



Hazard Identification and Risk Assessment

(HIRA)

for Installation and Commissioning of

Rooftop Solar Plant

Capacity : 850kWp

Site Details : Endurance Technologies Limited, E-71, Aurangabad,

Maharashtra

JUPISOL POWER INDIA PRIVATE LIMITED

REG. OFFICE: G3, WESTERN BUSINESS PARK, OPP SD JAIN SCHOOL, VESU, SURAT - 395007

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27.1 Introduction:

We at **Jupisol Power** believe that our contactors are our greatest assets and their safety is of the utmost importance. In our journey towards attaining zero harm/injuries/accidents, we have implemented best in-class safety systems, standards and procedures. The successful implementation of these standards and procedures require demonstrated management commitment and behaviors at all levels, which are consistent with our Safety Principles, in particular, "Working safely is everybody's responsibility and a condition of employment". Safety is a critical requirement as per contract terms & conditions.

27.2 Objective:

Hazard Identification and Risk Assessment (HIRA) establishes the process of corrective counseling and disciplinary actions in response to safety misconduct or violation in alignment with the Safety Acts/Rules applicable to the Company.

In the event that the desired safety behaviors are not demonstrated, then the provisions of the Consequence Management Policy (Safety) shall apply.

27.3 Scope:

This Policy is applicable to all contractors & sub-contractors of **Jupisol Power India Pvt Ltd**

27.4 Definitions:

Any act which is inconsistent with the fulfillment of express or implied requirement of Safety Acts/Rules applicable to the Company.

Any breach of an express or implied duty on the part of the employee.

- Slips are unintended actions
- Lapses are unintended failures to act
- Mistakes are intended, but not what was really meant
- Violations are known failures. Violations can be seen as a form of mistake

27.4.2 Intent behind the violation:

An unplanned or an unusual event, or a series of events and circumstances that resulted in, or had the potential to result in, an adverse or undesirable safety, process safety, health, fire and environmental consequence. Undesirable consequences related to HSE, incidents include, but are not limited to the following:

- Injuries/illnesses

- Significant environmental impact
- Unfavorable impact on the public
- Significant property damage
- Business interruption
- Damage to Reputation

27.5 Dealing with violation(s) – reactively:

Root cause(s) of incident:

Root cause(s) of the incidents are graded in three categories. The incident investigation report will indicate the exact root causes for each incidents based upon which the disciplinary actions shall be initiated.

Human Factors:

Unsafe acts by employee i.e. not following procedure, not using correct (fit for purpose) tools / equipment, not using protective equipment / methods and inattention / lack of awareness and knowledge of safety standards.

Physical Factors:

Unsafe conditions / situation created by individual or group of personnel, which, if it continues, can lead to an incident such as by pass or overlooked protective systems, use of defective or improper tools, equipment & vehicles, work with energized system, inadequate work place environment etc.

System Factors:

Management failure such as inadequate communication, inadequate work rules / policies / standards / procedures, inadequate provision of tools & equipment, inadequate work planning, inadequate management / supervision / employee leadership, inadequate training / knowledge transfer etc.

Loss / Potential loss (Severity)

Severity of loss or immediate potential loss arising from the violation is graded in five levels as indicated in OH&S Risk Assessment Matrix (RAM) below:

OH&S Risk Assessment Matrix (RAM)

Probability	Very high Almost certain, it will occur >80% in any time frame	(3) Medium	(4) High	(4) High	(5) Very High	(5) Very High
	High Expected to occur 10 % to 80 % chance in time frame	(2) Low	(3) Medium	(4) High	(4) High	(5) Very High
	Medium It could occur less than up to 10 % chance in time frame	(2) Low	(2) Low	(3) Medium	(4) High	(5) Very High
	Low Not expected to occur less than .1 % in time frame	(2) Low	(2) Low	(3) Medium	(3) Medium	(4) High
	Very Low Almost certain it will occur greater than .01% chance in time frame	(1) Very Low	(2) Low	(2) Low	(3) Medium	(3) Medium
		Very Low	Low	Medium	High	Very High
		1	2	3	4	5
	Consequence Severity Increases					
Consequences in various regimes	People (Health and Safety)	No Health / Injury risk	First aid cases or slight health problem	Lost time injury or potential health problem	Partial disability or major health problem	Total disability / fatality (s) server healthy problem
	Environmental	Negligible effect confined to in plant grounds / environment	Minor effects neighbors adjacent to plant complain	Localize rerelease makes local TV coverage / news paper	Major release make national TV coverage / news paper	Massive damage makes international TV coverage / new paper
	Product or Service Quality	Some product or service fails to meet standards	Several costumer complain verbally	Several customer complain in writing	Important / major customer cancelled orders	Loss of substantial marked share due problem
	Assets or finance loss	Slight damage is Up to Rs 10,000	Noticeable damage between Rs 10,000 to 1 Lakh	Large damage 1 Lakh to 10 Lakhs	Major damage 10 Lakhs to 100 Lakhs	Severe damage more than 1 Crore
	Reputation (Local, National, or International)	Slight to moderate impact	Loss of community reputation	Loss of state reputation	Loss of national reparation	Loss of international reputation

