Bharat Heavy Electricals Limited
Heavy Plates & Vessels Plant
Visakhapatnam – 530 012,
Andhra Pradesh, INDIA.

Tel. : +91(0) 891 288 1515 / 1345
E-mail : rameshsnvs@bhel.in &
dgs@bhel.in

NOTICE INVITING TENDER

::1::

Ref: OS/WC/2024-25/178/112 **Date: 27.02.2025**

Sub: Service contract for carrying out SIL Verification, Evaluation & Validation Services for Fresh Feed Furnace (412-H-1001) at IOCL- PANIPAT INDMAX Project Site (S.O.7935)- Reg.

Tenders are invited under **two bid system**, Techno-Commercial Bid (Part-I) and Price Bid (Part-II) from the reputed and experienced contractors with sound technical and financial capability for the subject work.

SL. NO.	NAME OF THE WORK
01	Service contract for carrying out SIL Verification, Evaluation & Validation Services for Fresh Feed Furnace (412-H-1001) at IOCL- PANIPAT INDMAX Project Site (S.O.7935)

1. PRE- QUALIFICATION REQUIREMENT (PQR):

I) Average annual turnover of the contractor should be at least **₹2.19 Lakh** during the last 3 years ending 31st March 2024.

Tenderer should enclose Certificate of incorporation / Firm registration, EPF, ESI/Employee Group Insurance, PAN, GSTIN registration no., Income tax returns for last three years (AY 2022-23, 2023-24 & 2024-25), Profit & Loss account and Balance Sheet certified by the Practicing Chartered Accountant for the last 3 years

II) The Contractor should have experience of completing similar works during the last 7 years ending **31st January 2025** as given below: -

(a) Three similar completed works costing not less than the amount equal to **₹2.92** Lakhs each

OR

(b) Two similar completed works costing not less than the amount equal to **₹3.65** Lakhs each

OR

(c) One similar completed work costing not less than the amount equal to **₹5.84** Lakhs

Work orders & Job Completion Certificates from the customer shall be enclosed in support of successful and satisfactory completion of the orders.

Note:

***S*imilar work means carrying out SIL Verification, Evaluation & Validation Services on regular contract basis for State / Central Govt. or Undertakings or Private Firms.**

The works executed in the own name of the tenderer will only be considered for eligibility criteria.

Note: While scrutiny it is found that If any bidder has made false declaration and/ or provided false information and/ or forged documents or has forged BHEL documents, certificates etc. for securing business, meeting PQR, such offers shall be rejected and action will be initiated as per BHEL extant Guide lines.

2. SCOPE OF WORK

Work is to be carried out as per detailed scope of work at Annexure - I

3. LOCATION OF WORK:

a) The subject work is to be carried out at IOCL- PANIPAT INDMAX Project Site

b) The intending tenderers are advised to visit the above place, note down the entry procedures, safety requirements, work permit system etc. and satisfy themselves of all conditions prevailing there before submission of their tenders.

Contd…2

4. WORK COMPLETION PERIOD:

Work shall be completed within 45 Days from the date of Intimation by Engineer In-charge

5. EARNEST MONEY DEPOSIT:

Not applicable

6. INCOME TAX:

Income tax will be deducted from the payment made to the contractor as per applicable GOI guidelines and TDS certificate will be issued to this effect.

7. TDS ON GST:

TDS on GST amount as per statutory requirement as applicable will be deducted on each payment made to the contractor. Present TDS on GST is 2%.

8. SECURITY DEPOSIT:

A. Security deposit means the security provided by the contractor towards fulfilment of any obligations in terms of the provisions of the contract.

B. The total amount of the security deposit will be **5%** of the contract value.

C. **Modes of Deposit:**

The required amount of Security Deposit of **5%** of the contract value may be accepted in the following forms:

a) Cash (as permissible under the extant Income Tax Act)

b) Local Cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.

c) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the company's act. The bank guarantee format should have the approval of BHEL.

d) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the company's act (FDR should be in the name of the contractor, a/c BHEL.

e) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL)

f) Insurance Surety Bonds.

(**Note:** BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

D. **Collection of Security deposit**:

At least 50% of the required Security Deposit, including the EMD, should be collected before start of the work. Balance of the Security Deposit can be collected by deducting 10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected.

In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder.

If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor.

The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

Contd…3

Note: In case of (a) small value contracts not exceeding Rs. 20 lakhs or (b) SAS jobs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/ recovery of initial 50% Security Deposit.

E. **Refund of Security Deposit:**

i. The security deposit shall be refunded after successful completion of the Contract as per agreement and subject to deduction of any amount due to BHEL.

ii. Security deposit shall not be refunded to the Contractor except in accordance with the terms of the Contract.

iii. The successful tenderers shall furnish Security Deposit within 15 days from the date of Work Order / Letter of Intent. The Security Deposit shall be furnished by the successful tenderers before commencement of work by them.

iv. The security deposit shall not carry any interest.

Note: Acceptance of Security Deposit against Sl. No. (d) and (e) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

Security Deposit / Bank Guarantee will be released after the maintenance **period of 2 months** or **on closure of contract whichever is later**.

9. LIQUIDATED DAMAGES / PENALTY:

If the Contractor fails to complete the job within the stipulated delivery period / work completion period, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay @ 0.5% of the contract value per week subject to a maximum of **10%** of the contract value.

10. PAYMENT TERMS:

100% Bill payment will be arranged within 45 days for MSE / 60 days for Medium / 90 days from the date of submission of bill.

Bill to be submitted to Engineer-in-charge along with following documents:

a) Invoice
b) Job completion certificate issued by the Engineer-in-charge
c) Proof of GST payment as per Annexure - GST.
d) RTGS form/ Bank account details in prescribed format
e) WAM 07 duly filled & signed
f) For any reduction in the Invoice value, Credit Note (under GST Act) to be issued by vendor and vice versa.
g) In case of release of security deposit, WAM-10 to be filled and submitted.

Note. All payments will be released through RTGS/ NEFT only.

11. PRICE SCHEDULE, TAXES & DUTIES:

a. Prices shall be quoted in GeM Portal for the complete scope of work.

b. **The quoted prices shall be inclusive of GST.** However, GST as applicable shall be payable by contractor & the same will be reimbursed as per Annexure - GST.

c. In addition to existing taxes, any new taxes imposed by Central/ State Govt. shall be payable by the contractor and same shall be reimbursed on submission of relevant documents / proof of payment.

d. In case, any new tax is imposed instead of existing tax, difference of the amount shall be reimbursed / recovered on submission of documentary evidence.

Contd…4

e. In case, any new tax is imposed by Central / State Govt. or there is any variation in taxes after expiry of delivery / contract period, the same shall be borne by the contractor only.

f. All terms & conditions of the contract in respect of taxes & duties are subject to new taxation laws introduced time to time by Govt. and terms & conditions will be deemed to be modified in accordance with the provisions of New Laws (i.e., GST).

g. The quoted prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.

12. VALIDITY OF OFFER:

The offer shall be valid for a period of **Two Months** from the last date for tender submission.

13. RISK PURCHASE:

In case the contractor fails to execute the work due to any reason, BHEL reserves the right to get the same completed through some other party at the risk & cost of the contractor and any additional expenditure incurred due to the same and overhead charges shall be charged to the contractor. Risk & Cost will be implemented as per STANDARD OPERATING PROCEDURE FOR IMPLEMENTATION OF RISK & COST of BHEL.

14. REVERSE AUCTION:

Reverse auction will be conducted in GeM portal with the technically qualified bidders

15. GENERAL:

a. Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry.

Deviations to the tender conditions are not acceptable and BHEL-HPVP reserves the right to reject such offers which do not meet Technical / Commercial requirements without any / further correspondence**.**

Bids not accompanied with requisite documents / delayed bids, incomplete / conditional offers, bids not conforming to the terms & conditions specified in the tender documents are liable for rejection.

b. BHEL reserves the right to modify or cancel or short close the tender at any stage at its discretion without assigning any reason thereof.

c. The bidders shall study the tender documents, drawings and all other relevant documents in detail for understanding the scope of work involved in various items before submission of offers.

d. For any clarifications required on this tender document, scope of work etc., the bidders shall depute their authorized representatives to HPVP, Visakhapatnam with prior intimation to get clarifications from concerned authorities.

e. **Manager (Engg) shall be the Engineer-in-charge for herein after referred to as such in the tender. Contact Details: Ph: 0891-288- 1156, email: ukk@bhel.in**

f. Lowest offer need not be the rate acceptable to BHEL-HPVP and BHEL-HPVP reserves the right for negotiation with the bidder.

g. The following documents (enclosed) shall form part of the contract including this Notice Inviting Tender:

a)	Scope of Work	: Annexure – I
b)	General Conditions of Contract (Works/ Service)	: Annexure – II
c)	Acceptance to the tender terms & conditions	: Annexure – III
d)	Contractor Information	: Annexure – IV
e)	Check List	: Annexure - V
f)	Price Bid (Schedule of Quantities & Rates)	: Annexure – VI

Contd…5

16. <u>COMPENSATION IN CASES OF DEATH/ PERMANENT INCAPACITATION OF PERSON DUE TO UNINTENDED/ UNFORESEEN OCCURRENCES DURING MANUFACTURING/ OPERATION AND WORK AT BHEL FACTORIES / OFFICES:</u>

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.

a) Victim: Any person who suffers permanent disability or dies in an accident as defined below.

b) 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, servicing, overhaul, renovation and retrofitting, trail operation, performance guarantee testing undertaken by company or during any works/during working at BHEL units/offices/townships and premises/project sites.

c) Compensation in respect of each of the victims:

(i) In the event of death or permanent disability resulting from Loss of both limbs: ₹10,00,000/- (Rupees Ten Lakhs)

(ii) In the event of other Permanent disability: ₹7,00,000/- (Rupees Seven Lakhs)

d) Permanent Displacement: A displacement that is classified as a permanent total disablement under the provision to Section 2(I) of the Employees Compensation Act, 1923".

17. <u>TENDER SUBMISSION</u>

a) **The Bid shall be submitted in Two parts**
Part-I Bid should contain following documents:

(i) Certificate of incorporation / Firm registration
(ii) Copy of EPF, ESI/Employee Group Insurance
(iii) Copy of GSTIN Registration Certificate.
(iv) Copy of PAN card.
(v) Udyam Registration (MSE) Certificate (if any)
(vi) Income tax returns for last three years (AY 2022-23, 2023-24 & 2024-25)
(vii) Profit & Loss account and Balance Sheet certified by the Practicing Chartered Accountant for the last 3 years
(viii) Similar work orders & work completion certificates
(ix) Bank a/c details as per Annexure NEFT / Bank Cheque copy of Company
(x) Signed & Sealed NIT copy along with all annexures

Part-II Bid
(i) Price Bid:

b) The tender completed in all respects **shall be submitted through GeM portal latest by 15.00 hrs**. **on 10.03.2025.**

Offers received in any other form will not be accepted.

c) Submission of offer by a tenderer implies that all the tender documents were read by the tenderer and the tenderer is aware of the scope and specifications of the work, site condition, local conditions and rates at which stores, tools and plant, free / chargeable materials etc., will be issued to him by BHEL - HPVP and other factors having bearing on the execution of the work**.**

Contd…6

18. OPENING OF TENDERS:

Part-I Bids will be opened on **10.03.2025 at 15.30 Hrs.** through GeM portal.

19. BREACH OF CONTRACT:

In case of Breach of Contract, 10% of the contract value will be recovered from the contractor and necessary action will be initiated as per contract terms and conditions and BHEL extant Guide Lines.

***

SCOPE OF WORK

INTRODUCTION:

M/s BHEL is executing the Fired Heater (Fresh Feed Furnace Tag No: 412-H-1001) for Indmax Unit of Panipat Refinery Expansion Project (P25) of M/s IOCL. The SIL study will be done for the various units of refinery based on PID diagrams and Hazop study. SIL classification is to identify the risk level of hazards protected by Safety Instrumented loop. The target SIL is outcome of a SIL classification. thyssenkrupp Industrial Solutions (TKIS India) has been engaged by IOCL as EPCM-2 Consultant for its facilities, as a part of capacity expansion of their Panipat Refinery from 15MMTPA to 25MMTPA (P-25 Project).

As a part of contractual requirement, SIL validation has to be carried out on SIL study conducted for Fresh Feed Furnace (412-H-1001) in FCC unit of M/s IOCL's Panipat Refinery Expansion Project (P25). The study was conducted at tkIS Office, Mumbai in India on 31st March 2023 under Chairmanship of a Third Party SIL Chairman, refer Doc. No. 6745-PRC-412-QB-0009, Rev 0. SIL study has been carried out as specified in 'SIL Methodology', refer Doc. No. 6745-PRC-000-QB-0002, Rev 0.

OBJECTIVE:

Bidder shall facilitate the SIL Verification, Evaluation & Validation Services for the SIL Loops in the SIL Study report in order to ensure that the design of the Safety Instrumented System (SIS) meets the required SIL Levels for FRESH FEED FURNACE (412-H-1001) of IOCL Panipat Indmax Heater Project. This involves performing detailed calculations and analysis to verify, evaluate & validate that the SIS design (i.e. including hardware and software) and SIF loops designed, achieves the desired target SIL levels.

SIL Verification and Valuation:

The objective of SIL Verification and Valuation is to ensure that the design of the Safety Instrumented System (SIS) meets the required SIL levels. This involves performing detailed calculations and analysis to verify that the SIS design—including hardware and software—achieves the target SIL levels. The process may include:

- Failure rate analysis
- Consideration of redundancy, diversity and diagnostic coverage

The following Inputs to the bidder will be provided within 1 week from the date of PO.

- SIL Study Report Doc. No. 6745-PRC-412-QB-0009 Rev 00.
- P&IDs, Cause & Effect diagram if available/applicable.
- SIL input reports of all instrumentation related items (like solenoid valves, etc.,) and control system.

Any comments by Customer / Project Consultant / BHEL shall be incorporated by the bidder and to be validated. Further revised report has to be submitted for review.

Preparation of Safety Requirement Specification (SRS):

The objective is to prepare the Safety Requirements Specification, the SRS document will outline the safety requirements that the SIS must meet. The following are inputs for performing SRS:

- SIL Study Report Doc. No. 6745-PRC-412-QB-0009 Rev 00.
- SIL Verification & Valuation Report as per the above-mentioned details.

Contd 2...

SCOPE OF WORK

SIL Validation Plan and Validation:

SIL validation plan has to be submitted for approval, after approval of SIL validation plan a physical validation will be performed which is an on-site job. SIL Validation confirms that the implemented SIS functions correctly and meets the defined safety requirements in line with SRS, Factory Acceptance Testing (FAT), Site Acceptance Testing (SAT) etc.

The validation results will demonstrate that the SIS is functioning as intended and meets the safety performance criteria.

Post-validation, it will be necessary to keep the SRS and Functional Safety Management Plan (FSMP) documents live and updated throughout the project lifecycle. This task will be managed by the BHEL internally.

Special Notes:

- Report submission to BHEL does not absolve the bidder from the PO/Contract, bidder is responsible for the acceptance of report by consultant/customer fulfilling the contractual requirements.
- Any software requirements for SIL Verification & Valuation, Evaluation and Validation services is to the account of bidder only.
- Meeting the contract specification requirements w.r.t SIL Verification, Evaluation & Validation services and report submission accordingly, is the sole responsibility of bidder.
- SIL Verification & Valuation, Evaluation & Validation has to be carried out by bidder and consolidated report w.r.t achieved SIL target levels shall be submitted by bidder within 3 weeks from the date of PO

TABLE OF CONTENTS

****

CHAPTER -1

GENERAL INSTRUCTION TO TENDERERS

1.1. DESPATCH INSTRUCTION:

i) The General Conditions of Contract form part of the Tender specifications. **All pages of the tender documents shall be duly signed, stamped and submitted along with the offer in token of complete acceptance thereof.** The information furnished shall be complete by itself. The tenderer is required to furnish all the details and other documents as required in the following pages.

ii) Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with the full understanding of the implications thereof. Should the tenderers have any doubt about the meaning of any portion of the Tender Specification or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, the scope of work etc., they shall at once, contact the authority inviting the tender well in time (so as not to affect last date of submission) for clarification before the submission of the tender. Tenderer's request for clarifications shall be with reference to Sections and Clause numbers given in the tender documents. The specifications and terms and conditions shall be deemed to have been accepted by the tenderer in his offer. Non compliance with any of the requirements and instructions of the tender enquiry may result in the rejection of the tender.

iii) Integrity pact (IP) shall be applicable for all tenders / contracts if indicated in NIT. This integrity pact shall be issued as part of the Tender documents and shall be returned by the bidder along with Techno-commercial bid duly filled, signed and stamped by the authorized signatory who signs the bid. Only those vendors / bidders who have entered into such an IP with BHEL shall be considered qualified to participate in the bidding. Entering into this pact shall be a preliminary qualification

1.2. SUBMISSION OF TENDERS:

1.2.1 The tenderers must submit their tenders as per instructions in the NIT

1.2.2 Tenders submitted by post shall be sent by 'REGISTERED POST ACKNOWLEDGEMENT DUE / by COURIER' and shall be posted with due allowance for any postal/courier delays. BHEL takes no responsibility for delay, loss or non-receipt of tenders sent by post/courier. **The tenders received after the specified time of their submission are treated as 'Late Tenders' and shall not be considered under any circumstances.** Offers received by Fax/Email/Internet shall be considered as per terms of NIT.

1.2.3 Tenders shall be opened by authorised Officers of BHEL at the place, time and date as specified in the NIT, in the presence of such of those tenderers or their authorised representatives who may be present

1.2.4 Tenderers whose bids are found techno commercially qualified shall be informed the date and time of opening of the Price Bids and such Tenderers may depute their representatives to witness the opening of the price bids. BHEL's decision in this regard shall be final and binding.

1.2.5 Before submission of Offer, the tenderers are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour, means of transport and access to Site, accommodation, etc. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions.

1.3. LANGUAGE:

1.3.1 The tenderer shall quote the rates in English language and international numerals. These rates shall be entered in figures as well as in words. For the purpose of the tenders, the metric system of units shall be used.

1.3.2 All entries in the tender shall either be typed or written legibly in ink. Erasing and over-writing is not permitted and may render such tenders liable for rejection. All cancellations and insertions shall be duly attested by the tenderer.

1.4 PRICE DISCREPANCY:

1.4.1 **Conventional (Manual) Price Bid opening**: In the case of price bid opening without resorting to Reverse Auction, if there are differences between the rates given by the tenderer in words and figures or in amount worked out by him, the following procedure for evaluation and award shall be followed:

i) When there is a difference between the rates in figures and in words, the rates which corresponds to the amounts worked out by the contractor, shall be taken as correct

ii) When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figure or in words, then the rate quoted by the contractor in words shall be taken as correct

iii) When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.

iv) In case of lump sum price, if there is any difference between the amount in figures and in words, the amount quoted by the bidder in words shall be taken as correct.

v) In case of omission in quoting any rate for one or more items, the evaluation shall be done considering the highest quoted rate obtained against the respective items by other tenderers for the subject tender. If the tenderer becomes L-1, the notional rates for the omission items shall be the lowest rates quoted for the respective items by the other tenderers against the respective omission items for the subject job and the 'Total quoted price (loaded for omissions)' shall be arrived at. However, the overall price remaining the same as quoted originally, the rates for all the items in the 'Total quoted price (loaded for omissions)' shall be reduced item wise in proportion to the ratio of 'Original' total price and the 'Total quoted price (loaded for omissions)''.

vi) The 'Final Total Amount' shall be arrived at after considering the amounts worked out in line with 'i' to 'iv' above.

1.4.2 **Reverse Auction**: In case of Reverse Auction, the successful bidder shall undertake to execute the work as per overall price offered by him during the Reverse Auction process. In case of omission of rates, the procedure shall be as per 'Guidelines for Reverse Auction' enclosed.

