



भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

TCN – 05

Ref: PSER:SCT: NKP-E2053:TCN-05

Date: 01-08-2020

Sub	Tender Change Notice (TCN) - 05	
Job	ERECTION, TESTING & COMMISSIONING OF ELECTRICAL SYSTEMS FOR UNIT# 3 OF 3X660 MW, NORTH KARANPURA STPP AT JHARKHAND.	
Ref	1.0	Tender no PSER:SCT:NKP-E2053:20
	2.0	BHEL's NIT, vide reference no Ref: PSER:SCT:NKP-E2053:7977, Date: 17-06-2020.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT: NKP-E2053:TCN-01 Date: 08-07-2020.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT: NKP-E2053:TCN-02 Date: 15-07-2020.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT: NKP-E2053:TCN-03 Date: 22-07-2020.
	6.0	BHEL's TCN-04, vide reference no PSER:SCT: NKP-E2053:TCN-04 Date: 29-07-2020.
	7.0	Other References, if any.

With reference to above, following points/ documents, relevant to tender, may please be noted and complied with while submitting offer.

1. NIT cl. no. 35.0 is revised as below:

“For this procurement, the local content to categorize a supplier as a Class-I local supplier/ Class-II local supplier/ Non-Local supplier and purchase preference to Class-I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04-06-2020 issued by DPIIT. In case of subsequent orders issued by the Nodal Ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT”.

Duly filled & signed Form-2 (Format for local content), as applicable, to be submitted by bidders along with their techno-commercial offer.

- Clarifications of bidders' queries attached vide Annexure-A to this TCN-05.
- Revised VOL-ID-SCC-HSE PLAN (REV-01) is attached herewith, superseding VOL-ID-SCC-HSE PLAN issued earlier along with NIT.
- Introduction of VOL-IF-TCC-ACC Lighting & VOL-IF-TCC- GA DRAWING.
- Revised 'No deviation certificate' is attached. Bidder to submit 'No deviation certificate' as per attached format only.
- All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HEAVY ELECTRICALS LTD

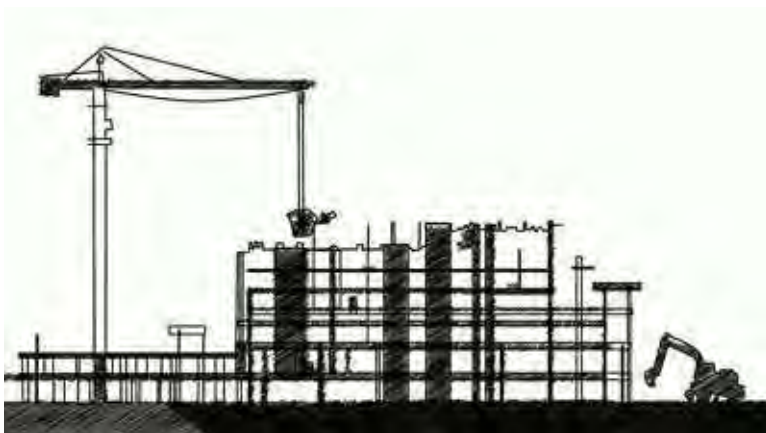
Dy. Manager (SCT)

Encl: As Above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION, DJ-9/1, SECTOR-II, SALT LAKE CITY, KOLKATA - 700 091

फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : (033) 2339-8000/ 2339 8231



HEALTH, SAFETY and ENVIRONMENT PLAN


For

SITE OPERATIONS

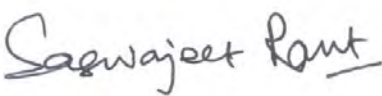
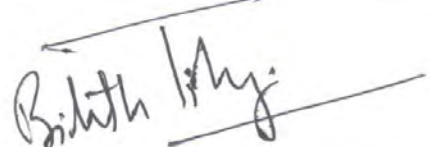
By

SUB-CONTRACTORS

POWER SECTOR- EASTERN REGION

 PS-ER	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SUB-CONTRACTORS (GENERAL)	Doc. No.: HSEP:14-ER Rev.: 01 Date: 08.05.20 Page 2 of 170
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DOCUMENT ISSUE SHEET

	PREPARED BY	APPROVED BY
NAME	Saswajeet Rout	Bishwanath Tirkey
DESIGNATION	Senior Engineer (HSE), PSER-HQ, Kolkata	Addl. GM (HSE), PSER-HQ, Kolkata
SIGNATURE		
ISSUED BY: Saswajeet Rout, Sr. Engineer (HSE), PSER-HQ, Kolkata		
ISSUED TO: All sites of BHEL-PSER		
COPY NO: E-Copy		
DATE OF ISSUE: 08.05.2020		

THIS PLAN SUPERSEDES THE STANDARD HSE PLAN

<div><div><div>बी एच ई एल</div><div>BHEL</div></div><div>PS-ER</div></div>	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SUB-CONTRACTORS (GENERAL)	Doc. No.: HSEP:14-ER
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HSE PLAN FOR SITE OPERATIONS BY BHEL'S SUBCONTRACTORS AT A GLANCE

BEFORE START	SIGNING OF MOU	
	Agree to comply to HSE requirement- Statutory and BHEL's	Agree to accept BHEL's decision on release of 1.5% (as specified in the contract) of Gross bill Amount or part thereof or otherwise (non-release), based on our HSE performance as evaluated by BHEL during the execution period
PLAN	HSE ORGANISATION	
	Manpower <ul style="list-style-type: none"> 1 (one) safety officer for every 300 workers or part thereof 1(one) safety-supervisor for every 150 workers 1(one) safety-steward/ supervisor for every 50 workers As per Cl. 7.1	HSE Roles and responsibilities <ul style="list-style-type: none"> All employees as per 7.2.1 Site In-charge & Package In-charges- As per clause 7.2.2 Safety officer- As per clause 7.2.3
	HSE Planning for Man, Machinery / Equipment/ Tools & Tackles	
PROVIDE	HSE INFRASTRUCTURE	
	<ul style="list-style-type: none"> PPEs Drinking Water Washing Facilities Latrines and Urinals Provision of shelter for rest Medical facilities 	<ul style="list-style-type: none"> Canteen facilities Labor Colony Emergency Vehicle Pest Control Scrapyard Illumination Crèches (if required)
TRAIN	HSE TRAINING , AWARENESS & PROMOTION	
	Training <ul style="list-style-type: none"> Induction training Height work and other critical areas Tool Box talk & Pep Talk Job Specific Training 	Awareness & Promotion <ul style="list-style-type: none"> Posters & Signage Emergency Contact/Information Display Banner Competition & Awards
COMMUNICATE	HSE COMMUNICATION	
	Incident Reporting <ul style="list-style-type: none"> Accident- Fatal, Major & Minor Property damage Near Miss Safety Performance Reporting	Event Reporting <ul style="list-style-type: none"> Celebrations Training Medical camp Motivational Activities



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EXECUTE SAFELY

SAFETY DURING WORK EXECUTION

PERMIT TO WORK

Height work (above 2 meters), Hot Work, Heavy Lifting, Confined Space,
Radiography, Excavation (More than 1.22 meters), Lockout / Tag out

OPERATIONAL CONTROL

- | | |
|---|--|
| <ul style="list-style-type: none"> Welding, Gas Cutting Grinding Rigging, Signaling Cylinder- Storage & Movement Demolition work T&Ps Chemical Handling Electrical works Painting | <ul style="list-style-type: none"> Fire Scaffolding Height work Working Platform Excavation / Civil Work Ladder Lifting Hoisting appliance Hard Barricading |
|---|--|

HOUSE KEEPING

WASTE MANGEMENT

TRAFFIC MANAGEMENT

ENVIRONMENTAL CONTROL

EMERGENCY PREPAREDNESS AND RESPONSE PLANNING

CHECKS

HSE AUDITS & INSPECTION

- | | |
|---|---|
| <ul style="list-style-type: none"> Daily Checks Inspection of Height work Inspection of PPEs Inspection of T & Ps | <ul style="list-style-type: none"> Inspection of Cranes & Winches Inspection of Welding and Gas cutting Inspection of elevators etc. |
|---|---|

HSE PERFORMANCE EVALUATION PARAMETERS

NON CONFORMANCE

PENALTY for NON CONFORMANCE

Refer Clause 16 Incremental
penalty

For repeated violation by the same person, the penalty would be double of the previous penalty

For repeated fatal incident in the same contract / package, incremental penalty to be imposed. The subcontractor will pay 2 times the penalty compared to the previously paid in case there are repeated cases of fatal incidents under the same subcontractor for the same package in the same unit.

COMPENSATION TO ACCIDENT VICTIMS

Refer Clause 17

Employee Compensation Act, 1922

Other Acts and Guidelines relevant to employee compensation



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ORGANIZATION OF THIS DOCUMENT

- **GENERAL SECTION**
- **SECTION A:**
MAIN REQUIREMENTS APPLICABLE IN FULL
- **SECTION B:**
SPECIAL REQUIREMENTS
- **ANNEXES**



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GENERAL



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1. PURPOSE

- 1.0 The purpose of this HSE Plan is to provide for the systematic identification, evaluation, prevention and control of general workplace hazards, specific job hazards, potential hazards and environmental impacts that may arise from foreseeable conditions during installation and servicing of industrial projects and power plants.
- 1.1 This document shall be followed by BHEL's Sub-Contractors at all installation and servicing sites. In case BHEL has contractual HSE obligations towards customer, this document will be followed in conjunction with (BHEL's) customer specific requirements, ensuring that applicable systems, controls and checks of both are implemented in letter and spirit.
- 1.2 In case the customer has any specific requirement, the same is to be fulfilled but may not include financial inclusion.
- 1.3 This document shall be followed unless otherwise mentioned in TCC (technical condition of contract) or elsewhere in NIT or contract documents. This supersedes all HSE clauses in GCC.
- 1.4 Although every effort has been made to make the procedures and guidelines in line with statutory requirements, in case of any discrepancy relevant statutory guidelines must be followed.

2. SCOPE

The document is applicable on all activities and assets including managerial, supervisory, professional, technical, clerical and other workers including contract laborers; and equipment operating under the control of BHEL's Subcontractors at all installation / servicing activities of BHEL Power Sector as per the relevant contractual obligations.



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3. OBJECTIVES

The HSE Plan reflects that BHEL places high priority upon the Occupational Health, Safety and Environment at workplaces. The Sub-contractor shall:

Health & Safety

- Prevent injury and ill health of all persons at site ('Persons' refers to all personnel including managerial, supervisory, professional, technical, clerical and other workers including contract laborers)

Environment

- Prevent pollution to environment and ensure protection of environment taking into account interested party concern and conservation of resources and reduction of wastage

Legal Requirements

- Comply at all times with the relevant statutory and contractual HSE requirements.

Planning & Resources

- Ensure that all work planning takes into account all persons that may be affected by the work.
- Ensure timely provision of resources to facilitate effective implementation of HSE requirements.

Competency, Training & Awareness

- Provide trained, experienced and competent personnel. Ensure medically fit personnel only are engaged at work.
- Provide all personnel with adequate information, instruction, training and supervision on the safety aspect of their work.

Maintenance of Equipment

- Ensure fitness testing of all T&Ps. Lifting appliances like cranes, chain pulley blocks etc. are certified by competent authority.

Safety during Operations

- Provide and maintain plant, places and systems of work that are safe and without risk to health and the environment.
- Effectively control, co-ordinate and monitor the activities of all personnel on the Project sites including subcontractors in respects of HSE.
- Establish effective communication on HSE matters with all relevant parties involved in the Project works.

HSE Improvement

- Capture the data of all incidents including near misses, process deviation etc. Investigate and analyze the same to find out the root cause
- Ensure timely implementation of correction, corrective action.
- Ensure continual improvement in HSE performance



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GOALS AND TARGETS

- ❖ To achieve “Zero Incident at Site” (LTI)
- ❖ 100% compliance of all legal/statutory requirements related to HSE.
- ❖ 100% Health, Safety and Environmental Induction training attendance for all workers.
- ❖ 100% High Risk activities to be carried out only after approved Method Statement, HIRA / Aspect-Impact / JSA / OCP and Permit to Work are implemented.
- ❖ 100% PPEs compliance in high and medium risk activities.
- ❖ 100% monitoring of all Work Areas
- ❖ 100% detection of non-conformities in work area and 100% closure within specified time
- ❖ 100% incident (near miss, minor, major, other) reporting, recording and reviewing for corrective actions.
- ❖ Regular Safety Reviews to assess HSE program compliance and 100% closure of any recognized gaps to continually improve safety management and incident prevention.

4. REFERENCES

1. ALL CONTRACTUAL HSE REQUIREMENTS INCLUDING THIS DOCUMENT
2. ALL APPLICABLE ACTS, RULES & REGULATIONS
3. BHEL POWER SECTOR HSE MANAGEMENT SYSTEM
 - I. HSE PROCEDURES (13.1.1)
 - II. WORK PERMITS (See Clause 13.1.2)
 - III. OPERATIONAL CONTROL PROCEDURES (See Clause 13.1.3)
 - IV. FORMATS (See Clause 21)
4. BHEL CORPORATE STANDARD PPE GUIDELINES
5. RELEVANT INDIAN STANDARDS FOR SAFETY (See Annexure 02)

(Note: Wherever, the date or revision number of a document is not mentioned, latest revision is implied)



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5. *BHEL HEALTH, SAFETY & ENVIRONMENT POLICY:*

In BHEL, Health, Safety and Environment (HSE) responsibilities are driven by our commitment to protect our employees and people we work with, community and environment. BHEL believes in zero tolerance for unsafe work/non-conformance to safety and in minimizing environmental footprint associated with all its business activities. We commit to continually improve our HSE performance by:

- Developing safety and sustainability culture through active leadership and by ensuring availability of required resources.
- Ensuring compliance with applicable legislation, regulations and BHEL systems.
- Taking up activities for conservation of resources and adopting sound waste management by following Reduce/Recycle/Reuse approach.
- Continually identifying, assessing and managing environmental impacts and Occupational Health & Safety risks of all activities, products and services adopting approach based on elimination/substitution/reduction/control.
- Incorporating appropriate Occupational Health, Safety and Environment criteria into business decisions, design of products & systems and for selection of plants, technologies and services.
- Imparting appropriate structured training to all persons at workplace and promoting awareness amongst customers, contractors and suppliers on HSE issues.
- Reviewing periodically this policy and HSE Management Systems to ensure its relevance, appropriateness and effectiveness.
- Communicating this policy within BHEL and making it available to interested parties.

Atul Sobti
Chairman & Managing Director



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6. TERMS AND DEFINITIONS

6.0 INCIDENT

Work- related or natural event(s) in which an injury or ill health (regardless of severity) or fatality, damage to property/environment occurred, or could have occurred.

6.1 NEAR MISS

An incident where no ill health, injury, damage or other loss occurs, but it had a potential to cause, is referred to as "Near-Miss incident".

6.2 MAN-HOURS WORKED

The total number of employee hours worked by all employees including subcontractors working in the premises.

It includes managerial, supervisory, professional, technical, clerical and other workers including contract laborers.

Man-hours worked shall be calculated from the payroll or time clock recorded including overtime. When this is not feasible, the same shall be estimated by multiplying the total man-days worked for the period covered by the number of hours worked per day. The total number of workday for a period is the sum of the number of men at work on each day of period. If the daily hours vary from department to department separate estimate shall be made for each department and the result added together.

6.3 FIRST AID CASES (FAC)

First aid cases include:

1. Visit to a physician or a licensed health care professional solely for observation or counselling
2. Conduct of diagnostic procedures like X rays, blood test including the prescription medications used solely for diagnostic purposes (e.g. eye drops to dilate eyes)
3. Using a non-prescription medicine at non-prescription strength (for medication available in both prescription and non-prescription form as recommendation by a physician or other licensed health care professional to use a non-prescription medication at prescription strength is considered medical treatment for record keeping purposes);
4. Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, are considered medical treatment);
5. Cleaning, flushing or soaking wounds on the surface of the skin;
6. Using wound coverings such as bandages, Band-Aids TM, gauze pads, etc.; or using butterfly bandages or Steri-Strips TM (other wound closing devices such as sutures, staples, etc., are considered medical treatment);
7. Using hot or cold therapy;
8. Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are considered medical treatment for record-keeping purposes);



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9. Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).
 10. Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
 11. Using eye patches;
 12. Removing foreign bodies from the eye using only irrigation or a cotton swab;
 13. Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
 14. Using finger guards;
 15. Using massages (physical therapy or chiropractic treatment are considered medical treatment for recordkeeping purposes); or
 16. Drinking fluids for relief of heat stress.
- No other treatments are considered first aid.

6.4 MEDICAL TREATMENT CASES (MTC)

An incident involved with an injury or illness that needs medical attention beyond First-aid as per 6.3 above.

6.5 Dangerous Occurrence is defined as:

- (1) Collapse or failure of lifting appliances or hoist or conveyors or other similar equipment/machine;
- (2) Collapse or failure of a crane, derrick, winch, hoist or other appliance used in raising or lowering persons or goods or any part thereof, or the overturning of a crane;
- (3) Explosion or fire causing damage to the structure of any room or place in which persons are employed, or to any machine or plant, resulting in the complete suspension of ordinary work;
- (4) Electrical short circuit or failure of electrical machinery, plant or apparatus, attended by explosion or fire, causing structural damage involving its stoppage or disuse;
- (5) Explosion of a receiver or container used for the storage at a pressure greater than atmospheric pressure of any gas or gases (including air) or any liquid or solid resulting from the compression of gas;
- (6) Collapse in whole or part from any cause whatsoever of any roof, wall, floor, Structure or foundation forming part of the construction site in which persons are employed;
- (7) Total or partial collapse of any overburden, face, tip or embankment on the Construction site;
- (8) The overturning of, or collision with any object by any bulldozer, dumper, excavator, grader, lorry or shovel loader, or any mobile machine used for the handling of any substance on the construction site.

6.6 **Fire:** Except Dangerous occurrence, any incident involving fire.

6.7 **Property Damage:** Except Dangerous Occurrences and Fire, any incident of property (materials, building, equipment etc) getting damaged.

6.8 TYPE OF INCIDENT / ACCIDENT & THEIR REPORTING:

The categories of Incident / accident are as follows:

Non-Reportable Cases or NON-LTI: (Including First-aid cases as per 6.3 and MTC as per 6.4)

Minor: In this case the injured person resumes duty within 48 hours of incident.



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Reportable Cases (LTI or Loss Time Injury Cases):

Major: In this case the injured person is disable for 48 hours or more and is not able to perform his duty. (as per IS 3786). It includes fatality.

All incidents must be reported orally immediately and in writing within 24 hours of time of incident. However, in case of fatality, it shall be reported to the statutory authority within prescribed timeline through proper channel. Internal reporting shall be done within 6 hours of time of the incident

6.9 TOTAL REPORTABLE FREQUENCY RATE

Frequency rate is the number of Reportable Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula read as:

$$\frac{\text{Number of Reportable LTI}}{\text{Total Man Hours Worked}} \times 1,000,000$$

6.10 SEVERITY RATE

Severity rate is the Number of days lost due to Lost Time Injury (LTI) per one Million Man hours worked. Mathematically, the formula reads as:

$$\frac{\text{Days lost due to LTI}}{\text{Total Man Hours Worked}} \times 1,000,000$$

6.11 FREQUENCY SEVERITY INDEX (FSI)

$$\text{Frequency Severity Index, FSI} = \sqrt{\text{FR} \times \text{SR} / 1000}$$

6.12 INCIDENCE RATE

Incidence Rate is the Number of LTI per one thousand manpower deployed. Mathematically, the formula reads as:

$$\frac{\text{Number of LTI} \times 1000}{\text{Average number of manpower deployed}}$$

6.13 JOB SAFETY ANALYSIS

A job safety analysis (JSA) is a procedure which helps integrate accepted safety and health principles and practices into a particular task or job operation. In a JSA, each basic step of the job is to identify potential hazards and to recommend the safest way to do the job. Other terms used to describe this procedure are job hazard analysis (JHA) and job hazard breakdown.



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6.14 SAFETY WALK

It's a walk (conducted periodically) by an official through a portion or whole of a site as an HSE officer, noting down HSE observations, speaking to concerned workmen and supervisor on observation, recording and reporting to in charges of agencies, getting the same rectified with personal follow up - to send out a strong message on Management's commitment to safety.

6.15 HEAVY & COMPLEX LIFTING

A heavy and complex lifting activity includes:

1. Lifting above 50 Tons
 2. Tandem Lifting using multiple cranes
 3. Total load exceeding 75% of capacity of crane
 4. Lift of unusual difficulty or geometry or rigging
 5. Lift over operating units
 6. Any other lift as decided by site HSE / Erection
- In any case, Job Safety Analysis to be carried out for any lift above 5 Tons.

6.16 SAFETY COMMITTEE

As per the BOCW, Safety Committee shall be constituted if there are more than five hundred or more construction workers are employed at any site. As per the Factories Act, 1948 it is for 250 workers. It shall be represented by equal number of representatives of employer and construction workers.

6.17 NIGHT WORK

Work conducted after sunset when only a fraction of total manpower is available

Section-A

Main Requirements

(Applicable in Full)



**POWER
SECTOR**

HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-A)

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7. HSE ORGANISATION

7.1 DEPLOYMENT

7.1.1 Minimum Number (Availability per contract / package per Working Shift)

7.1.1.1 HSE Officer	7.1.1.2 HSE Supervisor	7.1.1.3 HSE Steward / Observer
1 per 300 workers or part thereof as a minimum or as mandated by applicable legal requirements, whichever more stringent	1 per 150 workers or part thereof	1 per 50 workers or part thereof

7.1.1.4 The safety officers shall be engaged directly by the sub-contractor, whereas safety supervisors and safety stewards may be from the agencies engaged by the sub-contractor.

7.1.1.5 Deployment Plan:

- 7.1.1.5.1 These shall be minimum one HSE officer along with HSE supervisor and HSE steward in the aforesaid ratio for every shift for each unit of Boiler/ESP/Power House & TG/ Chimney/ Whole of Cooling Tower.
- 7.1.1.5.2 For Civil works and other BOP items, deployment shall be broadly as specified in the above table. But BHEL shall finally approve the deployment based on nature and volume of jobs, Risks and hazards associated etc.
- 7.1.1.5.3 The deployment plan of Safety manpower at various locations shall be submitted to BHEL for approval by subcontractor

BHEL reserves the right to demand more safety personnel than what is stipulated here and change the deployment pattern



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7.1.2 QUALIFICATION & EXPERIENCE

All Degrees/ Diplomas shall be recognized by State Council for Technical Education & Vocational Training (SCTE & VT) / All India Council for Technical Education (AICTE) / University

7.1.2.1 HSE Officer	7.1.2.2 HSE Supervisor	7.1.2.3 HSE Steward / Observer
<p>A.</p> <p>i. Recognized degree in any branch of Engg. or Tech. or Architecture with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than two years, or Recognized diploma in any branch of Engg. or Tech with practical experience of working in a building or other construction work in supervisory capacity for a period of not less than five years.</p> <p>ii. Recognized degree or diploma in Industrial safety</p> <p>ii. (Preferably) have adequate knowledge of the language spoken by majority of the workers at the construction site.</p> <p style="text-align: center;">Alternatively:</p> <p>B.</p> <p>Graduation Degree in Science with Physics & Chemistry and degree or diploma in Industrial Safety (from any Indian institutes recognized by AICTE or State Council of Tech. Education of any Indian State) with practical experience of working in a building, plant or other construction works (as Safety Officer, in line with Indian Factories Act, 1958) for a period of not less than five years.</p>	<p>As a minimum, (s)he shall possess:</p> <p>A recognized graduation Degree in Science (with Physics & Chemistry) or a recognized diploma in Engg. or Tech. with:</p> <p>a. Minimum Two years of practical experience in construction work environment and</p> <p>b. Should possess requisite skills to deal with construction safety & fire related day-to-day issues.</p>	<p>As a minimum, (s)he shall possess:</p> <p>1. Class XII pass certificate and</p> <p>2. Trained in fire-fighting as well as in safety / occupational health related subjects, with:</p> <p>a. Minimum two year of practical experience in construction work environment and</p> <p>b. Should have adequate knowledge of the local language spoken by majority of the workers at the construction site.</p>

7.1.3 HSE IN-CHARGE

In case there are more than one HSE Officers with any subcontractor, one of them, who is senior most by experience (in HSE discipline), may be designated as HSE In-Charge. Duties & responsibilities of such person shall be commensurate with that of relevant statute and primarily to coordinate with top management of Client and subcontractors.

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7.1.4 AVAILABILITY AND PENALTY FOR NON-DEPLOYMENT:

Subcontractor shall ensure physical availability of safety personnel at the place of specific work location including where Height Work Permit is required/granted. No work shall be started in any area until above safety personnel & concerned Site Engineer of subcontractor are physically deployed at site.

The Subcontractor shall prepare an organization chart identifying the areas of operations, responsibilities and reporting structure of all safety personnel and submit the same to BHEL.

The subcontractor shall deploy sufficient safety officers, supervisors and safety-stewards, as per numbers & qualifications mandated in this Section since mobilization of first batch of manpower and add more in proportion to the added strength in work force. Any delay in deployment will attract a penalty at following rates:

Non-deployment of HSE Officer	–	Rs 50000 per man-month
Non-deployment of HSE Supervisor	–	Rs 30000 per man-month
Non-deployment of HSE Steward	–	Rs 20000 per man-month

Penalty shall be collected for the period of non-availability of safety personnel after allowing a grace period of 15 days for finding a replacement.

7.1.5 QUALIFICATION OF CRANE & WINCH OPERATORS, DRIVERS etc.:

The Crane and Winch Operators, Drivers, Riggers and other professionals deployed shall be qualified and experienced, and have valid license for the class of vehicle / machinery as applicable. The subcontractor shall certify competence of these persons in writing as and when they join.


Crane/Winch operator should have certificate on subject course or owner experience certificate in letterhead.

7.1.6 In case the statutory requirements i.e. State or Central Acts and / or Rules as applicable like the Building and Other Construction Workers' Regulation of Employment and Conditions of Service- Act,1996 or State Rules (wherever notified), the Factories Act, 1948 or Rules (wherever notified), etc. are more stringent than above clarifications, the same shall be followed.

7.1.7 **BILLING:** Deployment of Safety manpower as per this clause **shall be** a billable item.

7.1.8 The Subcontractor shall verify & authenticate credentials of the HSE personnel detailed in this Section and furnish Bio-Data/Resume / Curriculum Vitae of the safety personnel as above for BHEL / Owner's approval, at least 1 month before the mobilization. The Subcontractor, whenever required, shall arrange submission of original testimonials / certificates of their Safety personnel, to BHEL / Owner (for verification/scrutiny, etc.)

7.1.9 Prior approval of CVs by BHEL for Safety Officer and Safety Supervisor is mandatory, however BHEL has right to check suitability of Safety Stewards as well.


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7.2 HSE RESPONSIBILITIES

The subcontractors shall communicate the HSE responsibilities as indicated in this section to relevant employees in written Form and ensure awareness of the same

7.2.1 ALL EMPLOYEES

1. To be aware of, get involved in and ensure implementation of all HSE related Systems and Procedures including but not limited to:
 - a) BHEL HSE Management System including HSE Procedures and OCPs
 - b) Work Permit System
 - c) Emergency Preparedness Response Plans
 - d) Contractual HSE requirements
 - e) Legal Requirements
 - f) Penalty System
 - g) Training requirements
2. To ensure that the persons engaged in respective area follow the safety rules like using appropriate PPEs.
3. To keep track of repetitive minor or major incident observation/ report and submit to BHEL.
4. To prepare HIRA / JSA as required and submit to BHEL for verification.
5. To record all incidents including near miss and report to BHEL.
6. To adopt safe working practices at all times and act as role model for Safety
7. To take immediate corrective action actions in case any non-conformity is observed on product / process / system with respect to Occupational Health, Safety and Environment.
8. In case any particular activity / work has extremely high consequential risk or high environmental impact, same shall be brought to the notice of BHEL Package In-charge before starting the work.
9. To interfere/ stop work as & when identified unsafe.
10. To maintain & promote improved level of house-keeping all the time at site.
11. To support/co-operate with audit team members as & when safety audits are carried out.
12. To involve in investigation, if any incident occurs in his work area.
13. To participate in safety promotional programmes.
14. To attend the safety committee meeting, if member/ invitee
15. To ensure that only fit T&Ps and qualified persons are engaged for all activities.
16. Shall ensure that person working above 2.0 meter should use Safety Harness tied to a life line/stable structure.
17. Shall ensure that materials are not thrown from height. Cautions to be exercised to


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prevent fall of material from height.

18. Shall ensure that all T&Ps engaged are tested for fitness and have valid certificates from competent authorities.

7.2.2 SITE IN –CHARGE & PACKAGE IN-CHARGES OF SUBCONTRACTOR

1. All requirements as per 7.2.1
2. **Shall ensure fulfillment of HSE requirements of BHEL contract as given in this document.**
3. Shall engage qualified safety manpower as per this document at all times.
4. Shall adhere to the rules and regulations mentioned in this document, practice very strictly in his area of work in consultation with his concerned engineer and the safety coordinator.
5. Shall screen all workmen for health and competence requirement before engaging for the job and periodically thereafter as required.
6. Shall ensure that all the workers are engaged after undergoing induction training.
7. Shall arrange for all necessary PPEs like safety helmets, belts, full body harness, shoes, face shield, hand gloves etc. before starting the job. Shall ensure that no working men /women carry excessive weight more than stipulated in Factory Rule Regulation R57.
8. Shall ensure that provisions stipulated in contract Labor Regulation Act 1970, Chapter V C.9, canteen, rest rooms/washing facilities to contracted employees at site.
9. Shall report all incidents (Fatal/Major/Minor/Near Miss) to the Site engineer /HSE officer of BHEL.
10. Shall conduct Safety Walks and safety inspections, and act as a role model for Safety.
11. Shall ensure that Horseplay is strictly forbidden.
12. Shall ensure that adequate illumination is arranged during night work.
13. Shall ensure that all personnel working under subcontractor are working safely and do not create any Hazard to self and to others.
14. Shall ensure display of adequate signage/posters on HSE.
15. Shall ensure that mobile phone is not used by workers while working.
16. Shall ensure conductance of HSE audit, mock drill, medical camps, induction training and training on HSE at site.
17. Shall ensure full co-operation during Client/External /Customer HSE audits.
18. Shall ensure submission of look-ahead plan for procurement of HSE equipment's and PPEs as per work schedule.
19. Shall ensure adequate valid fire extinguishers are provided at the work site.
20. Shall ensure availability of sufficient number of toilets /restrooms and adequate drinking water at work site and labor colony.
21. Shall ensure adequate emergency preparedness
22. Site In-charge also involve in the induction training so as to share knowledge of some incident and guide the worker to perform work safely.
23. Shall ensure power source for hand lamps shall be maximum of 24 v.
24. Shall ensure temporary fencing should be done for open edges if Hand – railings and Toe-

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guards are not available.

25. Shall be responsible for the periodic testing of T&Ps (winches / crane /hydra/tools/equipment so on.) and Pressure Vessels as per applicable codes and submit report to BHEL
26. Shall be member of site HSE committee and attend all meetings of the committee

7.2.3 HSE OFFICER OF SUBCONTRACTOR


1. All requirements as per 7.2.1
2. Carry out safety inspection of Work Area, Work Method, Men, Machine & Material, P&M and other tools and tackles.
3. Facilitate HIRA and Aspect/Impact Study in the area and ensure control measures.
4. Highlight the requirements of safety through Tool-box / other meetings.
5. Help concerned HOS to prepare Job Specific instructions for critical jobs.
6. Maintain record and conduct investigation of all incident/dangerous occurrences & recommend appropriate safety measures.
7. Advice & co-ordinate for implementation of HSE permit systems, OCPs & MPs.
8. Convene HSE meeting & minute the proceeding for circulation & follow-up action.
9. Plan procurement of PPE & Safety devices and inspect their healthiness.
10. Report to BHEL on all matters pertaining to status of safety and promotional programmes at site level.
11. Encourage raising Near Miss Report on safety along with, improvement initiatives on safety.
12. Facilitate administration of First Aid
13. Facilitate screening of workmen and safety induction.
14. Conduct fire Drill and facilitate emergency preparedness
15. Design campaigns, competitions & other special programs to promote safety in the workplace.
16. Notify non-conformance to safety norms observed during site visits / site inspections.
17. Recommend to Site In-charge, immediate discontinuance of work until rectification, of such situations warranting immediate action in view of imminent danger to life or property or environment.
18. To decline acceptance of such PPE / safety equipment that do not conform to specified requirements.

7.2.4 HSE SUPERVISOR OF SUBCONTRACTOR

1. All requirements as per 7.2.1
2. To assist Safety officer

7.2.5 HSE STEWARD / OBSERVER OF SUBCONTRACTOR

1. All requirements as per 7.2.1
2. To monitor allotted area for Safety violations, take required action and inform the concerned Safety Supervisor / Officer

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3. To assist Safety Officer and Safety Supervisor

7.2.6 HSE DOCUMENTS, SYSTEMS & PROCEDURES:

BHEL shall provide the subcontractor soft copies of all applicable HSE Procedures, Work Permits, Operational Control Procedures, Formats and any other instructions required for the implementation of HSE Management System before commencing operations at site. Subcontractor shall ensure the availability of the same.

7.2.7 IMPORTANT SITE EHS RULES RESULTING IN POSSIBLE EXPULSION FROM SITE

- ❖ Pre-employment Medical fitness is compulsory for all workers.
- ❖ EHS induction is mandatory for all new workers, supervisor and engineers, subcontractor managers etc.
- ❖ No visitors are allowed for site visit without safety induction.
- ❖ **Mandatory PPEs are**
 - ✓ Safety helmet,
 - ✓ Hard toe safety shoes,
 - ✓ Safety glasses
 - ✓ Reflective vest
 - ✓ Full/half sleeve (at least 4-inch-long) shirt
 - ✓ Full length pant/trousers for male and preferably Salwar Kameez for female
- ❖ **Zero Tolerance Safety Rules**
 - Violation of Fall protection / not anchoring & wearing safety harness above 6 feet,
 - Work without PTW
 - Child labor at site
- ❖ Restricted Use of cell phone in the working zone, operating vehicle/crane and at height. Encourage the people not to bring mobile phones inside the project premises.
- ❖ All vehicle being used at site to be in good condition in all respect.
- ❖ All electrical installations should have individual 30 mA ELCBs
- ❖ **Fighting:** Fighting anywhere on the Project site, including in parking areas, is strictly forbidden; violators will be barred from site and possibly subjected to legal action by local authorities.
- ❖ **Horseplay:** Running, pushing, practical jokes, and other horseplay are forbidden on the project site, including in parking areas.
- ❖ **Gambling:** Gambling on the Project site is not permitted
- ❖ **Alcohol & Drugs:** Intoxication or possession of alcohol or illegal drugs is strictly forbidden.
- ❖ **Weapons:** Possession of weapons on the Project site is strictly prohibited
- ❖ **Asbestos Material:** No asbestos material is allowed to use in Project Site
- ❖ **Hair:** Anyone working on site property with scalp hair longer than the top of his/her shoulders must tie-up and restrains the hair within the hard hat or coveralls, shirt or jacket collar.
- ❖ **Jewelry:** Loose necklaces, dangling earrings and bracelets shall not be worn when working on the Project site.

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- ❖ **Contact Lens:** While the site does not prohibit the wearing of contact lens, BHEL Project does not recommend their use.
- ❖ **Use of Empty Drums:** Use of empty drums to climb up and work is banned. Proper stool/ ladder/ stage required to be used if intended to work at height.
- ❖ Projects must comply in full with all applicable EHS local and national legislation. In circumstances where there is a conflict between local or national legislation and client requirements, the higher (more protective) requirement must prevail.
- ❖ All persons working on suspended scaffolds/cradles/gondolas must wear and use appropriate fall prevention equipment so as to protect them effectively at all times when they are at risk from any failure of any part of the scaffold/cradle/gondola, including its suspension system
- ❖ **Construction Trucks/Vehicles**
 - ✓ Vehicles must be equipped with proper seat belts for driver and passengers. All persons riding in vehicles must be advised of the requirement that seat belts are to be used whenever the vehicles are being operated.
 - ✓ The subcontractor is responsible for assuring the overall safe condition of vehicles assigned to its projects.
 - ✓ The speed limit on the project site is a maximum of 20 Km/hr.
 - ✓ Any person found operating or driving in a reckless or careless manner without regard for the safety of other employees or the general public will be immediately removed for the equipment they were operating and permanently prohibited from operating or driving any equipment on the project.
 - ✓ Any mobile equipment found to be unsafe or defective must be immediately removed from service and sent for repair or replacement. The subcontractor must ensure that the proper repairs have been made prior to putting the equipment back into service.
- ❖ **Construction Material Handling Heavy Equipment**
 - ✓ No equipment may be modified without equipment manufacturer's authorization.
 - ✓ Rollover Protective Structures must be provided for all equipment as required.
 - ✓ Seat belts must be provided and used by operators of all equipment that has a Rollover Protective Structure.
 - ✓ All bi-directional equipment must be equipped with an operable horn that must be used as needed when the machinery is moving in either direction.
 - ✓ All bi-directional equipment must also have an operable alarm in addition to the horn.
 - ✓ All equipment must be provided with a multi-purpose (class A, B, and C) fire extinguisher mounted in an easily accessible location.
 - ✓ Braking systems, controls, safety devices must be maintained in effective operating condition.
 - ✓ The operator must inspect the equipment at the beginning of the shift and test for acceptable



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- ✓ operation as per the equipment's manufacturer's instructions. Inspections must be documented and filed.
- ✓ Only qualified personnel must be allowed to operate equipment. Qualification must be documented and filed.

In case any worker violates any of the EHS rules identified by BHEL as above, following punitive action shall be taken:

First Offence	Second Offence	Third Offence	Fourth Offence
Oral warning	Gate Pass Punched	Gate pass punched (second)	Gate Pass Punched(third) and person sent out of the gate Photo of concerned worker to be displayed on Notice boards and prominent locations.

BHEL has the right to send out such person even earlier than fourth offence after considering the severity of the offence and/or the persons track record related to following general/EHS rules.

BHEL reserves right to expel even concerned supervisor or engineer as well in case of repeat of such cases of indiscipline.

Note:

The appellate authority in this case shall be the BHEL Site In-charge whose decision shall be final on the matter and binding on all parties.


8. PLANNING FOR HSE

A. Identifying Hazards / Risks & Aspects / Impacts and implementing control measures

- Subcontractor shall identify all OHS Hazards and Risks applicable to all activities in scope as per *HSEP01: HSE Procedure for OHS Hazards and Risks*, and plan & implement the required control measures.
- Subcontractor shall identify all Environmental Aspects and Impacts applicable to all activities in scope as per *HSEP02: HSE Procedure for Environmental Aspects and Impacts*, and plan & implement the control measures.

B. Register of Regulations:

Subcontractor shall prepare a register of applicable rules and regulations in the scope as per

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HSEP03: HSE Procedure for Register of Regulations and plan to ensure compliance.

The detailed plans and registers in A and B to be submitted to BHEL for review and approval within 60 days of start of work at site.

Note: The plans above are dynamic and shall be periodically reviewed as per BHEL requirement.

8.1 MOBILISATION OF MACHINERY / EQUIPMENT / TOOLS

1. Subcontractor shall furnish to BHEL, the Test Certificates issued by the jurisdictional competent persons of machinery, equipment and other T&Ps to be deployed at site, before deployment. BHEL reserves the right to disallow the same if found non-conforming to HSE / legal requirements
2. As a further measure to ensure that machinery, equipment and tools being mobilized to the construction site are fit for purpose and are maintained in safe operating condition and comply with legislative and owner requirement, inspection shall be arranged by in-house expert / competent authority (preferable) for acceptance. **(Report Format: HSEP:14-F15)**
3. **The equipment considered for this purpose shall include all those in the T&P list in the tender document. Conventional Hydra crane with carriage in front shall not be permitted. Other models like FX or TRX series of Escorts or equivalent shall be permitted.**
4. In the course of work, the subcontractor shall notify the BHEL Engineer, of his intention to bring on to site any equipment or any container, with liquid or gaseous fuel or other substance which may create a hazard.
5. The Engineer shall have the right to prescribe the condition under which such equipment or container may be handled and used during the performance of the works and the subcontractor shall strictly adhere to such instructions.
6. The Engineer shall have the right to inspect any construction tool and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition will be entertained.
7. Following items should be only ISO certified and not more than 2 yr. of purchase
 - i. Chain pulley block
 - ii. Wire rope slings
 - iii. Grinding machine and wheel and buffing wheel
 - iv. Gas cutting equipment
8. Following equipment should not be more than 5 Yr. old
 1. Welding machine
 2. Vibrator Machine
 3. Concrete cutter
 4. DB/Electrical panel
9. **Office Infrastructure** - subcontractor shall arrange a computer / Laptop with Network

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connection, chair and table for HSE Staff to facilitate HSE reporting and recordkeeping.

8.2 MOBILISATION OF MANPOWER

1. As a measure to ensure that manpower being mobilized to the construction site is fit and competent for safe working, screening arrangement shall be made by the sub-contractor to ensure fulfillment of contractual as well as legislative requirement by:
 - i. Ensuring the required qualification/ training/ certification/ license and experience for the job as per Section 7 of this document & applicable legal requirements
 - ii. **Medical Checkup:** Examination of medical fitness shall be conducted through qualified medical professional for all workers to be deployed. (Record: Format No. HSEP14:F02). For height workers, height phobia test to be carried out as qualification criteria.
 - iii. **Induction Training:** Induction training of all workers to be ensured as per clause 9.1 and HSEP04: *HSE Procedure for Training & Awareness* (Record: Format No. HSEP14:F03)

Only on successfully meeting above criteria, permanent gate passes to be issued.

2. The subcontractor shall strictly adhere to the maximum daily working hours and other requirements as per applicable laws and shall not engage any employee below 18 years of age.
3. The subcontractor shall take special care of the employees affected with occupational diseases under rule 230 and schedule II of BOCW Rules. The employees not meeting the fitness requirement should not be engaged for such job.
4. Ensure that the regulatory requirements of excessive weight limit (to carry / lift / move weights beyond prescribed limits) for male and female workers are complied with.
5. System for Issue of Gate Passes to authorized personnel only shall be ensured at site
6. The subcontractor shall keep accurate and updated records of all manpower preferably in soft form
7. The subcontractor shall ensure appropriate infrastructure for workers as per Clause 8.4.

8.3 PROVISION OF PPEs

1. Adequate numbers of Personnel Protective Equipment (PPEs), will be made available at site & their effectiveness and regular use by all will be ensured
2. The PPEs shall conform to the relevant standards as listed in Annexure 02, and bear ISI mark.
3. The following matrix recommends usage of minimum PPEs against the respective job. For details, the respective OCPs to be referred.



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Sl. No	Type of work	Suggested PPEs
1	Work at height	Double lanyard full body harness with rope grab (as applicable), retractable Fall arrestor (specific cases), Safety nets (single / double)
2	Concrete and asphalt mixing	Nose mask, hand glove, apron, gum boot, goggles
3	Welders/ Grinders/ Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders, safety goggles
4	Stone/ concrete breakers	Ear muffs, safety goggles, hand gloves
5	Electrical Work	Rubber hand glove, Electrical Resistance shoes, Arc-flash resistant suit.
6	Insulation Work	Respiratory mask, Hand gloves, safety goggles
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves, safety goggles
8	Painting	Plastic gloves, Respirators (particularly for Spray painting)
9	Radiography	As per BARC guidelines
10	General	Helmets, Safety Shoes Reflective vests, ear plugs, nose masks, safety goggles

4. The exact PPEs required for a particular task shall be chosen to ensure there are multiple lines of defense against accident or injury. All applicable safety precautions for a job shall be ensured notwithstanding the duration or perceived importance of the task.
5. Additionally, the BHEL safety officer may demand additional PPEs based on specific requirement
6. The applicability of PPEs shall be as per the concept of Hierarchy of controls, i.e.:
Elimination->Substitution->Engineering Controls->Administrative Controls-PPEs
7. Relying solely on PPEs without other applicable controls to be strictly avoided.
8. The issuing agency shall maintain register for issue and receipt of PPEs (Format No. HSEP: 14-F06A). All the PPEs shall be checked for quality before issue and shall be periodically re-checked. The users shall be advised to check the PPEs themselves for any defect before putting on. The defective ones shall be replaced.
9. The body harnesses shall be serial numbered.
10. All worker should wear reflecting Jacket during both shift Day/Night.
11. Where workers are employed in sewers and manholes, which are in use, the subcontractor shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into manhole, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent incident to the public
12. Besides the PPEs mentioned above, the persons shall use helmet, safety shoe and reflective vest at all times. The visitors shall use Helmet and any other PPEs as



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deemed appropriate for the area of work.

13. Following color scheme for Helmets to be maintained:

- a. Workmen: Yellow
- b. Safety staff: Green or white with green band
- c. Electrician: Red
- d. Others including visitors: White

14. The Helmets shall have logo or name (abbreviation of agency name permitted) affixed or printed on the front along with the person's gate pass no. & blood group. An awarded worker shall have reflective logo

8.4 ARRANGEMENT OF INFRASTRUCTURE


The subcontractor is responsible for ensuring and maintaining the required HSE infrastructure at site as described in this Section

8.4.1 DRINKING WATER

1. Drinking Water Storage Tanks shall be provided and maintained at suitable places at different elevations / locations to ensure easy accessibility. The tank/container shall be kept on a platform at an elevation of at least 2 feet and should be covered:



2. **Construction and Quantity:** The design of Drinking Water Storage Tank (DWST) shall be submitted to BHEL for approval prior to initiating construction. Provision of 5 liter water daily for each worker to be maintained.
3. **Labelling:** DWST should be labeled as "Drinking Water". Date of last cleaning, next due date shall be indicated on the container besides Date of source testing as per IS 10500.
4. Cleaning of the DWST shall be ensured at least once in a week. Mild cleaning detergents as used for cleaning vessels shall be applied and scrubbers (3M or equivalent) shall be used for removing scales and deposits on the inside surface. The tank shall be thoroughly cleaned with potable water only before it is refilled.
5. Suitability of the water source should be tested as per IS10500.
6. For all tanks containing water unsuitable for drinking, prominent "Do Not Drink" signage shall be pasted in English, Hindi and local language.
7. In Hot Work and other critical areas, drinking water shall be made available near the activity
8. Provision of supplying drinking water to height workers and those working in difficult to reach

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areas shall be made available through dedicated personnel.

- 8.4.2 **PROVISION OF LATRINES AND URINALS AT SITE** (Ref: Interstate Migrant Workmen (Regulation & Employment and Act, 1979) read with The Inter-State Migrant Workmen (Regulation of employment and conditions of service) central rules, 1980 (PI refer rule no. 42)

LATRINES

1. Latrines shall be provided in every establishment on the following scale, namely: -
 - a. Where females are employed, there shall be at least one latrine for every 25 females;
 - b. Where males are employed, there shall be at least one latrine for every 25 males:


Provided that where the number of males or females exceeds 190, it shall be sufficient if there is one latrine for 25 males or females, as the case may be, up to the first 100, and one for every 30 thereafter
2. Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.
3. Where workers of both sexes are employed there shall be displayed outside each block of latrine and urinal a notice in the language understood by the majority of the workers '**For Men Only**', or '**For Women Only**', as the case may be.
4. The notice shall also bear the figure of a man or of a woman, as the case may be.

URINALS

5. There shall be at least one urinal for male workers up to fifty and one for female up to fifty employed at a time:
6. Provided that where the number of male or female workmen, as the case may be, exceeds 500 it shall be sufficient if there is one urinal for every fifty females up to the first 500 and one for every 100 or part thereof thereafter.
7. The urinals shall be designed and located so as to ensure privacy.
8. In case a structure encompasses multiple floors, urinals shall be provided suitably for quick access
9. The latrines and urinals shall be conveniently situated and accessible to workers at all times at the establishment.
10. The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.
11. Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the public health authorities.
12. Water shall be provided by the means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

8.4.3 WASHING FACILITIES

1. In every workplace, adequate and suitable facilities for washing shall be provided and maintained.
2. Separate and adequate cleaning facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic

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condition and dully illuminated for night use.

3. Overalls shall be supplied by the subcontractor to the workmen and adequate facilities shall be provided to enable the painters and other workers to wash during the cessation of work.

8.4.4 PROVISION OF REST SHELTER FOR WOKERS

Proper Sheds & Shelters big enough to accommodate all possible workers shall be provided for workers to rest during break. Taking rest at height, in activity area and other hazardous locations shall not be allowed.

The drawing of such sheds shall be submitted to BHEL for approval before construction.

8.4.5 MEDICAL FACILITIES

Refer Section B for applicability of requirements pertaining to Clause 8.4.5.1

8.4.5.1 MEDICAL CUM FIRST-AID CENTER

- a) A medical center shall be setup at site with basic facilities for handling medical emergencies. The medical center shall be developed independently by BHEL/an agency as specified in the contract and run jointly by all agencies on proportionate sharing basis as stipulated in the contract.
- b) A qualified medical professional, not less than MBBS, shall be deployed at medical center as stipulated in the contract.(Part-time or full time as decided at the site).
- c) There shall be a full-time trained first aider and a nurse. Depending upon the working hours at the site, First-aider shall be deployed accordingly.
- d) The center shall have all articles as per Schedule IV of BOCW(Central) Rules'1998. In addition,, one Stokes basket stretcher shall be available.
- e) An ambulance shall be deployed for every 1000 persons along with trained driver and accessories as per schedule V of Central BOCW Rules'1998. Depending upon the working hours at the site, First-aider shall be deployed accordingly.
- f) The center shall be adequately equipped for Resuscitation, Immobilisation, Dressing, dealing with poisoning cases including snake and insect-bites and sufficient stock of emergency medicines as prescribed by the qualified medical professional as per point (b)

8.4.5.2 IMPORTANT

- g) If there is no specific mention of responsibility of deployment or setting up of any of the above facilities and operating expenses thereof, BHEL site management shall have the liberty to give this responsibility to any of the contractors on cost sharing basis.
- h) Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste –Management and Handling Rules, 1998)
- i) Every injury shall be treated, recorded and reported.
- j) All First Aid injuries shall be recorded as per Format No. HSEP:14-F17
- k) List of qualified first aiders and their contact numbers to be displayed at conspicuous places.



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8.4.5.3 FIRST AID

A. In addition to 8.4.5.1 &2, The subcontractor with Boiler&ESP, TG, Civil shall:

1. Provide necessary first aid facilities for every work place.
2. Ensure availability of qualified First-aider throughout the working hours.
3. Every injury shall be treated, recorded and reported.
4. Refresher course on first aid shall be conducted as necessary.
5. List of qualified first aiders and their contact numbers to be displayed at conspicuous places.
6. All First Aid injuries shall be recorded as per Format No. HSEP:14-F17

B. FIRST AID BOX

1. The first aid box shall be maintained by first aider who shall always be readily available during the working hours of the work place.
2. **Details of First Aid Box:**
 - a) Details of contents of first aid box is given in **Annexure 03**. A slip of contents shall be pasted on the First Aid Box with following details:

Name, Quantity, Expiry Date, Checked by...
 - b) First Aider's name and contact no to be displayed on the box.
 - c) The first aid box shall be distinctly marked with a Green Cross on white background.
 - d) The box shall be properly secured with lock & key to avoid misuse
7. The first aid boxes should be placed at various locations so as to make them available within easy reach of hazardous activities and at the quickest possible time.
8. The subcontractor shall ensure that the Supervisors and Engineers are adequately trained for attending to any emergency.
9. Monthly inspection of First Aid Box to be conducted by the subcontractor as per Format no. HSEP:14-F01

8.4.5.4 HEALTH CHECK UP

The persons engaged at the site shall undergo health checkup as per the **Format no. HSEP:14-F02** before induction. The persons engaged in the following works shall additionally undergo regular health checkup using same Format at least once in a year:

Height workers	Drivers/crane operators/riggers	Confined space workers
Shot/sand blaster	Welding and NDE personnel	Any person referred by BHEL

8.4.5.4.1 HEIGHT PHOBIA TEST

1. The persons engaged in working at heights (above 2 meters) to be assessed for Height Phobia and associated conditions.
2. Such workers are to be allowed only on successful completion of this test, otherwise they shall be allocated ground based jobs. IDs / Height passes shall be issued to such workers.

8.4.6 PROVISION OF CANTEEN FACILITY



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Minimum or better facilities to be ensured as per BOCW (Rule 244) / Factories Act, specially taking care of the following:

1. Canteen facilities shall be provided for the workmen of the subcontractor inside the project site.
2. Proper cleaning and hygienic condition shall be maintained.
3. Proper care should be taken to prevent biological contamination.
4. Adequate drinking water should be available at canteen.
5. Fire extinguisher shall be provided inside canteen.
6. Regular health check-up and medication to the canteen workers shall be ensured.
7. Canteen waste to be disposed of in compliance with law
8. Domestic LPG cylinder shall not be used
9. Canteen should be periodically inspected using standard checklist finalized along with BHEL

8.4.7 PROVISION OF ACCOMMODATION / LABOR COLONY

1. The subcontractor shall provide to every workman (within fifteen days of the commencement of the employment of migrant workmen):
 - a) In case he is accompanied by any other member of his family, a suitable barrack so as to accommodate one room having at least a floor area of 10 square meters, a verandah and adequate additional covered space for cooking food as well as one common sanitary latrine, one common bathroom for every three such quarters; and
 - b) In case he is unaccompanied by any other member of his family, a suitable barrack so as to accommodate not more than ten such migrant workmen, having at least a floor area of not less than 6.5 square meters for each such migrant workman making use of the barrack, a verandah and adequate additional covered space for cooking food as well as one common sanitary latrine and one common bathroom for every ten such migrant workmen
2. Every quarter and the barrack shall be so constructed as to afford adequate ventilation, protection against heat, wind, rain and shall have smooth, hard and impervious floor surface.
3. The quarters or the barracks, as the case may be, shall be at a convenient distance from the establishment and shall have adequate supply of wholesome drinking water.
4. The area in which the quarters and/or barracks are located as well as the latrines and bathrooms provided therein shall be kept in a clean and sanitary condition at all times.
5. Regular housekeeping of the labor colony shall be ensured.
6. Availability of Bathing/ washing bay to be ensured



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7. Room ventilation and safe electrification to be ensured
8. MSDS of LPG shall be put up prominently and shall be included in the induction training also.
9. The labor colony shall be secure so that only authorized persons have access to it.
10. Availability of local market to be ensured by the Sub-contractor
11. A "Suggestion Register" shall be made available at the labor colony for workers. The feedback shall be reviewed on weekly basis and acted upon.
12. Labor colony shall be inspected fortnightly by Subcontractor Safety Officer & HR executive, and report submitted to BHEL as per Format No. HSEP:4-F16
13. **Facility of Crèches** – to be provided wherein more than fifty female workers are deployed
14. Provisions of Clause 8.4.1, 8.4.2 and 8.4.3 shall be applicable on labor colony as well

8.4.8 PROVISION OF EMERGENCY VEHICLE

Dedicated emergency vehicle shall be made available at workplace by subcontractor for evacuation of victim from site.

However, Ambulance shall be used exclusively for transporting victim to hospital

8.4.9 PEST CONTROL

Regular pest control should be carried out at all offices, mainly laboratories, canteen, labor colony and stores by the subcontractor.

8.4.10 SCRAPYARD

1. Scrapyard shall be developed by subcontractor to store metal scrap, wooden scrap, waste, hazardous waste.
2. Scrap/Waste shall be segregated as Bio-degradable and non-bio-degradable and stored separately.

8.4.11 ILLUMINATION

1. The subcontractor shall provide adequate lighting facilities e.g. flood lighting, hand lamps, area lights etc. to ensure adequate lighting at all work places & their approaches including passage ways as per IS: 3646 (Part-II) at all times. Indicative recommended values are given below:

S. No.	Location	Lux Level
A.	Construction Site	
1	Outdoor areas like store yards, entrance and exit roads	20
2	Platforms	50
3	Entrances, corridors and stairs	100
4	General illumination of work area	150
5	Rough work like fabrication, assembly of major items	150



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6	Medium work like assembly of small machined parts	300
7	Fine work like precision assembly, precision measurements etc.	700
8	Sheet metal works	200
9	Electrical and instrument labs	450
B.	Office	
1	Outdoor area like entrance and exit roads	20
2	Entrance halls	150
3	Corridors and lift cars	70
4	Lift landing	150
5	Stairs	100
6	Office rooms, conference rooms, library reading tables	300
7	Drawing table	450
8	Manual telephone exchange	200

In case any area is not mentioned above, the applicable illumination for the same shall be specified by BHEL based on applicable standards and international norms

1. Level of illumination shall be checked periodically using a calibrated lux meter and recorded for each work area on minimum weekly basis as per Format No. HSEP:14-F21
2. Lamp (hand held) shall not be powered by mains supply but either by 24V or dry cells.
3. Lamps shall be protected by suitable guards where necessary to prevent danger, in case of breakage of lamp.
4. Emergency lighting provision for night work shall be made to minimize danger in case of main supply failure.

9. HSE TRAINING & AWARENESS

9.1 HSE INDUCTION TRAINING

1. All persons entering into project site shall be given HSE induction training before being assigned to work, which shall be imparted through audio-visual medium and shall be of minimum 2-hour duration.
2. Any single trainee batch size should not exceed 40.
3. Proper safety wear & gear must be issued to all the workers being registered for the induction (i.e., Shoes/Helmets/Goggles/Leg guard/Apron etc.)
 - i. They must arrive fully dressed in safety wear & gear to attend the induction.
 - ii. Any one failing to conform to this safety wear& gear requirement shall not qualify to attend.
4. In-house induction training subjects shall include but not limited to:



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- i. Briefing of the Project details and importance of employee for the project and for the nation.
 - ii. Safety related cardinal rules, objectives and targets.
 - iii. Site HSE rules.
 - iv. Site HSE hazards and aspects.
 - v. First aid facility.
 - vi. Emergency Contact No. and procedures
 - vii. Details of Fire prevention and emergency response systems & procedures at site.
 - viii. Requirement of incident / near miss reporting by all.
 - ix. Accident case studies
 - x. Rules to be followed in the labor colony (if applicable)
5. Evaluation to be carried out after training and induction training to be repeated in case of failure of participant in evaluation
 6. On completing subcontractor's in-house HSE induction, each employee shall sign an induction training form (format no. HSEP: 14-F03) to declare that he had understood the content and shall abide to follow and comply with safe work practices. They may only then be qualified to be issued with a personal I.D. card, for access to the work site (provided Health Checkup is over).


9.2 HSE TOOLBOX TALK

1. HSE Tool Box talk shall be conducted by frontline foreman/supervisor of subcontractor to specific work groups daily prior to the start of work. The agenda shall consist of the following:
 - i. Visual checkup of workers regarding health, any signs of fatigue, intoxication etc.
 - ii. Details of the job being intended for immediate execution.
 - iii. The relevant hazards and risks involved in executing the job and their control measures.
 - iv. Specific site condition to be considered while executing the job like high temperature, humidity, unfavorable weather etc.
 - v. Recent non-compliances observed.
 - vi. Appreciation of good work and warning for any unsafe acts done by any person.
 - vii. Any doubt clearing session at the end
2. Record of Tool box talk shall be maintained as per Format no. HSEP:14-F04

9.3 TRAINING ON HEIGHT WORK

Due to the large percentage of fall from height in incidents, training of minimum 2-hour duration on height work shall be imparted to all height workers by in- house / external faculty for every batch of new inductees. The training shall include following topics:

1. Inspection of work area, access and egress w.r.t height hazards
2. Use of PPEs; use of fall arrester, retractable fall arrester, life line, safety nets etc.
3. Safe climbing through monkey ladders.
4. Inspection of PPEs.
5. Medical fitness requirements.
6. Mock drill on rescue at height.
7. Dos & Don'ts during height work.

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8. Accident case studies

In case, above is organized by BHEL, proportionate cost shall be borne by subcontractors

9.4 HSE TRAINING DURING PROJECT EXECUTION

1. HSE training shall be arranged by subcontractor as per the need of the project execution and recommendation of BHEL.
2. The topics of the HSE training shall be as follows but not limited to:
 - i. Hazards identification and risk analysis & Identification of Environmental Aspects / Impacts
 - ii. Work Permit System
 - iii. Learning from past incidents
 - iv. First aid, Firefighting & Fire-warden training
 - v. EMS and OHSMS
 - vi. T & Ps fitness and operation
 - vii. Electrical & Chemical safety
 - viii. Welding, NDE & Radiological safety
 - ix. Material handling.
3. Safety awareness and on-the-job training programmes shall be carried out at site for all workers periodically. Periodicity to be decided by BHEL but shall be minimum once in six months
4. Penalty Training – In case of any incident, the involved person, group or agency shall undergo a penalty HSE training for a minimum period of 2 hrs or as decided by BHEL.
5. In case it is not possible to provide training to all workers at once, same shall be imparted in Batch-wise manner so as to cover all workers with specified periodicity.
6. An up-to-date record to be maintained with attendance of participants and trainers preferably in soft copy as per Format No. HSEP:14-F03.
7. Every employee of agency should be provided at least 2 hr. safety training in every month.

In case, above is organized by BHEL, proportionate cost shall be borne by subcontractors

10. HSE PROMOTION: SIGNAGE, POSTERS, COMPETITION, AWARDS ETC

10.1 DISPLAY OF HSE POSTERS AND BANNERS

Site shall arrange appropriate posters, banners, slogans in local/Hindi/English languages at work place.

10.2 DISPLAY OF HSE SIGNAGE

Appropriate HSE signage shall be displayed at the work area to enhance awareness of HSE workmen and passersby about the work going on and do's and don'ts to be followed.

10.3 COMPETITIONS ON HSE, AWARDS & REWARDS



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1. Subcontractor shall arrange competitions (slogan, poster, essay etc.) on HSE for workers and employees from time to time (Safety day, World Environment Day etc. minimum one such function each month) and winners will be suitably awarded during the functions.
2. Subcontractor shall identify workers following good HSE practices and reward them from time to time as encouragement to follow good HSE practices.
3. Alternatively, if a common monthly function is organized at site, subcontractor shall participate in the same so that a minimum frequency of one such function per month is maintained.

10.4 HSE AWARENESS PROGRAMMES

Subcontractor shall arrange HSE awareness programmes periodically on different topics including medical awareness for all personnel working at site from time to time including officials involved in execution.

11. HSE COMMUNICATION AND PARTICIPATION

11.1 MONTHLY HSE REPORTING

1. HSE activities shall be reported to BHEL monthly as per Format no. HSEP: 14-F05. The reporting medium can be hard/soft as per BHEL requirement.
2. The period of reporting shall be 25th of the preceding month to 24th of the present month and report shall be submitted by the end of the calendar month or as conveyed by BHEL.
3. BHEL can modify the reporting requirements as per requirement

11.2 HSE EVENT REPORTING


1. Important HSE events like HSE Training, Mock / Fire/Rescue Drills, Medical camp etc. organized by subcontractor shall be reported to BHEL in detail with photographs
2. Celebration of important days like National Safety Day, World Environment Day etc. shall also be reported likewise.

11.3 HSE INCIDENT REPORTING

All incidents (near misses, property damage, first-aid cases, minor, major and fatal incidents) shall be reported to BHEL as they happen through SMS and Hard/Soft copy as per Format No. HSEP: 14-F22

11.4 HSE SUGGESTIONS

All workers and employees to be encouraged to provide suggestions for improvement in

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Health, Safety & Environment at site. The suggestions to be recorded in a "Suggestions Register". Suggestions to be reviewed and those having potential of significant beneficial effects are to be implemented, and recognition / award to be given to the individual.

11.5 CLIENT COMMUNICATON

All HSE related communication from BHEL, customer / external statutory and regulatory agencies to be handled on priority. The relevant issues to be resolved in expeditious manner

11.6 RECORDS OF COMMUNICATON

Records of all communication and their responses as detailed above shall be maintained by subcontractor in hard / soft copy and produced when required.


