw) Power supply	3 sides Midhani 250 °C – 375 °C 3 – 4 500 °C 440/3/50 AC	
Coil support	Tubing material <ul style="list-style-type: none"> - Length - Diameter - Thickness 	Sileminite/ quartz/ silica	
Heating segment	Support details <ul style="list-style-type: none"> - Type - MOC - Nos. 		
Lining	Type of lining for the Kiln Skin temperature of cover Liner thickness – mm Liner cover material details	Replaceable compressed ceramic fibreboard/ firebrick lining. < 40°C	
Air exhaust fan for kiln moisture	Centrifugal forced draft fan Make: Dustven Fans, Bangalore. Indvent Fans, Kolkata etc. Motor KW: Specify VVFD(if any): Specify	To exhaust moisture inside the kiln. To regulate the fan.	
End seals	Dust seal Make Details	Mechanical type on both the ends Enclose literature	
Shell Cooling	Outside the heating zone by cold air flow Air flow rate (m3/hr.) Skin temperature of shell after air cooling	Both ends To be furnished To safeguard the bearing and mechanical seal	
Air cooling fan for shell cooling	Centrifugal forced draft fan Make: Dustven Fans, Bangalore. Indvent Fans, Kolkata etc. Motor KW: Specify	To safeguard the bearing and mechanical seal	
Safety devices	Details (over load relay/Limit switches}		
Electricals	Cable <ul style="list-style-type: none"> - Make - Rating 	Fortgloster/CCI/NICCO 3,5,7.5,10.....HP	

	<ul style="list-style-type: none"> - Size - Conductor material MCC/control panel <ul style="list-style-type: none"> - Contractor - Fuse - Switch, O/L relay Cable for heater <ul style="list-style-type: none"> - Make - Rating - Size - Conductor material 	2.5,4,4,6.....Sq. mm Aluminium Siemens/L&T E.E. Siemens/ L&T	
Instrumentation	As per Annexure – 2E1	As per Annexure – 2E	
Additional	Whether the following items have been furnished <ul style="list-style-type: none"> - Leaflets & brochure - Dimensional G.A. drawings - Electric circuit diagram - P & I Diagram 		

ANNEXURE – 2C**PROFORMA FOR PROPOSAL EXHIBIT SHEET
FOR TAKE IN ITEMS**

SUBJECT	DESCRIPTION (UNIT)	ROTARY DRYER DETAILS	
		SPECIFIED	OFFERED
Feed hopper	MOC Capacity Discharge arrangement Feed inlet Dimensions Motor type & make Class of enclosure/protection Rating (Kw) / Voltage (V) Speed (rpm) VFD	SS 316 ~400 litres. Screw feeder ~300mm dia. Proposed drawing: UCIL/TMD/PEROXIDE/ FEED HOPPER/A	
Feed hopper G/B	Type of gears Make/ size Reduction ratio Lubrication Service Factor Motor to G/B Coupling : Make : Size Transmission G/B to screws Make MOC	Worm & worm reducer Radicon Oil immersed Tyre Unique / Fenner Chain & sprocket Rol Kobo CS 1030, Gr. II, flame hardened to 300 BHN	
Feed hopper stand on wheels	Dimensions MOC Max height with feed hopper Type of wheels Wheel size Wheel material Wheel assembly Bearing make & details	Proposed drawing: UCIL/TMD/PEROXIDE/ FEED HOPPER/A MS ~1.30 to 1.35 m Swivel castor, heavy duty 100 ↓, 50 mm width Phenolic fibre Replaceable type SKF;	
Hopper trolley	Manually operated hydraulic trolley Make MOC Maximum height along with feed hopper & stand Maximum load with material in hopper Trolley floor area Trolley height	1.5 MT capacity MS 1.6 m 1.5 MT 1 m x 1.5 m < 100 mm	
Discharge screw conveyor	Spiral screw feeder with jacketed shell for water cooling Product inlet temperature Product outlet temperature Cold Water quantity	To be furnished < 50 °C	

	Cold Water temp. Hot Water temperature MOC of shell and spiral Speed of spiral – rpm Spiral Plate thickness – mm Spiral length No of spirals OD of spiral Spiral pitch End Sealing arrangement Details of spirals bearings Coupling: Type : Make & size : Service factor Drive motor rating and make Gear box <ul style="list-style-type: none"> - Type of gears - Make/ size - Reduction ratio - Lubrication - Service Factor 	To be furnished 30 °C To be furnished SS 316 To be furnished 5 mm To be furnished To be furnished To be furnished To be furnished Mechanical seal SKF, Tyre Unique/ Fenner 415/3/50 AC Horizontal foot mounted, Worm & worm reducer Radicon Oil immersed	
Dust seal	Bellow type for product packing		
Cooling tower	Capacity Hot water temperature Cold water temperature Make up water requirement Floor area requirement	5 M ³ /h < 30 °C	
Hot & cold water pump	Capacity Type of pump Make & Model Head RPM Motor HP & RPM Coupling details	5 M ³ /h Centrifugal pump KSB	

Annexure – 2D**TECHNICAL SPECIFICATIONS – ELECTRICAL**

UCIL will provide 415V \pm 10%, 50 Hz power supply at a single point, where the Rotary Dryer will be installed. All other items required to manufacture, installation & commissioning the Dryer, will be within the bidders' scope.

The scope shall include manufacturing and supply of Control panel/ MCC for the entire Rotary dryer system including motors, all electrical both panel and field control. Over load protection, under voltage trip, single-phasing preventer and triple pole switch with back up fuse to be provided for each motor. Interlocking with field control shall be in the scope of the Tenderer.

Bidder may note that there will be only one Control Panel for Electrical & Instrumentation System. All Panel Mounted Instruments, Annunciator, Illuminated Push Buttons, Selector Switches and Interposing Relays for Interlocks have been included in scope of Instrumentation System.

The system shall consist of motors/heaters for feed hopper drive, feed screw drive, rotary kiln drive, discharge feeder drive, cooling tower drive, cold & hot water pump drives and heating system along with suitable starter/ control panel/ MCC's for each drive, etc. Supply of cables, cable tray, cable gland, earthing system and other supporting material for cable laying shall be in the scope of bidder. Cable laying will be in the scope of UCIL. Finishing and termination of cables for above drives shall be in the scope of the Tenderer.

The bidder shall give full description of the insulation and G.A. drawing of support/ installation of heater/ insulation/ kiln in their offer.

In addition to the above, provision for two feeder for heating system (one will be spare), two nos. 7.5 HP and six nos. 5 HP drives, shall be made in the MCC/ control panel for auxiliary site requirement. Altogether two MCCs and one control panel for heater shall be provided.

The following vender list to be followed: -

Motor	: Kirloskar/ Crompton
Contractor	: Siemens / L&T,
Fuse	: E.E.
Switch, O/L relay	: Siemens / L&T (independent mounting type)
Power Cable	: FORTGLOSTER / CCI / NICCO.

ELECTRIC MOTOR

- 1.00.00 **GENERAL.**
- 1.01.00 Motors shall be furnished in accordance with both this general specification and the driven equipment specification.
- 1.02.00 In case of any discrepancy, the driven equipment specification shall govern.
- 2.00.00 **STANDARDS**
- 2.01.00 All motors shall conform to the latest applicable IS and IEC Standards/Publications except when otherwise stated herein or in the driven equipment specification.
- 2.02.00 Major standards that shall be followed are IS-325 and IEC-34. Other applicable Indian Standards for any component part shall also be followed.
- 3.00.00 **SERVICE CONDITIONS:**
- 3.01.00 The motors will be installed in hot, humid and tropical atmosphere, highly polluted and corrosive.
- 3.02.00 Unless otherwise noted, electrical equipment/system design shall be based on the service conditions.
- 3.03.00 For motor installed outdoor and exposed to direct sun rays, the effect of solar heat shall be considered in the determination of the design ambient temperature.
- 4.00.00 **TYPE AND RATING**
- 4.01.00 A.C. Motors
- 4.01.01 Motors shall be general purpose, constant speed, squirrel cage, three phase, induction type.
- 4.01.02 All motors shall be rated for continuous duty. They shall also be suitable for long period of inactivity.
- 5.01.00 Painting
- Motor including fan shall be painted with corrosion proof paints.
- 6.00.00 **TESTS**
- 6.01.00 Upon completion, each motor shall be subject to standard routine tests as per IS. In addition, any special test called for in the driven equipment specification shall be performed.

CONTROL PANEL/ MCC

- 1.00.00 **CODES AND STANDARDS**
- 1.01.00 Major standards which shall be followed are IS: 13947 and IEC: 947. Other applicable standards for any component, if not covered in the listed standards, shall also be followed.
- 2.00.00 **SERVICE CONDITIONS**
- 2.01.00 The equipment shall be suitable for hot, humid, and tropical atmosphere, heavily polluted with dust and corrosive chemical fumes.
- 3.00.00 **DESIGN CRITERIA**

- 3.01.00 Bus bars of MCC shall be sized to carry continuously the total running load of the MCC (including customer's load, wherever applicable) plus a 20% margin.
- All bus bars shall be capable of withstanding the mechanical forces and thermal stresses due to maximum short circuit current. Designed for 50 KA rms/1 sec and 105KA peak fault withstand.
- 3.02.00 In-cubicle ratings of incomer and bus-section breakers/switches shall be identical to the associated bus bar rating.
- 3.03.00 Motors shall be contactor operated.
- 3.04.00 For continuous operation at specified ratings, the temperature rise of various equipment/components shall be limited to the permissible values specified in relevant standards and/or this specification.
- 4.00.00 *SPECIFIC REQUIREMENTS*
- 4.01.00 Construction
- 4.01.01 MCC shall be constructed from 14 SWG thick CRCA sheet.
- 4.01.02 MCC shall be indoor, air insulated, and metal-clad type.
- 4.01.03 The design construction shall be such as to permit extension at either end. MCC shall be non-draw out (fixed) type.
- 4.01.04 MCC shall be suitable for floor-mounting
- 4.01.05 MCC in general shall be of single-front construction.
- 4.01.06 MCC assemblies shall comprise of a continuous line-up of dead-front, free-standing vertical sections, housing the control modules in multi-tier formation.
- All MCC shall be front-wired and front-connected
- 4.01.07 MCC shall be fully compartmentalised with metal/insulating partitions between compartments
- Working height shall be limited between 450mm and 1800mm from floor level.
- Each vertical section shall have a removable back cover. All doors and covers shall be gasketed.
- For MCC modules, all push-buttons, lamps and indicating instruments shall be flush/semi-flush mounted on respective module compartment.
- 4.01.08 For single-front assemblies, a full-height vertical cable alley with cable supports shall be provided in each section to facilitate unit wiring
- The alley shall be liberally sized to accommodate all cables and shall have removable cover at the front for access.
- 4.01.09 MCC shall be supplied with base frames made out of structural steel sections.
- 4.01.10 After isolation of power and control circuit connections, it shall be possible to safely carry out maintenance in a compartment with the bus bar and adjacent circuit live. Necessary shrouding arrangement shall be provided for this purpose over the cable terminations located in cable alley.
- 4.01.11 The minimum clearance in air between phases and between phases and earth for the entire run of horizontal and vertical bus bars shall be 25mm. For all other components, the clearance between two live parts, a live part and an earthed part, and isolating distance shall be at least 10mm throughout. Wherever it is not

possible to maintain these clearances, suitable barriers shall provide insulation. However, for horizontal and vertical bus bars, the clearances mentioned above should be maintained even when these are sleeved or insulated. All connections from bus bars up to fuses shall be fully shrouded to minimize the risk of phase to phase and phase to earth shorts.

4.02.00 Bus and Bus Taps

4.02.01 All MCC shall be provided with three phase bus bars and neutral bus bar.

All bus bar compartments shall be completely enclosed.

4.02.02 Horizontal and vertical bus bars and bus connections shall be of high conductivity copper/aluminium/aluminium alloy.

The maximum temperature of bus bars and bus connections shall be limited to 90°C i.e. 40°C rise over 50°C ambient.

4.02.03 No diversity factor shall be allowed for temperature rise.
All bus connections shall be provided with anti-oxide grease. Adequate contact pressure shall be ensured by means of two-bolt connection with plain and spring washers and locknuts.

4.02.04 Bimetallic connectors shall be provided for connections between dissimilar metals. The bus bar shall be in accordance with IS1898.

4.02.05 Cross-section of the bus bars shall be uniform throughout the length of the assembly. All bus bars and bus connections shall be supported and braced to withstand the stresses due to maximum short circuit current and also to take care of any thermal expansion.

4.03.00 MCC

4.03.01 MCC modules shall have self-aligning power/control disconnects. All disconnects shall be silver-plated to ensure good contacts.

4.03.02 Various module sizes should be multiples of one basic unit to facilitate modifications at site. Suitable provision for this purpose should also be incorporated in the vertical bus bars.

