

TCC & Detailed BOQ

**Supply and application of Anti Corrosive
Polyester Glass Flake Coating including grit
blasting on Sea Water Pipe lines**

at

KUDANKULAM NUCLEAR POWER PROJECT

UNIT 3&4 TAMILNADU

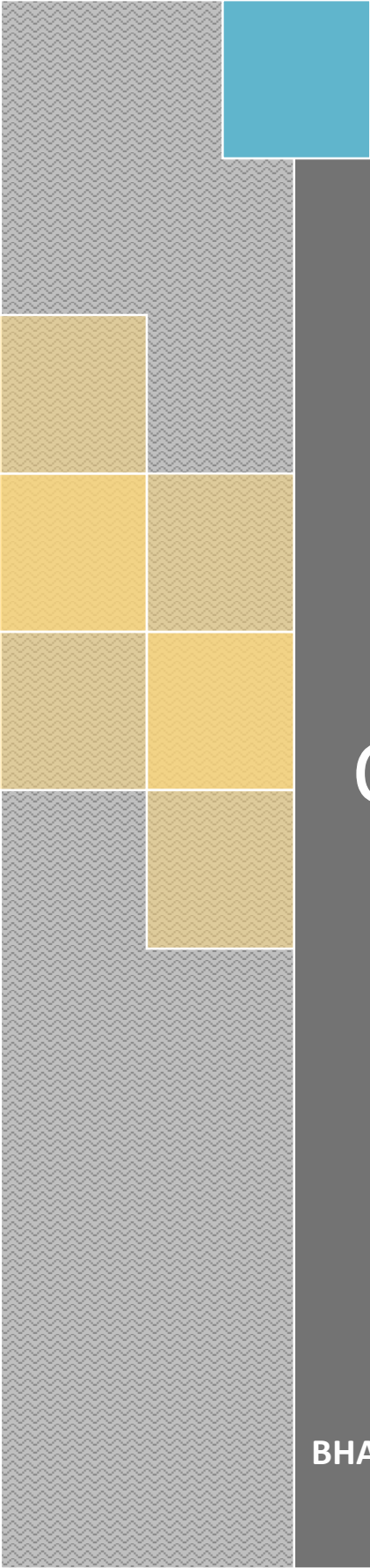


BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035.



VOLUME – IA

Part I

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED



TECHNICAL CONDITIONS OF CONTRACT (TCC)

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VOLUME-IA PART – I CHAPTER – I PROJECT INFORMATION

1.1	PROJECT TITLE	:	KUDANKULAM NUCLEAR POWER PROJECT UNIT 3 & 4
1.2	PLANT CAPACITY	:	2X 1000 MWe
1.3	TYPE OF PROJECT	:	GREEN FIELD
1.4	OWNER	:	NUCLEAR POWER CORPORATION OF INDIA LIMITED
1.5	PLANT LOCATION	:	KUDANKULAM VILLAGE, RADHAPURAM TALUK, TIRUNELVELI DISTRICT TAMILNADU
1.6	NEAREST TOWN	:	NAGERCOIL (41KM)
1.7	NEAREST RAILWAY STATION	:	KANYAKUMARI (35KM)
1.11	NEAREST AIRPORT	:	TUTICORIN (131KM)

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VOLUME-IA PART – I CHAPTER – II

SCOPE OF WORK

As Detailed in Bill of Quantity (BOQ)

ANTI CORROSIVE COATING FOR SEAWATER SYSTEMS (SCHEDULE-K of NPCIL Contract)

Contractor shall supply and carryout application of anticorrosive painting on indoor/outdoor/buried Seawater CS pipelines inner and outer surfaces, fittings, valves, supports, equipments, CS structures and external surface of buried CS pipelines. The scope of work Includes

1. Supply of all Anti Corrosive Polyester glass flake Coating material and consumables as specified for Anti Corrosive coating work as per the Technical specification no I02.KK34.0.0.TH.TS.PR009 R01
2. Establishment of grit blasting and painting shop (Empty shed shall be Provided by BHEL at Free of cost) and maintenance, surface preparation and application of anti-corrosive coating at shop as well as at field, inspection and testing.
3. All coating shall be done on clean, rust/scale free and dry surface after surface preparation and shall be fairly uniform.
4. Preparation and submission of coating procedure for approval of the EIC/NPCIL before taking up any coating work.
5. Contractor shall handle the painted pipes carefully by using nylon webbing slings/ rubber pads, etc not to cause any damage to painted surface. Care shall be taken during all stages like storage (stacking), handling, shifting at site not to cause any damage to painted surface. Shifting of pipes for internal anticorrosive coating and transportation back to BHEL storage yard shall be in the scope of the contractor. No additional payment will be made for such transportation work.
6. Contractor shall conduct inspection & tests on the painted pipes as per the technical specifications and prepare reports after acceptance by NPCIL

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7. Shifting of Non erected CS Pipe lines from BHEL storage yard under KKS Code PEB & PUQ of Annexure-1 to BOQ - 9900Mtrs /1440 MT Appx to Grit blasting & Painting shed, which is located in the BHEL storage yard itself for Grit Blasting & Anti corrosive coating application. The same shall be shifted back to storage yard and stacked properly after completion coating. No additional payment will be made for such transportation work.
8. Shifting of Pipes from NPCIL stores (which is located 1.5KM appx away from BHEL storage yard) under KKS Code except PEB & PUQ of Annexure-1 to BOQ- 4700 Mtrs /380MT Appx to Grit blasting & Painting shed for Grit Blasting & Anti corrosive coating application. The same shall be shifted back to BHEL storage yard and stacked properly after completion coating. No additional payment will be made for such transportation work.
9. Contractor shall construct their own office shed and storage shed /AC storage shed with racks/ AC bunk house for storing painting materials and tool & tackles at their cost.
10. BHEL shall not be responsible for the safety and protection of the materials of the contractor and the contractor shall make their arrangements for proper watch and ward for their materials.
11. Manufacturer NACE Level certified inspector shall witness all stages of painting namely surface cleaning, application of each coat. The painting application shall be supervised by manufacturer qualified personal, same shall be recorded and maintained at every stages as per NPCIL Technical specification.
12. The painting shall be carried out at site as per NPCIL approved procedure, QA plan (ITP) by qualified painters/ painting system.
13. All the batches of paints supplied shall comply NPCIL batch qualification requirement and inspection by NPCIL. Batch TC shall be submitted along with the product. Material shall be dispatched only after due clearance from NPCIL.
14. Manufacturing QP(ITP) shall be followed for each batch of product. QS/PDI requirements as per approved QP shall be followed.
15. Additional test at site for Mock up qualifications, performance tests shall be as per approved ITP/QP developed for site application.

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Technical specification for supply and application of Anti Corrosive Coating

NPCIL DOCUMENT NO: IO2.KK34.00.TH.TS.PR009 (R01)

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1.0 SCOPE

This technical specification is intended to cover pre-qualification of paint, supply of coating materials, coating application, inspection, testing, repair and handling of paint related work of sea water system and sea water metal structure.

1.1 EXTENT OF WORK

- a. All Carbon Steel Storage Tanks, pipes.
- b. All Carbon Steel, fittings, valves and flanges (including painting of identification marks).
- c. Painting of color bands on all piping as required for identification including insulated aluminum clad, galvanized, SS, plastic or plastic coated and nonferrous piping/ equipment if any. (specification of identification and color coding to be given to the successful bidder at the time of execution of the work)
- d. Identification lettering/ numbering on all painted surfaces of equipment/piping insulated aluminum clad, galvanized, SS and non-ferrous piping.
- e. Repair work of damaged pre-erection/ fabrication and shop primer and weld joints in the field/site before and after erection as required.
- f. Supply, handling, storage of all primers, paints and all other materials required for painting

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2.0 REFERENCE CODES & STANDARDS

CODE/ STD	TITLE
ISO 12944	Paint and varnish – corrosion protection of steel structure by protective paint system.
ISO 8501	Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness
ISO 8502-3	Preparation of steel substrates before application of paints and related products - Test for the assessment of surface cleanliness - Assessment of dust on steel surfaces prepared for painting, pressure sensitive tape method.
ISO 8503	Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast cleaned substrates.
ISO 8504-2	Preparation of steel substrates before application of paints and related products - Surface Preparation Methods - Abrasive blast-cleaning.
ISO 1513	Paints and varnishes - Examination and preparation samples for testing.
ISO 2808	Determination of film thickness
ISO 2409	Cross cut test.
SSPC-SP	Steel Structures Painting Council, U.S.A.
ASTM G 62-85	Standard Test Methods for Holiday Detection in Pipeline Coatings
ASTM D520	Standard Specification for Zinc Dust Pigment
ASTM D521	Standard Test Methods for Chemical Analysis of Zinc Dust (Metallic Zinc Powder)
IS 101	Methods of sampling and test for paints, varnishes and related products
ASTM D2697	Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings
ASTM D 5895	Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders
ASTM D 1200	Standard Test Method for Viscosity by Ford Viscosity Cup
ASTM D 1186	Standard Test Measurement DFT.
ASTM D 4060	Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM D 1653	Standard Test Methods for Water Vapor Transmission of Organic Coating Films
ASTM G-154	Standard Practice for Operating Fluorescent

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	Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ISO 4624	Pull of test for adhesion

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3.0 EQUIPMENT

3.1 All tools, brushes, rollers, spray guns, blast material, hand power tools for cleaning and all equipments, scaffolding materials, shot & grit blasting equipments & air compressors etc. required to be used shall be suitable for the work and all in good order and shall be arranged by the contractor at site and in sufficient quantity/nos. The manufacturer's test certificates / data sheets for all the above items shall be reviewed by Engineer-in-charge at site before start of work.

3.2 Mechanical mixer shall be used for paint mixing operations, except that the Engineer-In-Charge may allow the hand mixing of small quantities at his discretion in case of specific requirement for touch up work only.