12. INCIDENT REPORTING, INVESTIGATION & CORRECTIVE ACTION

1. A conducive environment for reporting of near misses and other incidents shall be developed at site through system of rewards etc.
2. Priority to be given to ensure medical treatment of the victim. Victim to be given immediate First Aid and transported to Medical Facility in a well-equipped Ambulance
3. All incidents, as they happen, shall be reported to BHEL immediately over phone/SMS/Whatsapp/mail and then in Format No. HSEP:14-F22 within 24 hrs. of occurrence. Immediate SMS shall be sent to concerned Package In-charge with following Details:

- a. Project & Customer Name:
- b. Subcontractor Name & Scope:
- c. Incident Area:
- d. Number of Injured / Fatalities:
- e. Date & Time of Accident:
- f. Incident Description in few lines:

No incident shall be hidden

4. Records of all incidents shall be maintained in hard / soft copy as per Format No. HSEP:14-F23.
5. For all incidents:
 - a. The incident area, equipment / tools involved, documents & records etc. shall be maintained as-it-is pending investigation
 - b. Root Cause Analysis (RCA) to be conducted and corresponding Corrective / Preventive Action (CAPA) ensured
 - c. Responsibility shall be assigned and action to be taken against the erring individual
 - d. In case presence of manufacturer of the equipment involved is required, subcontractor will arrange the same

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e. All expenses pertaining to the RCA / CAPA shall be borne by the subcontractor

6. RCA and CAPA reports of all near misses and minor injuries shall be identified and report submitted to BHEL within 7 days of occurrence.
7. For incidents, where worker does not resume duty within 48 hours of occurrence, Joint investigation along with BHEL shall be conducted within 7 days, and CAPA ensured.
8. Corrective action shall be immediately implemented at the work place. Work shall be put on hold in the area till corrective actions are verified by BHEL
9. All incidents, their Root Cause Analyses and Corrective actions shall be recorded, and analyzed so as to identify weak areas and actions to be taken to reduce the incident trend.

13. SAFETY DURING WORK EXECUTION

13.1 HSE SYSTEMS AND PROCEDURES

BHEL Power Sector HSE Management System (HSEMS) shall be referred for controlling hazards, aspects, and carrying out HSE activities at site. Subcontractor shall get familiar with and follow the HSEMS documents provided by BHEL which include the follows:

13.1.1 HSE PROCEDURES:

All HSE Procedures defined in HSEMS, as referred in various sub-clauses of this Section as given in Annexure 01

13.1.2 PERMIT TO WORK (PTW) SYSTEM

1. The following activities shall be carried out by the subcontractor strictly after obtaining Permit to Work (PTW) from BHEL
 - i. General Work Permit (**Format No. HSEP14-FP01**)
 - ii. Height working (**Format No. HSEP14-FP02**)
 - iii. Hot working (**Format No. HSEP14-FP03**)
 - iv. Confined space Work (**Format No. HSEP14-FP04**)
 - v. Excavation more than 2-meter depth (**Format No. HSEP14-FP05**)
 - vi. Radiography / Radiation Work (**Format No. HSEP14-FP06**)
 - vii. Heavy / Complex / Critical Lifting Activity (**Format No. HSEP14-FP07**)
 - viii. Night / Holiday Work (**Format No. HSEP14-FP08**)
 - ix. Material Loading / Unloading Permit (**Format No. HSEP14-FP09**)
 - x. Grating / Safety Net / Safety Facility Removal Permit (**Format No. HSEP14-FP10**)
 - xi. Live Electrical Maintenance etc. - Lockout / Tag (**Format No. HSEP14-FP07**)



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2. The above list is not exhaustive. BHEL reserves right to introduce additional Permits or modify requirements for usage of existing Permits. The conditions for using the Permit are specified in the Format (General Requirements).
3. Where customer is having separate Work Permit System the same shall be followed in conjunction to ensure all activities and checks are covered in all systems.
4. Permit applicant shall apply for work permit of particular work activity at particular location before starting of the work along with Job Hazard Analysis.
5. All Permit signatories shall physically visit the work area and check that all the safety control measures necessary for the activity are in place. Only then the permit shall be issued.
 - a. Signatory shall physically visit the area of work and ensure all required safeguards before signing the Permit
 - b. Signatory shall periodically visit the area to confirm the availability of required safeguards throughout the currency of the permit
 - c. In case any Permit requirement is not available, work will be stopped till it is made available
6. Permit holder shall implement and maintain all control measures during the period of permit. The permit will be closed after completion of the work and submitted to BHEL.

13.1.3 Operational Control Procedures

1. All applicable OCPs (Operational Control Procedures) as identified from outcomes of HIRA, Aspect / Impact studies and BHEL inputs will be followed by subcontractor. This will be done as part of normal scope of work.
2. Illustrative list of such OCPs is given in Table 13.1 and same will be made available to subcontractor by BHEL during work execution at site.
3. In case any other OCPs are required or existing ones need to be modified in order to control the risks / impacts associated with any activity during the execution of work subcontractor shall prepare / update and follow the same with information to BHEL.

Table 13.1 - LIST of Reference OCPs

No.	Topic	No.	Topic	No.	Topic
0	General Safety	22	Steam blowing	44	Material preservation
1	Handling of chemicals	23	Working in confined area	45	Electro-resistance heating
2	Electrical safety	24	Operation of passenger lift, material hoists & cages	46	Blasting
3	Energy conservation	25	Vehicle/ Crane maintenance	47	Transformer charging
4	Welding and gas cutting operation	26	Radiography	48	Handling of battery system
5	Fire safety	27	Waste disposal	49	DG set
6	Use of hand tools	28	Handling & storage of mineral wool	50	Sanitary maintenance
7	First aid	29	Working at night	51	Piling rig operation



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8	Food safety at canteen	30	Computer operation	52	Passivation
9	Use of cranes	31	Storage in open yard	53	EDTA Cleaning
10	Storage and handling of gas cylinders	32	Drilling, reaming and grinding(machining)	54	Chemical cleaning of Pre boiler system
11	Manual arc welding	33	Stress relieving	55	Boiler Light up
12	Use of helmets	34	Hydraulic test	56	Rolling and Synchronization
13	Good house keeping	35	Trial run of rotary equipment	57	Loading of Unit
14	Safe excavation	36	Batching	58	Air compressor
15	Working at height	37	Cable laying/tray work	59	Hydra Operation
16	Filling of hydrogen in cylinder	38	Spray insulation	60	Duct/ Structure Preassembly
17	Illumination	39	Compressor operation	61	Resumption of construction activities after lockdown and prevention of coronavirus infection during site operation
18	Handling and erection of heavy metals	40	Gas distribution test	61A	Prevention of Covid-19 infection in labour colony
19	Acid cleaning	41	Cleaning of Hotwell / Deaerator	62	Truss/ Structure fit-up & alignment
20	Oil flushing	42	Electrical maintenance		
21	Alkali boil out	43	O&M of control of AC plant & system		

13.2 ACTIVITY SPECIFIC REQUIREMENTS FOR SAFETY:


All Work shall be commenced only after taking the respective Work Permits (as applicable) and precautions as per relevant codes, systems and OCPs in order to ensure safe conditions throughout the duration of work. Additionally, activity specific safeguards as per this section shall be followed.

13.2.1 WORK AT HEIGHT:

1. All work at height above 2 meter above ground level without complete platforms, handrails and other related fall protection shall require a work permit in the prescribed form. This shall require approval by the competent authority. The HSE officer of sub-contractors shall follow the checklist religiously by physically verifying the condition of the work area before recommending for approval.
2. Prior to the start of work at elevation, the HSE Officer involved with the work must meet the work supervisor to review the scope of work, and must review all the possible fall hazards and effective safety responses. The evaluation / analysis must be documented and kept on file and on site by the HSE Officer.

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3. Whenever a fall hazard or other exposure exists for working at heights more than 2.0m/6ft, the nature and scope of work will be evaluated for conditions and environmental factors before selecting the appropriate fall protection system (active, passive or a combination of measures, as appropriate).
4. All Engineering and Administrative Controls including barricading, safe platform, Safety Nets etc. shall be made available at work location. Under no circumstances, there shall be total reliance on PPEs only
5. **Safety Nets**
 - a. Contractor shall maintain sufficient stock of Safety Nets for deployment
 - b. Safety Nets as per IS: 11057:1984 should be used extensively for prevention / arrest men and materials falling from height.
 - c. The safety nets shall be fire resistant, duly tested and shall be of ISI marked.
 - d. Safety Nets shall be deployed below all platforms where height work is envisaged. Duration of work, delay shall be no excuses for non-installation of Safety Net
6. Reaching beyond barricaded area without lifeline support, moving with support of bracings, walking on beams without support, jumping from one level to another, throwing objects and taking shortcut must be discouraged.
7. Monkey Ladder shall be fitted with cages. Rope ladder should be discouraged.
8. In case of pipe-rack, persons should not walk on pipes and walk on platforms only.
9. In case of roof work, walking ladder/ platform should be provided along with lifeline and/ or fall arrestor.
10. For chimney or structure painting, both hanging platform and men should be anchored separately to a firm structure along with separate fall arrestor.
11. The procedures for the safety response to identified fall hazards developed and rescue plans must be reviewed with all individuals exposed to the hazards.
12. The HSE Officer must establish an inspection process of fall protection systems. Some equipment requires documented inspections by its manufacture on a regular schedule. Such equipment must have evidence of the inspection and re-certification process on it. This information must be reviewed before the equipment is actually used. Individuals must visually inspect the fall protection equipment before each use. Failure to complete this inspection process could result in serious injury or death.
13. Immediately remove from service any fall protection equipment that is identified as defective, damaged, or has been subjected to an impact. Damaged fall protective equipment must be destroyed to prevent re-use and not be discarded into trash containers, as the worn or

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damaged equipment could be unintentionally re-used.

14. Aerial lifting devices, excluding scissor lifts require the use of full body harnesses and lanyards in any elevated position.

13.2.1.1 Personnel fall protection system must include:

a. Safety Harness

All height workers must use Safety harness with double lanyards. The primary lanyard is never unhooked until the secondary lanyard is secure. The design of the working platform should be such that **under no circumstances, worker should have both lanyards unhooked while at height.**

b. Lanyard

- i. The type of work and the environment conditions determine lanyard and lifeline selection. If welding, chemical cleaning that may damage lanyards, connectors or lifelines, sandblasting, etc., either protect the components or use more appropriate type of system.
- ii. Lanyards and lifelines must incorporate, or be used with, an appropriate deceleration (shock absorbing) device. Deceleration devices include rope grabs, rip-stitch lanyards, specially woven lanyards, tearing, or deforming lanyards, automatic self-retracting lifelines and lanyards which dissipate or limit the energy imposed on the employee during fall arrest.
- iii. Once in use, the system's effectiveness is to be monitored. In some cases, a program for cleaning and maintaining the system may be necessary. Lanyard and lifelines must use locking snap hooks only and under no circumstances must two lanyard snap hooks be connected.

c. Lifeline

All lifelines in general are to be made of min 8mm dia steel rope (plastic coated) and tied to columns with 3 clamps at each end. Wherever columns are not available to tie the lifelines, the vertical posts as per the design below are to be provided after carrying out drop load test initially. A load of 240kg to be dropped off the mid-point of lifeline in this test.

d. Lifeline Post



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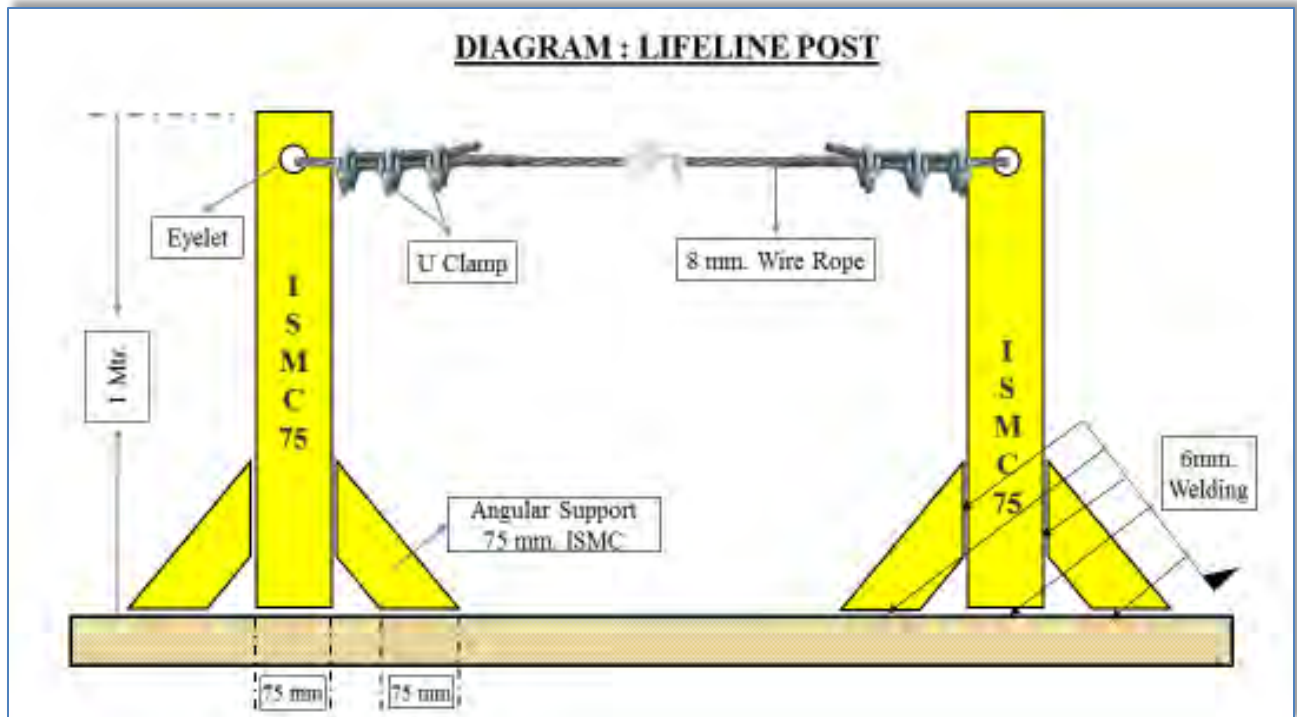


Fig. 13.2.1.1 Lifeline Post

- i. The support at vertical post shall be fixed at end-to-end. The maximum length of one end to another end shall be 18 meters
- ii. If the length of a lifeline is more than 18 meters, then intermediate vertical post(s) are to be used. Such intermediate post(s) will act as supports and the lifeline rope should simply pass through the eyelets (holes) of such supports without being anchored
- iii. The lifeline need not be wrapped / clamped to any intermediate post
- iv. Such intermediate posts must be used at an interval of every 18 meters
- v. The post(s) in which the original lifeline is to be installed should be capable of sustaining a tensile stress of 2268 Kgs
- vi. In a horizontal lifeline installation, maximum allowable sagging is 500-600 mm
- vii. For a single spun lifeline, no more than 2 persons are allowed to work; for more than two workers, another lifeline should be installed
- viii. Horizontal lifeline should be so installed that it does not impede safe movement of workers
- ix. All the installation work must be carried out by competent person with adequate knowledge

13.2.1.2 Working Platform

1. Working platforms, gangways and stairways shall be so constructed that they do not sag unduly or unequally and if the height of the platform gangways provided is more than 3.6 m above ground level or floor level, they shall be closely boarded and shall have adequate width, which shall not be less than 750 mm and be suitably fenced.

2. Precautions against the fall of Materials, Persons and Collapse of Structures



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- i. Every opening in the floor or a building or in a working platform shall be suitably barricaded to prevent the fall of persons by providing suitable fencing or railing whose minimum height shall be 90 cm.
- ii. Adequate precautions should be taken such as the provision of fencing, or barriers to protect any person who might be injured by the fall of materials, or tools or equipment being raised or lowered. Cradle may be used for lifting materials - however this shall be made of MS angles and flats only and duly certified by the HSE officer. Operators may also use designed containers for lifting small tools.
- iii. Guardrails (including scaffolding) erected over/adjacent working areas must have the guardrails screened (opening < 0.5), to prevent material from falling outside the platform/decking.
- iv. Guardrails must be able to withstand a 200-pound force exerted in any one direction.
- v. Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.
- vi. All openings through which workers are liable to fall should be kept effectively covered or fenced and indicated in the most appropriate manner.
- vii. Guardrails and toe-board/barricades and sound platform conforming to IS: 4912-1978 and

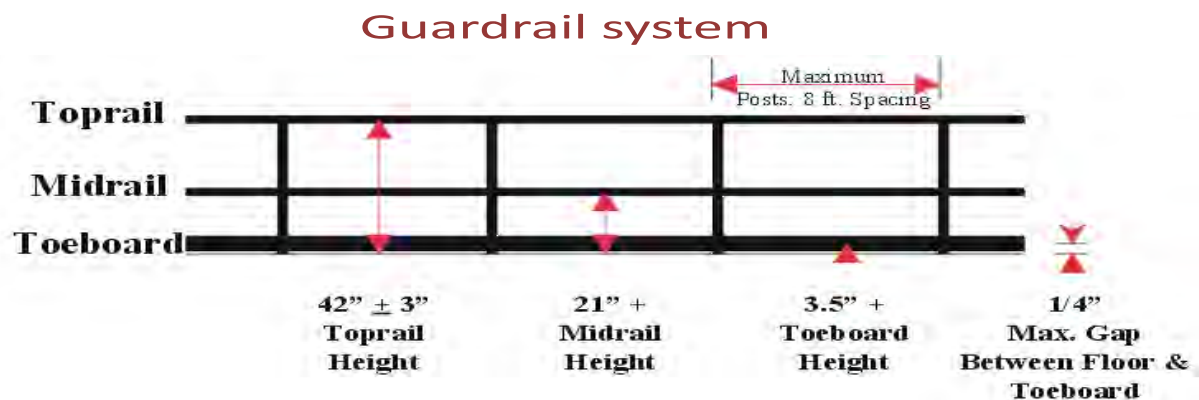


Fig. 13.2.1.2 Guard Rail System

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- viii. Guardrails shall be provided to protect workers from falling from elevated work places. The rails are generally made of MS pipes of suitable dia. Rebar shall not be used for any handrails, ladder or cover purpose. Wherever the guard-rails and toe-boards cannot be provided:
 - a. adequate safety nets or safety sheets shall be erected and maintained; or
 - b. adequate safety harnesses shall be provided and used and / or
 - c. adequate fall arrestor shall be provided and used.

As mentioned under PPE clause, all these PPEs shall be defect free and regularly inspected for any defect. The full body safety harness shall have double lanyard only with max 1.8m length.

- ix. The monkey ladders shall have sufficient fall arrestors. Adequate lifelines of 8mm steel wire



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rope shall be provided across the work area.

- x. The HSE officer shall recommend appropriate PPEs after analyzing hazards and risks involved.

13.2.1.3 Scaffolding

All scaffolds shall be conformant to the relevant standards including IS 3696 and IS 4014 as applicable. A sketch of the scaffolds proposed to be used shall be prepared and approval of the BHEL Engineer obtained prior to construction / use.

General

1. The scaffolding work must be carried out by a competent person, who shall train the scaffold users on safety aspects
2. All scaffolds shall be erected / dismantled by scaffolding crew under direct supervision of competent scaffolding supervisors.
3. All scaffolds shall be capable of supporting 4 times maximum intended load and erected on sound, rigid footing, capable of carrying the maximum intended load without settling or displacement. Bamboo scaffolding is not permitted for use on site.
4. Each employee on the scaffold shall use an approved safety harness attached to an independent lifeline. The lifeline is to be securely attached to substantial members of the structure (not the scaffold itself) or to securely rigged lines, which shall safely suspend a worker in event of a fall.
5. Guard rails and toe boards shall be installed on all open sides and ends of platforms more than (2) meters above ground or floor
6. Scaffold planks must be at least 5 cm x 25 cm (2" x 10") full thickness lumber scaffold grade or better.
7. Scaffold planks shall not span distances greater than 2.5 meters (8 feet).
8. Scaffold planks shall extend over end supports not less than 6 inches nor more than 12 inches and be secured to the scaffold. Scaffolding and accessories with defective parts shall be immediately repaired or replaced.
9. All scaffolding must be a minimum of two planks wide. No one may work from a single plank.
10. Scaffold planks must be inspected before use. Planks that have been damaged must be removed from the site.
11. Access ladders must be provided for each scaffold. Climbing the end frames is prohibited unless the design incorporates an approved ladder.
12. Adequate mudsills or other rigid footing capable of withstanding the maximum intended load must be provided.
13. Scaffolds more the 6 meters (20 feet) in height must be tied to the building or structure at intervals which do not exceed 4 meters (13 feet) vertically and 6 meters (20 feet) horizontally.
14. Do not overload scaffolds. Material should be brought up as needed. Scaffolding must not be loaded in excess of its rated capacity.
15. Barrels, boxes, kegs, blocks or similar unstable object must never be used as work platforms or to support scaffold.
16. Where persons must work under or pass under a scaffold then a 18 gauge wire mesh screen must be installed between the toe board and guard rail.
17. Employees exposed to overhead hazards while working on a scaffold will be protected by 5 cm (2") thick planks.
18. Wooden/bamboo ladders shall not be allowed at any cost. Ladder's rungs shall be fitted /welded properly. Before every use the rungs should be checked for safe use.



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19. Wooden scaffolds shall not be used in areas where fire / fire products are expected
20. Ropes made of jute / Plastic and other fire prone material shall not be used to tie up scaffolding components together
21. The platform should have permanent hand rail and mid rail with Toe board without fail.
22. All platforms are to be tightly planked for the full width of the scaffold, except as may be necessary for entrance openings. Platforms shall be secured in place.
23. On suspension scaffolds designed for a working load of 500 pounds, no more than two workers are permitted to work on the scaffold simultaneously. On suspension scaffolds with a working load of 750 pounds, no more than three workers are permitted on the scaffold simultaneously.

24. Requirements for different types of Scaffolds:

A. Suspended Scaffold

- i. Suspended scaffolds are platforms suspended by ropes, or other non-rigid means, from an overhead structure.
- ii. Requirements for use are to be preapproved by HSE Head, under a specific Permit to Work.

B. Rolling Scaffolds

- i. The height of rolling scaffolds shall not exceed three times the minimum base dimension.
- ii. The minimum base dimension of rolling scaffold will be 1.25 meters (4 feet).
- iii. Adequate help must be provided when moving a rolling scaffold.
- iv. Secure or remove all loose materials, equipment and tools before moving a rolling scaffold.
- v. No one is permitted to ride a rolling scaffold when it is being moved. Castor brakes must be locked-on when the scaffold is not being moved.

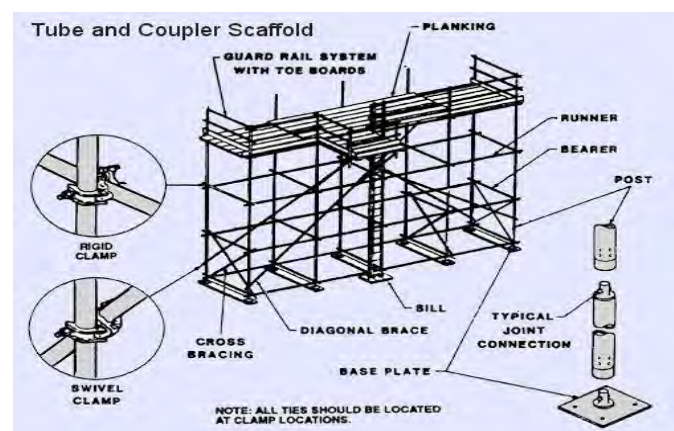
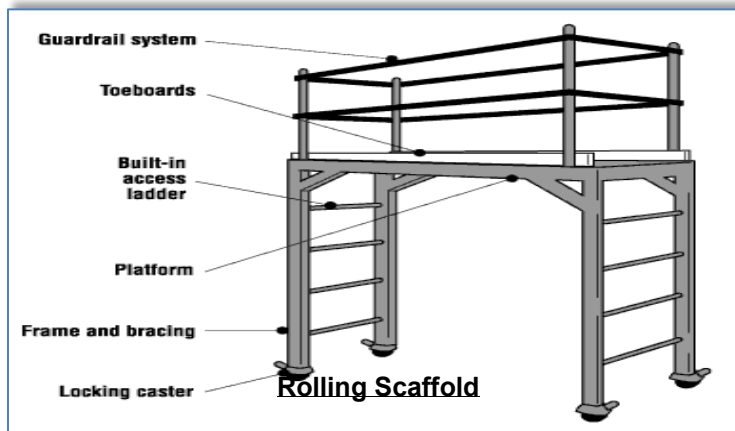



Fig. 13.2.1.3 Types of Scaffolds

25. Scaffold Tagging

Scaffolds being erected, modified or dismantled must be tagged as suitable for use. The scaffolds can only be accessed by those involved with the process.

GREEN scaffold tag- shall be fixed when scaffold is complete and safe for use, signed and dated by

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the scaffolding competent person daily.

RED scaffold tag – to be fixed if scaffold is in some way defective and cannot be used or is still under erection.

Examples of scaffold tags:



Fig. 13.2.1.4 Scaffold Tagging

13.2.1.4 Ladder Safety

A sketch of the ladders proposed to be used shall be prepared and approval of the BHEL Engineer obtained prior to construction / use

Safe Use of Ladders:

1. Fall protection is required when working on a ladder above 2 meters and when climbing above nearby guardrails.
2. Ladders must be inspected prior to use and by a competent person quarterly, with documentation.
3. Use portable ladders for height up to 4 M only
4. Provide fixed ladders for height above 4 M
5. Place the ladder at an angle of 75 degrees (approx.) from the horizontal (1:4)
6. Extend ladder at least 1 M above the top landing
7. Secure top and bottom of the ladder firmly to prevent displacement- anti skid lining at the bottom
8. Ensure that the width of the ladder is not less than 300 mm and distance between rungs is not more than 300 mm
9. Provide landings of minimum size 600 x 600 mm at intervals not more than 6 M for fixed ladders. Check the ladders daily for any defects
10. Ensure that the areas around base and top of the ladder are clear. Getting on and off the ladder is more hazardous than using it. Use a mudsill if the ladder is to rest on soft, loose or rough soil
11. Do not use ladders of conducting material near power lines, and only use ladders near power line or other energize system with exposed parts if they are confirmed locked-out and de-



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energized.

12. Stand no higher than the fourth rung from the top for carrying out any job standing on a ladder.
13. Never reach out from a ladder to perform work where your belt buckle protrudes past the ladder rung.
14. Always face the ladder while climbing up or down
15. Maintain three-point contact while climbing up or down a ladder i.e. two hands and one foot or two feet and one hand on the ladder at all the times.
16. Avoid climbing up or down a ladder while carrying anything in hands. Lift tools, equipment and materials with a rope.
17. Work from portable and extension ladders near guardrail where fall expose exists over the guardrail regardless of height, and above 2.0 mtr. heights from the working/walking surface will require the use of personal fall arrest equipment

13.2.2 EXCAVATION & CIVIL WORKS

All safety precautions shall be taken for foundation and other excavation marks as per IS-3764.

13.2.2.1 Excavation

The following safety measures are to be ensured before and during excavation:

1. All Excavation activities more than with depth of 1.22 meter or more shall require and Excavation Work Permit
2. Check for underground utilities like electrical / telephone cables, sewage, water lines and proper care has to be exercised to protect and prevent damage to it
3. Proper and adequate slope is maintained while excavating
4. Adequate shoring or sheeting is done wherever require to prevent soil sliding
5. Safe access through ladder or steps for exit & entry to excavation
6. No material /excavated soil is kept within one meter from the edge
7. Safe way is planned and provided for movement of HEM /transport equipment near excavation
8. Safety helmet and shoes/gum boots are provided and worn by the workmen at excavation works
9. Dewatering arrangement is made where water seepage is prevailed.
10. Stop blocks are provided to avoid vehicles reversing into the excavated trenches
11. Danger signs /Caution boards are displayed at work spot
12. Barricading is provided at excavated pits



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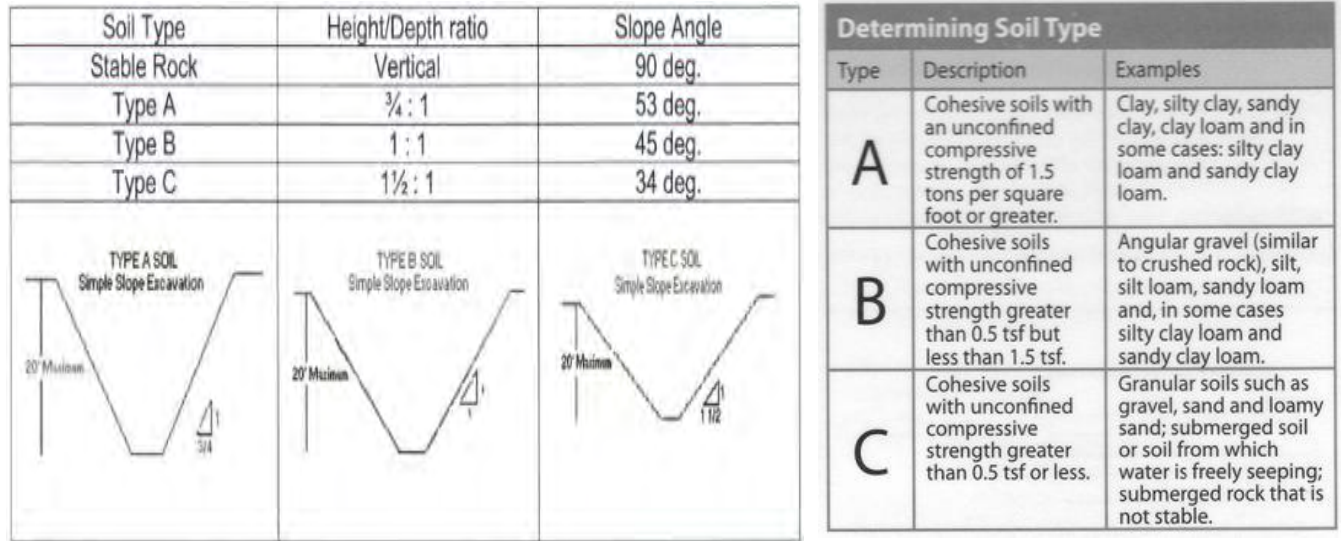


Fig. 13.2.2.1 Excavation Reference

13.2.2.2 Piling


Ensure the following precautionary measures before starting piling works:

1. Inspection of piling equipment by responsible person for its condition before initiating piling operation.
2. Checklist and OCP for piling to be prepared using manufacturer's instructions and used
3. Testing and its certification wire ropes, slings, D-shackles, chain pulley blocks using in the process of piling work by competent person
4. Adequate support and secured foundation of the piling equipment to avoid toppling
5. Hoses should be lashed and adequately secured
6. Proper work platform is to be provided on piling frame
7. Safe work procedures and close supervision to prevent unsafe acts of operators/any unsafe conditions that may arise
8. Only experienced and trained operators are engaged for the piling operation
9. Provision of Personal Protective Equipment (PPE) like safety shoes/gumshoes/safety helmet/safety belt etc. and its use by their workmen.
10. Special care and precautions If work is near electrical live cables/ electrical equipment
11. Cordoning of work area to prevent un authorized entry
12. Guarding of revolving parts
13. Specific measures to prevent over turning of pile driver/missing of hammer/ hammer movement out of range

13.2.2.3 Batching

Following Safety considerations for batching plant are to be ensured:

1. Modern type batching plant should be used in which all the moving parts are protected and

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emergency and safety features are incorporated.

2. Installation of external Electric moto-vibrators in the feeding hopper of all batching plants to reduce human intervention.
3. Installation of safety devices like pull-chord on both the sides of conveyor for stopping the conveyor in emergency
4. Workers carrying cement / sand to be given appropriate PPEs like respiratory masks & gloves.
5. Conveyor belt/rotating parts must be guarded properly.
6. Safety awareness shall be inculcated in workmen about the risk involved in rotating parts.
7. The agency shall ensure to erect the batching plant as per drawing including installation of all safety devices as provided by manufacturer and witnessed by BHEL Engineer in charge before starting of machine in future.
8. Safety audit to also focus on Batching plant.
9. The site shall impose penalty on the agency who has violated the safety norms as per contract.

13.2.2.4 Mobile Plant

Mobile plant includes tractors, trailers, dumpers, excavators, bulldozers, road rollers etc. for earthmoving purpose and concrete mixers, concrete transit mixtures, concrete pumps etc for concreting purpose. Due to the very nature of their function and movement in difficult terrains, congested areas, working in tandem with manual work and other operations the danger is inherent. Reverse horn is compulsory for all earth moving machineries.

Following Safety measures to be ensured for Mobile Plant:

1. Where movement around site is involved, routes should be planned, obstruction free and well maintained
2. Observe specified speed limits
3. Operating personnel should be aware of associated risks and its preventive measures
4. Only experienced, trained and authorized persons with valid license (wherever applicable) should operate the mobile equipment/vehicles
5. Provide and use Warning lights and reverse horn for cautioning the people around
6. Operation should be on level and stable ground with adequate working clearance.
7. Loading of out riggers/stabilizers should be well within safe ground bearing capacity
8. No person should be on equipment or vehicle during loading and unloading of material
9. Operators should be protected by warning barriers or switching off power when working in close proximity of overhead power lines
10. The equipment /vehicles should be well maintained and provided with effective brake system and other safety devices (wherever require)
11. Rotating parts of equipment should be adequately guarded
12. Provide necessary personal protective appliances and ensure its use by the operating personnel
Ensure effective measures at source to control harmful emissions, dust, fumes contaminating atmosphere and cause health hazards to the operators and people in the vicinity.
13. No overloading/over stressing of vehicles/plant is allowed
14. Hoses, pipes, receivers, gauges and valves involved in carrying out hydraulic fluid/ compressed air should be checked for leaks and tested prior to operation.
15. Adequate safe clearance for swing and movement is to be judged during operation of Concrete mixer



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16. Setting of machine on firm and level ground with wheel locked to prevent movement of machine
17. Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket
18. Operator leaving work spot should ensure that the equipment/vehicle is kept in neutral position and place on firm and level ground.
19. The hand brake should be kept in position and block road wheels as additional safety measure
20. Blades/buckets should be kept low while moving
21. The dozer blades should not be used as brakes except in emergency
22. The ground should be examined for its bearing capacity and general safety especially when operating road roller at the edges of slopes, embankments.
23. The roller should not be moved downhill with the engine out of gear
24. If operating near excavations the following precautionary measures are to be ensured
25. Barricading, edge protection to prevent fall of persons/vehicles over running while reversing etc.
26. Suitable support system and adequate allowance to avoid the danger of side collapsing
27. Experienced signaler /attendant should be always accompanied with operator/driver for proper direction /signal and also to caution others in the working Zone during operation of mobile plant

13.2.2.5 Concrete Vibrators

1. Revolving parts/belt drives should be adequately guarded and Vibrating unit shall be completely enclosed and have suitable overload relays and effectively earthed
2. Ensure sufficient length of cable to the Vibrator.
3. Ensure electric starters and other accessories are firmly fixed adequately supported
4. Ensure locking of needle load while inserting needle in to the vibrator,
5. Ensure periodical lubrication and maintenance

13.2.2.6 Concrete Mixers

1. Setting of machine on firm and level ground with wheel locked to prevent movement of machine
2. Proper instructions and Special precautions are to be ensured to prevent entry in to the danger zone of projectile of bucket while dropping bucket

13.2.3 WELDING & GAS CUTTING SAFETY (HOT WORK)

1. All Hot Work shall require a Hot Work Permit
2. There shall be flash-back arrestors conforming to IS-11006 at both cylinder and burner ends. Damaged tube and regulators must be immediately replaced.
3. All safety precautions shall be taken for welding and cutting operations as per IS-818.
4. When possible, items to be welded, cut, heated, etc. shall be moved to a safe location free of combustible or flammable material. If this is not possible, then all combustibles/ flammables that can be removed from the area shall be removed within a 35-foot circumference and a positive means of confining arcs and sparks generated by the process shall be ensured and additional person(s) shall be stationed as fire-watch for the area(s) still exposed, along with obtaining the Hot Work Permit as applicable.
5. Appropriate fire-fighting equipment is to be available in close proximity of any welding and gas cutting operations at all times suitable for the type of Fire.
6. Drums, tanks, and similar containers that have contained flammable or toxic material shall not be welded, cut, or heated until they have been made safe by water filling, thorough cleansing or similar accepted practices. The container shall also be ventilated during the welding, cutting, or heating process.



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7. Proper ventilation is required for any welding or torch operations performed in a confined space.
8. Any welding or gas cutting operations performed on metals of toxic compounds or coating such as zinc, stainless steel, lead, cadmium, chromium, and beryllium shall be properly ventilated and/or proper respiratory protection shall be worn by any person that could be exposed to fumes, vapors, and gasses created by the welding and gas cutting processes.
9. Wherever it is practical, all arc welding operations shall be shielded to prevent direct light rays or sparks from contacting persons in the vicinity or from reaching areas normally used to travel through or into the vicinity. Where this is not practical, persons who shall be in the area are to use proper eye and skin protection. Other persons who are not participating in the welding or gas cutting operations are not to be allowed into the hazard zone.
10. Welders and other employees who are exposed to arc welding radiation shall wear suitable clothing and protective apparel to prevent burns and other types of ultraviolet radiation damage to the skin.
11. Arc welding machines shall be shut down when being moved or when they are not in continuous use. Electrode holders left unattended shall have electrodes removed and shall not be left where they might contact employees or conducting objects.
12. Arc welding power supply cable shall be of proper rating and material, e.g. copper.
13. Welders shall guard against allowing materials adjacent to or behind them to reflect radiation back toward them or towards others in the area. Reflected radiation can cause skin burns and eye flash burns.
14. Valve caps shall be in place when cylinders are not in use. Valve caps shall never be used for lifting the cylinder vertically.
15. Torches shall only be lit by approved strikers; never with matches, cigarette lighters, or hot-work.
16. **Splatter / Slag Collector**

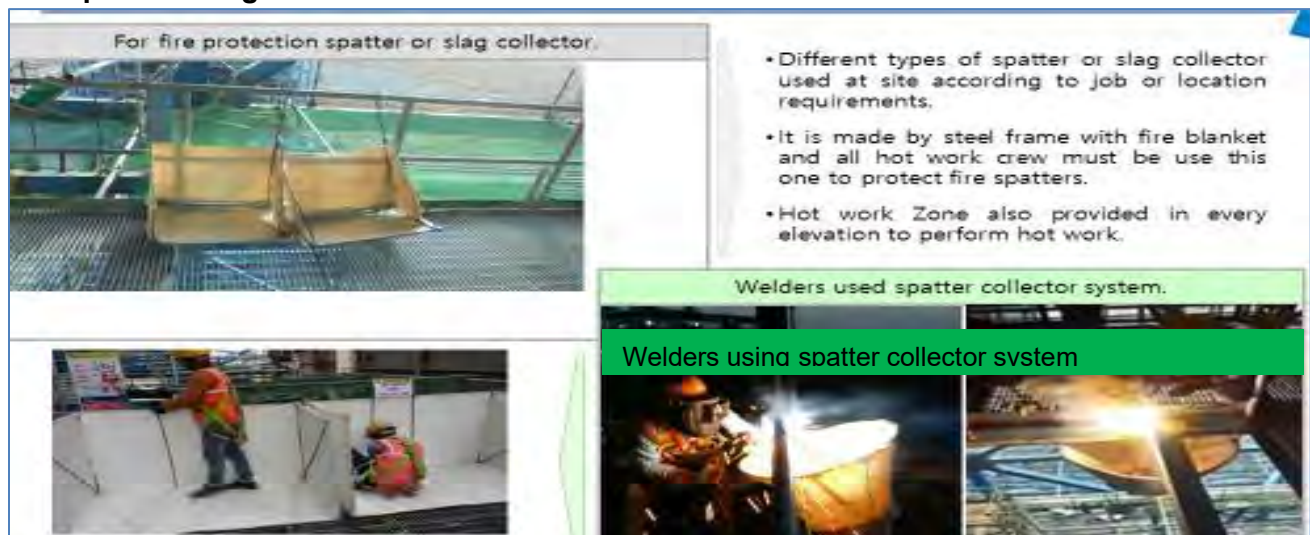


Fig. 13.2.3.1 Splatter / Slag Collector

While carrying out job at height, the sparks or molten slag shall be prevented from falling down by putting a fire-resistant (non-asbestos) sheet or patter/ slag collector or even MS Sheet. The passage of falling sparks or molten slag shall be barricaded till ground floor and any cable/ tubes/ any other objects interfering in the passages hall either be removed or covered with Fire-resistant sheet or MS Sheet.



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13.2.3.1 COMPRESSED GAS

1. All cylinder valves shall be closed when any work is finished and when any Cylinders are empty or being moved. Valve protection caps shall be placed and secured properly before gas cylinders are transported, moved or stored.
1. Compressed gas cylinders shall be secured in an upright position with chain or appropriate means during storage & use. However, a trolley shall be used for transportation.
2. Compressed gas cylinders shall always be secured from tipping or falling, whether in use, in storage or in transit. The cylinders shall always be secured upright, except during times when actually being hoisted or carried.
3. When cylinders are transported by powered vehicle they shall be secured in a vertical position.
4. Regulators shall be removed when cylinders are not in use or are in transit, unless the cylinder is firmly secured on a special carrier designed for this purpose.
5. Gas cylinders are not allowed to be used in man-basket when occupied.
6. Cylinders containing oxygen or fuel gasses shall not be taken into confined spaces.
7. Oxygen cylinders shall be stored a minimum of 6 meters from fuel gas cylinders or shall have an approved firewall between them.
2. All cylinders shall be kept at a safe distance from welding or cutting operations or shielded from arc/ sparks / slag.
3. All cylinders shall be placed where they cannot become part of the electrical circuit.
4. Oxygen and acetylene shall not be stored together. Oxygen must be separated from acetylene (or ANY fuel gas) or combustible material by at least 20ft or a barrier with a 30 minute fire resistance rating.
5. All Cylinders should be stored upright in a designated area with labels for the type of gas. All applicable precautions to be ensured during storage
6. Oxygen and fuel gas regulators, hoses and associated equipment shall not be altered and shall be in proper working order while in use.
7. Compressed air can be extremely dangerous if allowed to penetrate the skin. As such, the use of compressed air to clean off yourself or other workers shall be strictly prohibited.
8. All gas cylinders shall be stored in upright position. Suitable trolley shall be used for cylinder movement, the design of which shall be submitted to BHEL Engineer for approval.
9. No of cylinders shall not exceed the specified quantity as per OCP
10. Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dragged, struck or permitted to strike each other violently.
11. All cylinder should be kept only in cylinder trolley.
12. Cylinder shall be transported in upright vertical position by suitable mean.

13.2.4 LIFTING & RIGGING SAFETY

1. All Heavy / Complex Lifting operations as defined in Clause 6.12 shall require a Lifting Work Permit.
2. All the cranes and lifting tools & tackles shall be inspected on daily / weekly basis as well as



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monthly by expert as per applicable formats.

3. In addition, inspection / certification as mandated by law shall be carried out wherein these shall be tested and certificates of fitness shall be obtained from 3rd party State Govt. approved competent agency before deploying at site and later periodically. BHEL shall be given advance intimation of any such inspections
4. The last date of Third Party Inspection and the next Due date shall be conspicuously displayed on all cranes. A copy of certificate shall be pasted on operator's cabin of all the lifting equipment.
5. Following requirements shall be mandatorily followed, wherever applicable:
 - a. The manufacturer's instruction for maintenance shall also be followed. All safety measures shall be followed.
 - b. All tools tackles, lifting appliances; material-handling equipment etc. used by the subcontractor shall be of safe design and construction.
 - c. The operators, slingers and signalers shall be qualified as per IS 13367 (part-1):2003 "Safe use of cranes- code of practices".
 - d. There shall be a person responsible for co-ordination among cranes where multiple cranes are used, and lifting over 75% of the crane capacity to be avoided.
 - e. Mobile phone should be banned for crane operator and lifting operation. Only walki talki shall be allowed in rigging/Lifting purpose.

13.2.4.1 Personnel Lifts (Man-Basket / Jhoola):

The design of personnel man basket shall be submitted to BHEL Engineer for approval before use. Relevant permit (Height work & others as applicable) shall be completed prior to lifting any people, along with a rigging plan.

- a. A separate Lifeline / Fall arrestor anchored to a fixed structure outside of Jhoola shall be provided for the workers inside the basket. All occupants of the basket shall have Safety Harnesses equipped with rope grabs, which are to be hooked to the vertical lifeline.
- b. Man-basket shall be used where access through ladders or scaffolding is not feasible.
- c. Man-baskets shall be designed and engineered by a manufacturer (job made man-baskets are not allowed, unless designed and tested by a certified engineer), and built robust with MS Angles and flats or plates or channels only.
- d. Guard rails top and mid, must be in place and screened-in to avoid material from falling out of basket. The factor of safety shall be 200%.
 - e. It shall have a door with double latches and shall open inside. Anchor points shall be identified within the man-basket.
- f. The man-basket shall be thoroughly inspected and load tested and a trial run performed without personnel before being put to job.
- g. It shall be treated as a lifting tool (T&P Item) and shall undergo same certification cycle and inspection as other lifting equipment.
- h. An additional sling of required lifting capacity shall be fixed the man-basket main lifting point and attached to the crane above the ball or block.

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- i. While lifting man-basket, the crane shall maintain a uniform speed of lift without any swing.
- j. Once man-basket reaches the destination, the lift brakes shall be locked as long as the basket remains at that point. The same care shall be taken in its descent.
- k. As for hanging man-basket, the same shall be hung off a rigid structure with help U-shaped handle welded to man-basket. This shall be tested once in a year by a competent person.
- l. Use of Rebar steel for making and monkey-ladder must be avoided.

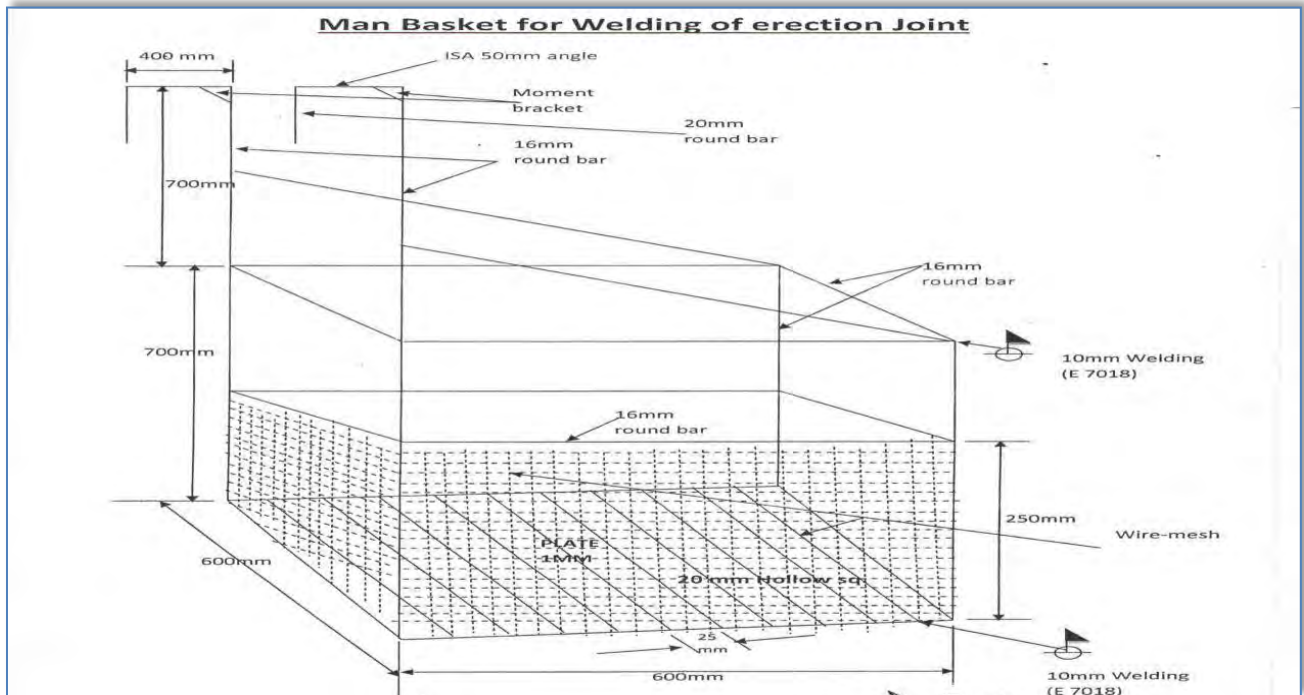


Fig. 13.2.4.1 Man Basket for Welding Erection Joint

13.2.4.2 Cranes & Hoisting Equipment:

This section provides the guidelines to ensure proper rigging and lifting activities are accomplished safely and in accordance with applicable specifications, codes, and regulations.



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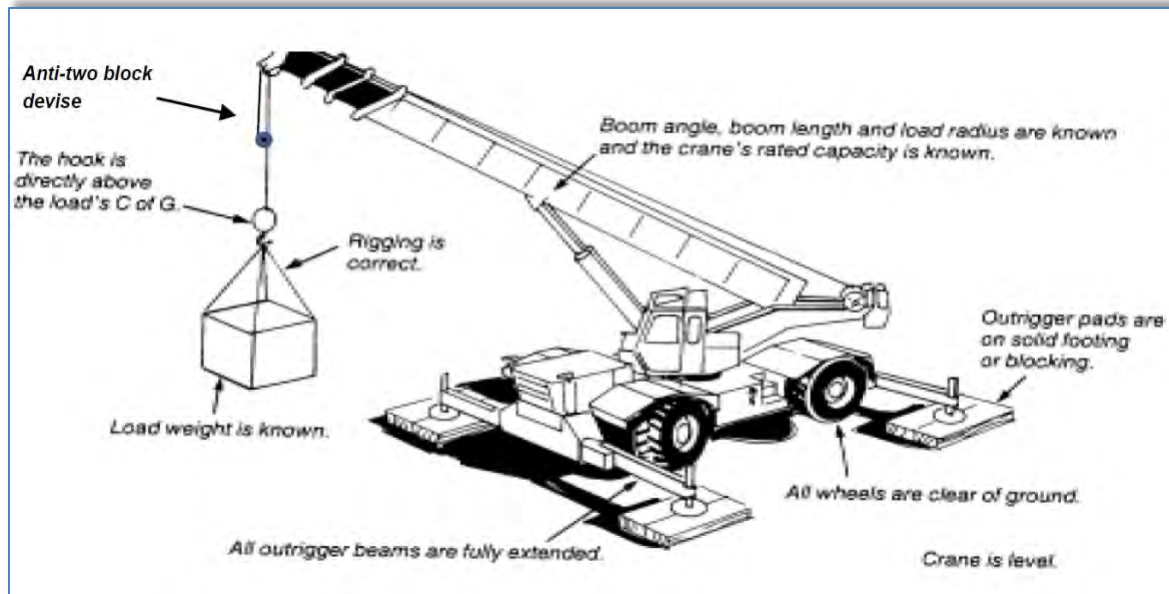


Fig. 13.2.4.2 Proper Crane Setup

- a. On every crane or piece of hoisting equipment notices of all rated load capacities, recommended operating speeds, and any hazard warnings or special instructions shall be conspicuously posted. All instructions and warning shall be visible from the equipment operator 's station.
- b. Cranes shall have an Anti-Two-block safety device installed
- c. All mobile cranes shall have overload and backup alarms, load angle indicators and limit switches
- d. All areas within swing radius of cranes that are potentially accessible by pedestrian, vehicular, or equipment movement shall be barricaded to prevent anyone or any vehicle or equipment from being struck by the crane or hoisting equipment, or its load(s).
- e. No part of the lifting equipment or its load shall be within the distance as specified in the Indian Electricity Act from an energized power line
- f. Cranes shall have annual certified third party inspection and be inspected before use by the operator. Any defects shall be corrected before use. Logs of crane inspection shall be kept with the crane.
- g. Make certain that the rigging personnel, material, and equipment have the necessary capabilities for the job and are in safe condition.
- h. Communicate with person(s) directly responsible for accomplishing the work and / or work area to establish requirements/responsibilities and make certain that all preparatory work is complete.
- i. Mats/Pads must be used on all lifting equipment, equipped with out riggers.
- j. Pick and carry must have the load secured to the rig in front.
- k. Only BHEL Approved Plate Lifting Spreader Beam configuration shall be used (Sample in Fig. 13.2.4.2)



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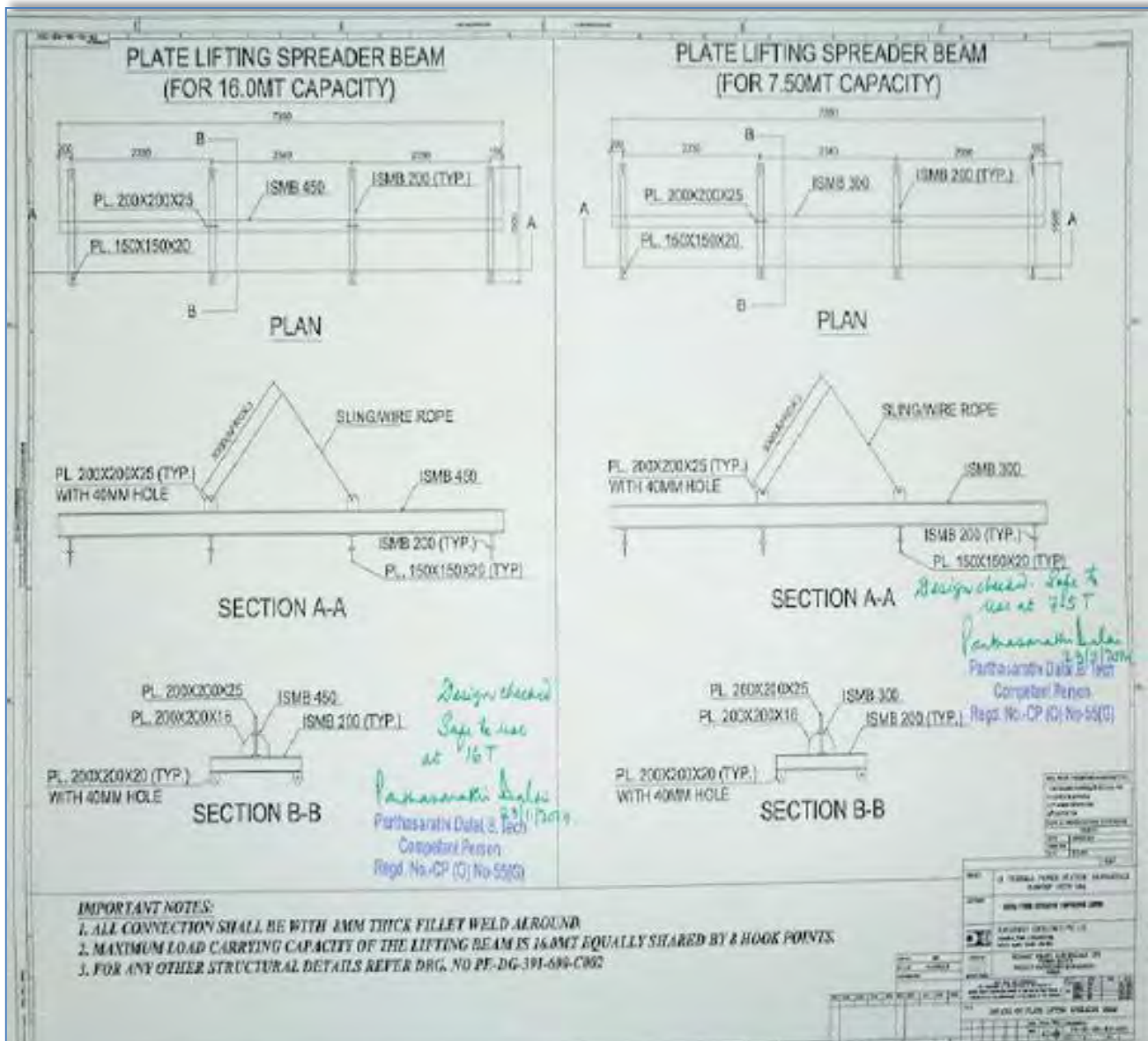



Fig. 13.2.4.3 Typical Plate Lifting Spreader Beam Configuration for 7.5 MT and 15 MT Loads

I. Crane operators must follow the following:

1. Pass an annual Operator's Physical examination
2. Carry a valid training certification card at all time while operating issued by the Govt. or other recognized institute.

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13.2.4.3 SAFE RIGGING PRACTICES

13.2.4.4

- Review the planned operation and requirements with the operator and rigging crew.
- Ensure a pre-lift meeting is conducted with crane operator, tagline operator, signal personnel, and Safety Manager.
- Designate a qualified person from the rigging crew to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- Clear the lift area of all unnecessary personnel.
- Hydras shall only be allowed for loading & unloading works & shall not be allowed to move with load

13.2.4.4.1 RULES FOR SAFE RIGGING

- Use loops, thimbles and corner pads to prevent damage to slings when used around corners or on cutting edges.
- Never allow wire rope to lie on the ground for any length of time or on rusty steel or near solvents, chemicals or corrosive substances.
- Slings must not be pulled from between or under loads with load resting on the sling.
- Keep all rope away from flame cutting or welding operations.
- Never use rope as sling material.
- Never wrap a wire rope completely around a hook.
- Do not bend wire rope near any attached fitting.
- The sling must be selected to suit the most heavily loaded leg rather than the total weight when using multi-legged sling to lift loads in which one end is heavier than the other.
- When using 3 and 4 legged sling configurations, any two legs must be capable of supporting the entire load.
- Where possible, wire rope choker hitches must include a shackle with the eye around the shackle pin to prevent breaking wires of the choke. The choker hitch must be "snugged down" prior to lifting, not after tension is applied.
- Unless authorized by the hook manufacturer when more than two rope eyes are placed over a hook, install a shackle, pin resting in the hook, and place the rope eyes in the bowl of the shackle.
- Properly rig all loads to prevent dislodgment of any part.
- Use guide ropes or tag lines to prevent the rotation or uncontrolled motion of the load when necessary.
- Loads must be safely landed and properly blocked before being unhooked and unslung. Tag lines must not be used in situations that jeopardize the safety of the lift.
- Lifting beams must be plainly marked with their weight and designed working load and must only be used in the manner for which they were designed.



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16. The hoist rope or chain must never be wrapped around the load. The load must be attached to the hook by slings or other rigging devices that are adequate for the load being lifted.
17. Multiple part lines must not be twisted around each other.
18. The hook must be brought over the center of gravity of load before the lift is started.
19. If there has been a slack rope condition, determine that the rope is properly seated on the drum and in the sheaves prior to lifting.
20. Keep hands away from pinch points as the slack is being taken up.
21. Leather gloves are recommended when handling wire rope.
22. Avoid impact loading caused by sudden jerking when lifting or lowering. Lift the load gradually until the slack is eliminated.
23. Never ride on a load that is suspended.
24. Avoid allowing the load to be carried over the heads of any personnel.
25. Never work under a suspended load until the load has been adequately supported from the floor and all conditions have been approved by the supervisor in charge of the operation.
26. Never leave a load suspended unless emergency evacuation is required.
27. Never make temporary repairs to sling.
28. The capacity of a sling is determined by its angle, construction, type of hitch and size.
29. Never lift loads with one leg of a multi-leg sling until the unused legs are made secure.
30. Never point load a hook unless it is especially designed and rated for such use.
31. Make certain that the load is broken free before lifting and that all legs are taking the load.
32. When using two or more slings on a load make certain all slings are made from the same materials.
33. Lower the loads on to adequate blocking to prevent damage to the slings.
34. Materials and equipment being hoisted must be loaded and secured to prevent any movement which could create a hazard in transit.
35. The weight of the hook, load block and any material handling devices must be included when determining crane capacity.
36. Calculated weights cannot exceed 75% of the chart without written approval.
37. Personnel must be completely clear of loads being picked up or set down by crane. Tag lines will be used to control the loads. Loads must not be touched by hand while placing/ moving.

13.2.4.4.2 SLINGS

a. Synthetic Slings

The following are rules for safe use of synthetic slings:

- i. Synthetic slings must be marked to show the rated capacity for each type of hitch and type of web material.
- ii. Nylon web slings must not be used where fumes, vapors, sprays or mists or liquids of acids or phenolic are present. Web slings with aluminum fittings must apply in this category.
- iii. **Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:**



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- a. Acid or caustic burns
- b. Melting or charring of any part of the sling surface
- c. Snags, punctures, tears or cuts
- d. Broken stitches
- e. Distortion of fittings
- f. Synthetic web slings of polyester or nylon must not be used at or come in contact with temperatures in excess of 82°C
- g. Polypropylene web slings must not be used at or come in contact with temperatures in excess of 93°C
- h. Insulated hooks must be tested yearly to insure insulation integrity to at least manufacturer's specifications.

iv. Wire Rope Slings must be removed from service and destroyed if any of the following conditions are present:

- a. In (10) randomly distributed wires broken in one (1) rope lay, or five (5) broken wires in one (1) strand in one (1) rope lay.
- b. Wear or scraping of one-third the original diameter of outside wires.
- c. Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure such as:
- d. Evidence of heat damage.
- e. End attachments that are cracked, deformed worn.
- f. Corrosion of the rope or end attachments.

v. Metal mesh slings must be immediately removed from service if any of the following conditions are present:

- a. A broken weld or broken brazed joint along the sling edge.
- b. Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion.
- c. Lack of flexibility due to distortion or corrosion.

vi. Synthetic web slings must be removed from service and destroyed if any of the following conditions are present:

- a. Acid or caustic burns
- b. Melting or charring of any part of the sling service
- c. Snags, punctures, tears or cuts
- d. Broken stitches
- e. Distortion of fittings

vii. Requirements of Plate Clamps:

1. The rated load of the plate clamp must be marked on the main structure.
2. Care must be taken to make certain the load is correctly distributed for the plate clamp being used.
3. Do not allow load or plate clamp to come into contact with any obstruction.
4. The plate clamp must not be used for side pulls or sliding the load.
5. When lifting stainless steel or special alloys, ensure plate clamp is designed for use on

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the specific metal.

13.2.4.4.3 SIGNALING PRACTICES:

- The "slinger" is responsible for attaching and detaching the load to and from the crane. He shall:
 - have received appropriate training on general safe lifting operations;
 - be capable of selecting lifting gears suitable for the loads;
 - liaise with the operator and direct the movement of the crane safely.
- The "signaller" is responsible for relaying the signal from the slinger to the crane operator. He shall:
 - have received appropriate training on general safe lifting operations;
 - be able to direct the movement of the crane and loads.

Suggested hand signals



Note: During the lifting operation, either the slinger or signaller shall communicate with the operator. Other communication methods (e.g., wireless walkie-talkies, telephones, etc.) may also be used.

Fig. 13.2.4.4 Recommended Signalling Practices



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13.2.5 DEMOLITION WORK

Before any demolition work is commenced and also during the process of the work the following shall be ensured, besides using the Work Permit:

1. All roads and open areas adjacent to the work site shall either be closed, suitably protected or restricted for movement
2. No electric cable or apparatus which is liable to be a source of danger nor a cable or an apparatus used by the operator shall remain electrically charged.
3. All practical steps shall be taken to prevent danger to persons employed from the risks of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render them unsafe.

13.2.6 T&Ps General

1. All T&Ps/ MMEs should be of reputed brand/appropriate quality & must have valid test /calibration certificates bearing endorsement from competent authority of BHEL.
2. Subcontractor to also submit monthly reports of T&Ps deployed and validity test certificates to BHEL safety Officer as per the format/procedure of BHEL.
3. Tagging and punching in all lifting tool is compulsory with SWL, sr. no. and due date.
4. All T&Ps shall be inspected by authorized Third Party agency as per applicable frequency. BHEL shall be kept informed of any such scheduled inspection
5. All T&Ps shall be internally inspected in each quarter and colour coded as below.


