

SA-S-005-02 HSE Requirements for contractors

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1. Introduction

The purpose of this document is to present the following:

- Health, Safety, Environment (HSE) & Sustainability administrative requirements
- HSE & Sustainability project/ service requirements
- Specific safe practices and procedures
- Environment good practices and procedures
- Sustainability good practices and procedures

Contract requirements should comply with the Hitachi Energy HSE & Sustainability policy to:

- Ensure the protection of life, property, and the environment
- Foster project/ service efficiency

These requirements could vary with respect to project and service scope, nature, complexity, location, and other project/ or service aspects.

2. Overview

The HSE & Sustainability contract requirements and the contractor's HSE program/ plan must aim to:

- Eliminate personal injuries and damage to property
- Eliminate and reduce wildlife impact and damage to the environment
- Minimize the effects of incidents on both the individuals and on the project
- Comply with Hitachi Energy's HSE & Sustainability policy and procedures
- Comply with all Hitachi Energy requirements and local statutory requirements and standards
- Prevent fatalities and life-changing injury incidents
- Prevent lost time resulting from incidents
- Prevent environmental incidents
- Prevent penalties and third-party/ community complaints
- Lead to safe working practices

3. Applicability and Scope

These requirements, which may vary depending on the specific contractor work scope, apply to all contractors carrying out any work on any facility, location, or project site on behalf of Hitachi Energy. These requirements shall be submitted to contractors as an appendix to the call for tender, for construction/ service contracts for work within existing sites, facilities and /or new projects.

The contractor company will extend compliance with this procedure to its potential subcontractors, informing them of its content and demanding and monitoring the compliance.

This procedure has the character of a minimum framework specification, so it may be accompanied by other contractual documentation on HSE & Sustainability (instructions, procedures, etc.) that complements, develops, or refines more specific aspects of business coordination for certain jobs or terms.

Templates attached to this procedure, or those that develop any of its chapters, may be substituted by others with similar or more improved content.

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3.1. Health, Safety, Environment, Security & Sustainability

Hitachi Energy is committed to safe, secure, and healthy design and working conditions for the prevention of work-related injuries and illnesses in our operations and across the value chain including anyone working with our products, systems, and services.

As mission-critical infrastructure providers, HSE & Sustainability is at the forefront of everything we do, and the safety of our people and contractors is our license to operate.

As a learning and resilient organization, we promote an open reporting environment to understand the reasons of our successes and failures. Together with active measuring and monitoring of our progress toward our goals and objectives, we can learn and continuously improve our performance, operations, and management systems.

4. HSE & Sustainability Policy

Hitachi Energy supports and adopts the values of quality, health, safety, and the environment across the organization, covering all business units, with the aims of eliminating defective products and unsatisfactory services; protecting the health and safety of employees, contractors, customers, and the community at large; and contributing positively toward protecting the environment for sustainable development.

5. Contractors and subcontractors

Contractors and subcontractors are required to have their own HSE Management System which might be required to be reviewed and approved by Hitachi Energy, and they must follow Hitachi Energy's good practices and procedures as well as an HSE management system.

5.1. General contractor

The site general contractor is responsible for taking the initiative in incident prevention. This responsibility cannot be delegated to subcontractors, suppliers, or other persons.

The general contractor is responsible for all occupational health, safety, and environmental (HSE) matters, and needs to:

1. Provide a safety program with a management statement of policy in relation to the following:
 - The company's HSE policy, including detailed disciplinary action to be taken with respect to the workers and contractors violating HSE rules.
 - The company's awareness and knowledge of all local HSE codes applicable to its contract.
 - The company's control of equipment including, but not limited to, cranes, hoists, lifting devices, mobile work platforms, vehicles, and power tools (possession of current certificates).
 - Ensuring that a chemical inventory is maintained by the general contractor and all sub-contractors and that hazards associated with these chemicals are communicated to affected workers onsite.
 - Ensuring that all contractors communicate the hazards associated with their specific site operations to all potentially exposed contractors operating at the same site.
2. Ensure its personnel are fully trained, certified, appointed (if it is needed) and competent to carry out the tasks of operating all machinery, equipment, and tools. Certificate of competency will be provided where applicable and whenever requested by Hitachi Energy.
 - Contractors will provide an adequate level of technical and HSE related training conducted by a recognized training institution for all relevant personnel in connection with the work.
 - All contractor supervisory personnel will attend relevant HSE training including, but not limited to, HSE Policy, HSE procedures, hazard identification, environmental aspects and operational controls in place and risk

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assessment, monitoring and control. The general contractor will ensure that all contractor and subcontractor personnel engaged in the work are healthy and fit, and possess the experience and skill required to perform the work safely

3. Maintain an induction program for site workers, which includes a review of:
 - HSE & Sustainability policies,
 - HSE procedures,
 - Hazards present in their work assignment and the general area in which they work,
 - Preventive measures in place,
 - Environmental aspects and operational controls in place
 - Personal protective equipment to be worn.
 - Methods of reporting any unsafe conditions.
4. The general contractor must ensure subcontractor compliance with the HSE & Sustainability program and procedures.