4.03.03 Modules shall house the control components for a circuit such as switch, fuse, contactors, relays, push-buttons, lamps, meters, etc. only the push-button actuators, lens' of indicating lamps, and transparent windows for meters shall be mounted on module door such that when the module is withdrawn, the cubicle door shall provide specified degree of protection when the module door is closed. Provision for remote start/ stop should be given.

4.03.04 Contactor operated motor feeder modules shall be provide with one (1) MCC-NORMAL-TRIAL selector switch.

These selector switches shall be lockable type and shall be mounted inside the panel.

4.03.05 The equipment layout shall provide sufficient working space in between the components.

4.04.00 Switches

4.04.01 Switch handle shall have provision for padlocking in ON and OFF position.

4.04.02 The compartment door shall be interlocked mechanically with the switch such that the door cannot be opened unless the switch is in OFF position. Means shall be provided for releasing this interlock at any time.

- 4.05.00 Fuses
- 4.05.01 Fuses shall be HRC type with operation indicator.
- 4.06.00 A.C. Starter
- 4.06.01 Contactors
- a) Motor starter contractors shall be of air break, electromagnetic type as per IS: 13947 Part-4, Section-1 suitable for DOL starting of motor and shall be of utilization category AC-3 for ordinary and AC-4 for reversing starters.
 - b) Contactor starters shall comply with the requirements of 8544 (Part-1) in respect of co-ordination of the characteristics of contactor, overload relay, and fuse. The type of co-ordination shall be Type-2 as per IS-8544.
- 4.06.02 Thermal Overload
- a) Thermal overload relays shall be manual reset type and ambient temperature compensated with adjustable settings.
 - b) Single phasing preventer shall be provided as an inbuilt feature of the thermal overload relay.
- 4.07.00 Control and Indication
- 4.07.01 Detailed requirements of individual circuits shall be developed by the Tenderer.
- 4.07.02 All indicating lamps shall be of high intensity cluster LED type.
- 4.07.03 For control supply, 2x100% adequately rated 415/240V control transformers with provision of momentary paralleling during changeover and with necessary taps shall be provided. Auxiliary bus bars shall be used to distribute 240V AC control supply. The control supply of different modules shall be tapped individually from the auxiliary bus bars. Transformer ratings shall have adequate spare capacity. All power and Control wiring shall be done through sufficiently rated copper wire (P.V.C insulated). Size of the control wire should be 2.5 sq. mm.
- 4.07.04 Provision for remote start stop and remote on off indication may be kept in each feeder module. The heater control panel shall have provision for remote operation, control and indication.
- 4.08.00 Meter and Meter Selector Switch
- 4.08.01 All indicating instruments (96 x 96 mm) shall be flush-mounted on front panel with 250 Deg. scale, anti-glare glass and accuracy class of + 2% full scale. Each meter shall have zero adjuster on the front.
- 4.08.02 Motor ammeters shall have an extended suppressed end-scale range to indicate starting current (6 to 8 times full-load current).
- 4.09.00 Secondary Wiring
- 4.09.01 Wiring shall be done with flexible, 650V grade, PVC insulated switchboard wires with stranded copper conductors of 2.5 mm² for control & current circuits and 1.5 mm² for voltage circuits.
- 4.10.00 Terminal Blocks
- 4.10.01 Terminal blocks shall be 660V grade box-clamp type with marking strips, similar to ELMEX 10 mm² or equal. Terminals for C.T. secondary leads shall have provision for shorting. Terminals blocks used for interface with DCS via termination cabinet shall be suitably sized to facilitate proper termination of interconnecting cables.

- 4.11.00 Cable Termination
- 4.11.01 Generally, all assemblies shall be designed for cable entry from the bottom.
- 4.11.02 Gland plates shall be minimum 4 mm thick. The gland plate and supporting arrangement for 1/C power cables shall be of non-magnetic material.
- 4.12.00 Ground Bus
- 4.12.01 A ground bus, rated to carry maximum fault current, shall be provided which shall extend the full length of the assembly.
- 4.12.03 All hinged doors shall be earthed by flexible copper braid.
- 4.13.00 Nameplates
- 4.13.01 Nameplates of approved design shall be provided on each cubicle, at the top of the assembly and on each instrument & device mounted on or inside the cubicle.
- 5.00.00 TEST
- 5.01.00 The switchgear shall be completely assembled, wired, adjusted and tested at the factory as per the relevant standards.
- 5.02.00 Routine Tests shall be carried out as per relevant standards.

C A B L E S

- 1.00.00 CODES AND STANDARDS
- Major standards which are to be followed are IS: 1554, IS: 6380, IS: 7098, IS: 9918 and IEC: 502
- 2.00.00 All cables shall be suitable for a hot, humid and tropical atmosphere with dust and corrosive chemical fumes. All cables shall be designed to withstand the mechanical, electrical and thermal stresses under the steady state and transient / fault conditions, and shall be suitable for the proposed method of installation.
- 3.00.00 DESIGN CRITERIA
- 3.01.00 For continuous operation at specified rating, maximum conductor temperature shall be limited to the permissible value as per relevant standard and / or this specification.
- 3.02.00 Armouring shall be single round wire of galvanised steel for multicore cables and aluminium for single core cable.
- 3.03.00 Core identification for multicore cable shall be provided by colour coding.
- 4.00.00 SPECIFIC REQUIREMENTS
- 4.01.00 Selection Criteria
- 4.01.01 In cable sizing the following are to be taken into consideration
- a) Short circuit current and duration b) Continuous current
 - c) Installation conditions d) Voltage drop under normal running and starting condition.
- 4.01.02 The standard cable sizes ampere capacities and derating factors as given in IS will be generally followed.

4.01.03 All control cables shall be of 2.5 Sq.mm copper.

5.00.00 TESTS

5.01.00 Tenderer shall submitted Cable Manufacturer's test certificate.

RATINGS AND REQUIREMENTS OF POWER AND CONTROL CABLES

POWER CABLE

Rating	Cable size (Aluminium conductor)
3 HP	2.5 Sq. mm
5 HP	4 Sq. mm
7.5 HP	4 Sq. mm
10 HP	6 Sq. mm
25 HP	16 Sq. mm
50 HP	50 Sq. mm
75 HP	95 Sq. mm
100 HP	120 Sq. mm

L. V. POWER CABLES

- 1.0 1100 V grade, 85° C rating, heavy duty, HR (Heat Resistant) PVC power cable in line with IS-1554, IS-5831 & IS-8130, IS-3975.
- 2.0 For heaters suitable cable with relevant IS code shall be used.

MOTOR FEEDER

MOTOR RATING (Kw)	SWITCH RATING	CONTACTOR	MODULE SIZE (MIN.) (In mm)
0 – 5.5	25A	25 A	600
5.6 – 11.0	63 A	40 A	600

Annexure – 2D1**LIST OF FEEDERS TO BE ACCOMODATED IN CONTROL PANEL/ M.C.C****Control panel/ MCC with emergency power supply**

Sl . No.	Equipment description	Rating of feeders	Approx. power cable length – mtr.
1.	Feed hopper drive	To be decided by the bidder	40
2.	Feed screw drive (VVFD)	To be decided by the bidder	40
3.	Rotary kiln drive (VVFD)	To be decided by the bidder	40
4.	Discharge feeder drive	To be decided by the bidder	40
5.	Cooling tower drive	To be decided by the bidder	80
6.	Cold water pump 2 nos.	To be decided by the bidder	80
7.	Hot water pump 2 nos	To be decided by the bidder	80
8.	Spare feeders	5 HP 2 nos	80
9.			

Control panel/ MCC with normal power supply

Sl . No.	Equipment description	Rating of feeders	Approx. power cable length – mtr.
1.	Heating system * (only fuse switch to be provided in MCC) Thy. Controller	To be decided by the bidder	40
2.	Vertical sump pump 2 nos.	7.5 HP each	50
3.	Area Exhaust fan 2 nos.	5 HP each	50
4.	Spare feeders	(a) 5 HP 4 nos. (b) Heating system	50 40
5.	Kiln Exhaust fan(02 nos.) & Kiln Cooling fan(01 no.)	To be decided by the bidder	60

- Heater control circuit shall be kept separately at one end of the Control Desk and Control Panel.

TECHNICAL SPECIFICATIONS – INSTRUMENTATION**Scope of Supply**

Scope of supply by Tenderer grossly includes the following:

1. Control Panel having walk through corridor containing all Entire electrical accessories like Start Stop Push Button, Local Remote Selector Switch, Annunciator, Single Loop Controllers, Digital Panel Meters A/M Station, Indicating Lamp, exchange of “Start Command” / “Stop Command” from Control Panel / Local Start Stop Push Button Station to MCC and “Started Feed Back” / “Stopped Feed Back” from MCC to Control Panel. There shall be hardware Annunciation in the Control Panel for important parameters. There shall be Test, Acknowledge & Reset Push Button on the Control Panel.
2. All Field Instruments as mentioned in the P&ID.
3. Local Start Stop Push Button Stations
4. Junction Boxes
5. Erection Hardware
6. Insurance Spares

The list of material of ‘**ESSENTIAL ITEMS**’ and ‘**TAKE IN ITEMS**’ are given in the tender document. ESSENTIAL Items and TAKE IN Items of Instrumentation System are marked with green & yellow background colour respectively in the P&ID of Uranium Peroxide Plant (Annexure – 12).

All Panel Mounted Instruments and Field Instruments, which are required only for operation & control of Rotary Kiln, are listed in ‘**Essential Items**’. Balance quantities of field instruments of P&ID are listed in ‘**TAKE IN ITEMS**’.

Exclusion

Control Cable, Multi core Instrument Cable and Thermocouple Compensating Cable required to take the signal from Field Instruments through Junction Box to Control Panel is excluded from the scope of supply of the Tenderer. But supply of cable glands is included in the scope.

Scope Of Services**Erection & Installation**

Installation of all sensors, instruments and transmitters, control panel, etc. which are covered under the scope of supply and cable termination between Local Pushbuttons, MCC & Control Desk as listed below:

- Field to Junction Box (JB)
- Junction Box (JB) to Control Panel
- MCC to Control Panel
- Control Desk to Local Push Button Station

Laying of all type of cables is excluded from the scope of service. However, cable glanding & termination of cables as mentioned above is in the scope of services

Calibration & Commissioning

Individual calibration of all erected instruments, control loop commissioning and Complete system testing is under the scope of supply and services.

Power Supply And Its Distribution

Purchaser will provide 3Phase AC power supply at single point. Further distribution of power supply shall be in Tenderers' scope. Solenoids shall be powered with 220V AC, 50 Hz power supply through interposing relays. Any other power supply required for C&I system will be generated by Tenderer from the available power supplies. All instruments will be given UPS power from existing source, which will be in the scope of purchaser.

Location of Control Panel & VVFD Panel:

Control panel, Thyristor Controller for Electric Heaters and VVFD Panel will be kept in Air Conditioned Control Room only. Bidder has to submit approximate dimensions of above equipment in the technical part of the offer so that control room size can be finalized.

Measurement & Control Loops (PID)

Following measurement and closed control loops are envisaged. Bidder may suggest additional requirement, if any, for better process control.

Measurement:

1. Inlet Container Weight measurement
2. Inlet Container Level measurement through Ultrasonic Level Transmitter
3. Outlet Container Weight measurement
4. Temperature measurement at Feed and Discharge end of Rotary Kiln.
5. Air temperature measurement between Heater and outer shell of Rotary Kiln.
6. Air Temperature measurement for Heater Controller (2 positions)
7. Cooling water inlet and outlet temperature measurement (2 nos.)
8. Uranium Peroxide temperature measurement at discharge end.
9. Cooling water flow measurement.
10. Load Current Measurement of Electric Heaters (3 nos.).

Closed Control Loops:

1. Inlet feed rate control. **Process Variable:** Inlet Container weight measurement, **Manipulated Variable:** Screw Conveyor speed through VVFD.
2. Rotary Kiln temperature Control. **Process Variable:** Temperature measurement, **Manipulated Variable:** Electric power to heater bank through Thyristor controller

Process Interlocks

1. Tripping of Any Thyristor Controller shall trip Inlet Screw Feeder Motor
2. Rotary Kiln Low outlet temperature shall trip Inlet Screw Feeder Motor
3. Rotary Kiln Very High outlet temperature shall trip electrical heater through Thyristor Controller.
4. Tripping of Outlet Screw Feeder Motor Shall trip Inlet Screw Feeder Motor and kiln drive after a preset time.
5. Tripping of Rotary Kiln Motor shall trip Inlet Screw Feeder & heater.

List of Annunciation

1. Feed Rate is too high (More than 25% of Set Point)
2. Feed Rate is too low (Less than 25% of Set Point)
3. Cooling Water: Flow Low
4. Cooling Water :Outlet Temperature High
5. Rotary Kiln Tripped
6. Inlet Screw Feeder Tripped.
7. Outlet Screw Feeder Tripped.
8. Thyristor Controller Tripped.
9. Outlet Container Weight High.