13.2.6.1 T&P Color Coding Procedure:

Inspections and tests shall be documented by means of color coding which shall verify that inspections or testing are current and that all receptacles, portable Power tools, Lifting Tools & Tackles have been inspected and tested as required. The color codes used on the project shall be:

GREEN	BLUE	YELLOW	RED
January February March	April May June	July August September	October November December

Table. 13.2.6.1 T&P Color Coding Procedure

- i. The cycle of colors shall be Quarterly as a minimum or as decided by BHEL. The color code tape / Sticker shall be clearly visible to designate the period for which the inspections and tests were conducted.

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- ii. Following the initial inspection, the equipment must be color-coded quarterly as per color-coding instructions that will be issued by the subcontractor.
- iii. Fire extinguisher with the current month color-coding inspection sticker must be provided and secured in the platform.
- iv. All slings shall be regularly inspected in accordance with the requirement of the project for frequent and periodic inspections and discard immediately if they fail to meet the minimum requirements of the project.
- v. The Subcontractor's Safety Officer shall ensure that all PPE is inspected prior to its issue. He is to ensure all subcontractor personnel are using safe and proper PPE equipment. Regular inspections on the PPE shall be carried out and personnel not adhering to those inspections shall be removed immediately from the site.
- vi. A five (10) day interval period shall be given into each monthly color code change. During this five (10) day period either color shall be acceptable.

13.2.7 CHEMICAL HANDLING

1. Displaying safe handling procedures & MSDS for all chemicals such as lube oil, acid, alkali, sealing compounds etc, at work place.
2. Where it is necessary to provide and/or store petroleum products or petroleum mixture & explosives, the subcontractor shall be responsible for carrying out such provision / storage in accordance with the rules & regulations laid down in the relevant petroleum act, explosive act and petroleum and carbide of calcium manual, published by the chief inspector of explosives of India. All such storage shall have prior approval if necessary from the chief inspector of explosives or any other statutory authority. The subcontractor shall be responsible for obtaining the same.
3. The used containers of chemicals shall be segregated and disposed off suitably
4. In case the used containers need to be re-used, all traces of the chemical to be removed by thorough cleaning with detergents etc. under trained supervision

13.2.8 ELECTRICAL SAFETY

1. Only electricians licensed by appropriate statutory authority shall be employed by the subcontractor to carry out all types of electrical works. The subcontractor shall maintain adequate number of qualified electricians to maintain his temporary electrical installations.
2. Power supply to all equipment at site to be routed through MCBs of appropriate rating. A 'Power Supply Distribution Plan' shall be prepared and submitted to BHEL Engineer for approval



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3. All power supplies through cables shall be underground or overhead with height > 3mtrs.
4. All distribution boxes shall be locked and the key controlled by site management of concerned subcontractor.
5. All individual equipment & tools at site shall be powered through Earth Leakage Circuit Breakers of 30 mA sensitivity.
6. These MCBs and ELCBs shall be regularly tested as per Clause 14
7. All fuses and fuse wires shall be of standard size and rating.
8. All electrical appliances used in the work shall be in good working condition and shall be properly double earthed other than armour earthing.
9. All extension boards shall have separate switches for all sockets / connections
10. All portable electric tools used by the subcontractor shall have safe plugging system to source of power and be appropriately earthed.
11. Providing adequate no. of 24 V sources and ensure that no hand lamps are operating at voltage level above 24 Volts especially in confined spaces like inside water boxes, turbine casings, condensers etc.
12. Electrical appliance shall have proper earthing and for appliances equal to & more than 415V shall have two separate earthing (as per IS-3043-1987)
13. Details of earth resource and their test date to be given to BHEL safety officer as per the prescribed formats of BHEL
14. The subcontractor shall use only properly insulated and armoured cables and conform to the requirement of Indian Electricity Act and Rules for all wiring, electrical applications at site.
15. BHEL reserves the right to replace any unsafe electrical installations, wiring, cabling etc. at the risk & cost of the subcontractor.
16. No maintenance work shall be carried out on live equipment
17. Adequate precautions shall be taken to prevent danger for electrical equipment. No materials on any of the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or the public
18. The subcontractor shall carefully follow the safety requirement of BHEL/ the purchaser with the regard to voltages used in critical areas.
19. Wiring and Branch Circuits Must be protected by a proper amperage over-current device such as a HRC fuse or circuit breaker. Such installations must be located so as to prevent physical damage to the wire conductors & panels.

20. Portable Electric Lights

- a. Portable electric lights used in wet or potentially wet locations must be either low voltage type (24 volts or less) or protected by a GFI (ground fault interrupter).
- b. They must be visually checked before each use and periodically while in use to assure their original integrity is maintained.
- c. Cords with cuts, breaks, deep abrasions, etc. shall be taken out of service immediately.
- d. Repairs to extension cords shall only be performed by qualified/ licensed electricians.
- e. Must not be allowed to lie in wet or potentially wet areas.



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21. Underground Cables:

- a. Every electric line or cable of unknown origin that is discovered or exposed during a digging, drilling, probing, or similar operation is to be considered as energized and life threatening.
 - b. The senior company employee on the site will ensure that all necessary safety precautions are taken in order to isolate the line from all workers and the public.
 - c. Such precautions may include halting the operation if appropriate.
 - d. The senior company employee on the site is to then contact the proper authorities to have the line identified and either confirmed to be abandoned and/or made safe for continuing the work.
 - e. Any and all underground lines that are discovered or become severed must be considered energized on both sides, and be treated accordingly.
22. In general, equipment or machinery being moved or transported must maintain minimum clearances of 25 ft. to all power lines.
 23. TAG IN/ TAG OUT must be in force in Switch Room and all Distribution Boxes for live power line. The authorized person's name and contact no shall be displayed
 24. Ensure "double insulated" three - core cables and three pin connectors are used and are properly ground "all insulated" types, all electrical tools and appliances must be manufactured for industrial use.
 25. All connections shall be electrically and mechanically sound and properly insulated. Taped joints are not permitted. Connections to socket outlets must be made with proper plugs.
 26. Splices in electrical cords are not permitted. Repairs must be made at the socket connection and retain the same mechanical and dielectric condition of the original connection.
 27. Damaged or defective electric tools, equipment and extension cords, etc. must not be used and shall be tagged out of service, removed from the work area and taken back to stores.
 28. Only licensed electricians are authorized to repair and work on electrical equipment. Tampering with electric tools or equipment by others could result in termination.
 29. Temporary electric cabling should be elevated 2.2 meters above the floor/ground or covered for protection. It must be kept clear of walkways and other locations where it may be exposed to damage or create a tripping hazard.
 30. Energized wiring in junction boxes, circuit breaker panels and similar places must be covered and locked at all times.
 31. Areas with live high voltage wires or terminals must be barricaded against entry and warning signs posted Danger – High Voltage and Authorized Personnel Only.
 32. Personnel should never work on energized equipment, de-energizing (lockout/tag out) the equipment is always the first requirement.
 33. The lockout and tag out procedure will be used when testing or working on, or around, energized installation.
 34. Working around energized equipment should never be done alone. A second electrician must always be available for assistance.



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35. If lockout/tag out of the work is infeasible (must be demonstrated), work on energized electrical circuits must be approved by the Site In-charge. All safety precautions necessary must be taken, PPE use must be evaluated per the exposure and used, i.e high/low voltage gloves, insulated shoes, overcoats/aprons, face shields, and other protective equipment like insulated tools, blankets, mats, etc. must be used.
36. The welding machines earth leads shall be properly fixed without loose contacts. The earth cable only has to be used. No steel members shall be used as earth leads.
37. Electrical crews must be qualified for the equipment and tools they work on, including being trained in Cardio-Pulmonary Resuscitation (CPR) methods and First Aid for rendering help in the event of electric shock.

38. Qualified Persons for Electrical Works

One who is trained and wiremen licensed to Govt of State and familiar with the construction, operation and safety hazards of the equipment upon which they are permitted to work.

- i. Qualified persons are intended to be only those who are well acquainted/experienced with and thoroughly conversant in the electric equipment and electrical hazards involved with work being performed.
- ii. Only qualified persons may be permitted to work on or near exposed energized parts. Such persons are required to have been trained in three specific areas:
- iii. Qualified persons must be capable of working safely on energized circuits;
- iv. Must be familiar with the proper use of special precautionary techniques and procedures based on equipment and exposure; and
- v. Must be familiar with required personal protective equipment, insulating and shielding materials, and insulated tools.
- vi. Qualified persons are expected to be able to evaluate unknown situations and adjust their activities in such a way that only safe work practices are used. Such behavior is the responsibility of the qualified person.
- vii. It is possible and likely for an individual to be 'qualified' with regard to certain equipment in the work place, and unqualified on other equipment they must know their limitation and stop work if not qualified on what equipment they were to work on.
- viii. An employee who is undergoing on-the-job training, who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training, and who is under the direct supervision of a qualified person is considered to be a qualified person for the performance of those duties. The process must be documented as proof.

13.2.9 USE OF HAND TOOLS AND POWER-OPERATED TOOLS

13.2.9.1 General Provisions

- a. All hands and power tools and similar equipment, shall be maintained in safe condition.
- b. When power operated tools are designed to accommodate guards, they shall be equipped
- c. with such guards, when in use;
- d. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains and other reciprocating, rotating or moving parts of the equipment shall be similarly guarded;
- e. Personnel using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall be



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provided with the particular personal protective equipment necessary to protect them from the hazards;

- f. All hand-held powered platen sanders, grinders, grinders with wheels of 5 cm or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws and jigsaws with blade shanks of 0.5 cm wide or less shall be equipped with only a positive on-off control.
- g. All hand-held powered drills, tappers, fastener drivers, horizontal, vertical or angle grinders with wheels greater than 5 cm in diameter, disc sanders, belt sanders, reciprocating saws, saber saws and other operating powered tools shall be equipped with a momentary contact on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

13.2.9.2 Hand Tools

- a. The subcontractor shall not issue or permit the use of unsafe hand tools;
- b. Wrenches including adjustable pipe end and socket wrenches shall not be used when saws are sprung to the point that slippage occurs;
- c. Impact tools such as drift pins, wedges and chisels shall be kept free of mushroomed heads;
- d. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight on the tools.

13.2.9.3 Power Operated Tools

- a. Electric power operated tools shall be either of the approved double-insulated type or shall be grounded;
- b. The use of electric cords for hoisting or lowering loads shall not be permitted;
- c. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming incidentally disconnected;
- d. Safety clips or retainers shall be securely installed or maintained on pneumatic impact (percussion) tools to prevent attachments from being incidentally expelled;
- e. All pneumatically riveting machine staplers and other similar equipment provided with automatic fastener feed, which operate at more than 7 kg/cm² pressure at the tool a safety device on the muzzle to prevent the tool from ejecting the fasteners unless the muzzle is in contact with the work surface;
- f. Compressed air shall not be used for cleaning purposes except when the pressure is reduced to less than 2 kg/cm² and that too with effective chip guarding. The 2 kg/cm² pressure requirement does not apply to concrete form, mill scale and similar cleaning purposes;
- g. The manufacturer's safe operating for hoses, pipes, valves, filters and other fittings shall not be exceeded;
- h. Only personnel who has been trained in the operation of the particular tool shall be allowed to operate power-actuated tools;
- i. The tool shall be tested each day before loading to see that the safety devices are in proper working condition. The method of testing shall be accordance with the manufacturer's



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recommended procedure;

- j. Any tool found not in proper working order, or that which develops a defect during use, shall be immediately removed from service and not used until properly repaired;
- k. Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any other person. Hands shall be kept clear of the open barrel end;
- l. Loaded tools shall not be left unattended;
- m. Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tiles, surface hardened steel, glass block, live rock, face brick or hollow tiles;
- n. Driving into materials that can be easily penetrated shall be avoided unless backed by a
- o. substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side;
- p. No fastener shall be driven into a palled area caused by an unsatisfactory fastening;
- q. Only non-sparking tools shall be used in an explosive or flammable atmosphere;
- r. All tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer.

13.2.9.4 Abrasive Wheels and Tools

- a. All grinding wheel must be ISO certified only.
- b. All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation;
- c. Grinding machines shall be equipped with suitable safety guards;
- d. The maximum angular exposure of the grinding wheel periphery and sides shall not be more than 900, except that when the work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 1200. In either case, the exposure shall begin not more than 8.650 above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the bursting of the wheel;
- e. Floor and bench-mounted grinders shall be work-rests, which shall be rigidly supported and readily adjustable. Such work-rests shall be kept at a distance not to exceed 5 mm from the surface of the wheel;
- f. Cup type wheels used for external grinding shall be protected by either revolving cup guard or a band type guard;
- g. When safety guards are required, they shall be mounted as to maintain proper alignment with the wheel and the guard and the guard and its fastening shall be adequate strength to retain the fragments of the wheel in case of incidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 1800;
- h. Portable abrasive wheel used for internal grinding shall be provided with suitable safety flanges;
- i. When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of incidental breakage, shall be used;
- j. All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that



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they are free from cracks or defects;

- k. Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place;
- l. All employees using abrasive wheels shall be protected by suitable eye protection equipment.

13.2.9.5 Wood Working Tools

- a. All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off-position;
- b. The operating speed shall be attached or otherwise permanently marked on all circular saws over 0.5 m in diameter or operating at over 3000 peripheral rpm. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is re-tensioned for a different speed, the marking shall be corrected to show the new speed;
- c. Automatic feeding devices shall be installed on machines wherever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points;
- d. All portable power driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

13.2.10 START UP, COMMISSIONING AND TESTING:

There are various activities involved prior to commissioning- the major ones are -Hydraulic Test, Steam Blowing, Transformers Charging, Boiler Light Up, Rolling and Synchronisation and Full loading of unit.

- a. These activities shall be personally supervised by the site executive along with the commissioning engineer.
- b. Appropriate Work Permits shall be taken as applicable
- c. The readiness of upstream and downstream system shall be ensured before taking up.
- d. These shall be handled strictly by the authorized persons only and the team shall be suitably briefed about the activity including hazards & risks involved and control plan by the concerned executive-in-charge before start.
- e. Entry of persons to the area of activity shall be suitably restricted and the emergency functions like Ambulance, first aid center and Fire station shall be intimated about the plan well in advance.
- f. Tag-in/ Tag-out shall be in place while charging transformer and whenever necessary.
- g. Electricians with valid wiremen license only shall be permitted to work on power lines.
- h. The area and the passage shall be adequately illuminated.



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13.2.11 FIRE SAFETY

Numbers and types of Fire Extinguishers shall be ensured as follows:

Sl. No	Type of Fire Risk (Class of Fire)	Extinguishing Medium & Relevant Indian Standard	Scale of Equipment (Minimum recommended)
1.	CLASS 'A' Fires involving ordinary combustible materials like wood, paper, textiles, rubber etc. (Ordinary hazard or low fire load)	WATER Soda acid type, water type (gas pressure) and water type (constant air pressure) IS: 934 -1976; IS: 940 -1976; IS: 6234 -1971	For every 600 square meter floor area or part, one 9-litre capacity. Minimum 4 numbers per floor or room; should not be required to travel more than 15 meter to reach any extinguisher.
2.	CLASS 'A' (Extra hazard & high fire load)	-do	-do – (Also, consult local fire authority).
3.	CLASS 'A' (Special hazards)	-do	-do – Extra provision For every 100 square meter floor area or part, one 4.5 Kg. CO ₂ ; minimum 2 numbers per room; should not be required to travel more than 10 meter to reach any extinguisher.
4.	CLASS 'B' (Fires in flammable liquids like oils, solvents, petroleum, products, varnishes, paints, etc. where blanketing effect is essential) (Storage and handling in small quantities)	FOAM / CARBON DIOXIDE / DRY CHEMICAL POWDER IS: 933 -1976; IS: 2878 1976; IS: 2171 1976; IS: 4308 -1982	For every 50 square meter floor area or part, 2 numbers 9 -liters foam or 5 kg dry powder; should not be required to travel more than 10 m in the area of storage to reach any extinguisher.
5.	CLASS 'B' (Bulk storage other than in tank form)	-do -	-do- (but minimum 3 numbers per room)
6.	CLASS 'C' (Fires involving gaseous substances under pressure where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder) (locations of storage and handling of gas cylinders)	CARBON DIOXIDE / DRY CHEM. POWDER. The best way to extinguish such fire is by stopping the flow of fuel gas to the fire. Container is kept cool with water spray. IS: 2878 1976; IS: 2171 -1976; IS: 4308 -1982	For every 100 square meter floor area or part; 2 numbers, 10 kg powder extinguisher or 6 kg CO ₂ ; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.
7.	CLASS 'D' Fires involving metals like magnesium, aluminum, zinc, potassium etc. where the burning metal is reactive to water and which require special extinguishing media or technique	SPECIAL DAY POWDER IS: 2171 -1976 IS: 4861 -1968	For every 50 square meter floor area or part, 2 nos. 5 kg special dry powder; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.
8.	MIXED OCCUPANCY (electrical); Generators; Transformers; etc.	CARBON DIOXIDE DRY POWDER, IS: 2878 -1976; IS: 2171 -1976	For every 100 square meter floor area or part one 10 kg CO ₂ . Minimum 2 numbers for every location should not be required to travel more than 10 meter to reach an extinguisher.

Note: Due to peculiarities of the power plant construction sites, there would be locations in the construction areas of Boiler, Turbine, Generator, Transformer, etc. where different types of fire risk (classes of fire) may co-exist. Special



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care shall be taken while selecting and installing portable fire extinguishers for such locations so that all types of fire risk that may co-exist, are adequately covered. Similar special care shall be taken for storage areas.


1. All Electrical welding booths shall be equipped with appropriate Fire Extinguisher
2. Appropriate Fire Extinguishers shall be made within easy reach of all welding operations
3. Fire extinguishers shall be regularly tested and last checked date to be indicated on each.
4. Providing appropriate firefighting equipment at designated work place and nominate a fire officer/warden adequately trained for his job.
5. Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labour colony etc. Such fire protection equipment shall be easy and kept open at all times.
6. The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
7. All other fire safety measures as laid down in the "codes for fire safety at construction site" issued by safety coordinator of BHEL shall be followed.
8. Non-compliance of the above requirement under fire protection shall in no way relieve the subcontractor of any of his responsibility and liabilities to fire incident occurring either to his materials or equipment or those of others.
9. Emergency contacts nos. must be displayed at prominent locations
10. Tarpaulin being inflammable should not be used (instead, only non-infusible covering materials shall be used) as protective cover while preheating, welding, stress relieving etc. at site.

13.2.12 HSE PREPAREDNESS FOR ADVERSE CLIMATES AND WEATHER

Subcontractor to remain updated on possible adverse weather conditions through reliable sources and all precautions taken accordingly.

13.2.12.1 SUMMER

1. The Working Time and Lunch Hour will be as per instruction of Statutory Authorities (no work between 11am to 3:30pm). However, in case temp comes down due to rain/cloudy weather work will continue as per normal routine.
2. During long lunch break, worker will be allowed to go back home for rest. Those who will like to stay back will avail at the facility of rest shed or other designed area.
3. They will be allowed to take small break during work as per their need.
4. Water sprinkling will be done on roads to reduce dust concentration.
5. Workers will be provided with adequate cool drinking water and Butter milk/Lemon water etc.
6. Adequate ORS stock will be made available at the work location in the First-Aid Box for use as needed and at First-aid Center for emergency need.
7. Fire prevention shall be on high alert, with removal of dry grass and bushes, etc, inside and outside the surrounding work areas. No smoking, and control of open flame/sparks shall be maintained and monitored.
8. Worker will be informed about the Do's and Don'ts to be followed during summer in the Pre Job Brief.

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Do's & Don'ts

9. Drink plenty of cool water and other non-alcoholic fluid and keep body well hydrated.
10. Eat salt in food to replenish loss of salt through sweating.
11. Avoid over physical exercise.
12. Have adequate sleep at night.
13. Eat light and less spicy food
14. Avoid eating food which was cooked long time ago.
15. Nobody should use small water bodies such as pits, running rain water through crevices etc. for drinking and cleaning purpose as it may be unhygienic.

Emergency Handling

In case of emergency due to heat disorder:

16. Rescue the victim from workplace and place under shed.
17. If to be rescued from height, use stoke basket or rescue kit.
18. Inform Ambulance immediately.
19. If nearby any air conditioned room/shed is available, place him inside the room/shed.
20. Administer First aid by trained First aider for Heat Disorder
21. If conscious, give him ORS solution to drink.
22. If required send the victim hospital immediately.

13.2.12.2 Monsoon

A. Height Work & Structural Safety:

1. Ensure that all height work platforms are barricaded and avoid any highly hazardous
2. height work.
3. Ensure that all personnel have good quality and intact safety shoes
4. Stop all dangerous height work during rain
5. Explain Do's and Don'ts to workers during Tool Box Meetings
6. Ensure that there are no weak structures, boards etc. that can fall during high winds
7. Do not allow any loose material (e.g. GI sheet, Ply board, empty cement bag, aluminum foil, foam sheets etc.) on roof sheds or top of structures.
8. Do not permit any one to ride up or come down scaffolds frame work during heavy wind or rain.
9. Provide "anchor" of adequate strength to scaffolds and other high-rise structures.
10. All rest sheds and GI sheds will be anchored into the round and wall and roof panels will be secured with J hook to prevent shed from blowing over or parts/pieces becoming airborne. Proper earthing per IS standard is also to be installed.
11. Do not go alone nor permit anyone to stay at tower-tops, roof-tops, high structures or on electrical poles during the course of stormy weather or heavy rain.



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B. Electrical:

1. All electrical connections / loads have to be routed through ELCB / RCCB (residual current circuit breaker) whose rating should be 30mA.
2. RCCB operational checks need to be done DAILY / WEEKLY during monsoon season.
3. Avoid joints on power cables which need to be laid over-head or under-ground, better not to have any joint at all. In case joints become essential, such cables must be housed rigidly and insulation must be provided as per approved standard. The joint shall be suitable for outdoor use.
4. All electrical distribution board shall be properly covered at top and sides to protect from rain water. Extension boards shall be protected from rain water.
5. Ensure proper "earthing" for each and every electrical appliance.
6. Double earthing need to be provided for 3-phase power supply and for voltage more than 220V.
7. Provide lightening arrestors at the top of Boiler 3 and boiler 4 and rest sheds which are not covered by existing lightening arrestor of other installation.

C. Others:

1. Maintain smooth flow on open drains. i.e. no obstruction or blockade shall be made on storm water drains. If required, make temporary drains.
2. Arrange back-filling of excavated pits on war-footing basis.
3. Arrange bringing down booms of all cranes, hydra machines during stormy weather (wind speed 40-50 kmph)
4. Confirm that all gantry cranes are effectively choked to prevent rolling and toppling.
5. Do not forget to deep ready a dew battery operated lights at site-offices during rainy season.
6. Avoid using wet damp clothes.
7. Barricade excavated zone filled with water.
8. Engage diesel operated water pump to dewater work area. For electrically operated water pump, the starter shall be protected from rain water. All rotating parts shall be guarded. Ensure availability of sufficient water pumps.

D. Health and hygiene:

1. Monsoon reduces the immunity of our body and makes us vulnerable to many diseases which are commonly associated with this season. It is time for us to keep our body challenging against disease by boosting our immunity and taking safety measures against these diseases.



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2. The diseases associated with monsoon are Malaria, Jaundice, Gastro-intestinal infections, like typhoid, cholera etc. apart from these viral infections like cold and cough also make their presence felt. Majority of above said diseases are on account of:
3. Puddle of water formed due to rain become breeding grounds for mosquitoes which spread disease like, malaria and dengue fever. As a precautionary measure against mosquito-bite disease one can use mosquito net around the end which is better choice to mosquito repellants like mats and coils.
4. Pollution of drinking water during monsoon is very common. It is very necessary to drink clean and pure water when water-borne monsoon diseases like diarrhea and gastro-intestinal infections threaten us.
5. Walking in dirty water during rainy season leads of numerous fungal infection which affect toes and nails. Diabetic patients have to take a special care about their feet. Keeping feet always dry and clean is very necessary. Avoid walking in dirty water. Keep shoes socks and raincoats dry and clean.

E. Workmen will be made aware of following Do's and Don'ts:

1. Do not sleep in daytime.
2. Avoid over physical exertion.
3. During lightning and thunder storm, do not take shelter under tree. Take shelter inside rest shed or store room.
4. Wash vegetables with clean water and steam them well to kill germs.
5. Avoid eating un-cooked foods and salads should be washed properly before consumption.
6. Drink plenty of water and keep body well-hydrated.
7. Always keep the surrounding area dry and clean. Don't allow to get water accumulated around.
8. Keep body warm as viruses attack immediately when body temperature goes down.
9. Do not enter air conditioned room with wet hair and damp cloths.
10. Dry your feet and webs with soft dry cloth whenever they are wet.
11. Eat light and less spicy food.
12. Avoid eating food which was cooked long time ago.
13. Eat salt in food to replenish loss of salt through sweating.

13.2.12.3 Emergency Weather Conditions

A. Cyclone/Severe thunder storm

In the event of Cyclone/Severe thunder storm, alert will be issued by subcontractor on notification received by Govt. authorities/Metrological departments Customer or BHEL.

The actions required during cyclone/rough weather:

1. Check and advice subcontractors to cleanup work area. Pick up all loose and unused material of respective supervisor's area.
2. Tie to secure all gas cylinders to avoid displacement and unsafe conditions which could be due to wind pressure.



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3. Secure portable electricity generating sets and other equipment, pumps, hoses etc.
4. Make preparation for removal of water logging.
5. Take review of work activity and make preparation for removal of equipment and material from vulnerable areas.
6. Isolate/turn off all electrical power from the main panel/switches. Secure and anchor panels properly.
7. Recheck anchorage/tie of all temporary structures/sheds, tall objects, cranes, rigs, scaffolds etc. to avoid toppling due to wind force.
8. Cranes boom shall be secured, either locked or lowered the booms as reasonably and practicably possible and rigs to safe position for the safety point of view.
9. Group up all trash barrels, wooden pallets, forms; wooden decks etc. and anchor properly.
10. Welding machines, air compressors and such equipment are to be grouped together and secured to the stable objects. Welding leads, electrical cables, hoses are to be rolled up and secured properly.
11. Set on site vehicles on high ground in the site area with brakes set firmly.
12. Anchor all tanks, vessels, gas cylinders that may be moved by high wind and water.
13. Evacuate job site.

Personnel Evacuation:

14. Personnel Evacuation will be required if predicted wind speed and storm surge heights are beyond acceptable limits as per the instructions from Govt. Authorities/ Metrological departments or Customer.
15. Once the warning is received for personnel evacuation, an emergency response team shall be formed. The team will work with local authorities and other agencies formed/deployed to evacuate and transport all personnel involved in the project to the cyclone shelter.
16. Cyclone may be followed by the calm "EYE", be aware of it. If the wind suddenly drops, don't assume the cyclone is over. Violent wind may resume from the opposite side direction. Wait for the official "All clear Signal".
17. After the cyclone, do not go outside until officially communicated about safe situation outside. Use recommended routes for returning. Do not panic or rush while returning.
18. Checking of gas leaks and well being of electrical appliances is essential before leaving the site.
19. Follow local communications for official warning and advice. The construction Manager shall also obtain updates from customer/metrological departments and communicate to the personnel on project site.

13.2.12.4 Preparedness for Other Adverse Climates and Weather Conditions

All Preventive and Precautionary measures to ensure Health & Safety of workers in all possible adverse weather conditions based on the analysis of the local area conditions to be taken by the subcontractor

13.3 ENVIRONMENTAL CONTROL

1. Environment protection has always been given prime importance by BHEL. Environmental



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damage is a major concern of the principal subcontractor and every effort shall be made, to have effective control measures in place to avoid pollution of Air, Water and Land and associated life.

2. Subcontractor shall list out all applicable environmental aspects and impacts, and ensure control measures to manage the same.
3. Chlorofluorocarbons such as carbon tetrachloride and trichloroethylene shall not be used.
4. Waste disposal shall be done in accordance with the guidelines laid down in the project specification.
5. Any chemical including solvents and paints, required for construction shall be stored in designated bonded areas around the site as per MSDS.
6. In the event of any spillage, the principle is to recover as much material as possible before it enters drainage system and to take all possible action to prevent spilled materials from running off the site. Subcontractor shall use appropriate MSDS for clean-up technique. Subcontractor shall be responsible for the cleanliness of their own areas.
7. Subcontractor shall ensure that noise levels generated by plant or machinery are as low as reasonably practicable. Where the subcontractor anticipates the generation of excessive noise levels from his operations the subcontractor shall inform BHEL accordingly so that reasonable & practicable precautions can be taken to protect other persons who may be affected.
8. It is imperative on the part of the subcontractor to join and effectively contribute to environmental protection measures such as tree plantation and towards social causes and maintaining good relations with local populace.
9. The subcontractor shall carry out periodic air and water quality check and illumination level checking in respective area of work place and take suitable control measure to maintain the same as per applicable laws / standards

13.3.1 WASTE MANAGEMENT

1. Subcontractor shall take suitable measures for waste management and fulfilling requirements of environment related laws/legislation as a part of normal construction activities.
2. Compliance with the legal requirements on storage/ disposal of paint drums (including the empty ones), Lubricant containers, Chemical Containers, and transportation and storage of hazardous chemicals will be strictly maintained.
3. Details of E-Waste, Hazardous Waste, shall be submitted to BHEL as per Format No. HSEP: 14-F18 and HSEP: 14-F19 respectively

13.3.1.1 BINS AT WORK PLACE

1. Sufficient rubbish bins shall be provided close to workplaces.
2. Bins should be painted yellow and numbered.
3. Sufficient nos. of drip trays shall be provided to collect oil and grease.
4. Sufficient qty. of broomsticks with handle shall be provided.
5. Adequate strength of employees should be deployed to ensure daily monitoring and service for waste management.

13.3.1.2 STORAGE AND COLLECTION

1. Different types of rubbish/waste should be collected and stored separately.



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2. Paper, oily rags, smoking material, flammable, metal pieces should be collected in separate bins with close fitting lids.
3. Rubbish should not be left or allowed to accumulate on construction and other work places.
4. Do not burn construction rubbish near working site.

13.3.1.3 SEGREGATION

1. Earmark the scrap area for different types of waste.
2. Store wastes away from building.
3. Oil spill absorbed by non-combustible absorbent should be kept in separate bin.
4. Clinical and first aid waste stored and incinerated separately.

13.3.1.4 DISPOSAL

1. Sufficient containers and scrap disposal area should be allocated.
2. All scrap bin and containers should be conveniently located.
3. Provide self-closing containers for flammable/spontaneously combustible material.
4. Keep drainage channels free from choking.
5. Make schedule for collection and disposal of waste.

13.3.1.5 WARNING AND SIGNS

1. Appropriate signage to be displayed at scrap storage area
2. No toxic, corrosive or flammable substance to be discarded into public sewage system.
3. Waste disposal shall be in accordance with best practice.
4. Comply with all the requirements of Pollution Control Board (PCB) for storage and disposal of hazardous waste.

13.4 HOUSEKEEPING

1. Keeping the work area clean/ free from debris, removing unused scaffoldings, scraps, insulation/ sheeting wastage /cut pieces temporary structures, packing woods etc. will be in the scope of the subcontractor.
2. Such cleaning has to be done by subcontractor within quoted rate, on daily basis by dedicated identified groups equipped with all require PPEs and training. The details of housekeeping group shall be provided to BHEL.
3. If such activity is not carried out by subcontractor / BHEL is not satisfied, then BHEL may get it done by other agency and actual cost along with BHEL overheads will be deducted from subcontractor's bill. Such decisions of BHEL shall be binding on the subcontractor.
4. Pests, such as beehives etc. shall be periodically removed in a humane fashion
5. **Following are to be taken care of on daily basis.**
 - i. All surplus earth and debris are removed/disposed of from the working areas to identified locations.
 - ii. Unused/Surplus cables, steel items and steel scrap lying scattered at different places /elevation within the working areas are removed to identify locations.
 - iii. All wooden scrap, empty wooden cable drums and other combustible packing materials, shall



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be removed from workplace to identified locations. Sufficient waste bins shall be provided at different work places for easy collection of scrap/waste. Scrap chute shall be installed to remove scrap from high locations

- iv. Access and egress (stair case, gangways, ladders etc.) path should be free from all scrap and other hindrances.
- v. Workmen shall be educated through tool box talk about the importance of housekeeping and encourage not to litter.
- vi. Labor camp area shall be kept clear and materials like pipes, steel, sand, concrete, chips and bricks, etc. shall not be allowed in the camp to obstruct free movement of men and machineries.
- vii. Fabricated steel structures, pipes & piping materials shall be stacked properly.
- viii. No parking of trucks/trolleys, cranes and trailers etc. shall be allowed in the camp, which may obstruct the traffic movement as well as below LT/HT power line.
- ix. Utmost care shall be taken to ensure over all cleanliness and proper upkeep of the working areas

13.5 TRAFFIC MANAGEMENT

13.5.1 SAFE WORKPLACE TRANSPORT SYSTEM

1. Traffic routes in a work place shall be suitable for the persons or vehicles using them.
2. Traffic routes for pedestrians and vehicles shall be clearly demarcated and indicated
3. Traffic routes shall never intersect the area of work and shall not endanger the site personnel
4. For internal traffic, lines marked on roads / access routes and between buildings shall clearly indicate where vehicles are to pass.
5. Temporary obstacles shall be brought to the attention of drivers by warning signs / hazard cones.
6. Power cables shall be maintained at a minimum height above ground as specified in Indian Electricity Act & Rules.
7. Sensible speed limits shall set and clearly displayed. Painted Speed ramps preceded by a warning signs or marker are necessary for stretches of roads exceeding 50 meters.
8. The traffic route should be wide enough to allow vehicles to pass and re-pass oncoming or parked traffic and it may be advisable to introduce on-way system or parking restrictions.
9. Safest route shall be provided between places where vehicles have to call or deliver.
10. Avoid vulnerable areas/items such as fuel or chemicals tanks or pipes, open or unprotected edges and structures likely to collapse
11. Safe areas shall be provided for loading and unloading of material. Loading / Unloading Permit shall be taken from BHEL prior to any significant loading / unloading activity
12. Avoid sharp or blind bends. If this is not possible hazards should be indicated e.g. blind corner.
13. Ensure road crossings are minimum and clearly signed.
14. Entrance and gateways shall be wide enough to accommodate a second vehicle without causing obstruction.
15. Forklift trucks shall not pass over road hump unless of a type capable of doing so.



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16. Overhead electric cable, pipes containing flammable hazardous chemical shall be shielded by using goal posts height gauge posts or barriers.
17. The height of Power cables above areas of movement shall conform to Indian Electricity Rules
18. Road traffic signs shall be provided on prominent locations for prevention of accidents and hazards and for quick guidance and warning to employees and public.
19. Safety signs shall be displayed as per the project working requirement and guideline of the state in which project is done.
20. Vehicles hired or used shall not be parked within the 15m radius of any working area. Any vehicle, that is required to be at the immediate/near the vicinity, shall be approved by the person in-charge of the site.

13.5.2 TRAFFIC ROUTE FOR PEDESTRIANS

1. Where traffic routes are used by both pedestrians and vehicles road shall be wide enough to allow vehicles and pedestrians safely.
2. Separate routes shall be provided for pedestrians to keep them away from vehicles. Provide suitable barriers/guard at entrances/exit and the corners or buildings.
3. Where pedestrian and vehicle routes cross, appropriate crossing shall be provided.
4. Where crowd is likely to use roadway e.g. at the end of shift, stop vehicles from using them at such times.
5. Provide high visibility clothing for people permitted in delivery area.

13.5.3 WORK VEHICLES

Work vehicles shall be as safe stable efficient and roadworthy as private vehicles on public roads. Subcontractors shall ensure that drivers are suitably trained and have valid license and experience for the designated class of vehicle. All vehicle e.g. heavy motor vehicle forklift trucks dump trucks mobile cranes shall ensure that the work equipment conforms to the following:

1. A high level of stability.
2. A safe means of access/egress.
3. Suitable and effective service and parking brakes.
4. Windscreens with wipers and external mirrors giving optimum all round visibility.
5. Provision of horn, vehicle lights, reflectors, reversing lights, reversing alarms.
6. Provision of seat belts.
7. Guards on dangerous parts.
8. Driver protection - to prevent injury from overturning and from falling objects/materials.
9. Driver protection from adverse weather.
10. No vehicle shall be parked below HT/LT power lines in conformance to Indian Electricity Act & Rules.
11. Valid Pollution Under Control certification for all vehicles



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13.5.4 DAILY CHECKS BY DRIVER

There should also be daily safety checks containing below mentioned points by the driver before the vehicle is used. Subcontractors should ensure that drivers carry out these checks as a minimum.

Brakes	Mirrors	Warning signals
Tires	Windscreen waters	Specific safety system i.e. control interlocks
Steering	Wipers	

13.5.5 TRANSPORTATION OF PERSONNEL AND MATERIALS BY VEHICLES


1. All drivers shall hold a valid driving License for the class of vehicle to be driven and be registered as an authorized BHEL driver with the Administration Department.
2. Securing of the load shall be by established and approved methods, i.e. chains with patented tightening equipment for steel/heavy loads. Sharp corners on loads shall be avoided when employing ropes for securing.
3. All overhangs shall be made clearly visible and restricted to acceptable limits
4. Load shall be checked before moving off and after traveling a suitable distance.
5. On no account is construction site to be blocked by parked vehicles Drivers of vehicles shall only stop or park in the areas designate by the stringing foreman.
6. Warning signs shall be displayed during transportation of material.
7. All vehicles used by Subcontractor shall be in worthy condition and in conformance to the Land Transport requirement

13.5.6 MAINTENANCE

All Vehicles used for transportation of man and material shall undergo scheduled inspections on frequent intervals to secure safe operation. Such inspections shall be conducted in particular for steering, brakes, lights, horn, doors etc. Site management shall ensure that work equipment is maintained in an efficient, working order and in good repair. Inspections and services carried out at regular intervals of time and or mileage. No maintenance shall be carried below HT/LT power lines.

13.6 EMERGENCY PREPAREDNESS AND RESPONSE

1. Subcontractor shall develop Emergency preparedness and response capability and Emergency Response Team as per [HSEP06: HSE Procedure for Emergency Preparedness and Response](#)
2. Availability of adequate number of first aiders and fire warden shall be ensured
3. All the subcontractor's supervisory personnel and sufficient number of workers shall be trained for fire protection systems. Enough number of such trained personnel must be available during the tenure of contract. Subcontractor should nominate his supervisor to coordinate and implement the safety measures and communicate the same to BHEL.
4. Assembly point shall be earmarked and access to the same from different location shall be shown
5. Fire exit shall be identified and pathway shall be clear for emergency escape.
6. Appropriate type and number of fire extinguisher shall be deployed as per Clause No. 13.2.11 and validity shall be ensured periodically through inspection
7. Adequate number of first aid boxes shall be strategically placed at different work places to cater

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to all emergency needs. Holder of the first aid box shall be identified on the box itself who will have the responsibility to maintain the same.

8. First aid center shall be developed at site with trained medical personnel and ambulance
9. Emergency contact numbers of the site shall be displayed at prominent locations.
10. Tie up with fire brigade shall be done in case customer is not having fire station.
11. Tie up with hospital shall be ensured in order to ensure the availability of following services to victims quickly without wasting precious time:
 - a. Intensive Care Unit with Ventilator and other necessary life support systems
 - b. Facility of specialized Orthopedic Surgery – in case of fracture / amputation
 - c. Facility of specialized brain / neuro surgery – in case of head trauma
 - d. Facility of specialized burn unit / ward – in case of Fire / burn injury
 - e. and other facilities as per requirement at site location

In case tie up with multiple hospitals is required to cover all possible accidents, same shall be done. The list of facilities to be regularly checked and updated.
12. A detailed emergency services (Fire / Medical etc.) tie up plan shall be submitted to BHEL in monthly report Format No. HSEP:14-F05
13. Mock drill shall be conducted on different emergencies periodically to find out gaps in emergency preparedness and taking necessary corrective action

14 HSE INSPECTION

Inspection on HSE for different activities being carried out at site shall be done to ensure compliance to HSEMS requirements. The subcontractor shall maintain necessary safety equipment as applicable, to enable inspection personnel/agency perform Inspection. If any test equipment is found not complying with proper safety requirements then the Inspection Agency may withhold inspection, till such time the desired safety requirements are met.

The requirements of respective work permits are to be ensured by respective supervisors, safety personnel and area in-charges. In addition, the formats & checklists as per Clause 21 of this document provided by BHEL shall be used for inspection by Safety personnel (as a minimum), and records of inspection to be maintained. BHEL shall reserve the right to modify any Format in this document or introduce additional checklists / formats to ensure regular inspection of all equipment as per requirement.

14.1 DAILY HSE CHECKS

Both the Site Supervisors and HSE Supervisors are to conduct daily site Safety inspection around work activities and premises to ensure that work methods and the sites are maintained to an acceptable standard. The following are to form the common subjects of a daily safety inspection:



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1. Height Work:

- a. Safe, barricaded platform
 - b. PPEs
 - c. Proper method
 - d. Awareness
2. Personal Safety wears & gear compliance.
 3. Complying with site safety rules and permit-to-work (PTW).
 4. Positions and postures of workers.
 5. Use of tools and equipment etc. by the workers.
 6. The inspection shall be carried out just when work starts in beginning of the day, during peak activities period of the day and just before the day's work ends.

14.2 INSPECTION OF HEIGHT WORKING

1. Any kind of height work (above 2 meters) shall not be carried out without active physical supervision by concerned supervisor or safety personnel. All non-conformances related to height work shall be handled on priority and closed immediately after halting the work.
2. A roster of personnel deployed for inspection of height work and other critical activities shall be prepared and submitted to BHEL in monthly report Format No. HSEP:14-F05, in order to ensure effective supervision at all times
3. Inspection on height working shall be conducted **daily** by supervisors before start of work to ensure safe working condition including provision of:

a. Fall arrestor	d. Fencing and barricading	g. Proper scaffolding with valid
b. Lifelines	e. Warning signage	Tags, access and egress.
c. Safety nets	f. Covering of opening	h. Illumination

4. Inspection on height working shall be conducted once in a week by HSE officer as per
5. Format no. HSEP: 14-F10.
6. Medical fitness, including vertigo test of height worker shall be ensured.
7. Height working shall not be allowed during adverse weather.

14.3 INSPECTION OF PPE

PPEs shall be inspected by HSE officer at random once in a week as per Format no. HSEP: 14-F06 for compliance to standard and provisions and any adverse observation shall be recorded in the PPE register.

14.4 INSPECTION OF T&Ps

1. All T& Ps being used at site shall be inspected by HSE officer once in a month as per specific Formats in this document, or (if not available) general Format no. HSEP: 14-F07 for its healthiness and maintenance.
2. A master list of T&Ps and validity of their inspection certificates shall be maintained by each agency and details shall be submitted to BHEL in monthly format no. HSEP:14-F05.
3. The T&Ps which require third party inspection shall be checked for its validity during inspection.



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The third party test certificate should be accompanied with a copy of the concerned competent person's valid qualification record. BHEL shall be given advance intimation of Third Party Inspection. BHEL shall associate with Inspection as per discretion.

14.5 INSPECTION OF CRANES AND WINCHES

1. Cranes and winches shall be inspected by the operator through a daily checklist for its safe condition (as provided by the equipment manufacturer) before first use of the day.
2. Cranes and Winches shall be inspected by HSE officer once in a month as per Format no. HSEP: 14-F08 & F09 for healthiness, maintenance and validity of third party inspection.
3. The date of third party inspection and next due date shall be painted on cranes and winches.
4. The operators/drivers shall be authorized by sub-contractor based on their competency and experience and shall carry the I-card.
5. The operator should be above 18 years of age and should be in possession of driving license of HMV man & goods), vision test certificate and should have minimum qualification so that he can read the instructions and check list.

14.6 INSPECTION ON WELDING AND GAS CUTTING OPERATION


1. Supervisor shall ensure that no flammable items are available in near vicinity during welding and gas cutting activity.
2. Gas cylinders shall be kept upright.
3. Use of Flash back arrestor shall be ensured at both ends.
4. Inspection during welding and gas cutting operations shall be carried out by HSE officer once a month as per Format no. HSEP: 14-F11.
5. Use of fire blanket to be ensured to avoid falling of splatters during welding or gas cutting operation at height.
6. Availability of fire extinguisher in vicinity shall be ensured.

14.7 INSPECTION ON ELECTRICAL INSTALLATION / APPLIANCES

1. Ensure proper earthing in electrical installation
2. Use of ELCB at electrical booth
3. Electrical installation shall be properly covered at top where required
4. Use appropriate PPEs while working
5. Use portable electrical light < 24 V in confined space and potentially wet area.
6. Monthly inspection shall be carried out as per Format no. HSEP: 14-F12.

14.8 INSPECTION OF ELEVATOR

1. Elevators shall be inspected by concerned supervisors once in a week as per Format no. HSEP: 14-F13.
2. All elevators shall be inspected by competent person and validity shall be ensured.
3. The date of third party inspection and next due date shall be painted on elevator.

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14.9 MONTHLY SITE INSPECTION

Subcontractor shall carry out monthly HSE inspection of all work areas as per Format No. HSEP:14-F20 and submit to BHEL

14.10 NON-CONFORMITY HANDLING:

Any serious non-conformances identified during inspection observed shall be addressed immediately.

In case immediate closure of non-conformities is not possible:

- work to be halted in the area
 - Non-conformance to be generated and submitted to responsible person and BHEL
 - non-conformance to be resolved through responsible agency / person
- Only after closure of serious non-conformances, work to be allowed to resume.

All non-conformances & safety violations to be recorded and closed in a time bound manner.

15 HSE PERFORMANCE

HSE performance of subcontractor shall be monitored as per BHEL criteria, based on which, marks will be awarded. Marks can be used to evaluate and rate the contractor as per BHEL internal systems. Format for vendor HSE performance evaluation is attached in annexure (Format No. HSEP:14-F33)

Subcontractor shall make available all data required for evaluation to BHEL as and when demanded.

- If safety record of the subcontractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognize the safety performance of the subcontractor may be considered by BHEL after completion of the job.
- 1.5% of running bill shall be cleared subject to certification of desired safety performance by BHEL

16 HSE PENALTIES FOR NON-COMPLIANCE

- Nonconformity of safety rules and safety appliances will be viewed seriously and BHEL has right to impose fines on the subcontractor for every instance of violation noticed.
- The applicable penalties for HSE violations are given in Format No. HSEP14-F14 of this document



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3. The list of non-compliances given in above format is not exhaustive. The BHEL site in-charge has liberty to impose a penalty for any other non-compliance and incidents of any nature.
4. If principal customer or statutory and regulatory bodies impose penalty on ground of statutory non-compliance or non-compliance of HSE rules by the subcontractor or any incident of any nature including fatality or permanent disability, the same shall be passed on to the subcontractor with appropriate overhead
5. The penalty amount shall be recovered from subcontractors from the RA Bill, otherwise Final bill.

17 COMPENSATION TO ACCIDENT VICTIMS

1. BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.
 - b. **Victim:** Any person who suffers permanent disablement or dies in an accident as defined below.
 - c. **Accident:** Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing/ operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works / during working at BHEL Units/ Offices/ townships and premises! Project Sites.
 - d. **Compensation in respect of each of the victims:**
 - i. In the event of death or permanent disability resulting from Loss of both limbs: Rs. 10,00,000/- (Rs. Ten Lakh)
 - ii. (ii) In the event of other permanent disability: Rs. 7,00,0001- (Rs. Seven Lakh)
 - e. **Permanent Disability:** A disablement that is classified as a permanent total disablement under the proviso to Section 2 (I) of the Employee's Compensation Act, 1923. "
2. In addition to above, contractor shall provide appropriate compensation to victims of major and fatal incidents as per Employee Compensation Act, 1923, ESIC Act, 1948 or as per any existing Acts and guidelines



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18 INTERNAL & EXTERNAL HSE AUDITS

1. Subcontractor shall extend full co-operation and maintain necessary documents & records as required by Internal & External HSE Audit carried out by BHEL. / Third Party
2. All non-conformities and observations on HSE shall be disposed of-by subcontractor in a time bound manner as detailed in Audit Report.
3. All required corrective actions shall be taken by the subcontractor in order to avoid recurrence

19 OTHER REQUIREMENTS

1. In case of any delay in completion of a job due to mishaps attributable to lapses by the subcontractor, BHEL shall have the right to recover cost of such delay from the payments due to the subcontractor, after holding an appropriate enquiry and notifying the subcontractor suitably.

2. RISK & COST:

If the subcontractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given reasonable opportunity to do so and/or if the subcontractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instruction regarding safety as per contractual requirements, BHEL shall have the right to take corrective steps at the risk and cost of the subcontractor after giving a notice of not less than 7 days indicating the steps that would be taken by BHEL.

3. If the subcontractor succeeds in carrying out its job in time without any fatal or disabling injury incident and without any damage to property BHEL may, at its sole discretion, favourably consider to reward the subcontractor suitably for the performance.
4. The subcontractor shall take all measures at all the sites of work to protect all persons from incidents and shall be bound to bear the expenses of every suit, action or other proceeding of law that may be brought by any persons for injury sustained, death or damage to environment



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owing to neglect of the HSE precautions by the subcontractor; and shall be liable to pay any such persons such compensation, should such claim proceeding be filed against BHEL.

The subcontractor hereby agrees to indemnify BHEL against the same.

20 HSE REVIEW

BHEL shall hold HSE review meeting every month or as per requirement in order to discuss and resolve HSE issues of site and improve HSE performance. It will also discuss the incidents occurred since previous meeting, its root cause and Corrective action. The indicative agenda is given below:

1. Implementation of earlier MOM
2. HSE performance review
3. HSE inspection review w.r.t non-conformances observed and their status
4. HSE audit and CAPA
5. HSE training conducted and requirement
6. Health check-up camp
7. HSE planning for the erection and commissioning and installation activities in the coming month
8. HSE reward and promotional activities
9. HSE data analysis and improvement – Data analyzed will include non-conformances closed and pending, incident data, training data etc.

Subcontractor shall ensure presence of site in-charge, all package in-charges and safety officers, as communicated by BHEL in the meeting.

Subcontractor shall take requisite actions as per record notes and as decided in the meeting, in a time bound manner and submit compliance report to BHEL.



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21 FORMATS USED

This is minimum list of Formats to be used for reporting by the subcontractor. Other Formats are indicated in respective HSE Procedures, Work Permits, OCPs or as specified by BHEL. The medium of reporting can be hard / soft as indicated by BHEL.

BHEL can modify these Formats or introduce new Formats to the extent necessary to get the desired performance data of all HSE activities.

SN	Format Name	Format No.	Frequency of check	Rev
1	Work at Height Permit	HSEP:14-FP01	Before start of work and regularly thereafter as per Permit conditions	00
2	Hot Work Permit	HSEP:14-FP02		00
3	Confined Space Work Permit	HSEP:14-FP03		00
4	Excavation Work Permit	HSEP:14-FP04		00
5	Radiation Work Permit	HSEP:14-FP05		00
6	Lifting Activity Work Permit	HSEP:14-FP06		00
7	Lockout-Tagout Work Permit	HSEP:14-FP07		00
8	Inspection of First Aid Box	HSEP:14-F01	Weekly	00
9	Health Check Up	HSEP:14-F02	With new Induction & as per requirement thereafter	00
10	HSE Induction / Regular / On-the-Job Training	HSEP:14-F03	With new Induction & as per requirement thereafter	00
11	Tool Box Talk	HSEP:14-F04	Daily before job start	00
12	Site HSE Report	HSEP:14-F05	Monthly	00
13	PPE Inspection	HSEP:14-F06	Weekly	00
14	PPE Issue and Receipt	HSEP:14-F06A	With new Induction	
15	Inspection of T&Ps (General)	HSEP:14-F07	Monthly / As per requirement	00
16	Inspection of Cranes	HSEP:14-F08	Monthly / As per requirement	00
17	Inspection of Winches	HSEP:14-F09	Monthly / As per requirement	00
18	Inspection of Height Working	HSEP:14-F10	Daily / As per requirement	00
19	Inspection on Welding & Gas Cutting	HSEP:14-F11	Weekly / As per requirement	00
20	Inspection on Electrical Installation	HSEP:14-F12	Weekly / As per requirement	00
21	Inspection on Elevator	HSEP:14-F13	Weekly / As per requirement	00
22	HSE Penalty	HSEP:14-F14	-	00
23	Initial Verification of PPE's & Lifting Tools & Tackles	HSEP:14-F15	As and when new PPEs and T&Ps are received	00
24	Inspection of Labor Colony	HSEP:14-F16	Monthly / as per requirement	00
25	Recording of First Aid Injuries	HSEP:14-F17	As and when such injuries occur	00
26	E-waste Handled / Generated	HSEP:14-F18	Half Yearly	00
27	Hazardous Waste at the Facility	HSEP:14-F19	Half Yearly	00
28	HSE Checklist-cum-Compliance Report	HSEP:14-F20	As per Audit Calendar	00
29	Illumination Levels	HSEP:14-F21	Weekly / As per requirement	00
30	Incident Reporting	HSEP:14-F22	-	00
31	Incident Recording	HSEP:14-F23	-	00
32	Monthly HSE Planning & Review	HSEP:14-F30	Monthly	00
33	Daily HSE Reporting	HSEP:14-F31A	Daily	00
34	Job Safety Analysis	HSEP:14-F32B	Before starting new job	00
35	Evaluation of HSE Performance	HSEP:14-F33	Monthly	00



HSEP:14-FP01

WORK AT HEIGHT PERMIT <small>Standard Permit for Work at Height (TCN-05)</small>		Permit No. & Date
Project & Unit:		Emergency Contact Nos:
BHEL Sub-contractor:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1	All workers on job are competent and medically fit (No Height Phobia) for working at height		
2	Hazards in the vicinity are identified, controlled and communicated to the worker.		
3	Scaffolding soundness inspected is available for use with valid tag		
4	Work platform is not made of bamboo or weak material. Barricading is available with Top, Mid Rails and Toe Guard.		
5	Working platform is clean without any unwanted material. Floor openings are covered.		
6	Access and exit to workplace are safe, marked and without obstruction.		
7	Adequate lighting provided (for dark hours) as per applicable lux standards (Refer HSEP:13)		
8	Safety nets are provided below working area.		
9	Area below the working platform has been cleared of all activity		
10	Ladders have been secured, inspected and provided as per BHEL standard/contract.		
11	Horizontal life lines are provided to cater to design specification of 2300 kg per person.		
12	Safety harness with life line support/ fall arrester are checked and available in working condition		
13	Safety shoes (non-slip), Helmet with chin strip available with employees		
14	Visible Signboards provided on working platforms in workers' understandable language		
15	All lifting / tightening tools, hand tools/equipment checked and in good condition		
16	ELCB provided for Electrical connections individually. Electrical cable, welding Hose/Compressed air hose properly secured and laid down without obstruction. Earth resistance is OK.		
17	Crane / Winch / Hydra operator is qualified and experienced		
18	Emergency response team & Medical Facilities available. Work area is cordoned off.		
19	Job Safety Analysis Submitted		
20	Additional Permits to be taken (Please specify & attach):		

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):	Site Safety Officer (Sub-Contractor):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):	Site Safety Officer (BHEL):
Signature:	Signature:
Name: _____ Designation: _____	Name: _____ Designation: _____
Package-in-charge (BHEL):	
Signature:	
Name: _____ Designation: _____	

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for working at height of 2 mtr. and above or above excavation of 2 mtr or deeper.
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work must be clearly indicated by the permittee.
4	Terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day only after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work at height, height phobia needs to be ascertained and proper fitness certificate to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy:
	Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.,



HSEP:14-FP02

HOT WORK PERMIT

Permit No. HSEP/CP/153:20 (TCN-05)

Permit No. & Date

Project & Unit:

Emergency Contact Nos:

BHEL Sub-contractor:

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Welder is trained and qualified with good attendance in on-the-job training		
2.	Area ensured safe and free from all hazards (explosives etc.) with barricading and safe inlet / exit		
3.	Proper ventilation and lighting provided (in case of dark hours).		
4.	Gas hoses are in good condition and not cut / leaking		
5.	Pressure gauges/Flash back arrestor (at both ends) provided and in working condition.		
6.	Gas pressure in cylinder is within limits and hydraulic test certificate is available		
7.	Gas cylinders are stacked vertically and not below the welding / cutting area. Regulator key is available with cylinder. Gas cylinders covered with shields to prevent falling splinters.		
8.	Power supply to welding machine is through ELCB of 30 mA rating, which is tested and found ok; Earthing is tested and found OK		
9.	Welding machine input/output cables, welding holder and weld return clamp (Holder) are insulated and in good condition.		
10.	In case of welding in enclosed / confined spaces, the integrity of the structure and supports are ensured, Gas Testing done and evacuation system ensured in place		
11.	Emergency STOP buttons are in working condition. Welder /Helper knows how to operate it.		
12.	Welder & Fitter trained to connect ground/work return clamps (Holder) to work place prior to energization of welding machine.		
13.	Personal Protective equipment Minimum applicable: safety helmet, safety goggles, welding helmet, safety (rubber) shoes, leather gloves, long sleeve and nose mask -provided		
14.	In case of pits, water removed from the pit and wood/rubber insulation provided.		
15.	Safety signboards / cautions are in place.		
16.	Adequate and Suitable nos. of applicable firefighting extinguisher provided.		
17.	Nearby combustible material removed. Housekeeping done.		
18.	All workers explained about the hazards		
19.	First aid in attendance.		
20.	Any other Precautions or Permits required (Height Work, Confined Space etc.), give details and attach		

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):
Signature:
Name: _____ Designation: _____

Site Safety Officer (Sub-Contractor):
Signature:
Name: _____ Designation: _____

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):
Signature:
Name: _____ Designation: _____

Site Safety Officer (BHEL):
Signature:
Name: _____ Designation: _____

Package-in-charge (BHEL):
Signature:
Name: _____ Designation: _____

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all kinds of Hot Work eg. Welding, cutting etc..
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work must be clearly indicated by the permittee.
4	Terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day only after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work, competency and fitness to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy:
	Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.,



HSEP:14-FP03

CONFINED SPACE WORK PERMIT

Permit No. & Date

Project & Unit:

Emergency Contact Nos:

BHEL Sub-contractor:

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Has the equipment been Isolated from Power/Steam/Air?		
2.	Has the equipment been Isolated from liquid or gases?		
3.	Has the equipment been de-pressurized &/or drained?		
4.	Has the equipment been Blanked/blinded or disconnected?		
5.	Has the equipment been water flushed &/or steamed?		
6.	Whether man ways open and ventilated?		
7.	Whether constant Inert gas flow arranged?		
8.	Whether mechanically ventilated and adequately cooled?		
9.	Whether 24 V lighting provided inside the confined space?		
10.	Whether Radiation sources removed?		
11.	Whether training on confined space provided to the individual / group?		
12.	Whether required PPEs (hand gloves, goggles, face shield, ear plug/muff, protective clothing etc.) used?		
13.	Whether Safety harness and Lifeline used?		
14.	Whether Dust/Gas/Air Line mask used?		
15.	Whether attendant with SCBA/Air mask available?		
16.	Whether grounded air Exhaust/Blower/ AC provided?		
17.	Whether Personal Gas alarm provided?		
18.	Whether communication Equipment Provided?		
19.	Whether rescue equipment/team available?		
20.	Whether firefighting arrangement done		
21.	Any other Precautions or Permits required (Height Work, Confined Space etc.), give details and attach		

Declaration: *All the points mentioned in the above checklist have been checked and found OK***Permit Receiver:**

Site Engineer (Sub- Contractor):
Signature: _____
Name: _____ Designation: _____

Site Safety Officer (Sub-Contractor):
Signature: _____
Name: _____ Designation: _____

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):
Signature: _____
Name: _____ Designation: _____

Site Safety Officer (BHEL):
Signature: _____
Name: _____ Designation: _____

Package-in-charge (BHEL):
Signature: _____
Name: _____ Designation: _____

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all confined space tasks, where injury can happen due to lack of oxygen, or chances of fire are there due to gas accumulation.
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work must be clearly indicated by the permittee.
4	Terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work, competency and fitness to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy:
	Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.,



HSEP:14-FP04

EXCAVATION WORK PERMIT

Project & Unit:

BHEL Sub-contractor:

Permit No. & Date

Emergency Contact Nos:

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1	Precautions taken for Underground Electrical Cable		
2	Precautions taken for Under / Above ground sewer/Drinking Water Line		
3	Precautions taken for Underground Telecommunication Line		
4	Precautions taken for Underground Product/Utility Line		
5	Precautions taken for Underground Fire Water Line		
6	Shoring / Shuttering / Sheet piling done to prevent collapse of excavation walls. Strength of Excavation wall ensured at all times		
7	Hard Barricading & Edge Protection provided		
8	Separate Safe Access for Man and Vehicle		
9	Lighting arrangement		
10	Banks Man Provided		
11	Required basic PPEs provided		
12	Slope Cutting/Benching Maintained		
13	Excavated soil / Construction Material / equipment kept away from the edge.		
14	First aid in attendance.		
15	Any other Precautions or Permits required (Height Work, Confined Space etc.), give details and attach		

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):	
Signature:	
Name:	Designation:

Site Safety Officer (Sub-Contractor):	
Signature:	
Name:	Designation:

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):	
Signature:	
Name:	Designation:

Site Safety Officer (BHEL):	
Signature:	
Name:	Designation:

Package-in-charge (BHEL):	
Signature:	
Name:	Designation:

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all excavation tasks 1.22 mtr or deeper
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work must be clearly indicated by the permittee.
4	Terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work, competency and fitness to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy:
	Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.,



HSEP:14-FP05

RADIATION WORK PERMIT DHA-10/NE/S/RT/KCP/RT/10 (TCN-05)		Permit No. & Date
Project & Unit:		Emergency Contact Nos:
BHEL Sub-contractor:		

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	All the persons at the site informed/removed from the area.		
2.	Area around the source of radiation cordoned off with the rope/chord.		
3.	Radiation warning symbol/boards displayed around radiography work on rope/chord.		
4.	Radiographer worn radiation badges during testing and is within safe limits.		
5.	Radiography camera and carrying case box having radiation symbol.		
6.	Radiation Survey Meter is in working condition, calibrated & within validity period.		
7.	Radiographer has valid certificate from BARC.		
8.	Blinking light provided on road during radiography (in dark hours).		
9.	Proper required Illumination provided		
10.	Safe access and working platform provided to conduct RT work		
11.	All the persons involved in Radiography work are aware of the hazard of radiation		
12.	Any other Precautions or Permits required (Height Work, Confined Space etc.), give details and attach		

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):	
Signature:	
Name:	Designation:

Site Safety Officer (Sub-Contractor):	
Signature:	
Name:	Designation:

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):	
Signature:	
Name:	Designation:

Site Safety Officer (BHEL):	
Signature:	
Name:	Designation:

Package-in-charge (BHEL):	
Signature:	
Name:	Designation:

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all activities in which there is danger of exposure to harmful radiation
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work must be clearly indicated by the permittee.
4	Terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work, competency and fitness to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy:
	Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.,



HSEP:14-FP06

LIFTING ACTIVITY WORK PERMIT

Permit No. & Date

Project & Unit:

Emergency Contact Nos:

BHEL Sub-contractor:

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

No.	Item	Yes	Not required / Remarks
1.	Crane used for lifting activity TPI tested, certified and approved for rated lifting		
2.	All lifting tackles, gears/appliances are tested and certified for lifting works.		
3.	Crane operator is trained and competent for lifting operation.		
4.	Lifting sling/ belt is protected against sharp edge of the jobs to be lifted.		
5.	Lifting hook is properly latched to prevent material falling over		
6.	Access and exit marked and without obstruction.		
7.	In case of lifting multiple materials at once, same are tied up with strong rope / material		
8.	Area below lifting activity barricaded to prevent movement		
9.	Minimum 2 guidelines have been provided for balancing and guiding jobs to be lifted.		
10.	Periphery area of crane booms as well as lifting job is barricaded and unauthorized/no-entry sign board posted.		
11.	Rigger and signal man is trained and competent for lifting work. Signal is clearly visible to the operator and understood		
12.	No lifting activity to be carried out during lightening, heavy wind/rain. No forecast of these conditions during work period		
13.	If scaffolding to be used during lift, scaffolding with valid tag available for use.		
14.	Add drawing /procedure etc. relevant for the lifting.		
15.	Any other Precautions or Permits required (Height Work, Confined Space etc.), give details and attach		

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):	
Signature: _____	
Name: _____	Designation: _____

Site Safety Officer (Sub-Contractor):	
Signature: _____	
Name: _____	Designation: _____

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Site Safety Officer (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Package-in-charge (BHEL):	
Signature: _____	
Name: _____	Designation: _____

Verified by Customer Representative (if applicable), Name: _____	Sign: _____	Date: _____	Time: _____
--	-------------	-------------	-------------

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all Heavy Lifting Activities that are either / all of the following: 1. Above 50 Tons; 2. Tandem Lifting; 3. Total Load exceeding 75% of capacity of crane; 4. Lift of unusual difficulty or geometry or rigging; 5. Lift over operating Units; 6. Any other Lift as decided by Site HSE / Erection
2	Job Safety Analysis (JSA) to be created for every Lift above 5 Tons.
3	This permit must be available at the work site all the times of the work.
4	Location and description of the work, and terms applicable must be clearly indicated by the permittee.
5	This permit shall be endorsed each day after checking all the compliance jointly by the contractor and BHEL safety.
6	Permit shall be issued for not more than 7 days including the issue date.
7	Permit shall be returned to the HSE Department of BHEL after completion of the job.
8	Before engaging anybody to work, competency and fitness to be ensured.
9	All safety precautions to be taken as per work site HSE plan.
10	Distribution of copy: Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.