5.2. Contractor's HSE supervisor

The general contractor's HSE supervisor is normally responsible for:

- Ensuring that a site health, safety, and environmental plan is in place.
- Making daily safety inspections of job sites and taking necessary immediate corrective action to eliminate unsafe acts and/or conditions. Recording observations on the appropriate forms and providing these inspection reports to Hitachi Energy.
- Reviewing incident reports and recommending corrective action(s).
- Providing appropriate material for use in conducting regular safety meetings.
- Attending safety meetings and evaluating effectiveness.
- Assisting in the preparation of the incident investigation and reporting procedures.
- Implementing training programs for supervisors and workers as they apply to their specific responsibilities.
- Encouraging programs for recognition of individual worker's safety efforts and their contribution toward improved work methods.
- Liaising with site supervision in providing the necessary safety equipment, including worker personal protective equipment (PPE).
- Arranging for necessary medical evaluations and training for using required PPE.
- Ensuring that spill control measures and necessary spill containment equipment is in place for all temporary fuel and chemical storage areas.
- Ensuring storm water and run off controls are in place.
- Ensuring arrangements are in place for the storage of chemical waste streams and their disposal.

6. General HSE Requirements

The health, safety, and welfare of Hitachi Energy's and contractors' employees are of prime importance to Hitachi Energy and, together with protecting the environment, are essential to its operations and undertakings.

The following rules and conditions have been prepared to ensure the safety of our employees, suppliers, and contractors' employees. Contractors must ensure that their employees are familiar with these rules and that they comply with them.

These rules do not exempt contractors from their statutory duties on HSE & Sustainability issues but are intended to

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assist them in attaining a high standard of compliance with those duties. In all facilities, locations and project sites, the following basic rules and personal code of conduct must be followed:

6.1. Basic rules

- Stop! Take 5 (last minute risk assessment).
- Think and check before you act.
- Follow the 10 Life Saving Rules.
- Follow the Health Saving Rules.
- Do not read documents or use your mobile phone while walking.
- Do not run.
- Go up and down the steps of the stairs one by one.
- Use the handrail on the stairs.
- Always wear the required working clothes and PPE for the activity to be performed.
- Always use proper tools and equipment. Check the status and ensure safety guards are in place before using them.
- Always keep your work area clean and orderly.
- Respect the rules and traffic signs.
- Do not use your mobile phone or view documents while driving.
- Pedestrians will walk on the side of the road, facing traffic, unless there are other defined pedestrian paths.
- Any accidental interruption of electrical lines or equipment in service or any irregularity observed must be reported immediately to the responsible manager.
- Protect the environment. Everyone is directly responsible for the environmental impact their work may cause.
- Do not wear music headphones while working outside of an office.

6.2. Personal code of conduct

- Having, consuming, arriving to the job under the influence of alcohol or illegal drugs, or bringing alcohol or illegal drugs onto site is strictly forbidden and subject to discharge from the site.
 - It is recognized that medical conditions and the use of prescribed medications are protected under privacy laws. To protect yourself and your fellow workers, inform your supervisor of the use of medicine prescribed by a medical practitioner that may cause drowsiness or lessen your ability to perform your job safely. This also applies to any non-prescriptive medication.
 - Any special medical needs or allergies need to be reported to site or HSE management to ensure Hitachi Energy can provide any required assistance.
- Smoking is absolutely prohibited in unauthorized areas.
- The manipulation or intervention of any equipment, machine or installation outside each company is prohibited.
 - Some electrical equipment can only be handled by authorized or qualified personnel.
- In no case can existing signs, posters and notices be modified, as well as cards or labels associated with equipment or machines, unless said modification is within the authorized work.
- Workers must strictly comply with regulations, signs, and warning labels.
- Loose-fitting clothing, chains, or other loose jewelry must not be worn around equipment that poses an entanglement hazard. Long hair should be tied back to keep it from potential entanglement.
- Identify (hang a sign) any machine that is being repaired.

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- Do not use damaged tools or equipment.
- See something, say something. Report all unsafe actions and conditions, to your supervisor immediately.
- If there is an injury, always notify your line manager.
- Do not use high-pressure air nozzles to clean clothes or your body.
- Do not use equipment, tools, or machines you are not authorized to operate.
- Take short breaks to stretch the muscles being used for the tasks.
- Correctly align your work.
- Do not lift more than 20 kg (44 lbs.). If necessary, ask someone for help.
- Supervisors must ensure workers are complying with the rules.

6.3. New on the job site

All workers will be provided with at least with the following information:

- Who is the Supervisor?
- Who is the contact for HSE?
- Who is the client's HSE contact?
- What are the special HSE requirements for this particular site?
- What are the emergencies instructions and contact for this particular site?
- How is the Safety Work organized?
- Who is the general contractor?

6.4. New worker HSE induction

Upon arrival at the job site an evaluation of the work area needs to be conducted to identify potential risks, evacuation routes and emergency procedures required by the customer. This is normally accomplished during the site environmental, health and safety induction.