Control Panel/ Local Push Button Station / MCC Interface Scheme:

Interface scheme between Control Panel, Local Push Button Station and MCC is given in ANNEXURE- 10.

Remote Start/ Stop Control Scheme for VVFD and Thyristor Controller is given in ANNEXURE- 11.

VENDOR LIST

DIGITAL PANEL METER

- NISHKO
- ABB, BANGALORE
- FORBES MARSHALL
- HONEY WELL
- SIEMENS
- OMRON

A/M STATION

- NISHIKO
- YOKOGAWA
- SIEMENS
- FORBES MARSHALL

SIGNAL ISOLATOR

- P & F
- NISHKO

SIGNLE LOOP CONTROLLER

- SIEMENS
- EUROTHERM
- HONEYWELL
- OMRON

MAGNETIC FLOWMETER

- ABB
- FORBES MARSHALL
- NIVO CONTROLS

CONTROL PANELS

- Rittal, Bangalore
- Pyrotech, Udaypur
- Electro- Fab, Kolkata
- ESAKI Controls, Kolkata
- FORBES MARSHALL
- A.C. Controls, Kolkata

RELAYS

- Larsen & Toubro, Mumbai
- OEN, Cochin
- Siemens, Mumbai
- Telemechanique (India), Mumbai
- PLA , Mumbai
- OMRON

ILLUMINATED PUSH BUTTONS

- Siemens, Mumbai
- Bharatiya Cutler-Hammer, Mumbai
- Technics
- Telemechanics
- L&T (Salzer)

LAMPS (LED TYPE)

- Binay

- Siemens, Mumbai
- L&T
- TECHNIK

ANNUNCIATORS

- APLAB, Mumbai
- Procon Engineers , Chennai
- Minilec , Pune
- Pyrotech, Udaipur

FUSES

- Larsen & Toubro, Mumbai
- Siemens, Mumbai
- Telemechanics

TERMINAL BLOCKS

- Elmex, Baroda
- Phoenix Contact, New Delhi
- Weidmuller, W. Germany
- Connect Well

SELECTOR SWITCH

- L& T
- Kay Cee
- BCH
- Siemens

RTD, THERMO-COUPLE & THERMO WELLS

- Pyrotech, Udaipur
- Asiatic Engineers, Kolkata
- Japsin Products, New Delhi
- Forbes Marshall

AIR FILTER REGULATOR

- Shavo Norgren
- Norgreen
- FESTO

SOLENOID VALVE

- ASCO

CURRENT TRANSMITTER

- ADEPT FLUIDYNE, PUNE
- MECO
- MTL
- P&F
- AUTOMATED ELECTRIC

WEIGHING SCALE

- REED MEDWAY PACKAGING COMPANY
- CHRONOUS RECHARDSON
- IPA, Bangalore
- AVEARY
- TRANSWEIGH, Mumbai

THYRISTER CONTROLLER

- Technocom, Kolkata
- Autodata, Mumbai

AIR CYLINER

- SCHRDER BELLOWS
- FESTO

VARIABLE FREQUENCY DRIVE

- Integrated Electronics, Bangalore
- Eurotherm
- Kirlosker Electric

ULTRASONIC LEVEL TRANSMITTER

- MILTRONICS
- E & H
- FORBES MARSHALL

Instrument's Specification

Control Panel cum Operator Console:

Operator Console shall be fabricated with 2.00mm CRCA sheet on all sides except desktop, which shall be of glazed stainless steel of 1.6mm thickness and sand blasted for surface finish.

The operator's side shall be provided with Electrical accessories like Illuminated Push Buttons (ILPB) and Selector Switches (S/S)

ILPB and S/S shall be provided on the top inclined cover. The components shall be well laid out for easy operation and ergonomic design. The top sheet should have arrangement for lifting and a locking arrangement for holding.

All the terminals shall be provided at the bottom, which shall be covered with hinged doors.

MIMIC, Annunciator, Digital Panel Meters and shall be mounted on Control Panel.

- | | | | |
|----|----------------------------|---|--|
| 1 | Material of Construction | : | Cold rolled sheet steel |
| 2 | Thickness of sheet | : | 2.00mm |
| 3 | Construction | : | Welded throughout |
| 4 | Post-welding operation | : | (i) Grounding of all welds to smoothness
(ii) Rounding of corners
(iii) Cleaning of weld spatters |
| 5 | Corners | : | 7mm inner radius |
| 6 | Dimensional tolerances | : | (i) In height & length – 3mm
(ii) In height between adjacent sections – 2mm
(iii) Total for a group – 6 mm |
| 7 | Surface preparation | : | (i) Sand blasting
(ii) Grounding
(iii) Sanding for removal of rust & scale
(iv) Solvent cleaning |
| 8 | Primer | : | Spray coat of epoxy surface |
| 9 | No. of primer coats | : | 2 Nos. |
| 10 | Final Finish | : | Power Coating |
| 11 | Unacceptable imperfections | : | Sags, cracks, blisters, teardrops, fat edges, etc. |
| 12 | Doors | : | Double, recessed, turned back edges. Lift-off type for control desk (with additional bracings, as required). |
| 13 | Thickness of door sheet | : | 2mm |
| 14 | Hinges | : | Stainless steel |
| 15 | Door gaskets | : | Three-point type |
| 16 | Door gaskets | : | Neoprene rubber on fixed frame |
| 17 | Opening of the doors | : | Outward |

- | | | | |
|----|-----------------------------|---|--|
| 18 | Louvers | : | With removable wire mesh to ensure dust and vermin proof ness |
| 19 | Color of exterior | : | IS 5, shade 631 (Light Grey) |
| 20 | Color of interior | : | Enameled white |
| 21 | Gland plates | : | Removable 4mm thick undrilled, separate for desk and panel parts (top and/or bottom depending on Cable/Impulse pipe entry) |
| 22 | Internal dissipation | : | 500 W/m ³ (max) |
| 23 | Cable entry | : | Backside |
| 24 | Hardware accessories | : | <ul style="list-style-type: none"> i) Removable eyebolt type lifting lugs ii) 15mm thick anti vibration rubber pad all throughout base channel iii) Predrilled base channel ISMC – 100 or equivalent for all sides iv) Foundation bolts v) Stainless steel buff-finished 2mm thick plate for all sides vi) Stainless steel scratch strips along desk edges and kick plate for panels fixed with pan-head recessed screws vii) Rubber strips to ensure air-tightness between kick plate and finished floor |
| 25 | Name plates | : | For all instruments and accessories except those having integral service engraving |
| 26 | Name plate material | : | Laminated phenolic (3 layers) |
| 27 | Fixing of name plates | : | Stainless steel pan head screws |
| 28 | Lettering | : | Black with white engraved |
| 29 | Mounting of terminal blocks | : | Vertical angle support bracket tack welded on heat steel plate, screwed on integral wall of enclosure |
| 30 | Illumination fixture | : | Mounting bracket at the top for two CFL fixture |

Internals Wiring

- | | | | |
|---|-----------------|---|---|
| 1 | Wiring standard | : | NEC and NEMA |
| 2 | Wiring material | : | <ul style="list-style-type: none"> i) Cross link polyethylene/PVC insulated timed copper, stranded conductor or switch board wire for all high level signal wiring |

- ii) Wiring to door mounted devices provided with 49 strands (minimum) and adequate loop lengths of hinge wire to be maintained to prevent excessive fatigue due to multiple door openings
- 3 Wire sizes :
 - i) Control switch wiring – 16 AWG
 - ii) Ammeter Circuits – 12 AWG
 - iii) Indicating lamps and push buttons – 16 AWG
 - iv) Annunciation – AWG
 - v) Interlocking- 16 AWG
 - vi) Power supplies – 2mm²
 - vii) Control systems – to suit requirement
 - viii) Transmitted signals – 16 AWG
 - ix) All others – 12 AWG
- 4 Dressing :
 - i) Internal wiring shall be grouped so that all outgoing wiring to each particular remote location is terminated on adjacent terminal blocks
 - ii) All low level signal cables shall be separately bundled from control cable and maintained at 300mm minimum spacing from control bundles
 - iii) Wiring shall be arranged to ensure free access to all instruments or devices necessary for adequate maintenance services
 - iv) No wiring shall be routed across the face or rear of any device, which will restrict the opening of covers or obstruct access to leads, terminals or devices
 - v) Tapping or splicing between terminal points is not permissible
 - vi) Interior wiring and jump rings shall be arranged so that external corrections can be made from internal side of terminal blocks
 - vii) Common connections limited to 2 (two) wires per terminal
 - viii) Groups of wires shall be bunched with cable straps(lockable unlock able type) provided at frequent intervals
- 5 Running of Wire : Suitably grouped wires placed in polyethylene wiring tray with clam on type covers
- 6 Terminal Lug : Compression, Insulated Sleeve, ring tongue type.

- | | | | |
|----|----------------------------------|---|---|
| 7 | Identification | : | Wire number of each termination shall be by means of split sleeve ferrules |
| 8 | Internal Lighting | : | Switch fuse unit for lighting supply separated from instrument power supply isolator are mounted inside the cabinet in each access door |
| 9 | Maximum Allowable Supply Voltage | : | 220 Volt |
| 10 | Power Supply Isolation | : | MCB for individual instruments |

Internals Terminal Block

- | | | | |
|---|-----------------|---|---|
| 1 | Wiring material | : | i) Moulded, Heavy Duty, Barrier type and single depth
ii) Having 6 or 12 points and equipped with corrosion resistant washer head binding screw |
| 2 | Rating | : | 600 Volts 30 Ampere AC |
| 3 | Applicability | : | i) For incoming & outgoing wires except where prefabricated cable are used for direct connection to electronic cubical
ii) Interconnecting wiring between all electrical device terminals shall be terminated in terminal blocks and jumpered across |
| 4 | Spare Capacity | | 20% after final wiring. |

MIMIC Board

Size of the MIMIC BOARD (LXB) : 800mmX 600mm

The mimic board will be made of semi opaque acrylic sheet of at least 4mm. Thickness. The diagram of the process shall be painted on the backside of the acrylic sheet with indelible colored ink as per the color scheme provided by UCIL.

The indicating lamps will be fixed at the back. At the fixing point of the lamp no color shall be provided to have clear visibility of the lamps. Lamps should be of LED type bicolor for ON and OFF indication.

The outer edge of the mimic board shall be covered and protected by black anodized aluminum frame of suitable size. The aluminum frame should be fixed with the sheet metal of the vertical surface front of the panel/desk. Sheet thickness of aluminum frame shall be 1.00 mm.

Annunciator

1. Logic: Micro processor based logic system with one controller module for 8 annunciator points
2. Cabinet: Moulded ABS enclosures suitable for flush panel mounting, with plug in type rack
3. Display: Backlight with 4 no.'s of red LED per window

All the LED are driven through a series limiting resistor from internal 24VDC Supply

4. Audible Alarm: A potential free normally open contact which closes under fault condition and opens on Accept is provided to actuate an external audible device
5. Supply Voltage: 230V AC – 50Hz +/-10%
6. Miscellaneous:

(a) press fit windows

(b) Signal Input selection for N/O or N/C through Dip switches

Indicative Lamp

1	Type	:	LED Type
2	Wattage	:	2.0 watts (approx.)
3	Lens	:	Screw on glass
4	Bulb replacement	:	From front
5	Wire connection	:	Rear
6	Color of lamps	:	Green & Red
7	Legend plate	:	Black anodized aluminum
8	Standard legends	:	Close, running, open, ready
9	Lamp fixing	:	Screwed type
10	Lamp size	:	24 x 24 mm to suit mosaic compact
11	MTBF of lamp	:	5000 glowing hours

Auxiliary Relay

1	Type	:	Plug in type / flag relay as required
2	Power supply	:	240V AC, 1 phase, 50 Hz
3	Operating principle	:	Electro-mechanically operated
4	Contact configuration	:	2NO + 2 NC
5	Contact rating	:	a) 5 Amp At 240V AC b) 0.5 Amp At 220V DC
6	Body material	:	Heavy-duty material
7	Connection	:	a) Fork type lug connection for contact b) Ring type lug connection for relay coil connection
8	Circuit application	:	Normally in energized condition; de-energizes on interlock or fault actuation.
9	Special features	:	i) Fork flag type relay, flag should drop down for display on de-exercitation.