4.0 GENERAL REQUIREMENTS:

The following to be submitted before start of work:

4.1 The bidder may be required to set up a coating facilities at site complete with all necessary equipment, consumables and personnel to complete the work. The bidder to submit details of the facility he proposes, including size of area required and utilities.

4.2 The bidder shall provide an inventory of the proposed equipment and personnel that will be used to execute the contract in the line with the project schedule.

4.3 The bidder shall provide a comprehensive execution plan and methodology of coating with the proposal.

4.4 The bidder shall perform all work in accordance with this specification and other requirements noted herein.

4.5 The bidder shall also submit copies of test reports conducted by reputed test agencies evidencing that materials conform to minimum performance requirements attached anywhere in this specification.

4.6 The contractor will be totally responsible for field coating, field weld joint coating including testing and inspection of coated area.

5.0 COATING MATERIAL SPECIFICATION:

5.1 The coating material should be as per properties indicated in Annexure- A& B.

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6.0 TECHNICAL REQUIRMENT OF PAINT APPLICATION

6.1 PRE-BLASTING:

6.1.1 Scope of work include treatment of surface for application of protective coating, is as follow:

- a) Removal of oil/grease contamination
- b) Removal of salt deposit and other water soluble compounds
- c) Abrasive blasting
- d) Removal of dust and abrasive product

6.1.2 The surfaces shall be free from any foreign matter such as weld flux, residue, slivers, oil, grease, salt etc. prior to blast cleaning.

6.2 BLAST CLEANING:

6.2.1 Blasting abrasives shall be dry, clean and free from contaminants which will be detrimental to the performance of the coating.

6.2.2 In case of rain or bad weather, surface preparation shall not be carried out outdoors.

6.2.3 When surface is wet, surface preparation shall not be carried out.

6.2.4 Surface prep./Roughness profile of the cleaned surface shall conform to the paint manufacturer recommendations.

6.2.5 Substrate condition during blasting must be 3 degrees Celsius above dew point temperature.

6.2.6 Irrespective of whether external or internal surface to be coated, blast cleaning shall not be performed where dust can contaminate surfaces undergoing such cleaning or during humid weather conditions having humidity exceed 85%. Relative Humidity reading shall be recorded every 2 hours during the blasting operation in the immediate vicinity of operation.

6.2.7 If wet abrasive method is used for cleaning than the substrate shall be fully dried before application of any coating.

6.2.8 Compressed air used for blast cleaning shall be clean, dry and free of moisture and oil. Moisture separators, oil separator, traps or other equipment may be necessary to achieve clean, dry air.

6.3 PAINT APPLICATION:

6.3.1 Pre-fabrication primer is not a part of the paint system. It might need to removed.

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6.3.2 The coating manufacturer shall provide a Data Sheet for each **coating system to be used, containing at least the following information for each product:**

- Surface pre-treatment requirements.
- Wet film thickness/dry film thickness (max, min. and specified).
- Maximum and minimum recoating intervals at 25 °C.
- Information on thinners to be used (quantities and type).
- Mixing, handling and application requirements/recommendations.
- Pot life 30 °C.
- Drying time at 25 °C

6.3.3 Paint/primer shall be applied after ensuring assessment of prepared surfaces as per ISO 8501-1 / ISO 8501-2

6.3.4 The elapsed time between the start of blasting and coating shall not exceed the maximum as given in the following table

Relative humidity	Maximum Time elapsed
Above 80%	2.0 Hour
Up to 80%	3.0 Hour
Up to 50 %	4.0 Hour

6.3.5 At the end of pipe joint where welding is to take place a cut back (60mm) may be allowed in the coating depending upon the field joint coating method selected. The actual distance if any, shall be agreed prior to application.

6.3.6 Area not to be coated shall be masked with disposable plastic sheets, tapes, cardboards etc.

6.3.7 Prior to the application of each coat, a stripe coat shall be applied by brush to all welds, corners, behind angles, sharp edges of beams etc. and areas not fully reachable by spray in order to obtain the specified coverage and thickness.

6.3.8 Surface shall not be coated in rain, wind or in environment where injurious airborne elements exists, when the Steel surface temperature is less than 3 degree C. above dew point, when the relative humidity is greater than 85% or when the temperature is below 5 degree. C

6.3.9 When the successive coat of the same colour have been specified, alternate coat shall be tinted, where practical, sufficiently to produce enough contrast to indicate complete coverage of the surface. The tinting material shall be compatible with the material and not detrimental to its service life and shall be recommended by the original paint manufacturer.

6.3.10 Field paint application shall not be done when the wind speed exceeds 20KM per hour.

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- 6.3.11 All nameplates, manufacturer's identification tags, machined surfaces, instrument glass, finished flange faces, control valve items and similar items shall be masked to prohibit coating deposition. If these surfaces are coated, the component shall be cleaned and resorted to its original condition.
- 6.3.12 No coat shall be applied until the preceding coat has dried. The material shall be considered dry for re-coating when another coat can be applied without the development of any film irregularities such as lifting or loss of adhesion of undercoats.
- 6.3.13 No paint shall be force dried under conditions which will cause chalking, wrinkling, blistering formation of pores, or detrimentally affect the conditions of the paint.
- 6.3.14 No drier shall be added to a paint on the job unless specifically called for in the manufacturer's specification for the paint.
- 6.3.15 Paint shall be protected from rain, condensation, contamination until dry to the fullest extent practicable.
- 6.3.16 The method of application shall be governed by the coating manufacturer's recommendation for the particular coating being applied.
- 6.3.17 Roller application of the first primer coat is not acceptable. When paints are applied by brush, the brush shall be of a style and quality acceptable to the coating manufacturer. Brush application shall be done so that a smooth coat, as uniform in thickness as possible is obtained.
- 6.3.18 Zinc silicate primer shall not be applied below relative humidity of 65%.
- 6.3.19 Spray application shall be in accordance with the following:
 - a. Air spray application equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied, and shall be equipped with suitable pressure regulators and gauges. The air caps, nozzles, and needles shall be those recommended by the manufacturer of the equipment for the material being sprayed. The equipment shall be kept in satisfactory condition to permit proper paint application.
 - b. All runs and sags shall be brushed out immediately or the paint shall be removed and the surface repainted.
 - c. Areas inaccessible to the spray gun shall be painted by brush.
 - d. Airless Spray Application shall be done with an equipment having pump ratios at least 45:1 or as recommended by product manufacturer.

6.4 FINAL SURFACE CONDITION:

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6.4.1 The maximum content of soluble impurities on the blasted surface as sampled using ISO 8502-6 and distilled water, shall not exceed a conductivity corresponding to a NaCl content of 20 mg/m². Equivalent methods may be used.

6.5 SURFACE PREPARATION AND PAINTING APPLICATION OF WELD/FLANGE JOINT: -

6.5.1 Painting of flange is to be done as per Annexure-F

6.5.2 All equipment's & pipeline flange faces, internal coating shall be terminated within groove as per Annexure-F.

6.5.3 In case of pipeline flange, internal coating to be continued on the flange faces also. External coating shall be carried out at all metal surfaces including bolt hole excluding gasket area. Coating should never be terminated at edges/corners, it should be terminated at flat area.

6.6 REPAIR OF DAMAGE SURFACE:

6.6.1 Where paint has been damaged in handling and in transportation, the repair of damaged coating of pre-erection / fabrication and Shop primer shall be done by contractor.

6.6.2 The contractor shall prepare a field weld joint coating and a repair procedure for review and approval by Engineer-in-charge.

6.6.3 Defective work shall be rectified/repared by the contractor at his own expenses.

7.0 INSPECTION AND TESTING

7.1 COATING PROCEDURE QUALIFICATION:

7.1.1 Prior to actual application on job, sample application shall be carried out to establish that the coating operation and coating material meet the requirements of this specifications.

7.1.2 Quality control tests shall be performed as follows:

- Blast cleanliness standard and profile inspection.
- Salt contamination test
- Visual testing.
- Thickness testing, holiday inspection, adhesion testing, curing testing as per approved standard specified in this specification.
- Repair procedure, as approved by NPCIL

7.1.3 No application/production shall commence until the Contractor has performed all the above tests to complete satisfaction of Engineer-in –charge.

7.2 VISUAL INSPECTION

7.2.1 Assessment of the prepared surfaces shall be visually assessed as described in ISO 8501

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7.2.2 Testing for soluble salt and other invisible contamination on visually cleaned surface by physical and chemical method shall be assessed as per ISO 8502.

7.2.3 The surface roughness profile in accordance with paint manufacturer shall be assessed as per ISO 8503.

7.3 THICKNESS TESTS

7.3.1 The paint thickness shall be checked using non-destructive test.

7.3.2 Dry Film Thickness (DFT) Meter used shall be calibrated before each inspection and shall be witnessed by the Inspector. It is the duty of the Inspector to satisfy himself with the performance of the DFT Meter.

7.3.3 The Dry Film Thickness (DFT), as measured in accordance with ASTM D-1186, shall not vary by 10 % of the specified value.

7.3.4 The Area coverage of DFT measurement is as per SSPC-PA2.

7.4 HOLIDAY DETECTION

7.4.1 100% of the internally coated surfaces shall be tested.

7.4.2 Holiday testing shall be done in accordance with ASTM G-62 after curing of paints.

7.4.3 No holidays are accepted and all holidays shall be repaired. The average and the maximum repair rates allowable for holidays shall be: Average 4 per day. If number is exceeded, or the daily average is exceeded for any 5 consecutive days of production, then application shall cease and the cause shall be investigated and resolved.

7.4 **Adhesion test** is destructive test and shall be done on applied surface selected by Engineer-in-charge if required, as per ISO 4624 or ASTM D4541.

7.5 Environment condition test.

7.5.1 Following parameter to be checked

- a. Air Temperature (Max. & Min.)
- b. Relative humidity (Min. & Max.)
- c. Dew Point Temperature.
- d. Surface Temperature.
- e. Wind Speed (Max.)

7.5.2 In an interval of eight hours, data to be collected and recorded in data sheet. More frequent measurement to be done if conditions are changing rapidly and will be decided by Engineer-in-charge.