The Site Manager, or designee, must provide workers with a site induction that includes a review of the site HSE plan. Additionally, a customer representative may provide workers with an HSE induction on their arrival. The induction needs to include HSE topics relevant to the site and the type of work to be performed. Following are suggested topics to be covered:

- Customer site HSE rules
- Hazard communication/reporting
- Confined space if applicable
- Emergency procedures (evacuation)
- Worker participation
- Fall protection, arrest, and rescue
- First Aid/CPR/AED
- Personal Protective Equipment
- Facility/Plant/Site requirements
- Incident, Near Miss and Injury reporting
- Permitting (lockout/ tagout, hot work, etc.)
- Fire protection measure
- HSE Meetings (Toolbox, Tailgate, etc.)
- HSE and Sustainability procedures

6.5. Life Saving Rules

6.5.1. I perform a Stop Take 5 before starting my work.



- 01 Always perform a Stop Take 5 hazard assessment before starting any work.
- 02 Ensure that a risk assessment is available for any high-risk activity.
- 03 Confirm that a work permit is delivered for any non-routine or high-risk activity.

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- 04 Conduct a job-specific risk assessment for any unplanned activity.
- 05 Ensure that the requirements of the work permit are effectively implemented and strictly adhered to.
- 06 Inform your team about all control measures during a pre-job briefing.
- 07 Include your contractors in your Stop Take 5 hazard assessment process.

6.5.2. I protect myself against a fall from heights.



- 01 Protect yourself against a fall from heights.
- 02 Apply the HAC principle: Harness, Anchor, Connector.
- 03 Use a full body harness only if you are trained and authorized to do so.
- 04 Use a full body harness only if it is tagged, inspected and compliant.
- 05 Always check your full body harness prior to use.
- 06 Use a certified and compliant anchor point.
- 07 Use a temporary lifeline only when set by a trained, competent, and authorized person.
- 08 Comply with the minimum anchor height (free fall) and promote a zero-fall factor.
- 09 Only use scaffolding set with a compliance tag.
- 10 Complete a daily check of scaffolding prior to use (toe board, mid-rail, upper-rail, and stability).
- 11 Protect the floor and ground openings with covers or fixed and rigid barriers.

6.5.3. I keep a safe distance from any suspended loads.



- 01 Keep a safe distance from any suspended loads.
- 02 Guide the load in compliance with a safe distance.
- 03 Position yourself so that you are not between the load and any fixed object.
- 04 Use the mobile lifting equipment on a flat and stable ground that can support the maximum load.
- 05 Use lifting accessories with a unique marking and a specified Maximum Working Load.
- 06 Check lifting equipment and accessories prior to each use.
- 07 Make sure that the lifting plan is validated and communicated before starting the activity.
- 08 Check that the load does not exceed the maximum load capacity of the equipment.
- 09 Check that all lifting crew members are trained and qualified, and that the lift leader is identified.
- 10 Use lifting devices and lifting equipment only when in good condition.

6.5.4. I apply the 7 steps for all electrical activities.



- 01 Evaluate the work. Do an on-site risk assessment or hazard analysis.
- 02 Ensure you clearly identify the work location and equipment.
- 03 Always disconnect electrical sources and secure against reconnection.
- 04 Verify the absence of operating voltage. Test before touching.
- 05 Ensure to carry out earthing and short circuiting.
- 06 Protect adjacent live parts and take special precautions when working close to the bare conductors.
- 07 Always complete the permit to work and “walk the permit”.

Reminder:

- Ensure that emergency equipment is available prior to starting the job.
- Always wear Arc Flash PPE according to the Arc Flash PPE Matrix.
- Ensure that a PICW is nominated for all electrical work activities.

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6.5.5. I apply 1 person, 1 lock, 1 key.

- 01 Apply 1 person, 1 lock, 1 key.
- 02 Ensure you are trained and authorized to perform Lockout/ Tagout (LOTO).
- 03 Verify that all energy sources are disconnected and isolated prior to commencing work.
- 04 Ensure a risk assessment is in place for all LOTO activity.
- 05 Verify that a Permit to Work is in place for all LOTO activity.
- 06 Follow the dedicated procedure to stop equipment.
- 07 Apply the LOTO device(s) to the energy-isolating point(s).
- 08 Always wear the required Arc Flash PPE as per the Arc Flash PPE Matrix.
- 09 Ensure you “walk the permit” to verify that all isolation points are locked and tagged.

6.5.6. I use machines with proper guards.

- 01 Only use machines fitted with proper guarding.
- 02 Only use machines if you are trained and authorized to do so.
- 03 Ensure the machine is equipped with emergency stop buttons.
- 04 Check that each safety device is in good working order before operating machines.
- 05 Only use machines with unaltered safety features in place.
- 06 06 Ensure interlocked guarding is operational
- 07 before using a machine.
- 08 Immediately remove non-compliant portable
- 09 equipment from service.
- 10 Notify your supervisor in case of non-compliance.

6.5.7. I make sure the air is safe prior to entry.

- 01 Ensure the air is safe prior to entering a confined space.
- 02 Ensure you use calibrated equipment to test confined space atmospheres.
- 03 Identify a trained and authorized person for each key role (watcher, rescuer, supervisor, and worker).
- 04 Check that the confined space entry rescue equipment and team are readily available and have current certificates.
- 05 Verify that a watcher/attendant is appointed and stationed outside the confined space.
- 06 Check that an appropriate means of communication is established between the watcher and the worker.
- 07 Obtain a Permit to Work before entering a confined space.
- 08 Only enter a confined space if you are trained and authorized.
- 09 Ensure that you have a certified gas detector before entering a confined space.
- 10 Ensure that each confined space is clearly identified with “Danger” and “Authorized personnel only” signage (or equivalent).