1.5. QUALIFICATION OF TENDERERS:

i) Only tenderers who have previous experience in the work of the nature and description detailed in the Notice Inviting Tender and/or tender specification are expected to quote for this work duly detailing their experience along with offer.

ii) Offers from tenderers who do not have proven and established experience in the field shall not be considered

iii) Offers from tenderers who are under suspension (banned) by any Unit/Region/Division of BHEL shall not be considered.

iv) Offers from tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt. of India shall not be considered.

1.6. EVALUATION OF BIDS:

i) Techno-commercial Bids submitted by the tenderer will be opened first and evaluated for fulfilling the Pre-Qualification criteria and other conditions in NIT/Tender documents, based on documentary evidences submitted along with the offer

ii) In case the same qualifying experience is claimed by more than one agency, then the agency who has executed the work as per documentary evidence submitted shall only be qualified. Scope of qualifying work should be totally with the agency who has executed and in case it is only labour + consumables without T&P, then the responsibility of execution is assigned to the first agency and not to the agency who has executed only as labour supply contractor. Further, BHEL reserves the right to ask for further proofs including submission of TDS certificates for the said job

iii) In case the qualifying experience is claimed by private organizations based on Work Order and completion certificates from another private organization, BHEL reserves the right to ask for further proofs including submission of TDS certificates for the said job

iv) Assessing Bidder Capacity for executing the current tender shall be as per Notice Inviting Tender

v) Price Bids of shortlisted bidders shall only be opened either through the conventional price bid opening or through electronic Reverse Auction, at the discretion of BHEL

vi) Price Bids of unqualified bidders shall not be opened. After release of Letter of Intent / Work Order, the un-opened bids (including price bids) shall be returned to respective bidder along with reasons for not opening the bid.

1.7. DATA TO BE ENCLOSED:

Full information shall be given by the tenderer in respect of the following. Non-submission of this information may lead to rejection of the offer.

i) **INCOME TAX PERMANENT ACCOUNT NUMBER**

Certified copies of Permanent Account Numbers as allotted by Income Tax Department for the Company/Firm/Individual Partners, etc. shall be furnished along with tender.

ii) **GSTIN REGISTRATION NUMBER**

Certified copies of GSTIN Numbers for the Company/Firm/Individual Partners, etc. shall be furnished along with tender

iii) **ORGANIZATION CHART**

The organization chart of the tenderer's organization, including the names, addresses and contact information of the Directors/Partners shall be furnished along with the offer.

An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor

iv) **IN CASE OF INDIVIDUAL TENDERER:**

His / her full name, address and place & nature of business.

v) **IN CASE OF PARTNERSHIP FIRM**

The names of all the partners and their addresses, A copy of the partnership deed/instrument of partnership dully certified by the Notary Public shall be enclosed.

vi) **IN CASE OF COMPANIES:**

a. Date and place of registration including date of commencement certificate in case of Public Companies (certified copies of Memorandum and articles of Association are also to be furnished).

b. Nature of business carried on by the Company and the provisions of the Memorandum relating thereof.

1.8. AUTHORISATION AND ATTESTATION:

Tenders shall be signed by a person duly authorized/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor shall be submitted along with the tenders

1.9. EARNEST MONEY DEPOSIT:

Not Applicable

1.10. SECURITY DEPOSIT / PERFORMANCE SECURITY:

A. Security deposit means the security provided by the contractor towards fulfilment of any obligations in terms of the provisions of the contract.

B. The total amount of the security deposit will be **5 %** of the contract value.

C. <u>Modes of Deposit</u>:

The required amount of Security Deposit of **5%** of the contract value may be accepted in the following forms:

a) Cash (as permissible under the extant Income Tax Act)

b) Local Cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.

c) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the company's act. The bank guarantee format should have the approval of BHEL.

d) Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the company's act (FDR should be in the name of the contractor, a/c BHEL.

e) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL)

(**Note:** BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

f) Insurance Surety Bonds

D. **<u>Collection of Security deposit</u>**:

At least 50% of the required Security Deposit, including the EMD, should be collected before start of the work. Balance of the Security Deposit can be collected by deducting 10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected.

In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder.

If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor.

The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

(**Note:** In case of (a) small value contracts not exceeding Rs. 20 lakhs or (b) SAS jobs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/ recovery of initial 50% Security Deposit).

E. Security deposit shall be released to the contractor upon fulfilment of contractual obligations as per the terms of the contract.

F. The security deposit shall not carry any interest.

G. Bidder agrees to submit performance security required for execution of the contract within the time period mentioned.

1.10.1 The validity of Bank Guarantees towards Security Deposit shall be initially up to the completion period as stipulated in the Letter of Intent/Award + 3 months, and the same shall be kept valid by proper renewal till the acceptance of Final Bills of the Contractor, by BHEL

1.10.2 BHEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfil any of the contractual obligations or in the event of termination of contract as per terms and conditions of contract. BHEL reserves the right to set off the Security Deposit against any claims of other contracts with BHEL.

1.11. RETURN OF SECURITY DEPOSIT:

Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor along with the 'Final Bill' after deducting all expenses/ other amounts due to BHEL under the contract / other contracts entered into with them by BHEL.

1.12. BANK GUARANTEE:

Where ever Bank Guarantees are to be furnished/ submitted by the contractor, the following shall be complied with

i) Bank Guarantees shall be from Scheduled Banks/ Public Financial Institutions as recommended by BHEL time to time.

ii) The Bank Guarantees shall be as per prescribed formats of BHEL.

iii) It is the responsibility of the bidder to get the Bank Guarantees revalidated/extended for the required period (subject to a minimum period of six months), as per the advice of BHEL Engineer-in-Charge / Site Engineer / Construction Manager. BHEL shall not be liable for issue of any reminders regarding expiry of the Bank Guarantees.

iv) In case extension/further extensions of any Bank Guarantees are not required, the bidders shall ensure that the same is explicitly endorsed by the Engineer-in-Charge / Construction Manager and submitted to the BHEL Visakhapatnam.

v) In case the Bank Guarantees are not extended before the expiry date, BHEL reserves the right to invoke the same by informing the concerned Bank in writing, without any advance notice/communication to the concerned bidder.

vi) Bidders to note that any corrections to Bank Guarantees shall be done by the issuing Bank, only through an amendment in an appropriate non judicial stamp paper.

vii) The Original Bank Guarantee shall be sent directly by the Bank to BHEL under Registered Post (Acknowledgement Due), addressed to the Finance Bills, BHEL, HPVP, Visakhapatnam – 530012

1.13. VALIDITY OF OFFER:

The rates in the Tender shall be kept open for acceptance for a minimum period of **THREE MONTHS** from latest due date of offer submission (including extension, if any). In case BHEL (Bharat Heavy Electricals Ltd) calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the original offer which shall be binding on the tenderers.

1.14. EXECUTION OF CONTRACT AGREEMENT:

The successful tenderer's responsibility under this contract commences from the date of issue of the Letter of Intent / Work Order by Bharat Heavy Electricals Limited. The Tenderer shall submit an unqualified acceptance to the Letter of Intent/Work order within the period stipulated therein.

The successful tenderer shall be required to execute an agreement in the prescribed form, with BHEL, within a reasonable time after the acceptance of the Letter of Intent/Work Order, and in any case before releasing the first running bill. The contract agreement shall be signed by a person duly authorized/empowered by the tenderer. The expenses for preparation of agreement document shall be borne by Contractor.

1.15. REJECTION OF TENDER AND OTHER CONDITIONS:

1.15.1 The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:

a. To reject any or all of the tenders.

b. To split up the work amongst two or more tenderers as per NIT

c. To award the work in part if specified in NIT

d. In case of either of the contingencies stated in (b) and (c) above, the time for completion as stipulated in the tender shall be applicable.

1.15.2 Conditional tenders, unsolicited tenders, tender which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.

1.15.3 Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with BHEL or tenderer under suspension (hold/banning /delisted) by any unit / region / division of BHEL or tenderers who do not comply with the latest guidelines of Ministry/Commissions of Govt. of India. BHEL reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job'. The decision of BHEL will be final in this regard.

1.15.4 If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, BHEL may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, BHEL may then cancel such tender at their discretion, unless the firm retains its character.

1.15.5 BHEL will not be bound by any Power of Attorney granted by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.

1.15.6 If the tenderer deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money/Security Deposit/any other money due.

1.15.7 Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.

1.15.8 In case the Proprietor, Partner or Director of the Company/Firm submitting the Tender, has any relative or relation employed in BHEL, the authority inviting the Tender shall be informed of the fact as per specified format, along with the Offer. Failing to do so, BHEL may, at its sole discretion, reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.

1.15.9 The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of BHEL's Construction Manager/Site-in-charge / Engineer-in-Charge. The tenderer is solely responsible to BHEL for the work awarded to him.

1.15.10 The Tender submitted by a techno commercially qualified tenderer shall become the property of BHEL who shall be under no obligation to return the same to the bidder. However unopened price bids and late tenders shall be returned to the bidders.

1.15.11 Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation. However, if the party who has submitted the unsolicited discount/rebate becomes the L-I party, then the awarded price i.e. contract value shall be worked out after considering the discount so offered.

1.15.12 BHEL shall not be liable for any expenses incurred by the bidder in the preparation of the tender irrespective of whether the tender is accepted or not.

1.16. EMD EXEMPTION FOR MSME VENDORS: Not Applicable

1.17. FRAUD PREVENTION POLICY:

The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice

***

CHAPTER-II

2.1 IDEFINITIONS:

In these general conditions of contract, the following terms shall have the meaning hereby assigned to them except where the context otherwise requires: -

(a) The "CONTRACT" means the documents forming the tender and acceptance thereof together with all the documents referred to therein including General and Special conditions of contract, CPWD specifications Vol. I to VII as amended up to date and the drawings. All the documents as applicable taken together shall be deemed to form one contract and shall be complementary to one another.

(b) The "TENDER DOCUMENT" means the form of tender as applicable General and Special Conditions of contract, and the specifications and/or drawings as given to contractors for the purpose of preparing their tender including "Notice Inviting Tender".

(c)The "WORK" means the work described in the tender documents in individual work order and/ or accompanying drawings and specifications as may be issued from time to time to the contractor by the Engineer-in-Charge in writing the power conferred upon them, including all modifications or additional works and obligations to be carried out either at the site or in factory, workshop or any other place as may be essentially required for the performance of the work.

(d) The "SITE" means the land and/ or other place on into or through which the work is to be executed under the contract or any adjacent land, part or structure which may be allotted to or used for the purpose of carrying out the contract.

(e) The "CONTRACTOR" means the individual firm or company whether incorporated or not, undertaking the work and shall include the legal personal representatives of such individuals or the person(s) composing the firm or company and the permitted assigns of such individuals or firm or company.

(f) The abbreviations "SE/ Dy. Mgr/ Mgr./ Sr. Mgr/ DGM/ Sr. DGM/ AGM/ GM" means Senior Engineer/ Deputy Manager/ Manager/ Senior Manager/ Deputy General Manager/ Sr. Dy. General Manager / Additional General Manager / General Manager respectively who will direct the contract.

(g) The "ENGINEER-IN-CHARGE " means the Engineer/ Sr. Engineer or any other executive deputed by BHEL to supervise the work or part of the work on behalf of the First Party.

(h) Accepting authority: As per BHEL Delegation of Power

(i) "APPROVED" means the approval of directions of the Sr. Manager/ Manager/ Dy. Manager or person deputed by them for the particular purpose.

"Bharat Heavy Electricals Limited" hereinafter referred to as BHEL shall mean the Head of the contracting / Outsourcing department / Other Administrator or other Administrative Officers of the said Company including the Engineer-in-Charge, Sr. Manager or other executive deputed by BHEL is authorized to invite tenders and enter into contract for works on behalf of the Company. BHEL means the Bharat Heavy Electricals Limited/ HPVP plant of the said Company at Visakhapatnam.

(j) In the case of percentage rate contract, "Contractor's percentage" shall if the context so permits means the uniform percentage tendered by the contractor and accepted by the Accepting Officer and expression "Contract Rates" shall refer to rates in the Schedule of Quantities & Rates (SOQR).

(k) The "CONTRACT SUM" means the sum accepted or the sum calculated in accordance with the prices accepted in tender and/ or the Contract rate as applicable to the contractor for the entire execution and full completion of the work.

(l) The "FINAL SUM" means the actual amount payable under the contract by BHEL to the contractor for the entire execution and full completion of the work.

(m) The "TIME OF COMPLETION" is the date or dates for completion of the work or any part of the work as set out in or ascertained in accordance with the individual work or the tender documents or any subsequent amendments thereto.

(n) A "WEEK" means seven days without regard to the number of hours worked in any day in that week.

(o) A"DAY" means a day of 24 (twenty-four) hours irrespective of the number of hours worked or not worked in that day.

(p) A "WORK DAY" means day other than that prescribed by the Negotiable Instruments Act, as being a holiday and consists of the number of hours of labour as commonly recognized by good employers in the trade, in the district where the work is carried out or as laid in the BHEL Rules and Regulations.

(q) "DEVIATION ORDER" means any order given by the Engineer-in-Charge to effect an alteration, addition or deduction, which does not radically affect the scope and nature of the contract.

(r) "EMERGENCY WORK " means any urgent measures which in the opinion of the Engineer-in-Charge become necessary during the progress of the work to obviate any risk of accident or failure or which become necessary for security.

(s) "PROVISIONAL SUM" or "PROVISIONAL LUMPSUM" means a lump sum included by the BHEL in the work for which details are not available at the time of inviting tender.

(t) "PROVISIONAL ITEMS" means items for which approximate quantities have been included in the tender documents.

SCOPE OF WORK

2.2 HEADING OF THE CONDITIONS:

The heading to these conditions shall not affect the interpretation thereof. The decision of BHEL regarding interpretation of any of terms and conditions set forth in this agreement shall be final and binding on the contractor

2.3 CONTRACT DOCUMENTS:

The accepting officer shall furnish to the contractor on demand, two copies of the signed drawings and schedule, and copies of all other relevant documents and specifications and the Engineer in- charge or his representative shall have, at all reasonable times, access to them.

2.4 WORKS TO BE CARRIED OUT:

The contractor shall, except as provided under schedule include all labour, materials, tools, plant, equipment & transport which may be required in preparation for, and in the entire execution and full completion of work. Schedule shall be deemed to have prepared in accordance with good practice and recognized principles & unless otherwise stated the descriptions given therein shall be held to include rate on materials, carriage, and cartage, lead, return of empties, hoisting, setting, fitting in position and all other labour necessary in and for the entire execution and full completion aforesaid. Any error in description or in quantity in schedule or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the work comprised there in accordance to the drawings and material workmanship but the articles or materials specified may be obtained from any other firm subject to the prior written approval of the Unit Head of the First Party.

In case of any discrepancy between schedule, the specification and/ or the drawings, the Accepting Officer shall be the deciding authority as to which shall prevail and his decision shall be final and conclusive. If neither drawings nor specifications contain any mention of minor details of construction, which in the opinion of the Accepting Officer are essentially as are reasonably and obviously and fairly intended for the satisfactory completion of the work, whose decision shall be final and conclusive. Such details shall be provided by the contractor without any extra cost as if they were specifically mentioned and shall be deemed to be included in the contract. The contractor shall be deemed to have satisfied himself as to the nature of site, local facilities of access and all matters affecting the execution and completion of the work. No extra charges consequent on any misunderstanding in these respects or otherwise will be allowed by the First Party.

2.5 DEVIATIONS:

The contractor shall not make any alteration and addition to or omission from the work as described in the tender documents except in pursuance of the written instructions of the Engineer-in-Charge. No such DEVIATION from the work described in the tender documents shall be valid unless the same has been specifically confirmed in writing.

The Accepting Officer may deviate, either by way of addition or deduction from the work so described provided that the contract sum thereby carried on the whole, by not more than the percentage set out in the tender documents. The value, of all additions and deductions will be added to or deducted from the contract sum. Whenever the Accepting Officer intends to exercise such a right, his intention shall specify the deviations, which are to be made on the lump sum assessment or the proposed basis of payment, the extra items allowed, if any, and the date for completion of entire contract. Any objection by the contractor to any matter consisting the order shall be notified by him in writing to Engineer-in-Charge within seven days from the date of such order, but under no circumstance shall the work be stopped (unless so ordered by the Engineer-in-Charge) owing to such difference or controversy that may arise from such an objection by the contractor. The Contractor shall be deemed to have accepted the order and the conditions stated therein. In the event of the contractor failing to agree with Engineer-in-Charge regarding the terms of proposed deviation, the objection shall be referred to the Accepting Officer or officer authorized by Accepting Officer whose decision shall be binding on the contractor.

2.6 TIME:

Time is the essence of the contract and is specified in the tender document or in each individual work order.

As soon as possible after the contract is let or any substantial work order is placed and before the work is to begin, the Engineer-in-Charge and the contractor shall (if so required by the Engineer-in-Charge) agree a time and progress chart for completion of the work within the scheduled time. The chart in the work order shall have the completion date of the individual items thereof and/ or the contract or order as a whole. It shall indicate the forecast of the dates for commencement and completion of the various processes or sequences of the work, and shall be amended as may be required by agreement between Engineer-in-Charge and contractor writing the limitations of time imposed in the tender document or order.

In the absence of any specific time and progress chart to be agreed to between the contractor and Engineer-in-Charge , the contractor shall ensure and maintain, uninterrupted progress of the work such that the entire work shall be completed within the time imposed in the tender documents or order and the proportion of work that shall be completed up to any time in relation to the entire work to be done under the contract or order shall not be less than the proportion that the time elapsed bears to the total time of completion provided in the tender documents or order. The contractor shall suspend the execution of the work or any part or parts thereof whenever called upon in writing by the Engineer-in-Charge. The contractor will be allowed an extension of time for completion limited to not less than the period of suspension but no other claim in respect for compensation or otherwise whatsoever will be admitted. Time may also be extended to allow for alteration of work made by the deviation order as may be decided upon by the Engineer-in-Charge in consultation with the contractor.

2.7 STORE AND MATERIALS:

The contractor shall, at his own expense, supply all stores and material required for the contract other than free issue materials provided by BHEL at the rates detailed therein subject to their availability at the place of issue indicated therein. All stores and materials to be supplied by the contractor shall be of the best kind as described in the specification and the contractor shall ensure that the stores and materials so comply with the specifications. The contractor shall, at his own expense and without delay, supply samples of stores and materials proposed to be used in the execution of the work for the approval of Engineer-in-Charge, who may reject all stores and materials not corresponding either in quantity or character to the approved samples. The stores and materials so rejected shall be duly replaced by the Contractor in time to ensure completion of the work as scheduled and the rejected stores/ materials shall also be replaced by him at his own cost and effort.

In case of stores and material provided by BHEL, the contractor shall bear the cost of loading, transporting to site, unloading, storing under cover and as required, assembling and jointing the several parts together as necessary and incorporating fixing these stores and materials in the work including all preparatory work of whatever description that may be required, and returning empty cases or containers to the place of issue without any extra charge.

2.8 DELAY AND TIME EXTENSION:

If in the opinion of Engineer-in-Charge the work is delayed by any one or more of the following:

1) By reason of abnormally bad weather,

2) By reason of serious loss or damage by fire,

3) By reason of civil commotion, local combination of worker, strike or lockout, affecting any of the trades employed on the work,

4) By delay on the part of the agency or tradesmen engaged by B.H.E.L./ HPVP in executing work not performing part of this contractor,

5) Earthquake & floods

6) Busy of nation

7) Riots

8) Non-availability of stores which are responsibility of BHEL etc. the same shall be covered under force majeure.

9) Any Other Reason.