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7.7.3 Sling Psychrometer to be used as per ASTM E337 to record wet & dry Temperature.

8.0 QUALIFICATION REQUIREMENTS

8.1 Qualification of Products:

- 8.1.1 Selection of products shall be carried out based on certificate submitted by paint manufacturer as indicated in Annexure- A, from an independent reputed Government lab agreed between contractor and NPCIL.
- 8.1.2 Test method mentioned in test certificate should be as per test standard mentioned in Annexure- A. However, equivalent standard other than specified in Annexure-A, may be followed subjected to NPCIL approval.
- 8.1.3 Only product approved by NPCIL based on the requirements given in Annexure- A shall be supplied for application.
- 8.1.4 Paint qualification cost shall be borne by the contractor/ Paint Manufacturer. The above qualification shall be carried before supply and application of paint.

8.2 Qualification of Personnel

8.2.1 Qualification of paint applicator

Applicator shall be qualified to perform the task viz blast cleaning, application etc. The personnel shall have relevant knowledge of health and safety hazard, coating materials, use of protection equipment, etc.

If not qualified, personnel shall carry out a test in accordance with the standard Coating Procedure Specification. The test shall be supervised by a qualified supervisor and inspected and accepted by qualified QC personnel. A test certificate shall be issued.

The test shall be carried out on a test panel (minimum 1 x 1 m), 1 angle, 1 spool piece of pipe Alternatively a location providing similar geometrical complexity on the component to be coated may be used.

The acceptance criteria are the requirements to the coating system described in this document. Variation in the film thickness shall be within the limits described in this

specification. Applicator failing to meet the requirements shall not be allowed to carry out work in accordance with this document.

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8.2.2 Qualification of procedures

Coating Procedure Specification (CPS)

Supplier shall establish a detailed CPS based on the requirements of this document. The CPS shall contain the following:

- Identification of equipment for surface preparation and application.
- Information given on Coating System Data Sheet.
- Personal protective equipment to be used.
- Safety data sheets for each product.

The qualified CPS shall be followed during all coating work.

The following changes in the coating application parameters requires the CPS to be requalified:

- Any change of coating material.
- Change of method and equipment for surface preparation and coating application.

9.0 QUALITY ASSURANCE PLAN

**QAP shall be submitted by vendor according to this specification.
Acceptance is subjected to NPCIL approval**

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10.0 RECOMMENDED PROTECTIVE COATING SYSTEM.

Sl. No	Equipment's	System recommended	DFT/coat μm	No of coats	Detailed specifications
1	Repair slide Gates, Embedded Guiding structure Embedded structuring cleaning machine (Rake)	Primer: Inorganic Zinc Silicate Under coat: Epoxy MIO Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.- 1,2,3 of Annexure- B
2	Metal structure of Gate Storage Embedded Structure of gate storage.	Primer: Inorganic Zinc Silicate. Under coat: Epoxy MIO intermediate coat. Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.- 1,2,3. of Annexure- B
3	Column Beam and steel structure of screen cleaning machine.	Primer: Inorganic Zinc Silicate. Under coat: Epoxy MIO intermediate coat. Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.- 1,2,3 of Annexure- B
4	External surface of CS Pipeline and support.	Primer: Inorganic Zinc Silicate Under coat: Epoxy MIO Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.- 1,2,3 of Annexure-B
5	Internal surface of CS pipeline	Polyester Glass Flake Total thickness(Min.)	500-550 1000-1100	2	Table No.-04 of Annexure-B
6	External surface of Buried (Soil) carbon steel pipeline.	Polyester Glass Flake Total thickness(Min.)	500-550 1000-1100	2	Table No.-04 of Annexure-B

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Sl. No	Equipment's	System recommended	DFT/Coat μm	No of Coats	Detailed specifications
7	External Surface of accessible part of Condenser cooling water pipeline	Polyester Glass Flake Top coat : Aliphatic Polyurethane (for color coding) Total thickness(Min.)	500-550 30 1060-1170	2 2	Table No.-04,02 of Annexure-B
8	External surfaces of CS Tank. (except bottom portion)	Primer: Inorganic Zinc Silicate Under coat: Epoxy MIO Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.-1,2,3 of Annexure- B
9	External surfaces of CS tank (soil side)	Coal Tar Epoxy Total thickness (Minimum)	100 200μ	2	Table No.-05 of Annexure- B
10	Internal surfaces of CS tank (Potable water)	Polyamine cured epoxy paint approval from CFTRI Mysore. Total Thickness	225-250 μ		Table No.-06 of Annexure- B
11	Carbon steel Metal structure, platform, handrails, stairs, track etc.	Primer: Inorganic Zinc Silicate Under coat: Epoxy MIO Top coat: Aliphatic Polyurethane Total DFT (Min.)	70-80 100-120 30 230-260μ	1 1 2	Table No.-1,2,3 of Annexure- B

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11.0 PAINT DATA REQUIREMENT

DATA TO BE FURNISHED BY THE COATING CONTRACTOR AT THE TIME OF COATING SYSTEM APPROVAL

Sl. No.	Parameters	Test Code (As specified according to Standard specified in the specification or equivalent)	Value / Details
1.0	Coating Details		
1.1	Type		
1.2	Resin		
1.3	Pigment		
1.4	Volume of Solids		
1.5	Total coating thickness to be achieved as per Tender.		
1.6	No. of main coats considered for achieving required thickness		
1.7	Each coat thickness		
1.8	Primer required (Type)		
1.9	Primer coat thickness		
2.0	Blasting material to be used for carbon steel		
	Main Coat Physical Properties		
2.1	Impact Resistance		
2.2	Color		
2.3	Density		
	Service Properties		
2.4	Adhesion to Steel		
2.5	Abrasion Resistance		
2.6	Water vapor permeability/ Transmission rate		for zinc silicate primer.
2.7	Accelerated weathering		
2.8	Accelerated Salt Spray		
2.9	Chemical resistance immersion of 30 days in sea water -		
	% wt change		
	% hardness change		
	% tensile strength change		
	% bond strength change		
3.0	Application		
3.1	Flash point at 30 degree cel.		
3.2	Mixing ratio		
3.3	Practical spreading rate		
3.4	Curing time		
	- for next coat		
	- for full cure		
3.5	Pot life at 30°C		
3.6	Thinner if any		
3.7	Storage life / Self life		
3.8	Cleaning fluid		

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ANNEXURE –A (For Pre-Qualification)

Table number-04

POLYESTER GLASS FLAKE

Sl.No.	Test	Method	Test panels	Accept.Criteria
1.	Pot life			>45 min at 30 deg C
2.	Shelf life			>6 months
3.	Volume solids	ASTM D 2697		>95 %
4.	Cathodic Disbondment	ASTM G8 “Cathodic Disbonding of Pipeline Coatings” Method A	2x500 micron DFT applied directly to SA 2.5 blasted steel.	Typically, less than 0.1 mm disbondment following 30 days exposure
5.	Immersion	ISO 2812 Part 2 (Modified)- “Resistance to sea water immersion @ 40 Deg C.	1x500 micron DFT applied directly to SA 2.5 blasted steel.	No film defects following 8000 hours exposure.
6.	Salt Spray	ASTM B 117 Resistance to neutral salt spray (fog) @ 35 Deg C.	2x500 micron DFT applied directly to SA 2.5 blasted steel.	No film defects, and no rust creep at the scribe following 10000 hours exposure.
7.	Abrasion	ASTM D 4060- “Abrasion Resistance of coatings via the Taber Abraser”	1x500 micron DFT applied directly to SA 2.5 blasted steel.	< 224mg weight loss per 1000 cycles using H18 wheels and a 1 Kg loading.
8.	Adhesion	ISO 4624-“Pull off	2x500 micron DFT	Not less than 90 Kg/cm ² when

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		test for adhesion” using portable adhesion testers.	applied directly to SA 2.5 blasted steel.	using a PAT adhesion tester on 5mm thick steel.
9.	Impact	IS 101 Part 5/sec3	1x500 micron DFT applied directly to SA 2.5 blasted steel.	Direct impact Resistane- Method A.
10.	Tensile Strength	ASTM-D 2370	1x500 micron DFT “free film”	200 Kg/cm ²
11.	Elongation @ Break	ASTM-D 2370	1 x 500 micron DFT “free film”	0.5%
12.	Water vapour Permeability	ASTM- D 1653	1x500 micron dft “free film”	< 0.2gm/m ² - hr/mil

Note-

- *a). Equivalent standard other than specified in paint specification table can be accepted subjected to approval from NPCIL.**

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ANNEXURE- B (*For Batch Testing)

Table Number-04				
Polyester Glass Flake				
Sl.no.	Test	*Method	Test panels	Accept.Criteria
1.	Pot life			> 45 min at 30 deg C
2.	Shelf life			>6 months
3.	Volume solids	ASTM D 2697		>95 %
4.	Abrasion	ASTM D 4060- “Abrasion Resistance of coatings via the Taber Abraser”	1x500 micron DFT applied directly to SA 2.5 blasted steel.	< 224mg weight loss per 1000 cycles using H18 wheels and a 1 Kg loading.
5.	Adhesion	ISO 4624- “Pull off test for adhesion” using portable adhesion testers.	2x500 micron DFT applied directly to SA 2.5 blasted steel.	Not less than 90 Kg/cm ² when using a PAT adhesion tester on 5mm thick steel.
6.	Tensile Strength	ASTM-D 2370	1x500 micron DFT “free film”	200 Kg/cm ²
7.	Elongation @ Break	ASTM-D 2370	1 x 500 micron DFT “free film”	0.5%

APPENDIX-C

COATING SCHEDULE

Inspection Agency:

Site:

Others:

/

TECHNICAL CONDITIONS OF CONTRACT (TCC)

APPENDIX-D

COATING SYSTEM DAILY INSPECTION REPORT

DATE	REPORT NO.	PROJECT REF. NO.	PAGE OF
PROJECT DESCRIPTION	LOCATION	CONTRACTOR	
INSPECTION ORGANISATION	INSPECTOR	APPLICABLE SPECIFICATION NO.	
I. <u>DESCRIPTION OF ITEMS AND / OR AREAS</u>			
II. <u>DESCRIPTION OF WORK PERFORMED / REMARKS</u>			