6.5.8. I fasten my seatbelt. I keep my hands on the wheel, never on a phone.

- 01 Always fasten your seatbelt.
- 02 Check that your passengers have fastened their seatbelts.
- 03 Keep both hands on the wheel, never on your phone.
- 04 Always comply with local traffic regulations.
- 05 Ensure that you keep a safe distance between cars while driving.

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- 06 Only drive a well-maintained vehicle and complete a visual inspection prior to use.
- 07 Never drive if you are tired, or under the influence of drugs, medication, or alcohol.
- 08 Always make direct eye contact with the driver before approaching a vehicle.
- 09 Ensure you hold a valid license to operate the vehicle.
- 10 Ensure pedestrian and vehicle routes are demarcated and barriers in place where possible.

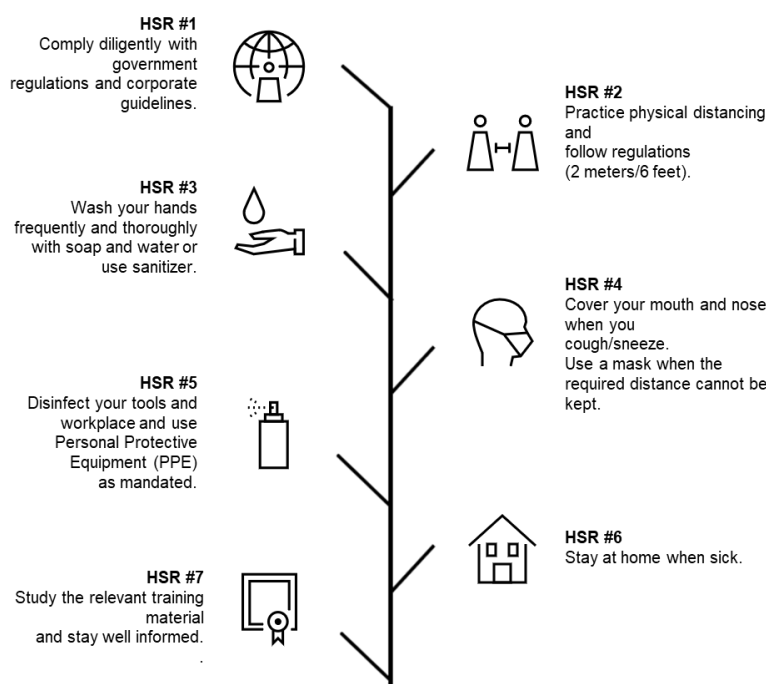
6.5.9. I am trained and certified to perform high-risk activities.



- 01 Be trained and certified to perform high-risk activities.
- 02 Verify that all workers who are required to perform a high-risk activity are trained, competent and authorized in writing.
- 03 Ensure that the training includes theoretical and practical parts and is adapted to your specific site and activity.
- 04 Complete a refresher course as required to maintain validity.

6.6. Health Saving Rules

Protect yourself and others from getting sick by following our Health Saving Rules (HSR).



6.7. HSE promotion

HSE promotion and awareness begins during the site worker induction process. Further promotion is achieved by:

- Continual improvement feedback
- Toolbox/ Tailgate meetings
- Memorandums and incident reports
- HSE notice board
- Activity-based risk assessments
- Recognition for excellent HSE performance

and must be implemented and monitored by contractors and subcontractors.

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7. HSE Requirements

7.1. Contractor Risk Assessment (RA)

Prior to performing work, contractors shall conduct a RA as a measure to eliminate or guard against hazards of a specified job and activity. In addition, contractors will incorporate those hazards identified and notified by Hitachi Energy into their risk assessment and come up with their additional protection measures if needed. Prior to commencing work, contractors must prepare and provide:

- Information regarding the tasks they will be performing
- Where this will be done (location)
- How these tasks will be carried out
- Hazards associated with the activities
- Control measures implemented to prevent or reduce harm
- How the works will be adequately supervised (including the number of supervisors being appointed)

Contractors shall identify health, security and environmental hazards as well and create an inventory at the workplace, assess the risk associated with exposure to these agents, decide on the control measures required (if any), and remove or reduce the risk to health to a level "As Low As Reasonably Practicable"

7.2. Toolbox/ Tailgate HSE meetings

Each worker will be required to attend daily toolbox/ tailgate HSE meetings. The meetings must be structured to allow worker participation. Discussions will center on the day's planned activities, related hazards which may be encountered and relative control measures. It is imperative that each person on the work crew be actively involved with the discussions to ensure full understanding of the tasks and related hazards. All workers must ensure full understanding of the work to be undertaken, related hazards and controls, and sign their attendance on a Toolbox/ Tailgate form.

In addition, there may be a weekly supervisors' HSE meeting and site wide HSE meetings for exchange of information. This informational exchange is required on multi-employer worksites.

7.3. Managing hazards

All contractors and employees are required to manage hazards.

Hazard reporting is a basic and proactive part of hazard management. Hazards are unsafe situations and/or unsafe conditions arising from the course of work. If not corrected, they have the potential to cause harm (injury, illness, and/or damage to material, property, or the environment). Hazards can be killers if not addressed.