By reason of any other cause, which in the absolute discretion of the Engineer-in-Charge (when he is the accepting officer of the contract), is beyond the contractor control. When in such case(s) the accepting officer, on recommendation of the Engineer-in-Charge (or higher authority) to be specified in this regard, may make fair and reasonable extension in the completion date of the individual items of work of the contract as a whole. Such extension, which will be communicated to the contractor by the Engineer-in-Charge in writing, but shall nevertheless use constantly his best endeavour to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the work. The delay caused on this account may be waived by the Accepting Officer on merit, based on the written request of the Contractor.

2.9 PATENT RIGHTS:

The contractor shall fully indemnify BHEL or the agent servant or employees or BHEL against any action, claim or proceeding to infringement or the use of any patent or design or any alleged patent or design rights, and shall pay any royalties which may be payable in respect of article or part thereof included in the contract. In the event of any claims being made or action against BHEL in respect of any of the matters aforesaid, the contractor shall immediately be notified thereof for taking necessary action provided that the payment of indemnity shall not apply when such infringement has taken place, in complying with the specific direction issued by BHEL but the contractor shall pay any royalties payable in respect of any such use.

2.10 TAXES & DUTIES:

All charges on account of taxes and/or duties on materials obtained for the work (excluding materials provided by BHEL) shall be as per Notice of Inviting tender.

2.11 ROYALTIES:

Royalties fixed from time to time as per prevalent local rules will be recovered for materials, after which the contractor may be allowed to remove from quarries situated on land, which is in the charge of BHEL authorities.

2.12 PLANT:

The contractor, shall at his own expense, supply all tools plants and equipment (herein after referred to as T & P) required for the execution of the contract, as specified in the tender documents.

2.13 ASSIGNMENT OR TRANSFER OF CONTRACT:

The contractor shall not without prior written approval of the accepting officer, assign or transfer the contract or any part thereof or any share, or interest wherein to any other person. No sum of money which may become payable under the contract shall be payable to any person other than the contractor without prior written approval of Accepting Officer to the assignment or transfer of such money.

SUB CONTRACT: The contractor shall not sub-contract any portion of the contract without the prior written approval of the Accepting Officer.

2.14 LAWS GOVERNING THE CONTRACT:

BHEL reserves the right to take penal action as deemed fit if any information provided by the vender / contractor is found to be incorrect. This contract shall be governed by the Indian Laws for the time being in force.

2.15 COMPLIANCE TO REGULATION AND BYE LAWS:

The contractor shall conform to the provisions of any statute relating to the work and regulations and bye-laws of any local authority and of any water and lighting companies or undertakings with whom/whose systems the work is proposed to be connected. Before making any variation from the drawings or specifications so as to necessitate for such connections the contractor shall give notice to Engineer-in-Charge specifying the variations proposed to be made and the reasons thereof. Until he has received instructions from the Engineer-in-Charge in respect thereof, the contractor required shall be bound to give all notice by statute regulations or bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

PERFORMANCE OF THE CONTRACT

2.16 ORDERS UNDER THE CONTRACT:

All orders, notices etc. to be given under the contract shall be in writing, typescript or printed and if sent by registered post to the address given in tender of the contractor, shall be deemed to have been on the date when in ordinary course they would have been delivered to him. The contractor shall carry out without delay all orders given to him.

2.17 ADMISSION TO THE SITE:

The contractor shall not enter on (other than for inspection purpose) or take possession of the site unless permitted to do so by Engineer-in-Charge. The portions of the site to be occupied by the contractor shall be clearly defined and marked on the site plan, and the contractor will not on any account be allowed to extend his operations beyond these areas.

The contractor shall be provided if necessary or required at site, temporary access thereto and shall modify and maintain the same as required from time to time. He shall take out and clear away and access route when no longer required, restoring the area to its original condition. The Engineer-in-Charge shall have power to execute other works whether or not connected with the work in contract agreement on the site contemporaneously with the execution of the original work and the contractor shall give reasonable facilities for this purpose.

BHEL reserves the right of taking over, at any times any portion of the site which they may require and the contractor shall at his own expense clear such portion forthwith. The photographs of the site of work or any part therein shall be taken, published or otherwise circulated with the prior approval of Engineer-in-Charge.

No such approval shall, however, exempt the contractor from complying with any statutory provision in regard to the taking and publication of such photograph. No such approval shall, however, exempt the contractor or shall give him the right to entry to the site at all time. The Engineer-in-Charge shall have the power to exclude from the site any person of the Contractor whose admission thereto may in his opinion be undesirable for any reason whatsoever.

2.18 CONTRACTORS SUPERVISORS:

The contractor shall either himself supervise the execution of the contract or shall appoint competent agent approved by the Engineer-in-Charge to act in his stead.

The contractor shall employ such Agent having at least DEGREE of BACHELOR of Engineering from a recognized University for contract value exceeding rupees ten lacs, or having at least a diploma in engineering from a recognized college for contract value exceeding Rs.5 lacs but not exceeding Rs ten lacs. The employment of any agent as aforesaid shall not be necessary if the contractor himself is in possession of recognized technical qualification and is in opinion of the Engineer-in-Charge, capable of receiving instructions of the Engineer-in-Charge and for execution of the works to the full satisfaction of the Engineer-in-Charge. If the contractor fails to appoint a suitable Engineer/ agent as aforesaid, the Engineer-in-Charge shall have full power to suspend the execution of work and stop payment of any advance that may become due until such date till a suitable Engineer/ agent is appointed and the contractor shall be held responsible for the delay caused to the work and no extension of time on this account shall be given to him as stipulated in condition mentioned above.

Orders given to contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

The contractor or his accredited agent shall attend whenever required and without making any claim for doing so, either to the office of the Engineer-in-Charge or the work site to receive instructions. The Engineer-in-Charge shall have full power and without assigning any reason, to require the contractor immediately and cease to employ in connection with this contract any agent, servant or employee whose continued employment is, in his opinion, undesirable. The contractor shall not be allowed any compensation on this account.

2.19 LABOUR LAWS TO BE COMPLIED WITH BY THE CONTRACTOR:

The contractor shall employ labour in sufficient number to maintain the required rate of progress and of quality required to ensure workmanship of the degree required by the specifications and to the satisfaction of the Engineer-in-Charge.

Contractor shall decide the number of employees to be deployed for execution of the work awarded to him and he or his authorized representative will be solely entitled to dictate such workers about the manner of carrying out the work as per the prescribed specifications and quality plan.

Contractor to ensure that the employees deployed in the premises of BHEL are physically and mentally fit and do not have any criminal record. Such employees should possess requisite skill, proficiency, qualification, experience etc. Contractor to provide employment card / identity with photograph duly verified and attested by the contractor to his employees. Contractor to indicate the name of the proprietary/ partnership firm/ company, place of work, contract no. and duration of validity of card. Contractor will be responsible for good conduct of his employees. In case of any misconduct / misbehaviour by any employee, the contractor will replace such employee(s) immediately.

BHEL shall have the privity of the contract with the contractor only and will give instructions to the contractor or his authorized representatives. BHEL will have nothing to do or be concerned with the employment of employees working for the contractor. The relationship between BHEL and the contractor will be that of independent entities and nothing herein contained will amount to joint venture, partnership or an employer employee relationship.

The contractor shall obtain a valid labour licence under the Contract Labour (R&A) Act 1970, and the Contract Labour (Regulation and Abolition) Central Rules 1971, before the commencement of the work, and continue to have a valid licence until the completion of work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act 1986. The relevant statutory provisions of the State Government of Andhra Pradesh shall also be applicable in toto. The contractor shall observe provisions of the Factories Act in respect of working hours, holidays, rest intervals, leaves and overtime to his employees. No work shall be done on second/ third shift, overtime, Sundays or on other declared holidays without written permission from BHEL.

Any failure to fulfil this requirement shall attract the penal provisions of the Contract arising out of the resultant non-execution of the work.

Payment of wages:

The contractor shall pay to labour employed by him either directly or through sub-contractors, in accordance with the provisions of the Contract Labour (Regulations and Abolition) Act 1970 and the Contact Labour (Regulation and Abolition) Central Rules 1971 or Minimum Wages Act wherever applicable, including the relevant statutory provisions of the State Government. The contractor shall ensure payment of wages to the Contract labour employed by him latest by 7th of the following month. The above payments shall be verified by the departmental supervisor under his name and designation.

II. In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the Contractor shall comply with or cause to be complied with the BHEL's Contractor's Labour Regulations made by BHEL from

time to time or as per the provisions of the Contract Labour (Regulations and Abolition) Act 1970 and the Contact Labour (Regulation and Abolition) Central Rules 1971 and Minimum Wages Act wherever applicable.

III. (A) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workforce by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the regulations.

B) Under the provisions of Minimum Wages (Central) Rules 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one-day rest for 6 days continuous work and pay wages at the same rates as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labour and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge concerned.

IV. The contractor shall duly comply with the provisions of the Payment of wages Act-1936, Minimum Wages Act 1948, Employees liability Act-1938, Workmen's compensation Act-1923, Industrial Disputes Act 1947, Maternity Benefits Act 1961, EPF and MP Act 1952, Payment of Gratuity Act 1972, Income tax Act, Service Tax Act, Employees State Insurance Act, Payment of Bonus Act 1967 etc. and the Contract Labour (Regulations and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made there under from time to time.

a) Contractor must ensure payment of PF, pension dues under EPF and MP Act 1952 to the RPFC.

b) Contractor must ensure payment of ESI contribution under ESI Act 1948 and provide ESI membership No. / Card of each employee.

c) Contractor shall produce proof of deductions as well as remittances of PF, Pension, ESI contribution; administrative charges etc. wherever applicable and shall maintain proper records. Contractor to issue wage slip to his employees.

d) The contractor shall furnish proper returns to the concerned statutory authorities like PF etc. and also provide a copy of the same to BHEL.

e) In case of non compliance of any of the labour laws e.g. payment of minimum wages to his employees or remittance of contribution to the concerned authorities etc., the contractor shall be responsible for all the expenses /liability occurring/ accruing on BHEL because of this including expenditure of legal proceedings. All such expenses shall be recoverable from the contractor from any of his running contracts / security deposit / other dues with BHEL or from any contract entered with BHEL thereafter.

f) Payment of bonus under the Payment of Bonus Act, payment of Gratuity under the Gratuity Act and retrenchment compensation under act will be the sole responsibility of contractor.

g) Contractor shall pay minimum wages as applicable from time to time including leave with wages to their workers as per rules /act.

h) Contractor will give three National Holidays to his workers.

V. The contractor shall indemnify and keep BHEL indemnified against statutory payments to be made under for due observance of the laws aforesaid as well as the BHEL contractor's Labour Regulations without prejudice to his rights to claim indemnity from his sub-contractors not affecting BHEL under any event or statutory violation by the contractor.

VI. The laws aforesaid shall be deemed to be part of this contact and any breach thereof shall be deemed to be a breach of the contract.

VII. Whatever is the minimum wage for the time being, such wage shall be paid by the contractor to the workmen directly without any intervention of jamadar and that jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen and by way of commission or otherwise.

VIII. The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by that jamadar from the wages of workmen engaged by him in the work premises of BHEL.

IX. All the registers and records shall be preserved in original for a period of 3 years from the passing of final bill and shall be produced on demand before any officer, inspector, etc. of the Government/ BHEL.

In respect of all labours directly or indirectly employed in the work of the performance of the contractor's part of the contract, the contractor shall its own expenses arrange for the safety provisions as per BHEL safety clause framed from time to time and shall its own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and provide necessary facilities aforesaid the Engineer-in-Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover in full the costs incurred in that behalf from the contractor.

Should it appear to the Engineer-in-Charge that the contractor is not properly observing and complying with the provisions of the BHEL Contractor's Labour Regulations and Model Rules and the Contact Labour (Regulation and Abolition) Central

Rules 1971, for the protection of health and sanitary arrangements for the workmen employed by the contractor, (hereinafter referred as "the said Rules") the Engineer-in-Charge shall have the power to give notice in writing to the contractor requiring that the said rules be complied with and the amenities prescribed therein be provided to the workmen within a reasonable time to be specified in the notice. If the contractor shall fail within the period specified in the notice to comply with and/observe the said Rules and to provide the amenities to the workmen as aforesaid, the Engineer-in-Charge shall have the power to provide amenities herein before mentioned at the cost of the contractor.

The Engineer-In charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractor's employee upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements.

It shall be the responsibility of the contractor to see that the building under construction is not occupied by anybody unauthorized during construction, and is handed over to the Engineer-in-charge with vacant possession of complete building. If such building though completed is occupied illegally, then the Engineer-in-charge shall have the option to refuse to accept the said building/ buildings in that position.

However, the Engineer-in-charge, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery. The contractor will be liable for all payments to be made under the law and for the observance of the regulations aforesaid without prejudice to his right to claim indemnity from his subcontractor.

2.20 ACCOMMODATION FOR LABOUR:

The contractor shall during the progress of the work, provide, erect and maintain at his own expense and approved standards and scales, all necessary temporary living and sanitary accommodation required for his work people on the site, in connection with the execution of the work and also arrange for supply of wholesome drinking water for his work people.

The planning, sitting, layout and erection of these temporary buildings shall be approved by the Engineer-in-Charge and the whole of such temporary accommodation shall at all times during the progress of the work be kept tidy and in clean sanitary conditions to the entire satisfaction of the Engineer-in-Charge and at the contractor's expenses. The contractor shall confirm generally to the sanitary requirements of the local medical and health authority and at all times with such precautions that may be necessary to prevent soil pollution of the site.

On completion of the work all such temporary buildings shall be cleaned away, all rubbish burnt, excrete or other disposal pits or trenches filled and effectively sealed off and the whole of the site left clean and tidy to the entire satisfaction of the Engineer-in-Charge and at the contractors expense.

2.21 ANTI MALARIAL PRECAUTION:

The contractor shall at his own expenses, conform to all anti-malarial instruction given to him by the Engineer-in-Charge including filling up of borrow pits, if any.

2.22 CONSERVANCY:

The contractor shall at his own expenses, carry out all instructions issued to him by Engineer-in-Charge to effect a proper disposal to night soil and other conservation work in respect of the contractors work people or his employees on the site.

The contractor will bear the cost of any charges levied by the local authority for the execution of such work on his behalf.

2.23 NUISANCE:

The contractor shall not at any time do, cause or permit any nuisance on the site or do anything which may cause unnecessary disturbance or inconvenience to the owners, tenants or occupier of other properties near the site and to the public generally and shall secure the efficient protection of streams and water ways against pollution.

2.24 WATER & ELECTRICITY:

Water and electricity shall be supplied to the contractor by the department subject to the following conditions:

a) One/ two source of supply of water/ electricity points, to be decided by Engineer-in-Charge, shall be provided by BHEL. However, contractor shall have to make their own arrangement for laying of pipelines/ connection from the main source of supply for working at site.

b) Department do not guarantee to maintain uninterrupted supply of water/ electricity and it will be incumbent on the contractor to make alternative arrangement for proper supply of the same at their own cost in the event of any break down in the government water/ electricity mains so that the progress of work is not held up for the want of the same. No claim of damage or refund will be entertained on account of such break down.

c) In case of non-availability of above facilities at work place, contractor has to make his own arrangements at his cost or as mentioned in the NIT.

2.25 TEMPORARY WORKSHOPS STORES etc.:

The contractor shall, during the progress of work, provide, erect and maintain at his own expense all necessary temporary work-shops, stores, offices etc. required for the proper and efficient execution of work. The planning, sitting and execution of these buildings/ works shall have the approval of the Engineer-in-Charge and the contractor shall at all times keep them tidy in a clean and sanitary condition to the entire satisfaction of the Engineer In-charge.

2.26 STORES AND MATERIALS ON SITE:

All stores and materials for the work are to be deposited by the contractor only in places to be indicated by the Engineer-in-Charge, where in accordance with the contract, stipulations certain stores and materials (for incorporation in the work) are to be issued to the contractor by BHEL as detailed.

BHEL free issue items will be so issued only to the extent required for the actual completion of the work as stipulated in the contract. The decision of Engineer—in-Charge / Head of the department regarding the quantities to be issued as above shall be final and binding on the contractor. For any excess quantities consumed on the work, the cost will be recovered from the contractor at punitive rates, which will be as mentioned in Schedule “B”.

As regard issue of material and stores to be issued to the contractor by BHEL, the contractor shall give the Engineer-in-Charge reasonable notice in writing of his requirement of such stores/ materials and on the approval of his demand being notified to him, he shall make immediate arrangement for drawing the same. Such stores and materials shall be transported by the contractor at his own expense direct from the place of issue to the site of work with the prior written approval, obtained from the Engineer-in-Charge to take them to a store or work shop or elsewhere. BHEL officers connected with the contract shall have the power at any time to inspect and examine any stores or at any factory or workshop or other place where material intended to be used in or on the workshop, or other places such stores or materials are being fabricated or manufactured, or at any place where the same are lying and the contractor shall give necessary facilities for such inspection and examination.

The Engineer-in-Charge shall be entitled to have tests made of any stores or materials supplied by the contractor who shall provide at his own expense all facilities which the Engineer-in-Charge may require for this purpose. If at the discretion of Engineer-in-Charge, independent expert is employed to make any such test, his charges shall be borne by the contractor only, if the test disclosed that the said stores or materials are not in accordance with the provisions of the contract.

Should the Engineer-in-Charge consider at any time during the construction or reconstruction or prior to the expiry of the maintenance period that the stores or materials provided by the contractor are unsound or of a quality inferior to the constructed or otherwise and not in accordance with the contract (in respect whereof the decision of the Engineer-in-Charge shall be final and conclusive). The contractor shall on demand in writing from the Engineer-in-Charge specifying the stores or materials complained or notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith remove the stores or materials so specified and provide other proper and suitable stores or materials at his own expense to the entire satisfaction of Engineer-in-Charge and in the event of his failing to do so within a period to be specified by Engineer-in-Charge in his demand aforesaid, the Engineer-in-Charge may replace with others, the stores or materials complained of, at the risk and expense in all respect of the contractor.

The liability of the contractor under this condition shall not extend beyond the maintenance period aforesaid except as regard stores or materials, which the Engineer-in-Charge shall have previously given, notice to the contractor to replace that. (Maintenance period for any work under this organization will be TWELVE MONTHS from the date of actual completion of the particular work and handing over to BHEL in the case of building works and SIX MONTHS for all other works.).

All stores and materials brought to the site shall become and remains the property of BHEL and shall not be removed from the site without the prior written approval of the Engineer-in-Charge. However, when the work is finally completed, the contractor shall at his own expense forthwith remove from the site surplus stores and materials originally supplied by him and upon such removal the same shall revert and become the property of the fixing in the work and which after making due allowance for the reasonable wear and tear/ or waste have not on completion of the works been so incorporated or fixed, shall be returned by the contractor at his own expense to the place of issue.

Credit for surplus stores and/ or material returned by the contractor to BHEL will be given to him at a price, based on the prevailing market rate but not exceeding that at which the said stores and materials were originally issued to him but due consideration shall be given to the allowance claimed by BHEL, in respect of any depreciation or damage suffered by the stores and / or materials while in the custody of the contractor regarding which the decision of Engineer-in-Charge shall be final and conclusive.

If in the opinion of the Engineer-in-Charge (which will be final and conclusive) any stores supplied by the BHEL have either during progress of work or after completion of work but under the custody of the contractor, become damaged to such an extent that they cannot be usefully utilized either in the same work or in other work, the Engineer-in-Charge shall not accept

the stores and in the event of his so rejecting, the contractor shall be charged for the said stores at a rate fixed by the accepting officer. The contractor shall not be entitled to any claim whatsoever on this account.