HSEP:14-FP07

**LOCKOUT/TAGOUT (LIVE ELECTRICAL
MAINTENANCE) WORK PERMIT**

Permit No. & Date

Project & Unit:

Emergency Contact Nos:

Exact Location of Work: _____

Nature / Description of Work: _____

Duration of Work Execution *: From Date: _____ to Date: _____ Daily from _____ hrs. to _____ hrs.

Name of Sub-Contractor Performing the Work: _____

Name of Sub-Contractor's Site Engineer (Permit Requesting Authority): _____ Sign: _____

Name of Sub-Contractor's Package In-charge: _____ Sign: _____ Date: _____

The above described work will be done under all the safety precautions mentioned as under during the currency of the Permit.

Tag No.	Device to be Tagged / Locked I.D. No.	Device Location	Device Position OPEN / CLOSED - ON/OFF	Lock No.	Tag Lock Placed by Name/Sign - Date/Time	Tag / Lock Removed by Name/Sign - Date/Time

Declaration: All the points mentioned in the above checklist have been checked and found OK**Permit Receiver:**

Site Engineer (Sub- Contractor):
Signature:
Name: _____ Designation: _____

Site Safety Officer (Sub-Contractor):
Signature:
Name: _____ Designation: _____

Permit Issuer:

Engineer of Concerned Execution Department (BHEL):
Signature:
Name: _____ Designation: _____

Site Safety Officer (BHEL):
Signature:
Name: _____ Designation: _____

Package-in-charge (BHEL):
Signature:
Name: _____ Designation: _____

Verified by Customer Representative (if applicable), Name: _____ Sign: _____ Date: _____ Time: _____

(* Permit valid for 7 days, subject to daily renewal, and extension as per overleaf instructions / record formats)

Daily Work Area Condition Endorsement

Sl. No.	Date	Signature with Date & Time		Remarks
		Agency Safety	BHEL Safety	
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				

Permit Extension Beyond Initially Requested Hours

Sl. No.	Extension Period		Remarks	Signature with Date & Time			
	From..... (Date & Time)	To..... (Date & Time)		Agency Site Engineer	Agency Safety Officer	BHEL Site Engineer (PIA)	BHEL Safety Officer
1.							
2.							
3.							
4.							
5.							
6.							

TO BE SIGNED BY THE BHEL HSE & EXECUTION AFTER THE WORK IS OVER

Permit is here by returned after completing the job & ensuring safe removal of men and material.

Site Engineer, BHEL		Site HSE Engineer, BHEL	
Signature:		Signature:	
Name:		Name:	

General Instructions:

1	This Permit is required for all maintenance and erection activities with danger of electrocution from Live Electric Power
2	This permit must be available at the work site all the times of the work.
3	Location and description of the work, and terms applicable must be clearly indicated by the permittee.
4	This permit shall be endorsed each day after checking all the compliance jointly by the contractor and BHEL safety.
5	Permit shall be issued for not more than 7 days including the issue date.
6	Permit shall be returned to the HSE Department of BHEL after completion of the job.
7	Before engaging anybody to work, competency and fitness to be ensured.
8	All safety precautions to be taken as per work site HSE plan.
9	Distribution of copy: Original- Permittee, Duplicate –Department HOS, Contractor, Triplicate - Site HSE Dept.

**POWER SECTOR****Inspection of First Aid Box**FORMAT NO: **HSEP:14-F01**

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site:	
Name of Sub-Contractor:	
Inspected by:	
Date of Inspection:	

Number of employees in the site: - _____

Sl. No.	Item	No. Available	Remarks
1	No. of small sterilized dressings		
2	No of medium sized sterilized dressings		
3	No of large sized sterilized dressings.		
4	No of large sized sterilized burn dressings		
5	No of (15 grams) packets sterilized cotton wool		
6	No of pieces of sterilized eye pads in separate sealed packets.		
7	No of roller bandages 10 cm wide.		
8	No of roller bandages 5 cm wide.		
9	Whether tourniquet available		
10	Whether supply of suitable splints available.		
11	No of packets of safety pins.		
12	Whether kidney tray available		
13	Whether sufficient number of eye wash bottles, filled with distilled water or suitable liquid, clearly indicated by a distinctive sign which shall be visible at all times, available.		
14	Whether 4%-xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops available.		
15	Whether (60ml) bottle containing a two percent alcoholic solution of iodine available		
16	Whether (two hundred ml) bottle of mercurochrome (2 per cent) solution in water available.		
17	Whether 120ml bottle containing Sal volatile having the dose and mode of administration indicated on the label,		
18	Whether roll of adhesive plaster (6 cm X 1 meter) available		

**POWER SECTOR****Inspection of First Aid Box**FORMAT NO: **HSEP:14-F01**


REV NO.: 00

PAGE NO. 01 OF 02

Sl. No.	Item	No. Available	Remarks
19	No of rolls of adhesive plaster (2 cm X 1 meter)		
20	Whether snake bite lancet available.		
21	Whether (30 grams) bottle of potassium permanganate crystals available.		
22	Whether a pair scissors available		
23	Whether copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India available.		
24	Whether bottle containing 100 tablets (each of 5 grains) of aspirin available		
25	Whether Ointment for burns available		
26	Whether bottle of a suitable surgical anti-septic solution available		
27	Whether List of Contents pasted on First Aid Box along with respective expiry dates		

Signature of Subcontractor's Site I/C

Date:

	POWER SECTOR	FORMAT NO: HSEP:14-F02 REV NO.: 00 PAGE NO. 01 OF 02
	Health Check-Up	

Name of Site:	
Name of Sub-Contractor:	
Name of Employee:	
Age:	

History Of Past Illness	H/O Epilepsy:	
	H/O Drug Allergy:	
	H/O Diabetics/ Hypertension:	
	H/O Unconsciousness:	
Personal History		

EXAMINATION		OBSERVATION	
General Physical Examination			
Height			
Weight			
BMI			
Built And nourishment			
Pallor			
Temperature			
Chest Expansion	Inspiration	Expansion	
Lymph Node Enlargement			
Upper Limbs Strength & Function			
Lower Limbs Strength & function			
Spine Adequately flexible for the job concerned (Yes/No)			
Mental alertness and stability with good eye, hand and foot co-ordination.			
Ear, Nose, Throat			
Ear / Hearing			
Nose			
Throat			
Vision			
Left Eye	Right Eye		

**POWER SECTOR****Health Check-Up**FORMAT NO: **HSEP:14-F02**

REV NO.: 00

PAGE NO. 02 OF 02

EXAMINATION		OBSERVATION	
<u>Cardiovascular System Examination</u>			
Inspection			
Palpation	Pulse	BP	
Auscultation (Heart Sounds)			
<u>Respiratory System</u>			
Inspection	Respiratory Rate		
Palpation:			
Percussion			
Auscultation (Breath Sounds)			
<u>Examination of Abdomen</u>			
Inspection			
Palpation			
Auscultation (Bowel Sounds)			
Any Other			
Clinical Impression			

Signature of the examining doctor

Date:

**POWER SECTOR**
**HSE Induction / Regular / On-the-Job
Training Records**
FORMAT NO: **HSEP:14-F03**

REV NO.: 02

PAGE NO. 01 OF 01

Name of Site:					
Name of Sub-Contractor:					
Date of Training (dd/mm/yyyy):		Duration (Hrs)			
		From		To	
Name & Details of Trainer:					
Subject of Training	Induction		On-The-Job Training (Give details)		
Name of Training Co-ordinator:					

Sl. No.	Name	Designation	Organization	Signature

I certify that Training has been carried out as per HSEP04: HSE Procedure for Training & Awareness

Signature of Training Coordinator

Date:

**POWER SECTOR****Toolbox Talk**

FORMAT NO: HSEP:14-F04

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Sub-Contractors Name :	
Date :	

Topic	Name of person delivered Tool Box Talk	No. of Participants attended	Remarks

Signature of Site I/C of Subcontractor

Date:

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:14-F05

REV NO.: 00

Page 01 of 6

Name of subcontractor:	Report Month:

A) Accidents/Incidents Details: -

a	Lost time in Accidents	No. of incidents	Man Hours Lost	No. of People Involved	No. of person reported to Govt.		
	For the Month						
	Cumulative						
b	Minor Injuries						
	For the Month						
	Cumulative						
c	Fires	No. of Near-Misses	No. of First- Aid cases	No. of persons injured	No. of equipment damaged	No. of Fire reported Outside	
	For the Month						
	Cumulative						
d	Other mishaps not covered in a, b, c.	No. of Near-Misses	No. of First- Aid cases	No. of persons injured	No. of equipment damaged	Total near misses and First-Aid	
	For the Month						
	Cumulative						

B) Data for Man-hours worked:

Details	Value	Remarks if any
No. of people		
Man Hours worked		
O.T. Hours		
Total Man Hours		
Grand Total of man hours worked during the month(A+B)		
Cumulative man-hours (from _____ to _____): (Since commencing of operations)		

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:14-F05

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C) Status of Deployment of Work force, Safety Officers/Supervisors & Construction Medical Officer(s) & Electricians:

Description	Name	Qualification & Experience
Safety Officers		
Safety Supervisors		
Construction Medical Officer		
Nursing Staff.		
Electricians		
Scaffolding Inspectors		
T&P Inspectors		

D) Status of deployment of manpower for critical HSE activities:

(All height work and other hazardous activities to be actively supervised by trained personnel. Area to be divided in manageable sections to ensure effective supervision at all times. For example, multiple elevations in a structure can be divided among multiple supervisors)

Activity	Location	Shift Timings	Personnel deployed	Remarks
Height Work	Boiler Unit- (Level 1-3)			
	Boiler Unit- (Level 4-6)			
	ESP			
Housekeeping	Boiler Unit-			
	ESP Unit			
Others				

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Monthly Site HSE Report**

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E) Lifting Tools, Tackles, Equipment and Pressure Vessels:

Item	Nos. Deployed	Nos. Tested by competent person	Identification Nos. (Comma separated) (A)	Validities of Test Certificates (Comma separated – corresponding to column A)	Whether internal testing using Color Coding or similar system done
Winches					
Chain Blocks					
Wire Rope Slings					
Man Cages					
D-Shackles					
Air Compressors					
Crawler Cranes					
Mobile Cranes					
Hydra Cranes					
Hydraulic Jack					
Others					

F) Reverse Horns in Construction Vehicles:

Item	Nos. Deployed with serial numbers (Comma separated) (A)	Nos. Having Functional reverse horns	Inspection Dates (Comma separated corresponding to column A)
Transit Mixers			
Hydra Cranes			
Dumpers/Trippers			
Backhoes			
Other Vehicles			

G) ELCBs:

No. Of ELCBs provided with Serial Nos. (Comma separated) (A)	Nos. Functional	When They were last Tested (Comma separated corresponding to column A)

H) Electrical Earthing:

No. Of Earth resources with serial numbers and locations (Comma separated) (A)	Whether Double Earthing provided to all equipment	When they were last tested (Comma separated corresponding to column A)

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:14-F05

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I) Fire Extinguishers

Name & designation of person responsible for maintenance of Extinguishers at different locations :(Individual subcontractor's Safety Officers).

A. FIRE EXTINGUISHERS AT ERECTION SITE:

Type (Add more rows if required)	Sizes	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 TYPE				

B. FIRE EXTINGUISHERS AT SITE OFFICES & STORES:

Type	Size (Add more rows if required)	Qty + Serial numbers (Comma separated) (A)	Healthiness – Last checked dates (Comma separated corresponding to column A)	Locations (Comma separated corresponding to column A)
FOAM TYPE				
SODA TYPE				
DRY TYPE (DCP)				
CO2 TYPE				

J) Tie-Ups with Emergency Services

Service (Add more rows if required)	Name, location & distance from site	Emergency contact details	Remarks
Hospital with ICU and facilities for orthopedic, neurological etc. trauma			
Fire services			
Others:			

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Monthly Site HSE Report**

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K) Implementation of Checklist, Work Permits:

Item	Numbers During the Month	Major Deviations

Note:- Please attach photocopies of all filled Checklists & Work permits for that month.

L) Personal Protective Equipment Issued (Extend table for each subcontractor):

Item	Issued this Month	Nos. Issued up to the Month	Percentage of usage at Site (as per physical verification)
Name of subcontractor:			
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Hand Gloves			
Face shield			
Welder shield			
Nose Mask			
Reflective Jacket			
Other PPEs.			

M) Safety Observations by Subcontractor Executives- Observations package wise:

Topic	Date Of Programme	No. Of Participants	Level Of Participants

• Tool-Box talks on Safety:

Date	Tool Box Talk - No of Participants	Topic	Remarks

• Safety Induction Trainings:

Date	Safety Induction No. of Participants	Topic	Remarks

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Monthly Site HSE Report**

FORMAT NO: HSEP:14-F05

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N) Progress of Management Programmes at Site

SL	Description Of MPs	Annual Plan	Achievement In This Month	Cumulative Achievement
A. Environment Improvement Programme				
1	Plantation of Trees			
2	Installation of Scrap Bins			
3	Chemical Storage & Handling system			
B. Improvement of Working Environment				
4	Increasing LTI free days			
5	Air Quality Monitoring			
6	Water Quality Monitoring			
7	Illumination level Monitoring			

O) HR Information:

Designation	Total No. Inducted	Total no. of Induction Balance	Total no. of Gate Pass Issued	Total no. of Gate Pass Balance	Total no. of Gate Pass Cancelled	Medical Checkup Completed	Medical Checkup Balance

P) Rewards on Account of Good Safety Performance

Serial Number	Reward Issued to	Details of Reward Issued (Amount etc.)	Brief Reason

Note: Photos of Reward Functions to be attached

Q) Other Safety initiatives / Safety Activities conducted (with photos, if any):

Signature of Subcontractor Site In-charge

Signature of Subcontractor HSE Officer

**POWER SECTOR****Personal Protective Equipment Inspection**

FORMAT NO: HSEP:14-F06

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Item	Total Checked	Numbers Found in Order	Remarks
Safety Helmet			
Safety Shoes			
Full Body Harness			
Fall Arrestor			
Safety Nets			
Hand Gloves			
Face shield			
Welder shield			
Nose Mask			
Reflective Jacket			
Other PPEs (Specify)			

Signature of Site I/C of Subcontractor:

Date:


Format for Register of Issue and Receipt of PPEs

PAGE NO. 01 OF 1

Site:

Subcontractor:

[illegible]

	POWER SECTOR	FORMAT NO: HSEP:14-F07 REV NO.: 00 PAGE NO. 01 OF 01
	Inspection Of T&Ps	

Name of Site :	
Name of Sub-Contractor :	
Date of Inspection :	

Sl.No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs / overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	
Signature-Subcontractor HSE Officer		Signature-Subcontractor Site In-charge



POWER SECTOR

Inspection Of Cranes

FORMAT NO: HSEP:14-F08

REV NO.: 00

PAGE NO. 01 OF 01

Name of Site :

Name of Sub-Contractor :

Inspected by :

Date of Inspection:

Crane Reg. No (Make/Model)

Name of Driver/Operator

Sl.no.	Description	Observation	Measures
1	Valid Driving license		
2	Hook & Hook Latch		
3	Over Hoist limit switch		
4	Boom limit switch		
5	Boom Angle Indicator		
6	Boom limit cutoff switch		
7	Condition of Boom		
8	Condition of ropes		
9	Number of load lines		
10	Size and condition of the slings		
11	Stability of the cranes		
12	Soil Condition		
13	Swing Break And Lock		
14	Proper Break And Lock		
15	Hoist Break And Lock		
16	Boom Break And Lock		
17	Main Clutch		
18	Leakage in Hydraulic Cylinders		
19	Out riggers fully extendable		
20	Tyre pressure		
21	Condition of Battery And Lamps		
22	Guards of moving and rotating parts		
23	Load chart provided		
24	Number and position of pedant ropes		
25	Reverse Horn		
26	Load Test Details		
27	Operator's fitness		
28	Pollution under control certificate		
29	Fire extinguisher of appropriate type.		
30	Training of the operator		

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection Of Winches**

FORMAT NO: HSEP:14-F09

REV NO.: 00

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Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Winch Reg. No (Make/Model) _____

Name of Operator _____

Sl. No.	Description	YES	NO	NA	Remarks
1	Has the copy of Third Party Inspection certificate been provided in winch machine shed?				
2	Is safe operating instructions displayed near winch?				
3	Is winch machine operator experienced enough to operate the winch machine?				
4	Is the winch machine operated by someone other than the winch machine operator?				
5	Is there guard provided in all moving parts like wheel and motor's shaft?				
6	Will it protect against unforeseen operational contingencies?				
7	Are brakes, clutch and locking arrangement working properly?				
8	Has it been ensured that the guard does not constitute a hazard by itself?				
9	Are the cranks and the connecting rods protected by guardrails?				
10	Is there provision for fully covered shed with wooden plank roof?				
11	Is wire rope free from any kind of damage or wear and tear?				
12	Is split pin provided for the protection of clutch and brake locking arrangement?				
13	Is pulley inspected by competent person and certified before use?				
14	Is pulley free from any wear and tear visually?				
15	Is winch rope barricaded with clipsheet for the protection of rope and person?				
16	Is the wire rope lubricated by cardium oil?				
17	Is there any friction in wire rope which may damage the wire rope rather than the rolling parts?				
18	Is there any oil leakage in the hydraulic system of the winch machine?				
19	Has it been ensured that the guard will not cause discomfort or inconvenience to operator?				
Total NO					
Total NA					
		% Compliance			

Signature of Site I/C of Subcontractor: _____

Date: _____



POWER SECTOR

Inspection of Height Working

FORMAT NO: HSEP:14-F10

REV NO.: 00

PAGE NO. 01 OF 2

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection:	

Sl. No.	Descriptions	Observation (Yes/No)	Remarks
A. General			
1	All the workers have been explained safe work method?		
2	Adequate illumination has been ensured.		
3	Work area inspected prior to the start of the work.		
4	Is the work area barricaded to prevent fall and platforms are of adequate strength (bamboo, jute / plastic ropes not to be used).		
5	The temporary work platforms & structures for height work including those used in Boiler structures, water walls, ESP, Powerhouse are fully barricaded with railings (as per IS 3696)		
6	Fabricated makeshift arrangements are checked for quality and type of material welding, anchoring etc.		
7	Are floor gaps, permanently covered and barricaded		
8	Area below the work place barricaded, particularly below hot work.		
9	Workers provided with bags /box to carry bolts, nuts and hand tools		
10	Arrangement for fastening hand tools made.		
11	All work platforms ensured to be of adequate strength and ergonomically suitable.		
12	Work at more than one elevation at the same segment is restricted.		
13	An established communication system has been established and explained to the workers.		
B. Access/Egress			
1	Walkways provided with handrail, mid-rail and toe guard?		
2	All checkered plates, gratings properly welded/ bolted?		
3	Are ladders inspected and they are in good condition?		
4	Are ladders spliced?		
5	Are ladders properly secured to prevent slipping, sliding or falling?		
6	Stairs erected above and below 1 tier column for safe access?		
7	Do side rails extend 36" above top landing?		



POWER SECTOR

Inspection of Height Working

FORMAT NO: HSEP:14-F10

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Sl. No.	Descriptions	Observation (Yes/No)	Remarks
8	Are built up ladders constructed of sound materials?		
9	Are rugs and cleats not over 12" on center?		
10	Metal ladders not used around electrical hazards.		
11	Proper maintenance and storage.		
12	Ladders placed at right slope.		
13	Ladders / staircases welded/ bolted properly.		
14	Any obstruction in the stairs.		
15	Are landing provided with handrails, knee rails, toe boards etc.?		
16	Whether ramp is provided with proper slope.		
17	Proper hand rails / guards provided in ramps.		
C. Housekeeping			
1	Walkways, aisles & all overhead workplaces cleared of loose material.		
2	Is any nut bolt/scrap left on beam/column?		
3	Flammable materials, if any, are cleared.		
4	All the de shuttering materials are removed after de shuttering is done.		
5	Platforms and walkways free from oil/grease or other slippery material.		
6	Collected scrap are brought down or lowered down and not dropped from height.		
D. PPE And Safety Devices			
1	Use of safety helmet, safety belts ensured for all workers		
2	Anchoring points provided at all places of work.		
3	Common lifeline provided wherever linear movement at height is required.		
4	Safety nets are use wherever required.		
5	Proper fall arrest system is deployed at critical workplaces.		
6	Crawler boards/Safety system or works on fragile roof are used.		
7	Is man-lift being used for personnel lifting?		
8	Does man basket / personnel lift system has an independent lifeline and all occupants safety harnesses connected to it with rope grab?		

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR**FORMAT NO: **HSEP:14-F11**

REV NO.: 00

PAGE NO. 01 OF 02

Inspection of Welding and Gas Cutting

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Welding				
Sl.no.	Description	Y e s	N o	Remarks
1	Is electric connection given through 30 mA ELCB/RCCB to welding m/c?			
2	Is welding machine more than 10 years old?			
3	Is there provision of fuse and is it bypassed?			
4	Is electric cable fitted properly in junction box on m/c?			
5	Is electrical cable free from joints?			
6	Are the joints attached firmly & insulated with tape?			
7	Is double earthing given to body of m/c?			
8	Is the physical condition of the m/c good?			
9	Is ON/OFF switch connected to the m/c is working and in good condition?			
10	Are indication lamps on m/c working?			
11	Is the electrode holder in good condition?			
12	Are the cables of the welding m/c lugged & tight properly?			
13	Is cable to welding machine terminal joint loose / burnt / glowing?			
14	Are return lead connected properly (Rod, Angle, Channels shall not be used)			
	Total No of NO			
	Total No of YES			

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection of Welding and Gas Cutting**FORMAT NO: **HSEP:14-F11**

REV NO.: 00

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Gas Cutting

Sl.no	Description	Yes	No	Remarks
1	Are Cylinders kept on trolleys?			
2	Physical condition of Gas cylinders Good?			
3	Is there Oil/Grease on valve of the cylinder?			
4	Are pressure regulators in good condition?			
5	Condition of hose pipe OK?			
6	Are hose pipe clamped with hose clip?			
7	Is flash back arrestor & NRV fitted on torch both for O2 and LPG cylinder?			
8	Is nozzle of the torch cleaned?			
	Total Number of NO			
	Total No of YES			
	% Compliance			

Signature of Site I/C of Subcontractor:

Date:

**POWER SECTOR****Inspection Of Electrical Installation**

FORMAT NO: HSEP:14-F12

REV NO.: 00

PAGE NO. 01 OF 02

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Contents	Yes/No	Remarks
A	Cable		
1.	Whether the condition of cable is checked?		
2.	Are cables received from other sites checked for insulation resistance before putting them into use?		
3.	Are all main cables taken either underground / overhead?		
4.	Are welding cables routed properly above the ground?		
5.	Are welding and electrical cables overlapping?		
6.	Is any improper joining of cables/wires prevailing at site?		
B	DBs/SDBs		
1.	Is earth conductor continued up to DB / SDB?		
2.	Whether DBs and extension boards are protected from rain / water?		
3.	Whether DB and extension board have separate MCB/ELCB		
4.	Is there any overloading of DBs / SDBs?		
5.	Are correct / proper fuses & CBs provided at main boards and sub-boards?		
6.	Is energized wiring in junction boxes, CB panels & similar places covered all times?		
C	ELCB		
1.	Whether the connections to all equipment are routed through individual ELCBs?		
2.	Is sensitivity of each ELCB maintained at 30 mA?		

**POWER SECTOR****INSPECTION OF ELECTRICAL INSTALLATION**

FORMAT NO: HSEP:14-F12


REV NO.: 00

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Sr. No.	Contents	Yes/No	Remarks
3.	Are the ELCB numbered and tested periodically & test results recorded in a logbook countersigned by a competent person?		
D	Grounding		
1.	Is natural earthing ensured at the source of power (main DB at Generator or Transformer)?		
2.	Whether the continuity and tightness of the earth conductor are checked?		
3.	Mention the gauge of the earth conductor used at the site.		
4.	Mention the value of Earth Resistance.		
E	Electrically operated Machines or Accessories.		
1.	Whether the plug top is provided everywhere.		
2.	Are all metal parts of electrical equipment and light fittings / accessories grounded / double earthed?		
3.	Is there any shed or cover for welding machines?		
4.	Are halogen lamps fixed at proper places?		
5.	Are portable power tools maintained as per norms?		
6.	Any other information:		

Signature of Site I/C of Subcontractor:

Date:


	POWER SECTOR	FORMAT NO: HSEP:14-F13 REV NO.: 00 PAGE NO. 01 OF 01
	Inspection of Elevator	

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

Sr. No.	Description	Remarks
1.0	Name of equipment	
2.0	Basic Information of equipment	
2.1	Specification	
2.2	Sr. No. of equipment	
2.3	Make	
2.4	Year of manufacture	
3.0	Major repairs/overhauls(Furnish details of work carried out)	Date(s) of major repair/overhaul
3.1		
3.2		
3.3	Repairs carried out at site	
4.0	Any performance test conducted	Yes/No
5.0	Document Submitted	Yes/No
6.0	Manufacturer's test / guarantee certificate	Available/ Not available
7.0	Performance test	Done/ Not Done
8.0	Acceptance Norms	
9.0	Committee Observations	
10.0	Date of next review (if accepted)	

Signature-Subcontractor/ Subcontractor's Safety Officer


Signature-Site Safety Officer (BHEL)

	POWER SECTOR	FORMAT NO: HSEP:14-F14 REV NO.: 00 PAGE NO. 01 OF 2
	HSE Penalty Format	

Sub: MEMO for Penalty for non-compliances in Safety and Fabrication Quality requirement

Following lapse (tick marked) was observed and penalty is imposed as stated at the bottom of this memo. It is requested that such occurrences may please be avoided in future.

S. No	Nature of Non - Compliance	Penalty (in Rs.)	Remarks
A. PPEs			
1.	Not wearing safety helmet / wearing without chin straps	500	Per Person/ day
2.	Not Wearing safety shoes	500	Per Person/ day
3.	Not wearing gloves, nose masks where required	350	Per Person/ day
4.	Not using grinding goggles while doing grinding operations	500	Per Person/ day
B. Height Work			
1.	Not providing Lifelines for height work	1000	Per location per day
2.	Not ensuring barricading of working platforms	1000	Per location per day
3.	Not using temporary platform during work at height	1000	Per case per day
4.	Not wearing safety belt while working at height (> 2 meters) or not anchoring to lifeline	2000	Per Person/ day
5.	Not providing proper barricades (caution tape at 2 elevations)	500	Per location per day
	Use of mobile phones by Height worker / Crane / Hydra Operator	1000	Per case per day
C. Electrical			
1.	Not using 24 V supply for lighting in confined spaces	500	Per case per day
2.	Lack of Electrical Earthing	2000	Per case per day
3.	Improper earthing of welding & Other electrical Machines. Earth resistance not OK	500	Per Machine per incidence
4.	Electrical plug not used for connection/ hand machines	500	Per connection per incidence
5.	Unsafe electrical practice like not installing ELCB/ RCCB	500	Per case per day
6.	Using frayed/ broken welding cables	500	Per machine per week
D. Lifting			
1.	Use of lifting equipment without having valid Third Party Test certificate	5000	Per equipment per seven days
2.	Lifting hooks without latches	500	Per hook per day
3.	Using damaged slings or not slinging properly	2000	Per event Per T&P
4.	Lifting cylinders without cage or rolling of cylinders	500	Per Event per incidence
5.	Non removal of scrap from platforms	1000	Per Event Per location per 7 days
E. Hot Work / Cylinder Handling			
20.	Gas cutting without flash back arrestor	2000	Per machine per incidence
21.	Gas cutting at height without sheet below	500	Per event
22.	Not keeping gas cylinders vertically / in trolley on ground	500	Per event
23.	Gas cutting with damaged hose pipes	500	Per event
	Not covering welding cylinder with top cover	500	Per event
F. Construction Vehicles			
24.	Not having valid driving license for the type of vehicle/ T&P	2000	Per driver per event
25.	Two wheeler entry in construction area	500	Per vehicle
26.	Using Hydra for material movement at site in unsafe manner	1000	Per case
27.	Using Two Hydra in Tandem for material movement	2000	Per case
28.	Vehicles, Hydras, Cranes, Dumpers and Earth Movers not having automatic back horns linked to gear	1000	Per Equipment per day
29.	Not using guide rope while moving material using Hydra or Crane	1000	Per event
30.	Violating speed limit during vehicle movement	1000	Per event

	POWER SECTOR	FORMAT NO: HSEP:14-F14 REV NO.: 00 PAGE NO. 02 OF 2
	HSE Penalty Format	

	Nature of Non - Compliance	Penalty in Rs.)	Remarks
Engineering / Administrative Controls / General			
31.	Major Accident – Victim not reporting for work within 48 hours – resulting in partial loss in earning capacity & termination / demotion in employment	200000	
32.	Fatal Accident/Accidents Resulting in total Loss in Earning Capacity #	500000	Per victim#
33.	Unsafe Act in violation of standards / clauses of this document	500-5000	Per case
34.	Activity carried out without safety work permit where applicable	2000	Per person per event
35.	Using untrained / unqualified personnel for hazardous work	2000	Per event
36.	Not maintaining proper hygiene in canteen as per BOCW	1000	Per event

or as deducted by customer, whichever is higher.

For repeated **major and** fatal incidents under the same subcontractor for the same package in the same Unit, the subcontractor will pay 2 times the penalty compared to previously paid

Details (if any) related to non- compliance (Name of persons, Nature of deficiency, etc.)

Penalty imposed:

1, Rate as per above chart _____

2. No. of Persons/ machine/ event/ labor _____

3. Total Penalty= 1. X 2. = _____

BHEL Personnel:

Signatures:

Name _____

Attachments: Photographs & Documentary proof (if available) for violation

Distribution: 1 Copy: to Sub- contractor Site In-charge,
1 Copy to Site Construction Manager (BHEL)

**POWER SECTOR****Format for Initial Verification of PPE's & Lifting Tools & Tackles**

FORMAT NO: HSEP:14-F15

REV NO.: 00

PAGE NO. 01 OF 1

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

S. No	Particulars (Serial Number, make, model of PPE, T&P)	Accepted / Rejected	Remarks
Checked (Name & Sign. Of Subcontractor HSE Officer)		Verified (Name & Sign. Of Subcontractor Site In-charge)	

**POWER SECTOR****Format for Inspection of Labor Colony**

FORMAT NO: HSEP:14-F16

REV NO.: 00

PAGE NO. 01 OF 1

Name of Site :	
Name of Sub-Contractor :	
Inspected by :	
Date of Inspection :	

S. No	Particulars	No	Yes	Comments
1	Sufficient living space ensured for each occupant with Kitchen area			
2	Area cleanliness ensured through regular cleaning			
3	Toilet facility sufficient for all occupants available, in order with adequate lighting, cleaned regularly and in hygienic condition			
4	Washing facilities available with adequate water supply			
5	Availability of sufficient drinking water in protected tanks with weekly tank cleaning and source tested annually as per IS10500 ensured			
6	Adequate drainage to remove waste and rain water, no flooding			
7	"Unsafe for Drinking" posted near accessible non-potable water and sources; posted in language of occupants or universal symbol			
8	Prevention of mosquitoes, flies, and rodents in immediate housing area through insecticide sprays if required			
9	Electricity provided & electrical connections safety ensured			
10	Fans, Coolers / Quilts, Heaters provided as required to cater to weather conditions along with adequate electricity supply			
11	Houses Walls and roof tight and solid; floors rigid and durable, with smooth, cleanable finish in good repair			
12	Availability of nominal rate ration / common use items shop within / nearby the colony			
13	Emergency medical plan developed: (A) Potential injuries determined (B) Local EMS response determined (C) Qualified first-aid person on site, if required			
14	Emergency plans posted where employees gather			
15	Transportation to nearest suitable facility			

Any other checks:

Remarks:		Name & Sign. Of Subcontractor HSE Officer		

FORMAT NO: HSEP:14-F17

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Name of Site:

Name of Subcontractor:

[illegible]

**POWER SECTOR**
**Format for Maintaining Records of E-waste
Handled / Generated**

FORMAT NO: HSEP:14-F18

REV NO.: 00

PAGE NO. 01 OF 1

(Generated Quantity in Metric Tons (MT) per year)

Site		
Subcontractor		
Date		
Types & Quantity of e-waste handled/generated**	Category	Quantity
	Item Description	
Types & Quantity of e-waste stored	Category	Quantity
	Item Description	
Types & Quantity of e-waste sent to collection center authorized by producer/dismantler/recycler/refurbisher or authorized dismantler/ recycler or refurbisher **	Category	Quantity
	Item Description	
Types & Quantity of e-waste transported*	Category	Quantity
	Item Description	
Name, address and contact details of the destination		
Types & Quantity of e-waste refurbished*	Category	Quantity
	Item Description	
Name, address and contact details of the destination of refurbished materials		
Types & Quantity of e-waste dismantled*	Category	Quantity
Name, address and contact details of the destination		
Types & Quantity of e-waste recycled*	Category	Quantity
Types & Quantity of materials recovered	Item Description	
	Quantity	
Name, address and contact details of the destination		
Types & Quantity of e-waste sent to recyclers by dismantlers	Category	Quantity
	Item Description	
Name, address and contact details of the destination		
Types and Quantity of other waste sent to respective recyclers by dismantlers / recyclers of e-waste	Category	Quantity
	Item Description	
Types and Quantity of e-waste treated & disposed	Category	Quantity
	Item Description	
Name, address and contact details of the destination		

Signature of Subcontractor Site In-charge:

Date

**POWER SECTOR****Format for Maintaining Records of Hazardous Waste at the Facility**FORMAT NO: **HSEP:14-F19**

REV NO.: 00

PAGE NO. 01 OF 1

1. Name of Site:
2. Name of the Subcontractor:
3. Date:
4. Description of hazardous waste:

Physical form with description	Chemical form	Total volume and weight (in kg.)

5. Description of storage and treatment of hazardous waste:

Date	Method of storage of hazardous wastes	Date	Method of treatment of hazardous wastes

6. Details of transportation of hazardous waste:

Name & address of consignee of package	Mode of packing/of the waste for transportation	Mode of transportation to site of disposal	Date of transportation

7. Details of disposal of hazardous waste:

Date of disposal	Concentration of hazardous material in the final waste form	Site of disposal (identify the location on the relevant layout drawing for reference)	Method of disposal	Persons involved in disposal

8. Data of environmental surveillance:

Date of measurement	Analysis of ground water			Analysis of soil samples			Analysis of air sampling			Analysis of any other samples (give details)
	Location of sampling	Depth of sampling	Data	Location of sampling	Depth of sampling	Data	Location of sampling	Data		

9. Details of the hazardous wastes reused and recycled:

Date	Total quantity of hazardous waste generated	Details of hazardous waste minimization activity	Material received	Final quantity of waste generated	Net reduction in waste generation quantity and percentage

Signature of Subcontractor Site In-charge:

Date:

**POWER SECTOR****HSE Audit / Inspection Checklist-cum-Compliance Report**

FORMAT NO: HSEP:14-F20

REV NO.: 00

PAGE NO. 01 OF 3

PROJECT: _____

CONTRACTOR: _____

DATE: _____

OWNER : _____

INSPECTION BY: _____

Note : write 'NA' wherever the items is not applicable

Item	Y e s	N o	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Passageways and walkways clear				
General neatness of working area				
Other				
PERSONNEL PROTECTIVE EQUIPMENT				
Goggles; shields				
Face protection				
Hearing protection				
Respiratory masks etc.				
Safety belts				
Other				
EXCAVATIONS / OPENINGS				
Openings properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				
WELDING, CUTTING				
Gas cylinders chained upright				
Cable and hoses not obstructing				
Fire extinguisher (s) accessible				
Others				
SCAFFOLDING				
Fully decked platforms				
Guard and intermediate rails in place				
Toe boards in place				
Adequate shoring				
Adequate access				
Others				
LADDER				
Extension side rails 1 m above				
Top of landing				
Properly secured				
Angle + 70° from horizontal				
Other				

**POWER SECTOR****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:14-F20

REV NO.: 00

PAGE NO. 02 OF 3

HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaf OK				
Condition of slings, chains, hooks OK				
Inspection & maintenance log maintained				
Outriggers used				
Signals observed and understood				
Qualified operators				
Others				
MACHINERY, TOOLS & EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspection and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Other				
TEMPORARY FACILITIES				
Emergency instructions posted				
Fire extinguishers provided				
Fire-aid equipment available				
General neatness				
Others				
FIRE PREVENTION				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas.				
Hydrants				
Clearance				
Others				
ELECTRICAL				
Proper wiring				
ELCB's provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Other				
HANDLING & STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguisher nearby				
Other				

**POWER SECTOR****HSE Checklist-cum-Compliance Report**

FORMAT NO: HSEP:14-F20

REV NO.: 00

PAGE NO. 03 OF 3

WORKING AT HEIGHT				
Safety nets				
Safety belts				
Safety helmets				
Anchoring of safety belt to the life line rope				
ENVIRONMENT				
Lubricant waste/engine oils properly dispose.				
Waste from Canteen, offices, sanitation etc. disposed properly.				
Disposal of surplus earth, stripping materials, expired batteries, oily rags and combustible materials done properly.				
HEALTH CHECKS				
Hygienic conditions at labor camps O.K.				
Availability of first-aid facilities				
Proper sanitation at site, office & labor camps.				
Arrangement of medical facilities.				
Measures for dealing with illness.				
Availability of potable drinking water for workmen & staff.				
Provision of crèches for children.				

Signature of Subcontractor Site In-charge:

Date:

**POWER SECTOR****Format for Inspection of Illumination / Lux Levels**

FORMAT NO: HSEP:14-F21

REV NO.: 00


PAGE NO. 01 OF 1

Name of Site :					
Name of Sub-Contractor :					
Inspected by :					
Date of Inspection :					
Details of Lux Meter Used for Illumination Checking					
Serial Number		Last inspection Date		Inspection Due Date	

S. No	Location	Applicable Lux Value	Measured Lux Value	Comments
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Any other checks:

Remarks:		Name & Sign. Of Subcontractor HSE Officer		

	POWER SECTOR	FORMAT NO: HSEP:14-F22 REV NO.: 00 PAGE NO. 01 OF 2
	Format for Incident Reporting	

Type of incident: Fatal/Major//Fire/Property damage (Tick what is applicable)

1	Name Of Site		3	Activity Area	
2	Scope Of Work		4	Name Of Contractor	
			5	NAME & DESIGNATION OF BHEL ACTIVITY I/C	
6	Date & Time Of Accident		7	Date Resumed	
8	No. Of Work-Days Lost by Victim (If Duty Not Resumed, Give Estimated Figure)				
9	No. Of Man-hours Lost By Others				
10	Personal Details Of Injured and/or Details Of Materials/Equipment/ Property Damaged				
Name			Name Of Material / Equipment / Property		
Period Of Employment					
Age	Yrs.	Sex	Male/Female	Estimated Cost	Actual Cost
Marital Status		Single/ Married			
Occupation				Nature Of Damage	
Part Of Body Injured					
Nature Of Injury					
Agency (Object / Equipment / Substance) Most Responsible For Causing Accident / Injury / Damage					
12	Person (Name & Designation) With Most Control Over Agency (Object / Equipment / Substance) Causing Accident Injury / Damage				
13	Describe Clearly How the Accident Occurred (Use Additional Sheet, If Required)				

**POWER SECTOR****Format for Incident Reporting**

FORMAT NO: HSEP:14-F22

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PAGE NO. 02 OF 2

Analysis

14	What Acts and/or Conditions Contributed Most Directly to This Accident	
15	What Are the Basic Reason for The Existence of These Acts and/or Condition?	
16	What Corrective Actions Have Been Taken to Prevent Accident Recurrence?	
	Date:	Signature Of Site HSE Coordinator
17	Comments of Head/Sox	
	Date:	Signature Of Head/SOX

FORMAT NO: HSEP:14-F23

Format for Incident Recording

PAGE NO. 01 OF 1

[illegible]




Tender no. PSER:SCT:NKP-E2053:20 (TCN-05)
POWER SECTOR

Format for Monthly HSE Planning & Review


FORMAT NO: **HSEP:14-F30**
REV NO.: 00
PAGE NO. 01 OF 3

Note: This is a template and can be modified in consultation with BHEL

Name of the Site		Name of the Subcontractor	
Scope of Work		Date	
PART- A: PLAN OF HSE ACTIVITIES FOR THE MONTH OF.....		PART-B: REVIEW ON	
SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
1	Availability of First Aid Box at Required Places and Inspection thereof as per Format: Fo1	Areas 1.	
2	Health check-up as per Format: Fo2	Health check-up for Nos 1. New inductees 2. Drivers & Operators 3. Workers in following high risk areas: a. ...	
3	Induction training of newly joined workers as per Format: Fo3	Minimum No. of workers:	
4	Toolbox talks (TBT) conducted before start of work as per Format: Fo4	Locations of TBTs & No. of workers 1. ...	
5	PPE usage and issue as per Format: Fo6		
6	Inspection of T&Ps as per Format: Fo7	List of T&Ps to be inspected 1.	
7	Identification & Inspection Status of T&Ps as per Format: Fo8		
8	Inspection of Cranes & Winches as per Format: Fo9	List of Cranes & Winches & Nos. 1. ...	
9	Inspection of Height Working as per Format: F10	Areas: 1. ...	
10	Inspection of Welding & Gas Cutting operations as per Format: F11	Areas: 1. ...	
11	Inspection of Electrical Installations as per Format: F12	Locations: 1. ...	
12	Inspection of Elevators (as applicable) as per Format: F13	Locations: 1. ...	
13	Inspection of Excavation as per Format: F13E	Locations: 1. ...	

	POWER SECTOR	FORMAT NO: HSEP:14-F30 REV NO.: 00 PAGE NO. 02 OF 3
	Format for Monthly HSE Planning & Review	

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
14	Job Safety Analysis as per Format F32B	Activities: 1. ...	
15	Regular Job Specific Training (Re-training) for workers involved in hazardous activities	Topics/ Hazards & No. of workers 1. ...	
16	Mass housekeeping (HK) drive in work areas	Areas 1. ...	
17	Vertigo Test of Height workers	Minimum No. of workers:	
18	Deployment of qualified HSE Officers as per contract	Location(s) & Nos. 1. ...	
19	Deployment of qualified HSE Stewards as per contract	Location(s) & Nos. 1. ...	
20	Deployment of Safety tools & Equipment (Safety Nets, Lifelines, Fall arrestors, Man-cages, flashback arrestors, scaffolding etc.)	Tool/ Equipment & Location 1. ...	
21	Safety Walks by site in charge of agency (4 -Weekly once)	Dates:	
22	Safety walks by departmental head (8-Weekly twice)	Dates:	
23	Availability/ deployment of Safety posters/ placards/ signage at strategic locations	Locations: Nos. 1. ...	
24	Provision of clean drinking water sources for workers	Locations: Nos. 1. ...	
25	Provision of toilets for workers (separate for male & female workers)	Locations: Nos. 1. ...	
26	Rest sheds for workers during lunchtime, rain, dust storm etc.	Locations: Nos. 1. ...	
27	Availability of following in Labor colony	1. Clean drinking water 2. Toilets 3. Cleanliness & Hygiene 4. Grass cutting, 5. Fogging 6. Electrical Inspection ...	

	Tender no. PSEP-SCT:NKP-E2053:20 (TCN-05) POWER SECTOR	FORMAT NO: HSEP:14-F30 REV NO.: 00 PAGE NO. 03 OF 3
	Format for Monthly HSE Planning & Review	

SN.	Description of HSE Activity & Formats	Plan & Targets for the month	Review
28	Availability of dust/ waste bins at various locations	Locations: 1. ...	
29	Availability of Ambulance (individual/ joint) in each shift	Ambulance No.	
30	Availability of emergency vehicle in each shift	Emergency vehicle	
31	Deployment/ Availability of tested Fire Extinguishers	Locations & Nos. 1. ...	
32	Tree plantation	Locations & Nos. 1. ...	
33	Waste disposal & Scrap Bins	Locations 1. ...	
34	Illumination checks	Locations 1. ...	
35	Safety award function: 1. Display of good practices Award presentation	Minimum 1 per month	
36	Submission of Daily Reports as per Format No.F31A	Daily Reports (Night & Day Shifts)	

PLAN		REVIEW	
<u>Agency</u> Name: Sign: Date:	<u>BHEL</u> Name: Sign: Date:	<u>Agency</u> Name: Sign: Date:	<u>BHEL</u> Name: Sign: Date:

**POWER SECTOR****Job Safety Analysis Format**

FORMAT NO: HSEP:14-F32B

REV NO.: 00

PAGE NO. 01 OF 1

Name of the Site	
Name of the Subcontractor	
Activity, Area	

HAZARDS					PRECAUTIONS	

(Name)	Submitted By (Agency HSE)		Reviewed By (BHEL Execution)		Approved By (BHEL HSE)	
(Sign)						
(Date)						

**POWER SECTOR- HQ**

Tender No PSEER.SCT.NKP-E2053:20 (TCN-05)

Checklist for Evaluation of HSE Performance

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 01 OF 3

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
1a	Induction training for new workers conducted through audio-visual medium & documented ?	M	1	Induction Training Records
1b	Tool box talk conducted regularly as per plan, and documented?	M	1	Toolbox Talk Records
1c	Contractor in charge and safety in charge attended safety meetings?	M	2	Minutes of Meeting
1d	Whether observations in safety meetings are complied before next meeting?	M	2	-do-
1e	Preparation and submission of Monthly HSE report within stipulated time	M	1	Report submission date
1f	Preparation and submission of Incident/near-miss report and RCA Report (as applicable) within stipulated time	M	1	Incident/ Near Miss Records
1g	Carrying out Inspections and submission of Inspection reports within stipulated time	M	1	Inspection Records
1h	Regular Job Specific Training ensured for High Risk Workers (through audio-visual medium) as per plan	M	1	Training & Attendance Records
2a	Whether the contractor is registered under BOCW	M	2	BOCW Registration Certificate
2b	Availability of Qualified safety officer (1 for every 500 labour)	M	2	Safety Officer qualification & experience records
2c	Availability of Qualified safety supervisor (1 for every 100 labour)	M	2	Safety Officer qualification & experience records
2d	All the workers are provided and using safety helmets and safety shoes/gum boots	M	2	PPE Issue Records, Inspection/ non-conformity records
2e	Housekeeping done on regular basis and scrap removal at site	M	1	Housekeeping records, Inspection/ non-conformity records
2f	Usage of Goggles/Face shields and Hand gloves for gas cutter and grinders		1	PPE Issue Records, Inspection/ non-conformity records
2g	Wall openings & floor openings are guarded?		1	Inspection/ non-conformity records
2h	Adequate illumination provided in all working area?		1	Inspection/ non-conformity records
2i	Safety posters, sign boards and emergency contact numbers in all prominent location are displayed?		1	Inspection/ non-conformity records
2j	Availability of automatic reverse horns, Main horn, hook latches for Vehicles, mobile cranes, Hydras		1	Inspection/ non-conformity records
2k	Ban of carrying mobile phones to work place is implemented for workers		1	Inspection/ non-conformity records
2l	Availability of Tags & Inspection Certificates for Cranes of all capacities		1	Master T&P List with internal & external test details
2l.2	Availability of Tags & Inspection Certificates for Winches of all capacities		1	Master T&P List with internal & external test details
2l.3	Availability of Tags & Inspection Certificates, color coding for Chain pulley blocks		1	Master T&P List with internal & external test details
2l.4	Availability of Tags & Inspection Certificates for Vehicles - Trailers, Dozers, Dumpers, Excavators. Mixers etc.		1	Master T&P List with internal & external test details
2l.5	Availability of Tags & Inspection Certificates for Welding machines, grinders, Drilling machines, etc.		1	Master T&P List with internal & external test details
2l.6	Availability of Tags & Inspection Certificates, colour coding for Wire rope slings etc.		1	Master T&P List with internal & external test details
2l.7	Availability of Tags & Inspection Certificates for Batching plants		1	Master T&P List with internal & external test details

**POWER SECTOR- HQ**

Tender No PSEER.SCT.NKP-E2053:20 (TCN-05)

Checklist for Evaluation of HSE Performance

FORMAT NO: HSEP:14-F33

REV NO.: 00

PAGE NO. 02 OF 3

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
2m.1	Use of Lifting Permit as per requirement		1	Permit Records
2m.2	Use of Height Permit as per requirement		1	Permit Records
2m.3	Use of Hot Work Permit as per requirement		1	Permit Records
2m.4	Use of Excavation permit as per requirement		1	Permit Records
2m.5	Use of Confined space work permit as per requirement		1	Permit Records
2m.6	Use of Grating removal and safety net removal permit as per requirement		1	Permit Records
2m.7	Use of Lockout-Tag out permit as per requirement		1	Permit Records
2m.8	Use of Radiography permit as per requirement		1	Permit Records
2m.9	Use of Night/ Holiday Work Permit as per requirement		1	Permit Records
2m.10	Use of Any other Applicable Permit as per requirement		1	Permit Records
3a	Material safety data sheet(MSDS) available for all chemicals and displayed in usage and storage area?		1	Inspection/ non-conformity records
3b	Spillages of oil/concrete and other chemical is controlled and cleaned by proper method in case of spill?		1	Inspection/ non-conformity records
3c	Availability of adequate number of urinals in workplace and in elevations and maintained	M	1	
3d	Availability of rest rooms for workers at site	M	1	
3e	Availability of Drinking water facility at work spot		1	
3f	Hygienic Labour colony is provided for workers.		1	
4a	Is heavy/complex critical lifting permit obtained for heavy, complex materials before handling/erection activity?		1	Work Permit records
4b	Whether area below lifting activities barricaded		1	Inspection/ non-conformity records
4c	Availability of experienced rigging foreman		1	Experience details of rigging foreman
4d	Is agency is following proper storage and handling procedure as per manufacturer standard for all hazardous material?		1	Procedure for storage & handling
4e	Are oxygen and acetylene cylinders are transported to work place from storage area in trolleys		1	
5a	Whether all deep excavation has been protected by barrier		1	Inspection/ non-conformity records
5b	Sloping/benching & shoring provided for excavation as per requirement?		1	-do-
5c	Proper access and egress provided for excavations?		1	-do-
5d	Blasting is done in controlled manner?		2	-do-
6a	Whether Electrical booth is equipped with Co ₂ fire extinguishers and fire buckets filled with sand?		2	Inspection/ non-conformity records
6b	Availability of Illumination lamp in electric booth?		1	-do-
6c	whether Caution Boards have been displayed?		1	-do-
6d	Usage of Metal Plug top for all hand power tools ?		1	-do-
6e	Usage of Insulated welding cables.		1	-do-
6f	Electrical Booth/Distribution Board to be covered by proper Canopy.		1	-do-
6g	Availability of functional & individual 30mA ELCB / RCCB and MCB for protection and conducting periodical check-up?		1	-do-
6h	Double earthing for panel boards and all machinery & proper earth pit with regular inspection available?		1	-do-
6i	Whether Electrician is qualified and experienced		1	Qualification & Experience records of electrician
6j	Availability and usage of Rubber hand gloves by electrician?		1	Inspection/ non-conformity records

**POWER SECTOR- HQ**

Tender No. PSER.SCT.NKP-E2053:20 (TCN-05)

FORMAT NO: HSEP:14-F33

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Checklist for Evaluation of HSE Performance

SL	Parameter for Measurement	M/ O	Wt	Supporting Documents
7a	Whether Scaffolding pipes made with steel or aluminum, are being used and checked periodically by experienced/ certified scaffolder?		2	Inspection/ non-conformity records
7b	8mm Stainless Steel wire rope with plastic cladding is provided for life line (Vertical / Horizontal) during height work?		2	-do-
7c	Availability of emergency lighting in case of power failure		1	-do-
7d	Whether all the openings are covered with Safety Nets made of fire proof Nylon?		1	-do-
7e	Whether MS pipe rails around staircases & platforms in usage are provided with top, middle rails and toe guard ?		1	-do-
7f	Whether Ladder with vertical life line /Fall arrestor is available to climb?		1	-do-
7g	Whether all workers deployed for working at height have been issued height pass after undergoing vertigo test?		1	Height Pass records
7h	Whether all workers deployed for height work / climbing ladder are provided and using Double lanyard safety belt?		1	PPE Issue records, inspection/ non-conformity reports
7i	Is all hand tools/Small material used by height workers is tied firmly to prevent fall?		1	-do-
8a	Flash back arrestors for all gas cutting sets is available on Torch side and cylinder side		1	Inspection/ non-conformity records
8b	Oxygen/Acetylene/LPG cylinders not in use have caps in place and stored separately?		1	-do-
8c	Availability of Face screen, Hand gloves, and Apron, for welders		1	-do-
8d	Protection from falling hot molten metal during metal cutting / welding at height by providing GI sheet below the cutting area especially in fire prone areas		1	-do-
9a	Pre-employment medical check-up done for all workers and submitted?		1	Medical check records
9b	Availability of first aid center, with MBBS doctor(Own or Sharing basis)	M	2	Attendance records
9c	Availability of Ambulance facility 24 hours (Own or sharing basis)	M	2	-do-
9d	Is First aid trained personnel's are available and their names are displayed at site?	M	1	-do-
9e	Availability of Emergency vehicle at site		1	
9f	Periodical medical check-up is conducted for all the workers and submitted?		1	Medical check records
9g	Availability of sufficient number of first aid box as per standard list and maintaining record		1	Inspection records
10a	Availability of Fire extinguishers, buckets at all vulnerable points		2	Fire extinguisher records
10b	Periodic fire mock drill conducted?		1	Fire, Mock drill records
10c	Are all flammable materials are stored separately?		1	
10d	Periodic grass cutting is done in material storage area?		1	
10e	Availability of 24V DC lighting in confined space work area		1	
10f	Availability of exhaust fan in confined space work area		1	

Note:

- **M: Mandatory; O: Optional.** Points other than mandatory can be excluded with appropriate justification (scope etc.) by BHEL
- Additionally: 30 Marks for each Fatal Accident and 10 mark for each major accident shall be deducted.

SECTION-B

Special Requirements



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)

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1. Establishment of Common Facilities for whole Project – cost to be borne in full by subcontractor.

Table 1.1

S. No.	Item	Details as per Clause No. of this Section	Applicable / Not Applicable with Remarks	Package
1	Construction of Medical Centre	a	Applicable	Civil
2	Construction of Worker Training Centre (A part of safety park)	b	Applicable	Civil
3	Construction of Vertigo Test Structure (A part of safety park)	c	Applicable	Civil
4	Deployment of Specialists	d	Applicable	By concerned agencies
5	HSE Equipment	e	Applicable	By concerned agencies
6	HSE measurement devices	f	Applicable	By concerned agencies
7	Urinals in under-construction structures	g	Applicable	By concerned agencies
8	Safety Park	h	Applicable	Civil

Note: Construction of Safety Park with allied infrastructure, is only applicable in those new projects of BHEL-PSER, where there is no established safety park.

a. MEDICAL CENTRE

- i. A medical center shall be setup at site with basic facilities for handling medical emergencies
- ii. Deployment of Medical Professional:
 1. **A qualified medical professional shall be deployed at site at all times.**
 2. **When total employee & worker strength at site crosses 500, medical professional with MBBS Degree from recognized institute shall necessarily be deployed**
- iii. Ambulance shall be deployed along with a trained driver and accessories as per Schedule V of BOCW Central Rules, 1998. Ambulance shall be utilized exclusively for transporting the accident victim. Ambulance drivers shall be regularly trained in First Aid.
- iv. Non deployment of Ambulance and First Aider as above shall invite a penalty of Rs. 30000 pm and Rs10000 PM respectively
- v. Medical waste shall be disposed as per prevailing legislation (Bio-Medical Waste – Management and Handling Rules, 1998).
- vi. Above are bare minimum requirements. Any legal requirements over and above these specifications shall supersede the above requirements



**POWER
SECTOR**

HEALTH, SAFETY AND ENVIRONMENT PLAN
HEALTH, SAFETY AND ENVIRONMENT PLAN
FOR
SITE OPERATIONS
(SECTION-B)

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b. WORKER TRAINING CENTRE

- i. Indoor Worker Training Center to be developed at site with seating capacity of at least 50 trainees
- ii. Projector with following minimum specifications:

Native Resolution	XGA, 1024x768
Brightness (ANSI lumens)	3300
Contrast Ratio	13000:1
Display Color	30 Bits
Aspect Ratio	4:3

- iii. A Laptop or Desktop PC with following minimum specifications:

Processor	Intel Celeron Dual Core
Memory (RAM)	2 GB
Graphics Card	2GB Video Memory
Hard Disk Capacity	60 GB
Monitor Size	14 inches
Keyboard	
Mouse	

- iv. Stereo speakers with minimum 50W RMS sound output
- v. PA system for Addressing Workers
- vi. Seating arrangement

c. Development of Vertigo Test Structure:

Vertigo test Structure to be developed as per **Annexure 04**

d. Specialists:

Following specialists shall be deployed by the subcontractor, who shall cater to whole project as per BHEL requirements / instructions

- I. **Qualified T&P Inspector:** subcontractor shall engage one qualified T&P inspector having undergone a certification course in the discipline.
- II. **Qualified Scaffolding Erector and Inspector:** Subcontractor shall deploy one qualified Scaffolding Supervisor and Inspector having undergone a certification course in the discipline



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)

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- e. **Tools & Equipment:** Following equipment conforming to relevant IS Codes for the job shall be ensured by subcontractor:

S. No.	Item
1	Lifelines
2	Retractable Fall Arrestors
3	Safety Nets (10m X 5m)
4	Sky Climbers
5	Fire Blanket
6	Honey Bee Removal Suit & Kit
7	Flashback Arrestors
8	Barricading Tape
9	Binoculars
10	Walkie-Talkies
11	LOTO kit
12	24-Volt light
13	Sand Buckets
14	Hard barricading planks
15	Standby Fire kits

S. No.	Item	Type of Job / Purpose	Remarks
1	Lifelines (Steel Rope) and posts	Height work	
2	Retractable Fall Arrestors	Height Work	
3	Safety Nets (for fall protection; railings also to be covered)	Height Work	
4	Sky Climbers	Height Work	
5	Fire Blanket, Spark/ slag collector	Hot Work	
6	Honey Bee Removal Suit & Kit	General	
7	Flashback Arrestors	Hot work	
8	Barricading –Hard (Scaffolding Pipes & Clamps or fabricated using structural/round	Height Work, Excavation, General Barricading	
9	Binoculars	HSE Inspection	
10	Walkie-Talkies	Lifting	
11	LOTO kit	Working on charged line	
12	24-Volt light	Confined Space/ temp work	
13	Sand and Water Buckets	Hot work/Electrical work	
15	Standby Fire kits Fire extinguisher stands	Hot work/Electrical work	



HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)

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Above equipment are bare minimum to be essentially maintained at all times. Additional numbers to be deployed as and when required in order to ensure fulfillment of all Safety requirements

f. HSE Measurement Equipment & Tools

S. No	Device
1	ELCB Tester
2	Multi meter (Light cables)
3	Earth Resistance Meter
4	Lux Meter
5	Decibel Meter
6	Anemometer
7	Breath Analyzer (Alcohol)
8	Multi-gas analyzer
9	Gas leakage detector / alarm
10	Gas monitor (confined space)
11	Radiation meter & Badges
12	Blood pressure monitor
13	Fire detectors
14	Dust Particle Detector

g. Urinals in Under-construction structures:

Urinals for in under-construction structures for easy access eg. In case of Boiler elevations etc.

2. Shared Facilities – where part of operating cost is borne by subcontractor in proportion to contract value

The subcontractor shall bear running expenses of above facilities on a 'proportional to contract value sharing basis as finalized by BHEL.