III. <u>PRE-WORK SURFACE CONDITION</u> SUBSTRATE _____ GENERAL DESCRIPTION _____ PRIMED FOR _____ SUBSEQUENT COATS. _____ REFERENCE REPORT _____ DATED ----- PREVIOUSLY PAINTED – _____ DEGREE OF CORROSION -- _____ • NEW METAL – DEGREE OF CORROSION -----	OBSERVED DEFECTS OIL & GREASE ** SHARP EDGES** WELD SPATTER** MOISTURE** LAMINATIONS ** SOLUBLE SALTS **	IV. <u>ENVIRONMENTAL CONDITIONS</u> TIME ----- AIR TEM/°C ----- WET BULB TEMP °C ----- RELATIVE HUMIDITY °C ----- DEW POINT °C ----- SURFACE TEMP MIN / MAX. °C ----- REMARKS: _____ -----
--	---	--

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ANNEXURE -E

DRY FILM THICKNESS MEASUREMENT WORKSHEET

DATE	REPORT NO.	PROJECT REF. NO.	APPLICABLE SPECIFICATION	PAGE OF				
ITEM / AREA DESCRIPTION	SPOT	NOT READINGS (MICRON)			TOTAL	AVERAGE	% MIN	REMARKS
		1	2	3				
	A							
	B							
	C							
APPROX. SQ. MTR	D							
	E							

TOTAL AVG

SPECIFIED DFT ----- MICRON
RANGE ACHIEVED ----- MICRON

REFERENCE REPORT DATED ----- FOR APPLICATION RECORD

REMARKS

INSPECTOR'S SIGNATURE

DATE

VOLUME-IA PART – I CHAPTER – III
FACILITIES & CONSUMABLES IN THE SCOPE OF CONTRACTOR /
BHEL
(SCOPE MATRIX)

Sl.No	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1	PART I			
1.3.1.1	ESTABLISHMENT			
1.3.1.1.1	FOR CONSTRUCTION PURPOSE:			
1.3.1.1.1.1	Open space for office	Yes		
1.3.1.1.1.2	Open space for storage	Yes		
1.3.1.1.1.3	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
1.3.1.1.1.4	Bidder's all office equipment, office / store / canteen Consumables		Yes	
1.3.1.1.1.5	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
1.3.1.1.1.6	Fire fighting equipment like buckets, extinguishers		Yes	
1.3.1.1.1.7	Fencing of storage area, office, canteen etc of the bidder		Yes	
1.3.1.1.2	FOR LIVING PURPOSES OF THE			
1.3.1.1.2.1	Living accommodation		Yes	
1.3.1.2	ELECTRICITY			Chargeable Basis
1.3.1.2.1	Electricity For construction Purposes			Prevailing rate of TANGEDCO
1.3.1.2.1.1	Single point source	Yes		
1.3.1.2.1.2	Further distribution for the work to be done which include supply of materials		Yes	
1.3.1.2.2	Electricity for the office, stores, canteen etc of the		Yes	
1.3.1.2.2.1	Distribution from single point including supply of		Yes	
1.3.1.2.2.2	Supply, installation and connection of material of energy meter including operation and		Yes	Calibration certificate to be
1.3.1.2.2.3	Duties and deposits including statutory		Yes	

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Sl.No	Description	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.2.2.4	Demobilization of the facilities after completion of works		Yes	
1.3.1.3	WATER SUPPLY			
1.3.1.3.1	For construction purposes		Yes	
1.3.1.3.2	Water supply for bidder's office, stores, canteen etc		Yes	
1.3.1.4	LIGHTING			
1.3.1.4.1	For construction work (supply of all the necessary materials) At office storage area At the preassembly area		Yes	
1.3.1.4.2	For construction work (Execution of the lighting work / arrangements) At office storage area At the preassembly area		Yes	

1.3.2	PART II	BHE	Bidder	Remarks
1.3.2.1	ERECTION FACILITIES			
1.3.2.1.0	Engineering works for Grit blasting & Painting			in consultation with BHEL & NPCIL
1.3.2.1.1	Providing the erection drawings/ documents for all the equipments	Yes		
1.3.2.1.2	Coating Application Methods & Procedures		Yes	
1.3.2.1.5	Preparation of site erection schedules and other input requirements		Yes	
1.3.2.1.6	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments		Yes	
1.3.2.1.7	Weekly erection schedules based on Sl No 1.3.2.1.5		Yes	
1.3.2.1.8	Daily erection / work plan based on Sl No 1.3.2.1.7		Yes	
1.3.2.1.9	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

1.3.3 LAND FOR SITE OFFICE

- 1.3.3.1 Minimum Open space as made available by customer will be provided at free of charges to the contractor, for construction of temporary office shed, storage area at the job site, contractor's stores shed(s).
- 1.3.3.2 BHEL shall not provide to the contractor any residential accommodation to any of their staff and the contractor has to make their own arrangements.
- 1.3.3.3 Location and area requirement for office / storage sheds shall be discussed and mutually agreed to.

1.3.4 ELECTRICITY:

- 1.3.4.1 Construction power will be provided to the contractor at one point within plant area by BHEL on chargeable basis at the applicable rate of TANGEDCO under LT tariff at the nearest substation. The present LT tariff VI rate of TANGEDCO is
 - a) Consumption charges: The prevailing rate of TANGEDCO is Rs.12.00 per unit
 - b) Fixed Maximum Demand [MD] charges as applicable per month
 - c) Electricity Tax on total amount

The TANGEDCO tariff and tax may vary from time to time. The required Energy meter for measuring the consumption shall be provided and installed by the contractor, within quoted rates. Any dispute regarding consumption, the BHEL engineer's decision is final. The contractor shall make their own arrangement for further distribution to the site of work using armored Power cable and MCB distribution boards.

- 1.3.4.2 Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards to contractor's office shed also, all such expenditure shall be borne by the contractor. Contractor to maintain log sheet with BHEL engineering in charge signature for weekly/ monthly power consumption and healthiness of ELCB.
 - 1.3.4.3 Provision of distribution of electrical power from the given points to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State/ BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.
 - 1.3.4.4 The required energy meter for measuring power consumption shall be arranged by the contractor and taken care by the contractor.
-

TECHNICAL CONDITIONS OF CONTRACT (TCC)

- 1.3.4.5 BHEL is not responsible for any loss or damage to the contractor 's equipment as a result of variations in voltage / frequency or interruptions in power supply.
- 1.3.4.6 Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.9 shall be provided by the contractor at their cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.
- 1.3.4.7 The contractor shall make own arrangements for deployment of required capacity DG sets for Grit blasting & Painting work of already laid sea water Pipe lines, where ever the Power supply extension may not feasible from the Single Point Power source due to Plant construction activities & Distance restriction.
- 1.3.4.7 As there are bound to be interruptions in regular power supply, power cut/load shedding in any construction sites, contractor should make their own arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown /failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency.
- 1.3.4.8 All electrical installations/works shall be carried out by qualified electricians under supervision GOVT approved electrical contractor as per IE Guide lines and Safety procedure of NPCIL. The same shall be maintained properly and regular periodic maintenance shall be carried out to ensure healthiness of electrical system

1.3.5 CONSTRUCTION WATER

Construction water if required any shall be arranged by the Contractor at their cost from outside of KKNPP.

1.3.6 DRINKING WATER:

Drinking water shall be arranged by the Contractor at their cost from outside of KKNPP.

1.3.7 LIGHTING FACILITY:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly yard and contractor's material storage area etc. at their cost.

1.3.7 CONTRACTOR'S OBLIGATION ON COMPLETION:

On Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at their cost. In the event of their failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER - IV

TOOLS & PLANTS AND MEASURING INSTRUMENTS SHALL BE DEPLOYED BY THE CONTRACTOR

1.4.1. Suitable capacity Mobile crane, Hydro crane, tractor trailer as required / as and when for handling of non-erected Pipes for grit blasting and application coating in BHEL work shop at KKNPP site

1.4.2 Suitable capacity steel ropes, Nylon ropes, Nylon belts, Nylon webbing slings, Rubber pads, Rubber Sheets, de shackle, manila ropes, metal slings, Tare Pauline and other required material handling equipment's/ tools to complete entire work as specified in the contract

1.4.3. All the material handling equipment's shall be tested at site by GOVT approved competent Persons and relevant certificate shall be furnished to BHEL/ NPCIL. The equipment shall be put in to use after due clearance from NPCIL safety.

1.4.4 Grit blasting arrangement with compressor and other related accessories of suitable capacity as many of required quantities to meet in site work of already erected sea water Pipe lines and in Work shop area for non-erected pipe lines.

Including supply of required quantity of Grit as per NPCIL Technical specification.

1.4.5. Polyester glass Flake coating apparatus, equipment's and special tools for inside coating lower dia Pipes as required to complete the entire work as specified in BOQ.

1.4.6. Measuring instruments, Special type meters as required to complete the job in all respect including completion quality documents as required by NPCIL.

1.4.7 Any other equipment's /Tools/ Special tools/Special Measuring instruments as required to complete the Job in all respect.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER - V FACILITIES PROVIDED BY BHEL

1.5.1 Grit blasting and Painting Shed (only empty sheds) shall be provided by BHEL, at BHEL site office/ storage area for Coating of Non erected Pipe lines and support structures at free of cost

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER-VI TIME SCHEDULE

1.6.1 TIME SCHEDULE

- 1.6.1.1 The entire work shall be completed within **12(Twelve)** months from the date of commencement of work at site.
- 1.6.1.2 During the total period of contract, the contractor has to carry out the activities in a phased manner in line fronts available and as required by BHEL/ NPCIL.
- 1.6.1.3 The work shall be commenced on the mutually agreed date between the bidder and BHEL engineer. The scope of work under this contract is deemed to be completed only when so certified/ cleared by NPCIL.