2.27 TOOLS AND PLANTS ON SITE:

All tools, plants and equipment brought to site shall become the property of the BHEL and shall not be removed from the site without the prior written approval of the Engineer-in-Charge. When the work is finally completed or contract is terminated for reasons other than the default of the contractor, the contractor shall forthwith remove from the site all tools, plants and equipments (other than those as may have been provided by BHEL) and upon such removal the same shall become the property of the contractor.

2.28 STATEMENT OF HIRE CHARGES:

A monthly detailed statement of the hire charges incurred in respect of BHEL tools, plants, equipment etc. shall be given to the contractor by the Engineer-in-Charge.

2.29 PRECAUTIONS AGAINST RISK:

The contractor shall be responsible for providing at his own expense, for all precautions to prevent loss or damage from any and all risk and to minimize the amount of any such loss or damage and for necessary steps to be taken for the said purpose until the works have been handed over complete in all respect to the Engineer In-charge.

The contractor shall provide all watchmen necessary for the protection of site, the work, the materials, tools, plants, equipment and anything else lying in the site during the progress of work. He shall solely be responsible for and shall take all responsible and proper steps for protecting, securing and watching all and/ or about the work and the site which may be dangerous to any person whatsoever.

2.30 NOTICES AND FEES:

The contractor shall give all notices required by any statutory provisions or by the regulations and/ or bye-laws or any local authority and/ or of any public service, company or authority affected by the work or with those systems if the same are or will be contracted. The contractor shall pay and indemnify BHEL against any fees and charges demandable by law under such Acts, Regulations and/ or bye-laws in respect of the work and shall make and supply all drawings and plans required in connection with any such notice.

2.31 SETTING OUT OF THE WORK & PROTECTING/ MAINTAINING SIGNALS & MARKS:

The Engineer-in-Charge shall supply dimensions, drawings, levels and other information necessary to enable the contractor to set out the work. The contractor shall at his own expense set out accurately according to the drawings, figures and dimensions there, on all the work in the contract and any extras or additions thereto and shall be solely responsible for their being so set out and executed. All bench marks, pegs, signals on surface, alignment stones, mile stones and all similar marks whether putting by BHEL authorities for the purpose of checking the contractor's work in the tenure of the contractor, be put under the care of the contractor who shall, at his own expense take all proper and responsible precautions and care to preserve and maintain them in their true position. In the event of these marks being disturbed or obliterated by accident or due to any other cause whatsoever the same may, if deemed necessary, be replaced by Engineer-in-Charge / Head of the department to the contractor's expense and the cost thereof deducted from any money thereon or/ after becoming due to the contractor.

Where requested by the contractor, the level mark, centre line and chain age pegs corresponding to those as shown on the drawings, will be pointed out to the contractor on the ground but all bench marks or chain age pegs additional to these shown on the drawing shall be provided by the contractor at his expense.

2.32 SITE DRAINAGE:

All water that may accumulate on the site during the progress of the work or in trenches and excavations shall be removed by the contractor to the entire satisfaction of the Engineer-in-Charge at his own expense.

2.33 EXCAVATION RELICS etc.:

Material of any kinds obtained from excavation on the site shall remain the property of BHEL and shall be disposed off as the Engineer-in-Charge directs. All gold, silver, oil and other materials of any description and all precious stones, coins, treasures, relics, antiquities and other similar items which may be found on at/upon the site shall be the property of the BHEL.

2.34 FOUNDATIONS:

The contractor shall not lay any foundation until the excavations for the same have been examined and approved in writing by the Engineer-in-Charge.

2.35 COVERING OF WORK:

The contractor shall give reasonable notices in writing to the Engineer-in-Charge whenever any work is to be permanently covered or cancelled, whether by earth or other means so that it can finally be inspected or measured if necessary. In default of doing so the contractor shall, if required by the Engineer-in-Charge uncover such work at his own expense.

2.36 APPROVAL OF WORKS BY STAGES:

All work embracing more than one process shall be subject to examination and approval at each stage and the contractor shall give due notice in writing to the Engineer-in-Charge when each stage is ready. In default of such notice being received, the Engineer-in-Charge shall be entitled to approve the quality and extent thereof at any time he may choose and in the event of any dispute, the decision of the Engineer-in-Charge thereon shall be final and conclusive.

2.37 EXECUTION OF WORK:

The work shall be executed in a workman like manner and to the satisfaction in all respect of the Engineer-in-Charge. The Engineer-in-Charge will communicate or confirm his instruction to the contractor in respect of the execution of the work in a "WORK SITE ORDER BOOK " maintained at his office and the contractor shall visit this office, daily and shall conform receipt of such instructions by signing the relevant entries in this book. Such entries will rank as order notices in writing within the intent and meaning of these conditions.

2.38 RESPONSIBILITY FOR BUILDINGS:

In the event of any building or part of any building being handed over to the contractor for execution of work thereto under provisions of the contract, he shall give a written receipt for all fixtures, glasses etc. and shall be required to make good at his own expense all damage resulting from whatsoever cause while in his charge and on completion of the work to deliver up the said building or part thereof in a clean stage complete in every particular to the entire satisfaction of the Engineer-in-Charge.

2.39 INSPECTION OF WORKS:

BHEL Officers / BHEL representatives concerned with the contract shall have power at any time in respect and examine any part of the work and the contractor shall provide such facilities as may be required for such inspection and examination. Should the Engineer-in-Charge consider at any time during the construction or reconstruction or prior to the expiry of maintenance period, that any work has been executed with unsound, imperfect or unskilled workmanship or of a quality inferior to that contracted for or not otherwise in accordance with the contract, in respect whereof the decision of the Engineer-in-Charge shall be final and conclusive. The contractor shall on demand in writing from the Engineer-in-Charge specifying the fault notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct, the work so specified, in whole or in part as the case may be, require at his own risk and expense to the entire satisfaction of Engineer-in-Charge, who may accept the work at reduced rate if deemed fit. However, the liability of the contractor under this condition shall not extend beyond the maintenance period except as regard workmanship, which the Engineer-in-Charge should have previously given notice to the contractor to rectify.

2.40 DAMAGE AND LOSS TO PRIVATE PROPERTY AND INJURY TO WORKS:

The contractor shall at his own expense reinstate and make good to the satisfaction of the Engineer-in-Charge and pay compensation for any injury, loss or damage caused to any property or right what so ever including property or/ and rights of BHEL (or agent /servants/any outsider or employees of BHEL) and the injury, loss or damage arising out of or in any way in connection with the execution or purported execution of the contract and further the contractor shall indemnify BHEL, against all claims enforceable against BHEL) or which would be so enforceable against BHEL were BHEL a private person in respect of any such injury (including injury resulting in death, loss or damage to any person whatsoever or property, including all claims which may arise under Workman's Compensation Act or otherwise.

2.41 COMPLETION:

The works shall be completed to the entire satisfaction of the Engineer In-charge and in accordance with contractor's forecast of time and progress where operative and that, all unused stores and materials, tools, plant, equipment, temporary buildings and things shall be removed and the site and work cleared of rubbish and all waste material and delivered up clean and tidy to the satisfactions of the Engineer In-charge at the contractor's expense on or before the scheduled date of completion. BHEL shall have power to take over from the contractor from time to time such section of work as have been completed to the satisfaction of the Engineer In-charge. The Engineer-in-Charge shall certify to the state of the work at the end of the maintenance period where applicable.

2.42 COMPENSATION AS LIQUIDATED DAMAGES FOR DELAY:

If the contractor fails to complete and clear the site on or before the scheduled date of completion or does not achieve the progress as set out under the caption "TIME " in clause 2.6 of these General Conditions, he shall without prejudice to any other right or remedy on BHEL on account of such breach, be liable to pay as compensation as liquidated damage an amount

equal to 0.50 percentage of the total contract sum for every week (7 days) of extension sought beyond the scheduled date of completion of the contract provided always that the total amount of compensation as liquidated damages to be paid under this condition shall not exceed 10% of the contract sum. Such amount may be adjusted or set off against any sum payable to the contractor under this or any other contract. If delay is for 8 days, it will be counted as delay for 2 weeks for liquidated damages. In case any penalty is to be levied at any stage during the progress of work, reference shall be made to the clause as mentioned in special condition of tender.

2.43 CANCELLATION OF CONTRACT FOR CORRUPT ACTS:

The Accepting Officer, whose decision shall be final and conclusive, shall without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter, BHEL cancel the contract if any of the following cases and the contractor shall be liable to pay to BHEL for any loss or damage relating from any such cancellation to the same extent as provided in the case of cancellation of defaults.

If the contractor---

a) Offer to give or agree to give to any person in BHEL service, any gift or consideration of any kind as an inducement or reward for doing or forbearing to do for having done or for borne to do any act in relation to obtaining or execution of this or any other contract for BHEL service

OR

b) Enter into a contract with BHEL in connection with which commission has been paid or agreed to be paid by him or with his knowledge, unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to the Accepting Officer.

OR

c) Obtain a contract with BHEL as a result of ring tendering or by non-bearing methods or competitive tendering without first disclosing the fact in writing to the Accepting Officer.

OR

d) Steel or misuse of any property of BHEL either by himself or through his workmen within his knowledge or convince.

2.44 CANCELLATION OF CONTRACT DUE TO INSOLVENCY, ASSIGNMENT OR TRANSFER OR SUBLETTING OF CONTRACT:

The Accepting Officer, without prejudice to any other right or remedy, which shall have accrued or shall accrue thereafter to BHEL, shall cancel the contract in any of the following cases:

If the contractor -----

a) Being an individual or if a firm, or any partner thereof shall at any time to be adjudged bankrupt or having a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition under any Bankruptcy Act for the time being enforce or make any connivance or assignment or makes unauthorized or illegal arrangement for the benefit of his creditors or propose to do so, or if any application be made under any bankruptcy and for the time being in force for the sequestration of his estate or if a trust deed be granted by him on behalf of his creditors,

OR

b) Being a company, shall pass a resolution or the court shall make an order for the liquidation of its affairs, or a receiver or Manager on behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the court of debenture holders to appoint a receiver or Manager.

OR

c) Assigns, sublets or attempts to assign, transfer or sublet any portion of the work without the prior written approval of the Accepting Officer,

Whenever the Accepting Officer exercises his authority to cancel the contract under this condition, he may complete the work by any means at the contractor's risk and expense, provided that, in the event of the cost of completion (as certified by Engineer-in-Charge, which is final and conclusive) being less than the contract cost the advantage shall accrue to the BHEL, and that if the cost of completion exceeds the money due to the contractor under the contract, the contractor shall either pay the excess amount ordered by the Engineer-in-Charge or the same shall be recovered from the contractor by other means

In case BHEL completes the work under the provisions of this condition, the cost of such completion to be taken into account in determining the excess cost to be charged to the contractor under this condition shall consist of the cost of materials purchased and/ or labour provided by BHEL with an addition of such percentage to cover superintendence and establishment charges as may be decided by the DGM / GM, whose decision shall be final and conclusive.

2.45 CANCELLATION OF CONTRACT IN PART OR IN FULL FOR CONTRACTOR'S DEFAULT:

If the contractor—

a) Makes default in commencing the work within a reasonable time from the date of handing over of the site and continues in that state after a reasonable notice from the Engineer-in-Charge.

OR

b) In the opinion of the Engineer-in-Charge at any time, whether before or after the date or extended date for completion, makes default in proceeding with the work with due diligence and continues in that state after reasonable notice from Engineer-in-Charge.

OR

b) Fails to complete the work, without prejudice to any other right or remedy which shall have accrued, or shall accrue thereafter to BHEL contract.

OR

c) Fails to comply with any of the terms and conditions of the contract after reasonable notice in writing with order properly issued.

OR

d) Fails to complete the work, work order, and items of work with individual dates for completion and clear the site on or before the date of completion, or if fails to achieve the conditions of contract, the Accepting Officer, may without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter or do only such work order or items of work in default from the contract at the expense and cost of the contractor. Whenever the Accepting Officer exercises his authority to cancel the contract as a whole or in part under this condition, he may complete the work as a whole or part to under this contract, the contractor shall either pay the excess amount ordered by Engineer-in-Charge or the same shall be recovered from the contractor by other means.

In case of BHEL completes the work or any part thereof under the provisions of this condition, the cost of such completion to be taken into account in determining the excess cost to be charged to the contractor under this condition, shall consist of the materials purchased and/ or labour provided by BHEL with an addition of such percentage to cover superintendence and establishment charges as may be decided by the DGM whose decision shall be final and conclusive.

In the event of termination of contract for any reason whatsoever, the contractor shall withdraw all his employees from the establishment of BHEL. In case contractor decides to terminate services of his employees he should settle all terminal dues including retrenchment compensation.

2.46 TERMINATION OF CONTRACT DUE TO DEATH:

Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the Accepting Officer shall have the option of terminating the contract without compensation to the contractor authorized survivors.

2.47 SPECIAL POWERS OF TERMINATION:

If at any time after the acceptance of the tender, BHEL shall for any reason whatsoever not require the whole or any part of the work, to be carried out, the Engineer-in-Charge shall give notice in writing of the fact to the contractor, who shall have no claim to any payment of compensation or otherwise, howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of the foreclosing of the work.

The contractor shall be paid at contract rates for the full amount of the work executed including such additional work i.e., cleaning of site etc. as may be rendered necessary by the said foreclosing. He shall also be allowed a reasonable payment (as decided by the Accepting Officer) for any expenses sustained on account of labour and material collected but which could not be utilized on the work as verified by the Engineer-in-Charge but the contractor shall not have any claim for compensation on account of any alterations having been made in the original specifications, drawings, designs and instructions involving and curtailment of the work as originally contemplated.

2.48 FAIR WAGE:

Refer clause 2.19 of General terms and conditions of Contract**.**

***

CHAPTER-III
VALUATION AND PAYMENT

3.1 RECORDS AND MEASUREMENTS:

All items having a financial value shall be entered in the BHEL Measurement book so that a complete record is obtained on all work performed under the contract.

Measurement shall be carried out as per unit mentioned in the bill of quantity (price-bid).

The measurements shall be taken jointly by any person or persons duly authorized on the part of the BHEL and the contractor.

The Engineer-in-Charge shall give reasonable notice in writing to the contractor of appointments for measurements.

The contractor shall without extra charge, provide assistance with appliance and other things necessary for measurements.

The contractor shall bear all the cost of measurement of his work.

Measurements shall be entered in the BHEL measurement book and signed and dated by both parties each day on the site on completion of measurement. If the contractor objects to any of the measurement recorded on behalf of BHEL in the Measurement Book or against the item or items objected to, and such note shall be signed and dated by both parties engaged in taking the measurements.

If as a result of such objection it becomes necessary to remeasure the work wholly or in part, the expense of such measurement shall be borne by the party requiring the measurement to be retaken provided that net error found by this remeasurement amount to less than 5 % (five percent) of the value as recorded by the first measurement.

If the contractor's representative fails to attend when required, the Engineer-in-Charge shall have power to proceed by himself to take measurements, and in that case these measurements shall be accepted by the contractor as final.

The contractor shall once in every month, submit to the Engineer with a copy to the concerned Engineer-in-Charge details of his claims for the work done by him up to and including the previous month which are not covered by his contract agreement in any of the following respects: -

a) Deviation from the item and specification provided in the contract documents.

b) Extra items / new items of the work.

c) Quantities in excess of those provided in the contract agreement.

d) Items in respect of which rates have not been settled, in addition furnish a clear certificate to the effect that the claims submitted by him as aforesaid cover all his claims and that no further claims shall be raised by him in respect of the work done up to and including the period under report.

3.2 FINAL BILLS:

As soon as possible after the completion of the work to the satisfaction of the Engineer-in-charge, the contractor shall forward a certified final account on BHEL forms in duplicate. It shall be accompanied with all abstracts; vouchers etc. in support thereof and shall be prepared, in the manner prescribed by the Engineer-in-Charge. No claims will be entertained after the receipt of the final bills.

The contractor shall be entitled to be paid the final sum less the value of payments already made on account subject to certification to the final bill by the Engineer-in-Charge. No charge shall be allowed to the contractor on account of the preparation of the final bills.

3.3 PAYMENTS OF BILLS:

The payment of final bill will be made only after successful proving. All payments to be made to the contractor under this contract shall be through online payment i.e., RTGS/ NEFT within a reasonable time after the certification by the Engineer-in-Charge.

3.4 RECOVERY FROM THE CONTRACTOR:

Whenever under the contract any sum of money shall be recoverable from or payable to the contractor, the same may be deducted from any sum then due or which at any time thereafter may become due to the contractor under the contract or under any other contract with BHEL or from his security deposit, or he shall pay the claim on demand.

3.5 POST TECHNICAL AUDIT OF WORK & BILLS:

BHEL reserves the right to carry out a post payment audit and technical examination of the work and bill including all supporting vouchers, abstracts etc. and to enforce recovery of any sums becoming due as a result thereof in the manner

provided into the proceedings sub-paragraph provided, however, that no such recovery shall be enforced after three years of passing the final bills.

3.6 REFUND OF SECURITY DEPOSIT:

After expiration of the maintenance period, provided always that the contractor shall first have been paid final bill and have rendered a "No Demand" certificate, the security deposit mentioned *shall be released after satisfactory completion of the maintenance period* of the work duly verified by Site In charge. *The maintenance period of work is 3 months from the date of actual completion of work.*

3.7 ARBITRATION:

All disputes between the parties to the contract arising out of or relating to the contractor other than those for which the decision of the Engineer-in-Charge / Accepting Officer or any other person is by the contract expressed to be final and conclusive, shall after written notice by either party to the contract, the other party be referred to the sole arbitration of Unit Head or any other officer of BHEL in his sole discretion unless the parties otherwise agree, such reference shall not take place until after the completion, alleged completion or abandonment of the work or the determination of the contract. The venue of arbitration proceedings will be at Visakhapatnam. The arbitrator shall have the power to extend, from time to time, the time for making his award with the consent of the parties. The award of the Arbitrator shall be final, conclusive and binding on both the parties to the contract. Any matter arising out of or in connection with the agreement shall be under jurisdiction of Visakhapatnam court. The Head of HPVP Unit of BHEL, Visakhapatnam shall appoint the Arbitrator. No person other than a person so appointed shall act as Arbitrator.

3.8 IMPLEMENTATION OF PROVISION OF THE APPRENTICE ACT:

Contractor shall comply with the provisions of Apprentice Act-1961, and the Rules and Orders issued there under from time to time. If he fails to do so his failure will be a breach of the contract and the Accepting Authority may, in his discretion cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provision of the Act.

3.9 SAFETY AND SECURITY:

1. BHEL reserves the right to take penal action as deemed fit if any information provided by the vender / contractor is found to be incorrect.