S. No.	Facility
1.	Operation of Ambulance, Nurses, Medical Consumables
2.	Construction, Maintenance & Upkeep of Latrines and Urinals in Common spaces
3.	Drinking Water Provision in Common Spaces
4.	Dust Control / Water Sprinkling, Pest Control, Fumigation at Site



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LIST OF REFERENCES

S. No	Code Name	Title
1	IS: 818-1888 (Reaffirmed 2003)	Code of Practice for Safety and Health requirements in Electric and Gas Welding and Cutting operations.
2	IS: 1179-1967 (Reaffirmed 2003)	Specification for Equipment for Eye & Face protection during welding.
3	IS: 1989 (Part 2):1986 (Reaffirmed 1997)	Specification for Leather Safety Boots & Shoes
4	IS:2925 – 1984 (Reaffirmed 2010)	Specification for Industrial Safety Helmets
5	IS:3521: 1999 (Reaffirmed 2002)	Industrial Safety Belts & Harnesses-Specification
6	IS:3646(Part II) – 1966(Reaffirmed 2003)	Code of Practice for Interior Illumination
7	IS:3696 (Part I) – 1987 (Reaffirmed 2002)	Safety Code for Scaffolds and Ladders
8	IS: 3696(Part 2) : 1991 (Reaffirmed 2002)	Scaffolds and Ladders-Code of Safety
9	IS: 3764:1992	Excavation Work – Code of Safety
10	IS:3786 – 1983 (Reaffirmed 2002)	Method for Computation of Frequency and Severity Rates for Industrial Injuries and Classification of Industrial Accidents
11	IS.4014.2.1967	Steel tubular Scaffolding
12	IS:4770: 1991 (Reaffirmed 2006)	Rubber Gloves Specification (Electricals Purposes)
13	IS:4912: 1978 (Reaffirmed 2002)	Safety Requirements for Floor and Wall Openings, Railings and Toe Boards
14	IS: 5557 – 1969	Industrial and Safety rubber knee boots.
15	IS: 5983 – 1980 (Reaffirmed 2002)	Specification for Eye-Protectors
16	IS:6519 – 1971 (Reaffirmed 1997)	Code of Practice for Selection, Care and Repair of Safety Footwear
17	IS.6549.1972	Glossary of terms used for Lifting tackles
18	IS:6994(Part I)-1973 (Re affirmed 1996)	Specification for Industrial Safety Gloves Leather and Cotton Gloves
19	IS.7215.1974	Steel Structure Fabrication
20	IS.7969.1975	Handling and storage of building material




**POWER
SECTOR**

HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)

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21	IS:8519 – 1977 (Reaffirmed 1983)	Guide for Selection of Industrial Safety Equipment for Body Protection.
22	IS:8520 – 1977 (Reaffirmed 2002)	Guide for Selection of Industrial Safety Equipment for Eye, Face and Ear Protection.
23	IS:9167:1979	Specification for Ear-Protectors
24	IS:9473:2002	Respiratory Protective Devices-Filtering Half Masks to protect against Particles-Specification.
25	IS: 9944:1992 (Reaffirmed 2003)	Natural and Man-made Fiber Rope Slings- Recommendations on Safe working loads.
26	IS 11006 : 2011	Flash Back(Flame) Arrestor Specification
27	IS: 11226 – 1985	Leather Safety footwear having direct molding sole.
28	IS:11057 – 1884 (Reaffirmed 2001)	Specification for Industrial Safety Nets
29	IS: 12254:1993 (Reaffirmed 2002)	Polyvinyl Chloride (PVC) Industrial Boots Specification
30	IS:13367(Part 1):1992 (Reaffirmed 2003)	Safe Use of Cranes-Code of Practice
31	IS: 14166:1994 (Reaffirmed 2002)	Respiratory Protective Devices-Full Face Masks Specification
32	IS:14746: 1999 (Reaffirmed 2003)	Respiratory Protective Devices-Half Masks and Quarter Masks - Specification
33	IS: 15397 :2003 (Reaffirmed 2008)	Portable Extinguisher Mechanical Foam Type(Stored Pressure)-Specification
34	IS: 19011:2002	Guidelines for Quality and/or Environmental Management Systems Auditing

 <p>POWER SECTOR</p>	HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)	Doc. No.: HSEP:14 Rev.: 01 Date: Page 159 of 170
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As per Contract Labor (Regulation & Abolition Act), Central Rules, 1971,

(1) The first-aid box shall be distinctively marked with a Red Cross on a white background and shall contain the following items, namely:

(a) For establishments in which the number of contract laborers employed does not exceed fifty, each first aid box shall contain the following equipment:

(i)	6 small sterilized dressings
(ii)	3 medium size sterilized dressings
(iii)	3 large size sterilized dressings
(iv)	6 pieces of sterilized eye pads in separate sealed packets.
(v)	6 roller bandages 10 cm wide.
(vi)	6 roller bandages 5 cm wide.
(vii)	One tourniquet
(viii)	A supply of suitable splints
(ix)	Three packets of safety pins.
(x)	Kidney tray.
(xi)	3 large sterilized burn dressings.
(xii)	1 (30ml) bottle containing a two percent alcoholic solution of iodine
(xiii)	1 (30 ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label
(xiv)	1 snake bite lancet
(xv)	1 (30gms) bottle of potassium permanganate crystals.
(xvi)	1 pair scissors
(xvii)	1 copy of the First-Aid leaflet issued by the Director General, Factory Advice Service and Labor Institutes, Government of India.
(xviii)	A bottle containing 100 tablets (each of 5 grains) of aspirin
(xix)	Ointment for burns
(xx)	A bottle of suitable surgical anti-septic solution



Details and Contents of First Aid Box

(b) For establishment in which the number of contract laborers exceeds fifty each first-aid box shall contain the following equipment:

(i)	12 small sterilized dressings
(ii)	6 medium size sterilized dressings
(iii)	6 large size sterilized dressings.
(iv)	6 large size sterilized burn dressings
(v)	6 (15 grams) packets sterilized cotton wool
(vi)	12 pieces of sterilized eye pads in separate sealed packets.
(vii)	12 roller bandages 10 cm wide.
(viii)	12 roller bandages 5 cm wide.
(ix)	One tourniquet.
(x)	A supply of suitable splints.
(xi)	Three packets of safety pins.
(xii)	Kidney tray.
(xiii)	Sufficient number of eye washes bottles filled with distilled water or suitable liquid clearly indicated by a distinctive sign which shall be visible at all times.
(xiv)	4 per cent Xylocaine eye drops, and boric acid eye drops and soda by carbonate eye drops.
(xv)	1 (60ml) bottle containing a two percent alcoholic solution of iodine
(xvi)	One (two hundred ml) bottle of mercurochrome (2 per cent) solution in water.
(xvii)	1 (120ml) bottle containing Sal volatile having the dose and mode of administration indicated on the label.
(xviii)	1 roll of adhesive plaster (6 cmX1 meter)
(xix)	2 rolls of adhesive plaster (2 cmX1 meter)
(xx)	A snake bite lancet.
(xxi)	1 (30 grams) bottle of potassium permanganate crystals.
(xxii)	1 pair scissors
(xxiii)	1 copy of the First-Aid leaflet issued by the Director-General, Factory Advice service and labor Institutes, Government of India.
(xxiv)	a bottle containing 100 tablets (each of 5 grains) of aspirin
(xxv)	Ointment for burns
(xxvi)	A bottle of a suitable surgical anti septic solution.

(2) Adequate arrangement shall be made for immediate recoupment of the equipment when necessary.



**POWER
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HEALTH, SAFETY AND ENVIRONMENT PLAN FOR SITE OPERATIONS (SECTION-B)

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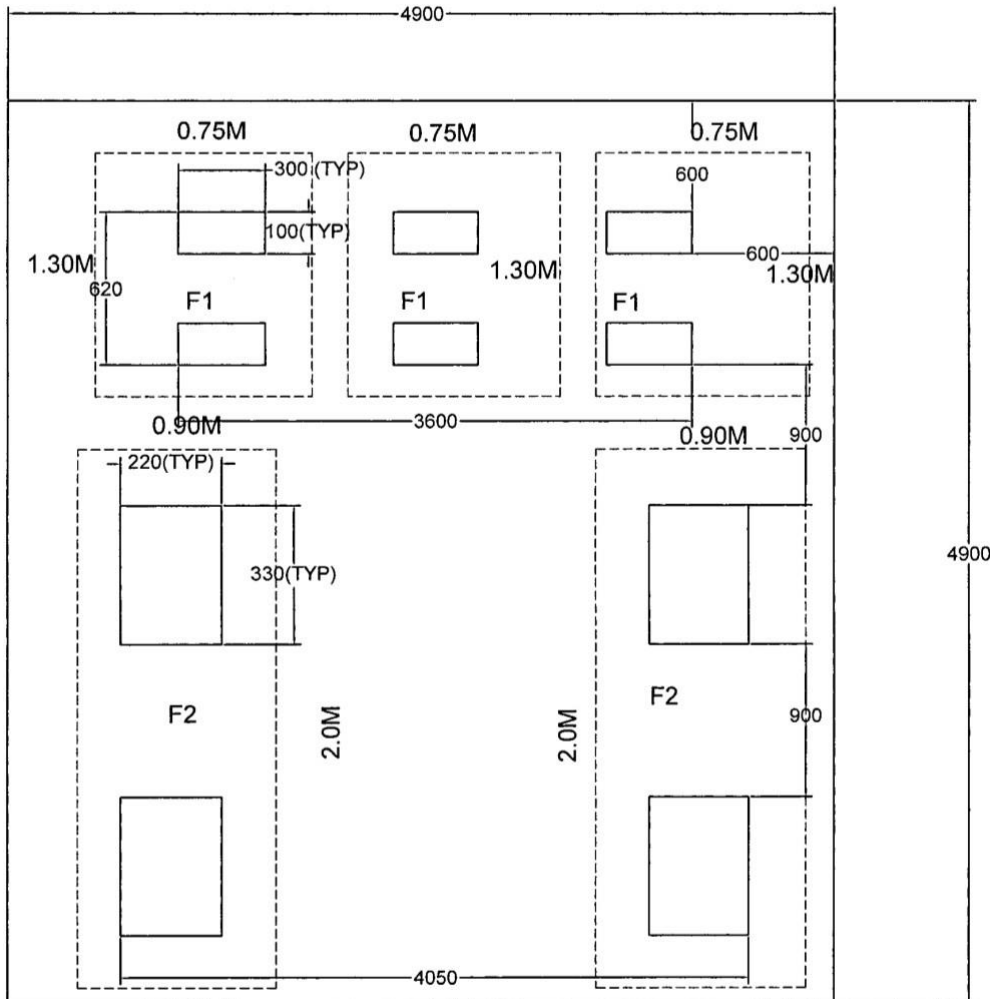
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Table 1

S. No.	Topic
1	Vertigo / Height working Test Structure Layout
2, 3	Structure Layout Sketch
3	Actual Photo of a typical structure
4	Bill of Materials
5	Guidelines for Conducting the Test



Note:

- All dimensions are in mm
- Drawing is not to scale
- Inside boundary area to be filled with sand to level with road (external)
- Details of F1 and F2 are shown below

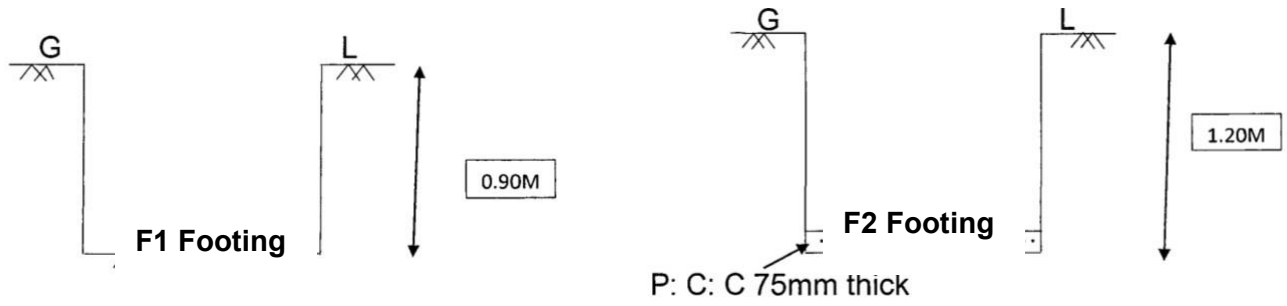
Figure 1: Vertigo / Height Work Test Structure Layout



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Vertigo Test Structure Specifications

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Note:

- Concrete Grade is M15
- Drawing is not to scale
- TOC is at Road Level
- G L refers to Ground Level

Figure 2

Vertigo Test Structure Specifications

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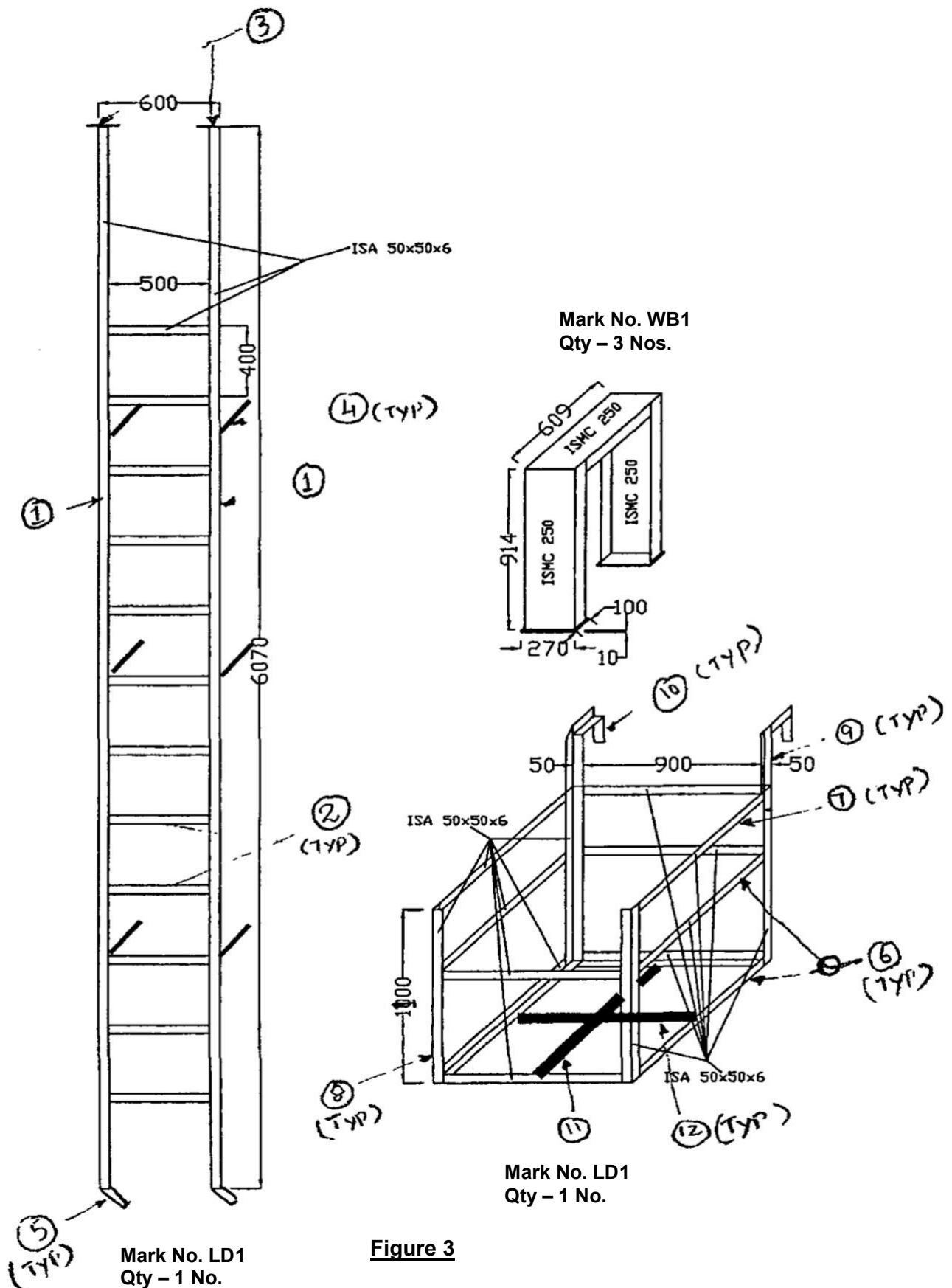
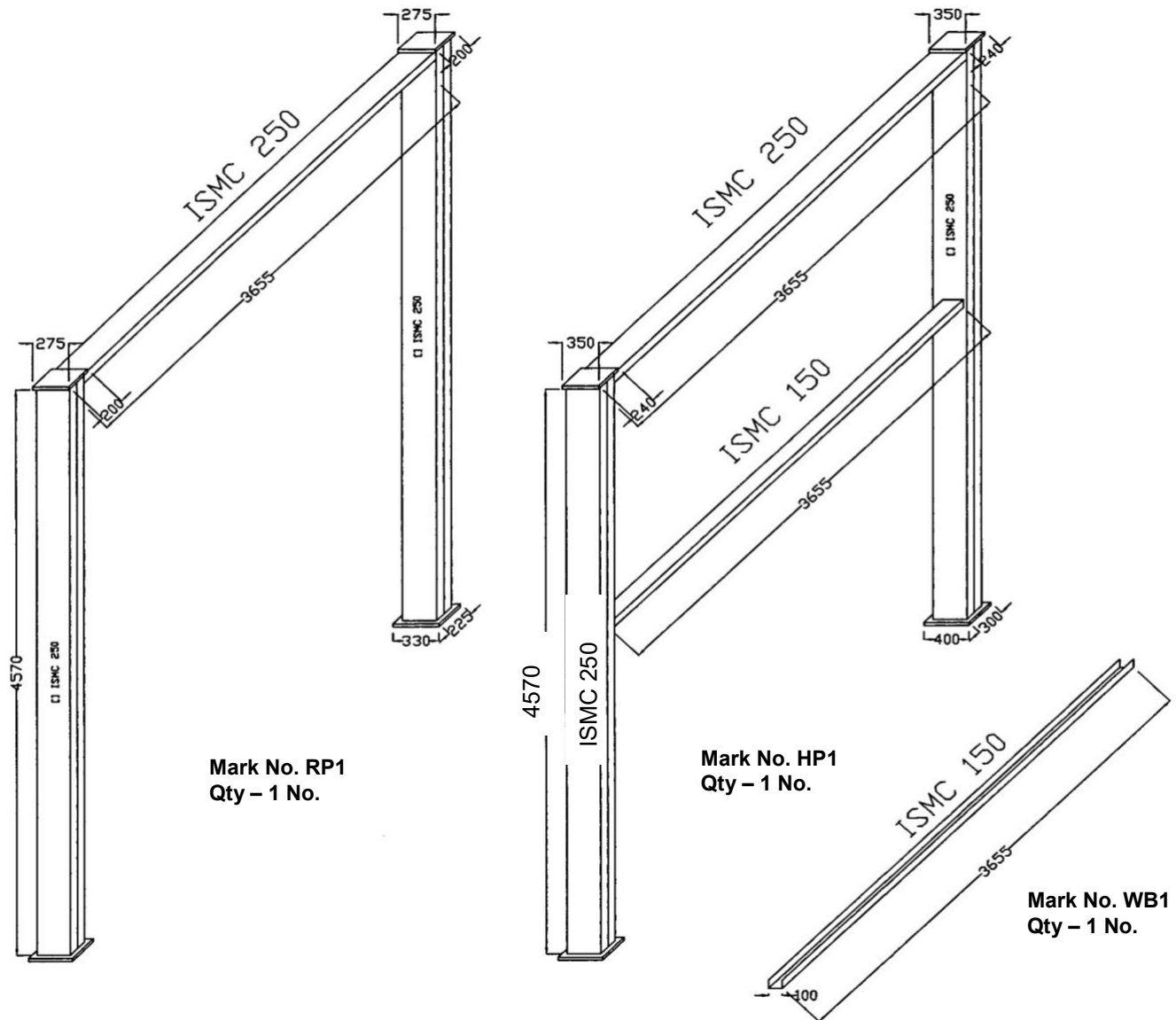


Figure 3

Vertigo Test Structure Specifications

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Figure 4



Pic-1: Actual Photo of a Typical Vertigo Test



Vertigo Test Structure Specifications

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Table 2: BOM FOR HEIGHT WORK INDUCTION TRAINING MODULE

Sl. No.	Description	Width (mm)	Length (mm)	Qty (No's)	Unit Wt (Kgs)	Total Wt. (Kgs)
MKD NO. WB1						
1	ISMC250		609	3	34.20	62.483
2	ISMC250		914	6	34.20	187.553
3	ISMC100		3655	1	9.56	34.942
4	PL10	100	270	6	78.50	12.717
			Total Weight (Kgs)			297.695
MKD NO. RP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	PL25	225	330	2	196.25	29.143
4	PL25	200	275	2	196.25	21.588
			Total Weight (Kgs)			800.908
MKD NO. HP1						
1	ISMC250		4570	4	34.20	625.176
2	ISMC250		3655	1	34.20	125.001
3	ISMC150		3655	1	16.80	61.404
4	PL25	300	400	2	196.25	47.100
5	PL25	240	350	2	196.25	32.970
			Total Weight (Kgs)			891.651
MKD NO. LD1						
1	ISA50X50X6		6070	2	4.50	54.630
2	ISA50X50X6		500	12	4.50	27.000
3	PL12	75	75	2	94.20	1.060
4	ISA50X50X6		300	6	4.50	8.100
5	ISA50X50X6		255	2	4.50	2.295
6	ISA50X50X6		1000	8	4.50	36.000
7	ISA50X50X6		910	3	4.50	12.285
8	ISA50X50X6		1100	4	4.50	19.800
9	ISA50X50X6		650	2	4.50	5.850
10	ISA50X50X6		350	2	4.50	3.150
11	PL8	75	900	1	62.80	4.239
12	PL8	75	410	2	62.80	3.862
			Weight (Kgs)			178.271
			Total Weight (Kgs)			2168.525



Vertigo Test Structure Specifications

Page 6 of 6

A. Test Procedure / Guidelines

Fear of height may be physiological or psychological. Therefore, to rule out any possibility of physiological factor, detailed medical check-up of workers is carried out before vertigo test. Medical check-up of workers includes the following:

history of past illnesses (like epilepsy, drug allergy, diabetics/ hypertension, unconsciousness etc.), general physical examination (like height, weight, BMI, build and nourishment etc.), measurement of pulse rate, Blood Pressure, respiratory rate.

After this check-up, those who are found suitable for height work by examining doctor, are allowed to undergo vertigo test.

During this health check-up, psychology of workers is also studied. If any worker finds it extremely difficult/ frightening to climb the monkey ladder & walk on the beam, during/after performing vertigo test or even before performing, then he is treated as disqualified.

As per standard, during vertigo test, worker is allowed to climb on a foundation through monkey ladder, walk on a beam, then steps down at the other end of beam, through monkey ladder. Height of the beam should be at least six feet from ground level. All necessary safety precautions are taken during this test. Worker has to wear full body harness with double lanyard. A horizontal lifeline is run parallel to the beam and worker has to put his lanyards into the lifeline. Additionally, a safety net is also put below the beam for rescue of the victim in case of a fall from beam.

Following activities are generally carried during testing:

1. Walking Bench Training:

- a. Person should walk over the channel. He should maintain balance & walk without much problem.
- b. If the person has problem to balances himself on repeated chances, he may be having flat foot or some other problem. So, he may not be fit for height work.

2. Rope Climb Training:

Person should be able to climb the rope up to the top channel for ensuring that in case of fall, a person hanging on the safety harness, will be able to safely climb back to the platform within minimum time period before the safety harness start breaking down under the load.

3. Height Work Training:

Person should walk freely on the middle channel while holding the top channel with the help of safety harness.

4. Ladder for Vertical fall arrestor Training:


Vertical fall arrestor rope is fixed from top to bottom of the ladder. It will ensure:

- Usage of vertical fall arrestor.
- Usage of two lanyards of a safety harness.
- Ensure 3-point contact on the ladder while climb.

5. Chair for work at height Training:

- Climb though vertical ladder with two lanyard ropes.
- Hooking of two lanyard ropes to life line. With this safe arrangement, he can walk to chair.
- Sits in the chair safely, comes out & walks back to the vertical ladder & come down from vertical ladder. After completion of vertigo test, blood pressure of worker is again measured. If it is not within acceptable limits for any worker, concerned worker is denied height pass.

Only those who pass the above training are fit for height work.

 <p>POWER SECTOR</p>	<p align="center">HEALTH, SAFETY AND ENVIRONMENT PLAN</p> <p align="center">FOR</p> <p align="center">SITE OPERATIONS</p> <p align="center">(SECTION-B)</p>	Doc. No.: HSEP:14
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Safety Park Requirements		
Sl. No.	Training room (capacity 40 persons)	Qty.
1	Class room chair	25
2	Office Table	3
3	Rolling chair	3
4	Almirah	1
5	Visitor chair	10
6	Drawer	2
7	Single bed	1
8	Mattress	1
9	Projector	1
10	Projector screen	1
11	Sound speakers	1
12	Desktop Computer	3
13	Printer	1
14	White Board	1
15	Marker	5
16	Duster	1
17	Door Mat	9
18	Dustbin (Small + BIG)	7+1
19	Mannequin	1
20	Helmet	1
21	Face Shield	1
22	Safety Goggle	1
23	Welding shield	1
24	Ear Muff	1
25	Ear Plug	1
26	Nose Mask	1
27	Breathing Apparatus	1
28	Hand Gloves (Cotton)	1
29	Hand Gloves for Electrician (Rubber)	1
30	Hand gloves Rubber	1
31	Hand Gloves Lather	1
32	Construction Safety Uniform (Boiler Suit)	1
33	Welding Apron	1
34	Safety Shoes	1
35	Leg Guard for Welder	1
36	Poster for Occupational Disease like Pneumoconosis, silicosis etc.	1

37	Gum Boot	1
38	Full Body Harness	1
39	8 MM Wire rope for life line. Length 20 Feet (FT).	1
40	Safety Net for man & materials. Size 15 FT X 15FT.	1
41	Monkey ladder 15 FT.	1
45	Fire Extinguisher All types(DCP,CO2 & Foam)	1
46	Bed Sheet	1
47	Pillow	1
48	Curtain	12
49	curtain fittings	12
50	AC (1.5 TON)	3
51	AC (2 TON)	2
52	Rope pully.	1
53	PP Rope for pully 20 MTR.	
54	Ladder Clamps	6
55	Aluminum ladder 6 MTR.	1
56	Carry Bag	
57	Scaffolding all Materials for 5 Mtr. Height like Scaffolding tubes, Sole plate, base plate, Right angle clamps, Swivel clamps, beam clamps, Joint box/joint pin, toe guard/board,	

RECORD OF REVISION

Clause No.	Rev. No.	Brief Description of Revision	Date
All	00	New Procedure Introduced	25.04.2019
All	01	OCPs-60, 61& 62 introduced, New formats introduced	08.05.2020




Health, Safety & Environment, Power Sector Headquarters

Bharat Heavy Electricals Limited

Regd. Office: BHEL House, Siri Fort, New Delhi – 110049, India

Website: www.bhel.com

	OPERATIONAL CONTROL PROCEDURE	Doc. No.: HSEOCP: 61 Rev. No.: 01 Rev. Date: 01.06.2020 Page 1 of 13
OCP No. : 61	Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations	

Purpose	<ul style="list-style-type: none"> ➤ To resume work in a safe manner after Lock down due to COVID-19 Outbreak ➤ To ensure health & safety of personnel and prevention of infection during operations ➤ To ensure HSE Management & Control during operations 	Scope	PS Regions
Background	<ul style="list-style-type: none"> ➤ The purpose of this procedure is to resume construction works at BHEL project sites in the event of 'Construction activities' being permitted by the Government/District Administration/Statutory Authorities. ➤ By following this OCP the chain of corona spread will largely be contained and works can be done safely. ➤ All precautionary measures are to be ensured at site and labor colonies so that the labor force feels safe and secure at work place and act in a productive manner. ➤ This OCP also lays down guidelines to handle cases of infection 		
Applicability	<ul style="list-style-type: none"> ➤ This OCP applies to all BHEL employees and its subcontractors working at project sites. ➤ It also covers guidelines for medical personnel, security personnel, visitors and others 		
Responsibility	Concerned Site In-charge / Site HSE Head/Package Head		
Performance Criteria	Number of cases of violations from these guidelines. All violations must be recorded and compliance for the same immediately/ within day		
References	<ul style="list-style-type: none"> ➤ Corporate HSE Circular BHEL:CO: SOP: COVID-19 : 01 ➤ Corporate Guidelines regarding disinfection for Prevention of COVID-19 in BHEL Offices, Townships, Hospitals, Factories and other common places (No. AA:HR:MR 1 (C) dated 20-03-2020) ➤ OHSAS : 18001 , ISO : 14001:2015, ISO 45001:2018 ➤ ICMR & WHO Guidelines for COVID 19 ➤ Govt. of India Guidelines being issued from time to time ➤ Guidelines issued by National Centre for Disease Control and other agencies of Govt. of India ➤ WHO Guidelines being issued from time to time 		

Prepared by	Reviewed by	Approved By
Task Force: Rohit Kumar, SM/ PSHQ-HSE Nitesh K. Meena, DM/ PSNR-HSE Saswajeet Raut, SE/PSER-HSE Navin Sadh, SE/ PSWR-HSE Sandeep Dalal, SE/ PSSR-HSE	HSE Heads/ PS-Regions: S. C. Meena, AGM/ PSNR B Tirkey, AGM/ PSER R. O. Jadhao, AGM/ PSWR Mukesh Shrivastava, AGM/ PSSR	Head/ HSE, PSHQ: Santosh Nair, GM



OPERATIONAL CONTROL PROCEDURE

Doc. No.: HSEOCP: 61

Rev. No.: 01

Rev. Date: 01.06.2020

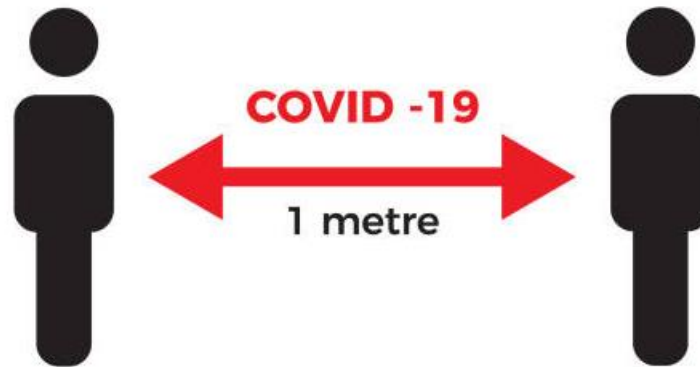
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OCP No. : 61

Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations

General PPEs & Precautions

Maintain Social Distance of at least 1 meter **Minimum (more the better)**



Precautions at all times is necessary. Even a single lapse can lead to infection



Face shield/ mask must be worn by all at all times and disposed/ cleaned properly



Protective clothing must be worn



Protective gloves as identified in Safety Data Sheet



Appropriate footwear with substantial uppers must be worn



Mandatory requirements are specified and must be followed. Report any accidents.



Spray to disinfect personal items/ areas

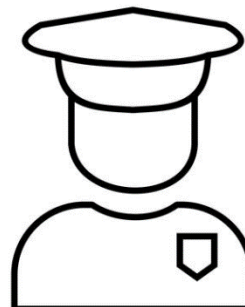


Spray to disinfect public places/ infrastructures/ tools etc.


Strictly No Shaking Hands



Hazmat suits and special PPEs for medical personnel and other officials with more probability of coming into contact with infected



Strict security & control at Gate to avoid entry into site/office premises of infected persons and persons without necessary PPEs, unauthorized personnel, animals etc.


	<h1 style="text-align: center;">OPERATIONAL CONTROL PROCEDURE</h1>	Doc. No.: HSEOCP: 61 Rev. No.: 01 Rev. Date: 01.06.2020 Page 3 of 13
OCP No. : 61		<h2 style="text-align: center;">Resumption of Construction Activities After Lock Down and Prevention of Coronavirus Infection during Site Operations</h2>

General


1. This procedure is applicable for all personnel working at Project Site, including staff, workers, officials, medical and security personnel, cleaners, housekeeping staff etc. It also includes visitors including drivers, cleaners, doctors, nurses, etc. entering the site premises
2. These are broad guidelines that may be followed in order to ensure the purpose of this OCP is met.
3. The procedure refers specifically to COVID-19 disease caused by SARS-CoV-2 Virus, but is applicable to similar highly infectious respiratory illnesses as well
4. This procedure is branches out of Corporate HSE Circular **BHEL: CO: SOP: COVID-19: 01 – ‘Standard Operation Procedure for Work Resumption after Lockdown’**. In case of any ambiguity & duplicity, Corporate HSE Circular & Guidelines and Govt. guidelines to be followed
5. This procedure is necessary to ensure continuation of business operations in order to avoid mandatory lockdown due to an infection. All precautions to be taken seriously due to the contagiousness and mortality rate of this disease. Even a slight lapse can lead to infections and shut down of site operations for the mandatory notified period
6. The physical distancing guidelines of minimum 1 m indicated in this document to be reviewed in line with latest Govt. guidelines and ensured appropriately

Detailed Procedures & Controls are given below


Procedures and Controls		
S No	Activity	Responsibility
1	<p style="text-align: center;"><u>Deployment/ Nomination of COVID Marshall</u></p> <ol style="list-style-type: none"> BHEL and Agencies shall nominate COVID Marshalls, who will be responsible for monitoring the COVID prevention measures and apprising management on the same. Every agency shall nominate COVID Marshall, who shall report to BHEL COVID Marshall BHEL COVID Marshall shall be nominated by Site In-charge in consultation with Site HSE Head. BHEL COVID Marshall shall be the Nodal COVID Marshall for the site, and having overall responsibility. 	Agency, BHEL
2	<p style="text-align: center;"><u>Directions for Newly Joining Workers/ Officials</u></p> <ol style="list-style-type: none"> Mandatory health check-up for every worker/ official joining the site An undertaking to be submitted by every worker/ official which shall specify if he/she had been in contact with a Covid-19 positive case, and other health-related details (as per Format HSEOCP61-F01) All newly joining workers/ officials, shall follow the applicable procedures/ guidelines as laid out by Govt./ statutory authorities pertaining to quarantine, prior to joining work 	Agency, BHEL
3	<p style="text-align: center;"><u>Routine HSE Management Activities During COVID-19</u></p> <ol style="list-style-type: none"> Due to the stress on existing medical facilities due to COVID-19 pandemic, it is imperative to take utmost precautions and avoid any incidents during operations. All activities to be carried out in safest manner possible with all necessary precautions. All activities to be carried out using least amount of paperwork and physical proximity as far as possible. The methodology to issue Permit etc. can be decided by Site Management. All necessary precautions before starting activity to be ensured and regularly monitored by concerned execution and HSE Team. 	Agency, BHEL

	OPERATIONAL CONTROL PROCEDURE	Doc. No.: HSEOCP: 61 Rev. No.: 01 Rev. Date: 01.06.2020 Page 4 of 13
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	<ul style="list-style-type: none"> d. As far as possible, meetings & classroom trainings to be avoided. Essential meetings can be carried out by following the relevant guidelines e. HSE Observer App to be used to monitor HSE Activities and follow up with agencies for closure of non-conformities. Follow up can also be carried out through Phone/ Video Call etc. f. Apart from monitoring of HSE requirements, monitoring of COVID-19 precautions by workers and BHEL and Agency Officials also to be carried out 	
4	<p style="text-align: center;"><u>Strict Control at Gates</u></p> <ul style="list-style-type: none"> a. Strict Control at the Gate/ Banning Entry to Anyone Not Wearing Masks <ul style="list-style-type: none"> i. Security personnel at the gate may erect a barricade preferably approx. 10 meters from the gate and only allow personnel who are wearing proper masks inside. ii. Public address system may be used to warn any non-compliant visitors iii. Near entry gate, round markers at minimum 1-meter distance to be ensured so that distancing is ensured iv. A hand-wash or hand sanitiser facility is preferable at the gate to allow entry after hand wash or hand sanitisation. These are also to be provided at key locations to enable hand wash / hand sanitisation before starting work, before eating, etc. v. Gutkha, Paan, tobacco etc. to be banned from the site. Spitting to be strictly prohibited. vi. Screening at Gate with Contactless Thermometer & Action on Suspected Cases <ul style="list-style-type: none"> 1) Security Personnel at the Gate to screen each person entering the premises using a non-contact infrared thermometer, which is duly serial numbered and calibrated. 2) In case any site worker/ official is found to have fever more than 99 Degrees Fahrenheit or found coughing/ sneezing, he/she may be advised rest till recovery and entry to be permitted after obtaining clearance from medical officer/assistance/attendants. b. Any parcel/courier person should be stopped at gate only. Parcel to be collected from gate by concerned person preferably with provision of Special Box (wood/metal/plastic or the like) that can be sanitized daily. A provision of drop box at front of BHEL site office may also be deployed for receiving document like letter/invoice, etc. Parcels to be properly sanitized prior to opening. c. Any construction material received at site, unless properly sanitized, to be kept undisturbed for at least 3 days and to be used only after that period. d. Don't allow any new vehicle without concerned BHEL engineer permission. e. Ensure that number of persons coming inside and going outside is matching, agency wise. f. Visitor entry in site office to be avoided as far as possible. 	Security, Agency, BHEL
5	<p style="text-align: center;"><u>Maintaining Strict Social Distancing during site/office activities – minimum 1 meter distance between any two personnel to be Enforced Strictly</u></p> <ul style="list-style-type: none"> a. During meetings, classroom training programmes like induction training and on-the job training, toolbox talks and other gatherings, following precautions may be ensured: <ul style="list-style-type: none"> i. Preferably, such meetings to be avoided and communication carried out through other means (email, phone, pamphlets etc.) ii. At door, hand sanitizer or soap and water to be ensured for sanitizing hands during entry & exit by each individual iii. Only limited number of personnel to be called in training/ meeting, so as to ensure distance of minimum 1 meters between two participants iv. Each participant to wear mask 	Agency/ BHEL

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	<ul style="list-style-type: none"> v. In case any individual is symptomatic/ coughing/ sneezing, he/ she may be taken to quarantine area by the medical/ first aid personnel, and medical assistance sought from specialized hospital, etc vi. Persons may be allowed to attend the induction training/ meeting only after temperature screening if felt necessary. <p>b. Social Distancing During Toolbox Talks During Toolbox Talks, minimum 1 meter distance between any two workers to be ensured</p> <p>c. During site execution activities:</p> <ul style="list-style-type: none"> i. For all site execution activities, social distancing is to be maintained. In case this is not possible due to nature of work, speciality of work, etc, ensure sensitisation of the labour/staff involved and use of appropriate PPEs, especially mandatory face mask. In any case, close working to be allowed only in special circumstances and ensuring these activities are preferably time staggered to the extent possible ii. Ensure hand wash / hand sanitisation facility at key places and these are topped up regularly <p>d. In office premises:</p> <ul style="list-style-type: none"> i. Sharing of items like pens, water bottles etc. in office premises to be avoided ii. Seating arrangement to be ensured to ensure minimum 1 meter distance iii. Doors preferably to be in open condition to avoid contact iv. All common touch points to be regularly disinfected. 	
6	<p style="text-align: center;"><u>Mandatory Face Masks for Everyone at All Times</u></p> <ul style="list-style-type: none"> a. Face masks, and other necessary PPEs to be provided to all workers as per guidelines of Govt/ statutory authorities b. Those responsible for sanitation and cleaning of areas to be given coveralls c. The Govt of India advisory available at following link gives details on how to prepare, use and clean such masks. <p>https://www.mohfw.gov.in/pdf/Advisory&ManualonuseofHomemadeProtectiveCoverforFace&Mouth.pdf</p> <ul style="list-style-type: none"> i. The workmen/staff may use home-made masks/ “gamchha” (गमछा) provided they are used effectively and constantly. ii. All site personnel to wear masks as specified at all times except possibly while having lunch/ tea. During that period, a distance of minimum 2 meters to be maintained between two persons. iii. Minimum two masks to be ensured for each person – one can be used and other washed. Daily washing with detergent is mandatory iv. Strict directions for usage, washing of mask to be given to workers and officials. Masks are not to be touched from outside, and are to be put in soap solution on reaching residential quarters. v. There must not be a sharing of face covers and a face cover must be used by only one individual vi. Regular awareness by way of posters or daily briefing to be provided regarding correct usage, handling, washing, disposal etc of face masks/<i>gamchhas</i>/cloth etc 	Concerned Individual/ Supervisor

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	<p>d. Types of Masks and Use case scenarios</p> <p>i. Homemade/ Reusable Face Covers:</p> <ol style="list-style-type: none"> 1) Such home/ self-made face covers may be preferably used by all personnel. In case they can arrange better masks, same may be allowed. 2) In any case, no person to be permitted in site premises without a mask. <p>ii. Triple Layer Surgical Masks</p> <ol style="list-style-type: none"> 1) These are disposable masks to be given to visitors/ used by workers and officials as per requirement. <p>iii. N95 Masks</p> <ol style="list-style-type: none"> 1) Medical, security, and other officials, who come into contact with large number of people during the course of the day to be given N95 Masks 2) In addition, infected personnel and who are suspected of infection to use specialized masks as indicated by doctor <p>e. Minimum two sets of masks to be ensured with everyone so that one can be used while other is washed</p>	
7	<p style="text-align: center;"><u>Mask cleaning/ disposal</u></p> <p>The Govt of India guidelines in above link also give details on how to wash and dispose the masks. Same to be followed.</p> <p>In addition,</p> <ol style="list-style-type: none"> a. For re-usable masks, in labor colony, separate area for cleaning masks to be identified, wherein all workers to wash the masks using detergent and water b. Cleaning of masks and availability of backup to be ensured by officials as well. <p>c. Safe disposal of Masks, Infected clothing, items etc.</p> <ol style="list-style-type: none"> i. Each location to have separate bin for collecting used disposable masks and possibly infected items. ii. All these bins to be collected daily and disposed of by trained staff wearing proper PPEs 	Concerned Individual, Agency, BHEL
8	<p style="text-align: center;"><u>Provision of Food & Refreshments</u></p> <p>a. Workers: Tea for workers may be avoided. In case necessary, strict social distancing to be ensured, besides hand washing. It is preferable to let the labour bring their own cups/glasses or else use of disposable paper based cups to be encouraged</p> <ol style="list-style-type: none"> i. Tea cups may be arranged by the server and picked by worker in contactless manner. ii. Food for workers may be served in packets. iii. Preparation: Common food preparation to be carried out under strict hygiene with cooks wearing gloves and masks. A guard specifically to monitor the health of the cooks may be deployed, who can warn the management regarding any possible health issues. iv. At tea/ food distribution area, social distancing norms to be ensured <p>b. Officials: As far as possible, home cooked food to be preferred. In case not possible, packed food to be delivered at each seat, prepared in hygienic fashion as above</p>	Agency/ BHEL

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9	<p style="text-align: center;"><u>General Precautions in Site Areas</u></p> <ol style="list-style-type: none"> a. Workers to be instructed to maintain social distancing of minimum 1 m at all time (tool box meeting, tea time lunch time, gate entry time and drinking/service water area) b. Daily Tool Box Meeting to also include awareness about COVID 19 and precautionary measures to prevent spread. c. No other group meeting to be conducted preferably. d. Contractor to keep their working area clean and hygienic. Disinfectant spray/powders to be applied daily at common places (eating place, drinking water area, service water area and transport vehicles) e. All the workers during resting also, to maintain physical distance of at least 1 meter. Subcontractor has to disinfect the rest shelter at regular intervals. f. Subcontractor may keep sanitizer/hand wash in sufficient numbers at all common points. g. All hanging load must be inspected before starting work. A committee can be formed by each contractor to ensure all these pre start up inspections are done and submit the report to BHEL. h. Sanitizer may be kept at stair case entrance, lift entry point etc. Lifts to be avoided to the extent possible, and staircases preferred i. If any worker is found with COVID-19 symptom, he/she has to be sent to quarantine chamber immediately by medical personnel and medical assistance sought. Contractor to maintain extra room to keep person with symptom in quarantine. j. Workers may be advised to keep separate water bottles. Common water bottles/mugs/glasses to be preferably avoided. k. Contact Biometric attendance system is strictly prohibited till such advisory is in place. l. Regular disinfection of all Areas, Equipment and facilities <ol style="list-style-type: none"> i. Each agency to prepare the disinfecting plan and act accordingly. ii. A dedicated disinfectant gang to be identified for the task by each agency. The disinfectant gang to be provided full body suits for the task. iii. All areas (including office premises, site areas, chairs, tables, furniture etc.), tools & equipment to preferably be disinfected by dedicated gang every day before resumption of work. iv. Common touch points like handrails, lift buttons, door/window knobs or handles, vehicle door handles, taps, conference room & dining hall tables/chairs, common sofas/chairs, visitor sofa/chairs, files & folders, etc to preferably be disinfected regularly at frequent intervals every day. v. Pool vehicles, to be disinfected after every use. Social distancing to be maintained inside the common pool vehicles as per Govt./ statutory body guidelines. m. Provision of Disinfectant Spraying Machine and Disinfectant Chemical <ol style="list-style-type: none"> i. Provision of disinfectant machine may be deployed for faster disinfection of surfaces, premises, offices etc. The indicative composition of disinfectant chemicals is given in Corp HR Circular No. AA:HR:MR 1 (C) dated 20-03-2020 n. Disinfecting the operator/driver touch points of Vehicles/cranes, T&Ps etc. Disinfection to also be carried out for all Cranes, Vehicles, Equipment, consoles, T&Ps etc. which come into contact with operating personnel. o. Mandatory Disinfecting of all PPEs, Tools & Items on daily basis All PPEs, Tools & Items to be disinfected mandatorily before use/ issue and also those in stores 	Agency/ BHEL
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	<p>p. Posters on COVID-19</p> <p>q. Sufficient Posters on COVID-19 to be ensured across the site in languages understood by most workers. Contractor to display precautionary measures, 'Do's and Don'ts' at prominent places in languages spoken by their workers.</p> <p>r. Provision of Hand-Hygiene at Site</p> <p>1) In order to ensure hand-hygiene at site, wash basins with sufficient flowing water (going to drain after washing – not re-usable) to be installed at various locations. Here flowing water means water flowing from any tap or poured from tanker/sump/tank etc. Dipping hands into water in buckets/tanks/sumps etc for the purpose of washing is strictly prohibited as it is counter-productive.</p> <p>2) Brief guidelines for hand washing are as below:</p> <ol style="list-style-type: none"> Soap to be provided at each wash basin and replenished regularly. Washing with soap for at least 20 seconds is recommended. As a general guideline, for every 100 workers, 1 wash-basin may be provided at site areas. Close queue to be avoided near wash-basins and 1-meter distance to be maintained. Round markers at 1-meter distance can be ensured as guidance <p>s. Penalty</p> <ol style="list-style-type: none"> To ensure compliance penalty may be imposed in line with district administration norms or higher for not wearing mask or violating social distancing guidelines. Concerned subcontractor may also be warned of stricter penalties in case of continued negligence 	
10	<p style="text-align: center;"><u>Labor Colony</u></p> <p>Following guidelines for COVID Prevention in labor colony may be followed:</p> <ol style="list-style-type: none"> All relevant guidelines in Corporate HSE Circular BHEL:CO: SOP : COVID-19 : 01 to be followed HSEOCP No. 61A for Labor Colony. Any other guidelines issued by applicable Govt/ Statutory authorities 	Agency/ BHEL
11	<p style="text-align: center;"><u>Provision of Quarantine Chambers</u></p> <ol style="list-style-type: none"> In labor colony/ near site, a temporary home quarantine/ isolation chamber may be set up to keep possible infected cases (with cough, cold, fever or other symptoms) until further medical help arrives. Quarantine chamber should be away from labor colony tenements. Similar arrangement of quarantine chambers may be set up at Site premises. Necessary arrangements for quarantine shall be as per Govt./ statutory body guidelines 	Agency/ BHEL
12	<p style="text-align: center;"><u>Action in case any individual is suspected of COVID infection or showing symptoms</u></p> <p>In case any suspected COVID-19 case is found or an individual is showing symptoms like cough/ cold/ fever etc.:</p> <ol style="list-style-type: none"> Immediately alert BHEL HQ & Corporate office, Customer, Local authorities/ district administration, etc Arrange to take the individual to the COVID testing or COVID care facility as per advise of local authorities/district administration Sanitize and disinfect immediately all the areas where the person would have visited in the Project premises and labour colony etc. 	Agency/ BHEL



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	<p>d. Co-operate with the local authorities in identifying and tracing individuals who might have come in close contact with the suspected person. Take immediate action as advised by the local authorities/ district administration, customer, etc including cordoning off or sealing of the area.</p> <p>e. Apprise BHEL offices and customer regularly.</p>	
13	<p><u>Liaison with Specialty Hospitals for COVID-19</u></p> <p>a. Liaison with specialty hospitals for COVID-19 test/treatment facility, for timely care to suspected individuals, and advice.</p> <p>b. Information regarding local authorities dealing with COVID to be maintained</p> <p>c. Addresses of COVID centers for possible scenarios to be maintained</p>	BHEL
14	<p><u>Hazmat Suits and N95 Masks for Medical Personnel</u></p> <p>Medical Personnel at site to be provided hazmat suits besides N95 masks</p>	BHEL
15	<p><u>Training/ Awareness regarding COVID-19</u></p> <p>All site personnel to be given inputs on COVID-19 regularly covering following broad topics: (Workers may be given Pep Talk once a month through Audio-Visual Medium and daily through toolbox talks and officials to be informed in internal meetings as and when they happen.</p> <p>Every meeting to begin with brief discussion on COVID-19 and need to ensure precautions like masks and social distancing).</p> <p>Suggested topics are given below:</p> <p>a. What is COVID-19 & How it spreads through coughing, sneezing and touching mucous membranes like mouth, eyes after touching infected surface</p> <p>b. What are the symptoms of COVID-19, namely coughing accompanied with fever and flu-like symptoms including running nose and sneezing</p> <p>c. The highly infectious spread, Number of infections and fatalities in the world from this disease</p> <p>d. Fatality rate from COVID-19 varies from 1-10% and individuals with preexisting conditions like heart diseases, diabetes, kidney & liver problems, smokers are more vulnerable to have serious effects from Coronavirus infection</p> <p>e. How COVID-19 infected individual can be asymptomatic, but can still infect friends and family members. Infected individual can be immune, but friends and family members can develop serious issues, so it is best to be protected to avoid problems for friends & family and especially elders</p> <p>f. According to studies, Coronavirus can stay on surfaces from few hours to few days, so touching of unknown surfaces to be avoided and hands washed/ sanitized frequently</p> <p>g. There is no cure/ vaccine for this disease so far</p> <p>h. Prevention is the only cure</p> <p>i. Best way to save oneself is to wear mask at all times and not to touch surfaces and protect oneself from infection from respiratory droplets</p>	Agency/ BHEL
16	<p><u>Keeping Updated on COVID-19 in the Area/ Locality</u></p> <p>Site to remain vigilant about any reported COVID-19 cases in the vicinity and take appropriate precautions/actions as advised by the local authorities/district administration</p>	Agency/ BHEL

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17	<p style="text-align: center;"><u>Staggered Shifts to Avoid Contact during Commute</u></p> <ol style="list-style-type: none"> Staggered deployment of labour/staff to be ensured to prevent accumulation of people in work areas as well as in common transport vehicles. Aim is to ensure distance of minimum 1 meter between two occupants Drivers to also wear protective masks, preferably N95 Proper air circulation and ventilation to be ensured in vehicles 	Agency/ BHEL
18	<p style="text-align: center;"><u>Air circulation, filtering and ventilation in Office Premises & Training Halls</u></p> <ol style="list-style-type: none"> Air circulation to be ensured in closed areas Well ventilated areas/rooms preferred to air conditioning, to the extent possible 	Agency/ BHEL
19	<p style="text-align: center;"><u>Guidelines to handle outside papers (eg. At Weigh bridge area, LR copies, gate passes, documents, etc.)</u></p> <ol style="list-style-type: none"> All involved personnel to strictly maintain 1-meter distance and all social distancing and other guidelines PPES like Face mask and gloves to be necessarily worn by the dealing person. If required, papers to be handled using long forceps, ironed on both sides using hot iron, and then handled (with gloves) The driver/ visitor must always wear mask and maintain distance 	Agency/ BHEL
20	<p style="text-align: center;"><u>General/ Other</u></p> <ol style="list-style-type: none"> Shift roster should be followed, Mass gathering meetings should not be conducted. Communications/meetings to be preferably through telephone, Mail, WhatsApp, Web-ex, etc. Face to face meetings to be preferably avoided. In case of unavoidable situations, social distancing to be maintained. Canteen to remain closed preferably. Committee may be formed to monitor implementation of COVID-19 prevention steps besides hygiene and fulfillment of essential needs at labor colony. Office common areas may be sanitized daily (door handle, pantry, washrooms, common printers and other common areas) Vehicle seats and door handle to be sanitized daily. Vehicle arrangement to be made so as to maintain social distancing. Extra persons should not travel in the vehicle. As per Corporate HSE circular, not more than 3 personnel to travel in a single site vehicle (6 seater) at a time After lock down period, on resumption of work, all office equipment such as PC, Printers, AC, etc. are to be disinfected and started one by one after checking for any wear & tear due to rodent acts during lockdown. Banning animals from site: As per recent reports, Coronavirus is also spreading to animals. Hence, all animals may preferably be expelled from site. 	Agency/ BHEL

Note:

- Other precautions as deemed necessary by concerned sites may be ensured in order to ensure strict precautions to prevent even a single case of Coronavirus Infection
- Responsibilities are only indicative – to be decided at Site Level

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Some Useful Links

A. Internet links of Govt and other authoritative sources on COVID-19 and Coronavirus are listed below:

1. MyGov COVID-19-19 Page: <https://www.mygov.in/COVID-19/>
2. Preventive Measures (Advisory) : <https://www.mohfw.gov.in/pdf/PreventivemeasuresDOPT.pdf>
3. Guidelines for Home Quarantine: <https://www.mohfw.gov.in/pdf/Guidelinesforhomequarantine.pdf>
4. Guidelines for COVID-19 Quarantine Facilities: <https://ncdc.gov.in/WriteReadData/l892s/90542653311584546120.pdf>
5. Posters, Dos, Don'ts on COVID-19: <https://www.mohfw.gov.in/>
6. Miscellaneous guidelines and circulars: <https://www.nhp.gov.in/whatsnew>
7. Advisory for Ensuring Safe Drinking Water : <https://www.mohfw.gov.in/pdf/advisorydrinkingwaterpdf.pdf>

B. World Health Organization:

1. Infection Prevention & Control : <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control>
2. Advice for Public : <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
3. Points of Entry & Mass Gatherings: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/points-of-entry-and-mass-gatherings>

Coronavirus Self Declaration Form

- 1) Name:
- 2) Age:
- 3) Father's Name:
- 4) Agency:
- 5) Identification Number.....Identification Type.....
- 6) Arriving from:
- 7) Are you arriving from any COVID Hot Spots or Containment Zones? If Yes, please give details:
- 8) Have you come in contact in with relatives/ friends/ people infected, suspected or diagnosed with COVID-19 in last 21 days? If Yes, please provide your relationship with people and your last contact date with them:
- 9) Have you been advised quarantine/ isolation or undergone treatment w.r.t. COVID-19? If Yes, please provide details (date, duration, location, medical report etc.):
- 10) Please state if you have experienced/ are experiencing any of the following symptoms:


Symptom	Yes	No
i) Fever		
ii) Cough		
iii) Shortness of Breath		
iv) Persistent pain in the Chest		

I acknowledge that the information I have given is accurate and complete.

Date:

Place:

Signature:

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Site to follow all the general safety precautions as per this OCP.

In addition, relevant records pertaining to actions taken to be prepared and kept.

Records:


Record Title	Record No.	Location	Responsibility	Retention Period

Verification, Corrective and Preventive Action:

HOD / Site In-charge shall ensure effective implementation of the above procedure. In case of any deviation, shall take suitable corrective and preventive action.


Revision History

Revision Date	Revision No.	Old Text	New Text	Reason	Revised by
18/04/2020	00	-	-	First Issue	As indicated on Page 1
01/06/2020	01	-	Besides general improvements/ corrections, modifications as below: Added (Other clauses shifted by 2): 1. Deployment of COVID Marshalls 2. Directions for newly Joining Workers/ Officials; Addition of Format F1 Edited: 4. Construction material, unless sanitized to be kept undisturbed for 3 days 6. Sanitization staff to be given coveralls 10. Reference to OCP 61A for COVID Prevention in labor colony added	New Govt. guidelines/ general improvements	PSHQ-HSE

	<h1 style="text-align: center;">OPERATIONAL CONTROL PROCEDURE</h1>	Doc. No.: HSEOCP: 61A Rev. No.: 00 Rev. Date: 27.04.2020 Page 1 of 3
		OCP No. : 61A Prevention of COVID-19 Infection in Labor Colony

Purpose	➤ To ensure necessary precautions in Labor Colony in order to prevent spread of Infectious diseases like COVID-19 among residents	Scope	PS Regions
Applicability	➤ This SOP applies to labor colonies at project sites.		
Responsibility	Concerned Site In-charge / Site HSE Head/Package Head		
Performance Criteria	Number of cases of violations from these guidelines. Violations must be recorded and compliances be done for the same immediately/ within a day		
References	➤ HSEOCP:61 and all References therein This OCP is an Annexure to HSEOCP 61)		

Procedures and Controls		
S No	Activity	Responsibility
1	<p style="text-align: center;"><u>General</u></p> <ul style="list-style-type: none"> a. Norms for social distancing, training/ awareness, face masks, disinfection, sanitization, gate entry, quarantine, medical, action in case of suspect COVID cases etc. as indicated in HSEOCP:61, Corporate HSE Circular BHEL:CO: SOP: COVID-19 : 01 and Govt. guidelines b. Each labor colony will be secured preferably by a boundary wall and gate, manned by a guard. Only workers with valid ID cards to be let inside c. New workers should not be allowed to enter colony without health checkup. 	Agency, BHEL
2	<p style="text-align: center;"><u>Precautions for Living Rooms & Common Areas in Labor Colony</u></p> <ul style="list-style-type: none"> a. Spacing of minimum 2 meters between living areas of workers inside a room may be maintained. Preferably, the living area of each worker may be partitioned using sheet of cloth, plastic etc. b. Rooms to be properly ventilated as far as possible c. Sanitation to be given prime importance and personal hygiene to be promoted d. Outside every common facility, eg. Toilet, washroom, food hall/ canteen etc., provision of washbasin with water (flowing water preferably) and soap (preferably liquid soap) to be ensured e. Round markers with chalk at 1-2 meter distance to prevent crowding at each common facility like toilet, washroom, drinking water point, washing area, mess/ canteen etc. f. Staggered shift planning – In case the capacity of infrastructure and facilities like toilets, washrooms, canteen etc. is not sufficient, workers can be assigned staggered shifts so as to not overwhelm the facilities. A group can depart before the next group starts to get ready. Detailed assessment and planning in this regard is to be carried out by each concerned agency g. Face masks shall be worn by everyone inside the colony premises (Refer 1(a)). h. Sanitisation/Disinfection of all areas to be carried out regularly (Refer 1(a)). i. Spitting of Pan. Gutkha etc. inside the colony and urinating etc. outside the toilets to be strictly avoided j. Regular visits by Doctors to the labor colony can be arranged on non-working day for check-up of all workers k. Banning animals from labor colony: As per recent reports, Coronavirus is also spreading among animals. Hence, all animals to preferably be expelled from labour colony. l. Necessary social distancing to be ensured during cooking and taking food. Separate water bottles, utensils etc to be preferably maintained by each worker to prevent infection. Common cooking to be preferably avoided. In case necessary, adequate care to be taken especially w.r.t. health and well-being of the cook and maintaining proper distance during serving food/ tea etc. 	Agency/ BHEL

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	<ul style="list-style-type: none"> m. Identification of “COVID Wardens” (CWs) by each agency for maintaining the following: <ul style="list-style-type: none"> i. Keeping an eye on the health of workers and report any suspected cases of fever, coughing etc. to the management ii. Keeping an eye on the social distancing measures in the labor colony and report any non-conformances to the management. iii. Educate the workers about social distancing and COVID prevention measures. n. Training/ Awareness regarding COVID-19 <ul style="list-style-type: none"> i. Workers to be instructed to maintain social distancing of minimum 1 m at all time ii. Posters on COVID-19: Sufficient Posters on COVID-19 to be ensured across the labor colony in languages understood by most workers. iii. All workers to be instructed to inform any suspected cases of illness (individual or others) to an emergency contact number of CW, The emergency contact numbers and CW contact numbers to be displayed at prominent locations o. Commute to/ from Labor Colony <ul style="list-style-type: none"> i. Social distancing precautions and masks to be strictly ensured during commute between labor colony and site. Govt. guidelines on occupancy of the vehicles to be followed. ii. In case vehicles are used, concerned drivers to be instructed to keep a watch on the occupants following the necessary social distancing measures and wearing masks. p. Inspection & Review <ul style="list-style-type: none"> i. Daily Inspection by concerned COVID Wardens and reporting to Agency ii. Regular inspection by Agency & BHEL 	
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Note:

1. Other precautions as deemed necessary by concerned sites may be ensured in order to prevent Coronavirus Infections. This OCP suggests minimum requirements. However, Sites may consider alternative actions based on feasibility and circumstances, while adhering to GOI/District Administration/Local Authority guidelines, issued from time to time for social distancing, sanitation, use of face masks, etc
2. Responsibility assignments are only indicative – to be decided at Site Level



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OCP No. : 61A

Prevention of COVID-19 Infection in Labor Colony

Site to follow all the general safety precautions as per this OCP.

In addition, relevant records pertaining to actions taken to be prepared and kept.

Records:

Record Title	Record No.	Location	Responsibility	Retention Period

Verification, Corrective and Preventive Action:

HOD / Site In-charge shall ensure effective implementation of the above procedure. In case of any deviation, shall take suitable corrective and preventive action.