1.6.2 COMMENCEMENT OF CONTRACT PERIOD

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy the decision of BHEL engineer is final.

1.6.3 CONTRACT PERIOD

The contract period for completion of entire work under scope shall be 12 (Twelve) months from the “COMMENCEMENT OF CONTRACT PERIOD” as specified earlier.

1.6.4 GUARANTEE PERIOD

Normal guarantee period is 18 months from the date of completion of supplies or 12 months from the date of completion of entire work, whichever is later. In addition to above, 05 years Corporate Guarantee shall be given by successful bidder, typed in Rs.100 stamp paper for a value equivalent to 10% contract value excluding GST. Corporate guarantee starts from date of expiring of normal guarantee period as mentioned earlier, for a period of 05 years. The same shall be submitted before expiring of CPBG of normal guarantee period. CPBG will be returned only after receipt of Manufacturer corporate guarantee certificate for a period of 05 years. Normal guarantee period shall commence from the date of completion of work in all respect. The last Protocol date with BHEL/ NPCIL is taken as commencement date of Guarantee Period. During the Corporate Guarantee period any Coating damage occurs, shall be rectified / re-coated at free of cost to the satisfaction of Customer NPCIL.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER-VII TERMS OF PAYMENT

1.7.0 Terms of Payment:

The progressive payment against monthly running bills on accepted rate / price of contract value will be released on Pro rata basis as mentioned below

1.7.1 **95%** - On completion of Grit blasting and application anticorrosive coating, Testing & completion quality protocols with BHEL/NPCIL

1.7.2 **5 %** - On completion entire work

Note:

1. Payment for the first running bill will be released only on production of the following.
 - i. PF Regn. No.
 - ii. Labour License No. if applicable
 - iii. Workmen Insurance Policy No.
 - iv. Unqualified Acceptance for Detailed L.O.I.
 - v. Performance Bank guarantee as per GCC

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER VIII TAXES AND OTHER DUTIES

1.8.0 TAXES:

- **GST will be paid extra at actuals on submission of documentary evidence, as applicable.**
- **Statutory variations in GST shall be to BHEL's account**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

VOLUME-IA PART – I CHAPTER - IX

BOQ

NPCIL KUDANKULAM Unit 3 & 4 (2X1000MWe)			
Supply and Application Anti corrosive coating for sea water Pipes and Pipe supports			
BOQ Sl.no	Description		QTY
	SCHEDULE - K (NPCIL contract)		
	(Anti corrosive painting for seawater systems)		
K	1	<u>Supply and application of Anti-corrosive coating of Polyester glass flake (Minimum 1000 microns DFT) including grit blasting:</u> Product qualification, supply and application of paint as per technical specification I02.KK34.0.0.TH.TS.PR009(R01), identification, shifting of CS pipes and fittings to blasting and painting area, handling, surface preparation by grit blasting using steel grits -for CS piping and equipment. Application of anticorrosive paint of minimum 1000 microns DFT (2 coats each 500 micron) on indoor/outdoor/buried Seawater CS pipelines inner and outer surfaces, fittings, valves, supports, equipments, Main & TDFP condenser water boxes, CS structures and external surface of buried CS pipelines using airless painting machine, testing and inspection at various stages, preparation of report and work completion including field painting as per the drawings, documents and specifications with acceptance of EIC. The work scope includes assessment of material requirement, procurement with material test certificate supply of steel and Aluminium oxide grit, Iron contamination check on SS surface, inspection at contractor's store, preparation of IMIR (Incoming Material Inspection Report), establishment of workshop, holiday test, P&M, scaffolding & platforms, tools and tackles, manpower as required	
K	1.1	On inner surface of pipelines and fittings of diameter more than 80 mm up to 1220 mm. Work will be carried out either at in BHEL workshop at inside NPCIL Kudankulam or on site on erected pipes - List of various sizes of pipes with quantity is given in Annexure -1	Square Meter 22000
K	1.2	On inner surface of pipelines and fittings of diameter more than 1220 mm and inner surface of condenser water boxes.on site work on already erected pipes - List of various sizes of pipes with quantity is given in Annexure -2	Square Meter 27000
K	1.3	On external surface of carbon steel pipelines, fittings, supports, structures, valves and equipments. Work will be carried out either at in BHEL workshop at inside NPCIL Kudankulam or on site on erected pipes.	Square Meter 3000

TECHNICAL CONDITIONS OF CONTRACT (TCC)

NOTE:

1. Rates are to be filled only in the Price bid.
2. Before filling the Rates in the Price bid, the bidder shall go through the detailed specification of all items of BOQ as well as Scope of Work as specified in relevant Clause of this document.
3. The quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual quantity executed as certified by BHEL Engineer.

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Annexure- 1 to BOQ								
KUDANKULAM UNIT 3&4								
Quantity estimation for Anti corrosive internal Painting area up to Dia 1220 mm								
BOQ Sl.no K.1.1								
BLDG	SYSTEM KKS	WD PKG.NO	MATL (CS/SS/TI)	PIPE SIZE	THICK	WEIGHT OF PIPELINE	LENGTH OF PIPELINE	INTERNAL
			CS/SS	mm	mm	MT	m	Sq.m
1,2 UQZ	PEB	15410, 16428	CS	630	12	523.2	2813	5356
			CS	530	12	65.5	403	641
			CS	406	12	64.5	681	817
UKA	PEB	11167	CS	530	12	17.37	110.76	176
			CS	325	8	5.01	52.11	51
1-4 UKD	PEB	ISN924	CS	325	8	21.544	335.95	326
			CS	219	8	2.614	60.49	39
			CS	159	6	0.242	10.28	5
1,2 UQC	PEB	1116105, 1116109, 1126160	CS	630	12	7.916	42.25	81
				219	8	2.02	31.18	20
UQA	PCB	1126173	CS	1020	12	7.24	23.97	75
			CS	720	12	0.862	13.33	29
			CS	630	12	1.34	7.17	14
			CS	530	12	6.201	39.54	63
			CS	426	12	6.11	48.5	61
			CS	325	8	3.1	48.34	47
			CS	159	6	0.475	20.2	9
	PCB 24	1126173	CS	820	12	0.25	1	3
	PCB 34		CS	530	12	1.772	11.3	18
	PCB 40		CS	426	12	2.36	18.45	23
	PCB 60		CS	426	12	0.907	7.2	9
	PCB61		CS	426	12	6.33	50.2	63
	PDB		CS	219	8	2.33	53.82	34
	PCB 51,52		CS	325	8	2.67	41.57	40
05UKD	PCB 51,53	115654	CS	325	8	1.7	26.5	26
UQR	PCB	SITE ISN 1237 1244	CS	630	12	1.2	6.6	12
			CS	426	10	9.8	80	102
			CS	377	10	2.5	23.15	26
			CS	325	8	12.7	205.83	200
			CS	219	7	0.6	14.41	9
			CS	159	5	0.7	36.85	17

TECHNICAL CONDITIONS OF CONTRACT (TCC)

UQA	PUS	1116104	CS	159	6	10.7	455	210
			CS	133	5	0.5	22.5	9
			CS	108	4.5	2.2	92.4	29
UQA	PUJ	1126175	CS	219	8	6.945	136.9	87
UQA	PUK	1126175	CS	325	8	8.553	105.8	103
			CS	159	6	0.143	7.5	3
UQA	PUA	1126166, 1136118	CS	325	8	4.104	58.9	57
UQA	PUN	1116110, 1126167	CS	325	8	7.238	105.2	102
UPX	PUL	1116104, 1126163	CS	1220	12	18.6	52	195
			CS	820	12	3.2	13.3	33
			CS	720	12	3.7	17.7	39
			CS	325	8	0.1	1.1	1
			CS	108	4	0.286	27.75	9
UQA	PUP	1126170	CS	219	8	8.9	213.8	136
UQZ	PUQ	16411, 17412	CS	219	8	4.6	124.4	79
			CS	159	6	4.4	196.6	91
			CS	89	5	1.4	132.2	33
UQC	PUD	1116108, 1126178	CS	219	8	7.521	160.6	102
			CS	159	6	1.491	21.8	10
UMA- UQX Burried	PAB 89	16426	CS	1220	12	33.429	96.94	364
UMA	PAS		CS					832
						Qty per unit		10916
						Qty for both units		21832

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Annexure- 2 to BOQ								
KUDANKULAM UNIT 3&4								
Quantity estimation for Anti corrosive internal Painting area above Dia 1220 mm								
BOQ Sl.no K.1.2								
BLDG	SYSTEM-KKS	W.D PKG NO	MATL(CS/SS/TI)	PIPE SIZE	THICK	WEIGHT OF PIPE LINE	LENGTH OF PIPE LINE	INTERNAL
			CS/SS	mm	mm	MT	m	Sq.m
1UQD	PAB10	14415	CS	2220	12	92.3	139.615	963
1UQD	PAB20	14415	CS	2220	12	87.2	132.231	912
1UQD	PAB30	14415	CS	2220	12	81.3	122.508	845
1UQD	PAB40	14415	CS	2220	12	79.9	115.708	798
2UQD	PAB50	14415	CS	2220	12	37.5	56.228	388
2UQD	PAB60	14415	CS	2220	12	38.1	57.285	395
1UQE	PAB10	14415	CS	2220	12	50.2	75.6	522
1UQE	PAB20	14415	CS	2220	12	50.2	75.6	522
1UQE	PAB30	14415	CS	2220	12	50.2	75.6	522
1UQE	PAB40	14415	CS	2220	12	50.2	75.6	522
1UQE	PAB50	14415	CS	2220	12	50.2	75.6	522
1UQE	PAB60	14415	CS	2220	12	50.2	75.6	522
UMA	PAB10		CS	2220	12		73.1	504
UMA	PAB20		CS	2220	12		68.6	473
UMA	PAB30		CS	2220	12		63.9	441
UMA	PAB40		CS	2220	12		58.7	405
UMA	PAB50		CS	2220	12		54.1	373
UMA	PAB60		CS	2220	12		49.8	344
UMA	PAB		CS					3305
						Qty per unit		13278
						Qty for both units		26556