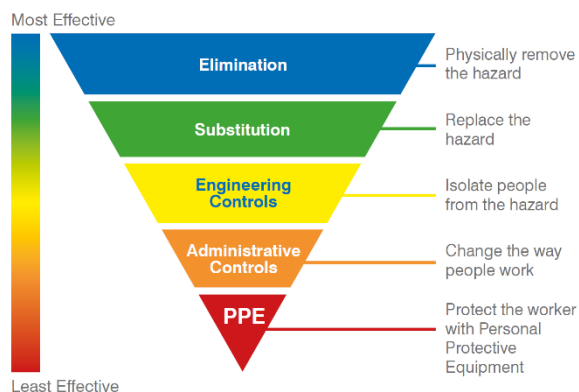
Managing hazards is essential. This is a continuous process, especially when there are changes in the workplace (work practices, types of machinery, effectiveness of previous controls, etc.).

Hazards can be identified in many ways, including:

- Direct observation
- Communication/ feedback
- Inspections/ audits
- Previous history/ safety records
- Incident investigation

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7.4. Control measures



Having identified the hazards and assessed the risks, the next step is to take appropriate measures to control them. The control measures are determined by using the following “Hierarchy of Control” which indicates the preferred means of eliminating or reducing the exposure to a hazard.

All contractors are required to manage hazards defining and implementing appropriate measures to control them.

7.5. Pre-start planning

Before the work can start, the conditions must be prepared to allow work to be carried out safely. Workers must be aware of the hazards and elements of risk as well as the relevant rules and regulations.

7.6. Permits to work

To achieve optimum safety for special work or within special areas, workers are required to obtain a permit to work, participate in related training, and have the correct safety measures and equipment in place. It is important that workers be familiar with HSE requirements and follow the rules and procedures which are applicable on the work site.

A work control permit system will be adhered to for the control of all applicable work activities at all Hitachi Energy, customer, project, and service sites. The use of a work control Lockout/ Tagout (LOTO) permit system for working in an area declared as energized or with equipment declared as energized is mandatory.

Tasks with higher levels of risk need to be analyzed more thoroughly and additional controls implemented to prevent any harm or damage. These include, but are not limited to, LOTO, hot work and confined spaces. There are several high-risk tasks, which present a significant and immediate risk to health and/or safety that require strict control. These are normally considered appropriate for:

- 1) Non-production work, e.g., maintenance, repair, inspection, testing, construction, cleaning, etc.
- 2) Non-routine operations, e.g., commissioning
- 3) Jobs where two or more persons or parties need to coordinate activities to safely complete their tasks
- 4) Jobs or tasks where there is a transfer of work and responsibilities from one party to another.

More specifically, permits to work are likely to be required in the following high-risk situations:

- 1) Hot work (except in workshops designed for the purpose), including work that may generate sparks or other sources of ignition where the risk of fire and explosion is high
- 2) Work involving the breaking of systems and equipment that contain flammable, toxic, or other dangerous substances and/or pressure systems
- 3) Work on electrical systems, which may give rise to electrical danger
- 4) Entry and work in confined spaces such as tanks, vessels, transformers, and other similar equipment
- 5) Certain high-risk mechanical lifting operations
- 6) Work in deep excavations
- 7) Exposure to atmospheres containing hazardous substances or use of hazardous substances including radioactive materials

- 8) Work in isolated locations where the point of operation is remote from the work location
- 9) Certain high-risk tasks involving work at height (e.g., working on a fragile roof or near the edge of a roof, using a Mobile Elevated Work Platforms (MEWP) in a field environment)
- 10) Work which could give rise to a significant pollution incident, such as loss of containment, fire, or emission to atmosphere
- 11) Fumigation operations using gases

No work should begin until the control measures have been applied and confirmed on the permit.

7.7. Stop Take 5 - Hitachi Energy's Last-minute risk assessment

A last-minute risk assessment familiarizes workers with the work area, improves job site situational awareness, creates a healthy sense of uneasiness, and leads workers to make informed decisions to control the identified risks according to the hierarchy.

7.8. Time Out for Safety

Respecting the human rights of all workers, Time Out for Safety empowers workers to pause work when they are instructed to perform tasks they consider to be unsafe or when a perceived unsafe condition, behavior, or hazard arises. If something on the job site becomes too unsafe or hazardous, workers, regardless of position, have an **obligation** to pause work until the risk is mitigated to a safe level.

The goal of Time Out for Safety is to encourage workers, contractors, visitors, etc. to speak up when they see a potentially at-risk situation unfolding without fear of retribution. **The ability of any worker to pause a job is not a right, it is a responsibility; lives may depend on it.** A worker who feels ownership of the safety process shifts from a reactive worker to a proactive business partner who shares decision rights to protect and sustain a workplace free of injury, illness, or other loss. The work process in question must not be carried out until the matter has been resolved and determined safe by all parties.

7.9. Chemical management requirements

Chemicals to be used or introduced by contractors shall be approved via the local or project-established new chemical request / approval process, prior to introduction and use.

Contractors must maintain a current risk assessment and Safety Data Sheet (SDS) for all chemicals used on site.