2. Other safety related conditions:

a) The contractor shall ensure proper safety of all the workmen, materials, plant and belonging to him or to BHEL or to others, working at or near the site. The contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislation and the Engineer-in-charge as he may deem necessary.

b) The contractor shall adopt adequate safety measures and use of protective clothing by all the workmen at site/work place whether engaged or not in actual of work or supervision thereof. The contractor shall ensure that the workmen on site use safety belt, gloves, helmets, masks etc. as are necessary for their safety.

c) The contractor shall be responsible for safety arrangements of all equipment used in connection with the execution of the work and shall ensure employment of only trained person to operate the equipment. Only tested equipment, tools, wires, ropes etc. shall be used and shall periodically be tested to the satisfaction of the BHEL. All test certificates shall be made available to the BHEL at site as and when required.

d) The contractor shall ensure provision and maintenance of lights, guards, fencing with gates and watching when and where necessary or required by the BHEL or by any one duly constituted authority for the protection of the work and / or for the safety and convenience of the public or others.

e) The contractor shall take adequate safety precautions for prevention of accidents at site. The contractor shall also ensure that their employees / workmen comply with the statutory safety rules and regulations as and also those laid down by BHEL from time to time.

f) The contractor shall provide at his cost necessary watch and ward force as may be approved by the BHEL to ensure security and safety of all buildings, structures, equipments and materials under their custody at the site of work.

g) The contractor shall abide by all security regulations at site by the BHEL from time to time. The contractor shall provide identify badges to their personnel and workmen, which must be properly displayed by them at site.

h) In order to facilitate issue of exit gate permits by the BHEL for materials and equipments either during execution or the maintenance period, the CONTRACTOR shall submit to the BHEL list of construction / erection equipment etc. and / or other materials that shall be taken by them inside the site from time to time. Such movement of materials, equipment, tools, tackles etc. shall be subject to certification by the Engineer-in-Charge.

i) The contractor and his personnel / workmen shall be subject to security check by BHEL's own security force or Central Industrial Security Force if engaged by the BHEL for the overall protection of the project.

j) The contractor shall not allow any visitors on the works except with the written permission of the BHEL.

k) From the commencement to the completion of work, the contractor shall take full responsibility for the care of the work, constructional plant and equipment and all temporary works and in case any damage or loss shall happen to the work, constructional plant and equipment or to plant temporary work from any cause whatsoever, the contractor shall at his own cost replace or repair and make good the same.

l) The contractor will notify well in advance to the Engineer-in-charge of his intention to bring to site any container filled with liquid or gaseous fuel explosive or petroleum substance or such chemicals, which may involve hazards. The Engineer-in-charge shall have the right to prescribe the conditions under which such containers are to be stored, handled and used during the performance of the works and the contractor shall strictly adhere to and comply with such instructions. The Engineer-in-charge shall have to right at his sole discretion to inspect any such container or such construction plant / equipment, for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by BHEL nor shall BHEL entertain any claim of the contractor towards additional safety provisions/ conditions to be provided for/ constructed as per Engineer-in-Charge instructions compliance to statutory in respect of such conditions will be the sole responsibility of the contractor.

m) Further any such decision of the Engineer-in-Charge shall not in any way absolve the contractor of his responsibilities for safety provisions and in case, use of such a container or entry thereof into the site area is forbidden by Engineer-in-Charge without any cost implications to BHEL or extension of work schedule.

n) Where it is necessary to provide and/ or store petroleum products or petroleum mixtures and explosive, the contractor shall be responsible for carrying out such provision and / or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act 1948 and Petroleum and Calcium Carbide Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Engineer-in-charge. In case, any approval is necessary from the Chief Inspector (Explosives) or other statutory authorities, the contractor shall be responsible for obtaining the same.

o) All equipment used in construction & erection by the contractor shall meet Indian/ International Standards and where such standards do not exist, contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the contractor in accordance with manufacturer's operation manual and safety instructions and as per guide lines/ rules of BHEL in this regard.

p) Periodical examination and all tests for all lifting/ hoisting equipment and tackles shall be carried out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Rules 1910 and associated Law/ Rules in force from time to time. A register of such examinations and tests shall be promptly produced as and when desired by Engineer-in-charge or Safety Officer.

q) Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need at his own cost as may be directed by Engineer-in-charge who will also have the right to examine these safety equipments to determine their suitability, reliability, acceptability and adoptability.

r) The contractor shall provide safe working conditions to all workmen and employees at the site including safe means of access, railings, stairs, ladders, scaffolding, safety belts etc. the scaffoldings shall be erected under the control and supervision of an experienced and competent person.

s) The contractor shall not interfere with or disturb electric fuses, wiring and other electrical equipment belonging to BHEL or other contractors under any circumstances whatsoever, unless specially permitted in writing by BHEL to handle such fuses, wiring or electrical equipment.

Before the contractor connects any electrical appliances to any plug or socket belonging to the other contractor or BHEL, he shall:

i) Satisfy the Engineer-in-charge that the appliance is in good working condition.

ii) Inform the Engineer-in-charge of the maximum current rating voltage and phases of the appliances.

iii) Obtain permission of the Engineer-in-charge detailing the sockets to which the appliances may be connected.

The Engineer-in-charge will not grant permission to connect until he is satisfied that:

i) The appliance is in good condition and is fitted with a suitable plug.

ii) The appliance is fitted with suitable cable having two earth conductors, one of which shall be an earthed metal sheet surrounding the cores.

iii) No electrical cable in use by the contractor will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.

iv) No repair work shall be carried out on any live equipment, the equipment must be declared safe by the Engineer-in-charge and a permit to work shall be issued by Engineer-in-charge before any repair work is carried out by the contractor. While working on electric lines/ equipment whether alive or dead suitable type and sufficient quantity of tools will have to be provided by contractor to electricians/ workmen/ officers.

t) The contractor shall employ necessary number of qualified full time electricians/ electrical supervisors to maintain his temporary electrical installations.

u) In case any accident occurs during the construction/ erection or other associated activities undertaken by the contractor thereby causing any minor or major or fatal injury to his employees due to reason whatsoever, it shall be the responsibility of the contractor to promptly inform the same to BHEL Engineer-in-Charge in prescribed from. The contractor will be responsible for all pecuniary liability if any under such circumstances.

v) The Engineer-In charge and Safety Officer shall have the right at his sole discretion to stop the work, if in his opinion, the work is being carried out in such a way that it may cause accidents and endanger the safety of the person and/ or property and/ or equipments. In such cases, the contractor shall also be informed in writing about the nature of hazards and possible injury/ accident and he shall remove the shortcomings promptly. The contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the respective General Manager within 3 days of such stoppage of work and decision of GM in this respect shall be conclusive and binding on the contractor.

w) Notwithstanding anything contrary to this, in the event of his workmen, the contractor shall be required to fill Injury Report and submit to the Shop Manager/ Engineer-in-Charge of BHEL immediately and ensure due compliance of Workmen Compensation Act 1923 and Rules made there under.

x) The contractor shall not be entitled to any damages/ compensation for stoppage of work due to safety reasons as provided above and the period of such stoppage of work will not necessarily be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

y) The contractor shall follow and comply with all BHEL safety rules, relevant provision of applicable law pertaining to the safety of workmen, plant and equipment as may be prescribed from time to time without any demur protest or contest or reservation. In case of any unconformity between statutory requirement and BHEL Safety Rules referred above, the later shall be binding on the contractor unless the statutory provisions are more stringent.

z) If the contractor fails in providing safe working environment as per the statutory requirements and / or BHEL Safety Rules or continue to work even after being instructed to stop the work by Engineer-in-charge or Safety Officer as provided above, the contractor shall promptly pay to BHEL, on demand, compensation at the rate of Rs. 500/- per day or part thereof till instructions are complied with and so certified by Engineer-in-charge/ Safety Officer. However, in case of accident taking place causing death/ injury to any individual the statutory provisions shall apply in addition to compensation mentioned in this para; and the contractor will be solely liable on account of this.

* * *

ANNEXURE – III

Ref: OS/WC/2024-25/178/112 **Date: 27.02.2025**

Sub: Service contract for carrying out SIL Verification, Evaluation & Validation Services for Fresh Feed Furnace (412-H-1001) at IOCL- PANIPAT INDMAX Project Site (S.O.7935)- Reg

ACCEPTANCE TO TENDER TERMS & CONDITIONS

I / We hereby confirm that the Tender documents, all Annexures etc. have been studied in detail and we have fully understood the scope of work.

I / We accept to all the Terms and Conditions of the Tender Enquiry and the prices quoted are in accordance with the same.

I / We accept to offer valid for a period of **02 months** from the last date for tender submission.

I / We accept to participate in Reverse Auction.

Tender documents duly signed on all the pages by the Owner / authorized representative of the bidder are attached herewith.

Signature of Tenderer with company seal

ANNEXURE- IV

CONTRACTOR INFORMATION

Sl. No.	Particulars	To be Filled by Bidder
01.	Name of the Contractor	
02.	Nature of Firm / Concern (Proprietor/ Partnership/ Pvt. Limited/ Public Ltd.) Note: In case of partnership concern, please enclose photo copies of the partnership deed	
03.	Full address	
04.	Name of the Proprietor/Partner	
05.	Name of the Person(s) and designation authorized for signing the contract/dealing with BHEL	
06.	Telephone No. of the firm	
07.	Mobile No.	
08.	E-mail ID	
09.	PAN Number	
10.	GSTIN Registration No.	
11.	HSN / SAC Code	
12.	Udyam Reg No. (if any)	

***

CHECK LIST

Sl. No.	Particulars	Document Enclosed (Yes / No)	Document No
01.	Name of the Contractor (Company Registration Copy)		
02.	Signed & Stamped NIT along with all Annexures		
03.	GSTIN Registration Certificate		
04.	PAN Number		
05.	PF Registration No.		
06.	ESI Registration No.		
07.	Income Tax Returns for last 3 years		
08.	Profit & Loss account, Balance Sheet and Turnover certificate certified by the Practicing Chartered Accountant for the last 3 years		
09.	Work orders & Job Completion Certificates in similar works as mentioned in eligibility criteria.		
10.	Udyam Registration certificate		

***

ANNEXURE – NEFT

ACCEPTANCE FOR ELECTRONIC FUND TRANSFER / RTGS / NEFT TRANSFER

01	NAME & ADDRESS OF THE SUPPLIER / SUBCONTRACTOR	
02	VENDOR CODE ASSIGNED BY BHEL, HPVP LTD	

DETAILS OF BANK ACCOUNT

03	NAME & ADDRESS OF THE BANK	
04	NAME OF THE BRANCH	
05	BRANCH CODE	
06	MICR CODE	
07	ACCOUNT NUMBER	
08	TYPE OF ACCOUNT	
09	BENEFICIARY'S NAME	
10	IFSC CODE OF THE BRANCH	
11	EMAIL ID	
12	TELEPHONE / MOBILE NUMBER	

CERTIFICATE

I / We here by agree to receive the payments due from M/s Bharat Heavy Electricals Ltd., by the National Electronic Fund Transfer / or RTGS Transfer mode by credit to my / our above-mentioned Bank account. I / We also agree that payments made to the above-mentioned account are a valid discharge of the liability of M/s Bharat Heavy Electricals Ltd. I / We also agree to bear the applicable Bank charges for the above mode of transfer. A copy of the Cheque leaf/ cancelled Cheque leaf of the above account is sent herewith.

(Authorized Signatories with Name & Seal)

BANKER'S CERTIFICATION

We confirm that we are enabled for receiving RTGS and NEFT credits and we further confirm that the account number of _____ _____ (name of account holder), the signature of authorized signatory and the MICR and IFSC codes of our branch mentioned above are correct.

Place: Bank Manager / Officer

Date: Signature with Bank stamp and Name seal

FORWARDED TO ACCOUNTS DEPARTMENT / CASH SECTION

We confirm the above details are verified with the records available with us

Signature of BHEL Official with Name & Seal
Operating the contract / Services

ANNEXURE- GST

GST COMPLIANCE FOR INDIGENOUS SUPPLIERS / CONTRACTORS

1. In Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GSTIN which should be clearly mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
2. Supplier shall mention their GSTIN in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per P0, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.
3. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
4. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
5. All documents like Test Certificate, LR copy, Guarantee/Warrantee certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment where ever applicable. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
6. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the suppliers, within the calendar month notified by BHEL.
7. For any such delay in availing of tax credit for reasons attributable to supplier (as mentioned above), interest (calculated @ SBI Base Rate + 6%) along with penalty if any will be deducted for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
8. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/ contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.
9. This is to inform that GST portion of invoice, shall be released only upon Vendor declaring such invoice in his GSTR-1 and receipt of goods and Tax invoice by BHEL and Confirmation of payment of GST thereon by vendor on GSTN portal. Alternatively, BG of appropriate value may be obtained from vendor which shall be valid At least one month after the confirmation of date of payment of GST by vendor on GSTN portal and receipt of Tax invoice and receipt of goods, whichever is later. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
10. That in case vendor delays Declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.

Note: The above will be followed strictly for Processing vendor payments to ensure GST Compliance.

***

ANNEXURE- VI

PRICE BID

BHARAT HEAVY ELECTRICALS LIMITED
HEAVY PLATES & VESSELS PLANT
VISAKHAPATNAM – 530 012

NAME OF WORK: Service contract for carrying out SIL Verification, Evaluation & Validation Services for Fresh Feed Furnace (412-H-1001) at IOCL- PANIPAT INDMAX Project Site (S.O.7935)- Reg.

Tender Enquiry No: OS/WC/2024-25/178/112, Date: 27.02.2025

SCHEDULE OF QUANTITIES & RATES (SOQR)

Line Item No	DESCRIPTION OF WORK	UNIT	Total Amount Including GST in ₹
1	Safety Integrity Level (SIL) Verification Services for FRESH FEED FURNACE (412-H-1001) for IOCL Panipat Indmax Heater Project	Lumpsum	
2	Safety Requirement Specification	Lumpsum	
3	Safety Integrity Level (SIL) Validation	Lumpsum	
4	Total Amount including GST		

Total Amount in words (Including GST):

Note:

1) **The prices shall remain fixed and firm for an entire period of contract & No additional payment shall be made to contractor over and above the quoted price.**
2) GST as applicable shall be paid by contractor and same shall be reimbursed on submission of proof of payment as per annexure - GST.
3) **L1 price evaluation will be done line item wise**
4) The quantity indicated above is approximate and may vary on both sides subject to the requirement of BHEL – HPVP, but total value of contract will not exceed the awarded value, unless otherwise order is amended. However, payment shall be made for the actual quantities executed only.

Signature of Tenderer with company seal

SIL REPORT FOR FRESH FEED FURNACE (412-H-1001)

tkIS India / Vendor

Category Codes (Submission Purpose)

- ☐ 1 For Approval
- ☐ 2 For Review / Comments
- ☐ 3 For Information
- ■ 4 For Engineering
- ☐ 5 For Enquiry
- ☐ 6 For Order Placement
- ☐ 7 Final & Approved
- ☐ 8 Released for Construction

Acceptance Codes (Approval Codes)

- ☐ 1 Approved
- ☐ 2 Approved for Manufacturing / Fabrication with Comments as marked
- ☐ 3 Not Approved / Resubmit
- ☐ 4 Retained for Information / Records
- ☐ 5 Reviewed
- ☐ 6 Reviewed as Noted / Resubmit

Remarks for AC2 : This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-sbumitted after revision. This drawing should be revised only to the extent of tkIS India / Owner / Client comments. Any other changes made by you will not be considered unless clearly highlighted in covering letter asking for approval.

This approval / review does not absolve the supplier from the full responsibility for design and fabrication.

Date : ___/___/_____ Name : _____

tkIS India / Owner / Client

Category Codes (Submission Purpose)

- ☐ 1 For Approval
- ☐ 2 For Review / Comments
- ■ 3 For Information
- ☐ 4 For Engineering
- ☐ 5 For Enquiry
- ☐ 6 For Order Placement
- ☐ 7 Final & Approved
- ☐ 8 Released for Construction

Acceptance Codes (Approval Codes)

- ☐ 1 Approved
- ☐ 2 Approved for Manufacturing / Fabrication with Comments as marked
- ☐ 3 Not Approved / Resubmit
- ☐ 4 Retained for Information / Records
- ☐ 5 Reviewed
- ☐ 6 Reviewed as Noted / Resubmit

Date : ___/___/_____ Name : _____

Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC
00	IFD	Issued for Information	03/04/23	PJ	03/04/23	MGK	03/04/23	MGK	-

Barcode

Category Code: - 3

TABLE OF CONTENTS

1.0 INTRODUCTION

This document is SIL classification report for Fresh Feed Furnace (412-H-1001) in FCC unit of M/s IOCL's Panipat Refinery Expansion Project (P-25).

The study was conducted at tkIS Office, Mumbai in India on 31st March 2023

SIL study was attended by representatives from **IOCL (Client), BHEL (Vendor), tkIS (Detailed Engineering Consultant) under Chairmanship of a Third Party SIL Chairman**.

SIL study has been carried out as specified in 'SIL Methodology' (Doc. No. 6745-PRC-000-QB-0002, Rev 0). Same is attached with this report for reference (Annexure IV).

2.0 OBJECTIVE

SIL classification basically evaluates the Safety Instrumented Function (SIF) intended to achieve safe state of process when demand is placed on it.

It classifies the hazards when SIF fails to operate with respect to injury to people, financial loss due to damage to assets and damage to environment.

In analysing these situations, frequency of initiating events plays important role.

3.0 SIL CLASSIFICATION METHODOLOGY

1. Reference documents
   a. IEC 61508 Functional Safety of Electrical/Electronic/programmable electronic safety related systems
   b. IEC 61511 Functional Safety – Safety instrumented systems for the process industry sector
   c. SIL Methodology (6745-PRC-000-QB-0002, Rev 0).

2. Project documents
   a. P&IDs (Issued for Design Status)
   b. Cause & Effect Diagrams
   c. HAZOP Report for Fresh Feed Furnace (412-H-1001) (6745-PRC-412-QB-0002, Rev 0)
   d. PSV Datasheets

3. Recording software

exSILentia Software by Exida is used to record SIL classification results.

4. Steps followed during SIL study

a. Identification of SIF

Identification of SIF is important step in SIL study. All initiators which detects same hazardous situation and all final elements which averts same hazardous situation are classified as one SIF.

b. Cause of upset (Cause of demand on SIF)

Demand on SIF is caused by instrument malfunction, operator error or equipment failure etc.

c. Consequences

Consequences of failure of operation of SIF on demand are assessed.

d. Initiating Event frequency (W)

In order to ensure a consistency in the assessment for various SIF, a guideline is established for major initiating frequencies.

e. Safety risk level based on Safety risk graph

f. Financial risk level based on Financial risk graph

g. Environmental risk level based on Environmental risk graph

h. Overall SIL

Highest of three (point ‘e’ to ‘f’) is considered as Overall SIL.

i. Credit to other protection layers

If any other protection layer (Relief valve etc.) is provided to fully protect the system then SIL level is reduced by one to arrive Target SIL level.

j. Target SIL level

4.0 RESULTS AND CONCLUSIONS

During SIL Review sessions, total 11 Safety Instrumented Functions (SIFs) have been identified for SIL classification. Summary is indicated in Annexure-II

Target SIL of individual Safety Instrumented Functions (SIFs) is indicated in Annexure-III

Detailed SIL classification report of individual Safety Instrumented Functions (SIFs) is indicated in Annexure-IV

5.0 REFERENCE

Documents referred during SIL study are as below:

1. HAZOP Report for Fresh Feed Furnace (412-H-1001) (6745-PRC-412-QB-0002, Rev 0)

2. SIL Methodology (6745-PRC-000-QB-0002, Rev 0).

ANNEXURE-I

SIL STUDY TEAM

ANNEXURE-II

SUMMARY OF SIFs CLASSIFIED

During SIL Review sessions, total 11 Safety Instrumented Functions (SIFs) have been identified for SIL classification in Fresh Feed Furnace. Summary is as follows:

SIL Level	Total SIF
-	2
1	1
2	8

ANNEXURE-III

INDEX OF SIFs WITH TARGET SIL

1 SIF List – Project IOCL Panipat refinery- Indmax & MS Block

This Safety Instrumented Function List is automatically generated by the exida exSILentia tool for the Project:

IOCL Panipat refinery- Indmax & MS Block

1.1 General Information

Project identification: 66-6745-700
Project Name: IOCL Panipat refinery- Indmax & MS Block
Company: tkIS India
Project Leader: Kiran Dalal
Project Initiated On: 02 Mai 2022
Project Description:

1.2 Safety Instrumented Functions

SIF Name	SIF Tag	SIF Description	SIF Reference	Required			Achieved		
				SIL	RRF	PFH	SIL	RRF	PFH
Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3)	412-SIF-H-1001-01	TAHH-2327A/B/C will initiate I-1028 to trip the heater.		2	N/A	-	- [a)]	0	-
Heater Inlet Flow Low Low FALL-2321A (2oo3)	412-SIF-H-1001-02	FALL-2321A (2oo3) combined with TAHH-2325A will initiate I-1025 to trip the heater.		2	N/A	-	- [a)]	0	-
Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow	412-SIF-H-1001-03	FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3) will initiate I-1026 to trip the heater.		2	N/A	-	- [a)]	0	-

SIF Name	SIF Tag	SIF Description	SIF Reference	Required			Achieved		
				SIL	RRF	PFH	SIL	RRF	PFH
Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3)	412-SIF-H-1001-04	TAHH-2325A/B/C (2oo3) will initiate I-1027 to trip the heater.		2	N/A	-	- [a)]	0	-
Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3)	412-SIF-H-1001-05	PALL-2362A/B/C (2oo3) will initiate I-1030 to trip the heater.		2	N/A	-	- [a)]	0	-
Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3)	412-SIF-H-1001-06	PALL-2365A/B/C (2oo3) will initiate I-1023 to trip the heater.		-	N/A	-	- [a)]	0	-
Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3)	412-SIF-H-1001-07	PAHH-2365A/B/C (2oo3) will initiate I-1024 to trip the heater.		2	N/A	-	- [a)]	0	-
Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3)	412-SIF-H-1001-08	PAHH-2362A/B/C (2oo3) will initiate I-1031 to trip the heater.		-	N/A	-	- [a)]	0	-
Combustion Air Flow Low Low FALL-2341A/B/C (2oo3)	412-SIF-H-1001-09	FALL-2341A/B/C (2oo3) will initiate I-1033 to trip the heater.		2	N/A	-	- [a)]	0	-
Heater Box Presssure High High PAHH-2329A/B/C (2oo3)	412-SIF-H-1001-10	PAHH-2329A/B/C (2oo3) will initiate I-1021 to trip the heater.		2	N/A	-	- [a)]	0	-
Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343)	412-SIF-H-1001-11	Both FD fans not running also initiates I-1033 to trip the heater (through SAL-2342 & SAL-2343)		1	N/A	-	- [a)]	0	-

a) The Safety Instrumented Function operates in Low Demand

b) The Safety Instrumented Function operates in High Demand

c) The Safety Instrumented Function operates in Continuous Demand

2 Project References

This chapter provides an overview of the various References that were defined for the IOCL Panipat refinery- Indmax & MS Block project.