27.6 Dealing with violation(s) – Proactively:

Within Jupisol Power , potential Safety violations are identified proactively through safety inspections, audits, Safety Observation & Conversation (SOC), Safety Walk (SW), Yellow Card (YC), etc. and the reports are generated. Based on the severity and intention of findings, the fact-finding committee shall initiate disciplinary actions.

27.7 Guidelines for Implementation:

Step 1 – Fact Finding:

The Divisional Head / Unit Head shall appoint a team to establish the facts related to the incident including the circumstances leading to the safety violation(s)

- Minimum of 3 members in a team
- Departmental head shall lead the team
- Site/Plant HSE in-charge shall be involved, if needed

The Functional Head/Unit/Project Head shall establish the facts related to the incident including the circumstances leading to the safety violation.

Step 2 – Evaluation:

Intent behind the violation:

In determining the appropriate root causes behind the violation, the team shall consider the following factors:

Level of Intent	Description
I -1	Unintentional non-compliance Lacks the knowledge of safety standards and the accompanying hazards
I -2	Rare / Exceptional violation Has good knowledge of the safety standards and the accompanying hazards but violated due to work exigency, pressure from peers and supervisors
I -3	Routine violation - Frequent, known and condone Has fair knowledge of safety standards and the accompanying hazards but violated due to routine activity without thought
I -4	Situational violation - Adapting to the problems in the workplace Have good knowledge of safety standards and the accompanying hazards but violated due to work place constraints (lack of resources, tools, equipment etc.)
I -5	Optimizing violation - Doing things better, for kicks Has good knowledge of safety standards and the accompanying hazards but violated due to over confidence, to save time, avoid discomfort, to gain attention, etc.

Loss/Potential loss (Severity)

In determining the appropriate level of severity category (i.e. very low, low, medium, high or very high) of the loss and / or potential loss arising from the violation, the team shall consider the following factors:

Level of severity	Description
S -1	No Health / Injury risk, Negligible effect confined to in plant grounds / environment, Some product or service fails to meet standards, Slight damage is Up to Rs. 10,000 and Slight to moderate impact on reputation
S -2	First aid cases or slight health problem, Minor effects neighbors adjacent to plant complaints, Several customer complaints verbally, Noticeable damage between Rs. 10,000 to 1 Lakh, Loss of community reputation
S -3	Lost time injury or potential health problem, Localize rerelease makes local TV coverage / newspaper, Several customer complaints in writing, Large damage Rs. 1 Lakh to 10 Lakhs, Loss of state reputation
S -4	Partial disability or major health problem Major release make national TV coverage / newspaper, Important / major customer cancelled orders, Major damage Rs. 10 Lakhs to 100 Lakhs, Loss of national reputation
S -5	Total disability / fatality (s) server health problem, Massive damage makes international TV coverage / newspaper, Loss of substantial marked share due problem, Severe damage more than Rs. 1 Crore, Loss of international reputation

Step 3 - Recommended disciplinary action - Based on step 1 and 2:

The team will recommend the appropriate disciplinary action for individual, group or contractor as appropriate as per following table to Divisional Head

Intent	I - 5	V - 3 M	V - 4 H	V - 4 H	V - 5 VH	V - 5 VH
	I - 4	V - 2 L	V - 3 M	V - 4 H	V - 4 H	V - 5 VH

I-3	V-2 L	V-2 L	V-3 M	V-4 H	V-5 VH
I-2	V-2 L	V-2 L	V-3 M	V-3 M	V-4 H
I-1	V-1 VL	V-2 L	V-2 L	V-3 M	V-3 M
	S-1	S-2	S-3	S-4	S-5