Contractors shall review the list of prohibited and restricted substances (SA-S-204-01) for applicability. The applicability review and presence of any prohibited and restricted substances shall be documented.

All containers used by contractors shall be properly labeled according to current dangerous goods or hazard communication legislation applicable to the respective location.

Chemicals, including compressed gases and flammable substances, shall be stored according to the SDS and local legislation. Secondary containment must be provided for liquid chemical storage.

Dispensing or transferring chemicals between containers shall be conducted according to the SDS.

A spill prevention, control and response plan shall exist according to local legislation (review section 8.2)

Any chemical spill or release shall be reported via the local or project-established incident reporting process. his reporting process shall be communicated to all involved in chemical handling prior to the start of work.

Contractors are responsible for removing all chemicals, including waste chemicals, from the location when no longer in use, unless otherwise agreed upon between the Company and the contractor.

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7.10. Fire hazard

All workers will be trained in fire prevention and emergency management processes during the site induction. Workers will take all suitable measures to prevent fires, including the disposal of paper, rags, garbage, and any other combustible materials. Keep escape routes free from materials, tools, cables, etc.

If Hot Work is performed with tools or equipment that generates open flame or sparks, special precautions are required:

- Perform a last-minute risk assessment.
- Complete and perform work under a "Hot Work Permit."
- Always have the correct fire extinguishing equipment available.
- A fire watch for 30 minutes after completion of the hot work.

7.11. Tools

All hand tools, power tools and similar equipment, whether furnished by the contractor or its employees, must be maintained in a safe condition. Supervisors and craft workers are responsible for the inspection and repair of tools under their control. The use of different tools requires a variety of PPE.

All machinery and tools must be inspected and tested at intervals not exceeding six (6) months, to ensure they are in satisfactory condition and capable of safely performing the functions for which they were designed and built.

7.11.1. Hand tools

- Insulated or non-conducting tools should be used when working near energized electrical circuits.
- Tool handles should be tightly fitted. Wooden handles should be carefully checked and tightened with wedges, if necessary, or replaced if split or splintered.
- All impact tools such as chisels, punches and wedges must be regularly dressed to eliminate mushrooming or flaring of the point of impact.

7.11.2. Power tools

Power tool accidents are caused by improper handling or poor maintenance. The following apply to all types of power tools.

- Only authorized personnel are permitted to operate or repair power tools.
- The maintenance of power tools must be systematic. All worn or damaged tools are to be promptly repaired or replaced. All tools must be cleaned, tested, and inspected regularly.
- Power tools are not to be used if safety equipment, such as shields, tool rests, hoods and guards has been removed or otherwise rendered inoperative.
- Employees using tools under conditions that expose them to hazards of flying objects or harmful dust will be provided with the required personal protective equipment.
- All electrically powered tools must be properly grounded.
- Gasoline-powered tools must not be used in unventilated areas. Gasoline is to be dispensed only in approved safety cans.
- Portable grinders are to be provided with hood type guards with side enclosures that cover the spindle and part of the wheel as per international standard/satisfaction of the supervisor and/or responsible team. All wheels will be inspected regularly for signs of fracture.
- Bench grinders must be equipped with deflector shields and side covers guards. Tool rests and tongue guards must have clearance from the wheel as per international standard.
- Hoses supplying pneumatic tools must have couplings, whip checks and/or tie wires, secured to prevent accidental disconnection.

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- Air-supply lines are to be protected from damage, inspected regularly, and maintained in good condition.
- Air sources supplying hoses with inside diameters exceeding 0.5 inch must be protected by excess flow valves to prevent whipping in the event of hose separation or failure.
- The pressure of compressed air used for cleaning purposes must be 30 PSI or less (this does not apply for cleaning forms, etc.).
- All hand-held power drills, tapes, fastener drivers, horizontal, vertical and angle grinders, disc sanders, belt sanders, reciprocating saws, saber saws and all other powered tools with similar operations must be equipped with a momentary contact on-off control switch/trigger.
- All personnel who operate pneumatic, electric, or gasoline-powered chain saws must be trained in the safe operation of chain saws. Documentation attesting to this training needs to be on file in the contractor's office and available upon request.
- All chain saws must have the following equipment at a minimum:
 - safety tip
 - hand guard/chain brake
 - spark arrester (gasoline only)
 - chine catcher
 - bumper spikes

7.11.3. Power-actuated tools

- Only those employees who have furnished evidence of having been trained in its use will be allowed to operate a power-actuated tool.
- Eye protection must be worn by all personnel using power-actuated tools.
- Tools must not be loaded until just prior to use. Loaded tools must not be left unattended.
- Tools must not be used in an explosive or flammable atmosphere.
- Cartridges (power sources) must be kept separated from all other material.
- Power-actuated tools must meet all applicable federal/ local code requirements.

7.12. Personal Protective Equipment

Personal protective equipment (PPE), as required by the work conditions, must be used, and used properly. The site induction is used as a forum to inform workers of the general PPE requirements. Additional PPE requirements will be identified through the type of activity, risk assessment, SDS, and site procedures. Different work sites and operations have different requirements for the use of personal protective equipment.