Revision History

Revision Date	Revision No.	Old Text	New Text	Reason	Revised by
27/04/2020	00	-	-	First Issue	PSHQ-HSE

HARBIN AIR CONDITIONING CO., LTD LIST OF DRAWINGS

VOLUME INDEX
HAC-NKP-D-T07

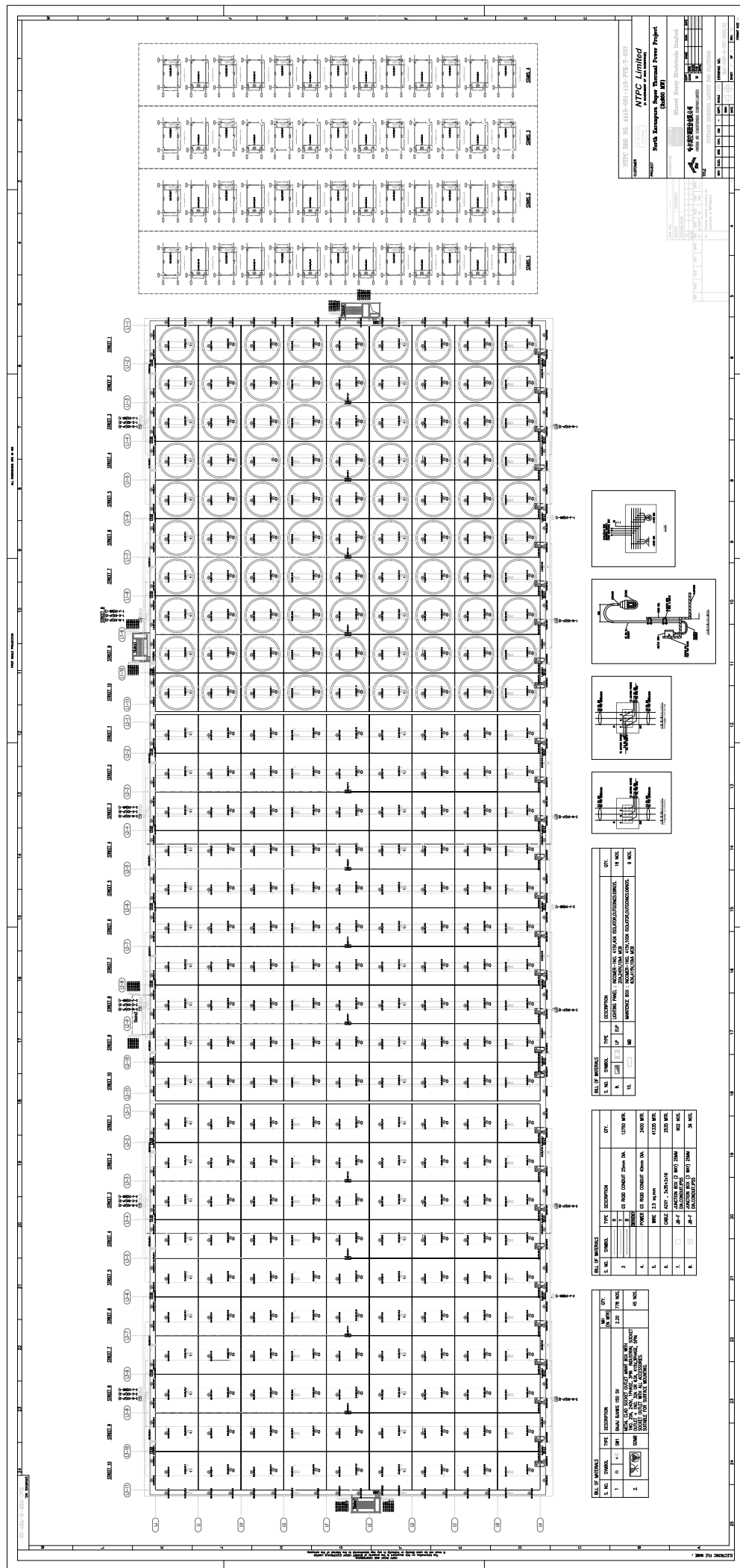
DATE : 14-12-18

PROJECT North Karanpura Super Thermal Power Project PAGE 1
(3x660 MW) OF 1
 PART ELECTRICAL STAGE DETAIL DESIGN
 VOLUME TITLE LIGHTING DRAWING FOR ACC AREA
 DRAWING 19 PAGES REPORTS -- COPIES
 APPROVED BY: --- CHECKED BY: WJX
 REVIEWED BY: QZG DESIGNED BY: GY

NO.	DOCUMENT NO.	DOCUMENT TITLE	MAPSHEET	PAGES	REMARKS
1	HAC-NKP-D-T07-01	MATERIAL LIST	A3	1	
2	HAC-NKP-D-T07-02	ACC SWGR ROOM CABLE TRENCH LAYOUT	A0+0.5	2	
3	HAC-NKP-D-T07-03	LIGHTING PANEL CONNETION FOR UNIT1'S PLATFORM	A1	3	
4	HAC-NKP-D-T07-04	LIGHTING PANEL CONNETION FOR UNIT2'S PLATFORM	A1	3	
5	HAC-NKP-D-T07-05	LIGHTING PANEL CONNETION FOR UNIT3'S PLATFORM	A1	3	
6	HAC-NKP-D-T07-06	OUTDOOR LIGHTING LAYOUT FOR 0m	A1	2	
7	HAC-NKP-D-T07-07	LIGHTING PANEL CONNETION FOR OUTDOOR 0m	A1	2	
8	HAC-NKP-D-T07-08	INDOOR LIGHTING & POWER LAYOUT ACC SYSTEM	A1	3	

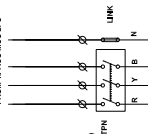
Digitally signed by Samit Kumar Madhukar
 DN: cn=Samit Kumar Madhukar, c=IN, o=NTPC, ou=Task Force, email=samitmadhukar@ntpc.co.in
 Date: 2018.12.31 16:25:02 +05'30'

NOTE:





415V, 3PH, 3WIRE
FROM 19 ACC MCC 2FC



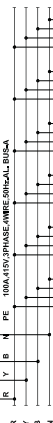
SCHEMATIC DIAGRAM
OF MAINTENANCE BOX
1.J.02.MB-1(IP55)



SCHEMATIC DIAGRAM
OF MAINTENANCE BOX
1.J.03.MB-1(IP55)



SCHEMATIC DIAGRAM
OF MAINTENANCE BOX
1.J.04.MB-1(IP55)



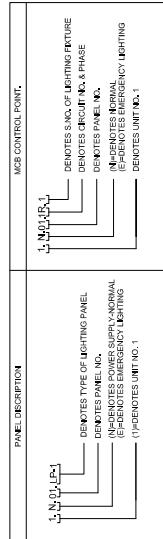
CIRCUIT NO. & PHASE	1R	1Y	1B	2R	2Y	2B	SPARE
CABLE SIZE IN MM ²	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6
EARTH WIRE SIZE IN MM ²	14	14	14	14	14	14	14
NO. OF POINTS	1	1	1	1	1	1	1
LOAD IN WATTS	40000	40000	40000	40000	40000	40000	40000
AREA SERVED	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)
TOTAL LOAD IN PHASE R	80000						
TOTAL LOAD IN PHASE Y		80000					
TOTAL LOAD IN PHASE B			80000				
TOTAL LOAD (KW)	80000						

CIRCUIT NO. & PHASE	1R	1Y	1B	2R	2Y	2B	SPARE
CABLE SIZE IN MM ²	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6
EARTH WIRE SIZE IN MM ²	14	14	14	14	14	14	14
NO. OF POINTS	1	1	1	1	1	1	1
LOAD IN WATTS	40000	40000	40000	40000	40000	40000	40000
AREA SERVED	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)
TOTAL LOAD IN PHASE R	80000						
TOTAL LOAD IN PHASE Y		80000					
TOTAL LOAD IN PHASE B			80000				
TOTAL LOAD (KW)	80000						

CIRCUIT NO. & PHASE	1R	1Y	1B	2R	2Y	2B	SPARE
CABLE SIZE IN MM ²	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6	35/45+1/6
EARTH WIRE SIZE IN MM ²	14	14	14	14	14	14	14
NO. OF POINTS	1	1	1	1	1	1	1
LOAD IN WATTS	40000	40000	40000	40000	40000	40000	40000
AREA SERVED	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)	UNIT 1 (L1-L2)
TOTAL LOAD IN PHASE R	80000						
TOTAL LOAD IN PHASE Y		80000					
TOTAL LOAD IN PHASE B			80000				
TOTAL LOAD (KW)	80000						

NOTES:-

1. ALL DIMENSIONS IN MM AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED ON THE DRAWING.
2. LOCATION OF ALL RECEPTACLES/PANEL SHOWN IN THE DRAWING IS INDICATIVE ONLY, AND MAY BE REVISED/RELOCATED IN CASE OF COLLISION WITH OTHER SERVICES OR EQUIPMENT.
3. THE MOUNTING TYPE OF LIGHTING FIXTURES INDICATED IN TABLE-A IN THIS DRAWING SHALL BE USED UNLESS OTHERWISE SPECIFIED.
4. LIGHTING PANELS SHALL BE EARTHED BY 25X4 AL STRIP/PLAT AT TWO SEPARATE POINTS. THE EARTHING POINTS SHALL BE THE NEAREST EARTHING GRID AS PER LAYOUT OF NTPC.
5. NO RECEPTACLE SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
6. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
7. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
8. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
9. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
10. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
11. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
12. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
13. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
14. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
15. LOCATION OF ALL RECEPTACLES/PANEL SHOWN IN THE DRAWING IS INDICATIVE ONLY, AND MAY BE REVISED/RELOCATED IN CASE OF COLLISION WITH OTHER SERVICES OR EQUIPMENT.
16. THE MOUNTING TYPE OF LIGHTING FIXTURES INDICATED IN TABLE-A IN THIS DRAWING SHALL BE USED UNLESS OTHERWISE SPECIFIED.
17. LIGHTING PANELS SHALL BE EARTHED BY 25X4 AL STRIP/PLAT AT TWO SEPARATE POINTS. THE EARTHING POINTS SHALL BE THE NEAREST EARTHING GRID AS PER LAYOUT OF NTPC.
18. NO RECEPTACLE SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
19. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
20. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
21. IN OFFICE AREAS & CONTROL ROOMS SWITCH BOXES SHALL BE FLUSH MOUNTED IN WALLS & JBS SHALL BE RECESS MOUNTED.
22. LIGHTING PANELS SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
23. CONDUITS SHALL BE KEPT, WHEREVER POSSIBLE AT LEAST 300 mm AWAY FROM WALLS & JBS.
24. WIRING INSTALLATION IN WAREHOUSES AREAS BETWEEN LIGHTING PANELS, JUNCTION BOXES, FIXTURES, RECEPTACLES ETC. SHALL BE DONE IN G CONDUITS SUPPORTED BY METAL STANDS/BEAMS & WALLS BY USING METALLIC SADDLES/COMPS AT AN INTERNAL OF 1.0 M.
25. RECEPTACLES & LIGHTING FIXTURES SHALL BE FED FROM DIFFERENT CIRCUITS.
26. TO DISTINGUISH EMERGENCY AC FIXTURES FROM NORMAL AC FIXTURES, RED PAINTED MARKS SHALL BE USED ON EMERGENCY LIGHTING FIXTURES.
27. SELF CONTAINED EMERGENCY LIGHTING FIXTURES SHALL BE GENERALLY BE INSTALLED IN OFF SITE AREAS ON WALL/COLUMN/STRUCTURES AS REQUIRED AT SITE.
28. EQUIPMENT REFER RESPECTIVE NTPC EQUIPMENT LAYOUT DRAWINGS.
29. LOCATION OF LIGHTING/SOCKET OUTLET/PANELS/JBS ARE TENTATIVE ONLY AND MAY BE CONSULTATION WITH SITE ENGINEER.





DATE
14.12.2018

NTPC DRG NO. 4410-001-110-PVE-T-037

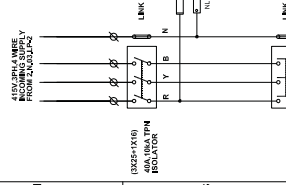
CUSTOMER
NTPC
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT
North Karanpura Super Thermal Power Project
(3x660 MW)

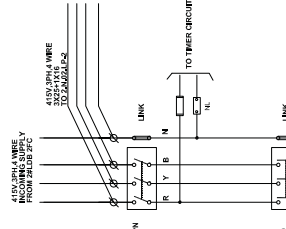
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			HARSEN AIR CONDITIONING COMPANY LIMITED									
			DEPT	NAME	DATE							
			CODE	DRN	DESN	14.12.2018						
		CRD	14.12.2018									

TITLE
LIGHTING PANEL CONNECTION FOR UNIT'S PLATFORM

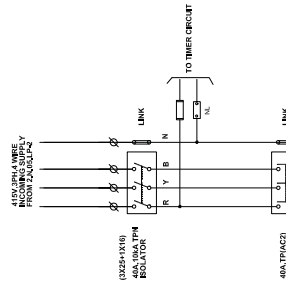
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REV.	02								
SHEET	3	OF	3						
DATE									
REV.	02								
FORMAT	SIZE	A1							



SCHEMATIC DIAGRAM
OF LIGHTING PANEL
2.N.02.LP-2(IP55)

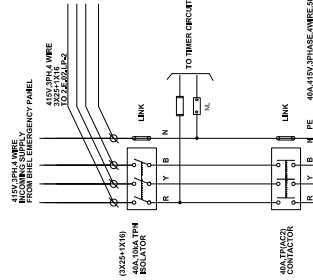


SCHEMATIC DIAGRAM
OF LIGHTING PANEL
2.N.03.LP-2(IP55)

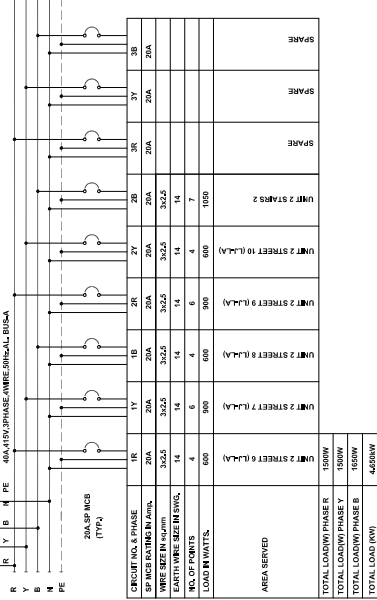



































































































SCHEMATIC DIAGRAM
OF LIGHTING PANEL
2.N.04.LP-2(IP55)

60A/15V/PHASE A WIRE SCHEDULE-BUILD									
R	Y	B	N	PE	R	Y	B	N	PE
20A-60P ACBS (TYPE)									
CIRCUIT NO. & PHASE									
1R 20A 20A 20A 20A 20A 20A 20A 20A 20A									
WIRE SIZE IN MM ²									
WIRE SIZE IN INCH									
EARTH WIRE SIZE IN MM ²									
NO. OF POINTS									
LOAD IN WATTS									
AREA SERVED									
UNIT 2 STREET 1 (L&E)									
UNIT 2 STREET 2 (L&E)									
UNIT 2 STREET 3 (L&E)									
UNIT 2 STREET 4 (L&E)									
UNIT 2 STREET 5 (L&E)									
SPARE									
SPARE									
SPARE									
SPARE									
TOTAL LOADIN PHASE A									
2800W									
TOTAL LOADIN PHASE B									
2800W									
TOTAL LOADIN PHASE C									
2800W									
TOTAL LOADIN PHASE D									
2800W									
TOTAL LOAD (MW)									
72000W									



**SCHEMATIC DIAGRAM
OF LIGHTING PANEL**
2.E.03.LP-2(IP55)

[illegible]

PANEL DESCRIPTION	MOS CONTROL POINT
                                                                                                	

NTPC DRG NO. 4410-001-110-PVE-T-037


CUSTOMER

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

एन टी पी सी
NTPC


PROJECT
North Karanpura Super Thermal Power Project
(3x660 MW)

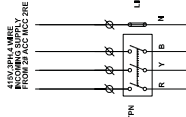
JOB NO.	: 405			
STATUS	: CONTRACT			
DISTRIBUTION :				
TO				
No. OF				
REV	DATE	ALTD	CHD	APPD

CONTRACTOR  **Bharat Heavy Electricals Limited**

	DEPT	NAME	SIGN	DATE
 HARBIN AIR CONDITIONING COMPANY LIMITED	DRN CODE			14.12.2018
	DESJN			14.12.2018
	CHD			14.12.2018
	AORD			14.12.2018
	M			14.12.2018
				14.12.2018

TITLE

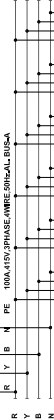
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						 SIGN	
						DATE	SHEET 2 OF 3 REV. 02



SCHEMATIC DIAGRAM
OF MAINTENANCE BOX
2.J.03.MB-1(IP55)



SCHEMATIC DIAGRAM
OF MIANTENCE BOX
2.J.04.MB-1(IP55)

[illegible]

NO.	AREA	SP. RATIO	SP. RATIO IN AREA	AREA SERVED				TOTAL LOAD (W)	TOTAL LOAD (MW)
				UNIT 1 (L1)	UNIT 2 (L2)	UNIT 3 (L3)	UNIT 4 (L4)		
1	AREA SERVED								
2	AREA SERVED								
3	AREA SERVED								
4	AREA SERVED								
5	AREA SERVED								
6	AREA SERVED								
7	AREA SERVED								
8	AREA SERVED								
9	AREA SERVED								
10	AREA SERVED								
11	AREA SERVED								
12	AREA SERVED								
13	AREA SERVED								
14	AREA SERVED								
15	AREA SERVED								
16	AREA SERVED								
17	AREA SERVED								
18	AREA SERVED								
19	AREA SERVED								
20	AREA SERVED								
21	AREA SERVED								
22	AREA SERVED								
23	AREA SERVED								
24	AREA SERVED								
25	AREA SERVED								
26	AREA SERVED								
27	AREA SERVED								
28	AREA SERVED								
29	AREA SERVED								
30	AREA SERVED								
31	AREA SERVED								
32	AREA SERVED								
33	AREA SERVED								
34	AREA SERVED								
35	AREA SERVED								
36	AREA SERVED								
37	AREA SERVED								
38	AREA SERVED								
39	AREA SERVED								
40	AREA SERVED								
41	AREA SERVED								
42	AREA SERVED								
43	AREA SERVED								
44	AREA SERVED								
45	AREA SERVED								
46	AREA SERVED								
47	AREA SERVED								
48	AREA SERVED								
49	AREA SERVED								
50	AREA SERVED								
51	AREA SERVED								
52	AREA SERVED								
53	AREA SERVED								
54	AREA SERVED								
55	AREA SERVED								
56	AREA SERVED								
57	AREA SERVED								
58	AREA SERVED								
59	AREA SERVED								
60	AREA SERVED								
61	AREA SERVED								
62	AREA SERVED								

15. LOCATION OF ALL RECEPTACLES/PANEL SHOWN IN THE DRAWING IS INDICATIVE ONLY AND MAY BE REVISED/RELOCATED IN CASE OF FOLLING WITH OTHER SERVICES OR TO SUIT SITE CONDITIONS IN CONSULTATION WITH THIS SITE MANAGER/ENGINEER.
16. THE FOLLOWING IS A GENERAL GUIDELINE FOR EACH ELECTRICAL POINT TO BE LOCATED AT SITE IN ORDER TO BE FOLLOWED BY THE CONTRACTOR:
17. LIGHTING PANELS SHALL BE MOUNTED BY 2003 ALU STRIP/FAN ON TWO SEPARATE WALLS/CEILING. LIGHTING POINTS SHALL BE NEARBY TURNING CORNERS PER EACH LAYOUT
18. NO RECEPTACLE SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
19. ALL QUANTITIES OF CONDUIT, WIRES AND EARTHING WIRES SHOWN IN THIS DRAWING ARE APPROXIMATE. CONTRACTOR MUST OBTAIN THE EXACT QUANTITIES TO BE WORKED OUT AT SITE BEFORE THE START OF WORK IN THIS AREA.
20. FOR SINGLE LINE DIAGRAM OF NORMAL LIGHTING, EMERGENCY LIGHTING AND DC SYSTEMS SEE ATTACHED DRAWINGS.
21. IN OFFICES & JCB SHALL BE RECESS MOUNTED
22. IN CORROSIVE AREAS USE BATTERY ROOM WATER TREATMENT PLANT ETC.
23. CONDUITS SHALL BE KEPT WHEREVER POSSIBLE AT LAST 30 CM AWAY FROM HOT PIPES, HEATING DEVICES ETC.
24. CONDUITS SHALL NOT BE USED FOR ANY OTHER PURPOSES THAN FOR THE CARRYING OF RECEPTABLES ETC. SHALL BE USED FOR ALL CONDUITS SUPPORTED BY WALLS/CEILING.
25. RECEPTABLES & WALLS BY USING METALLIC SADDLES/CAMPS AT AN INTERVAL OF 100 CM.
26. TO DISTINGUISH EMERGENCY AS FIXTURES FROM NORMAL AC FIXTURES, RED PAINTED CIRCULAR MARK OF 1.0CM DIA. TO BE PROVIDED ON EMERGENCY FIXTURES.
27. IN OFF SITE AREAS ON WALL/CONCRETE STRUCTURES AS REQUIRED AT SITE.
28. THIS DRAWING IS ONLY FOR LIGHTING LAOUT PURPOSE. FOR EXACT LOCATION OF LIGHTING SOCKET OUTLET/PANELS/JBBS ARE TENTATIVE ONLY AND MAY BE REVISED/RELOCATED IN CASE OF FOLLING WITH OTHER SERVICES AT SITE IN CONSULTATION WITH THE SITE MANAGER/ENGINEER.

PANEL DESCRIPTION	MCB CONTROL POINT
	DENOTES S.NO. OF LIGHTING FIXTURE DENOTES CIRCUIT NO. & PHASE DENOTES PANEL NO. (N)-DENOTES NORMAL (E)-DENOTES EMERGENCY LIGHTING DENOTES UNIT NO. 1

DATE	14/12/20
------	----------

NTPC DRG NO. 4410-001-110-PVE-T-037

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)



North Karanpura Super Thermal Power Project
(3x660 MW)

JOB NO.		: 405	
STATUS		: CONTRACT	
DISTRIBUTION :			
TO			
No. Of			
REV	DATE	ALTD	CHD
			APPO

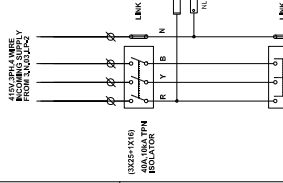
Bharat Heavy Electricals Limited

	HAREN AIR CONDITIONING COMPANY LIMITED				
	DEPT		NAME	SIGN	DATE
	CODE				
		DRN	DESN	CHD	
				14.12.2018	
				14.12.2018	
				14.12.2018	

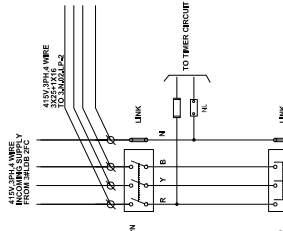
LIGHTING PANEL CONNECTION FOR UNIT2'S PLATFORM

MAX	ELEC.	MSE	C&I	DEPT.	SCALE 1:100	 	DRAWING NO. HAC-NKP-D-T07-04(3/3)
				SIGN			
				DATE	SHEET 3 OF 3 REV. 02		

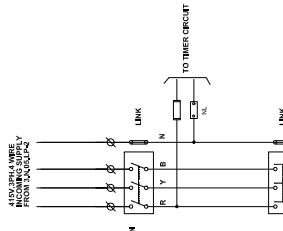
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SCHEMATIC DIAGRAM
OF LIGHTING PANEL
3.N.02 LP-2 (IP55)

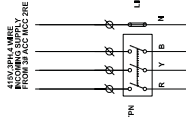


SCHEMATIC DIAGRAM
OF LIGHTING PANEL
3.N.03 LP-2 (IP55)



SCHEMATIC DIAGRAM
OF LIGHTING PANEL
3.N.04 LP-2 (IP55)

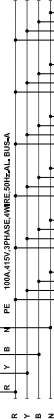
60A 415V PHASE A WIRE SIGNAL BUS											
R	Y	B	N	PE							
						</					



SCHEMATIC DIAGRAM
OF MAINTENANCE BOX
3.J.03.MB-1(IP55)



SCHEMATIC DIAGRAM
OF MIANTENCE BOX
3.J.04.MB-1(IP55)



	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SPRUE	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67																																	

[illegible]

15. LOCATION OF ALL RECEPTACLES/PANELS SHOWN IN THE DRAWING IS INDICATIVE ONLY AND MAY BE REVISED/RELOCATED IN CASE OF FOLLING OUT OTHER SERVICES OR TO SUIT SITE CONDITIONS IN CONSULTATION WITH NTPC SITE MANAGER/ENGINEER.
16. TO BE FOLLOWED IN ADDITION TO THE DRAWING. THE FOLLOWING ARE TO BE FOLLOWED IN ADDITION TO THE DRAWING.
17. LIGHTING PANELS SHALL BE PROVIDED BY 2003 ALL STEEL PLAT AT 2% FLAREHOUT AND DISTANT POINTS WITH THE NEAREST SUPPLY POINT AS PER EXISTING LAYOUT.
18. NO RECEPTACLE SHALL BE FIRED FROM EMERGENCY LIGHTING SYSTEM.
19. ALL QUANTITIES OF CONDUIT, Wires AND EXISTING Wires ETC SHOWN IN THIS DRAWING ARE APPROXIMATE AND NOT TO BE DEPENDANT TO BE WORKED OUT AT SITE BEFORE THE START OF WORK IN THIS AREA.
20. FOR SINGLE LINE DIAGRAM OF NORMAL LIGHTING, EMERGENCY LIGHTING AND DC LIGHTING.
21. IN OFFICES & CONTROL ROOMS SWITCH BOXES SHALL BE FLUSH MOUNTED IN WALLS & BBS SHALL BE RECESS MOUNTED.
22. IN CORROSIVE AREAS LIKE BATTERY ROOM, WATER TREATMENT PLANT ETC CONDUITS SHALL BE LEFT WHEREVER POSSIBLE AT LEAST 300 MM AWAY FROM HOT PIPES, HEATING DEVICES ETC.
23. CONDUITS SHALL BE SUPPORTED BY PLASTIC OR METAL HANGERS, UNLESS OTHERWISE SPECIFIED ON COLUMN/BEAMS & WALLS BY USING METALLIC SADDLES/CLAMPS AT AN INTERVAL OF 1.00 M.
24. RECEPTACLES & LIGHTING FIXTURES SHALL BE FROM DIFFERENT CIRCUITS.
25. TO DISCHARGE EMERGENCY AC FIXTURES FROM NORMAL AC FIXTURES, RED PAINTED CIRCULAR MARK OF 100 MM DIA. TO BE PROVIDED ON EMERGENCY FIXTURES.
26. TO DISCHARGE EMERGENCY AC FIXTURES FROM NORMAL AC FIXTURES, RED PAINTED CIRCULAR MARK OF 100 MM DIA. TO BE PROVIDED ON EMERGENCY FIXTURES.
27. THIS DRAWING IS ONLY FOR LIGHTING LAYOUT PURPOSES. FOR EXACT LAYOUT OF LIGHTING/CONDUIT/OUTLET PANELS/DBs ARE TYPICALLY ONLY MAY BE BY THE REVISIONS/RELOCATED IN CASE OF FOLLING OUT OTHER SERVICES AT SITE IN CONSULTATION WITH NTPC SITE MANAGER/ENGINEER.

VCB CONTROL POINT



DENOTES S.N.O. OF LIGHTING FEATURE
 DENOTES CIRCUIT NO. & PHASE
 DENOTES PANEL NO.
 (N)-DENOTES NORMAL
 (E)-DENOTES EMERGENCY LIGHTING

DATE _____

14.12.2018

NTPC DRG NO. 4410-001-110-PVE-T-037



एन टी पी सी
NTPC

**North Karanpura Super Thermal Power Project
(3x660 MW)**

Bharat Heavy Electricals Limited

DEPT CODE	NAME	DATE	SIGN
DRN		14.12.20	
DESIN		14.12.20	
CHD		14.12.20	
APPD		14.12.20	

LIGHTING PANEL CONNECTION FOR UNIT3'S PLATFORM

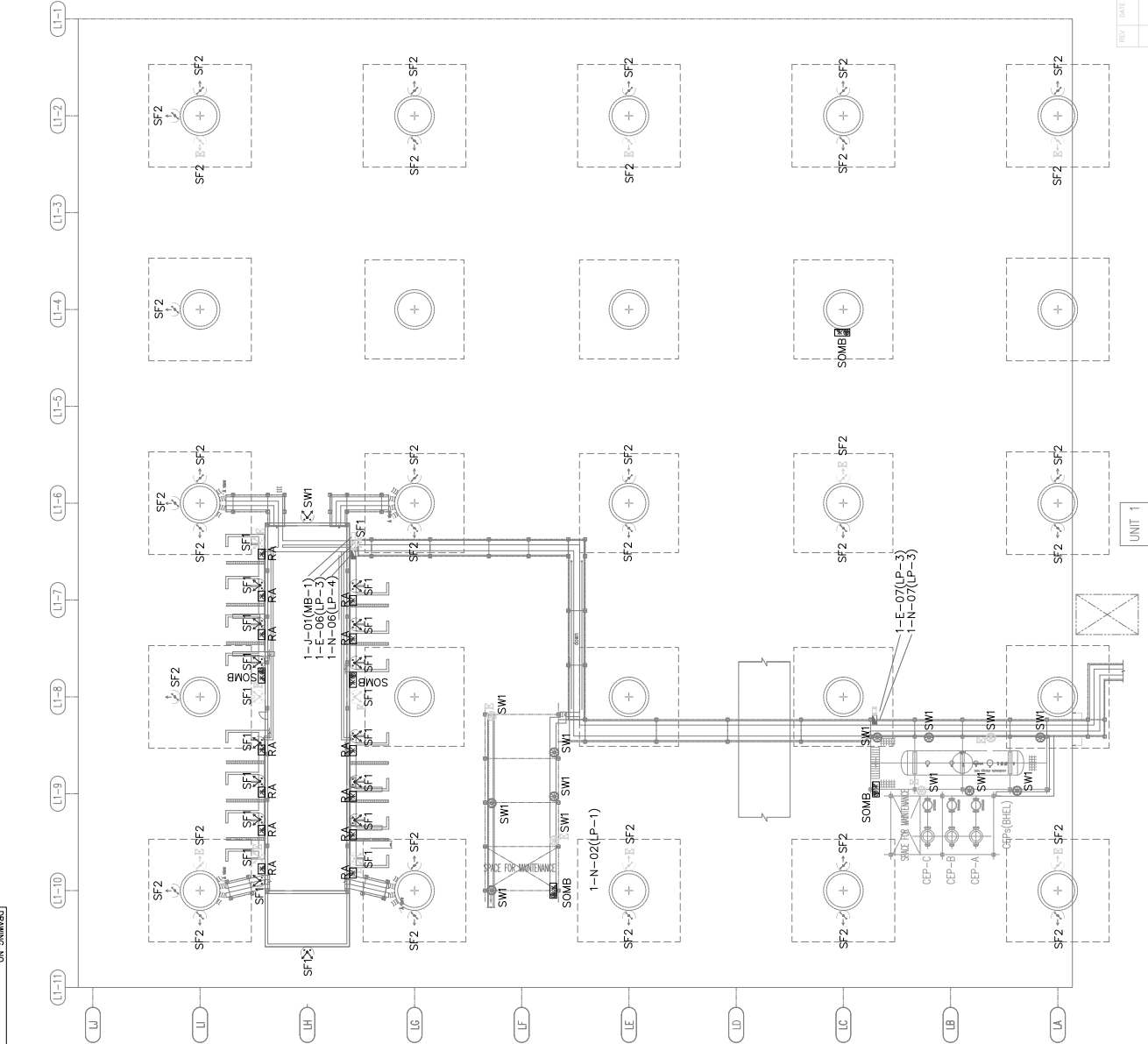
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FORMAT SIZE A

(2/1)90-20L-0-0XN-3VH
ON DIMENSIONS

FIRST ANGLE PROJECTION

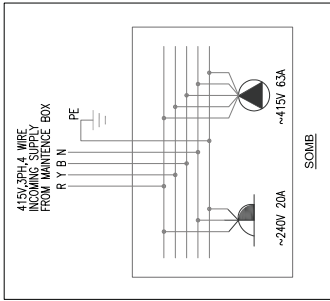
ALL DIMENSIONS ARE IN MM



BILL OF MATERIALS FOR EACH UNIT				
S. No.	SYMBOL	TYPE	DESCRIPTION	QTY.
1.		SF2	BAJAJ BJFL 400 SV T S	35 NOS.
2.		SWI	BAJAJ BJWMS 150 SV (CONDENSER PLATFORM) (VACUUM PUMP AREA)	13 NOS.
3.		SF1	BAJAJ BGEWF 70 SV T	21 NOS.

BILL OF MATERIALS FOR EACH UNIT		
S/NO.	SYMBOL	TYPE DESCRIPTION
4		METAL CLAD SOCKET OUTLET MANT BOX WITH 1NO. 20A, 240V, 1PHASE, 3PIN INDUSTRIAL SOCKET OUTLET + 1NO. 32A OR 63A, 415V, 3PHASE, 5PIN SOCKET OUTLET WITH ALL ACCESSORIES. SUITABLE FOR SURFACE MOUNTING.
5		20A, 240V, 1PHASE, 3PIN INDUSTRIAL METAL CLAD INDUSTRIAL SOCKET OUTLET WITH SWITCH GI GANG BOX ETC. SUITABLE FOR SURFACE MOUNTING.

BILL OF MATERIALS FOR EACH UNIT				
S. NO.	SYMBOL	TYPE	DESCRIPTION	QTY.
6.		LP	LIGHTING PANEL : INCOMER-1NO. 415V/40A ISOLATOR OUTGOINGS: 08NOS. 20A/240V/10A MCB	1 NOS.
7.		ELP	LIGHTING PANEL : INCOMER-1NO. 415V/40A ISOLATOR OUTGOINGS: 08NOS. 20A/240V/10A MCB	3 NOS.
8.		MB	MAINTENANCE BOX : INCOMER-1NO. 415V/100A ISOLATOR, DIACONDUIT : OUTGOINGS: 08NOS. 63A/415V/10A MCB	1 NOS.



DATE
14/12/2018

NTPC DRG NO. 4410-001-110-PVE-T-037

CUSTOMER
NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT
**North Karanpura Super Thermal Power Project
(3x660 MW)**

CONTRACTOR
Bharat Heavy Electricals Limited

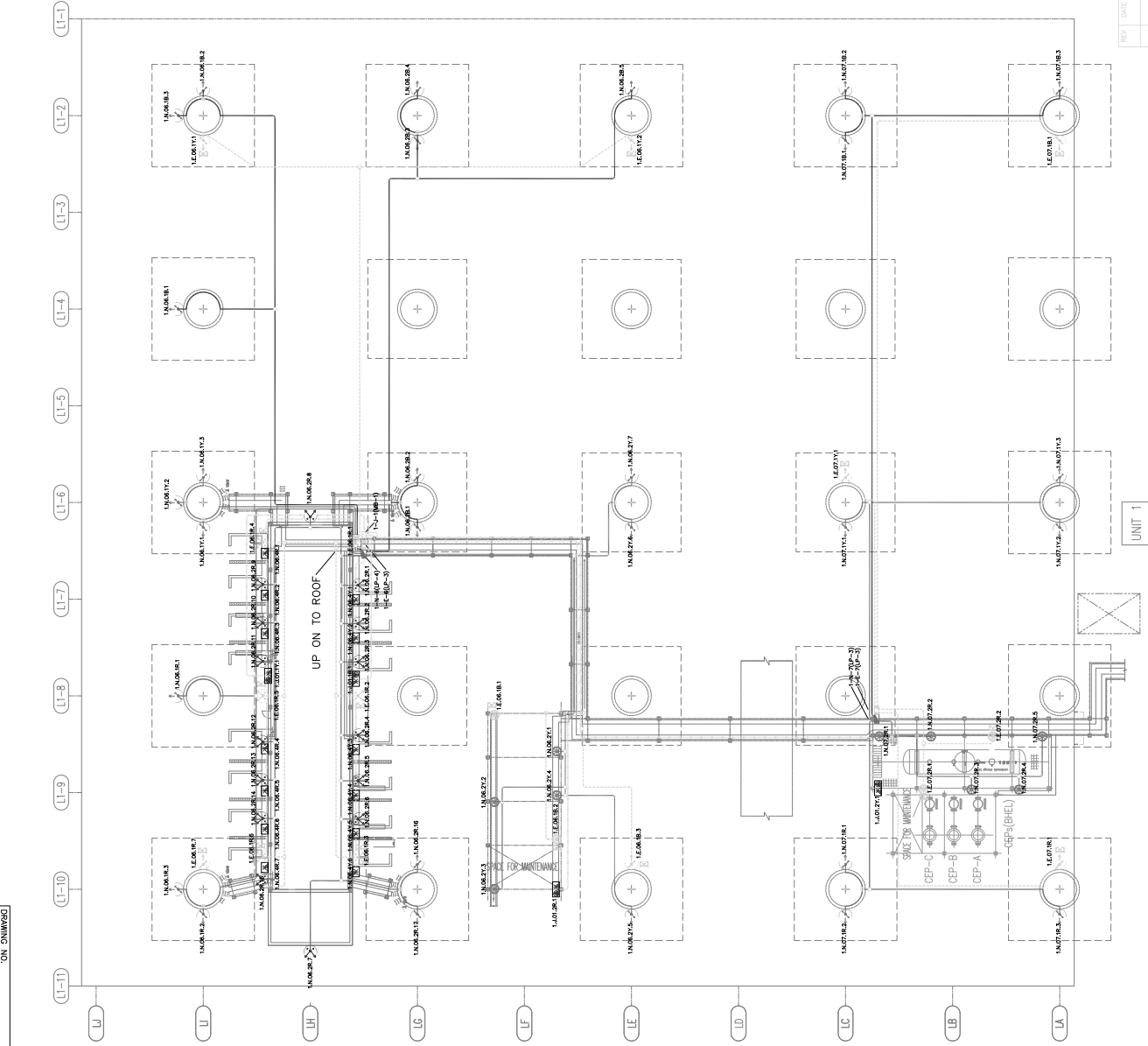
DESIGN
CODE
NAME
DATE

TITLE
HARBIN AIR CONDITIONING COMPANY LIMITED
M APPS

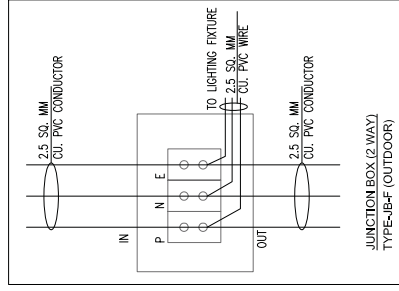
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HAC-NKP-D-T07-008(I/2)

SHEET 1 OF 3 REV. 08

FORMAT SIZE



BILL OF MATERIALS FOR EACH UNIT					
S. No.	SYMBOL	TYPE	DESCRIPTION	QTY.	
1	○	JB-F	PULL OUT BOX (4 WAY) SUITABLE FOR 25MM DIA.CONDUIT	11 NOS.	
2	□	JB-F	JUNCTION BOX (2 WAY) 25MM DIA.CONDUIT	52 NOS.	
3	—	R Y B	GS RIGID CONDUIT 25m.m DIA.	2470 MTR.	
4	—	EMERGENCY	GS RIGID CONDUIT 40m.m DIA.	165 MTR.	
5	—	WIRE	2.5 sq.mm	6930 MTR.	
6	—	CABLE	AZXY , 3x35+2x16	400 MTR.	



DATE
14/12/2015

NTPC DRG NO. 4410-001-110-PVE-T-037

CUSTOMER
NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT
North Karanpura Super Thermal Power Project
(3x660 MW)

CONTRACTOR
Bharat Heavy Electricals Limited

DESIGNER
HARSH ARI CONSTRUCTION COMPANY LIMITED

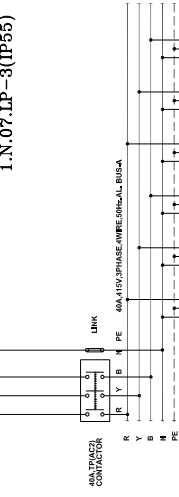
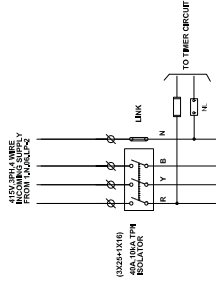
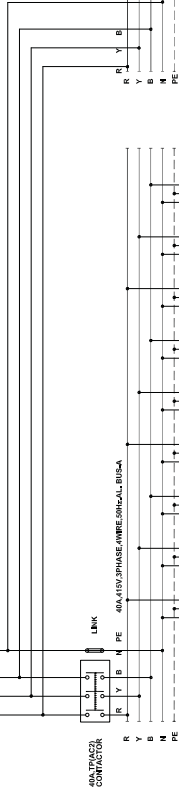
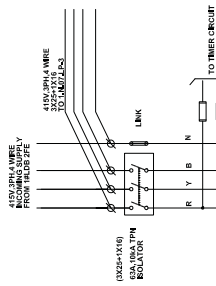
TITLE
OUTDOOR LIGHTING LAYOUT FOR 0m

JOB NO. : 405	STATUS : CONTRACT
DISTRIBUTION :	
TO :	
REV. DATE	CHD
APPD	CHD
REV. DATE	CHD
APPD	CHD

11	10	9	8	7	6	5	4	3	2	1
LA	LB	LC	LD	LE	LF	LG	LH	LI-11	LI-10	LI-9
LI-8	LI-7	LI-6	LI-5	LI-4	LI-3	LI-2	LI-1			



BHARAT
HEAVY
ELECTRICALS
LIMITED



AREA SERVED	UNIT 1 (L1-L6)	UNIT 1 (L1-L4, L12)	UNIT 1 (L5-L10), ON ROOF	UNIT 1 (L5-L10, L12)	VACUUM PUMP AREA	UNIT 1 (L5-L10, L12)	UNIT 1 (L1-L12)	SPARE	SPARE	SPARE	
	10A	20A	30A	40A	50A	60A	70A	80A	90A	20A	
	14	14	14	14	14	14	14	14	14	14	
	30x25	30x25	30x25	30x25	30x25	30x25	30x25	30x25	30x25	30x25	
	1200	1200	1200	1200	1650	1650	2000	2000	2000	2000	
TOTAL LOADWASH PHASE A		TOTAL LOADWASH PHASE B		TOTAL LOADWASH PHASE C		TOTAL LOADWASH PHASE D		TOTAL LOADWASH PHASE E		TOTAL LOADWASH PHASE F	
3500W		3500W		3500W		3500W		3500W		3500W	
TOTAL LOADWASH PHASE Y		TOTAL LOADWASH PHASE Z		TOTAL LOADWASH PHASE A		TOTAL LOADWASH PHASE B		TOTAL LOADWASH PHASE C		TOTAL LOADWASH PHASE D	
5250W		5250W		5250W		5250W		5250W		5250W	





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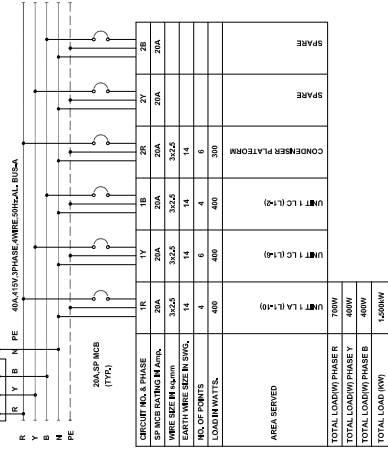
NOTES:-

1. ALL DIMENSIONS IN MM AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED ON THE DRAWING.
2. THE MOUNTING HEIGHT OF LIGHTING FIXTURES / SOCKETS / PANELS / EXH. FANS SHALL BE 2.40M FROM FINISHED FLOOR LEVEL.
3. LIGHTING PANEL BOTTOM : FFL + 1200 MM
4. OUTDOOR MANTENCE BOX : FFL + 900 MM
5. LIGHTING FIXTURE SHALL GENERALLY BE GROUP CONTROLLED DIRECTLY FROM A LIGHTING PANEL.
6. LIGHTING PANELS EXCEPT SMALL ROOMS, OFFICE AREA OR ELSE SPECIFIED ON A C.E. NORMAL, A C. EMERGENCY WIRING SHALL BE RUN THROUGH OUT IN SEPARATE CONDUITS, RUNS ALONG EACH CONDUIT.
7. SEPARATE NEUTRAL WIRE SHALL THROUGHOUT RUN ALONG EACH CONDUIT.
8. INSIDE OF WALLS AND CEILING WIRING OF SAME PHASE RUNNING IN THE SAME CONDUIT SHALL BE SEPARATED BY 25MM.
9. FROM 3.2/5.1/5.3 SAME WIRE, THE SAME SHALL BE TAKEN THROUGH A CONDUIT OF 25MM UP TO BUNCHING OF GROUPS THROUGH JUNCTION BOXES / PULL BOXES.
10. FROM 2.20M TO 2.40M, 2.40M TO 2.60M, 2.60M TO 2.80M CONDUIT SIZE SHALL BE 20MM.
11. CONDUIT SIZE OF CONDUIT SHALL BE 20MM AND WIRE SIZE 22/4.0 50MM.
12. CONDUIT SHALL BE USED FOR THE PURPOSE.
13. NO OTHER SIZE OF CONDUIT SHALL BE USED.
14. CONDUIT SECTION BOX SHALL BE PROVIDED FOR LAST FIXTURE CONNECTED TO CONDUIT.
15. NO LIGHTING FIXTURE SHALL BE DIRECTLY SUSPENDED FROM THE JUNCTION BOX.
16. THE WIRE SIZE FOR WIRING BETWEEN THE JUNCTION BOX AND LIGHTING FIXTURE SHALL BE 32/2.50MM (CU).
17. 2.00M WIRE SHALL BE CONNECTED AT EACH TERMINAL.
18. 2.00M WIRE SHALL BE CONNECTED AT EACH TERMINAL.
19. ENDORSING OF JUNCTION BOXES LIGHTING FIXTURES/TERMINAL BLOCKS SHALL BE DONE BY THE CONTRACTOR.
20. 4.3A WELDED SCREWS SHALL BE USED FROM THE WELDING BOB.
21. 4.3A SCREWS SHALL BE USED FOR THE SCREWS OF THE JUNCTION BOX.
22. 4.3A SCREWS BETWEEN SHEATHING LEAD AND EQUIPMENT (PANEL) SHALL BE USED.

15. LOCATION OF ALL RECEPTACLES/PANESL SHOWN IN THE DRAWING IS INDICATIVE ONLY, AND MAY BE REVISED/DELOCATED IN CASE OF FOLLOWS WITH OTHER SERVICES OR TO SUIT SITE CONDITIONS IN CONSULTATION WITH NTPC SITE INCHARGE/ENGINEER.
16. THE WORK SHALL BE COMPLETED WITHIN THE TIME FRAME MENTIONED AT SITE IN ORDER TO FOLLOW UP ON GENERAL CONTRACTOR'S SCHEDULE.
17. LIGHTING PANELS SHALL BE MARKED BY 200x300 STRIP/FAT/ TWO SEPARATE AND DISTINCT POINTS WITH THE NEAREST BYPASS SWITCH AS PER EACH LAYOUT
18. NO RECEPTACLE SHALL BE FED FROM EMERGENCY LIGHTING SYSTEM.
19. ALL QUANTITIES OF CONDUIT, WIRES AND EARTHING Wires SHOWN IN THIS DRAWING ARE APPROXIMATE AND CONTRACTOR SHALL BE REQUIRED TO PUT AT SITE BEFORE THE START OF WORK IN THIS AREA.
20. FOR SINGLE LINE DIAGRAM OF NORMAL LIGHTING, EMERGENCY LIGHTING AND DC SUPPLY, SEE ATTACHED DRAWINGS.
21. IN WALLS AND CEILING, CONTROL ROOM SWITCH BOXES SHALL BE FLUSH MOUNTED
22. IN OFFICE AREA, CONTROL ROOM SWITCH BOXES SHALL BE HUNG ABOUT 2.0 METRE ABOVE GROUND LEVEL.
23. CONDUITS SHALL BE KEPT WHEREVER POSSIBLE AT LEAST 300 mm AWAY FROM HIGH PRESSURE HEATING DEVICES SUCH AS STEAM PIPES, JUNCTION BOXES, PATTERNS & WALLS BY USING METALLIC SADDLES/CAMPS AT AN INTERVAL OF 1.0 M.
24. RECEPTABLES & LIGHTING FIXTURES SHALL BE FED FROM DIFFERENT CIRCUITS.
25. TO DISTINGUISH EMERGENCY GAS FIXTURES FROM NORMAL GAS FIXTURES, RED PAINTED STRIPS SHALL BE USED.
26. SELF CONTAINED EMERGENCY LIGHTING FIXTURES SHALL BE GENERALLY BE INSTALLED IN OFF SITE AREAS ON WALL/HOUSTURES AS REQUIRED AT SITE.
27. EQUIPMENT, RESPECTIVE NTPC EQUIPMENT LAOUT DRAWINGS.
28. LOCATION OF LIGHTING/AUXILIARY OUTLET SHALL BE DETERMINED ONLY MAY BE IN CONSULTATION WITH SITE ENGINEER.

[illegible][illegible]

DATE		14.12.2018																	
NTPC DRG NO. 4410-001-110-PYE-T-037 <div style="display: flex; justify-content: space-around; align-items: center;"> <div>  <p>NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)</p> </div> <div> <p>North Karanpura Super Thermal Power Project (3x860 MW)</p> </div> </div>																			
CUSTOMER																			
PROJECT																			
CONTRACTOR		 <p>Bharat Heavy Electricals Limited</p>																	
<div style="display: flex; align-items: center;">  <div> <p>HABRI AIR CONDITIONING COMPANY LIMITED</p> </div> </div>		<table border="1"> <thead> <tr> <th>DEPT</th> <th>NAME</th> <th>SSN</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>DESIGN</td> <td></td> <td></td> <td>14.12.2018</td> </tr> <tr> <td>CHECK</td> <td></td> <td></td> <td>14.12.2018</td> </tr> <tr> <td>APPROV</td> <td></td> <td></td> <td>14.12.2018</td> </tr> </tbody> </table>		DEPT	NAME	SSN	DATE	DESIGN			14.12.2018	CHECK			14.12.2018	APPROV			14.12.2018
DEPT	NAME	SSN	DATE																
DESIGN			14.12.2018																
CHECK			14.12.2018																
APPROV			14.12.2018																
TITLE LIGHTING PANEL CONNECTION FOR OUTDOOR 0m																			
MAX	ELEC	WSE	CIVIL																
DEPT.		SCALE	1:100																
CAM		-																	
SSN																			
DATE		<table border="1"> <thead> <tr> <th>SHEET</th> <th>1</th> <th>OF</th> <th>2</th> </tr> </thead> <tbody> <tr> <td colspan="4" style="text-align: center;"> HAC-NKP-DR-010-07(1/2) </td> </tr> </tbody> </table>		SHEET	1	OF	2	HAC-NKP-DR-010-07(1/2)											
SHEET	1	OF	2																
HAC-NKP-DR-010-07(1/2)																			
REV.		02																	
FORMAT SIZE A																			



LIGHTING FIXTURE L & PHASE

DATE
14/12/2018

NTPC DRG NO. 4410-001-110-PVE-T-037

CUSTOMER



NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

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NTPC

PROJECT
North Karanpura Super Thermal Power Project
(3x660 MW)

JOB NO.	: 405
STATUS	: CONTRACT
DISTRIBUTION	:
TO	
No. OF	
REV	DATE
	ALTD
	CHD
	APPD

TITLE

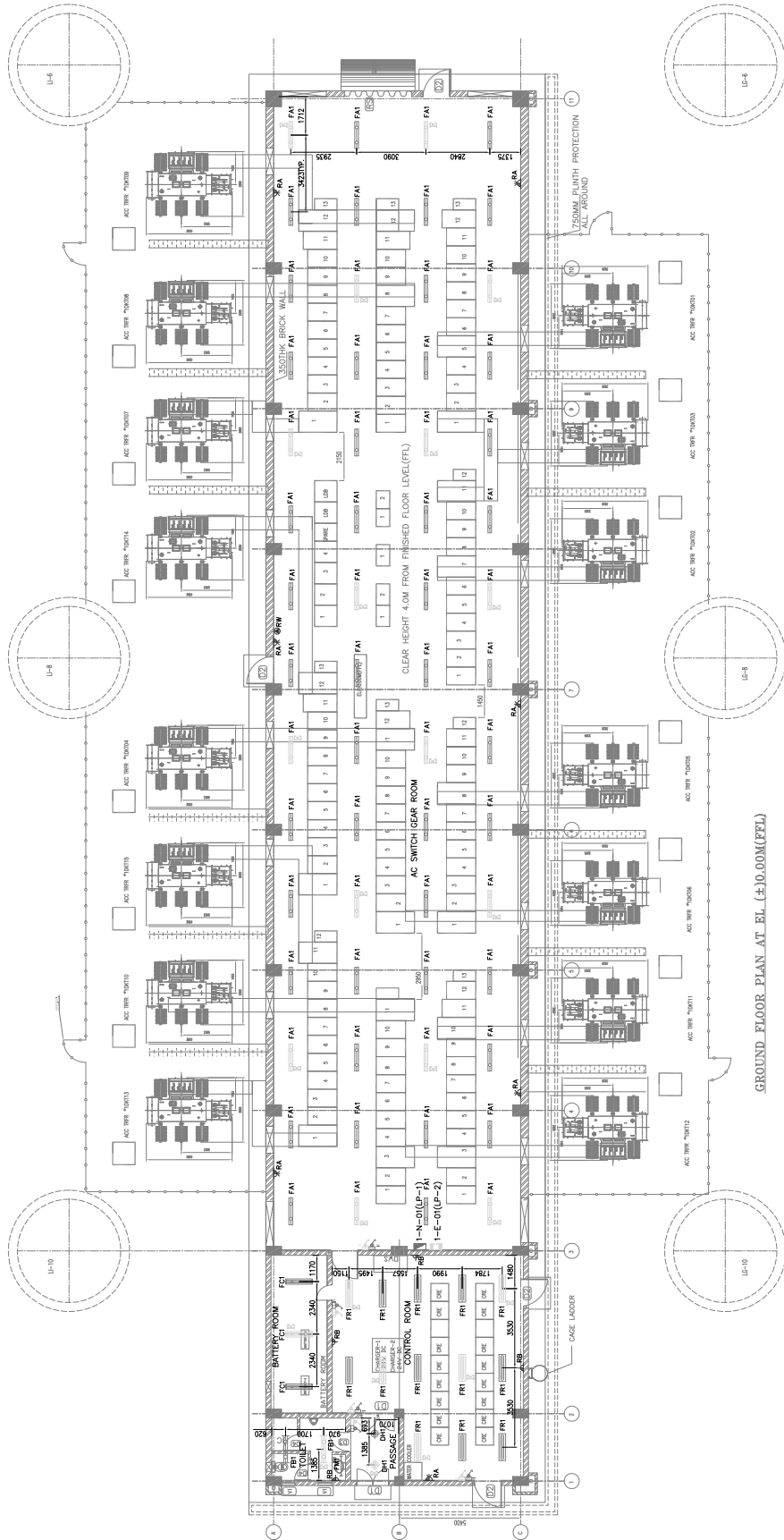
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FORMAT SIZE A1

(C/1) 00-001-110-PVE-T-037
ON DWM640

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM



GROUND FLOOR PLAN AT EL. (+0.00M(F.F.L))

DATE

08.12.2018

NTPC DRG NO. 4410-001-110-PVE-T-037

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT
North Karanpura Super Thermal Power Project
(3x660 MW)

CONTRACTOR
Bharat Heavy Electricals Limited

DEPT	CODE	NAME	DATE
M	APPS		

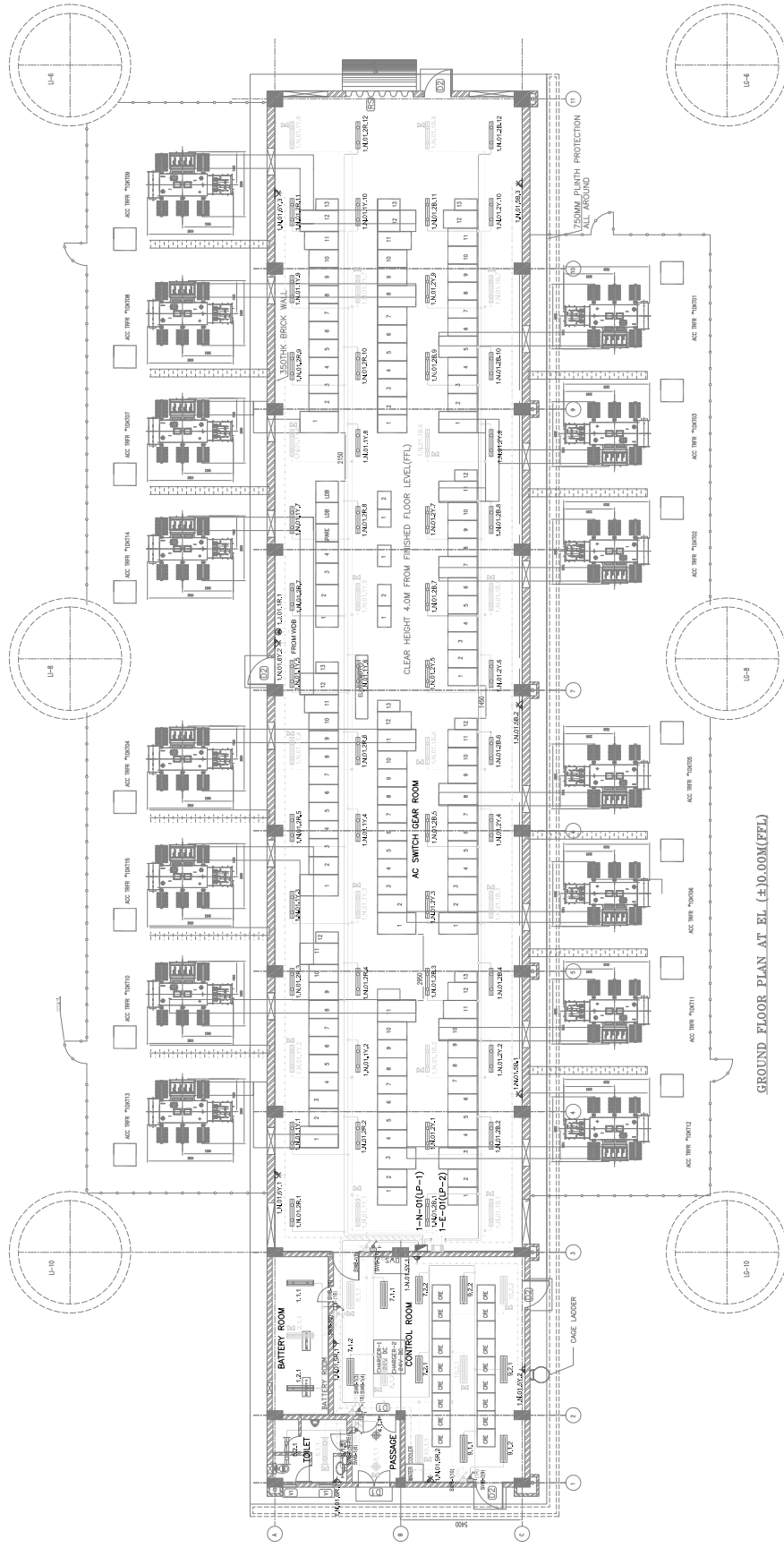
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REV	DATE	BY	CHK	APP	DATE	REV	DATE	BY	CHK	APP	DATE
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FORM SIZE : 11 10 9 8 7 6 5 4 3 2 1

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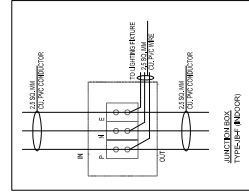
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GROUND FLOOR PLAN AT EL (+)0.00M(FFL)


LEGEND / BILL OF QUANTITIES		DESCRIPTION		QTY.
SERIAL NO.	SYMBOL	TYPE		
01		RA	20A, 240V, 3PHASE, 3PN INDUSTRIAL METAL CLAD INDUSTRIAL SOCKET OUTLET WITH SWITCH ON GANG BOX ETC. SUITABLE FOR SURFACE MOUNTING.	04 NOS.
02		RB	6/6A/240V, 1 PHASE, UNIVERSAL MODULAR TYPE SOCKET OUTLET WITH SWITCH ON GANG BOX, FANCL SWITCHES ETC. RUSTED MOUNTING TYPE.	07 NOS.
03		RW	63A,415V/3 PHASE, .5PN SOCKET OUTLET WITH PLUGTOP AND ALL ACCESSORIES. SUITABLE FOR SURFACE MOUNTING.	01 NO.
04		R	GS RIGID CONDUIT 25mm DIA.	990 MTR.
05		JB-F	JUNCTION BOX (2 WAY) 25MM DIA.CONDUIT	90 NOS.
06		PB	PULL OUT BOX (4 WAY) SUITABLE FOR 25MM DIA.CONDUIT	12 NOS.
07		LP-1	LIGHTING PANEL - INCOMER-INO. 415V/6.3A ISOLATOR/OUTGOINGS:18NOS.	01 NO.
08		ELP-1	LIGHTING PANEL - INCOMER-INO. 415V/40A ISOLATOR/OUTGOINGS:09NOS.	01 NO.

LEGEND / BILL OF QUANTITIES				QUANTITIES
S. No.	SYMBOL	TYPE	DESCRIPTION	QUANTITIES (M IN MTR)
1.		FAT	BA/JA BTIE 228 TS	3.4 60 NOS.
2.		FCI	BA/JA BT 228 TS	3.5 63 NOS.
3.		FBI	BA/JA 13605 DZSL LED	3.0 13 NOS.
4.		DBI	BA/JA BTR 128 TS	3.0 02 NOS.
5.			BA/JA 13371 DZSLD 18W	3.1 02 NOS.
6.		FMI	MIRROR LIGHT	01 NO.




LEGEND / BILL OF QUANTITIES				
S.NO.	TYPE	LEGEND	DESCRIPTION	QTY.
1			SWITCH BOARD WITH 5A-2NOS. SWITCHES	08 NOS.
2			SWITCH BOARD WITH 5A-3NOS. SWITCHES+NO. 5A SOCKET.	02 NOS.

JOB NO.	: 405									
STATUS	: CONTRACT									
DISTRIBUTION	:									
TO										
No. OF										
REV	DATE	ALTD	CHD	APPD						

MAX	ELEC.	MSE	CIVIL	C&I	-	DEPT.	SCALE	1:100	DRAWING NO. HAC-NKP-D-T07-08(2/3)
						SIGN		SHEET 2 OF 3	
						DATE			

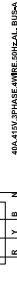
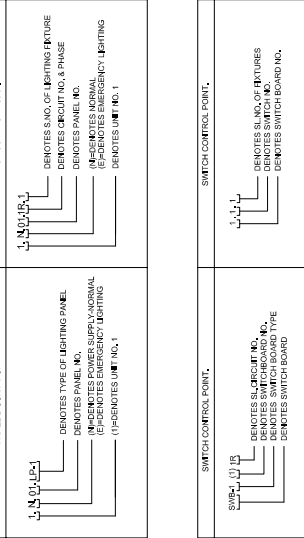
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MAX	ELEC.	MSE	CIVIL	C&I	-	DEPT.	SCALE	1:100	DRAWING NO. HAC-NKP-D-T07-08(2/3)
						SIGN		SHEET 2 OF 3	
						DATE			

FORMAT SIZE A

ELECTRONIC FILE NAME :

SCHEMATIC DIAGRAM
OF LIGHTING PANEL
1.E.01.LP-2(IP55)


[illegible]

NTPC DRG NO. 4410-001-110-PVE-T-037

North Karanpura Super Thermal Power Project
(3x660 MW)

DATE	SIGN	NAME	DEPT CODE	DRN	DRN CODE
08.12.2018					
08.12.2018			DESIN		
08.12.2018			CHD		
08.12.2018			M		

TITLE





MAX	ELEC.	MSE	CIVIL	C&I	DEPT.	SCALE 1:100	DRAWING NO. HAC-NRP-D-T07-08(3/3)	
					-			
							SHEET 3 OF 3	REV. 00

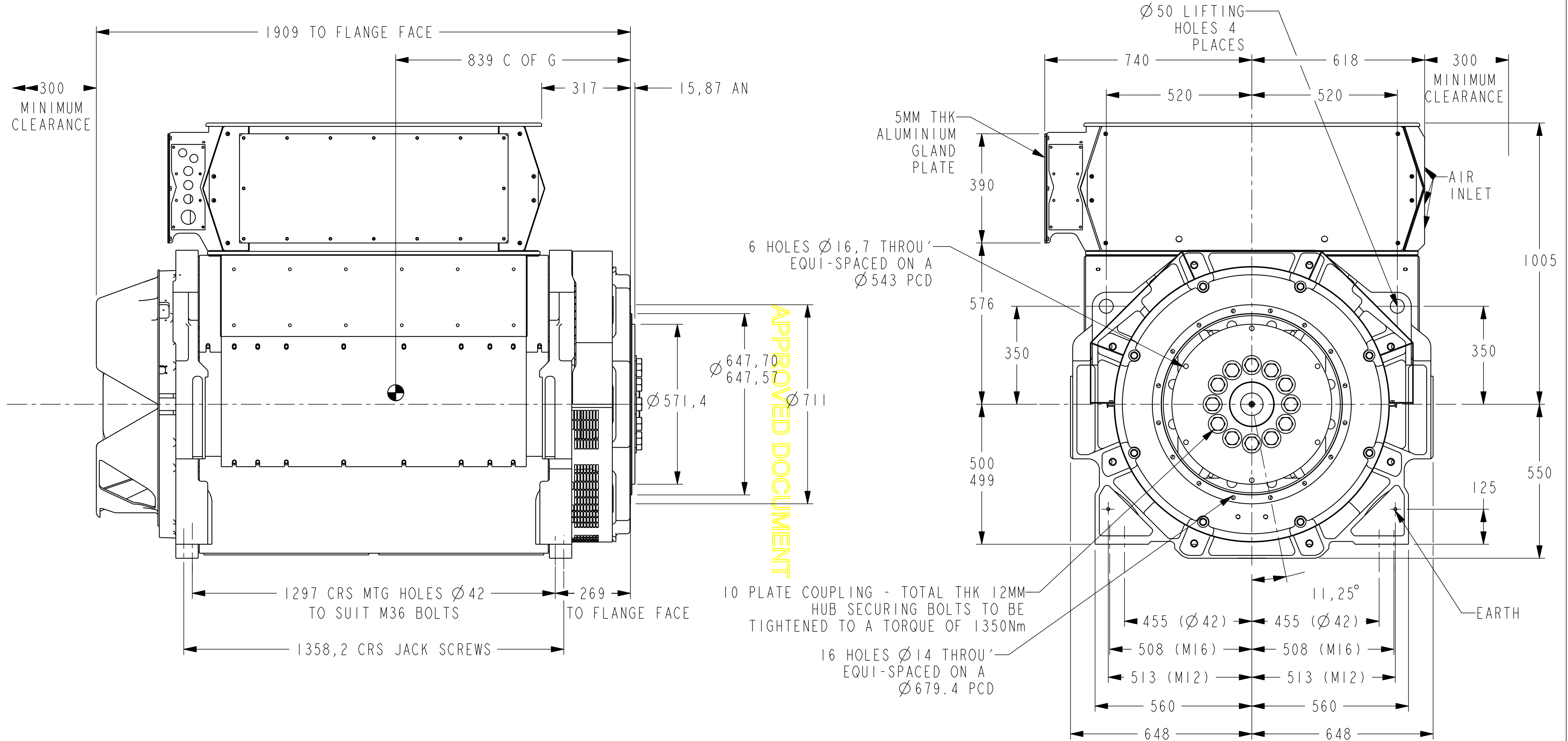
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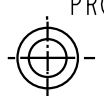
[DG SETS - GA DRAWING & DETAILS OF ALTERNATOR, ENGINE, ACCOUSTIC ENCLOSURE, FUEL TANK, TERMINAL BOX, AUX PANEL, BATTERY CHARGER & BASE FRAME.]