- The relay shall be hand reset type.
- ii) Plug in type relays shall be compact and dustproof. The transparent plastic cover should be easily removable
 - iii) For plug in type relays also status display will be preferred
- 10 Mounting : Flag relay - Flush mounting
Plug in relay - Base mounted inside panel
- 11 Accessories : Mounting bases and other necessary items

Electromagnetic Flow meter

1. Material:
 - Flow Tube-SS316 PTFE Lined
 - Flanges-Carbon Steel ANSI 150
 - Sensing Element-Haste-alloy C
2. Flange: Drilled to BS 10D
3. Flow range: As per process requirement
4. 4.Pipe line: As per process requirement
5. Flow Medium: Industrial water
6. I/P power supply – 220 V, 50 Hz. +/- 15%
7. O/P signal – 4 to 20 Ma DC
8. Converter: Separated unit, microprocessor based having Dot Matrix Display with Totalizer facility.
9. Type: Digital

Single Loop (PID) Controller

1. Control Input (selectable) : 4-20 Ma, Pt-100, Thermocouple, With programmable range
2. Output : 4 to 20 Ma DC
3. Triple Display one for process value, one for Set point and one for controlled output. Bar graph display of process value and set point is also required.
4. Control Action : PID
5. Alarm Output : 2 Points
6. Supply Voltage : 220 V ac +/- 10 %, 50 Hz
7. Auto/Manual selection option should be available on the front panel.

Control Panel of Thyristor Controller

Purpose: The purpose of the control panel is to operate a Thyristor Controller through push buttons/ PID loop after satisfying the necessary interlocks.

11. The Panel shall consists of the following facilities:

- a. Contactor and Overload suitable for Heater Bank Power Rating
- b. Push Buttons for:
 - Thyristor Start
 - Thyristor Stop
 - Load Reset
- c. Remote / Local Operation Selector Switch
- d. Ammeter for 3 Phase with ASS. (Analog)
- e. Voltmeter for 3 Phase with VSS. (Analog)
- f. Potentiometer for Local Control of Load Current
- g. Indicating lamps (LED type) for:
 - i) Thyristor Ready to Start
 - ii) Thyristor Running
 - iii) Thyristor Stop
 - iv) Thyristor Trip
 - v) 3-Phase Supply indications.

12. Degree of protection: As per IP – 55

13. Cable to be used: 2.5 sq. mm flex copper for internal wiring of the panel.

(II) General Instructions

- a. Sheet Thickness: 14 SWG
- b. The Thyristor Controller should be mounted inside the Panel and its display should be visible from outside.

Thyristor Controller for Electric Heater

Type: Integral Cycle Heater Controller for control heating applications. The powers input to the heaters are to be controlled by the control signals at the input of the heater controller.

- a. Input Voltage: Three phase, 415V +/- 10 % 3 Wire.
- b. Frequency: 50 Hz. +/- 3 %
- c. Ambient Temp. : 45 deg C
- d. Output: Continuous output current
- e. Control range: 0 to 100 % Voltage
- f. Control Inputs: 4 to 20 Ma DC
- g. Fault Indication: Output fail of individual phase
- h. Protection: 1.dv/dt through snubber
- i. Short circuit through high speed Thyristor fuses at the input and output of the

Controller

- There should be Thyristor controller for each Heater bank
- Provision for external interlock for tripping of Heater circuit connection should be there.

- Digital output to indicate tripping at remote place should be there.
- Both Auto (through control signal) and Manual (through potentiometer at the front panel) options of running the controller should be there.
- Cooling fan of ebm-NADI make should be provided for proper cooling of the controller panel.
- Output voltage adjustable option through potentiometer should be there in the cards, which is to be used in case desired temperature is not achieved in the heater.

Control Panel of AC Drive (VVFD)

Purpose: The purpose of the control panel is to operate a frequency drive through push buttons/ PID loop after satisfying the necessary interlocks of the drive.

14. The Panel shall consists of the following facilities:

Contactor and Overload suitable for our frequency drive.

Push Button operation for:

- i. Drive Start
- ii. Drive Stop
- iii. Drive Reset
- iv. Frequency Increase
- v. Frequency Decrease

Ammeter for 3 Phase with ASS. (Analog)

Voltmeter for 3 Phase with VSS. (Analog)

Remote and Local operation option through 4 – 20mA Control Signal

Control voltage – 220V AC, 50 Hz

Indicating lamps (LED type) for:

- i. Drive Ready to Start
- ii. Drive Running
- iii. Drive Stop
- iv. Drive Trip
- v. 3-Phase Supply indications

Input and Output of AC drive shall be connected through suitable choke. (Please note that the distance between the drive and motor is more than 100 meter)

Insulation Level: With 1000 V Megger

Dielectric Test: 1.5 KV for 1 sec. Withstand

Degree of protection: As per IP – 55

Mode of mounting: Wall mounting

Cable to be used: 2.5 sq.mm flex copper for internal wiring of the panel.

20% spare Terminal should be provided.

(II) General Instructions

- Sheet: 14 SWG
- The frequency Drive should be mounted inside the Panel and it's display should be visible from outside.

VVFD Drive

15. Type : Variable speed A.C. drive
16. Power Rating : 1.5 times of the motor rating
17. Speed Range : 0 – 1440 RPM
18. Minimum and Maximum speed locking facility required
19. Power Supply : 3 Phase, 440V +10%, -15%, 50 Hz
20. Speed control signal : 4 to 20 Ma. , 0 to 10 V and through external digital input reference
21. Environmental Condition : 10 to 50 degree C. 90% RH
22. Overload Capacity : 150%
23. Protection :
 - i. Under and over voltage
 - ii. Program setting error
 - iii. Over current
24. Relay Contact output (potential free) required for Drive Fault condition
25. Inverter start/ stop by digital input
26. Analog output (0 to 10 V DC) is required

To be supplied with control panel.

Digital Panel Indicator

1. I/P Supply: 220 V ac, +/- 10%, 50Hz
2. Input: Universal
3. Type: Microprocessor based
4. Range: 0 – 100 %
5. Output: Retransmitted 4 – 20 Ma DC, 2 nos. of relay contact rated for 220 V AC, 5A
6. Set point: 2 nos. adjustable at site over entire range
7. Transmitter power supply: 24 V DC
8. Display: 4 digits, 0.5" LED, seven segment.
9. Accuracy: (+/-) 0.25 %

10. Mounting: Flush on panel.

11. Cutout: 138 (H) X 68 (W)

Auto/ Manual Station

1. I/P Supply: 220 V AC, +/- 10%, 50Hz
2. Input: 4 to 20 Ma DC
3. Type: Microprocessor based
4. Display Range: 0 – 100 %
5. Output: 4 – 20 Ma DC
6. Display: 4 digits, 0.5" LED, seven segment
7. Accuracy: (+/-) 0.25 %
8. Mounting: Flush on panel
9. Cutout: 138 (H) X 68 (W)

Weighing Scale

Capacity: 2 Ton, full tarring range

Electronic Unit details:

1. Weighing Range: 10% to 110%, Platform size 1.5m x 1.5m
2. Temp Range of Operation: +5 to +70 Deg C
3. Type of Load Cell: Strain Gauge based shear beam load cell
4. Calibration System: Microprocessor based
5. Accuracy: +/- 0.5% Static and +/- 1.0% Dynamic
6. Speed Sensing Device: Tacho
7. Supply: 220 V AC, 50 Hz
8. Type: Microprocessor based
9. Display: Digital display for weight indication
10. Output signal: 4 – 20 Ma Analog Optically isolated outputs for weight display in Control Room
11. Enclosure type: Fully sealed against dust and moisture (IP – 54)

Pushbutton

1	Type	:	Shrouded (mushroom head for important trips/illuminated push button/stay put type/ key operated PB, as required
2	Construction	:	Modular
3	Enclosure	:	Dust-proof type
4	Contact configuration	:	4 stacks (2 NO + 2 NC in general)
5	Contact element	:	Nickel-silver alloy
6	Gasket	:	Rubber gasket between actuator and panel
7	Cable connection	:	Rear with screws for accepting full ring lug (6 Sq.mm cable)
8	Legend plate	:	Start-stop, forward, reverse, fast, slow, on, off, raise lower, accept reset, test enable
9	Colours	:	To be decided after award of contract
10	Body material	:	Chrome plated zinc alloy
11	Contact housing	:	Moulded melamine
12	MTBF of pushbutton	:	10^7 operations or more
13	Frequency of operations	:	10 times / minute or better
14	Voltage rating	:	500V AC / 250V DC
15	Breaking capacity (unless otherwise specified)	:	40A AC up to 500V 10A – 24V DC non-inductive 3.5A – 110V DC non-inductive 1.0A - 220V DC non-inductive
16	Overall size	:	Mosaic compacts (24x24mm, preferred)
17	Fixing on panel	:	Single cut out on panel with locknut

Selector Switch

1	No. of poles	:	Two / Three
2	No. of points	:	Four / Six / Twelve as required along with neutral position
3	Mounting	:	Flush panel type
4	Contact material	:	Silver / Gold plated
5	Bezel dimension	:	48 x 48 mm as required

Current Transducer

1	Type of mounting	:	Inside panel
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2	Power supply	: 220V / 240V AC, 1 phase, 5 Hz
3	Input signal	: From CT secondary 1 Amp Or 5 Amp Directly from line
4	Continuous input overload	: 2 times or more
5	Range	: Shall be intimated later
6	Output	: 4-20 Ma DC linear, galvanically isolated
7	Load	: 750 Ohm or more
8	Output voltage on open ckt.	: Less than 20V
9	Galvanic isolation	: Between input & output
10	Accuracy	: + 0.5% or better
11	Temp. effect for temperature variation of 10 deg. C	: Less than 0.2%
12	Ripple content in output	: Less than 0.1%
13	Response time	: Less than 1 sec
14	Amb. Operating temp. range	: 0 deg. C – 50 deg. C
15	Internal consumption	: 2.5VA.
16	Housing	: Conforming to NEMA-4 or IP-55.

Thermocouple

1	Application	: Temperature measurement upto 800 deg. C
2	Type	: K (Chrome-Alumel), Ungrounded
3	Element Size	: AWG 16
4	No. of Element	: Two
5	Accuracy	: Type-K Range 0-275 deg. C; Accuracy ±2.2 deg. C
6	Inset tube	: AISI 304-SS
7	Filling	: MgO powder (purity – 99.4%)
8	Extension length	: 150 mm
9	Extension nipple	: AISI 316-SS seamless ¾” Sch.80 pipe M/M
10	Mounting fittings (element)	: AISI 316 compression fitting threaded both sides
11	Response time	: 15 seconds (for 63.2% change – max.)
12	Response lag	: 4 seconds (max)
13	Connection head	: Coated cast aluminum body and cover with zinc plated carbon steel retaining chain and heat & moisture proof gaskets, water / weather proof type
14	Terminal blocks	: Silver plated

- 15 Cable connection : ½" NPT
- 16 Codes & standards : ANSI MC 96.1 – 1975
- 17 Accessories : Thermo well and 3m long flexible conduit

Resistance Temperature Detector

1	Application	: Temperature measurement upto 400 deg. C (except vibration prone areas/applications)
2	No. of elements	: Two (2) nos
3	Material	: Platinum
4	Resistance	: 100 Ohms at deg. C \pm 0.1 Ohm.
5	Base	: Wound on ceramic
6	Windings	: Two (anti-inductive)
7	Type	: 3 wire (each)
8	Inset tube	: Stainless steel (8 mm OD)
9	Insulators	: Sileminite
10	Filling	: MgO powder
11	Extension wire	: Silver / Constantan
12	Tolerance	: As per DIN 43760
13	Accuracy	: 0.5% (600 deg. C span) or better
14	Element length	: 30 mm
15	Vibration	: 50 G, 60 to 2 KHz
16	Shock	: 1000 G (min)
17	Stability	: 0.05% after thermal cycling (ASTM E 235)
18	Insulation	: 100 M Ohms at 250V DC at ambient temp.
19	Measuring current	: Upto 20 Ma
20	Extension length	: 150 mm
21	Extension nipple	: AISI 316-SS with F/F union
22	Response time	: 25 seconds (for 63.2% change) (max)
23	Response lag	: 6 seconds (max)
24	Connection head	: Coated cast aluminum body & cover with zinc plated carbon steel retaining chain and, heat and moisture-proof gaskets, water / weather-proof type
25	Terminal blocks	: Silver plated
26	Cable connection	: 1/2" NPT
27	Codes & standards	: a) Temperature measurement by electrical resistance thermometer- IS: 2806 b) Temperature element – platinum resistance – IS: 2848 c) As per DIN 43760
28	Accessories	: Thermo well and 3m long flexible conduit

Solenoid Valve

1. Application: For automatic control double/ single acting Air Cylinders.
2. Type: Direct Acting, Single Coil Operation
3. Solenoid Enclosure: Metal general purpose (IP41) with embedded screw terminal coil and electrical entry hole to suit 20 mm fittings.
4. MOC: Body- Brass, Seals- Buna-N and Viton, Core tube- 305SS, Springs: 302SS
5. Electrical: Supply Voltage- 220V, 50 Hz, +10/ -15%
6. Coils: Moulded continuous duty coils class F
7. Temperature: Maximum (Fluid & Ambient): 70 Deg C