Severity (S)

Legend		Financial Penalty (Rs)
VL	Very Low	500/-
L	Low	1,000/-
M	Medium	2,000/-
H	High	5,000/-
VH	Very High	10,000/-

Severity	Level of disciplinary action				
	Counseling	Warning Letter	Financial Penalties	Suspension for 1 Week	Termination
VL	Yes		Yes		
L	Yes		Yes		
M		Yes	Yes		
H		Yes	Yes		
VH		Yes	Yes	Yes	

27. 7 Guidelines for Implementation - (Safety Violations):

SI. No	Violations of Safety code of conduct	Severity
1	Working without Permit-to-Work (PTW) for activities that is listed in Appendix 2 of PTW procedure	VH

2	Non-compliance of the Lock out Tag out (LOTO) procedure	VH
3	Not confirming isolation before beginning of work on all rotating and electrical equipment or any system that may have and use the specified life-protection equipment	VH
4	Defeating or overriding safety-critical trips or interlocks without obtaining proper authorization	VH
5	Smoking in the notified „No Smoking“ areas	VH
6	Specified fall-prevention equipment not used when working at height	VH
7	Operated any machinery / powered equipment without formal training and registered authorization to operate	VH
8	Not wearing seat belt in a moving vehicle, including rear seat where fitted	VH
9	Using mobile phone while driving a motor vehicle or working with mechanized equipment	VH
10	Driving or working under the effect of drugs or alcohol	VH
Violation: Non-usage of PPE as per TATA POWER SOLAR PPE mandate		
11	Industrial Safety Helmet	L
12	Rider's Crash Helmet	L
13	General purpose hand gloves	L
14	Safety Goggles	L
15	Industrial Safety Shoes / Boots	L
16	Face Shield (Welding / Cutting)	M
17	Chemical handling suit	H
18	Arc suit	H
19	Full body harness & Safety lifeline at sheet roof	
Violation: Unsafe Condition		
20	Vehicle not meeting Tata Power Solar Vehicle standard as stipulated in vehicle inspection check list	M
21	Mobile lifting equipment i.e. Crane, hydra etc. not meeting Tata Power Solar lifting equipment standard as stipulated in inspection check list	M
22	Confined Space not meeting Tata Power Solar confined space standard as stipulated in confined inspection check list	M
23	Excavation not meeting Tata Power Solar excavation standard as stipulated in excavation inspection check list	M

24	Gas cylinders not meeting Tata Power Solar gas cylinders standard as stipulated in gas cylinder inspection check list	M
25	Hand tools not meeting Tata Power Solar hand tools standard as stipulated in hand tools inspection check list	M
26	Housekeeping not meeting Tata Power Solar housekeeping standard as stipulated in housekeeping inspection check list	M
27	Machines not meeting Tata Power Solar machine safety standard as stipulated in machine safety inspection check list	M
28	Power operated hand tools not meeting Tata Power Solar power operated hand tools standard as stipulated in power operated hand tools inspection check list	M
29	Personal protection Equipment (PPE) not meeting Tata Power Solar personal protection Equipment (PPE) standard as stipulated in personal protection Equipment (PPE) inspection check list	M
30	Scaffolding not meeting Tata Power Solar scaffolding standard as stipulated in scaffolding inspection check list	M
31	Temporary Electrical Supply not meeting Tata Power Solar temporary electrical supply standard as stipulated in temporary electrical supply inspection check list	M
32	Welding machine not meeting Tata Power Solar welding machine standard as stipulated in welding machine supply inspection check list	M
33	Winch not meeting Tata Power Solar winch standard as stipulated in winch inspection check list	M
34	Housekeeping not meeting Tata Power Solar housekeeping standard as stipulated in housekeeping inspection check list	M
35	Portable ladder / platform not meeting Tata Power Solar portable ladder / platform standard as stipulated in portable ladder / platform inspection check list	M
Violation: Unsafe Acts		
36	Sleeping at Work Place	L
Violation: Traffic		
37	Driving beyond speed limit	M
38	Driving without license	H
39	Over taking above speed limit / at no overtaking area	H
40	Wrong Parking / Wrong Side Driving	L

27.8 General Guidelines:

- All the records of disciplinary actions shall be maintained in vendor file at HSE and HR & Admin Department.
- Financial penalties shall be charged to main contractors.
- For repeated violations, the next level of disciplinary actions shall be initiated.
- HR & Admin, Maintenance Department and Other respective departments shall provide a monthly report of disciplinary actions taken to HSE Department.
- It is incumbent upon every employee including contractor to report safety incidents in which they are involved or which come to their notice. Withholding, non-reporting or manipulation of safety incidents and related information / data is an offence which will be viewed seriously and strict disciplinary action will be taken for such an offence including termination of service / contract.
- All unsafe conditions identified through safety inspections are classified as "M" because it can be addressed proactively before an incident.
- The company reserves the right to take the circumstances of the rule breaking / violation into account to determine the disciplinary actions to be taken.