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VOLUME-IA PART –I CHAPTER -X

10.1 SAFETY PROCEDURE FOR SITE WORK

- (a) The occupier should ensure that safety precautions are taken during the execution of awarded work and work areas are maintained safe at all times. At the end of each shift and at all times when the work is suspended, it should be ensured that the work area is left safe in such a way that no materials and equipment that can cause damage to existing property, personal injury or interfere with the other works of the project or station are left in an unsafe manner.
 - (b) The occupier should ensure to provide and maintain all lights, guards, fencing, warning signs, caution boards and other safety measures and provide for vigilance as and when necessary for the protection of workers and for the safety of others. The caution boards should also have appropriate symbols.
 - (c) Adequate lighting facilities such as floodlights, hand lights and area lighting should be provided at the site of work, storage area of materials and equipment and temporary access roads within the working area.
 - (d) All works should be planned so as to avoid interference with other facilities, works of other contractors or sub-contractors at the site. In case of any interference, necessary coordination should be ensured for safe and smooth working.
 - (e) It should be ensured that the instructions given by the safety officer or his designated nominee regarding safety precautions, protective measures, housekeeping requirements, etc. are complied with. The safety officer with due intimation to engineer-in-charge should have the right to stop the work, if in his opinion, proceeding with the work will lead to an unsafe and dangerous condition. Engineer-in-charge should arrange to get the unsafe condition rectified and/ or provide appropriate protective equipment.
 - (f) Engineer-in-charge should ensure that each job with a hazard whether small or big is intimated to the safety officer of the facility well before it is taken up.
 - (g) The facility should be fully responsible for non-compliance of any of the safety measures or requirements, implications, injuries, fatalities, dangerous occurrences and compensation arising out of such situations or incidents.
 - (h) Maximum duty hours of an individual should be as per the Factories Act 1948 or its latest amendment.
 - (i) Illumination levels should be as per the statutory requirements.
-

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10.2 Safe Means of Access/Platforms

Adequate safe means of access and exit should be provided for all work places, at all elevations.

- (a) Suitable scaffolds should be provided for workmen for all works that cannot be done safely from the ground, or from solid platform except such short duration work that can be done safely from ladders. Bamboo/wooden scaffolding should not be permitted.
 - (b) Where the platform for working is more than 3.5 m above ground, the width of the platform should be minimum 1 m.
 - (c) Ladder should be of rigid construction having sufficient strength for the intended loads. Wooden/bamboo/rope ladders should not be permitted. All ladders should be maintained in good condition. The ladders should be fixed to the ground or rigid platforms. An additional person should be engaged for holding the ladder, if ladder is not securely fixed. Ladder shall be extended from floor to at least one meter above the platform.
 - (d) A portable ladder should be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical). Ladders should not be used for climbing while carrying materials in hands. While climbing both the hands should be free.
 - (e) Any working platform on scaffolding or staging more than 3.5 m above the ground or floor should have a guard rail attached, bolted, braced at least 1 m high above the floor or platform of such scaffolding or staging along with mid-rail.
 - (f) The planks used for any working platform should not project beyond the end supports to a distance exceeding four times the thickness of the planks used. The planks should be rigidly fixed at both ends to prevent sliding, slipping or tilting. The thickness of the planks should be adequate to take load of men and materials and should not collapse. Plywood or packing wood should not be used as planks.
 - (g) The guardrail should extend along the entire exposed length of the scaffolding with only such opening as may be necessary for the delivery of materials. Standard railing should have posts not more than 2 m apart and an intermediate rail halfway between the floor or platform of the scaffolding and the top rail.
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Such scaffolding or staging should be so fastened as to prevent it from swaying from the building or structure. Scaffolding and ladder should conform to IS 3696 (Part 1): 1987 and (Part II): 1996.

- (h) Working platforms of scaffolds should have toe boards at least 15 cm in height to prevent materials from falling down.
- (i) A sketch of the scaffolding proposed to be used should be prepared and approval by the engineer-in-charge obtained prior to start of erection of scaffolding. All scaffolds should be examined by engineer- in-charge before use.
- (j) Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or gangway or stairway is more than 3.5 m above ground level or floor level. They should have adequate width for easy movement of persons and materials and should be suitably guarded.
- (a) No single portable ladder should be used for access to a height of more than 4.5 m. For ladders up to 3m in length the width between styles (side bars)/width in the ladder should in no case be less than 300 mm. For longer ladders this width should be increased by at least 20 mm for each additional meter of length. Step/runs spacing should be uniform and should not exceed 300 mm. Portable ladder should be used only for access to work place. In case work place is higher than 4.5 meters, pre-fabricated steel staircase should be used.

10.3 Work at Height

- (b) Person to work at height should be medically fit and should have height pass issued by safety section. (Appendix A Part A, B and C). Safety training should be imparted before working at height.
 - (c) Safety work-permit system for working at height should be obtained from industrial safety section.
 - (d) At elevated places, secure access and foothold should be provided. Adequate and safe means of access and exit should be provided at all work places for all elevations. Means of access may be portable or fixed ladder, ramp or a stairway. The use of crosses, braces or framework, as a means of access to the
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working platform should not be permitted.

- (e) Linear movement at height should be reduced to minimum. In case of such movement provision for anchoring the safety belt should be made.
- (f) Where barricades cannot be installed, a safety net of adequate strength should be installed close to the level at which there is a danger of fall of personnel/fall of objects.
- (g) In case where 'work at height' is on asbestos roof, crawling board, roof ladder should be used to walk across the asbestos roof.

10.4 Electrical Safety

All electrical installations shall comply with the appropriate statutory requirements given below and shall be subject to approval of the electrical engineer and safety officer.

- (i) The Electricity Act, 2003
- (ii) The Indian Electricity Rules 1956 (as amended in 2000)
- (iii) The National Electricity Code 2008
- (iv) Atomic Energy (Factories) Rules, 1996
- (v) Other relevant rules of statutory bodies and power supply authority
- (vi) Relevant standards of BIS

In addition to the above statutory provisions, the clauses indicated in this document shall also be complied.

- a. It shall be the responsibility of the user seeking temporary power supply to indicate in writing, if any of the clauses (requirements noted in above regulations and in this document) are conflicting with each other and for which the user cannot decide the course of action regarding safe installation, commissioning, operation, maintenance and decommissioning of the electrical installations.
- b. The electrical engineer and safety officer of the facility providing temporary power supply shall interpret the concerned conflicting clauses and approve in writing the safe course of action.

10.5 Material Handling and Lifting Machines and Tackles

- (a) It should be made compulsory to supervise jobs like lifting/placing/ loading/unloading/carrying/transporting etc. of
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- heavy material by qualified supervisor having knowledge about hazards involved and precautions to be taken for such job.
- (b) The line managers should ensure that the material handling equipment used is adequate to handle the load.
 - (c) Manual pulling of heavy equipment and trolley loaded with heavy material is not to be permitted.
 - (d) Stacking and handling of heavy materials should be done on a firm ground to prevent settlement.
 - (e) No lifting machine and no chain, rope or lifting tackle, except a fiber rope or fiber rope sling, shall be taken into use in any factory for the first time in that factory unless it has been tested and all parts have been thoroughly examined by a competent person. A certificate of such a test and examination specifying the safe working load or loads and signed by the person making the test and the examination has been obtained and is kept available for inspection.
 - (f) Use of lifting machines and tackles should conform to relevant BIS requirements [IS 13367 (Part 1): 1992 Reaffirmed 2003, IS 4573: 1982 (Reaffirmed 2000) and IS 13834 (Part 1): 1994 Reaffirmed 2003 etc. The accessories and the attachments, anchorages and supports etc. should be ensured in healthy conditions by regular inspections at defined frequencies.
 - (g) Every rope used in hoisting or lowering materials or as a means of suspension should be of good quality and adequate strength and free from any defect. This should be ensured by regular inspection as per IS 2762: 1982- Specification for wire rope slings and sling legs (first revision).
 - (h) Every crane operator or lifting appliance operator should be authorised. No person under the age of 18 years should be in charge of any hoisting machine or give signal to an operator of such machine.
 - (i) In case of every lifting machine (and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or as a means of suspension) the safe working load should be ascertained and clearly marked. In case of a lifting machine having a variable safe working load, each safe working load and the conditions under which it is applicable should be clearly indicated. No part of any machine should be loaded beyond the safe working load
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except for the purpose of testing. This should be approved by the engineer-in-charge and head, industrial safety.

- (j) In case of facilities machines, the safe working load should be notified by the engineer-in-charge. As regards the contractor's machines, the contractor should declare the safe working load of the machine to the engineer-in-charge whenever he brings any machinery to site of work and get it verified by the engineer-in-charge, supported by a valid test certificate by the competent person.
- (k) Thorough inspection and load testing of lifting machines and tackles should be done in the presence of competent person at least once in every 12 months and records of such inspections and testing should be maintained.
- (l) No mobile crane should be allowed to move under live high-tension power transmission line.
- (m) While lifting loads, cranes should be located on level ground.
- (n) A thorough load analysis should be carried out before using cranes in tandem.
- (o) Motors, gear transmission, couplings, belts, chain drives and other moving parts of hoisting appliances should be provided with adequate safeguards. Hoisting appliances should be provided with such means, which will reduce the risk of any part of a suspended load becoming accidentally displaced or lowered.
- (p) It should be ensured that the cabin of the lifting machine in outdoor service:
 - (i) is made of fire resistant material,
 - (ii) has a suitable seat, a footrest and protection from vibration,
 - (iii) affords the operator an adequate view of the area of operation,
 - (iv) affords the operator adequate protection against the weather, and
 - (v) is provided with fire extinguisher.