Ultrasonic Level Measuring System

1. Microprocessor based Ultrasonic Transceiver and Integral transducer with a range of 0.25 – 5.0 mtr
2. Preprogrammed echo detection and processing algorithms
3. All calibration data held in Transceiver with EEPROM, no battery backup required
4. Accuracy of +/- .25 % of full range
5. Resolution 3mm over selected range
6. Three-character 7mm. Digit (LCD) Multi segment graphics display for setup and operational status
7. Measurement display in feet or meters
8. Current output of 4 – 20 Ma up to 750 ohms
9. Fully encapsuled integral transducer operating at 50 KHz. With inbuilt temperature compensation
10. Power supply: 24 VDC
- 11. Two wire system**
1. Enclosed rugged body with conduit entrance from either side

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ANNEXURE – 2F**List of essential items to be supplied along with the Rotary dryer.**

S.No.	<u>EQUIPMENT (essential Items)</u>	<u>Quantity</u>
1.	Rotary kiln shell assembled with sprocket/ girth gear	1 no.
2.	Replaceable lifters/ spiral	1 set
3.	Kiln Feed screw assembly	1 set
4.	Two nos. mechanical seal one each for feed and discharge end	2 nos.
5.	feed & discharge end bearings of kiln/ tyre and roller assembly	1 no. each
6.	Drive sprocket and chain/ pinion assembly for kiln	1 no. each
7.	Kiln hammer	1 set
8.	Kiln drive gearbox	1 no.
9.	Couplings for kiln drive gear box	1 set
<u>ELECTRICAL (essential items)</u>		
1.	Heating coil	2 sets
2.	Insulators for heating system	2 sets
3.	Terminal block for heating system	2 sets
4.	Insulators/ washers, etc.	2 sets
5.	Supporting tubes for heating coils	2 sets
6.	HRC fuses for heater and other drives	2 sets
7.	Essential spares for heating panel	1 lot
<u>INSTRUMENTATION (essential items)</u>		
1.	Control Panel	1 Set
2.	Duplex Thermocouple	2 Nos.
3.	RTD	2 Nos.
4.	Digital Panel Meter	15 Nos.
5.	Single Loop Controller (PID)	1 No.
6.	Thyristor Controller for Heater Bank with Control Panel	3 Nos.
7.	Auto Manual Station	3 Nos.
8.	Sol. Valve and Air Cylinder for (Inlet) Gate Valve	1 Set
9.	Sol. Valve and Air Cylinder for Hammers	1 Lot
10.	Variable Frequency Drive for Kiln Drive with Control Panel	1 Set
11.	Annunciator (24 channel)	1 Set
12.	Illuminated Push Buttons	40 Nos.
13.	Selector Switches (3 Position)	16 Nos.
14.	Relays for Interlock, Contact Multiplication & Status Indication	40 Nos.
15.	Erection Hardware	1 Lot
16.	Junction Boxes	1 Lot
17.	Current Transmitter & Current Transformer for heaters	3 Sets
18.	Insurance Spares	1 Lot
19.	Local Push Button Station	16 Nos.
20.	All Kind of PCBs, IGBT, Cooling Fan, Thyristor Fuse for Thyristor Controller-Electric Heaters	1 set each
21.	Air cylinder for pneumatic hammer	1 no.

22.	Seal kit for pneumatic hammer	1 set
23.	Air cylinder for ON/OFF valve	1 no.
24.	Seal kit for ON/OFF valve	1 set
25.	RTD & thermocouple Rotary kiln	1 no. each
26.	Current transformer for Thyristor controller	1 no.

1. Any Hardware that will be required for completeness but is not mentioned in the tender shall be offered by the Tenderer and the same should be mentioned specifically in the part-1 of the offer. Items necessary for completeness, not mentioned by the Tenderer, to be supplied free of cost.
2. Control Cable, Multi core Instrument Cables, Compensating Cable & Cable Trays: Supply & Laying is excluded from the scope but successful bidder will submit the requirement within 30 days of placement of work order.

1. List of optional spares required for two years trouble free operation.

List of optional spares to be submitted by the Tenderer along with item description, quantity required and price as per Annexure 6C.

ANNEXURE – 2G**LIST OF ITEMS WITH QUANTITY (TAKE IN PRICE)**

S.No.	<u>Item</u>	<u>Quantity</u>
1.	Feed Hopper	10 nos.
2.	Feed Hopper spiral	4 nos
3.	Feed hopper discharge end pneumatically operated knife gate valve	4 nos
4.	Feed hopper gearbox	1 no.
5.	Feed hopper stand with wheels	10 nos.
6.	Wheel assembly for feed hopper stand (Spare)	6 nos.
7.	Couplings, sprocket and chain for feed hopper	4 sets
8.	Jacketed Discharge Spiral	1 unit
9.	Discharge drive gearbox	1 no.
10.	Couplings, sprocket and chain for discharge spiral	1 set
11.	Discharge spiral unit	1 no.
12.	Hydraulic Trolley Cap. 1.5 MT	6 nos.
13.	Cooling Tower with 2 sets of hot and cold water pumps	1 set
14.	Pump impeller	1 each
15.	Pump shaft	1 each
16.	Shaft sleeve	2 nos each
17.	RTD	3 Nos.
18.	Single Loop Controller	1 No.
19.	Sol. Valve and Air Cylinder for Outlet Gate Valve	2 Set
20.	Variable Frequency Drive for Screw Feeder with Control Panel	1 Set
21.	MIMIC	1 Set
22.	Ultrasonic Level Transmitter	1 No.
23.	Magnetic Flow meter	1 No.
24.	Insurance Spares	1 Lot
25.	Weighing Scale	3 Sets
26.	All kinds of PCBs and load cells for inlet and outlet container weighing scales	1 set each

ANNEXURE – 3**INSTRUCTIONS TO TENDERER A GENERAL CONDITIONS OF CONTRACT.**

Tenderers are required to give their sealed Tender in duplicate.

No Tender shall be considered if:

- a) Tenders are received after the specified date and time.
- b) The quotations are not legible and contain overwriting.
- c) Prices are tendered telegraphically on the due date and not confirmed subsequently.
- d) Competent and authorised persons do not sign all the pages of offer. Any person given a tender shall furnish documentary evidence that his signature on the tender, submitted by him is legally binding upon himself, his firm or company as the case may be.

Prices: The prices quoted must be net per unit quantity Sales tax/Excise duty, packing and delivery charge if applicable should be shown separately. Wherever necessary the prices may be shown separately if the material or part is imported.

Prices shall be given as under:

- a) F.O.R. destination (Jaduguda) by road.
- b) If the item is imported, break up shall be furnished indicating:
 - i) F.O.B. port of shipment in foreign currency.
 - ii) Insurance & freight up to Calcutta Port.
 - iii) Foreign Exchange rate.
 - iv) Customs tariff heading and custom's duty.
 - v) Clearance & charges for delivery at Jaduguda.

Acceptance of Tender: The final acceptance of the tender rests with UCIL, who reserves to itself the right to reject any or all tenders without assigning any reason. It does not bind itself to accept the lowest or the whole of a tender. Order may be placed on more than one Tenderer.

Validity: The prices should remain firm for acceptance for 90 days from the date of opening of the tender.

Responsibility of Completeness: Goods quoted for must be complete in all respect. Any fittings or accessories which may not be specifically mentioned in the specification but which are usual or necessary are to be provided by the Tenderer without extra charges.

Quantity: The Corporation reserves the right to order less or more than the specified quantity at the offered rates.

Insurance: Transit insurance should cover all risks up to the destination. Insurance will be arranged by the Corporation or the supplier depending on the basis of the contract.

Earnest Money: Offers should be accompanied by an earnest money deposit as noted below, without which, the offer is liable to be rejected.

- (a) The Small Scale Industrial unit which are registered with NSIC if submit their valid registration certificate in this regard, they will be exempted from submission of the EMD amount.

(b) The value of the EMD shall be as specified in "Specific Terms & Conditions".

- (c) E.M.D. amount for Rs. 1,00,000/- or less shall be tendered either by way of a demand draft only drawn on State Bank of India, Jaduguda Branch (code No. 0227) or a branch at

Jamshedpur, India of any Indian Scheduled Commercial bank drawn in favour of URANIUM CORPORATION OF INDIA LTD.

- (d) E.M.D amount more than Rs. 1,00,000.00 can also be deposited in the form of a bank guarantee (as per proforma enclosed) issued by / or in the case of a BG of a foreign bank, counter guaranteed by an Indian Scheduled commercial bank in favour of URANIUM CORPORATION OF INDIA LTD.

E.M.D. shall not bear any interest.

Security Deposit: The successful bidder shall furnish a security deposit to the extent of 5% of the total value of the order, before the order is awarded. Such a deposit will be held by the Corporation until successful completion of the order/contract, and will bear no interest. It will be forfeited in the event of breach of contract. Security deposit may be in the form of a bank guarantee issued by/ counter guaranteed by an Indian scheduled commercial bank in favour of URANIUM CORPORATION OF INDIA LTD.

Inspection: UCIL reserves the right of stage and/or pre-despatch inspection for which due notice shall be given by the supplier. However, final inspection shall be done on receipt of goods at destination.

Capability: List of customers of repute with Photostat copies of order may be submitted along with your offer.

Rejection of Goods: UCIL reserves the right to reject goods which are not as per specification and also if supplied in breach of the terms & conditions stipulated. In case of rejection you shall have to replace free of cost or refund the amount paid.

UCIL shall be entitled to recover from the supplier costs incurred by UCIL in respect of the rejected goods. Rejected goods will be lying at the UCIL's store at the supplier's risk and shall be removed by the supplier at his own cost immediately on receipt of rejected advice. The Corporation will not be responsible for any loss on account of deterioration etc. of the rejection goods. If rejected goods are not removed by the supplier, UCIL may charge penal rent and dispose off the goods as deemed.

Failure and Termination of Contract: When once the tender is opened, the Tenderer is bound to abide by the rate, delivery and other terms & condition quoted by him. For any default in this connection or withdrawal of the quotation, the earnest money deposit shall be forfeited. If the Tenderer fails to deliver any stores in accordance with to the terms & conditions, as per specifications stipulated, replace any stores rejected within such time as may be stipulated or breach of contract in any other way, the Corporation shall be entitled to anyone or more of the following:

- a) Cancel the contract, wholly or partly.
- b) Forfeit the earnest money and/or security deposit
- c) Impose penalty ranging from 3% to 10% of the contract value.
- d) To procure from alternative sources and recover extra cost incurred by the Corporation.
- e) Removal of supplier's name from the approved list of suppliers.
- f) To receive from the Tenderer as agreed liquidated damages a sum equal to half a percent of the value of the stores which the Tenderer fails to deliver per each week or part thereof during which the delivery of such stores may be in arrears.
- g) Recovery of Liquidated damages.

In the event of action taken under clause (d) and (f) above, the Tenderer shall be liable for any loss which the Corporation (UCIL) may sustain on that account but the Tenderer shall not be entitled to any saving on such purchases made against default.

The decision of the Corporation (UCIL) shall be final as regards the

- Acceptability of stores supplied by the Tenderer and the Corporation.
- Shall not be required to give any reason in writing or otherwise at
- Any time for the rejection of the Stores.

Warranty Clause: The tender shall declare that the goods/stores/articles sold to the Corporation, (UCIL) under contract shall be of the best quality, workmanship and shall be strictly in accordance with the specifications and duty parameters contained in the contract. The corporation reserves the right to call for a performance guarantee backed by a bank guarantee. Notwithstanding the fact that the Corporation (UCIL), or any person on its behalf, may have inspected and/or approved the said goods/stores/articles, if it be discovered not to conform to the description and quality aforesaid or deteriorated goods may be rejected. On such rejection all the provisions relating to 'Rejection of goods' shall apply. The Tenderer shall, if so called upon, replace the good, or such portion thereof as is rejected by the Corporation and compensate such damages as may arise by reason of the break of the condition here in contained. Nothing, here in contained shall prejudice any other right of the corporation (UCIL) in that behalf under a contract or otherwise.

Payment terms: Unless otherwise agreed to, payment will be made within 30 days of receipt and acceptance of goods.

Force Majeure: In the case of strikes/lockouts, closure of works (whole or partial) breakdown of machinery, act of God or any other cause beyond the control of the Corporation preventing or hindering the normal operation, the Corporation shall be at liberty to cancel this order at any time before receipt of the goods without being liable to the supplier for damages or other claims.

Disputes: Both parties agree in, disputes arising out of this order may be settled by arbitration, in accordance with the Indian arbitration Act, 1940 by a sole arbitrator who shall be appointed by the Chairman & Managing Director of this Corporation (UCIL).

Jurisdiction: This agreement/order shall be deemed to have been executed at Jaduguda, District Singhbhum (East), Jharkhand and it is subject to the jurisdiction of the court of Law in Ghatshila only irrespective of anything to the contrary that may be mentioned in the offer of the Tenderer.