8. High-risk activities

8.1. Working at height

At locations where the height to the lower level is more than 1.22 m (4 ft.), the area must be secured with a handrail, a mid-rail, and a toe board. Access/ egress to all working places must be clear and free of obstruction.

When working on a floor or roof, all openings must be properly covered or secured with a railing. Should the railing need to be removed for access, a safety harness with a lifeline must be used. As soon as the job is completed, reinstall the railing immediately. When fall protection or rails are not feasible, spotters and warning barricades need to be placed six feet, or as required by legislation, from the roof edge. Where conflicting information on roof edge distances is found, the most stringent applies. The spotters serve as the primary means to warn workers when they

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get within the established distance of the roof's edge, the warning barricades as a secondary warning method. Spotters will not be assigned additional responsibilities.

When work is carried out at high elevations, the area must be secured and marked with "Overhead Work in Progress" signs. Remember to remove the sign when the work is completed!

When manhole covers, railing, deck plates, etc. are removed, the openings must be adequately covered, and the cover secured. The cover must be identified with "Open Hole" clearly indicated as a warning. When working in a trench, warning signs must be placed, and the area secured with barricade tape or plastic fencing a safe distance from the edge of the trench.

8.1.1. Ladders

Ladders may often be used to provide a means of access to another level above 2 m (~6.6 ft.). In such cases, the length of portable extension ladders must not exceed 15 m (~49 ft.), must be properly secured at the top to prevent any possible movement, and needs to extend at least 1 m (~3.3 feet) above the platform.

Every ladder must be inspected (documented) on a regular basis, e.g., quarterly to ensure that it is maintained in good condition and free from defects. It must also carry an identification mark and be of a heavy-duty standard. Ladders also need be checked prior to use.

8.1.2. Scaffolding

Scaffolds are to be erected by competent individuals with specific expertise in scaffold erection. This expertise must be verified by documentation validating training in scaffold erection. Once a scaffold is erected, no modifications will be allowed unless approved by the person who is competent in scaffold erection and/or design.

8.1.3. Stairs

Where individuals can fall more than 2 meters (6.5 ft.) from step edges or the edges of a stairway, a double guard-rail (i.e., one fixed at a height of between 910 mm and 1.15 meters (36 – 45 inches) and another fixed halfway between the upper guard-rail and the stairs) need to be provided.

Where individuals cannot fall more than 2 meters, one edge of the stairway needs to be provided with a scaffold handhold at a height of between 910 mm and 1.15 meters.

8.2. Mechanical Lifting

Any worker using cranes, hoists or boom trucks must be trained and certified to use the equipment. The operator must have a current medical evaluation of their vision, color acuity, heart, and hearing. They must also be current regarding their annual drug screen. If involved in rigging operations, they must have completed a course in rigging, lifting, and signaling. Training and certification of riggers can be achieved by an experienced onsite rigger or certified crane operator.

Contractors are required to ensure that, at a minimum, the following are in place before conducting any lifting operations:

- Specific Lifting Plan.
- Lifting devices, hoists and lifting gear are certified and fit for purpose
- Lifting operations are planned and controlled so that a safe system of work is provided and maintained, and the most suitable lifting device, gear and equipment are selected.
- Assessments of each lifting operation are made prior to starting
- The weight and center of gravity of the load to be lifted are determined
- Access for both the lifting equipment and the load to be lifted are considered at the planning stage

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- The ground conditions both in relation to access and the load that will be imposed during the erection and operation of the crane can withstand the pressure
- Inspections, tests, and examinations of cranes, lifting devices, lifting gear are undertaken by an approved third-party inspection authority; no cranes will work without having current records of tests and examinations
- The automatic safe load indicator must be tested and examined before the crane is placed into service after erection, or alteration which might affect the operation of the indicator
- All hoists, wire ropes, chains and lifting gear must be tested and examined before first use
- For mobile cranes, the setting up of outriggers is checked and the ground upon which the outriggers are to sit has sufficient good material beneath it to give an acceptable ground bearing pressure
- No lifting appliance is left unattended with a suspended load
- All cranes are marked clearly with their maximum safe working loads
- Except for testing purposes, lifting devices are not used for loads greater than their specified safe working load
- All lifting gear is color coded; any lifting gear that does not carry the agreed safety color code must not be used
- Defective lifting equipment must be tagged out and removed from the work site

8.3. Electrical requirements

This document is to establish the minimum requirements for the management of electrical safety risks to be met on all Hitachi Energy controlled and customer sites to prevent or minimize exposure to electrical risk arising out of the installation, testing, commissioning, operation, servicing and maintenance of electrical systems and equipment.