28. Tools, Tackles & Lifting Equipment's Inspection

28.1 Pre deployment Inspection:

- All lifting tools, tackles & lifting equipment should have certificate from competent person.
- All lifting tools & tackles should be inspected by Tata Power solar HSE representative at site.
- The observation shall be documented and ensures defective materials are not being issued.
- Inspection team records their findings in suitable checklists.

28.2 Periodic Inspection:

- The contractor shall maintain a database for all tools and tackles.
- From the compiled list HSE representative will prepare a schedule and arrange periodic inspection through Site engineer.
- The inspection team submits the observation and recommends corrective action.
- Defective tools and tackles are removed from service and the same gets updated in the stores document.
- HSEO shall prepare the report and shall escalate the matter in case of any non-compliance.

28.3 Inspection of Tools, tackles & Lifting equipment's by Competent Person:

- Contractor shall Organize Inspection of all tools, tackles & Lifting equipment's by competent person with frequency at least once in a year or as per the legal requirement.
- Contractor shall Intimate HSE and Site Engineer to witness Inspection of tools and tackles by the competent person.

30. Incident Investigation and Reporting Protocol

30.1 INCIDENT CLASSIFICATIONS & DEFINITIONS

Type of Incident	Description
Unsafe Act	Performance of a task or other activity that is conducted in a manner that may threaten the health and/or safety of workers. For example: Lack of or improper use of PPE. Failure to lockout tag out/. Operating equipment at unsafe speed etc..
Unsafe Condition	A condition in the work place that is likely to cause property damage or injury. For example: Defective tools, equipment, or supplies, Inadequate supports or guards, Inadequate warning systems, Poor housekeeping, etc..
Near Miss	Is an undesired event that, under slightly different circumstances, could have resulted in harm to people, damage to environment or property, or loss to process
First aid cases	A work-related injury or illness that undergone a onetime treatment by either medical professional or by any trained first aider and the injured person able to continue his work on that shift when incident occurred or the next day shift, without any working day lost.
Medical Aid cases	A work –related injury or illness, during which victim was referred to the external hospital for detailed investigation by the doctor or other licensed health care professional and after treatment is advised to resume his / her normal duties. Then it will be considered as a MEDICALLY TREATED injury and not a FIRST AID case and not a LOST TIME injury
Restricted work case Incidents	A work – related injury or illness, during which victim was given a first aid or medical aid treatment and returned back to office, but unable to do his/her routine job and restricted to some limited job is defined as Restricted work case incident
Lost time Incident (LTl)/ Recordable Lost time incident (As per IS 3786 & Indian Factories	A work related injury or illness that causes the injured person to be away from work for at least one normal shift after that on which the injury occurred, because he/ she is unfit to perform any duties. (Eg.) if Mr. X while working in A shift on 25.12.11 met with an accident at 10.30 AM, He might have treated by the company doctor or referred to external hospital, if he does not join his duty in the next scheduled shift on 26.12.11 (by end of shift) this is to be treated as a LOST TIME injury. Please note if the next day was a non-working day and Mr. X, in the opinion of the

act)	medical professional would not have been able to undertake his normal duties then even in this case, it is to be considered as a LOST TIME injury. If the victim is not able to report to his duty within 48 hours or more is referred as recordable lost time injury. It needs intimation to the Inspectorate of factories in Form 17.
Occupational Illness	An Occupational Illness is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion or direct contact. e.g. work related upper limb disorders and stress
Environmental Incident	An unplanned event in which air, water, or ground was impacted. This would include such events as leaks or spills of more than one gallon or pound of hazardous material outside of secondary containment and un-permitted discharges. It would also include events in which wastes were improperly disposed or any other unplanned environmental event requiring notification of regulatory authorities
Third party Transportation Incident	An unplanned incident involving road or third party travel such as rental cars, company leased vehicles, or movement of our goods to work sites or customers.
Product stewardship Incident	Any incident causing HSE concerns to the end users (Customers) because of our products is categorized as Product stewardship incident needs to be reported to HSE for detailed RCA, By the receiver of this type of complaint, normally customer support team.
Security Incident	Incident related to offence to person(assault, wounding, verbal abuse etc.,) or properties (theft, vehicle tampering, Property damage etc.,)