ANNEXURE – 4**PROFORMA FOR BANK GUARANTEE AGAINST SECURITY DEPOSIT.**

TO

URANIUM CORPORATION OF INDIA LIMITED
P.O. JADUGUDA MINES,
DIST: EAST SINGHBHUM (JHARKHAND)
PIN : 832102

Sir,

WHEREAS on or about the _____ day of _____ M/s (Supplier's name & address), a Company / Firm registered under (companies Act 1956/.....) and having its registered office situated at (Postal address) (herein after referred to as 'The Supplier') entered into a contract bearing reference no. _____ dtd. _____ with Uranium corporation of India Limited., (A Govt. of India Enterprises), P.O. Jaduguda Mines, Dist: Singhbhum East, Jharkhand – 832102 (herein after referred to as UCIL) for supply (details of order) (herein after referred to as 'The Contract').

AND WHEREAS under the terms and conditions of the contract the supplier is required to keep with UCIL a security deposit of Rs. _____ (Rupees _____ only) or submit a Bank Guarantee in lieu of cash deposit for the fulfillment of the terms and conditions of the contract, and whereas the supplier has chosen to submit a Bank Guarantee.

NOW WE (Bankers) hereby agree and undertake to indemnify UCIL and keep UCIL indemnified to the extent of a sum not exceeding the sum of Rs. _____ (Rupees _____) against any damage or loss that may be suffered by UCIL by reason of non-fulfillment of any of the terms and conditions of the contract by the supplier.

AND WE, (Bankers) hereby undertake to pay on demand in writing by UCIL or any officer of UCIL within 48 hours and without any demur to UCIL on behalf of the supplier any sum of sums not exceeding in the total Rs. _____ (Rupees _____) as may be claimed by UCIL as the damages or loss that UCIL may have suffered by reasons of the non-fulfillment of any particular terms and conditions of the contract by the supplier.

We undertake to pay to you any money so demanded notwithstanding any dispute or disputes raised by the supplier in any suit or proceeding pending before any court or tribunal or arbitrators relating thereto.

AND WE, (Bankers) hereby further agree that the decision of UCIL as to whether the supplier has committed breach of any such terms & conditions of the contract or not and assessment of UCIL as to the amount of damages or loss suffered by UCIL on account of such breach would be final and binding on us and it need not be established.

AND WE, (Bankers) lastly agree that our liability hereunder shall not be discharged by virtue of agreements between UCIL and the supplier whether with or without our knowledge, and / or consent or by reason of UCIL showing any indulgence or forbearance to the supplier whether as to payment, time, performance or any other matter whatsoever or any modification of the said contract which but for this provision would amount to discharge of the surety under the law.

This guarantee shall not be revoked by us whether before its coming into force or any time during its currency without your previous consent in writing.

AND WE, (Bankers) also agree that our liability hereunder shall not be discharged by any change in the constitution of this bank or the firm of supplier. Our liability under the guarantee shall not in any event whatsoever exceed the sum of Rs. _____ (Rupees _____).

Our guarantee shall remain in force until (date) or such further date up to which this bank guarantee is renewed or extended and unless a claim under the guarantee is lodged with us within 6 (six) months from such date all rights of UCIL under the guarantee shall be forfeited and we shall be relieved and discharge from all liabilities thereunder.

For the purpose of enforcing legal rights / remedies under this guarantee we agree that the court of law of GHATSILA, Singhbhum East, Jharkhand State shall have exclusive jurisdiction.

We have power to issue this guarantee and the undersigned has full power to sign this guarantee on our behalf under POWER OF ATTORNEY granted to him by the Bank.

Dated at (Place) this _____ day of _____ 201_____

For (BANKER'S NAME)

Signature
(Name in Capital letter)
Designation _____

Signature
(Name in Capital letter)
Designation _____

ANNEXURE – 5**PROFORMA FOR BANK GUARANTEE AGAINST WARRANTY**

TO

URANIUM CORPORATION OF INDIA LIMITED
P.O. JADUGUDA MINES,
DIST: EAST SINGHBHUM (JHARKHAND)
PIN : 832102

Sir,

WHEREAS M/s (Name and full address) (hereinafter referred to as the 'contractor' received an order bearing reference number _____ dated _____ (hereinafter referred to as the 'Contract') from Uranium Corporation of India Limited, P.O. Jaduguda Mines, District: Singhbhum, Jharkhand – 832102 (hereinafter referred to as 'UCIL') for the supply of _____.

And whereas the contractor is required to guarantee that the goods supplied is free from defects in its material of construction workmanship and its performance and further required to rectify by repair or replacement free of all costs to UCIL any defect / defects in the goods and / or its performance, if noticed within the warranty period stipulated.

And whereas UCIL has agreed to pay the contractor the full value (inclusive of duties and taxes) of the goods supplied on the contractor furnishing a bank guarantee in the manner here in contained for a sum of Rs. _____(Rupees _____) to cover the said guarantee.

Now we (the Banker) hereby agree and undertake to indemnify UCIL and keep UCIL indemnified to the extent of a sum not exceeding the sum of Rs. _____(Rupees _____) against any damage or loss that may be suffered by UCIL by reason of non-fulfillment of the obligations under the said guarantee by the contractor.

AND WE, (Banker) hereby undertake to pay on demand in writing by UCIL or any officer of UCIL within 48 hours and without any demur to UCIL on behalf of the supplier any sum or sums not exceeding in the total Rs. _____(Rupees _____) as may be claimed by UCIL as the damages or loss that UCIL may have suffered by reasons of the non-fulfillment of any particular terms and conditions of the contract by the suppliers.

We undertake to pay to you any money so demanded notwithstanding any dispute or disputes raised by the supplier(s) in any suit or proceeding pending before any court or Tribunal or arbitrators relating thereto.

AND WE (Bankers) hereby further agree that the decision of UCIL as to whether the contractor has committed breach of any such terms and conditions of the contract or not and assessment of UCIL as to the amount of damages or loss suffered by UCIL on account of such breach would be final and binding on us and it need not be established.

AND WE, (Bankers) lastly agree that our liability hereunder shall not be discharged by virtue of arrangements between UCIL and the supplier whether with or without our knowledge, and / or consent or by reason of UCIL showing any indulgence or forbearance to the supplier whether as to payment, time, performance or any other matter whatsoever or any modification of the said contract which but for this provision would amount to discharge of the surety under the law.

This guarantee shall come into force simultaneously with your making the payment to the supplier and shall not be revoked by us whether before its coming into force or any time during its currency without your previous consent in writing.

AND WE, (Bankers) also agree that our liability hereunder shall not be discharged by any change in the constitution of this bank or the firm of supplier. Our liability under the guarantee shall not in any event whatsoever exceed the sum of Rs. _____ (Rupees _____).

Our guarantee shall remain in force until _____ (date) _____ or such further date up to which this bank guarantee is renewed and unless a claim under the guarantee is lodged with us within 6 (six) months from such date, all rights of UCIL under the guarantee shall be forfeited and we shall be relieved and discharge from all liabilities thereunder.

For the purpose of enforcing legal rights / remedies under this guarantee we agree that the court of law of GHATSILA, Singhbhum East, Jharkhand State shall have exclusive jurisdiction.

We have power to issue this guarantee and the undersigned has full power to sign this guarantee on our behalf under POWER OF ATTORNEY granted to him by the Bank.

Dated at (Place) this _____ day of _____ 201__

For (BANKER'S NAME)

Signature
(Name in Capital letter)
Designation _____

Signature
(Name in Capital letter)
Designation _____

PROFORMA FOR BANK GUARANTEE AGAINST EARNEST MONEY DEPOSIT

Annexure-5A

Uranium Corporation of India Limited
P.O. Jaduguda Mines,
Dist: East Singhbhum (Jharkhand)
Pin: 832 102

Dear Sir,

In accordance with invitation to Bid under your Tender no. _____, M/s (Supplier's name & address) hereinafter called the (Bidder) wish to participate in the said bid for supply of (Material Description & Quantity) and you, as a special favour have agreed to accept an irrevocable and unconditional, Bank Guarantee for an amount of Rs. _____ valid upto _____ on behalf of the bidder in lieu of the Earnest Money Deposit (EMD) by way of demand draft required to be made by the bidder, as a condition precedent for participation in the said bid.

We, (Banker's name & address) guarantee and undertake to pay immediately on demand by Uranium Corporation of India Limited, the amount of Rs _____ (Rupees _____) without any reservation, protest, demur and recourse. Any such demand made by the said owner shall be conclusive and binding on us irrespective of any dispute or difference raised by the bidder.

This Guarantee shall be irrevocable and shall remain valid upto and including (Validity of offer + 6 months). If any further extension of this guarantee is required, the same shall be extended to such required period (not exceeding one year) on receiving instructions from M/s (Supplier's name) on whose behalf this guarantee is issued.

AND WE, (Bankers) lastly agree that our liability hereunder shall not be discharged by virtue of agreements between UCIL and the supplier whether with or without our knowledge, and / or consent or by reason of UCIL showing any indulgence or forbearance to the supplier whether as to payment, time, performance or any other matter whatsoever or any modification of the said contract which but for this provision would amount to discharge of the surety under the law.

This guarantee shall not be revoked by us whether before its coming into force or any time during its currency without your previous consent in writing.

AND WE, (Bankers) also agree that our liability hereunder shall not be discharged by any change in the constitution of this bank or the firm of supplier. Our liability under the guarantee shall not in any event whatsoever exceed the sum of Rs. _____ (Rupees _____).

Our guarantee shall remain in force until (date) or such further date up to which this bank guarantee is renewed or extended and unless a claim under the guarantee is lodged with us within 6 (six) months from such date all rights of UCIL under the guarantee shall be forfeited and we shall be relieved and discharge from all liabilities thereunder.

NOT withstanding anything contained herein:

- i. Our liability under this Bank Guarantee shall not exceed Rs. _____ (Rupees _____)
- ii. This Bank Guarantee shall be valid upto _____.
- iii. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before _____.

For the purpose of enforcing legal rights / remedies under this guarantee we agree that the court of law of GHATSILA, Singhbhum East, Jharkhand State shall have exclusive jurisdiction.

We have power to issue this guarantee and the undersigned has full power to sign this guarantee on our behalf under POWER OF ATTORNEY granted to him by the Bank.

Dated at (Place) this _____ day of _____ 201____

For (BANKER'S NAME)

Signature

(Name in Capital letter)
Designation _____

Signature

(Name in Capital letter)
Designation _____

NOTE TO SUPPLIERS:

- i) BANK GUARANTEE submitted by you should be sent to us directly by the issuing bank under Registered Post (A.D).

NOTE TO ISSUING BANK:

- i) In case you desire to submit the BANK GUARANTEE directly to us, you are requested to send by Registered Post (A.D) an unstamped duplicate copy of the guarantee directly to us with a covering letter to compare with the original BGs and confirm that it is in order.

PROFORMA FOR BANK GUARANTEE AGAINST ADVANCE PAYMENTANNEXURE -5B

TO

URANIUM CORPORATION OF INDIA LIMITED
 (GOVT. OF INDIA ENTERPRISE)
 P.O. JADUGUDA MINES,
 DIST: EAST SINGHBHUM (JHARKHAND)
 PIN : 832102

Sir,

WHEREAS on or about the _____ day of _____ 20____ M/s (Supplier's name & address), a Company / Firm registered under companies Act 1956 and having its registered office situated at (Postal address) (herein after referred to as 'The Supplier') entered into a contract bearing reference no. _____ dated _____ with Uranium Corporation of India Limited, (A Govt. of India Enterprise), P.O. Jaduguda Mines, Dist: Singhbhum East, Jharkhand – 832102 (herein after referred to as 'UCIL') for (details of order) (herein after referred to as 'The Contract').

AND WHEREAS under the terms & conditions of the contract advance payment of Rs. _____ (Rupees _____) is to be made by UCIL to the supplier, which the supplier is to repay to 'UCIL', and whereas UCIL has agreed in pursuance of the said terms and conditions of the contract to make advance payment of Rs. _____ (Rupees _____) to the supplier on the supplier furnishing a bank guarantee in the manner herein contained.

NOW WE (Bankers) in consideration of UCIL having agreed to pay the supplier advance payment of Rs. _____ (Rupees _____), hereby agree and undertake to indemnify UCIL and keep UCIL indemnified to the extent of a sum not exceeding the sum of Rs. _____ (Rupees _____) against any damage or loss that may be suffered by UCIL by reason of non-fulfillment of any of the terms and conditions of the contract by the supplier.

AND WE, (Bankers) hereby undertake to pay on demand in writing by UCIL or any officer of UCIL within 48 hours and without any demur to UCIL on behalf of the supplier any sum of sums not exceeding in the total Rs. _____ (Rupees _____) as may be claimed by UCIL as the damages or loss that UCIL may have suffered by reasons of the non-fulfillment of any particular terms and conditions of the contract by the supplier.

We undertake to pay to you any money so demanded notwithstanding any dispute or disputes raised by the supplier(s) in any suit or proceeding pending before any court or tribunal or arbitrators relating thereto.