#	Document ID	Title	Rev	Rev Date
-	-	-	-	-

3 Abbreviations

RRF	Risk Reduction Factor
SIF	Safety Instrumented Function
SIL	Safety Integrity Level

4 Disclaimer and Assumptions

4.1 Disclaimer

The user of the exSILentia software is responsible for verification of all results obtained and their applicability to any particular situation. Calculations are performed per guidelines in applicable international standards. *exida.com L.L.C.* accepts no responsibility for the correctness of the regulations or standards on which the tool is based. In particular, *exida.com L.L.C.* accepts no liability for decisions based on the results of this software. The *exida.com L.L.C.* guarantee is restricted to the correction of errors or deficiencies within a reasonable period when such errors or deficiencies are brought to our attention in writing. *exida.com L.L.C.* accepts no responsibility for adjustments made to this automatically generated report made by the user.

4.2 Assumptions

An overview of the specific assumptions made for each of the exSILentia sub-tools, SILect, SIF SRS, and SILver, are listed in the analysis reports that can be generated for each of these tools.

ANNEXURE-IV

DETAILED SIL CLASSIFICATION REPORT

SIL Selection

IEC 61511 Compliance Report

IOCL Panipat refinery- Indmax & MS Block

Kiran Dalal
Project Leader

REV	DATE	APPROVED	DESCRIPTION OF CHANGE
	31 Mrz 2023		

Table of Contents

1 Project IOCL Panipat refinery- Indmax & MS Block

This exSILentia detailed report is automatically generated by the exida exSILentia tool for the Project:

IOCL Panipat refinery- Indmax & MS Block

1.1 General Information

Project Identification:	66-6745-700
Project Name:	IOCL Panipat refinery- Indmax & MS Block
Company:	tkIS India
Project Leader:	Kiran Dalal
Project Initiated On:	02 Mai 2022
Project Description:	

1.2 Risk Graph Tolerable risk categories

In the SIL selection process the following risk receptor categories were considered.

- Personnel Safety
- Environmental Impact
- Asset Loss

The SIL selection process was based on the Risk Graph method. The calibrated Risk Graph(s) are shown underneath.

The following definitions are specified for the various Risk Graph parameters.

Demand Rate		Consequence Category					
		Health and Safety		Environment		Assets (Economics)	
-	--	C0	No Impact	E0	No Effect	A0	No Effect
-	--	CA	Minor Injury	E1	Small, Uncontained Release	A1	Moderate $100K to $1M, 1-5 days
W1	Very Low (10 to 100 years)	CB	Severe Injury/One Death	E2	Moderate Uncontained Release	A2	Major $1M to $6M, 5 - 15 days
W2	Low (1 to 10 years)	CC	Several Deaths	E3	Large Uncontained Release	A3	Extensive $6M to $12M, 15 - 30 days
W3	High (<1 year)	CD	Many Deaths/Catastrophe	E4	Extensive Uncontained Release	A4	Catastrophic >$12M, > 30 days

Additional Parameters				Custom	
Presence in Danger Zone		Probability avoid Hazard		U0	---
FA	Seldom to Frequently	PA	Under Certain Circumstances	U1	---
FB	Frequently to Continuously	PB	Almost Impossible	U2	---
				U3	---
				U4	---

2 412-SIF-H-1001-01 Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-01 Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3).

2.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-01
SIF Description	TAHH-2327A/B/C will initiate I-1028 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. No/Less Flow of Process flow through the Heater.
	2. High Temperature of the process feed to the heater.
	3. TIC-2326/FIC-2361 loop failure causing overfiring.
Consequence	1. Overheating of the tubes which can lead to possible damage to heater internals and High temperature of heater outlet.
	2. Overfiring resulting in the increase of the heater outlet temperature.

2.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

2.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-01 Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3). This function relates to the hazard: 1. No/Less Flow of Process flow through the Heater.

2. High Temperature of the process feed to the heater.

3. TIC-2326/FIC-2361 loop failure causing overfiring.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-01 Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 1.

Table 1 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	2
Custom	N/A
Target SIL	2

2.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-01 Heater Outlet Temperature High High TAHH-2327A/B/C (2oo3) Safety Instrumented Function are shown in Table 2.

Table 2 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PA] Under Certain Circumstances *TAH-2330A / 2321A / 2322A available.*

3 412-SIF-H-1001-02 Heater Inlet Flow Low Low FALL-2321A (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-02 Heater Inlet Flow Low Low FALL-2321A (2oo3).

3.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Heater Inlet Flow Low Low FALL-2321A (2oo3)
SIF Tag	412-SIF-H-1001-02
SIF Description	FALL-2321A (2oo3) combined with TAHH-2325A will initiate I-1025 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. FIC/FV-2321A malfunctions and closes.
	2. FIC/FV-2328A malfunctions and opens. (individual coil purge to steam line)
Consequence	1. Overheating of the tubes for pass #1 leading to coking.
	2.Reduction in the process flow causing overheating of the tubes for pass #1.

3.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

3.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-02 Heater Inlet Flow Low Low FALL-2321A (2oo3). This function relates to the hazard: 1. FIC/FV-2321A malfunctions and closes.

2. FIC/FV-2328A malfunctions and opens. (individual coil purge to steam line)

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-02 Heater Inlet Flow Low Low FALL-2321A (2oo3) Safety Instrumented Function can be concluded as displayed in Table 3.

Table 3 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	2
Custom	N/A
Target SIL	2

3.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-02 Heater Inlet Flow Low Low FALL-2321A (2oo3) Safety Instrumented Function are shown in Table 4.

Table 4 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PA] Under Certain Circumstances *TAH-2330A / 2321A / 2322A available.*

4 412-SIF-H-1001-03 Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-03 Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow.

4.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow
SIF Tag	412-SIF-H-1001-03
SIF Description	FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3) will initiate I-1026 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. FIC/FV-2321A and FIC/FV-2321B malfunctions and closes.
Consequence	1. Overheating of the tubes for pass #1 leading to coking.

2.Reduction in the process flow causing overheating of the tubes for pass #1.

4.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

4.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-03 Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow. This function relates to the hazard: 1. FIC/FV-2321A and FIC/FV-2321B malfunctions and closes.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-03 Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow Safety Instrumented Function can be concluded as displayed in Table 5.

Table 5 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	2
Custom	N/A
Target SIL	2

4.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-03 Heater Inlet Flow Low Low FALL-2321-1A/ 2A/ 3A (2oo3) and FALL-2321-1B/ 2B/ 3B (2oo3)- Any two pass low low flow Safety Instrumented Function are shown in Table 6.

Table 6 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PA] Under Certain Circumstances *TAH-2330A / 2321A / 2322A and TAH-2330B / 2321B / 2322B available.*

5 412-SIF-H-1001-04 Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-04 Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3).

5.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-04
SIF Description	TAHH-2325A/B/C (2oo3) will initiate I-1027 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	TIC-2324A/FIC-2321A loop failure.
Consequence	Overheating of the tubes in pass #1 which can lead to possible damage to heater internals and High temperature of heater outlet.

5.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

5.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-04 Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3). This function relates to the hazard: TIC-2324A/FIC-2321A loop failure.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-04 Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 7.

Table 7 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	2
Custom	N/A
Target SIL	2

5.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-04 Heater Outlet Temperature High High TAHH-2325A/B/C (2oo3) Safety Instrumented Function are shown in Table 8.

Table 8 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PA] Under Certain Circumstances *TAH-2330A / 2321A / 2322A available.*

6 412-SIF-H-1001-05 Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-05 Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3).

6.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-05
SIF Description	PALL-2362A/B/C (2oo3) will initiate I-1030 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. No/Less Flow of fuel gas to the pilot burner.
	2. Strainer choked.
	3. UV-2364/2365 malfunctions and closes.
	4. UV-2366 malfunctions and opens.
Consequence	Pilot burner will be off.

6.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Integrity Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

6.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-05 Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3). This function relates to the hazard: 1. No/Less Flow of fuel gas to the pilot burner.

2. Strainer choked.

3. UV-2364/2365 malfunctions and closes.

4. UV-2366 malfunctions and opens.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-05 Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 9.

Table 9 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	2
Custom	N/A
Target SIL	2

6.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-05 Fuel Gas to Pilot Burner Presssure Low Low PALL-2362A/B/C (2oo3) Safety Instrumented Function are shown in Table 10.

Table 10 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PA] Under Certain Circumstances *FRI-2371A available.*

7 412-SIF-H-1001-06 Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-06 Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3).

7.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-06
SIF Description	PALL-2365A/B/C (2oo3) will initiate I-1023 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. No/Less Flow of fuel gas to the main burner.
	2. Strainer choked.
	3. UV-2361/2362 malfunctions and closes.
	4. UV-2363 malfunctions and opens.
	5. FV-2361 malfunctions and closes.
Consequence	Main burner will be off.

7.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

There are no SIL requirements for this SIF

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

7.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-06 Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3). This function relates to the hazard: 1. No/Less Flow of fuel gas to the main burner.

2. Strainer choked.

3. UV-2361/2362 malfunctions and closes.

4. UV-2363 malfunctions and opens.

5. FV-2361 malfunctions and closes.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-06 Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 11.

Table 11 Risk Reduction Requirements

	SIL
Personnel Safety	--
Environmental Impact	--
Asset Loss	--
Custom	N/A
Target SIL	There are no SIL requirements for this SIF

7.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-06 Fuel Gas to Main Burner Presssure Low Low PALL-2365A/B/C (2oo3) Safety Instrumented Function are shown in Table 12.

Table 12 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[C0] No Consequence
Environmental Impact	[E0] No Consequence
Asset Loss	[A0] No Consequence
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

8 412-SIF-H-1001-07 Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-07 Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3).

8.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-07
SIF Description	PAHH-2365A/B/C (2oo3) will initiate I-1024 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. FV-2361 malfunctions and opens.
	2. TIC-2326 loop failure causing overfiring.
Consequence	1. Overfiring and possibility of main burner blowout.
	2. Overfiring resulting in the increase of the heater outlet temperature.

8.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

8.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-07 Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3). This function relates to the hazard: 1. FV-2361 malfunctions and opens.

2. TIC-2326 loop failure causing overfiring.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-07 Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 13.

Table 13 Risk Reduction Requirements

	SIL
Personnel Safety	1
Environmental Impact	2
Asset Loss	2
Custom	N/A
Target SIL	2

8.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-07 Fuel Gas to Main Burner Presssure High High PAHH-2365A/B/C (2oo3) Safety Instrumented Function are shown in Table 14.

Table 14 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

9 412-SIF-H-1001-08 Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-08 Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3).

9.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-08
SIF Description	PAHH-2362A/B/C (2oo3) will initiate I-1031 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	Blocked condition.
Consequence	Overpressurization of the fuel gas line.

9.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

There are no SIL requirements for this SIF

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

9.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-08 Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3). This function relates to the hazard: Blocked condition.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-08 Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 15.

Table 15 Risk Reduction Requirements

	SIL
Personnel Safety	--
Environmental Impact	--
Asset Loss	--
Custom	N/A
Target SIL	There are no SIL requirements for this SIF

9.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-08 Fuel Gas to Pilot Burner Presssure High High PAHH-2362A/B/C (2oo3) Safety Instrumented Function are shown in Table 16.

Table 16 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[C0] No Consequence
Environmental Impact	[E0] No Consequence
Asset Loss	[A0] No Consequence
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

10 412-SIF-H-1001-09 Combustion Air Flow Low Low FALL-2341A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-09 Combustion Air Flow Low Low FALL-2341A/B/C (2oo3).

10.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Combustion Air Flow Low Low FALL-2341A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-09
SIF Description	FALL-2341A/B/C (2oo3) will initiate I-1033 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. Trip of forced draft fan.
	2. HV-2343 malfunctions and closes (during APH bypass mode operation)
	3. HV-2341 malfunctions and closes (during APH bypass mode operation)
Consequence	1. Reduced combustion air flow and loss of burner leading to accumulation of unburnt fuel gas in the heater box.
	2. Overpressurization of the heater box and consequently reduction of the combustion air flow due to high backpressure.

10.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

10.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-09 Combustion Air Flow Low Low FALL-2341A/B/C (2oo3). This function relates to the hazard: 1. Trip of forced draft fan.

2. HV-2343 malfunctions and closes (during APH bypass mode operation)

3. HV-2341 malfunctions and closes (during APH bypass mode operation)

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-09 Combustion Air Flow Low Low FALL-2341A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 17.

Table 17 Risk Reduction Requirements

	SIL
Personnel Safety	1
Environmental Impact	2
Asset Loss	2
Custom	N/A
Target SIL	2

10.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-09 Combustion Air Flow Low Low FALL-2341A/B/C (2oo3) Safety Instrumented Function are shown in Table 18.

Table 18 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

11 412-SIF-H-1001-10 Heater Box Presssure High High PAHH-2329A/B/C (2oo3)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-10 Heater Box Presssure High High PAHH-2329A/B/C (2oo3).

11.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Heater Box Presssure High High PAHH-2329A/B/C (2oo3)
SIF Tag	412-SIF-H-1001-10
SIF Description	PAHH-2329A/B/C (2oo3) will initiate I-1021 to trip the heater.
SIF Reference	
Unit / Process Area	412
Hazard	1. HV-2341 malfunctions and closes (during APH bypass mode operation)
	2. FIC-2344 loop failure / FD fan VFD malfunction.
	3. PIC-2341 loop failure / ID fan malfunctions and stops.
	4. Accumulation of unburnt fuel gas in the heater box.
Consequence	1. Overpressurization of the heater box and consequently reduction of the combustion air flow due to high backpressure.

11.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 2

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

11.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-10 Heater Box Presssure High High PAHH-2329A/B/C (2oo3). This function relates to the hazard: 1. HV-2341 malfunctions and closes (during APH bypass mode operation)

2. FIC-2344 loop failure / FD fan VFD malfunction.

3. PIC-2341 loop failure / ID fan malfunctions and stops.

4. Accumulation of unburnt fuel gas in the heater box.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-10 Heater Box Presssure High High PAHH-2329A/B/C (2oo3) Safety Instrumented Function can be concluded as displayed in Table 19.

Table 19 Risk Reduction Requirements

	SIL
Personnel Safety	1
Environmental Impact	2
Asset Loss	2
Custom	N/A
Target SIL	2

11.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-10 Heater Box Presssure High High PAHH-2329A/B/C (2oo3) Safety Instrumented Function are shown in Table 20.

Table 20 Risk Graph Selections

Demand Rate	[W2] Low (1 to 10 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

12 412-SIF-H-1001-11 Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343)

This chapter displays the analysis results for Safety Instrumented Function 412-SIF-H-1001-11 Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343).

12.1 General Information

The following characterizes the Safety Instrumented Function.

SIF Name	Both FD fans not running also initiates I-1033 to trip the heater (through SAL-2342 & SAL-2343)
SIF Tag	412-SIF-H-1001-11
SIF Description	Both FD fans not running also initiates I-1033 to trip the heater (through SAL-2342 & SAL-2343)
SIF Reference	
Unit / Process Area	412
Hazard	Trip of forced draft fan.
Consequence	Reduced combustion air flow and loss of burner leading to accumulation of unburnt fuel gas in the heater box.

12.2 Safety Integrity Levels

The target Safety Integrity Level determined for this Safety Instrumented Function is:

SIL 1

SIL verification determined that the Safety Integrity Level achieved by the Safety Instrumented Function is:

N/A

12.3 SILect

This section provides a detailed overview of the Safety Integrity Level selection performed for Safety Instrumented Function 412-SIF-H-1001-11 Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343). This function relates to the hazard: Trip of forced draft fan.

The SIL selection has been performed by , on .

Comments:

Given the Risk Graph risk calibration defined in section 1.2, and the risk graph selections made, the risk reduction requirements for the 412-SIF-H-1001-11 Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343) Safety Instrumented Function can be concluded as displayed in Table 21.

Table 21 Risk Reduction Requirements

	SIL
Personnel Safety	a(0)
Environmental Impact	1
Asset Loss	1
Custom	N/A
Target SIL	1

12.3.1 Risk Graph Selections

The risk graph selections made during the Safety Integrity Level selection of the 412-SIF-H-1001-11 Both FD fans not running also initiates I-1033 to trip the heater (through SAL- 2342 & SAL-2343) Safety Instrumented Function are shown in Table 22.

Table 22 Risk Graph Selections

Demand Rate	[W1] Very Low (10 to 100 years)
Personnel Safety	[CB] Severe Injury/One Death
Environmental Impact	[E2] Moderate Uncontained Release
Asset Loss	[A3] Extensive $6M to $12M, 15 - 30 days
Custom	[U0] No Consequence
Additional Parameters	
Presence in Danger Zone	[FA] Seldom to Frequently
Probability to avoid Hazard	[PB] Almost Impossible

13 SILect IPL Reuse Overview

This chapter provides an overview of the various Independent Protection Layers that were defined during the SIL selection analyses of the IOCL Panipat refinery- Indmax & MS Block project. The reuse of IPLs is available between initiating events and Safety Instrumented Functions to account for identical protection layer hardware used in those different initiating events and Safety Instrumented Functions. The IPL reuse allows users to specify a specific IPL once, reuse it, and with all future changes made to a single IPL cascading to all initiating events and Safety Instrumented Functions it is used in.

This overview indicates the IPLs that were reused, the number of times they were reused, and the initiating events and Safety Instrumented Functions that they were used in.

13.1 IPLs Reused

No Groups Reused

14 Project References

This chapter provides an overview of the various References that were defined for the IOCL Panipat refinery- Indmax & MS Block project.