30.2 HSE INCIDENTS REPORTING PROTOCOL

Why do we need to report and investigate accidents, occupational illnesses, near misses, and unsafe acts? To establish the immediate and basic causes and to identify actions necessary to prevent a similar occurrence & to comply with statutory & HSE policy.

How do we report an incident? The injured person or witness should report an incident straight away, from the location where it occurred. All Near miss, First Aid, Recordable incidents should be reported to your line manager & HSE, who will record It and look for the root cause through investigation and to prevent such incidents in future as a proactive manner.

Note: If a particular person is not contactable it may be necessary to by-pass the hierarchy.

Type of Incident	Who informs Whom , How & When				Comments
	Responsibility	Inform	When	How	
Unsafe Act/ Condition	Individual	HOF, HSE	Within 24 hrs.	Safety observation	Employees are encouraged to proactively report such cases through SAP-EHS application
Near Miss	Individual	HOF, Head HSE →LT	Within 12 hrs.	Verbal/SMS /e-mail	High potential (HIPO) Near miss Incidents needs root cause analysis by HSE & Concerned team for corrective and preventive actions The report also needs circulation with HOF, LT and other concerned
First Aid/Medical Aid Cases	Victim or witnessing individual	HOF, Head HSE→LT	Within 4hrs	Verbal/SMS /e-mail	Requires Root Cause Analysis by HSE & Concerned team and the report should be circulated to HOF, LT & Other concerned
Lost time / Reportable cases	Individual→ HSE → LT	HOF→ Head	Immediate	Verbal/SMS /e-mail	FIR should be circulated to HOF/LT within 24 Hrs. & Needs Root Cause Analysis and the report to be circulated to HOF, LT & to be reported to Tata
Fatal Cases		HOF→ Head HSE → LT	Immediate	Verbal/SMS /e-mail	FIR should be circulated to HOF/LT and TATA group and the concerned statutory peoples within 24 hours. Needs Root cause analysis to be done and the report should be shared to LT & Tata Group.
Dangerous Occurrences	Individual→ Fire station Security→ Fire Station		Immediate	Verbal/SMS /e-mail	Immediate FIR should be circulated to HOF/LT and TATA group and the

such as., Fire, Explosives, Building collapse, etc., (As per the factories rules)	IND or HOF→ Head HSE → LT			concerned statutory peoples within 24 hours. Needs Root cause analysis to be done and the report should be shared to LT & Tata Group. Also notification to statutory bodies to be done in 24 Hrs.
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30.3 HSE INCIDENTS INVESTIGATIONS

When do we need to investigate an incident? Following an incident an investigation should be carried out for all serious or major incidents (injury or damage) and any minor incident or near-miss with a high potential of being a major one. This includes all fatalities, lost time cases, medical treatment cases and first aid injuries or illnesses. Less serious incidents should be investigated with a degree of rigor appropriate to the potential for loss or injury.

What is the purpose of the investigation? It is very unusual for an incident to have one single cause. Normally incidents result from a chain or combination of actions or errors, some going quite far back in time. This is why it is essential to have a systematic and thorough investigation, following a consistent methodology, so that the chain of causes can be tracked right back to its origins.

Who investigates? For Near miss, first aid, Medical aid HSE & Head of the department will decide the team members for doing the Root cause analysis. Specialist advice from outside the company may be required depending on the incident.

How do we investigate?

- 1) Establish investigation team or individual
- 2) Gather evidence and information from the scene and from the injured person and any witnesses
- 3) Establish a chain of related and unrelated events
- 4) Identify the critical factors. i.e. these are actions or events that had they not have happened the incident would not have occurred
- 5) Establish root causes (Immediate causes & Systemic causes)
- 6) Identify actions to avoid repeat and lessons for sharing

All the Investigations should propose the recommendations to prevent such incidents by identifying the immediate cause and the systemic causes. Respective Head of the department is responsible for taking the actions to close the recommendations given in the Investigation.