AND WE, (Bankers) hereby further agree that the decision of UCIL as to whether the supplier has committed breach of any such terms & conditions of the contract or not and assessment of UCIL as to the amount of damages or loss suffered by UCIL on account of such breach would be final and binding on us and it need not be established.

AND WE, (Bankers) lastly agree that our liability hereunder shall not be discharged by virtue of arrangements between UCIL and the supplier whether with or without our knowledge, and / or consent or by reason of UCIL showing any indulgence or forbearance to the supplier whether,

as to payment, time, performance or any other matter whatsoever or any modification of the said contract which but for this provision would amount to discharge of the surety under the law.

This guarantee shall come into force simultaneously with your making the said advance payment to the supplier and shall not be revoked by us whether before its coming into force or any time during its currency without your previous consent in writing.

AND WE, (Bankers) also agree that our liability hereunder shall not be discharged by any change in the constitution of this bank or the firm of supplier. Our liability under the guarantee shall not in any event whatsoever exceed the sum of Rs. _____ (Rupees _____).

Our guarantee shall remain in force until (date) or such further date up to which this bank guarantee is renewed or extended and unless a claim under the guarantee is lodged with us within 6 (six) months from such date, all rights of UCIL under the guarantee shall be forfeited and we shall be relieved and discharge from all liabilities thereunder.

For the purpose of enforcing legal rights / remedies under this guarantee we agree that the court of law of GHATSILA, Singhbhum East, Jharkhand State shall have exclusive jurisdiction.

We have the power to issue this guarantee and the undersigned has full power to sign this guarantee on our behalf under POWER OF ATTORNEY granted to him by the Bank.

Dated at (Place) this _____ day of _____ 201____

For (BANKER'S NAME)

Signature

(Name in Capital letter) _____
Designation _____

Signature

(Name in Capital letter) _____
Designation _____

NOTE TO SUPPLIERS :

- ii) BANK GUARANTEE submitted by you should be sent to us directly by the issuing bank under Registered Post (A.D).

NOTE TO ISSUING BANK :

- i) In case you desire to submit the BANK GUARANTEE directly to us, you are requested to send by Registered Post (A.D) an unstamped duplicate copy of the guarantee directly to us with a covering letter to compare with the original BGs and confirm that it is in order.

ANNEXURE-6**PRICE FORMAT FOR ROTARY DRYER**

Sl. No.	DESCRIPTION	VALUE IN RUPEE
1.	Design, Manufacturing, supply of Rotary Dryer & its accessories and essential spares (as per annexure 6A)	
2.	Erection & Commissioning charges (as per annexure 6B)	
3.	Charges for material Tests as specified in the tender documents (if any)	
4.	TOTAL	
5.	Total price of optional spares for one year trouble free operation (as per annexure 6C)	
6.	GRAND TOTAL (Rs.)	

ANNEXURE-6A**Price Format for supply items**

1	2	3	4	5				6	7	8	9
Sl. No	Item	Qty.	Ex- works prices	Taxes & Duties For Supply				Total taxes & duties on Supply = 5a + 5b + 5c + 5d	Freight charges	Loading & Unloading charges (if any)	Total Price (4+6+7+ 8)
				5a	5b	5c	5d				
				P&F	ED + Cess	CST / VAT	Other taxes & duties (pl. specify				
1 : : : : : :	Design, Manufacturing & supply of Rotary Dryer (As per Annexure – 2F & 2G)										
								<u>TOTAL</u>			

ANNEXURE-6B**Price Format for Erection & Commissioning**

1	2	3	4	5
Item Description	Quantity	Erection & Commissioning Charges	Taxes if any (please specify WCT / Service tax)	Total Cost
1 : : : : : :				
	TOTAL			

ANNEXURE – 6C**PRICE FORMAT FOR OPTIONAL SPARES REQUIRED
FOR 2 YEARS TROUBLE FREE OPERATION**

Sl. No.	Item Detail	Qty. Req.	Basic Price	Excise duty	Edu. Cess	CST/ VAT	Insura- -nce	Other Taxes	Freight	Total
1										
2										
3										
4										
5										
:										
:										
:										
:										
Grand Total										

Note: *Price of Optional spares (Annexure –6C) for 2 years trouble free operation may not be considered for deciding the lowest bidder.*

ANNEXURE-7**DETAILS OF PAST SUPPLY/CREDENTIALS OF ROTARY DRYER/KILN .**

1.	Capacity & Size of Rotary Dryer				
2.	Order details				
3.	Order value				
4.	Date of commissioning				
5.	Completion certificate to be attached				
6.	Performance report from the customer to be attached				
7.	Name of Customer				
8.	Name of contact person				
9.	Address, fax and phone nos.				

ANNEXURE-8**SCHEDULE**

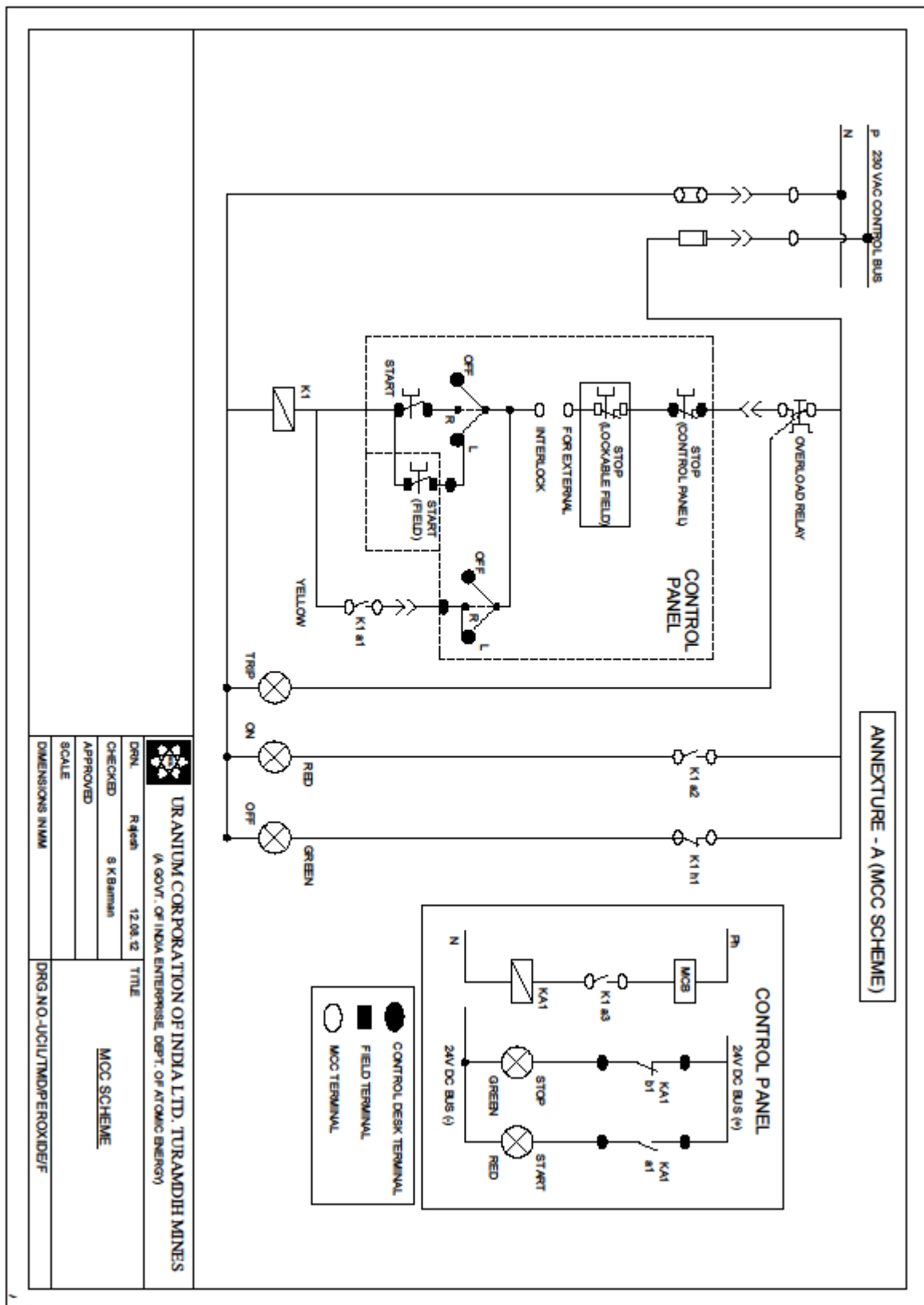
Sl. No.	Item	Schedule date of supply
1.	3 sets of G.A. drawings and details of drawings for approval	Within 30 days from the date of order/ LOI
2.	Inspection of Rotary Dryer at works	Within 100 days from the date of order/ LOI
3.	Delivery of Rotary Dryer	Within 120 days from the date of order/ LOI
4.	Erection & Commissioning	Within 60 days of supply

ANNEXURE – 9**Deviations from NIT**

<u>Sl. No.</u>	<u>Items detail</u>	<u>Specification</u>	<u>Offered</u>
1.			
2.			
3.			
:			
:			
:			
:			
:			