10.6 Painting

- a) Appropriate breathing air respirators should be provided for use by the workers when paint is applied in the form of spray, or a surface having lead paint is dry rubbed or scraped.
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- b) Only the quantity of paint, thinner and polish required for the day's work should be kept at the work spot. Excess storage should not be permitted at the work spot.
- c) Smoking, open flames or sources of ignition should not be allowed in places where paints, varnish, thinner and other flammable substances are stored, mixed or used. A caution board, with the instructions written in national language and regional language, 'SMOKING - STRICTLY PROHIBITED' should be displayed in the vicinity where painting is in progress or where paints are stored. Symbols should also be used on caution boards
- d) All electrical equipment of paint storage room should be of explosion proof design. Suitable fire extinguishers/sand buckets should be kept available at places where flammable paints are stored, handled or used.
- e) When painting work/hot resin mix is done in a closed room or in a confined space, adequate ventilation should be provided and ensured. In addition, suitable respirators should be provided. No portable electric light or any other electric appliance of voltage exceeding
- f) 24 volts should be permitted for use inside any confined space. Walkie-talkie or other means of communication should be provided. Rescue arrangement like full body harness with lifeline, tripod with pulley and extra BA sets should be available.
- g) The workers should use PVC gloves and/or suitable barrier creams to prevent the skin contact with Epoxy resins and their formulations used for painting.

10.7 Demolition

10.7.1 Before any demolition work is commenced and also during the progress of the work, all roads and open area adjacent to the work site should either be closed or suitably cordoned. Appropriate warning signs should be displayed for cautioning approaching persons/ vehicles.

10.7.2 Before demolition operations begin, it should be ensured that all the service lines are de-energized.

10.7.3 Persons handling demolition operations shall use appropriate PPE.

10.7.4 All demolition operations should be carried out with safe and duly approved procedures which shall include following but not

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limited to:

- 10.7.5 No masonry/material should be permitted to fall in such masses or volume or weight so as to endanger the structural stability of any floor or structural support.
- 10.7.6 No wall, chimney or other structure or part of a structure is left unguarded in such a condition that it may fall, collapse or weaken due to wind pressure or vibration.
- 10.7.7 No floor, roof or other part of the building should be overloaded with debris or materials as to render it unsafe.
- 10.7.8 After the demolition, the debris and other materials collected should be disposed safely and not permitted to be dropped freely.
- 10.7.9 Entries to the demolition area shall be restricted to authorised persons wearing safety helmets and safety shoes.

10.8 Traffic

- 10.8.1 All the vehicles moving at sites should conform and comply with the requirements of Motor Vehicles Act, 1988 and the Rules made there under. All the drivers/operators of vehicles should possess valid driving license as per Motor Vehicles Act, 1988 or its latest amendment.
 - 10.8.2 The facility should conduct operations so as to interfere as little as possible with the use of existing roads at or near locations where the work is being performed. When interference to traffic is inevitable such as road cutting or transit unloading of heavy equipment etc. notice of such interference should be given to the engineer-in-charge and safety officer well in advance with the details of start of the work and time required.
 - 10.8.3 A cleaner/assistant must be available for all heavy vehicles whenever vehicles move forward as well as in the reverse direction. All vehicles should be fitted with proper reverse horns, back view mirrors and indicator signals.
 - 10.8.4 Facility should ensure that the assessment of the driver's visual ability is carried out as per Rule 55 of the Atomic Energy (Factories) Rules, 1996/guidelines of advisory committee on occupational health (ACOH), AERB or as per the latest amendments in statutes.
 - 10.8.5 Effective speed breakers with yellow stripes on the roads to
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regulate the speed at the vulnerable points should be installed. Effective barricading with adequate caution signs should be placed to warn the vehicle drivers whenever the jobs are carried out on the road.

10.8.6 All vehicles moving at the site should have roadworthiness certificate issued by the concerned authority.

10.8.7 Special limit boards and caution boards indicating turns should be installed wherever necessary.

10.8.8 In general, the following maximum speed limits should be specified and implemented. Vehicles speed limits should be as per Motor Vehicle Act or 20 Km/h. Extra precautions and care should be exercised particularly during heavy material/equipment movements.

10.8.9 Safety awareness programmes should be conducted for all the drivers of the light, medium and heavy vehicles.

10.9 Fire Safety

10.9.1 All provisions for fire safety shall be complied as per AERB safety standard on 'Fire Protection Systems for Nuclear Facilities' [AERB/ NF/SS/FPS (Rev. 1)].

10.9.2 All necessary precautions should be taken to prevent outbreak of fires at the construction site. It should be ensured that all hot work is carried out under valid work permit.

10.9.3 Combustible materials such as wood, cotton waste, oil, coal, paints, chemicals etc., should be segregated and kept to the required bare minimum quantity at work place.

Containers of paints, thinners and allied materials should be stored in a separate room which should be well ventilated and free from excessive heat, sparks, flame or direct rays of the sun. The containers of paint should be kept covered or

- (a) properly fitted with lid and should not be kept open except while using.
 - (b) Adequate number of trained persons from approved fire training centre required to extend fire safety coverage should be ensured.
 - (c) Fire extinguishers as approved by the engineer-in-charge/in-charge of fire station/safety-in-charge should be located at the construction site at appropriate places.
 - (d) Adequate number of trained workmen in firefighting who can
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operate fire extinguishers should be ensured.

- (e) Portable fire extinguishers with periodic inspection, maintenance and re-filling complying with the mandatory requirements should be ensured.
- (f) Availability of adequate water for fire fighting should be ensured.
- (g) Implementation of the provisions of various statutory licenses for storing gas cylinders, petroleum products, explosives etc. as per the relevant acts and rules should be ensured wherever required.

10.10 Environmental Safety

Relevant provisions of the state/central statutory authority regarding environment protection should be adhered to.

10.11 Public Protection

The Facility should make necessary provisions to protect the public. He should be bound to bear the expenses in defense of every action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of any precaution required to be taken to protect the public. He should pay for the any such damage and cost which may be awarded in any such suit, action or proceedings to any such person, or the amount, which may be fixed as a compromise by any such person.

10.12 Safety of Visitors

- 1) Visitors for the project shall be given health and safety induction before they are allowed in to the construction project. It shall include the minimum PPE to be used, hazards and risks at the work area, restricted areas of entry, emergency response arrangements, etc.
- 2) Visitors shall always be accompanied by one of the employees of the project site.
- 3) Visitors shall not be allowed in the hazardous areas unless they are competent and trained to work in such areas.

10.11 Housekeeping

- 1) It should be recognized that a proper place for everything and everything in its place is maintained for a good housekeeping.
 - 2) The material required for immediate use only should be brought to the designated workplace and stacked properly and labeled suitably.
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- 3) All work spots, site office and surroundings should all times be kept clean and free from debris, scrap, concrete muck, surplus materials and unwanted tools and equipment. A day-to-day collection and disposal of scraps/debris should be done safely at designated place.
- 4) Electrical cables, leads and hoses should be so routed as to allow safe traffic by all concerned. Cable should be preferably supported on the brackets fixed along the wall to maintain safe access. Wherever routing on the floor cannot be avoided, care should be taken to ensure mechanical protection of these cables and safe access is not disturbed.
- 5) .No material on any work place should be so stacked or placed or disposed off as to cause danger, inconvenience or damage to any person or environment.
- 6) All unused scaffoldings, surplus/scrap materials and equipment/ systems like temporary electrical panels etc. should not be allowed to accumulate and shall be removed from the premises at the earliest.
- 7) Accumulation of water/oil spillages on the floor or any other workplace should be avoided.
- 8) Proper aisle space marking should be provided in all workplaces.

10.12 Other Statutory Provisions

Notwithstanding the clauses in the above subsections, there is nothing in these clauses to exempt the Facility from the provisions of any other act or rules in force in the Republic of India. In particular, all operations involving the transport, handling, storage and use of explosives should be as per the standing instructions and conform to the Indian Explosives Act, 1884 and the Explosives Rules, 1983. Handling, transport, storage and use of compressed gas cylinders and pressure vessels should conform to the Gas Cylinder Rules 2004 and Static and Mobile Pressure Vessels (Unfired) Rules 1981. In addition, The Indian Electricity Act 2003 and Indian Electricity Rules 2005, the Atomic Energy Act, 1962, the Radiation Protection Rules, 2004, the Atomic Energy (Factories) Rules, 1996 and AERB safety manual on 'Radiation Protection for Nuclear Facilities' (AERB/NF/SM/O-2) should be complied with.

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10.13 PERSONAL PROTECTIVE EQUIPMENT

General

- 1) Although the primary approach in any safety effort is that the hazard to the workmen should be eliminated or controlled by engineering methods rather than protecting the workman through use of personal protective equipment (PPE). Engineering methods could include design change, substitution, ventilation, mechanical handling, atomisation etc. Under those situations when it is not possible to introduce any effective engineering methods for controlling hazards, it is necessary that workman use appropriate type of PPE. For example, in construction work there is the possibility of a hand tool, a bolt, or some loose material to fall from an elevated level and striking the head of workman working below. It is therefore necessary that construction worker wear a safety helmet. It is for such situations, both the Factories Act 1948 and the Atomic Energy (Factories) Rules, 1996 have provisions for use of appropriate type of PPE.
 - 2) It is thus recognised that use of PPE is an important and necessary consideration in the development of a safety programme. Once the safety professional decides that PPE is to be used by workmen, it is essential to select right type of PPE and management should ensure that workman uses it and also PPE is correctly maintained.
 - 3) All personal protective equipment as considered necessary should be made available for the use of the persons employed on the site and maintained in a condition suitable for immediate use. Also adequate steps should be taken by engineer-in-charge to ensure proper use of PPE.
 - 4) All the PPEs in use should be as per relevant IS standards as referred in the AERB safety guidelines on 'Personal Protective Equipment' (AERB/SG/IS-3).
 - 5) All persons employed at the construction site should use safety helmets. Safety helmet should be with BIS mark and should have its headband with back support and chin strap.
 - 6) Workers employed on mixing asphaltic materials, cement and lime mortars should use protective goggles, protective foot wears, hand gloves and respirators as required.
 - 7) Persons engaged in welding and gas-cutting works should use suitable welding face shields. The persons who assist the welders should use
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suitable goggles. Protective goggles should be worn while chipping and grinding.