#	Document ID	Title	Rev	Rev Date
-	-	-	-	-

15 Project Team Members

This chapter provides an overview of the various Team Members that were defined for the IOCL Panipat refinery- Indmax & MS Block project.

Initials	First Name	Last Name	Company	Title
-	-	-	-	-

16 Abbreviations

IPL	Independent Protection Layers
HFT	Hardware Fault Tolerance
MCI	Maintenance Capability Index
MTTFS	Mean Time To Fail Spurious
MTTR	Mean Time To Repair
PFDavg	Average Probability of Failure on Demand
PFH	Probability of a Dangerous Failure per Hour
PIU	Proven In Use
RRF	Risk Reduction Factor
SERH	Safety Equipment Reliability Handbook
SFF	Safe Failure Fraction
SIF	Safety Instrumented Function
SIL	Safety Integrity Level
SRS	Safety Requirements Specification
Sys. Cap.	Systematic Capability
β-factor	Beta factor, indicating common cause susceptibility

DD	Dangerous Detected
DU	Dangerous Undetected
SD	Safe Detected
SU	Safe Undetected
AD	Annunciation Detected
AU	Annunciation Undetected

Architectural Constraints	This reports the maximum SIL achievable based on the SIF's subsystems architecture alone. This is calculated solely on the basis of Type A or Type B device selection, redundancy (hardware fault tolerance), and the safe failure fraction (calculated or conservatively assumed if no data is provided). It does not pertain to Systematic Capability or certification. This is calculated as indicated, using respective IEC 61508 or IEC 61511 tables.
Mission Time	This is the time period that the SIF is expected to be operational. Alternatively this is the time period between points in time where the SIF can be considered as new. Note that this is not the proof test interval because of imperfect proof tests considerations. The mission time could, for example, correspond to the major turnaround period of a unit.
Startup Time	This represents the time it will take to perform maintenance and repair on a unit after a spurious trip plus the time it will take to restart the unit. This is typically longer than the online Mean Time To Repair.
Systematic Capability	This reports the maximum SIL achievable based on the SIF's equipment items systematic integrity alone. This is determined on the basis of the IEC 61508 certification level of each equipment item and/or the systematic integrity claim made by the user for a specific equipment item as part of its Proven In use justification. This addresses the requirement in IEC 61511 that

all equipment used in a SIF must either be assessed per IEC 61508 or proven in used.

17 Disclaimer, Assumptions, Equipment Data

17.1 Disclaimer

The user of the exSILentia software is responsible for verification of all results obtained and their applicability to any particular situation. Calculations are performed per guidelines in applicable international standards. *exida.com L.L.C.* accepts no responsibility for the correctness of the regulations or standards on which the tool is based. In particular, *exida.com L.L.C.* accepts no liability for decisions based on the results of this software. The *exida.com L.L.C.* guarantee is restricted to the correction of errors or deficiencies within a reasonable period when such errors or deficiencies are brought to our attention in writing. *exida.com L.L.C.* accepts no responsibility for adjustments made to this automatically generated report made by the user.

17.2 Assumptions SILect

The severity level translation into tolerable frequencies is based on the risk calibration selected by the user.

Unmitigated frequencies are directly calculated from initiating event frequencies and probabilities for enabling conditions and Independent Protection Layers using algebraic formulas.

The required Risk Reduction Factor, and therefore Target SIL, is obtained directly from the relation between tolerable frequency and unmitigated frequency.

The tolerable fatality frequency used in the Health and Safety Executive - HSE UK tolerable risk calibration is based on The Setting of Safety Standards: A Report by an Interdepartmental Group of External Advisors, London, HM Stationery Office, r2p2 2001.

The tolerable fatality frequency used in the IEC 61511-3 (CDV), Annex C tolerable risk calibration is based on IEC 61511 part 3, Functional Safety: Safety Instrumented Systems for the process industry sector - Part 3: Guidance for the determination of Safety Integrity Levels, Geneva Switzerland, IEC, 2003.

exida.com L.L.C. holds no responsibility for the above mentioned tolerable fatality frequencies nor any other tolerable fatality frequencies used in the SILect tool.

SIL Threshold example

Assume a calculated Required Risk Reduction Factor of 29, which would fall in the 10 - 100 Risk Reduction range. With a SIL Threshold Ratio of 1, a calculated Risk Reduction Factor of 29 would result in a Target SIL of SIL 2. The calculated Risk Reduction Factor is in this case greater than the SIL determination threshold which lies at 10 (10 * 1). With a SIL Threshold Ratio of 3, a calculated Risk Reduction Factor of 29 would result in a Target SIL of SIL 1. The calculated Risk Reduction Factor is in this case less than the SIL determination threshold which lies at 30 (10 * 3). The SIL determination threshold (the boundary between one SIL level and the next one up) is calculated by multiplying the relevant lower limit of the Risk Reduction range times the SIL Threshold Ratio.

17.3 Assumptions SIF SRS

All information that is output of the SIF SRS tool is directly linked to user input. No calculations are performed, nor is the information provided by the user changed in any way. The Target Safety Integrity Level listed in the SIF SRS (if any) is derived from user input into the SILect tool.

17.4 Assumptions SILver

Systematic Capability

If the user disables the **Consider IEC 61508 Systematic Capability** option it is assumed that the justification of equipment used is performed outside of the SILver tool as in that case the results of the SIL verification only address the quantitative requirements of IEC 61511.

A list of all other assumptions on which SILver is based can be found in the online SILver Help.

17.5 Equipment data

exida has compiled a proprietary equipment failure database. This database is a compilation of failure data collected from a variety of public and confidential sources and presents an industry average. The database is published as the “Safety Equipment Reliability Handbook” ISBN-13: 978-0-9727234-9-7. The reliability data collection process as described in this book applies to the SILver equipment data collection process.

The user is responsible for determining the applicability of the failure data to any particular environment. The stress levels assumed to determine the equipment failure rate are average for an industrial environment and can be compared to the RAC Ground Benign classification. Accurate plant specific data is preferable to general industry average data. Industrial plant sites with high levels of stress must use failure rate data that is adjusted to a higher value to account for the specific conditions of the plant.

ANNEXURE-V

SIL METHODOLOGY

tkIS India / Vendor

Category Codes (Submission Purpose)

☐	1	For Approval
☐	2	For Review / Comments
☐	3	For Information
☐	4	For Engineering
☐	5	For Enquiry
☐	6	For Order Placement
☐	7	Final & Approved
☐	8	Released for Construction

Acceptance Codes (Approval Codes)

☐	1	Approved
☐	2	Approved for Manufacturing / Fabrication with Comments as marked
☐	3	Not Approved / Resubmit
☐	4	Retained for Information / Records
☐	5	Reviewed
☐	6	Reviewed as Noted / Resubmit

Remarks for AC2 : This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-sbumitted after revision. This drawing should be revised only to the extent of tkIS India / Owner / Client comments. Any other changes made by you will not be considered unless clearly highlighted in covering letter asking for approval.

This approval / review does not absolve the supplier from the full responsibility for design and fabrication.

Date : ___/___/_____ Name : _____

tkIS India / Owner / Client

Category Codes (Submission Purpose)

☐	1	For Approval
☐	2	For Review / Comments
☐	3	For Information
☐	4	For Engineering
☐	5	For Enquiry
☐	6	For Order Placement
☐	7	Final & Approved
☐	8	Released for Construction

Acceptance Codes (Approval Codes)

☐	1	Approved
☐	2	Approved for Manufacturing / Fabrication with Comments as marked
☐	3	Not Approved / Resubmit
☐	4	Retained for Information / Records
☐	5	Reviewed
☐	6	Reviewed as Noted / Resubmit

Date : ___/___/_____ Name : _____

Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC
00		Issued for Engineering	18.10.21	BFD	18.10.21	CMA	18.10.21	MGK/RLD	-

Category Code: -

Contents:

1. INTRODUCTION

The SIL study will be done for the various units of refinery based on PID diagrams and Hazop study. SIL classification is to identify the risk level of hazards protected by Safety Instrumented loop. The target SIL is outcome of a SIL classification.

SIL study will be carried out using Risk Graph methodology based on IEC61511 standard.

This document describes the methodology to be followed for carrying out SIL study for the Project.

2. SCOPE OF WORK

thyssenkrupp Industrial Solutions (tkIS India) has been engaged by Indian Oil Corporation Ltd. (IOCL) as EPCM-2 Consultant for its INDMAX FCC Unit, Gasoline splitter unit (GSU), MS Block (consisting of NHT, CCR & ISOM Unit) and SR LPG Treater Unit including all associated Utilities within the units & relevant interfaces with the offsite facilities, as a part of capacity expansion of their Panipat Refinery from 15 MMTPA to 25 MMTPA (P-25 Project).

3. DEFINATIONS AND ACRONYMS

- SIL: Safety Integrity Level
- SIS: Safety Instrumented System
- SIF: Safety Instrumented Function
- IPL: Independent Protection Layer
- IE: Initiating Event
- PFD: Probability of Failure on demand

4. REFERENCE DOCUMENTS

- IEC 61508 Functional Safety of Electrical/Electronic/programmable electronic safety related systems
- IEC 61511 Functional Safety – Safety instrumented systems for the process industry sector

5. METHODOLOGY

4.1 SIL Classification Team

- SIL Review Chairman
- Process Engineer
- Instrumentation Engineer
- Package Vendor Process Engineer (For Package Unit study)
- Scribe

4.2 Document required

4.2.1 P & IDS

4.2.2 Hazop report

4.2.3 Cause & effect diagram if available

4.2.4 Other related documents like control narratives, safety studies etc if prepared

4.3 Steps for SIL Study:

ExSilentia Software from Exida will be used for carrying out the SIL study. Following steps will be performed during SIL study.

Step 1: Based on Hazop report, consequences for which instrumented interlock is identified / recommended as safeguard will be populated in exSILentia software.

Step 2: All initiating events causes of the consequences are identified from Hazop report and populated in exSILentia software. This is generally identified as “Cause” in Hazop report.

Step3: Select consequence severity level for Safety, Environment and asset. Refer attached table which is based on IEC 61511-3, Annexure D & E.

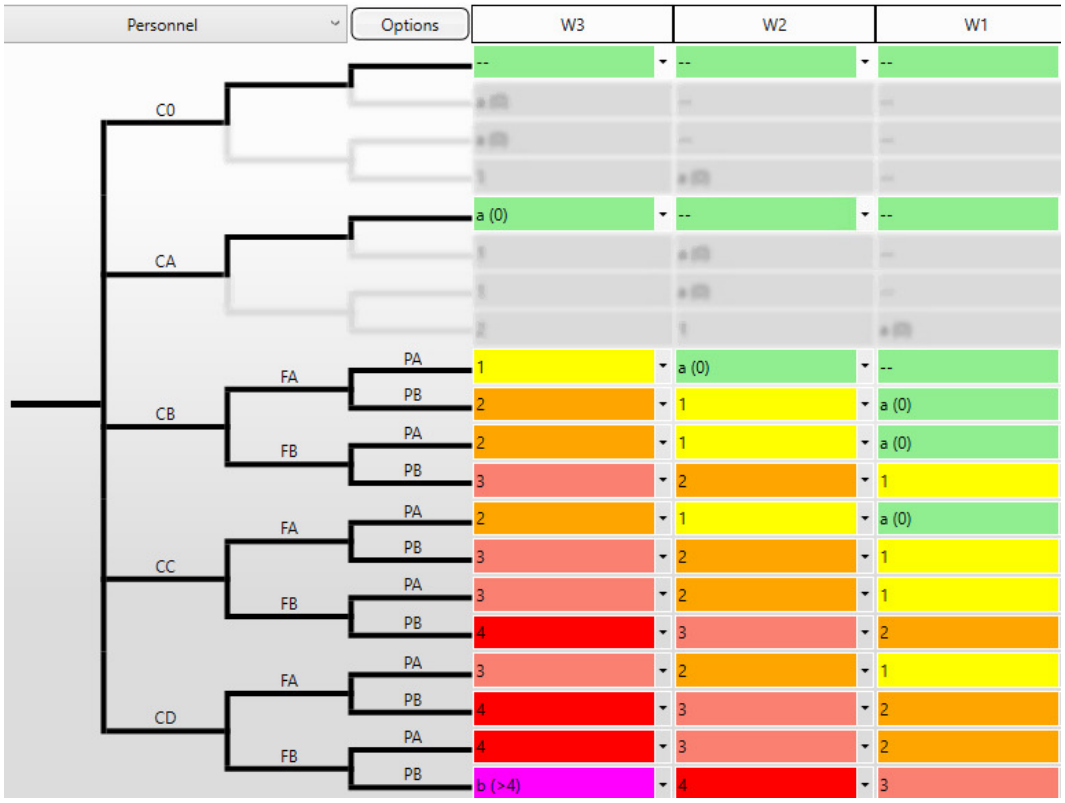
Step 4: Enter likelihood value of initiating causes. Bellow table shows typical initiating causes likelihoods. In case any initiated event is not part of the attached table then team can decide its frequency based on their experience.

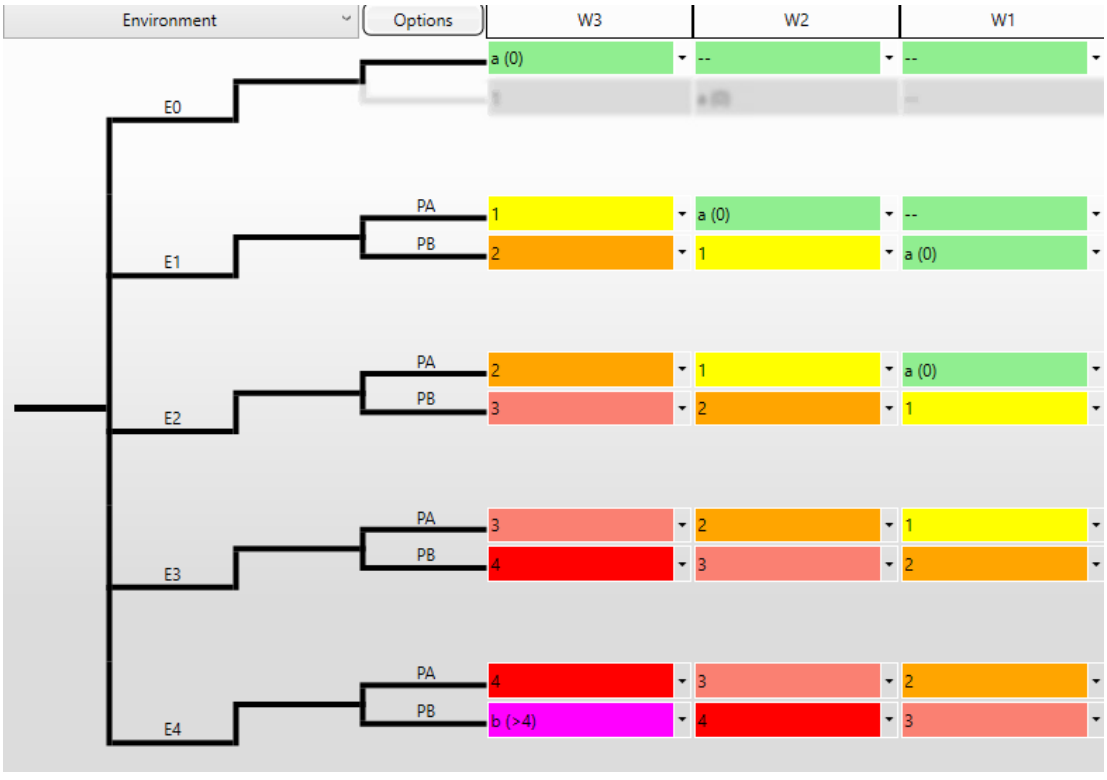
Step 5: Identify independent protection layer which will avert hazardous situation e.g. Safety valves. Required credit shall be taken based on PFD value of the protection device. It has to be ensured that IPL is independent with other protecting devices.

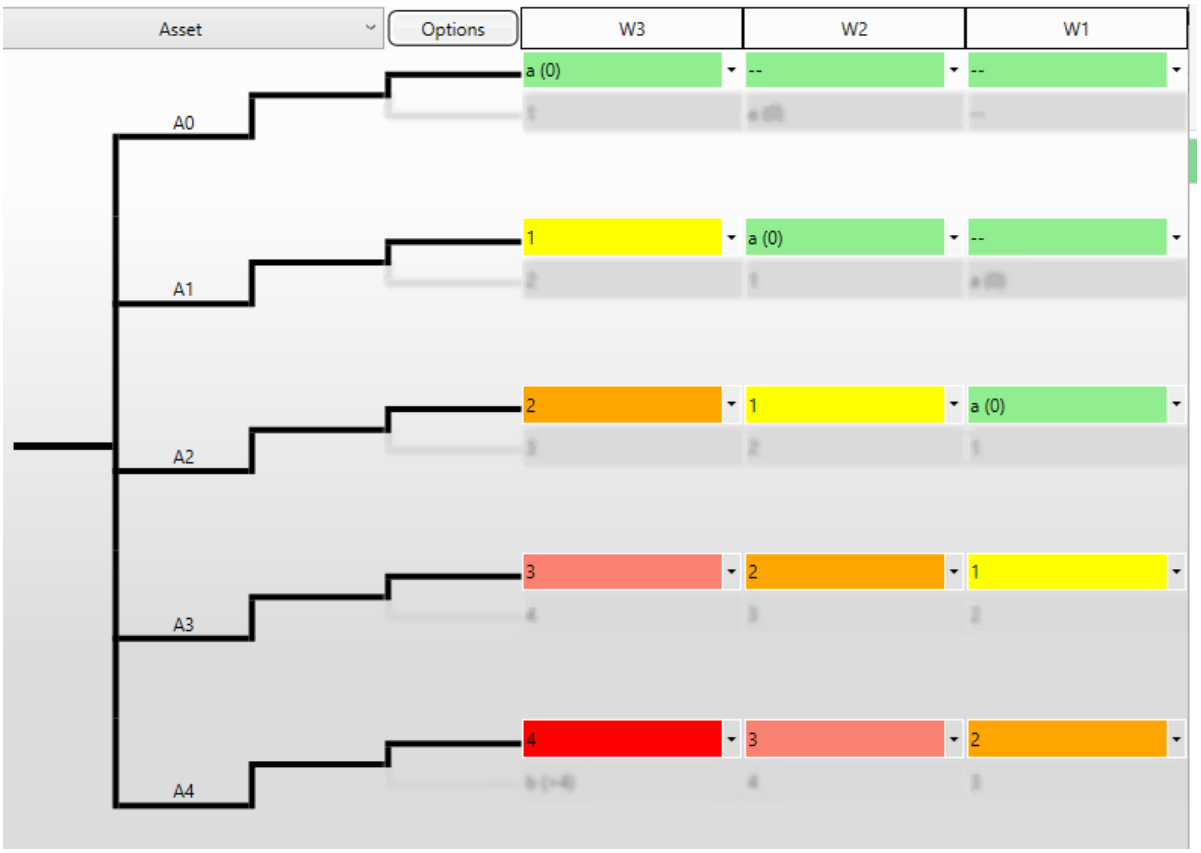
Step 7: Highest of three SIL (Safety, Environment & Asset) will be considered as Target SIL. SIF loop to designed as per Target SIL.

4.4 Risk Graph and guidelines

4.4.1 Risk Graph






Asset
Options
W3
W2
W1
A0
a (0)
--
--
A1
1
a (0)
--
A2
2
1
a (0)
A3
3
2
1
A4
4
3
2

4.4.2 The following definitions are specified for the various Risk Graph Parameters

Above is based on statistical historical data. SIL classification team shall decide for the credit to be taken for IPL based on individual SIF under discussion. Independence of IPL shall be ensured with respect to SIF under discussion and cause which put demand in SIF. Any other IPL credit may be taken based on decision by SIL study team.