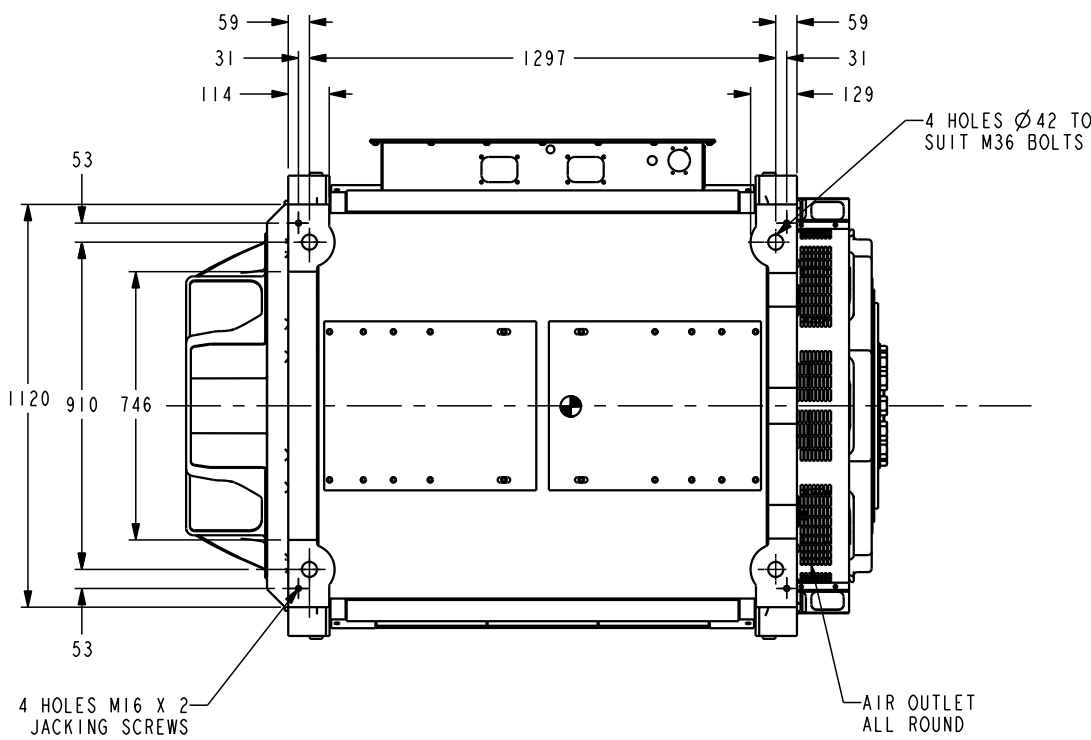
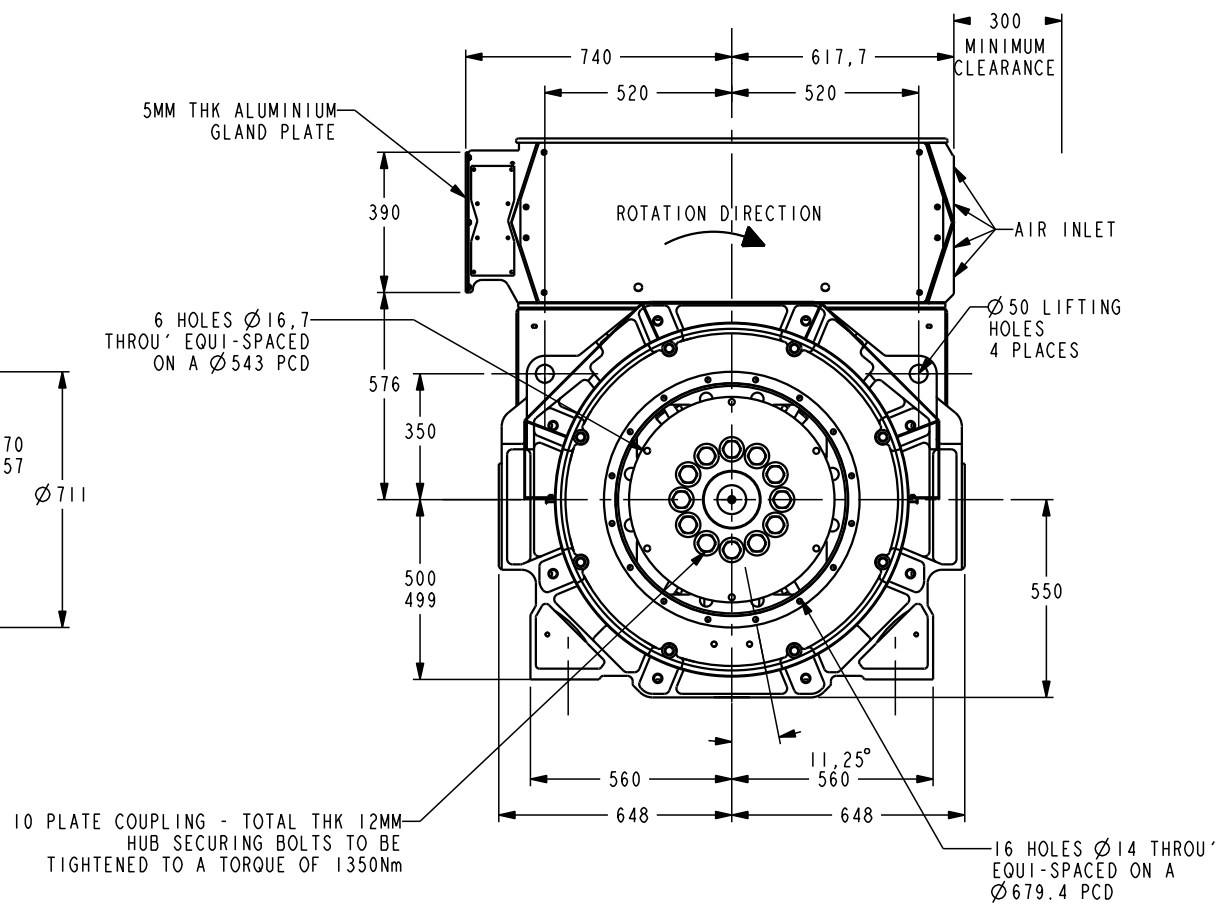
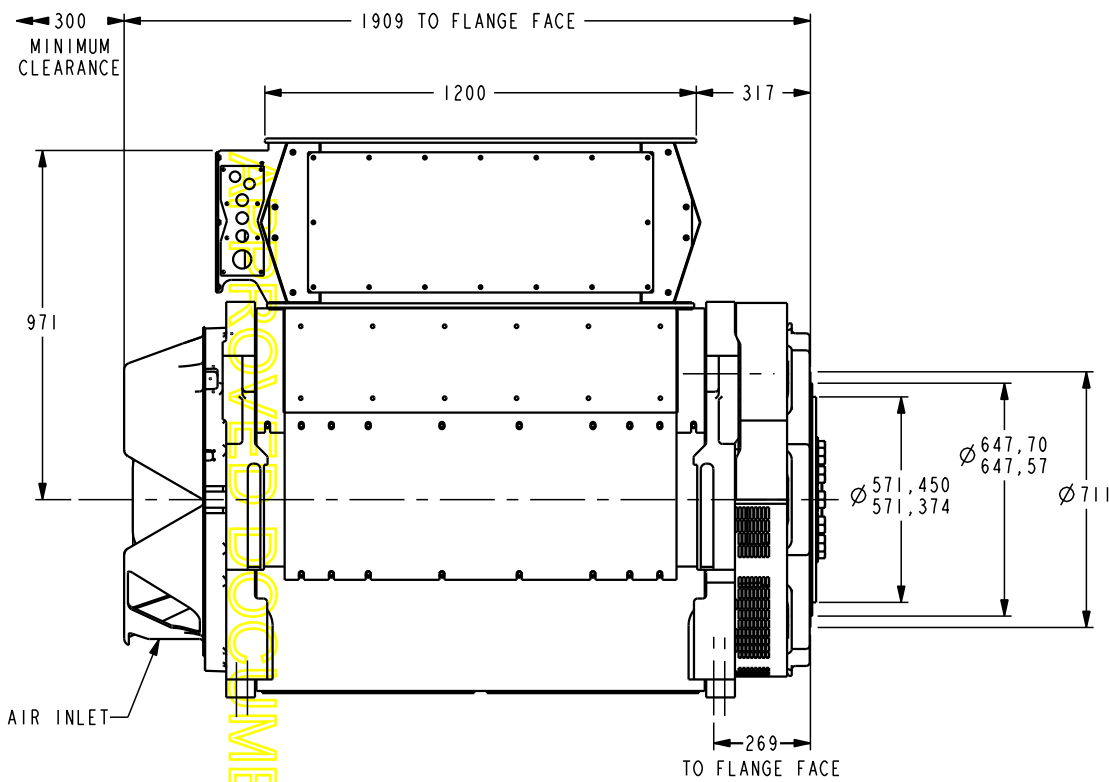
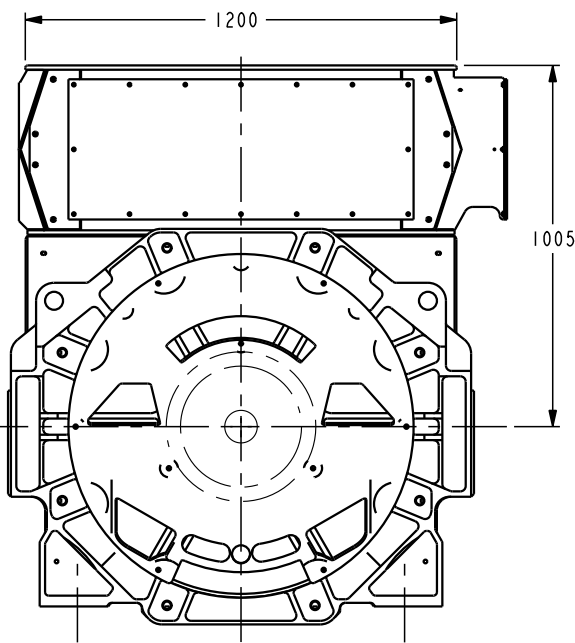
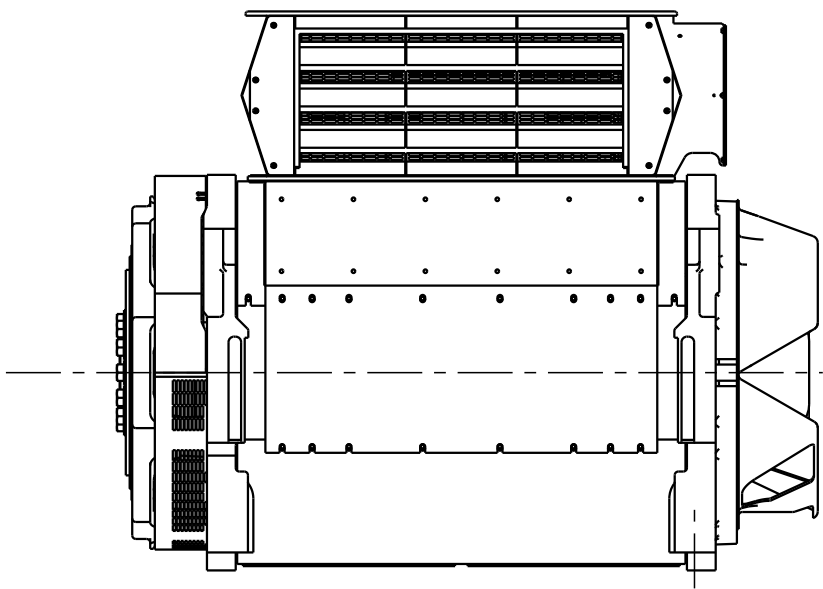
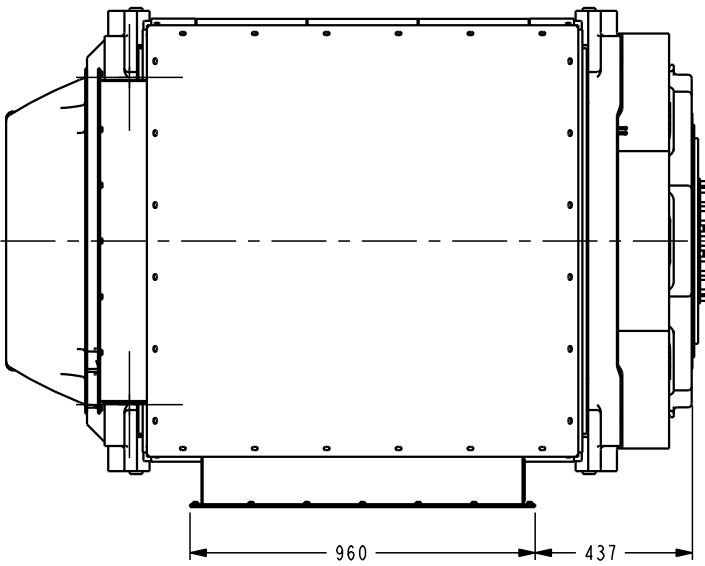
***Notes :-**

1. Busbar Panel not applicable since DG sets are connected through Bus Duct.
2. Engine & Battery charger drawings of Kudgi project has been endorsed.


01	23.06.2016	RESUBMISSION AS PER COMMENTS																									
00	05.05.2016	FIRST RELEASE	Lalit	Sanjay																							
REV NO.	DATE	DESCRIPTION	DRAWN	APPD.																							
EPC CONTRACTOR:			PROJECT :																								
<div><div></div><div>BHARAT HEAVY ELECTRICALS LTD. INDUSTRIAL SYSTEMS GROUP BANGALORE</div></div>			NORTH KARANPURA STPP (3X660 MW) (EPC PACKAGE)																								
CUSTOMER:		CONSULTANT:	SUPPLIER :																								
<div><div></div></div>		<div><div></div></div>	<div><div></div><div>M/S. JAKSON LIMITED</div></div>																								
DRAWN BY			BHEL –ISG DRG NO: IS-3-GA-684-800-A001	REV.	SHEET																						
CHECKED BY																											
APPROVED BY																											
SCALE	NTS	<table><tr><td>4</td><td>4</td><td>1</td><td>0</td><td>-</td><td>0</td><td>0</td><td>1</td><td>-</td><td>2</td><td>1</td><td>5</td><td>-</td><td>P</td><td>V</td><td>E</td><td>-</td><td>B</td><td>0</td><td>4</td><td>8</td></tr></table> NTPC DRAWING NUMBER			4	4	1	0	-	0	0	1	-	2	1	5	-	P	V	E	-	B	0	4	8	01	1 OF 38
4	4	1	0	-	0	0	1	-	2	1	5	-	P	V	E	-	B	0	4	8							



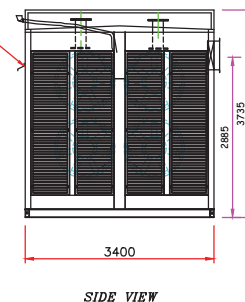
					CONFIDENTIAL PROPERTY OF CUMMINS GENERATOR TECHNOLOGIES LTD					P80 ALTERNATOR LV S CORE CENTRE HEIGHT = INTEGRAL 500 CONNECTION DISC SAE18						
					MATERIAL PROPS -		DIMENSIONS IN MILLIMETRES (MM) AT 20°C		PROJECTION 			SCALE 1:10	MATERIAL SEE BOM			
					FINISH SPEC -				WEIGHT = 5794 KG		DRG. SIZE C	CASTING No -				
					GEOMETRY SPEC -						DRAWN	AGS	14/05/08	PART No		ISSUE A
					ASSEMBLY SPEC -		SURFACE FINISH VALUES IN MICRO METRES		CHECKED	JWS	15/05/08	REL. PHASE P		80-2474		
					PERFORMANCE SPEC -				APPROVED	R.MAC	21/05/08	Pro/ENGINEER			SHEET	1
					QUALITY SPEC -		UNLIMITED DIMS ± --									
4-9606-01					A	AGS	14/05/08	ORIGINAL ISSUE								
MOD.					ISSUE	DRAWN	DATE	MODIFICATION								








FRAME	P80
CORE LENGTH	S
VOLTAGE RATING	LV
BEARINGS	I
CENTRE HEIGHT	INTEGRAL 500
ADAPTOR	SAE0
COUPLING	SAE18
ENCLOSURE	IP23
CABLE ENTRY FROM DE	LEFT

CONFIDENTIAL PROPERTY OF CUMMINS GENERATOR TECHNOLOGIES LTD						P80 ALTERNATOR LV S CORE CENTRE HEIGHT = INTEGRAL 500 CONNECTION DISC SAE18			
MATERIAL PROPS		- DIMENSIONS IN MILLIMETRES (MM) AT 20°C	<div>PROJECTION</div> <div></div>			SCALE		MATERIAL	
FINISH SPEC						1:10		SEE BOM	
GEOMETRY SPEC		SURFACE FINISH VALUES IN MICRO METRES	WEIGHT = 5793,919 KG			DRG. SIZE		CASTING No	
ASSEMBLY SPEC			DRAWN AGS 14/05/08			A		-	
PERFORMANCE SPEC		UNLIMITED DIMS ± --	CHECKED JWS 15/05/08			REL. PHASE		PART No	
QUALITY SPEC			APPROVED R.MAC 21/05/08			P		80-2474	
						PROENGINEER		ISSUE A	
						SHEET		2 OF 2 SHEETS	

4-9606-01	A	AGS	14/05/08	ORIGINAL ISSUE
MOD.	ISSUE	DRAWN	DATE	MODIFICATION






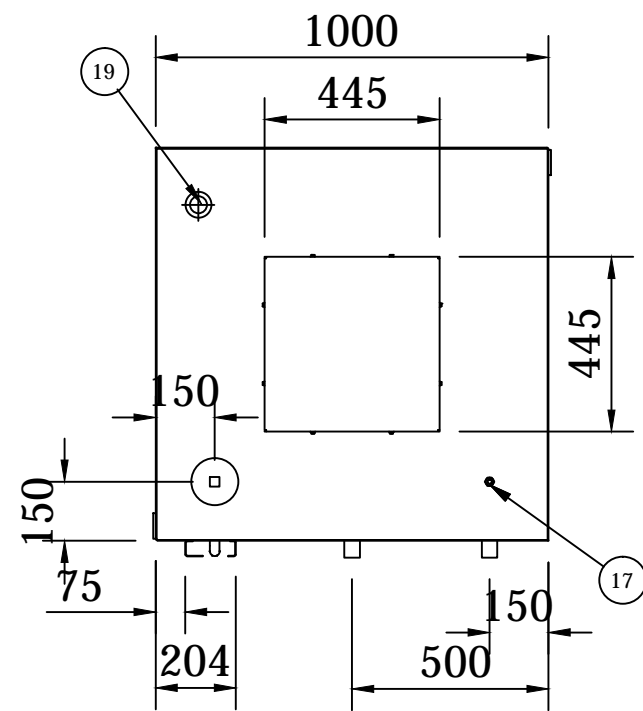
				NO. NO. 62268971			
PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)						
CONSULTANT		NTPC Limited NATIONAL THERMAL POWER CORPORATION (A GOVT. OF INDIA ENTERPRISE)					
	BHARAT HEAVY ELECTRICALS LTD INDUSTRIAL SYSTEMS GROUP, BANGALORE						
BHEL'S CONTRACTOR:  JAKSON ENGINEERING PEOPLE		JAKSON ENGINEERS LTD. PLOT NO-45, KOTICH-38 UDTQ BANGALORE, S. INDIA U.P.		NAME	SIGN	DATE	NO. OF VIR
DIRECTION : 000			SCALE NTS	SPL. CHD.	-		
					APPRO.	-	
FILE NO. : 000			WEIGHT(Kg.)	NTPC DRAWING NO. 6430-001-225-PVE-8-048		ITEM NO.	NO. OF ITEMS
TITLE : ACQUISIC ENCLASURE FOR 1700 KTA S.D.O. SBT. GENERAL ARRANGEMENT DRAWING				BHEL DRAWING NO. 213-6A-684-800-4001			REV.
				SHEET NO. 2 OF 2		NO. OF SHEETS	2
9		10		11		12	

NOTES / SPECIFICATIONS:

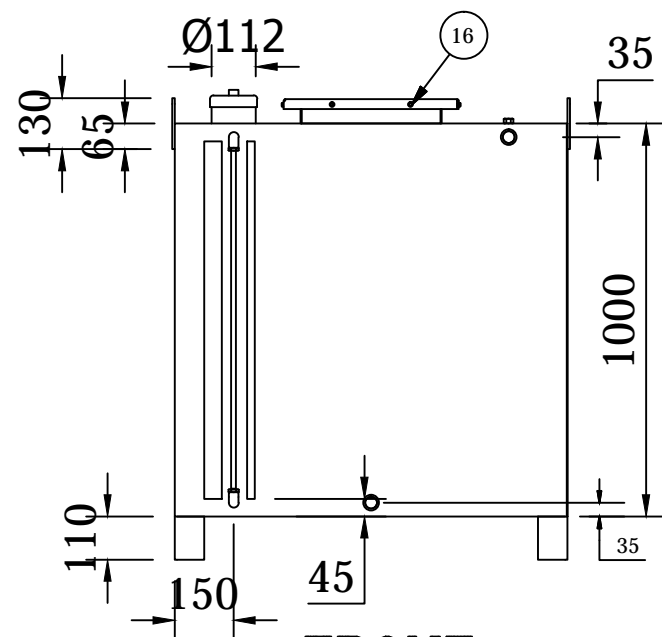
1. ENGINE :— CUMMINS INDIA LTD. MODEL NO. QSK-60-G4 (RADIATOR COOLED)
2. ALTERNATOR:— STAMFORD, FRAME SIZE LVS1804S1
3. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED.
4. FUEL TANK OF 990 LTRS. CAPACITY IS LOCATED OUTSIDE THE ACOUSTIC ENCLOSURE.
5. THE ENCLOSURE OUTER BODY & DOORS SHALL BE FABRICATED WITH MILD STEEL CRCA SHEET 2 MM. THK. AND BASE FRAME FROM ISMC 150.
6. THE COMMON BASE FRAME SHALL BE PAINTED -BLACK SHADE.
7. THE ENCLOSURE SHEET METAL PARTS SHALL BE POWDER COATED WITH PAINT SHADE GREY RAL 9002 AFTER PRE-TREATMENT PROCESS.
8. THE ENCLOSURE WALL SHALL BE PADDED WITH 100MM THK. ROCK WOOL OF 64KG/M³ DENSITY.
9. THE ACOUSTIC ENCLOSURE DOOR LOCK SHALL BE SINGLE POINT TYPE.
10. THE ACOUSTIC ENCLOSURE IS SUITABLE FOR WEATHER PROOF.
11. PROVIDED DOORS FOR EASSY ACCES OF ALL THE SERVICEABLE PARTS OF DG SET.
12. 16 NOS CFL TUBES 11 WATTS 230V, AC. SHALL BE PROVIDED FOR INSIDE ILLUMINATION OF THE ENCLOSURE.
13. SILENCER OUTLET INTERNAL DIAMETER 300 MM.
14. BLOWER FAN : $\phi 1000 \times 7$ BLADS - 4 NOS. (WITH CASING) FAN CAP-22225 CFM (EACH).
MOTOR : 5HP, 960:RPM- 4 NOS.
15. PROVIDED MIN. CLEAR SPACE OF 800MM ON THE DRG. OF ACCOUSTIC ENCLOSURE AS SHOWN ON TOP VIEW

REV.	DESCRIPTION	DATE	CHKD.	SIGN.

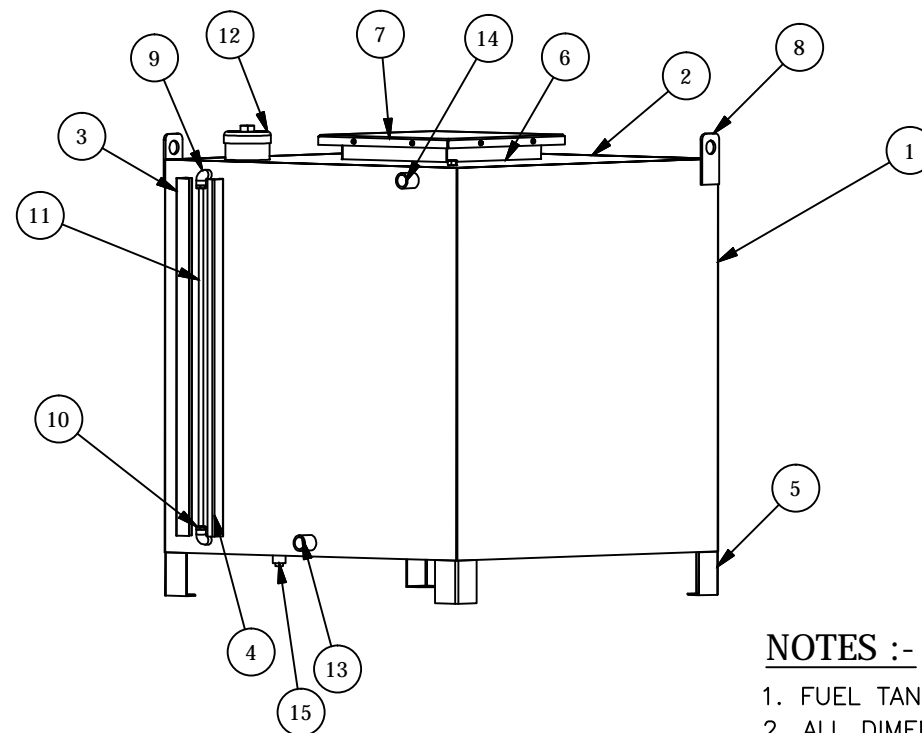
PROJECT		NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)						
CONSULTANT		 NTPC Limited <small>POWER GENERATION DIVISION (A GOVERNMENT OF INDIA ENTERPRISE)</small>						
		 BHARAT HEAVY ELECTRICALS LTD INDUSTRIAL SYSTEMS GROUP, BANGALORE						
BHEL'S CONTRACTOR:		 JAKSON ENGINEERS LTD. <small>FLAT NO.-26, SCOTECHE-II UDYOG KHANDA, G.S. NAGAR U.P.</small>		DRP. CHG.	NAME	SIGN	DATE	NO. OF VIR
DIRECTORY : 000		SCALE		WEIGHT(Kgs.)	NTPC DRAWING NO.		ITEM	NO. OF ITEMS
FILE NO. : 000		NTS		4430-001-215-PVE-8-048		NO.	
TITLE :		ACOUSTIC ENCLOSURE FOR 1750 KVA D.G. SET.		BHEL DRAWING NO.		REV.		
		GENERAL NOTES & SPECIFICATION		IS-3-64-684-800-A001				
				SHEET NO. 1 OF 2		NO. OF SHES. 2		



TOP

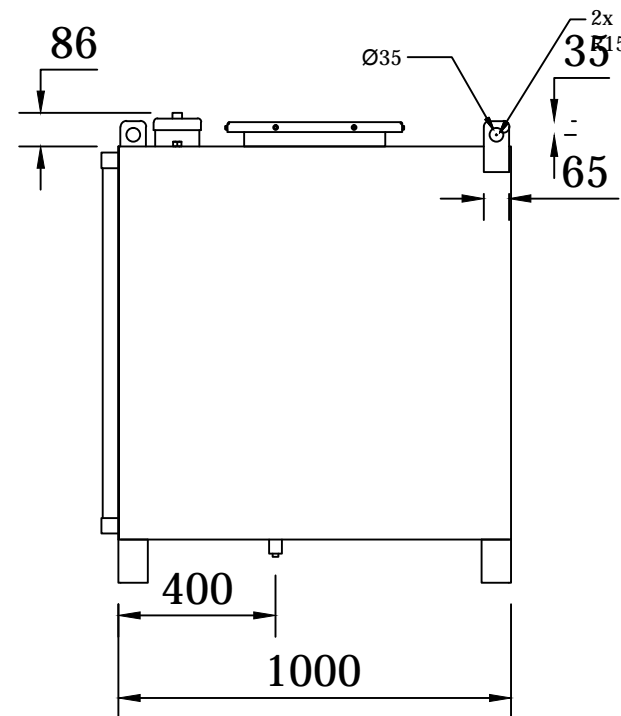


FRONT







NOTES :-

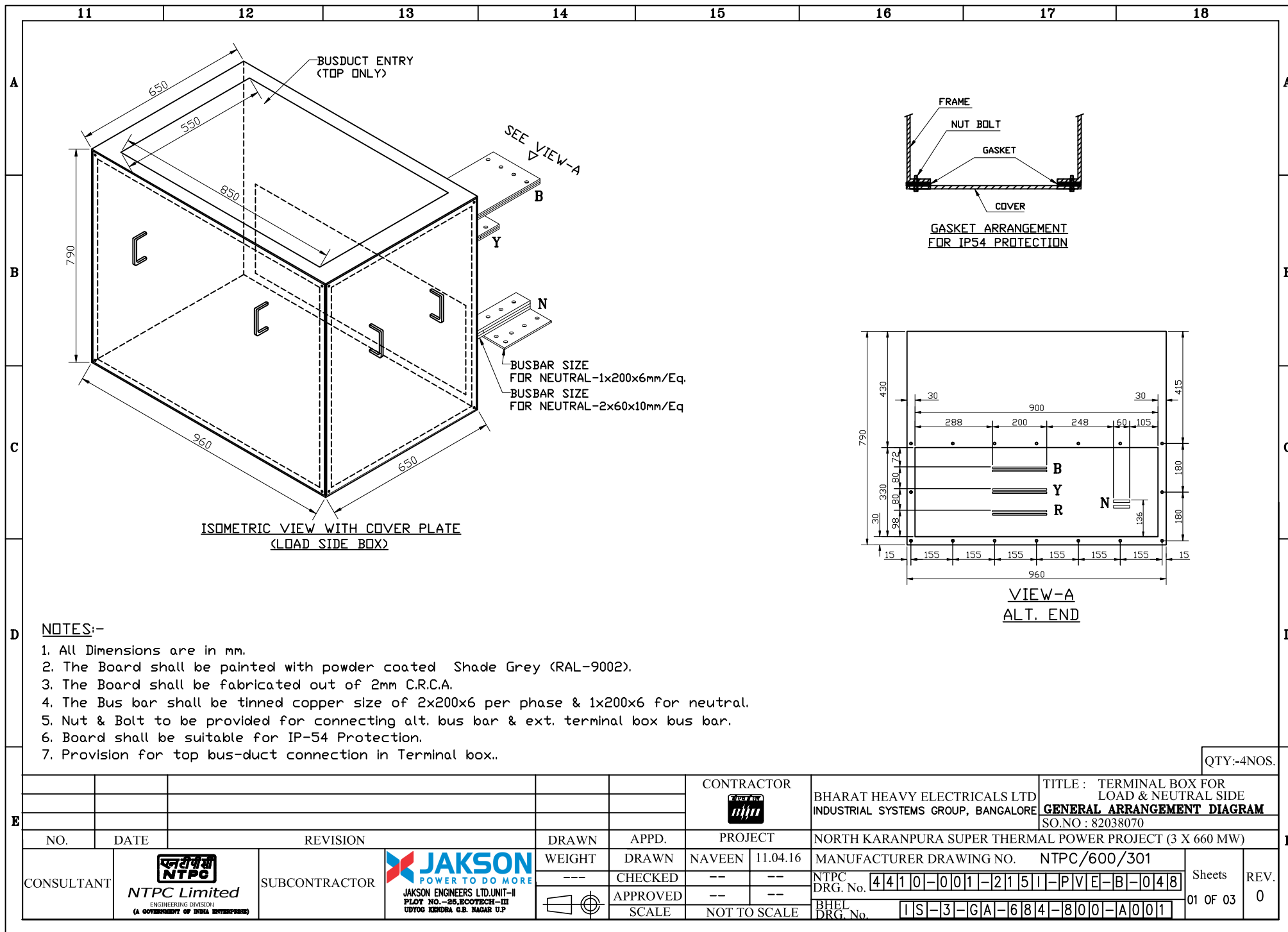
1. FUEL TANK MATERIAL SHEET THICKNESS – 3 MM
2. ALL DIMENSIONS ARE IN M.M.
3. SYNTHETIC ZINC CHROMATE PRIMER TO BE APPLIED AFTER THOROUGH CLEANING.
4. PAINT : RAL– 9002 GREY
5. APPROX. WEIGHT OF FUEL TANK – 140 KG (APPROX.)

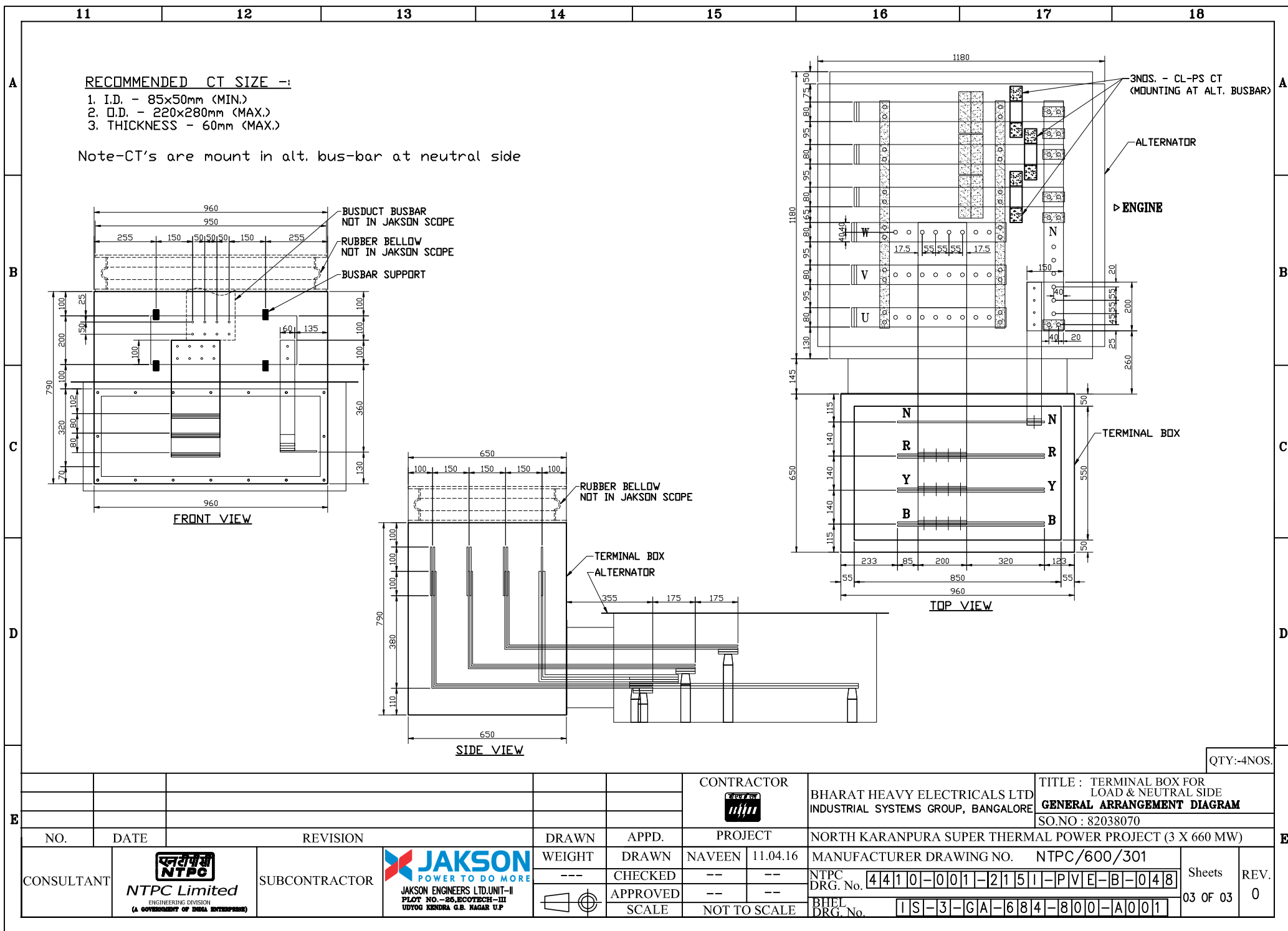


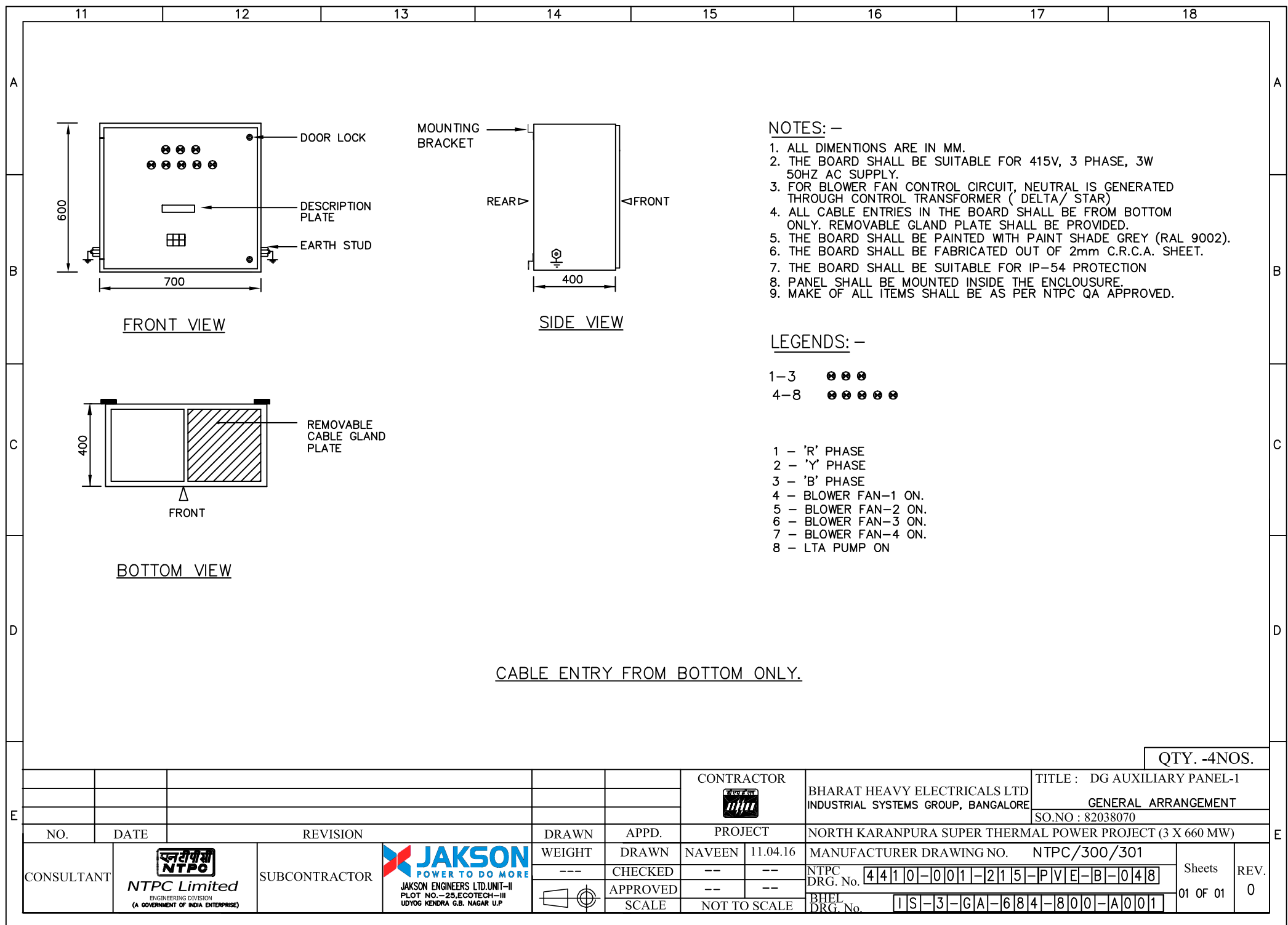
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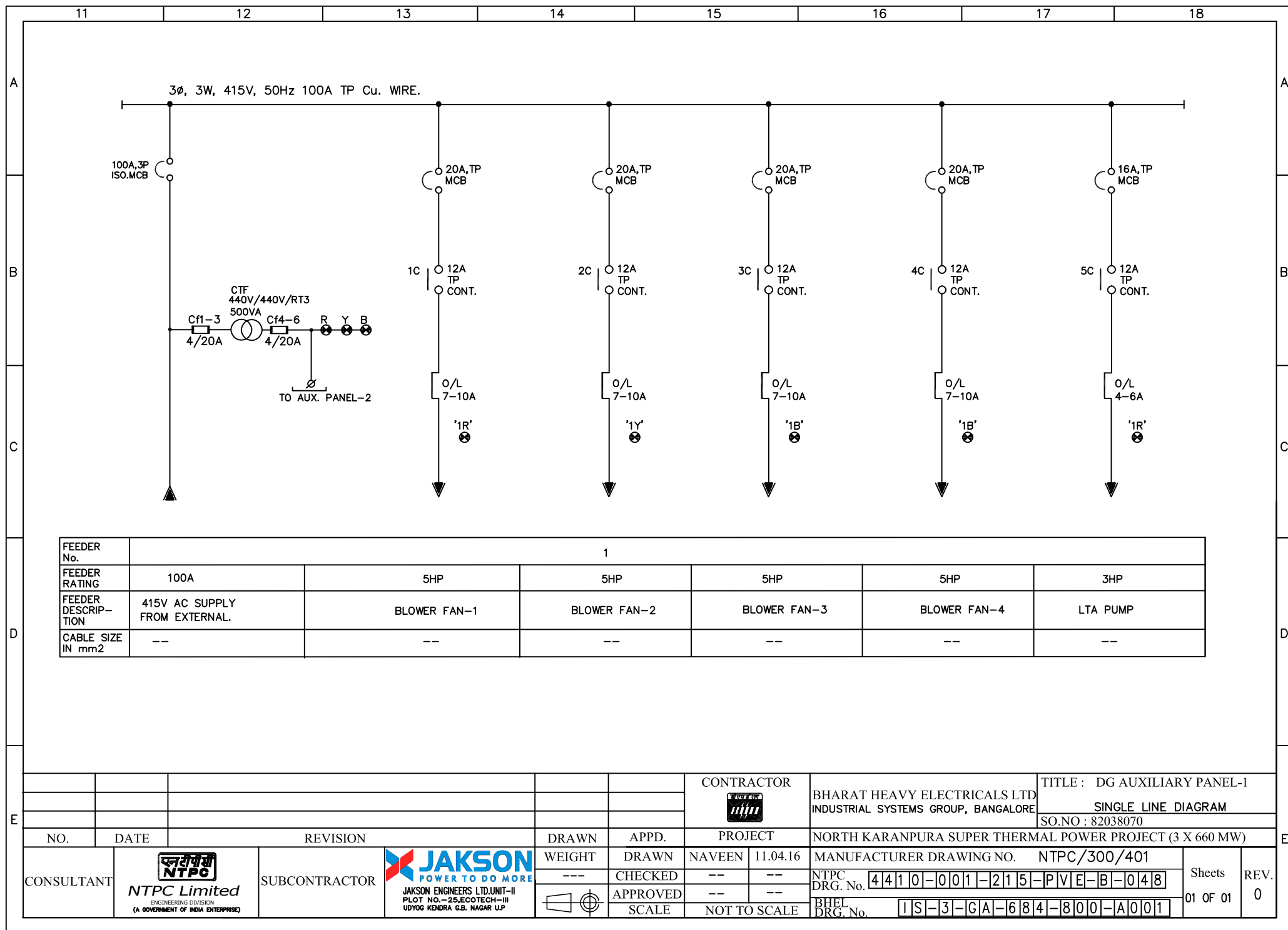
S.NO.	ITEM NAME	DESCRIPTION	QTY.
1	FUEL TANK SIDE WALLS		1 EACH
2	FUEL TANK TOP & BOTTOM WALLS		1 EACH
3	SUPPORT CHANNEL FOR FUEL LEVEL INDICATOR STICKER		1
4	SAFETY SUPPORT CHANNEL FOR FUEL LEVEL INDICATOR		1
5	TANK LEGS		4
6	MAIN HOLE FRAME		1
7	TOP COVER		1
8	LIFTING HOOK		2
9	MS ELBOW	1/2"	2
10	BRASS NOZZLE	1/4"	2
11	PVC PIPE (ID = 8MM)	L = 850	1
12	FUEL PIPE WITH CAP	Ø112x105	1
13	MAIN LINE MS SOCKET	2"	1
14	RETURN LINE MS SOCKET	2"	1
15	DRAIN PLUG WITH DEAD PLUG	3/4"	1
16	M8 MS BOLT WITH NUT (PLATED)	M8x20	8
17	M12 NUT WITH AIR BREATHER		1
18	MS CLAMP	PLATED	2
19	OPENING FOR FUEL LEVEL SWITCH 80 NB	--	1

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)																		
CONSULTANT	<div> NTPC Limited <small>INCORPORATED IN INDIA (A GOVERNMENT OF INDIA ENTERPRISE)</small></div>																		
	<div> BHARAT HEAVY ELECTRICALS LTD INDUSTRIAL SYSTEMS GROUP, BANGALORE</div>																		
BHEL'S CONTRACTOR:	<div> JAKSON <small>TM</small> EMPOWERING PEOPLE</div>		Jakson Limited			<table><thead><tr><th>NAME</th><th>SIGN</th><th>DATE</th></tr></thead><tbody><tr><td>DRN. Hira Lal</td><td>—</td><td>06.04.2016</td></tr><tr><td>Chd. S. Bhatt</td><td>—</td><td>07.04.2016</td></tr><tr><td>APPD. R. Khore</td><td>—</td><td>08.04.2016</td></tr></tbody></table>	NAME	SIGN	DATE	DRN. Hira Lal	—	06.04.2016	Chd. S. Bhatt	—	07.04.2016	APPD. R. Khore	—	08.04.2016	NO. OF VAR
NAME	SIGN	DATE																	
DRN. Hira Lal	—	06.04.2016																	
Chd. S. Bhatt	—	07.04.2016																	
APPD. R. Khore	—	08.04.2016																	
DIRECTORY : 000		SCALE N.T.S.	WEIGHT(Kg.)	NTPC DRAWING NO. 4410-001-215-PVE-B-048		ITEM NO.	NO. OF ITEMS												
FILE NO. : 000																			
TITLE :	<u>TYP. GA DRG. FOR FUEL TANK</u> <u>(CAPACITY- 990 LTRS)</u>			BHEL DRAWING NO. IS-3-GA-884-800-A001		REV. 0													
				SHEET NO. 1 OF 1	NO. OF SHTS.	1													









11 12 13 14 15 16 17 18 BILL OF MATERIAL

S.NO.	LEGEND	ITEM DESCRIPTION	TYPE	RATING	QTY.	UNIT	MAKE	REMARK
1	ISO.	ISOLATING SWITCH	3 MODULE	100A, TP	1	NOS	L&T/ABB/C&S	
2	MCB	MINIATURE CIRCUIT BREAKER	10KA C-CURVE	20A, TP	4	NOS	L&T/ABB/C&S	
3	MCB	MINIATURE CIRCUIT BREAKER	10KA C-CURVE	16A, TP	1	NOS	L&T/ABB/C&S	
4	CTR	CONTROL TRANSFORMER RESIN CAST, 440V/440V/RT3 AC	3PH.	500VA	1	NOS	PRECISE/G&M/AE/INDCOIL	
5	C	POWER CONTACTOR	—	12A	5	NOS	L&T/ABB/C&S	
6	O/L	THERMAL OVER LOAD RELAY	—	7-10A	4	NOS	L&T/ABB/C&S	
7	O/L	THERMAL OVER LOAD RELAY	—	4-6A	1	NOS	L&T/ABB/C&S	
8	I/L	INDICATION LIGHT	22.5MM DIA	--AC/DC	1	SET	ESBEE/C&S	AS PER REQ.
9	CFL	CONTROL FUSE LINK WITH BASE	—	---A	1	SET	L&T/ABB/C&S	AS PER REQ.

QTY. -4NOS.

CONTRACTOR



BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP, BANGALORE

TITLE : DG AUXILIARY PANEL-1

BILL OF MATERIAL

SO.NO : 82038070

NO. DATE

REVISION

DRAWN

APPD.

PROJECT

NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)

MANUFACTURER DRAWING NO. NTPC/300/501

NTPC DRG. No. 4410-001-215-PVE-B-048

BHEL DRG. No. IS-3-CA-684-800-A001

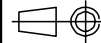
Sheets
01 OF 01

REV.
0

CONSULTANT

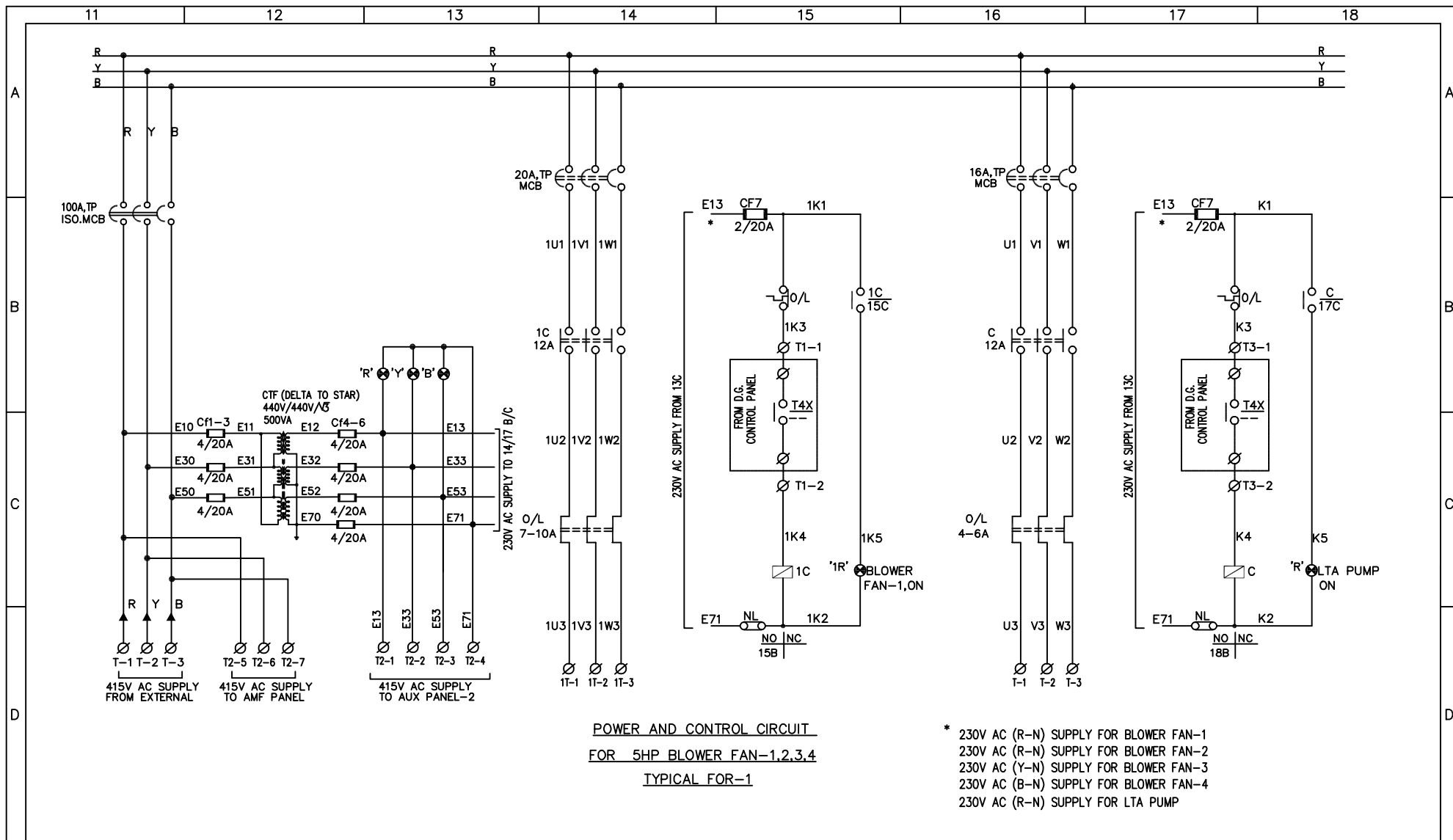


SUBCONTRACTOR



SCALE

NOT TO SCALE



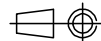
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								BHARAT HEAVY ELECTRICALS LTD	
								INDUSTRIAL SYSTEMS GROUP, BANGALORE	
								SCHEMATIC DRAWING	
								SO.NO : 82038070	
NO.	DATE	REVISION		DRAWN	APPD.	PROJECT		NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)	
				WEIGHT	DRAWN	NAVEEN	11.04.16	MANUFACTURER DRAWING NO. NTPC/300/601	
				---	CHECKED	--	--	NTPC	
				---	APPROVED	--	--	DRG. No. 44110-001-215-PVE-B-048	
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								01 OF 01	0

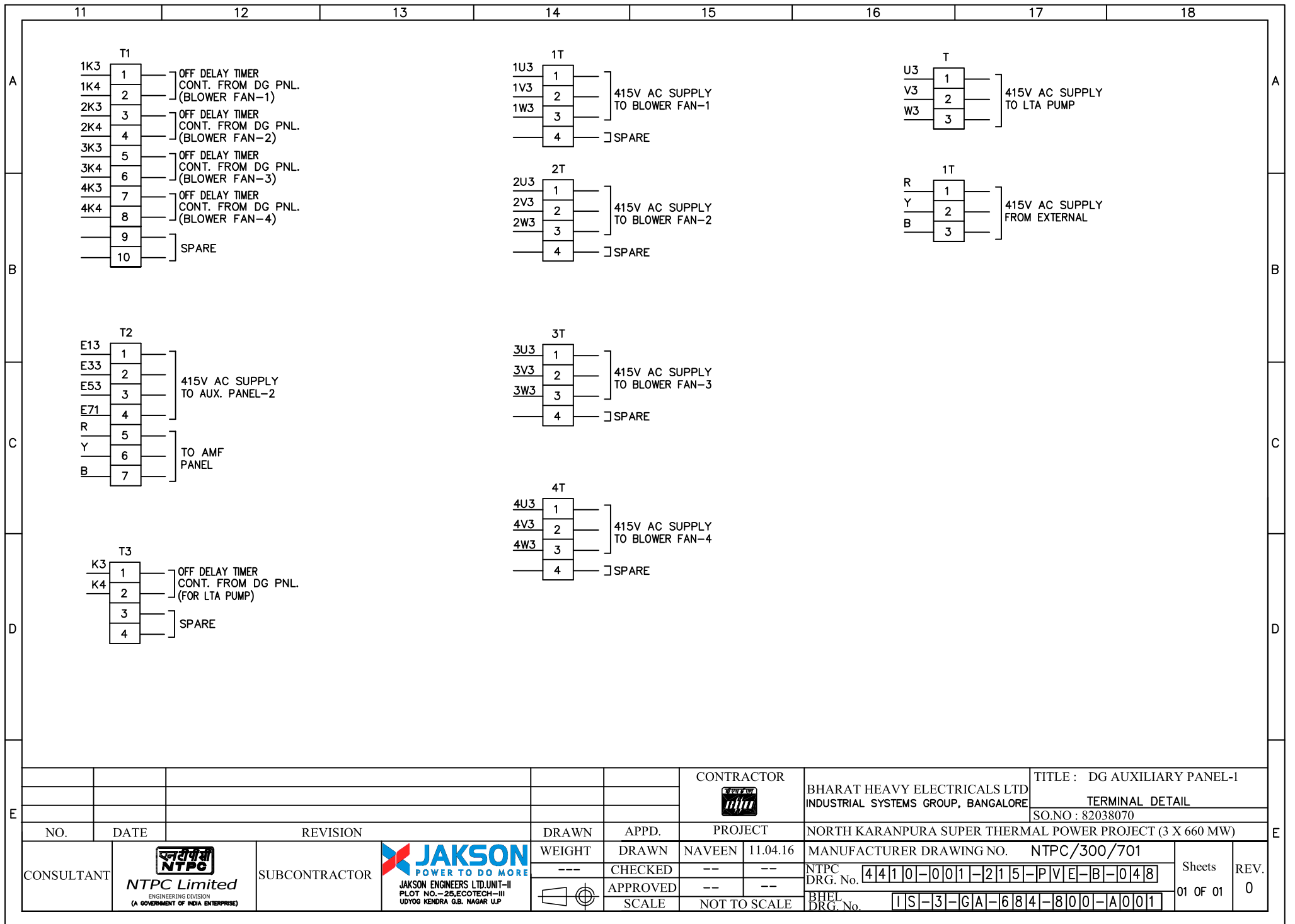
CONSULTANT

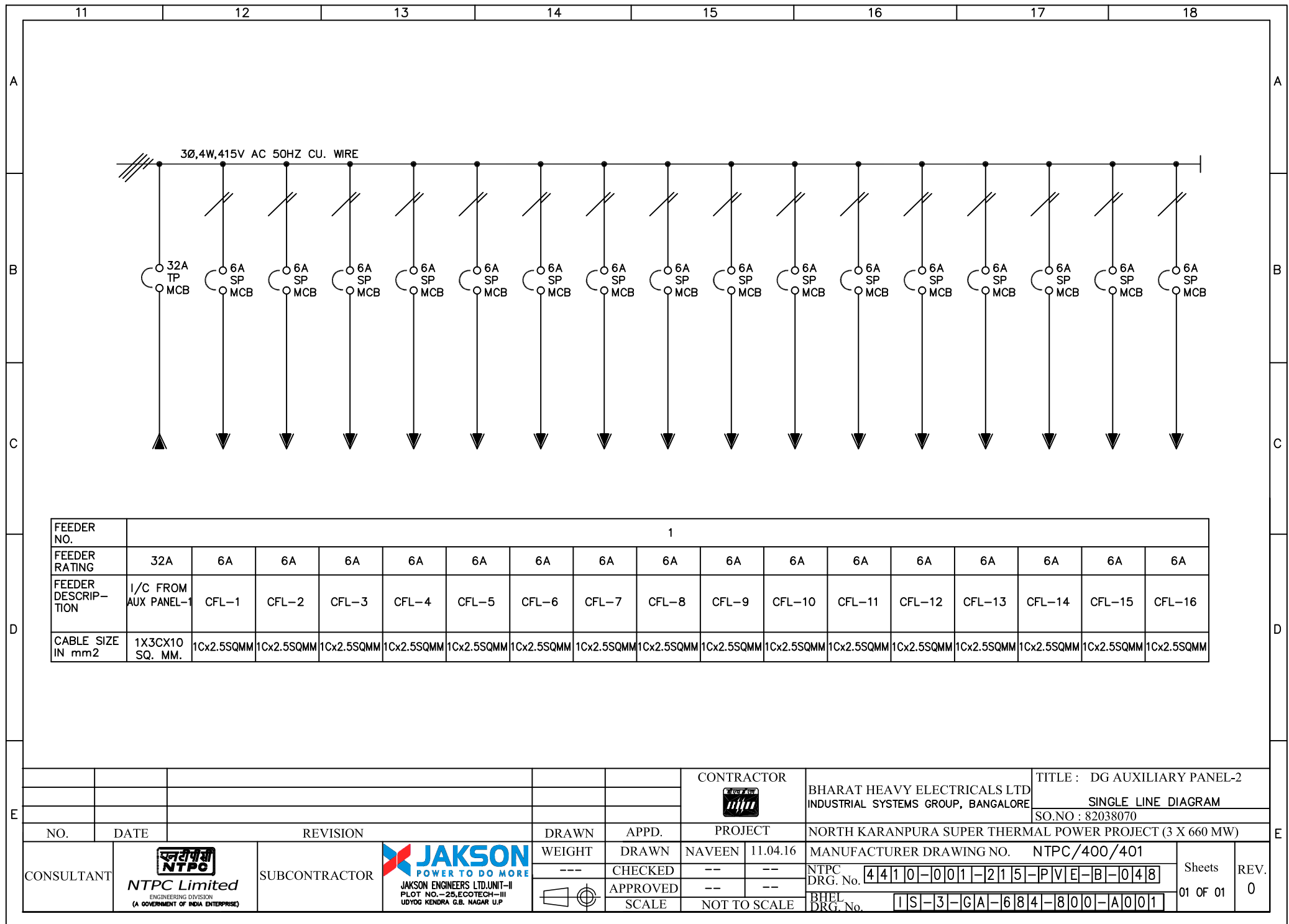
NTPC Limited
ENGINEERING DIVISION
(A GOVERNMENT OF INDIA ENTERPRISE)

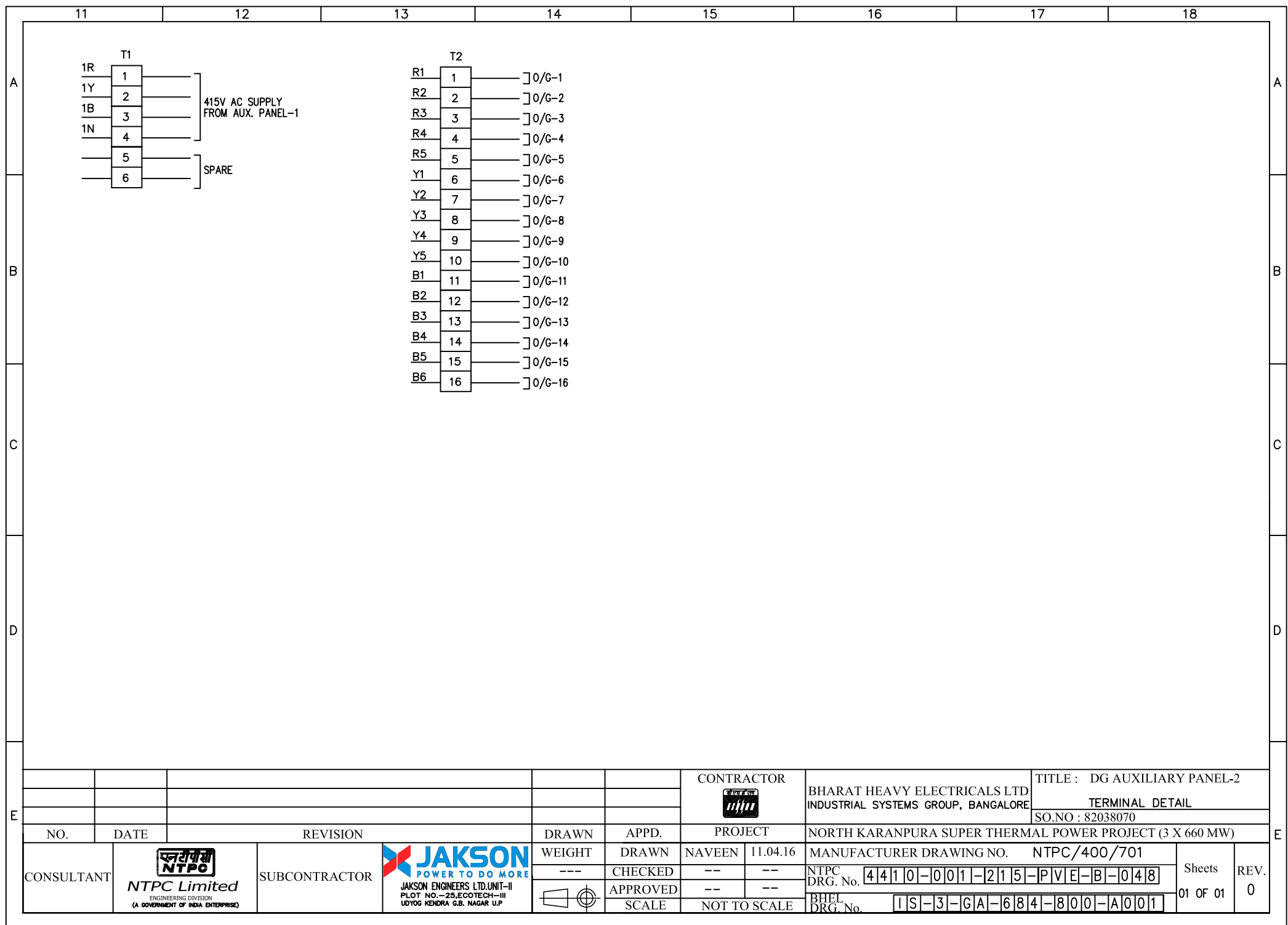
SUBCONTRACTOR




JAKSON
POWER TO DO MORE
JAKSON ENGINEERS LTD. UNIT-II
PLOT NO.-25, ECOTECH-III
UDYOG KENDRA G.S. NAGAR U.P.