- 8) Stonebreakers should use protective goggles. They should be seated at sufficiently safe distances from one another.
 - 9) Safety goggles should be of shatterproof type and with zero power.
 - 10) Persons engaged in or assisting in shot blasting operations and cleaning the blasting chamber should use suitable gauntlets, overalls, shatterproof and dust-proof goggles and self contained breathing apparatus set.
 - 11) All persons working at heights more than 3.5 m above ground or floor and exposed to risk of falling down should use full body harness safety belts, unless otherwise protected by cages, guard railings, etc. In places where the use of safety belts is not feasible, suitable net of adequate strength fastened to substantial supports should be used.
 - 12) When workers are employed in sewers and inside manholes that are in use, it should be ensured that the manholes are opened and are adequately ventilated at least for an hour. After it has been well ventilated, the atmosphere inside the space should be checked for the presence of any toxic gas or oxygen deficiency by a competent person and recorded in the register before the workers are allowed to get into the manholes. A pilot team should enter the area donning self contained breathing apparatus (SCBA). The manholes opened should be cordoned off with suitable railing and provided with warning signals or caution boards to prevent accidents. There should be proper illumination in the night. Depending upon the work situation, the facility should provide PPE including the SCBA as recommended by Head, industrial safety.
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VOLUME-IA PART –I CHAPTER -XI

NPCIL GATE PASS FORMALITIES

11.1 SECURITY RULES:

It may be noted that the construction site is within the purview of the Central Industrial Security Force / other security agency engaged by NPCIL. The contractor shall follow all security rules as may be framed by Corporation from time to time regarding removal / movement of materials, equipment and personnel to and from site, issue of identity cards, control of entry of personnel and all similar matters. The Contractor and his personnel shall abide by all security measures imposed by the Engineer or his duly authorized representative from time to time.

11.2 Entry/ Exit of Manpower:

The contract labour shall enter the project premises only through turnstile gate by using the computerized biometric photo entry pass (RFID) issued to them. To ensure traceability/identity, each and every person engaged by the contractor will be required to furnish/upload bio-data of labourers/staff IPMIS (software based tool of NPCIL) which includes individual photograph, name, present and permanent address, identification mark and any of the following identity proofs for issue of temporary pass for period of maximum 15 days. The application shall be submitted through IPMIS for Entry/ Exit of Manpower.

- i. Voter ID.
 - ii. AADHAR Card.
 - iii. Ration Card.
 - iv. Passport.
 - v. Bank Account Passbook of any Nationalized Bank.
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- vi. Any document certified by a Gazetted Officer which provides photo identity and address of the individual.
- vii. Driving License.
- viii. Identity certificate from Native Village Administrative Officer or Elected Panchayat President.
- ix. PAN Card.
 - a. Based on the submission of the above along with prescribed filled application form for entry permission to site, initially, one-time 3 days (up to 15 days maximum) temporary pass or permission will be issued to Contractor's personnel for entry to KKNPP-3&4 Project Site areas for training on Industrial Safety / Fire Protection etc. Contractor shall take printout of the passes. Within 15 days of issue of temporary pass the Contractor shall submit the police verification certificate and Medical fitness certificate along with standard application format for issue of Regular pass (RFID). The Police verification must be carried out by the Police under the Police Station area(s) where the contract person was staying for the last two to three years. The police verification shall be valid for only three years. Minors or physically unfit persons shall not be deployed for the work.
 - b. All the data so furnished shall be certified by the contractor and countersigned by the Engineer-in-charge (EIC) of work, KKNPP-3&4 along with the undertaking from Contractor personnel that he is not involved in any criminal activity and no FIR or police case is pending against him and further endorsed by the contractor that he stands responsible for the conduct of the worker while working inside the KKNPP-3&4 project areas and countersigned by EIC.

Official visit by representatives of Vendors, suppliers, contractors and their Mobiles (without camera), Materials and Vehicles to KKNPP-3&4 Project Site areas are permitted on one-day gate pass through Visitor Management

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System (VMS) or Integrated Project Management Information System (IPMIS). They shall prove their identity by producing any of the above identity proof to the security personnel at main gate at the time of entry to KKNPP- 3&4 Project Site areas. Identity card issued by the Security Section should always be carried/ displayed by the Contractor's employees or persons while working inside the Plant.

- c. In the case of loss of entry pass, the contractor concerned shall duly intimate to EIC and Security and should lodge FIR and produce the copy of FIR to security. In this case, also a penalty of Rs. 3000/- shall be deposited by the contractor concerned for issue of fresh entry pass. In case of change of RFID from one contractor to another contractor, No Objection Certificate from earlier employer shall also to be submitted along with the documents.
 - d. On completion of work or return of labourers, the RFID cards shall be returned back to NPCIL. The contractor shall obtain a certificate in this regard from SECURITY and submit it to EIC along with submission of the final bill. Penalty of Rs. 3000/- per RFID card (or as revised from time to time) will be levied for non return / loss of RFID cards / Damage of RFID. Any RFID passes not used for a continuous period of 30 days will be disabled in the system preventing entry of the said person. This can be re-validated only through separate approval. Un-utilised / Expired entry passes shall have to be submitted immediately to NPCIL.
 - e. The contractor and his personnel shall abide by all security measures imposed by the NPCIL from time to time. Contractor shall also follow all rules and regulations applicable to the area being declared / pronounced from time to time by the authorities of existing Nuclear Power Station in the vicinity or any other statutory orders.
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- f. No mobile phone with camera is allowed inside the plant premises.

11.3 Material Gate passes:

- i) To bring materials/ equipments/ tools/ tackles etc. inside the plant for construction work, the Contractor has to produce challans/ proper documents to security agency engaged by NPCIL at gate. The materials shall be checked thoroughly by security agency engaged by NPCIL at Gate and entry details shall be recorded in their register before allowing any material to bring inside the plant by Contractor. It is Contractor's responsibility to see that the recorded entry no., date, signature of NPCIL's authorized representative with stamp challans/ supporting documents signed by security personnel at gate during entry in the challans also. These challans shall be retained safely and reproduced when material is taken back from KKNPP site. During the entry and exit of all the materials brought by contractors at KKNPP-3&4 Project site, the details shall be entered in the "Material entry/exit register" maintained at security gate. One copy of documents pertaining to materials being taken inside shall be kept with security. While taking the material out, this shall be cross-checked with the inward documents and confirmed.
- ii) Contractors will be allowed to take their materials in/ out of the construction areas from / to their work shops inside plant premises through material movement format approved by the Project Manager / Site- in-charge of the contract. For taking materials inward/outward of KKNPP-3&4 Project Site areas (in/ out of the main plant boundary), gate pass in standard format shall be used and be approved through NPCIL. The contractor shall print gate pass book in quadruplicate in approved format of NPCIL for the entry/exit of materials to/from project premises.
- iii) Loading of materials belonging to contractors inside plant premises, on to trucks/ tractor-trailers/ any other vehicles for taking out of plant premises
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shall be carried out in the presence of security personnel. A formal request for deployment of security personnel stating the time of loading of materials should invariably be sent to security through Engineer well in advance. Contractor's Project Manager/ Site in-charge shall issue a certificate certifying that contractor's materials are only being loaded and shifted out of plant premises.

- iv) Once software based tool (IPMIS) of NPCIL for materials entry/exit is ready, contractor will be asked to apply through the same tool.

11.4 Vehicle permit:

Entry and exit of Contractor's vehicles at KKNPP-3&4 Project site areas for carrying their staff/ labour, and other vehicles like Trucks, Cranes, Trailers, Forklifts, Hydra, JCB, Water Tanker etc shall be controlled through vehicle pass and the application shall be submitted in standard format.

Free issue materials could be loaded/ unloaded at Central Stores/ Warehouse between 0800 hours and 1800 hours with the approval of Engineer on the request submitted by the Contractor. While entering at the gate, the vehicles shall be checked along with its registration, insurance and driving license of driver.

The following requirements are to be met to obtain vehicle permit:

- i) Vehicle/P&M etc. should be brought to site in good conditions.
 - ii) Valid Road tax certificate, fitness certificate, PUC certificate and insurance policy from competent authority.
 - iii) Valid operating/ driving license of driver/operator.
 - iv) Vehicle permit shall be applied through IPMIS.
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11.5 Mobile passes:

Contractors' staff / labour shall be allowed to carry mobiles without camera / data card /internet facility in to KKNPP-3&4 Project site areas only on approval. They shall submit the application for mobile pass in standard format through IPMIS through ENC.

11.6 Photography in Project Premises:

Photography of the Project Premises is strictly Prohibited

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VOLUME-IA PART –I CHAPTER -XII

GENERAL

PROVIDENT FUND & MINIMUM WAGES

- 1) The contractor is required to extent the benefit of Provident Fund to the labour employed by them in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, contractor are hereby required to get themselves registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to them by the Provident Fund authorities within one month from the date of issue of this letter of intent. In case contractor are exempted from such remittance, an attested copy of authority for such exemption is to be furnished. Please note that in the event of their failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to BHEL by the customer or paid to statutory authorities by BHEL, such amount will be recovered from payments due to contractor.
- 2) The contractor shall ensure the payments of minimum labour wages to the workmen under them as per the rules applicable from time to time in the state.
- 3) The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable.

OTHER STATUTORY REQUIREMENTS

- 1) The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no along with the first running bill.
 - 2) The contractor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.
 - 3) The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. In case of “Non-compliance of Sec 21 or non-payment of wages” to the workmen before the expiry of wage period by the contractor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.
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TECHNICAL CONDITIONS OF CONTRACT (TCC)

- 4) The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workman under I D Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with Copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act 1948 (If applicable) to BHEL along with the Final Bill.
- 5) In case of any dispute pending before the appropriate authority under I D act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.
- 6) In case of any dispute prolonged/pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL.

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