Demand Rate		**Consequence Category**					
		Health and Safety		**Environment**		**Assets (Economics)**	
-	--	C0	No Impact	E0	No Effect	A0	No Effect
-	--	CA	Minor Injury	E1	Small, Uncontained Release	A1	Moderate $100K to $1M, 1-5 days shutdown
W1	Very Low (10 to 100 years)	CB	Severe Injury/One Death	E2	Moderate Uncontained Release	A2	Major $1M to $6M, 5 - 15 days shutdown
W2	Low (1 to 10 years)	CC	Several Deaths	E3	Large Uncontained Release	A3	Extensive $6M to $12M, 15 - 30 days shutdown
W3	High (<1 year)	CD	Many Deaths/Catastrophe	E4	Extensive Uncontained Release	A4	Catastrophic >$12M, > 30 days shutdown

Additional Parameters			
Presence in Danger Zone		**Probability avert Hazard**	
FA	Seldom to Frequently	PA	Under Certain Circumstances
FB	Frequently to Continuously	PB	Almost Impossible

4.4.3 Demand rate guidelines (W)

Initiating event	Demand Rate	Demand Frequency
Agitator motor failure	W1	Very low (10 to 100 Years)
Blower failure	W1	Very low (10 to 100 Years)
Centrifugal pump failure	W1	Very low (10 to 100 Years)
Heat exchanger tube leak	W1	Very low (10 to 100 Years)
Gasket/Packing failure	W1	Very low (10 to 100 Years)
Instrument air failure	W2	Low (1 to 10 years)
Control loop failure	W2	Low (1 to 10 Years)
Power supply failures	W2	Low (1 to 10 years)
Valve Failure	W2	Low (1 to 10 years)
Cooling water failure	W2	Low (1 to 10 years)
Loss of Nitrogen	W2	Low (1 to 10 years)
Blockage of line /flame arrestor chocking	W2	Low (1 to 10 years)
PHE failure	W2	Low (1 to 10 years)
Pump Failure loss of flow	W2	Low (1 to 10 years)
Positive displacement pump trip	W3	High (< 1 Year)
Centrifugal compressor trip	W3	High (< 1 Year)
Operator failure – Under stress	W3	High (< 1 Year)
Operator Failure – Unstressed	W2	Low (1 to 10 years)

Above is based on statistical historical data. For causes other than above which put demand on safety function, SIL classification team to decide appropriately.

4.4.4 Guidelines for the credit of independent protection layer (IPL)

IPL	Credit for IPL
Dike	1×10^{-2}
Blast wall/Bunker	1×10^{-3}
Relief Valves	1×10^{-2}
Rupture Disk	1×10^{-2}
SIF – SIL1 - Independent	1×10^{-1}
SIF – SIL2 - Independent	1×10^{-2}
SIF – SIL3 - Independent	1×10^{-3}

Above is based on statistical historical data. SIL classification team shall decide for the credit to be taken for IPL based on individual SIF under discussion. Independence of IPL shall be ensured with respect to SIF under discussion and cause which put demand in SIF. Any other IPL credit may be taken based on decision by SIL study team.

tkIS India / Vendor

Category Codes (Submission Purpose)

☐	1	For Approval
☐	2	For Review / Comments
☐	3	For Information
☐	4	For Engineering
☐	5	For Enquiry
☐	6	For Order Placement
☐	7	Final & Approved
☐	8	Released for Construction

Acceptance Codes (Approval Codes)

☐	1	Approved
☐	2	Approved for Manufacturing / Fabrication with Comments as marked
☐	3	Not Approved / Resubmit
☐	4	Retained for Information / Records
☐	5	Reviewed
☐	6	Reviewed as Noted / Resubmit

Remarks for AC2 : This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-sbumitted after revision. This drawing should be revised only to the extent of tkIS India / Owner / Client comments. Any other changes made by you will not be considered unless clearly highlighted in covering letter asking for approval.

This approval / review does not absolve the supplier from the full responsibility for design and fabrication.

Date : ___/___/_____ Name : _____

tkIS India / Owner / Client

Category Codes (Submission Purpose)

☐	1	For Approval
☐	2	For Review / Comments
☐	3	For Information
☐	4	For Engineering
☐	5	For Enquiry
☐	6	For Order Placement
☐	7	Final & Approved
☐	8	Released for Construction

Acceptance Codes (Approval Codes)

☐	1	Approved
☐	2	Approved for Manufacturing / Fabrication with Comments as marked
☐	3	Not Approved / Resubmit
☐	4	Retained for Information / Records
☐	5	Reviewed
☐	6	Reviewed as Noted / Resubmit

Date : ___/___/_____ Name : _____

Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC
00		Issued for Engineering	18.10.21	BFD	18.10.21	CMA	18.10.21	MGK/RLD	-

Category Code: -

Contents:

1. INTRODUCTION

The SIL study will be done for the various units of refinery based on PID diagrams and Hazop study. SIL classification is to identify the risk level of hazards protected by Safety Instrumented loop. The target SIL is outcome of a SIL classification.

SIL study will be carried out using Risk Graph methodology based on IEC61511 standard.

This document describes the methodology to be followed for carrying out SIL study for the Project.

2. SCOPE OF WORK

thyssenkrupp Industrial Solutions (tkIS India) has been engaged by Indian Oil Corporation Ltd. (IOCL) as EPCM-2 Consultant for its INDMAX FCC Unit, Gasoline splitter unit (GSU), MS Block (consisting of NHT, CCR & ISOM Unit) and SR LPG Treater Unit including all associated Utilities within the units & relevant interfaces with the offsite facilities, as a part of capacity expansion of their Panipat Refinery from 15 MMTPA to 25 MMTPA (P-25 Project).

3. DEFINATIONS AND ACRONYMS

- SIL: Safety Integrity Level
- SIS: Safety Instrumented System
- SIF: Safety Instrumented Function
- IPL: Independent Protection Layer
- IE: Initiating Event
- PFD: Probability of Failure on demand

4. REFERENCE DOCUMENTS

- IEC 61508 Functional Safety of Electrical/Electronic/programmable electronic safety related systems
- IEC 61511 Functional Safety – Safety instrumented systems for the process industry sector

5. METHODOLOGY

4.1 SIL Classification Team

- SIL Review Chairman
- Process Engineer
- Instrumentation Engineer
- Package Vendor Process Engineer (For Package Unit study)
- Scribe

4.2 Document required

4.2.1 P & IDS

4.2.2 Hazop report

4.2.3 Cause & effect diagram if available

4.2.4 Other related documents like control narratives, safety studies etc if prepared

4.3 Steps for SIL Study:

ExSilentia Software from Exida will be used for carrying out the SIL study. Following steps will be performed during SIL study.

Step 1: Based on Hazop report, consequences for which instrumented interlock is identified / recommended as safeguard will be populated in exSILentia software.

Step 2: All initiating events causes of the consequences are identified from Hazop report and populated in exSILentia software. This is generally identified as “Cause” in Hazop report.

Step3: Select consequence severity level for Safety, Environment and asset. Refer attached table which is based on IEC 61511-3, Annexure D & E.

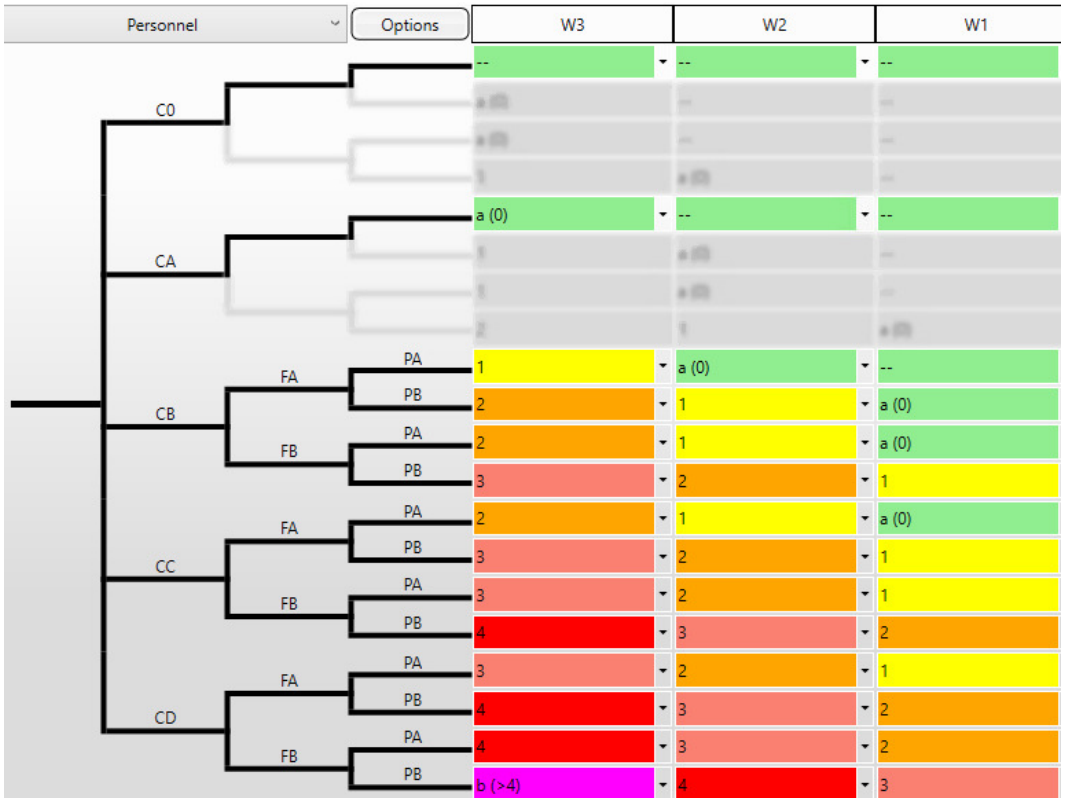
Step 4: Enter likelihood value of initiating causes. Bellow table shows typical initiating causes likelihoods. In case any initiated event is not part of the attached table then team can decide its frequency based on their experience.

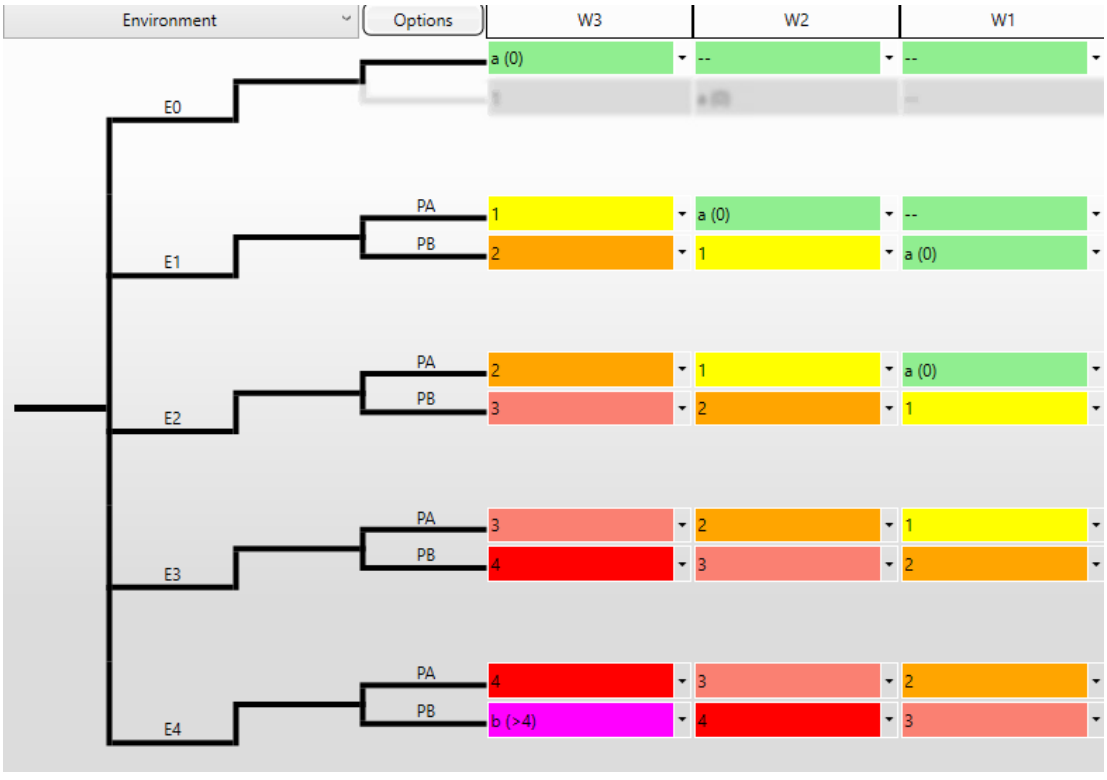
Step 5: Identify independent protection layer which will avert hazardous situation e.g. Safety valves. Required credit shall be taken based on PFD value of the protection device. It has to be ensured that IPL is independent with other protecting devices.

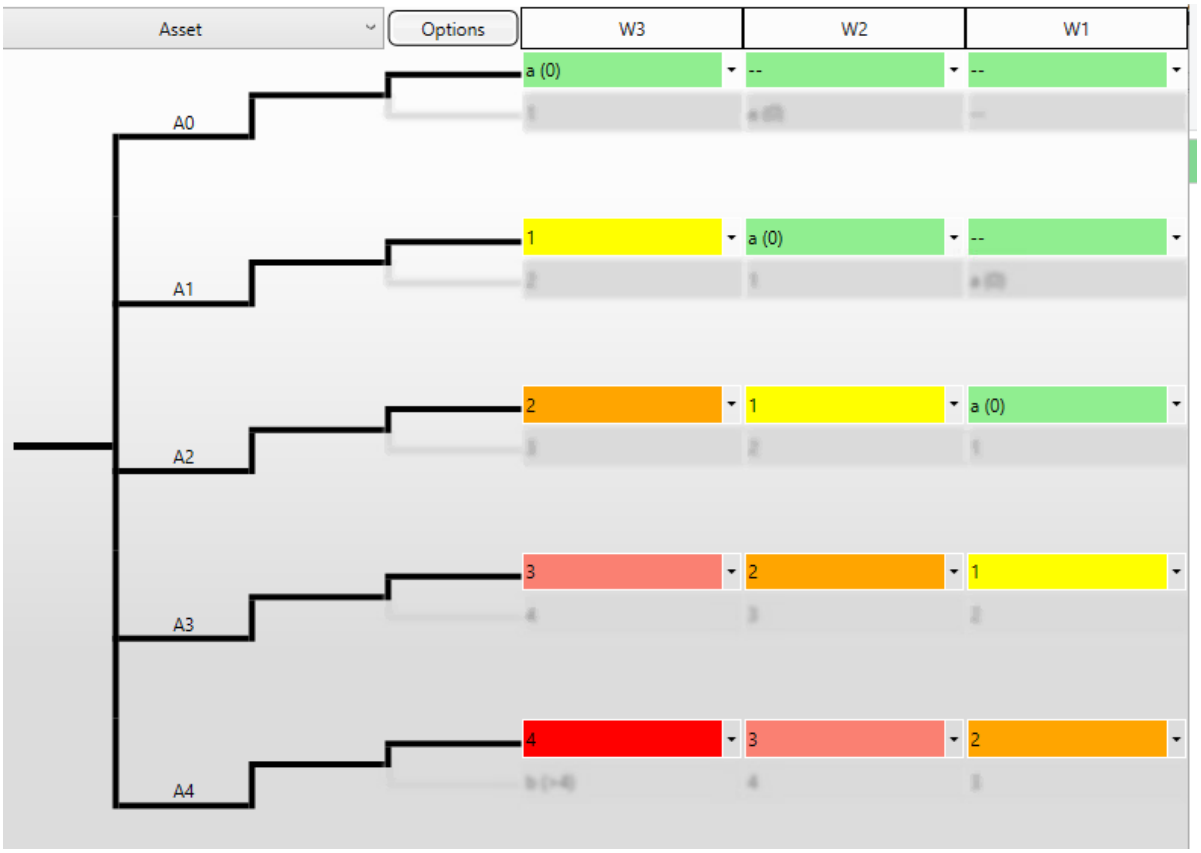
Step 7: Highest of three SIL (Safety, Environment & Asset) will be considered as Target SIL. SIF loop to designed as per Target SIL.

4.4 Risk Graph and guidelines

4.4.1 Risk Graph






Asset
Options
W3
W2
W1
A0
a (0)
--
--
A1
1
a (0)
--
A2
2
1
a (0)
A3
3
2
1
A4
4
3
2

4.4.2 The following definitions are specified for the various Risk Graph Parameters

Above is based on statistical historical data. SIL classification team shall decide for the credit to be taken for IPL based on individual SIF under discussion. Independence of IPL shall be ensured with respect to SIF under discussion and cause which put demand in SIF. Any other IPL credit may be taken based on decision by SIL study team.

Demand Rate		**Consequence Category**					
		Health and Safety		**Environment**		**Assets (Economics)**	
-	--	C0	No Impact	E0	No Effect	A0	No Effect
-	--	CA	Minor Injury	E1	Small, Uncontained Release	A1	Moderate $100K to $1M, 1-5 days shutdown
W1	Very Low (10 to 100 years)	CB	Severe Injury/One Death	E2	Moderate Uncontained Release	A2	Major $1M to $6M, 5 - 15 days shutdown
W2	Low (1 to 10 years)	CC	Several Deaths	E3	Large Uncontained Release	A3	Extensive $6M to $12M, 15 - 30 days shutdown
W3	High (<1 year)	CD	Many Deaths/Catastrophe	E4	Extensive Uncontained Release	A4	Catastrophic >$12M, > 30 days shutdown

Additional Parameters			
Presence in Danger Zone		**Probability avert Hazard**	
FA	Seldom to Frequently	PA	Under Certain Circumstances
FB	Frequently to Continuously	PB	Almost Impossible

4.4.3 Demand rate guidelines (W)

Initiating event	Demand Rate	Demand Frequency
Agitator motor failure	W1	Very low (10 to 100 Years)
Blower failure	W1	Very low (10 to 100 Years)
Centrifugal pump failure	W1	Very low (10 to 100 Years)
Heat exchanger tube leak	W1	Very low (10 to 100 Years)
Gasket/Packing failure	W1	Very low (10 to 100 Years)
Instrument air failure	W2	Low (1 to 10 years)
Control loop failure	W2	Low (1 to 10 Years)
Power supply failures	W2	Low (1 to 10 years)
Valve Failure	W2	Low (1 to 10 years)
Cooling water failure	W2	Low (1 to 10 years)
Loss of Nitrogen	W2	Low (1 to 10 years)
Blockage of line /flame arrestor chocking	W2	Low (1 to 10 years)
PHE failure	W2	Low (1 to 10 years)
Pump Failure loss of flow	W2	Low (1 to 10 years)
Positive displacement pump trip	W3	High (< 1 Year)
Centrifugal compressor trip	W3	High (< 1 Year)
Operator failure – Under stress	W3	High (< 1 Year)
Operator Failure – Unstressed	W2	Low (1 to 10 years)

Above is based on statistical historical data. For causes other than above which put demand on safety function, SIL classification team to decide appropriately.

4.4.4 Guidelines for the credit of independent protection layer (IPL)

IPL	Credit for IPL
Dike	1×10^{-2}
Blast wall/Bunker	1×10^{-3}
Relief Valves	1×10^{-2}
Rupture Disk	1×10^{-2}
SIF – SIL1 - Independent	1×10^{-1}
SIF – SIL2 - Independent	1×10^{-2}
SIF – SIL3 - Independent	1×10^{-3}

Above is based on statistical historical data. SIL classification team shall decide for the credit to be taken for IPL based on individual SIF under discussion. Independence of IPL shall be ensured with respect to SIF under discussion and cause which put demand in SIF. Any other IPL credit may be taken based on decision by SIL study team.