						CONTRACTOR		BHARAT HEAVY ELECTRICALS LTD INDUSTRIAL SYSTEMS GROUP, BANGALORE		TITLE : DG AUXILIARY PANEL-2 TERMINAL DETAIL SO.NO : 82038070	
NO.	DATE	REVISION			DRAWN	APPD.	PROJECT		NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)		
CONSULTANT	<div> NTPC Limited ENGINEERING DIVISION (A GOVERNMENT OF INDIA ENTERPRISE)</div>	SUBCONTRACTOR	<div> JAKSON POWER TO DO MORE JAKSON ENGINEERS LTD.UNIT-II PLOT NO.-25,ECOTECH-III UDYOG KENDRA G.B. NAGAR U.P</div>	WEIGHT	DRAWN	NAVEEN	11.04.16	MANUFACTURER DRAWING NO. NTPC/400/701		Sheets 01 OF 01	REV. 0
				---	CHECKED	--	--	NTPC DRG. No. 4410-001-215-PVE-B-048			
					APPROVED	--	--	BHEL DRG. No. IS-3-GA-684-800-A001			
						SCALE		NOT TO SCALE			

ENDORSEMENT SHEET FOR GA DRAWING OF ENGINE FOR APPROVAL

TO BE FILLED IN BY SUPPLIER AT THE TIME OF SUBMISSION



To be filled in by NTPC

PROJECT NAME	NORTH KARANPURA SUPER THERMAL POWER PROJECT(3X660 MW)
CONTRACT NO.	CS-4410-001-2
PACKAGE NAME	EPC PACKAGE
MAIN SUPPLIER	M/s. BHEL - ISG
MANUFACTURER NAME	M/S. JAKSON LIMITED PLOT NO. 1-A TO 4-A, IID CENTRE, GOVINDSAR, KATHUA-184102
<u>MAJOR EQUIPMENT DETAILS:</u> NAME OF EQUIPMENT TYPE/MODEL NO. RATING DOCUMENT No.:	DIESEL GENERATOR SET SILENT TYPE 1750 KVA 4410-001-215-PVE-B-048
REFERENCE APPROVED GA DRAWING OF ENGINE ONLY. NTPC DRAWING No.: 9573-215-PVE-B-048	REFERENCE PROJECT NAME: KUDGI SUPER THERMAL POWER PROJECT-I (3X800 MW)

DISTRIBUTION OF ENDORSEMENT OF

A) GA DRAWING OF ENGINE

1. MAIN SUPPLIER
2. RIO/CQA

CERTIFIED that the item/component is identical to that considered for GA DRAWING OF ENGINE for approval.



SIGN.: (Main Supplier)



DATE

SIGN. (Manufacturer)

NTPC (Reviewed/Approved By/Date & Seal)

GA DRAWINGS FOR (AS BELOW):

GA of Alternator
 GA of Engine
 GA of Acoustic Enclosure
 GA of Terminal Box (Load Side)
 GA of Terminal Box (Neutral Side)
 GA of Busbar Panel
 GA of Aux Panels 1
 GA of Aux Panels 2
 GA of Base Frame

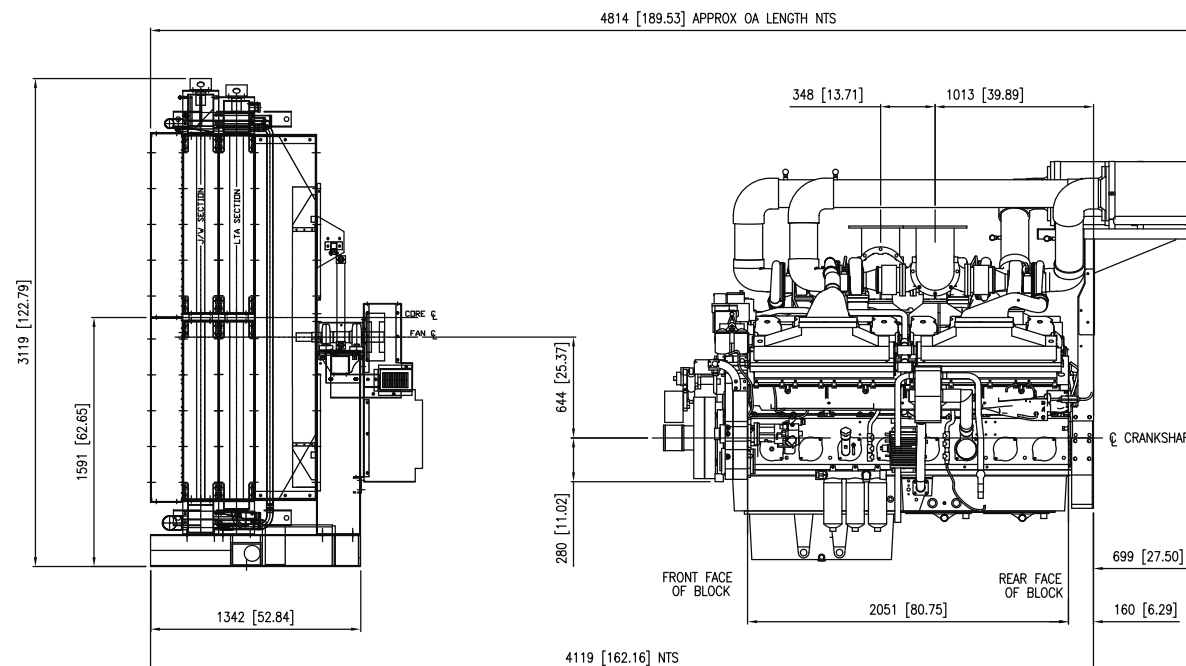
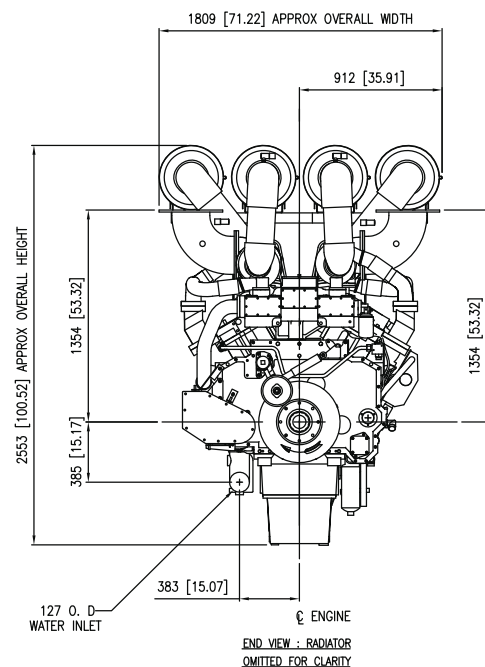
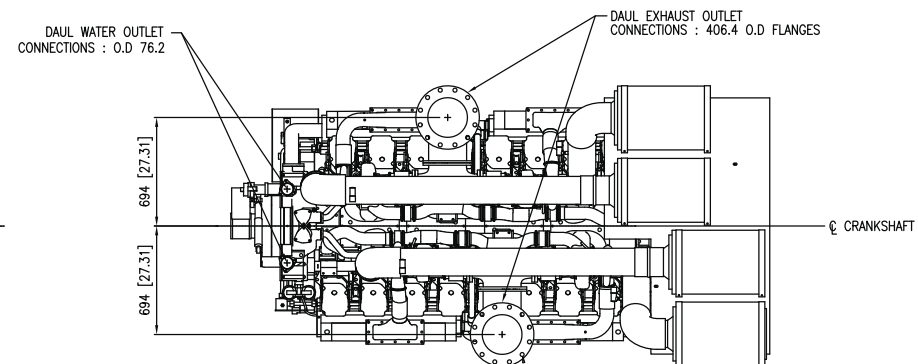
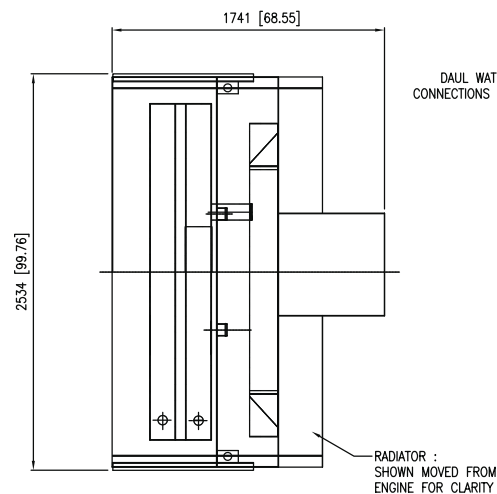
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02	10.07.2014	Corrected & resubmitted	-	-
01	04.06.2014	2nd corrected submission	-	-
0	17.02.2014	1st submission	-	-
NO.	DATE	REVISION	DRAWN	APPD.
CLIENT:  NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION		PROJECT: Kudgelu Super Thermal Power Project, Singur (800MW) Date: 2015.07.09 17:15:04 IST Location: JAKSON, KATHUA, J&K		
PACKAGE : ELECTRICAL EQUIPMENT SUPPLY & ERECTION				
CONTRACTOR:  Petron Engineering Construction Ltd. 6th Floor, Swastik Chambers, Sion-Trombay Road, Chembur, Mumbai - 400071, India		SUB CONTRACTOR: JAKSON, KATHUA, J&K		
DRAWN BY	-	-	NTPC DRG NO:	
CHECKED BY	-	-	REV.	SHEET
APPROVED BY	-	-	03	1 of 41
SCALE	NTS		9573-215-PVE-B-048	

0500-4281 A1

REL. No.	REV. No.	REVISION	DATE
0500-4281	A1	1 PRODUCTION RELEASE	26/06/2005

NOTES:

1. DIMENSIONS SHOWN IN [] ARE IN INCHES
2. ENGINE WEIGHT (DRY) : 7185 Kg ENGINE OIL CAPACITY : 280 L
3. RADIATOR WEIGHT (DRY) : 2500 Kg RADIATOR COOLANT CAPACITY : 242 L
4. MUST INSTALL RADIATOR IN ACCORDANCE WITH CPGK WORK INSTRUCTIONS
5. FOR FURTHER ENGINE INFORMATION, PLEASE REFER TO RESPECTIVE ENGINE INSTALLATION DWG.



AutoCAD

DO NOT SCALE PRINT



SCALE: 1:16

TOLERANCE UNLESS OTHERWISE SPECIFIED	UNLESS OTHERWISE SPECIFIED	DATE
±0.05	±0.05	26/06/2005
±0.10	±0.10	07/09/2005
±0.15	±0.15	07/09/2005



DESIGNED BY	CHECKED BY	DATE
C. CAMPBELL	C. CAMPBELL	26/06/2005
J. JONES	J. JONES	07/09/2005

Cummins Power Generation	ENGINE OUTLINE
Columbus Avenue, Manston, Ramsgate Kent, CT12 5BF, England, UK	0500-4281




ENDORSEMENT SHEET FOR GA, SCHEMATIC & BILL OF MATERIALS FOR BATTERY CHARGER PANEL FOR APPROVAL

TO BE FILLED IN BY SUPPLIER AT THE TIME OF SUBMISSION		 To be filled in by NTPC
PROJECT NAME	NORTH KARANPURA SUPER THERMAL POWER PROJECT(3X660 MW)	DISTRIBUTION OF ENDORSEMENT OF A) GA, SCHEMATIC & BILL OF MATERIALS FOR BATTERY CHARGER PANEL 1. MAIN SUPPLIER 2. RIO/CQA
CONTRACT NO.	CS-4410-001-2	
PACKAGE NAME	EPC PACKAGE	
MAIN SUPPLIER	M/s. BHEL - ISG	
MANUFACTURER NAME	M/S. JAKSON LIMITED PLOT NO. 1-A TO 4-A, IID CENTRE, GOVINDSAR, KATHUA-184102	
<u>MAJOR EQUIPMENT DETAILS:</u> NAME OF EQUIPMENT TYPE/MODEL NO. RATING DOCUMENT No.:	DIESEL GENERATOR SET SILENT TYPE 1750 KVA 4410-001-215-PVE-B-048	
REFERENCE APPROVED GA DRAWING & DETAILS OF BATTERY CHARGER NTPC DRAWING No.: 9573-215-PVE-B-048A	REFERENCE PROJECT NAME: KUDGI SUPER THERMAL POWER PROJECT-I (3X800 MW)	
CERTIFIED that the item/component is identical to that considered for GA, SCHEMATIC & BILL OF MATERIALS FOR BATTERY CHARGER PANEL for approval.		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div> SIGN.: (Main Supplier) DATE SIGN. (Manufacturer) </div> <div align="center">  </div> </div>		NTPC (Reviewed/Approved By/Date & Seal)

DG SETS - GA DRAWING & DETAILS OF BATTERY CHARGER

01	20.01.2015	Resubmission	-	-
0	04.06.2014	1st submission	-	-
NO.	DATE	REVISION	DRAWN	APPD.
CLIENT:		PROJECT:		
 NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION		Kudgi Super Thermal Power Project, Singri (3X800MW) Date: 2015.02.03 09:50:49 IST Recd OKAGE Location:		
PACKAGE : ELECTRICAL EQUIPMENT SUPPLY & ERECTION				
CONTRACTOR:		SUB CONTRACTOR:		
 Petron Engineering Construction Ltd. 6th Floor, Swastik Chambers, Sion-Trombay Road, Chembur, Mumbai - 400071, India		JAKSON, KATHUA		
DRAWN BY	-	-	NTPC DRG NO:	
CHECKED BY	-	-	REV.	SHEET
APPROVED BY	-	-	01	1 of 41
SCALE	NTS		Doc. read as: 9573-215-PVE-B-048A	

ENDORSEMENT SHEET FOR GA DRAWING OF BATTERY CHARGER FOR APPROVAL

TO BE FILLED IN BY SUPPLIER AT THE TIME OF SUBMISSION		 To be filled in by NTPC
PROJECT NAME	KUDGI SUPER THERMAL POWER PROJECT-I (3X800 MW)	<u>DISTRIBUTION OF ENDORSEMENT OF</u> A) GA DRAWING OF BATTERY CHARGER 1. MAIN SUPPLIER 2. RIO/CQA
CONTRACT NO.	CS-9573-215-2	
PACKAGE NAME	ELECTRICAL EQUIPMENT SUPPLY & ERECTION PACKAGE	
MAIN SUPPLIER	M/s PETRON ENGINEERING CONSTRUCTION LIMITED	
MANUFACTURER NAME	M/S. JAKSON LIMITED PLOT NO. 1-A TO 4-A, IID CENTRE, GOVINDSAR, KATHUA-184102	
<u>MAJOR EQUIPMENT DETAILS:</u> NAME OF EQUIPMENT TYPE/MODEL NO. RATING DOCUMENT No.:	DIESEL GENERATOR SET SILENT TYPE 2000 KVA 9573-215-PVE-B-048A	
REFERENCE APPROVED GA DRAWING OF BATTERY CHARGER. NTPC DRAWING No.: 9661-243-01IS-PVE-B-011	REFERENCE PROJECT NAME: BOILER TURBINE GENERATOR PACKAGE FOR SINGARENI THERMAL POWER PROJECT (2X600 MW).	
CERTIFIED that the item/component is identical to that considered for GA DRAWING OF BATTERY CHARGER for approval.		
		
SIGN.: (Main Supplier)	DATE	
SIGN. (Manufacturer)		NTPC (Reviewed/Approved By/Date & Seal)

ENDORSEMENT SHEET FOR GA DRAWING OF BATTERY CHARGER FOR APPROVAL

TO BE FILLED IN BY SUPPLIER AT THE TIME OF SUBMISSION

PROJECT NAME	SINGARENI THERMAL POWER PROJECT (2X660 MW)
CONTRACT NO.	CS: 9661-243-01
PACKAGE NAME	BOILER TURBINE GENERATOR PACKAGE
MAIN SUPPLIER	M/s BHEL-ISG, BANGLORE
MANUFACTURER NAME	M/s JAKSON LIMITED
MAJOR EQUIPMENT DETAILS: NAME OF EQUIPMENT TYPE/MODEL NO. RATING ANY OTHER IMPORTANT PARAMETER	DIESEL GENERATOR SET SILENT TYPE 1500 KVA
REFERENCE APPROVED GA DRAWING OF BATTERY CHARGER NTPC DRAWING NO.9575-215-PVE-B-019F	REFERENCE PROJECT NAME: ELECTRICAL EQUIPMENT SUPPLY & ERECTION PACKAGE FOR MAUDA SUPER THERMAL POWER PROJECT STAGE-II (2X660 MW)

CERTIFIED that the item/component is identical to that considered for GA DRAWING OF BATTERY CHARGER.



SIGN.: (Main Supplier)

DATE

SIGN. (Manufacturer)



To be filled in by NTPC

DISTRIBUTION OF ENDORSEMENT OF

A) GA DRAWING OF BATTERY CHARGER

1. MAIN SUPPLIER
2. RIO/CQA

Certification signature Digitally Signed
 prsen@ntpceoc.co.in by M/s JAKSON LIMITED

Date: 2014.01.03

16:28:13 IST

Reason for Approval Approved By/Date & Seal)

Location:


NTPCEOC

01	03.06.2013	REVISED AS PER COMMENTS GIVEN DURING DISCUSSION ON 11.04.2013	RSA	KKJK
00	13.12.2012	FOR APPROVAL	RSA	KKJK
No.	DATE	REMARKS	CHECKED	APPROVED

REVISION

NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)

Certification signature: Digital signed
<tikaram@ntpsc.co.in> known
Date: 2013.06.14
Time: 13:32:28 IST
Reason: CAT I
Location: NTPCEOC



L&T Construction
Power Transmission & Distribution

PROJECT: MAUDA SUPER THERMAL POWER PROJECT-II (2x660MW) PACKAGE: ELECTRICAL EQUIPMENT SUPPLY & ERECTION PACKAGE SPECIFICATION NO : CS : 9575-215-2		SIGN	DATE
	DSND	JACKSON	11.12.2012
	DRWN	JACKSON	11.12.2012
	CHKD	RSA	11.12.2012
	APPD	KKJK	13.12.2012

TITLE : DG SETS 1500KVA – DG SETS – GA DRAWING & DETAILS OF BATTERY CHARGER	SCALE N.A	NTPC DRG. No. 9575-215-PVE-B-019F	REV 01
	CODE		

Compliance sheet for GA drawing Battery charger (NTPC-Solapur)

S.No.	Comments received on	Comments	JAKSON Reply
A	Main circuit diagram for 24V/40A battery charger PL. EXPLAIN THIS POINT.		
1		From DG control panel (Input)	Noted & incorporated. Please find the enclosed revised drawing & document.
2		Separate fused	Please note that we have provided the auxiliary supply to meters from DC to DC converter. And we have provided control fuse link for DC to DC converter. Hence separate fuse link for meter is not required.
3		Pl. use separate fuse for control supply & main contactor	Noted & incorporated.
4		DG control panel (output)	Noted & incorporated.





Chhabi Electricals Private Limited

Regd. Office & Factory : E-66, MIDC, Jalgaon - 425 003 (Maharashtra) INDIA.
Tel : 91-257-2210626/ 27/ 28, 2270174/75 Fax : 91-257-2213434
Email : chhabi_jal@sancharnet.in, Web site : www.chhabi-india.com



DOCUMENTS TRANSMITTAL SHEET	Format No. : QF/DD/06
	Rev. No. : 00
	W.E.F. : 01/04/2006

TO, JAKSON LIMITED 100% EOU PLOT NO.1-A TO 4-A, IID CENTRE, GOVINDSAR, KATHUA – 184 102 Kind Attn. : Mr. Amit Tripathi	Our Ref. No. : CE-2920/0452/2013/SSP
	Date : April. 21, 2013
	Your Ref. No. :
	Date :
	Your P.O. No.: ZNB-(EOU-J&K)1056120409
	Date : 26.11.2012
	Legends: [A] For Information Only [B] For Approval [C] For Final Approval

Dear Sir,

We refer to the above subject. We are sending herewith Drawings & documents Listed below for your approval:

Sr. No.	Doc. No.	Rev. No.	Description / Title Of Drawing & Documents	No. of Prints	Remark
1	C15164A	1	Main ckt diagram for 24V SMPS based battery charger	3	B
2	C15164B	0	Ckt diagram for 24V Annunciation	3	B
3	C15164C	0	Legend printing for annunciation	3	B
4	C15165	0	General layout for 24V SMPS based battery charger	3	B
5	LC4882	1	Bill of material for 24V SMPS based battery charger	3	B
6	-	0	Make of Component	3	B
7	DS2920	0	Technical data sheet	3	B
8	-	0	V-I Characteristic	3	B
9	-	0	O&M instruction Manual	3	B

Kindly expedite the final approval of the same within one week and send us one set duly approved drawings & documents for our reference/record.

Thanking you & assuring you of our best & prompt attention all the times.

Yours Truly,
For *Chhabi Electricals Private Limited*

CC
Chhabi Electricals Pvt. Ltd.
New Delhi

D.J.Patil
(Manager - Design)
Mobile No. 09422224413

Kind Attn: Mr. P.K. Jain
General Manager – Marketing

Regional Offices :

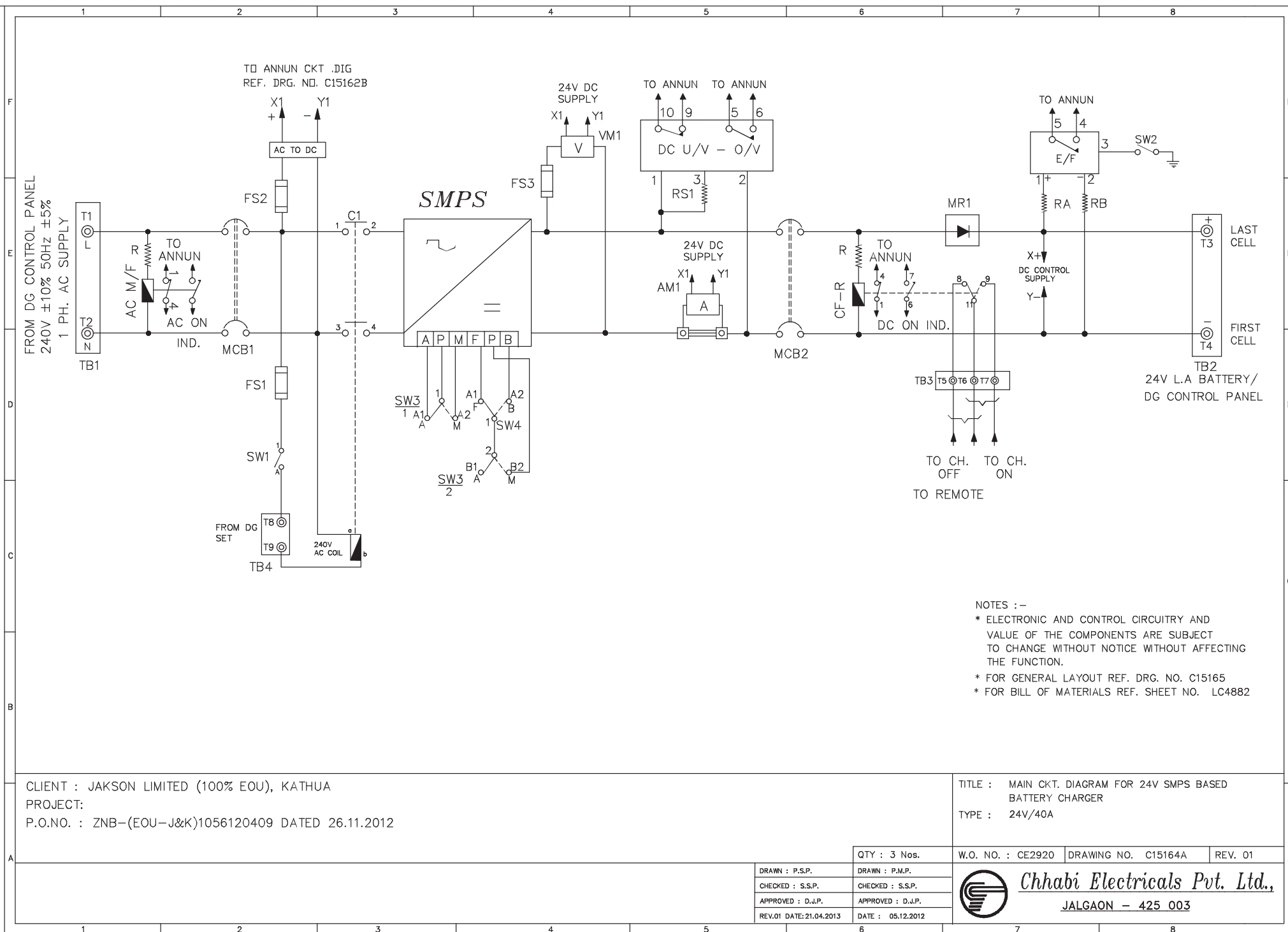
Mumbai : 20, Anupam Indl. Estate no. 3, L.B.S. Marg Mulund (W) Mumbai - 400 080 (Maharashtra) - INDIA.
Phone No. : +91-22-2561 4435/5945, Fax No. : +91-22-2568 0513, Email : chhabi@mtnl.net.in

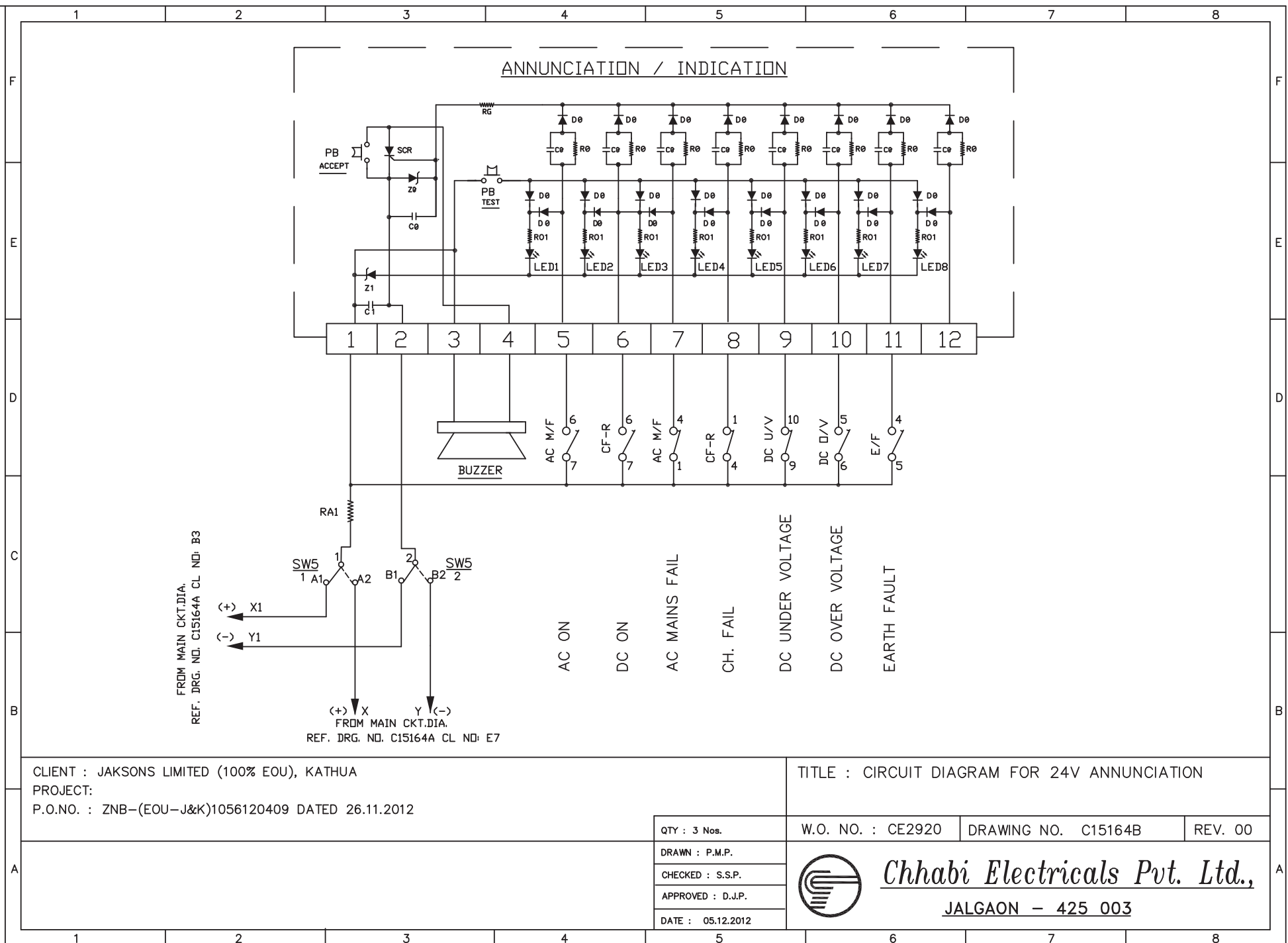
Delhi : F-12, First Floor, Pankaj Grand Plaza, Mayur Vihar Phase-1, Delhi - 110 091.
Phone No. : +91-11-4215 1213 - 14, Fax No. : +91-11-4215 1215 Email : chhabindl@chhabi-india.com

Bangalore : 120, First Floor, "Ajantha" 6th C Main Road, Remco Layout Vijayanagar 2nd Stage Bangalore - 560 040 (Karnataka) - INDIA.
Phone No. : +91-80-2314 0031, Fax No. : +91-80-2314 0031 Email : chhabibl@chhabi-india.com

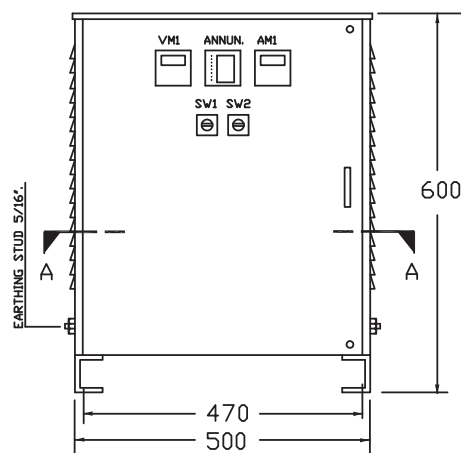
Kolkata : 16/1A Bose Pukur Road, Kolkata - 700 042 (West Bengal) INDIA.
Phone No. : +91-33-24411375, Email : chhabikol@chhabi-india.com

Bhubaneshwar : A/62, Nayapalli, NS-5, Bhubaneshwar - 751 003 (Orissa) - INDIA. Email : chhabibbsr@chhabi-india.com

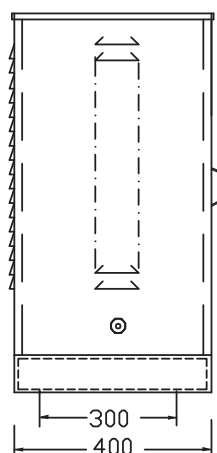




1	2	3	4	5	6	7	8
F	<h1 style="margin: 0;">ANNUNCIATOR</h1>						F
E	<div style="border: 1px solid black; padding: 10px; margin: 0 auto; width: 80%;"> <p>LED S</p> <ul style="list-style-type: none"> ● AC ON ● DC ON ● AC MAINS FAIL ● CH. FAIL ● DC UNDER VOLTAGE ● DC OVER VOLTAGE ● EARTH FAULT ● <div style="border: 1px solid black; height: 20px; width: 100%;"></div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>ACCEPT</p> <div style="border: 1px solid black; width: 20px; height: 20px; border-radius: 50%; margin: 0 auto;"></div> </div> <div style="text-align: center;"> <p>TEST</p> <div style="border: 1px solid black; width: 20px; height: 20px; border-radius: 50%; margin: 0 auto;"></div> </div> <div style="text-align: center;"> <p>○</p> <p>POWER ON</p> </div> </div> </div>						E
D							D
C							C
B							B
A	<p>CLIENT : JAKSONS LIMITED (100% EOU), KATHUA</p> <p>PROJECT:</p> <p>P.O.NO. : ZNB-(EOU-J&K)1056120409 DATED 26.11.2012</p>				<p>TITLE : LEGEND PRINTING FOR ANNUNCIATOR.</p>		
				<p>QTY: 3 Nos.</p>	<p>W.O.NO. : CE2920</p>	<p>DRAWING NO. : C15164C</p>	<p>REV.00</p>
				<p>DRAWN : P.M.P.</p>	<div style="display: flex; align-items: center; justify-content: center;"> <div> <p style="font-size: 1.2em; font-weight: bold; margin: 0;"><i>Chhabi Electricals Pvt. Ltd.,</i></p> <p style="margin: 0;"><u>JALGAON - 425 003</u></p> </div> </div>		
				<p>CHECKED : S.S.P.</p>			
				<p>APPROVED : D.J.P.</p>			
				<p>DATE : 05.12.2012</p>			
1	2	3	4	5	6	7	8

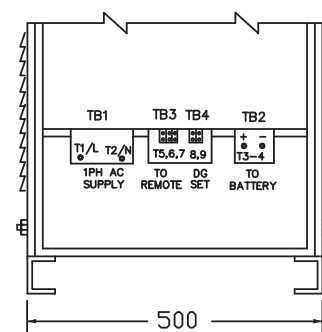


FRONT VIEW

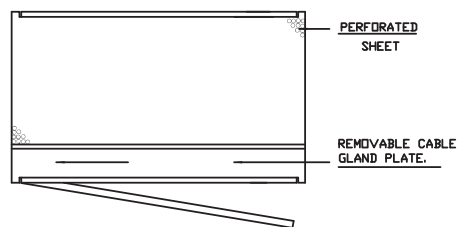


SIDE VIEW

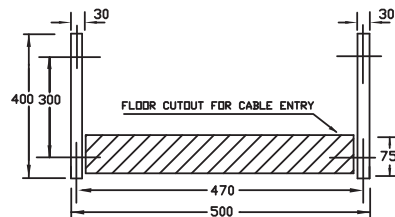
←
FRONT



FRONT VIEW (WITHOUT DOOR)



TOP VIEW ↑ FRONT
(SECTION AT A-A)



↑
BOTTOM VIEW

NOTES :

- * ALL DIMENSIONS ARE IN mm.
- * CABLE ENTRY FROM BOTTOM (FRONT) WITH REMOVABLE CABLE GLAND PLATES.
- * POSITION OF INTERNAL COMPONENTS ARE SUBJECT TO CHANGE WITHOUT NOTICE WITH SUITABLE MODIFICATION.
- * DIMENSIONS OF THE EQUIPMENT WILL BE ACCURATE ± 10 mm.
- * FOR MAIN CKT, DIA, REF. DRG. NO. C15164A-C
- * ALL COMPONENTS MOUNTED ON THE FRONT PANEL & INSIDE THE PANEL SHALL BE SUITABLY LABELED.
- * SHEET STEEL THICKNESS OF 2mm & GLAND PLATE THICKNESS OF 3mm.
- * DEGREE OF PROTECTION-IP31
- * COLOUR SHADE : RAL 9002
- * DRAWING IS IN N.T.S.

CLIENT : JAKSONS LIMITED (100% EOU), KATHUA
PROJECT:
P.O.NO. : ZNB-(EOU-J&K)1056120409 DATED 26.11.2012

TITLE : GENERAL LAYOUT FOR 24V SMPS BASE
BATTERY CHARGER.

TYPE : SMPS BASE FCB - 24V/40A

QTY. : 3 Nos.

W.O. NO. : CE2920

DRAWING NO. C15165

REV. 00

DRAWN : P.M.P.

CHECKED : S.S.P.

APPROVED : D.J.P.

DATE : 05.12.2012



Chhabhi Electricals Pvt. Ltd.,

JALGAON - 425 003

BILL OF MATERIALS			
W.O.NO.	: CE2920		
REV.NO.	: 01		
DATE	: 21.04.2013		
UNIT	: SMPS BASE BATTERY CHARGER FOR 24V LEAD ACID BATTERY.		
TYPE	: FLOAT CUM BOOST : CP-CC 24V/40A		
REF.DRG. NO.	: C15164A-C		
CLIENT	: JAKSON LIMITED (100% EOU), KATHUA		
P.O.NO.	: ZNB-(EOU-J&K)1056120409 DATED 26.11.2012		
QTY.	: 3 Nos.		
SR. NO.	CODE NO.	DESCRIPTION	RATING
I. TERMINAL PLATES AND LINKS			
1	TB1	Terminals for 240V, 1 Phase, 2 wire AC incoming power supply. (T1-T2) (L N).	Suitable for 1x2Cx10 sq. mm AL Cable
2	TB2	DC output Battery terminals (T3 -T4) (+ve, -ve).	Suitable for 1x2Cx35 sq. mm AL Cable.
3	TB3	Terminals for Charger 'ON' & Charger 'OFF' to remote. (T5-7).	Suitable for 1x2Cx 1.5 sq. mm CU Cable
4	TB4	Terminal for DG set (T8-T9)	Suitable for 1x2Cx 1.5 sq. mm CU Cable
II. FUSES			
1	FS1	HRC fuses with suitable fuse fittings for Contactor coil C1	2A
1	FS2	HRC fuses with suitable fuse fittings for AC to DC converter	2A
2	FS3	HRC fuses with suitable fuse fittings for VM1.	500mA
III. BLOCKER DIODES /SMPS			
1	MR2	Silicon Blocker Diode for float cum boost charger.	70A/1600PIV
2	SMPS	SMPS for FCB Battery charger	24V/40A Float Mode Voltage- 26.4V Boost Mode Voltage -31.8V
IV. CONTACTORS			
1	C1	2 Pole AC mains contactor for charger.	18A/240V AC Coil
V. RESISTANCE & POTENTIOMETERS			
1	RS1	Dropping resistance for DC Under & Over voltage relay	200E/50W
2	RA, RB	Dropping resistance for Earth fault relay	100E/25W
VI. METERS (ACCURACY CLASS- 1.0%) 96X96 sq. mm. DIGITAL (24V DC Supply)			
1	VM1	DC voltmeter to read DC output voltage.	0-50V
2	AM1	DC ammeter with external shunt to read DC O/P current.	0-75A

SR. NO.	CODE NO.	DESCRIPTION	RATING
VII. SWITCHES & MCB's			
1	MCB1	Two pole ON/OFF miniature circuit breakers for AC input.	16A
2	MCB2	Two pole ON/OFF miniature circuit breaker for DC output.	50A
3	SW1	Single Pole ON/OFF Cam switch for contactor coil operation.	10A
4	SW2	1 pole by-pass Cam switch for earth leakage relay.	10A
5	SW3	2 pole 2 way switch for Auto/ Manual boost to float change over	10A
6	SW4	1 pole 2 way switch for Float/ Boost mode selection	10A
7	SW5	2 pole 2 way switch for select annun. Supply	10A
VIII. PRINTED CIRCUIT BOARDS, ELECTRONIC RELAYS & CONTROL CARDS			
1	DC U-O/V	Load DC under-over voltage ckt. Of solid state sensing type.	DC U/V O/V Act.V = 22V 34V Rst.V = 23V 33V
2	AC M/F	AC mains fail relay for annunciation & AC ON indication.	6A/230V AC
3	CF-R	Solid-state relay for Charger fail & DC ON indication.	6A/24V DC coil
4	ANNUNCI- ATOR	Annunciation circuit of Accept, Test push Button with common audible alarm and individual fault indicating LED's (Inbuilt in 96 sq. mm meter with push button, buzzer mounted outside)	24V
5	E/L (IMD)	Earth Fault Circuit (Insulation Monitoring Device) of solid state sensing type to annunciation.	24V/ 1-7mA
6	AC TO DC Converter	AC To DC Converter for annun. Supply	I/P : 90-270V O/P: 24V /2.5A

UNIT	:	SMPS BASE BATTERY CHARGER FOR 24V LEAD ACID BATTERY.	
P.O.NO.	:	ZNB-(EOU-J&K)1056120409 DATED 26.11.2012	
CLIENT	:	JAKSON LIMITED (100% EOU), KATHUA	
TITLE	:	TECHNICAL DATA SHEET FOR BATTERY CHARGER	SHEET 1 OF 1
DOC. NO	:	DS2920	REV. 00 DATED : 18.01.2013

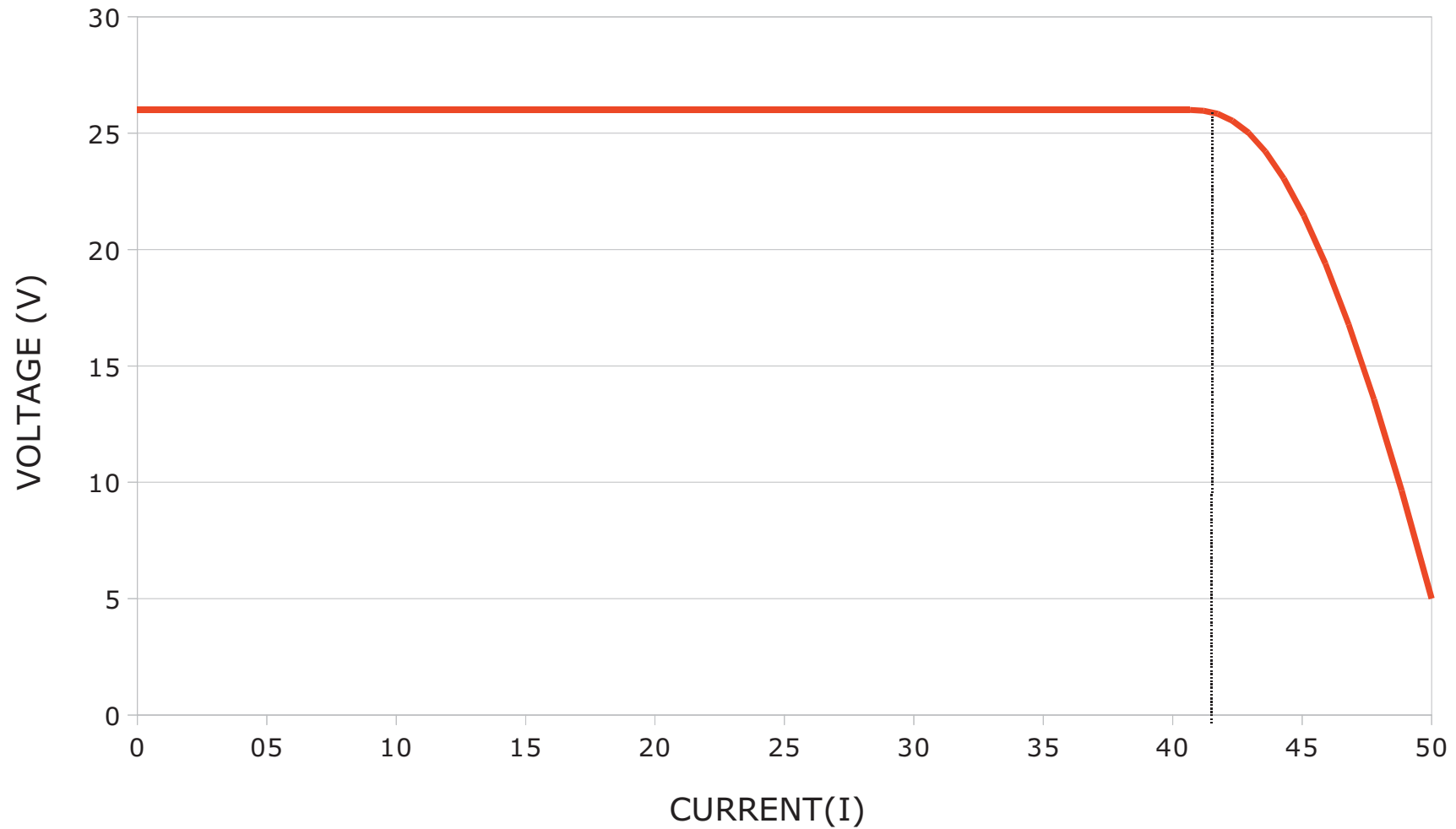
1 Battery Charger

- 1.01 Manufacturer's name and address : Chhabi Electricals Pvt. Ltd.
- 1.02 Type of rectifier : SMPS Based
- 1.03 Rated output current (Amp.) : 40 Amps
- 1.04 Output voltage range (Volts) : 24 VDC
- 1.05 Applicable standards : The rectifier/SMPS assembly shall be provided per relevant IS Standards
- 1.06 Time required for recharging the battery : 10 Hrs.
- 1.07 Whether drooping characteristics provided as per specification : Yes
- 1.08 Complete technical specification and literature to be furnished : Enclosed with drawings
- 1.09 Paint shade : RAL- 9002 (grey) as per Tech. Spec.
- 1.10 Paint thickness : 50 micron
- 1.11 Note : Make of component list is enclosed

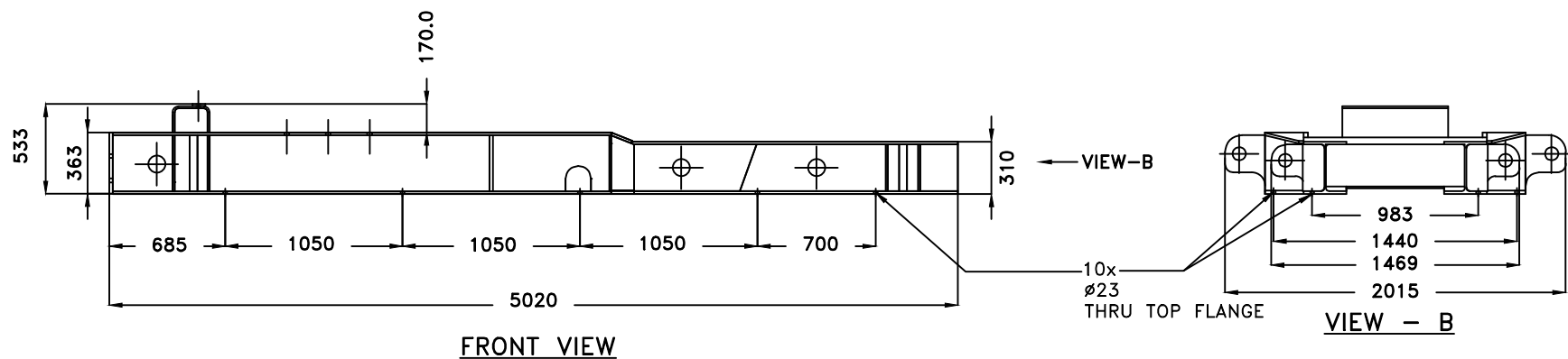
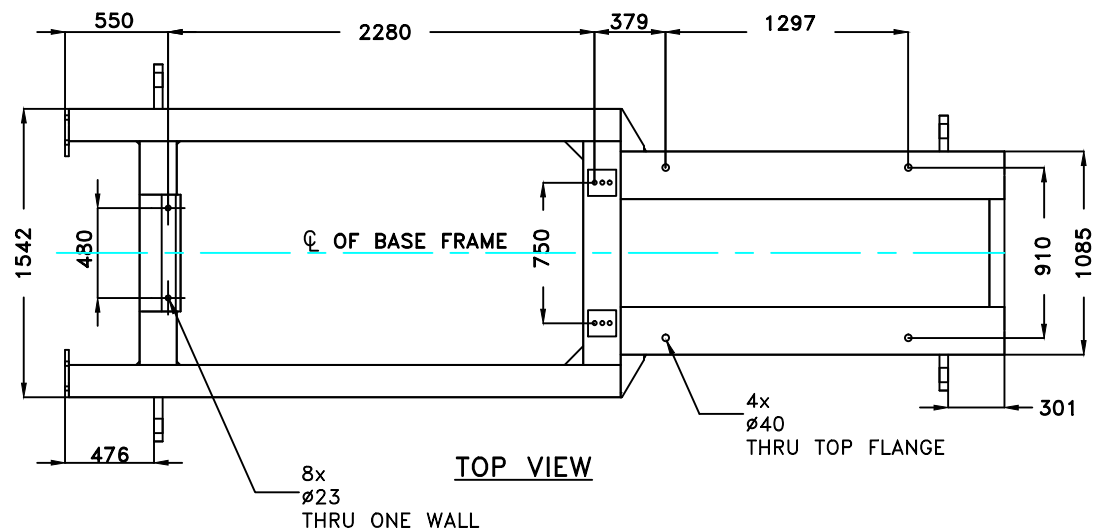
MAKE OF COMPONENTS

SR.NO.	DESCRIPTION	MAKE
1	ALARM ANNUNCIATOR	CHHABI
2	CAPACITOR	
	A) AC – PF CAPACITOR	EPCOS/L&T
	B) DC – FILTER CAPACITOR	SARDA/ALCON/RESCON
3	CIRCUIT BREAKER	
	A) MCB	C&S/SCHNEIDER/LEGRAND/ABB/SIEMENS
	B) MCCB	C&S/ABB/SIEMENS/SCHNEIDER
	C) ACB	C&S/ABB/SCHNEIDER/L&T/SIEMENS
4	CONTACTOR & RELAYS	
	A) AC CONTACTOR	C&S/ABB/L&T
	B) DC CONTACTOR	C&S/ABB/SIEMENS/INDIAN SOLENOID OR EQUIVALENT
	C) THERMAL OVER LOAD RELAY	C&S/ABB/L&T
	D) AUXILLARY RELAY	SHAVISION/OMRON
5	TRANSDUCER	CHHABI/SETO/RISHABH
6	ELECTRONICS MODULE	CHHABI
7	ENCLOSERS	CHHABI APPROVED VENDOR
8	FILTER/CHOKES	
	A) FILTER CHOKE	CHHABI (OUR OWN MAKE)
	B) RFI / EMI	CHHABI/ELCOM/EQUIVALENT
9	FUSELINK	
	A) HRC FUSELINK	C&S/GE/BUSSMAN/SIEMENS/L&T
	B) SEMICONDUCTOR FUSELINK	GE/BUSSMAN/FERRAZ
10	INDICATORS	CHHABI/TEKNIC
11	MEASURING INSTRUMENT	
	A) ANALOG METER	AE/UBAH/RISHABH
	B) DIGITAL METER	CHHABI/RISHABH
12	CURRENT TRANSFORMER	INDCOIL
13	RECTIFIER (SCR & DIODE)	SEMIKRON/RUTTONSHA/EUPACK/ANSALDO/IMPORTED
14	SURGE PROTECTION DEVICE	PHONIX
15	SWITCH	
	A) CONTROL SWITCH	KAYCEE
	B) ROTARY SWITCH – AC	KAYCEE
	C) ROTARY SWITCH – DC	KAYCEE
	D) SFU	C&S/L&T/HPL
	E) ISOLATOR / CHANGEOVER	C&S/HPL
	F) PUSH BUTTON	TEKNIC
16	TERMINAL	
	A) CONTROL	CONNECTWELL
	B) POWER	CHHABI
	C) FOR DCDB	Up to 35 sqmm – Clipon type
		Above 35 sqmm – Stud/Busbar type (Chhabi Make)
17	TIMERS	L&T/SELECTRON
18	TRANSFORMER	CHHABI (OUR OWN MAKE)

TYPICAL V-I CHARACTERISTICS FOR 24V BATTERY CHARGER



CE2920



NOTES:

- ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
- SYNTHETIC ZINC CHROMATE PRIMER TO BE APPLIED AFTER THOROUGH CLEANING.
- PAINT - EPOXY BLACK.
- SKID OF RADIATOR COMES WITH RADIATOR & BOLTED ARRANGEMENT PROVIDED IN BASE FRAME FOR ASSEMBLY.

RATING (KVA)	1750
CUMMINS ENGINE MODEL	QSK-60-G4
STAMFORD ALTERNATOR FRAME	LVS1804S1

REV.	DESCRIPTION	DATE	CHKD.	SGN.

PROJECT		NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660 MW)					
CONSULTANT		NTPC Limited <small>(A MEMBER OF THE STATE POWER CORP.)</small>					
SHELL'S CONTRACTOR		BJH					
BHEIL'S CONTRACTOR		JAKSON ENGINEERS LTD. <small>FLAT NO.-88, BHOIRAMBA-88 CHANDRANAGAR, CHANDRANAGAR TWP</small>					
DIRECTORY :	000	SCALE	NTS	WEIGHT(Kgs.)	*****	NTPC DRAWING NO.	4430-001-215-PVE-B-048
FILE NO. :	000	APPRO.		NAME		SIGN	DATE
TITLE :		BASE FRAME - 1750 kVA		ITEM NO.		NO. OF ITEMS	
REV.		SHEET NO. 1 OF 2		NO. OF SHTS.		2	

Tender no PSER:SCT:NKP-E2053:20 (TCN-05) ANNEXURE – A				
Sl. No.	Cl. No.	Existing provision	Bidder's query	BHEL's clarification
1	Volume –III Priced Schedule Rev-00 SOR SI No.: G.10	CABLE JOINTS (Straight through jointing kit installation including supply)	1.In TCC, Doc No. Volume-IF-TS-1-R-0 : Clause No. 5.7 - The transformer is equipped with a neutral grounding resistor whose secondary is connected across a resistor. Erection of NGR, HT cabling from transformer neutral terminal to NGR (XLPE cable and jointing kit is to be supplied by BHEL), control cabling of resistor and upto JB/ TB/ marshalling box associated for this item, HV test of the cables is included in this contract and the quote rates by contractor shall be inclusive of the required cabling and termination work – Please confirm who will supply Straight through jointing kit. 2. Please confirm whether indoor type or outdoor type straight through joints are required.	Jointing kit will be supplied by BHEL
2	Volume –III Priced Schedule Rev-00 SOR SI No.: S.1	OIL FILLED TRANSFORMERS (SCOPE OF WORK: a) SHIFTING OF TRANSFORMER FOR ERECTION PURPOSE (Job involving Loading from storage location at about maximum 500 Mtr. periphery inside the plant premises, Transportation through multi axle low bed trailer and unloading for erection purpose) b) Erection, Testing and commissioning of Transformer and associated Equipment / accessories.)	Please confirm maximum distance for loading of transformer from Storage.	Tentative distance 400 mtr.
3	Volume –III Priced Schedule Rev-00 SOR SI No.: S.1.0	265 MVA, 420/√3/21 Kv, OFAF or ODAF, YNd11, Z=15% ON 265 MVA BASE, OCTC +/- 5% IN STEPS OF 2.5% ON HV SIDE	1.Please confirm size, weight and type of Transformer (1-ph/3-ph) 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 7000(L)x3500 (W)x 4500(H). Weight (including Oil) : 8.0 MT Oil volume: 1750 Ltr
4	Volume –III Priced Schedule Rev-00 SOR SI No.: S.2.0	120/60/60 MVA, 400/11.5/11.5 kV, ONAN/ONAF, YNyn0yn0, OLTC +/-10% IN STEPS OF 1.25% ON HV SIDE, ZHV-LV1 = Z HV-LV2 = 28%, Z LV1-LV2 = 51% AT 120 MVA BASE WITH 02 NOS NGR (11.06 OHM, 600A FOR 10 SECS	1.Please confirm size, weight and type of Transformer (1-ph/3-ph) 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 7500(L)x 4000 (W)x 4500(H). Weight: 130 MT Oil volume: 67700 Ltr
5	Volume –III Priced Schedule Rev-00 SOR SI No.: S.3.0	45 MVA, 21/11.5 kV, ONAN/ONAF, Dyn1, Z=11.5% ON 45 MVA BASE, OLTC +/- 10%IN STEPS OF 1.25% ON HV SIDE WITH NGR (11.06 OHM, 600A FOR 10 SECS)	1.Please confirm size, weight and type of Transformer (1-ph/3-ph) 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 7500(L) x 3700 (W) x 3500(H). Weight: 50 MT Oil volume: 25400 Ltr

Tender no PSER:SCT:NKP-E2053:20 (TCN-05) ANNEXURE – A				
Sl. No.	Cl. No.	Existing provision	Bidder's query	BHEL's clarification
6	Volume –III Priced Schedule Rev-00 SOR SI No.: S.4.0	16 MVA, 11/3.45 KV, ONAN, DyN1, Z= 12.5% UAT and CHP Transformer with NGR (3.32OHM, 600A, 10Secs)and accessories complete. (UAT-02 Nos)	1.Please confirm size, weight and type of Transformer (1-ph/3-ph) 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 4400(L) x 2400 (W) x 3200(H). Weight (including oil): 40 MT Oil volume: 11000 Ltr
7	Volume –III Priced Schedule Rev-00 SOR SI No.: S.5.0	95 KV/900 mA HVR TRANSFORMER(ERECTION IS EXCLUDED , RATE TO BE QUOTED FOR OIL FILTRATION & COMMISSIOINING ONLY)	1.Please confirm size, weight and type of Transformer (1-ph/3-ph) 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Erection excluded from Electrical agency's scope. HVR oil volume approx. 800 ltr
8	Volume –III Priced Schedule Rev-00 SOR SI No.: S.2.1.0	1600kVA, 11kV/0.433kV, 3 phase, 2 winding, outdoor, ONAN, Z=8.0%, Dyn1, OFF Circuit taps ±5% in steps of 2.5% (with cable box type HV, with bus-duct type LV and with solidly grounded LVN termination)	1.Please confirm size and weight of transformer. 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 2500 (L) x 800 (W)x 1560(H). Weight(including oil): 5.85 MT Oil volume: 1070 Ltr
9	Volume –III Priced Schedule Rev-00 SOR SI No.: S.2.2.0	2000kVA, 11kV/0.433kV, 3 phase, 2 winding, outdoor, ONAN, Z=10.0%, Dyn1, OFF Circuit taps ±5% in steps of 2.5% (with cable box type HV, with bus-duct type LV and with solidly grounded LVN termination)	1.Please confirm size and weight of transformer. 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: 3000(L) x 800 (W) x 1700(H). Weight (including Oil) : 8.0 MT Oil volume: 1750 Ltr
10	Volume –III Priced Schedule Rev-00 SOR SI No.: S.2.3.0	2500kVA, 11kV/0.433kV, 3 phase, 2 winding, outdoor, ONAN, Z=13.0%, Dyn1, OFF Circuit taps ±5% in steps of 2.5% (with cable box type HV, with bus-duct type LV and with solidly grounded LVN termination)	1.Please confirm size and weight of transformer. 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Main Tank dimension: approximate 3000(L) x 800 (W)x 1700(H). Approximate Weight (including Oil) : 9.0 MT Approximate Oil volume: 2000 Ltr
11	Volume –III Priced Schedule Rev-00 SOR SI No.: S.3.1.0	11 / 0.433KV Dry Type Transformer (DTT), 1.6 to 2.5 MVA	1.Please confirm size and weight of transformer. 2. Please confirm oil capacity of transformer or volume of oil to be filtered.	Dimension: 3000(L)x1550(W)x2900(H). Weight 7MT- 9.6 MT. Dry type transformer
12	Volume –III Priced Schedule Rev-00 SOR SI No.: ZA	BUSDUCTS	1. Please confirm size and section weight of the IP Busduct(24KV), SP Busduct(11KV & 3.3 KV) and LT Busducts	IPBD enclosure dia Main: 1700 mm Delta:1200 mm Tap off:780 mm SPBD 11 kV Cross section: 1900x775 mm SPBD 3.3 kV Cross section: 1450x600 mm

Tender no PSER:SCT:NKP-E2053:20 (TCN-05) ANNEXURE – A				
Sl. No.	Cl. No.	Existing provision	Bidder's query	BHEL's clarification
13	Volume –III Priced Schedule Rev-00 SOR SI No.: ZB	1750 KVA DG SETs along with Accoustic enclosure, Fuel tank(day tank, bulk oil tank), accoustic enclosure, fuel oil piping, exhaust piping,DG set stack Installation of Generator terminal adaptor/box, Current transformer, instruments, Power JB, Control JB, cleaning of radiator tubes (cleaning agent to be supplied by BHEL), replacement of engine oil and its filter, lub. oil filter, radiator coolant (Diesel for commissioning, engine oil & its fil	1. Please confirm weight and stack height of DG.	Drawing enclosed with TCN-05
14	Volume –III Priced Schedule Rev-00 SOR SI No.: ZD	LIGHTING AND MAINTENANCE SYSTEM OF ACC (Erection and Commissioning Assistance Services)	1.0 Please confirm size and weight and stack of lighting panel. 2.0 Please confirm size and weight of maintenance box. 4.0 Please confirm size and weight of main lighting distribution board. 5.0 Please confirm height of Lighting pole	Drawing enclosed with TCN-05
15	Volume –IV , Supply Part, Priced Schedule Rev-00 SOR SI No.: A.1.0	Supply of 6mm thick black chequered rubber mat of appropriate voltage class Size for laying in front of switchgears upto 11 KV. (as required under IE Rule).	As per discussion with manufacturer of Chequered Rubber Mat, following are the sizes available with vendors as per new IS Standard: Thickness Supply Voltage 2.0 mm upto 3.3 KV 2.5 mm 3.3 KV to 11 KV	As per tender document.
16	Volume –IV , Supply Part, Priced Schedule Rev-00 SOR SI No.: D	Supply of Moisture Sealing compounds for wall, floor, panel openings for all variants	Please provide texture of the compound or approved make, if any.	As per requirement (mostly silicon sealant)
17	Ref : PSER:SCT:NKP-E2053:7977, 1.0 Salient Features of NIT Clause No. VII (Page No. 01)	EMD AMOUNT – Rs. 15,87,576/- (Applicable. Exemption allowed only for MSE vendors in line with clause no 27.0 of NIT)	However as per new guidelines issued by MHA, MSMEs are exempted from paying of EMD amount. Please confirm.	Shall be as per Tender.
18	Ref : PSER:SCT:NKP-E2053:7977, 1.0 Salient Features of NIT Clause No. VIII (Page No. 02)	COST OF TENDER – Rs. 5000/- (Applicable. Exemption allowed only for MSE vendors in line with clause no 27.0 of NIT)	However as per new guidelines issued by MHA, MSMEs are exempted from paying of Tender Fees. Please confirm.	Shall be as per Tender.

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
 Power Sector - Eastern Region,
 Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
 Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	ERECTION, TESTING & COMMISSIONING OF ELECTRICAL SYSTEMS FOR UNIT# 3 OF 3X660 MW, NORTH KARANPURA STPP AT JHARKHAND.	
Ref	1.0	Tender no PSER:SCT:NKP-E2053:20
	2.0	BHEL's NIT, vide reference no Ref: PSER:SCT:NKP-E2053:7977, Date: 17-06-2020.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT: NKP-E2053:TCN-01 Date: 08-07-2020.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT: NKP-E2053:TCN-02 Date: 15-07-2020.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT: NKP-E2053:TCN-03 Date: 22-07-2020.
	6.0	BHEL's TCN-04, vide reference no PSER:SCT: NKP-E2053:TCN-04 Date: 29-07-2020.
	7.0	BHEL's TCN-05, vide reference no PSER:SCT: NKP-E2053:TCN-05 Date: 01-08-2020.
	8.0	Other References, if any.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted/uploaded offer/documents in accordance with tender instructions with acceptance of the terms & conditions of the tender by us and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized
representative of the bidder)

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION DJ-9/1, SECTOR-II, SALT LAKE CITY, KOLKATA - 700 091

फैक्स/Fax : (033) 23211960

फोन/Phone : बोर्ड/EPABX : (033) 23398000