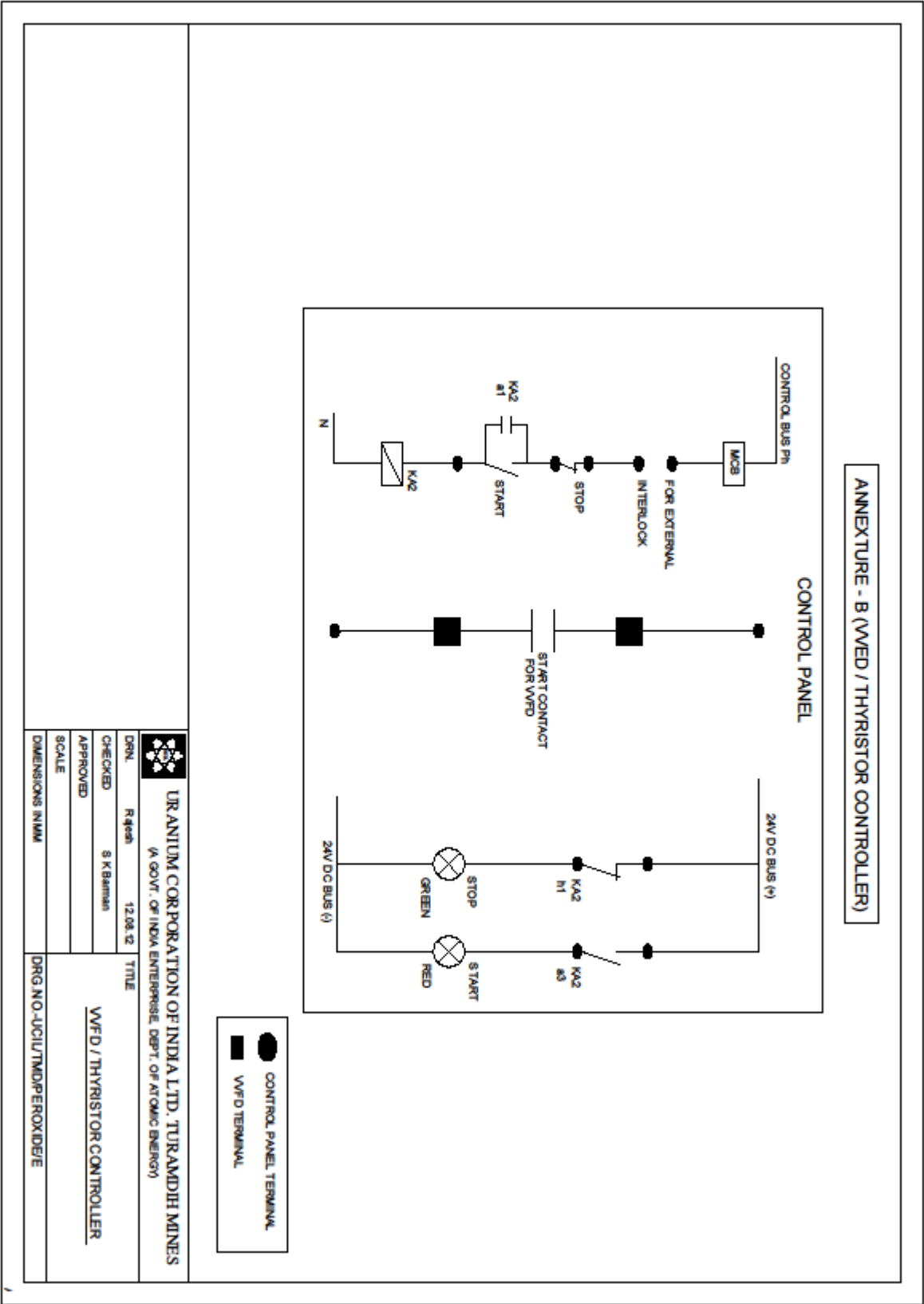
ANNEXURE – 10

APPROVED SCHEME FOR MCC



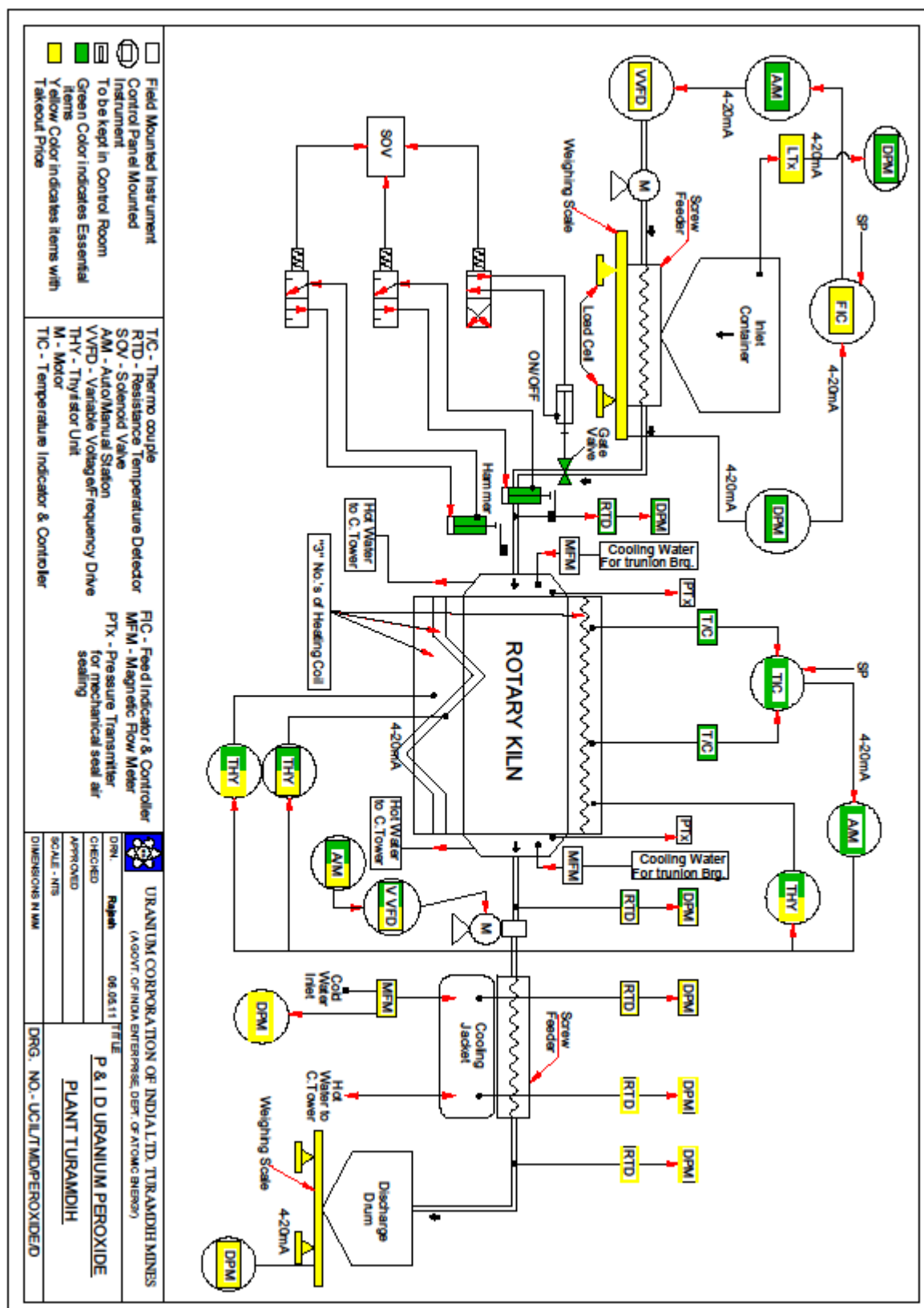
ANNEXURE – 11

APPROVED SCHEME FOR VVFD/ THYRISTOR CONTROLLER

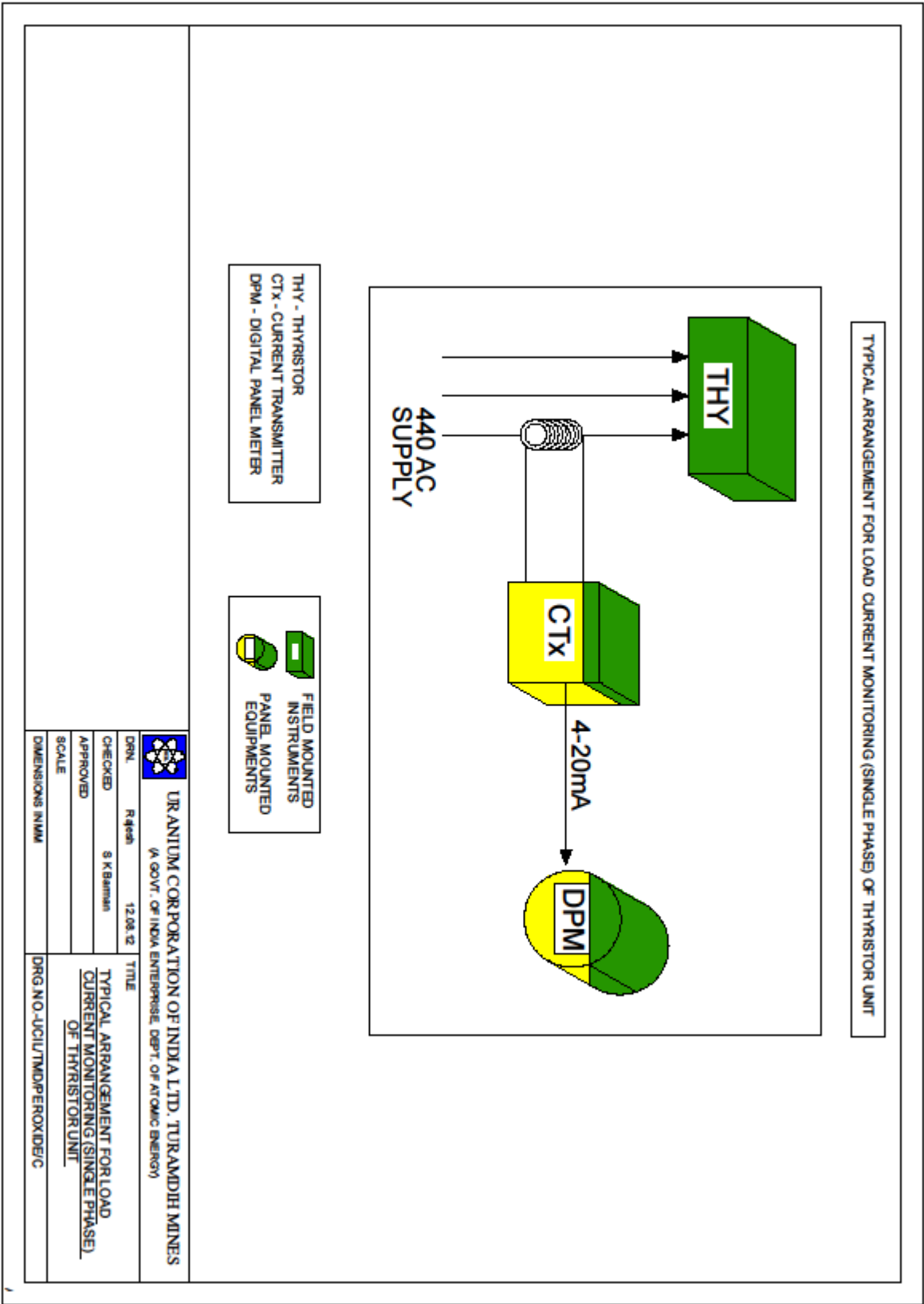


ANNEXURE – 12

P&ID OF URANIUM PEROXIDE PLANT



ANNEXURE – 13
TYPICAL ARRANGEMENT FOR LOAD CURRENT MONITORING (SINGLE PHASE OF THYRISTOR UNIT)

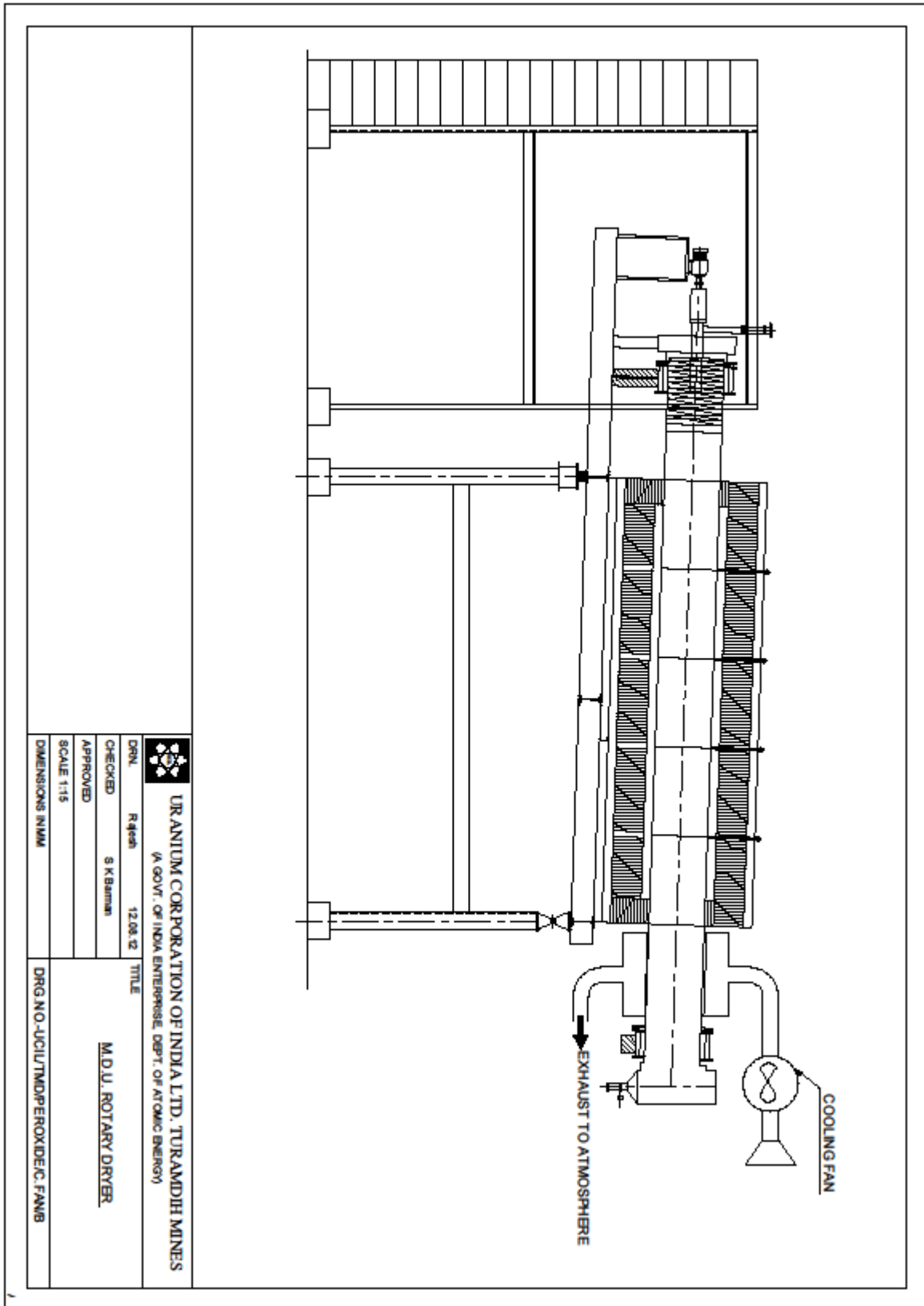


The technical drawing illustrates a movable M.D.U. feed hopper with the following specifications:

- Front View:** Shows a hopper with a total width of 1070 mm and a height of 687 mm. The top width is 240 mm. The material is specified as SMC 100.
- Top View:** Shows a square base with a side length of 900 mm. The inner square has a side length of 675 mm. The material is specified as ISA 50x50x6.
- Side View:** Shows the hopper's profile with a total width of 1547 mm and a height of 900 mm. The top width is 480 mm. The material is specified as SMC 100.

ANNEXURE-15

PROPOSED SCHEMATIC DIAGRAM FOR COOLING FAN



DRAWINGS

1. UCIL/TMD/PEROXIDE/FEED HOPPER/A
2. UCIL/TMD/PEROXIDE/COOLING FAN/B
3. UCIL/TMD/PEROXIDE/C (ANNEX-13)
4. UCIL/TMD/PEROXIDE/D (ANNEX-12)
5. UCIL/TMD/PEROXIDE/E (ANNEX-11)
6. UCIL/TMD/PEROXIDE/F (ANNEX-10)