8.3.1. Planning and preparation of electrical works

- 'Live' working on electrical systems and equipment is to be avoided wherever possible and is therefore only allowed under exceptional circumstances like testing, commissioning, and troubleshooting activities.
- A detailed risk assessment for all electrical work activity such as installations, testing and commissioning of new systems or servicing and maintenance, must be undertaken and documented in advance of the work being executed. Risk assessment must be complemented with a Stop! Take 5 point of work risk assessment.
- All personnel required to work on or near electrical installations, must be specifically instructed, trained, and individually authorized as competent to carry out the electrical work activity. Qualifications, training, and experience regarding products, activities, duties, and responsibilities must be confirmed.
- Training needs to include Hitachi Energy's electrical safety requirements as embodied within the 7 steps framework, including requirements for arc-rated protective workwear and personal protective equipment (PPE) designed to minimize harm from arc flash and electric shock.
- First aid, CPR and defibrillator training are required to all worker exposed to electrical risks.
- In the case that a contractor is appointed to carry out an electrical work on behalf Hitachi Energy without expected direct site supervision of Hitachi Energy, the contractor must appoint a competent Person in Charge of Work (PICW) to oversight and supervise the works. The contractor must ensure that all Hitachi Energy standards are applied.
- All isolations involving switching activities of an energized system, must be preferably undertaken by the customer or if not possible by an Authorized Person who has completed a comprehensive training course for safe switching.
- Any person that is exposed to equipment energized or partially isolated must wear a minimum of 8 cal/cm² arc-rated long-sleeve shirt and trousers or coveralls. Adequate higher level of protection should be considered based on the arc flash risk assessment or the Electrical Safety Matrix.

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Hitachi Energy Electrical Safety Matrix							
Specifications		A	B	C	D	E	F
Voltage: valid for AC and DC		<30V and	>30 ... ≤480V and	>30V ... ≤480V or	>480V...≤1000V or	>1 kV ... ≤7 kV or	>7 kV ≤ 40 kV
Upstream overcurrent breaker (device)		≤16 A and	≤16 A and	>16 A ... ≤63 A or	>63 A ... ≤200 A or	>200 A or	N/A
Short circuit current		Isc ≤ 1 kA	Isc ≤1 kA	Isc >1 kA ... ≤7 kA	Isc >7 kA ... <15 kA	Isc ≥15 kA	N/A
Energy Storage (eg. Capacitors W= 1/2 *C*U²)			or ≤ 10 kJ	or >10 kJ	or ≤ 150 kJ	or ≤ 300 kJ	or ≤ 300 kJ
Properties of the protective garments Worn as NFPA 70E IEC 61482-1-2 EST1 RL 407		Hitachi Energy's Minimum arc-flash workwear: ATPV 28cal/cm² Class 1 (IEC)	One Layer ATPV 28cal/cm² Class 1 (IEC) Category 2 (NFPA 70E)	One Layer ATPV 28cal/cm² Class 1 (IEC) Category 2 (NFPA 70E)	Multilayer ATPV 28cal/cm² and ATPV 28cal/cm² or ATPV 25cal/cm² Jacket and Trousers	Multilayer mandatory ATPV 28cal/cm² and ATPV 25cal/cm²	Multilayer mandatory ATPV 28cal/cm² and ATPV 240cal/cm²
Task	ACTIVITIES				NOTE: A helmet, visor, and neck protector of the same calorie rating can be worn in lieu of the flash hood.	NOTE: A helmet, visor, and neck protector of the same calorie rating can be worn in lieu of the flash hood.	NOTE: A helmet, visor, and neck protector of the same calorie rating can be worn in lieu of the flash hood.
LIVE WORKING	Connecting, installing, assembling & dismantling, maintaining, greasing, covering & cleaning		These works may not be executed unless they are technically necessary and justified. When required, additional training and level of competence, a specific operating instruction and special equipment are necessary. Live work needs pre-approval and authorization by the Manager of the Organisation or LBU.				
UNDERTAKING PROCEDURES TO ACHIEVE SAFE WORKING	<ul style="list-style-type: none">Switch off switchgear/distributionIdentify equipment to be worked on;test circuits are deadisolate and lock off & tagapply earthing and short circuiting.protect against other live partsswitch on switchgear /distributionRemoving or inserting fuse cartridges which are not protected against direct contact.Diagnostic measurementsExamination works	***Outerwear: Long-Sleeved Shirt; [ATPV (Arc Thermal Protective Value) rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] ***Outerwear: Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] PPE: Safety Glasses when required, Arc-Rated or Leather Gloves where required, and Work Boots (EH Rated where applicable)	Outerwear: Long-Sleeved Shirt; [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Outerwear: Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] PPE: Safety Glasses, [Voltage- Rated Helmet and Visor minimum (8cal/cm²) and Balacava or Neck Protector: ARC/FR minimum where required], Electrical Gloves Class 00 = 500V and Leather Over-gloves, Work Boots (EH Rated where applicable)	Outerwear: Long-Sleeved Shirt or Jacket: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Outerwear: Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Balacava or Neck Protector: ATPV rating of 28cal/cm² PPE: Safety Glasses, Voltage- Rated Helmet and Visor minimum ATPV 8cal/cm², Ear Defenders, ARC Visor minimum (8cal/cm²), Electrical Gloves Class 00 = 500V and Leather Over-gloves, Work Boots (EH Rated where applicable)	Underwear: Long-Sleeved Shirt: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Outerwear [Coverall or jacket and trousers]: ATPV rating of 28cal/cm² [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Neck Protector or Flash Hood: ATPV rating of 25cal/cm²	Underwear Long-Sleeved Shirt: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Outerwear: [Coverall or jacket and trousers: ATPV rating of 225cal/cm²] [PPE Category 3 (NFPA 70E) or Class 2 (IEC)] Neck Protector or Flash Hood: ATPV rating of 240cal/cm²	Underwear Long-Sleeved Shirt: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Trousers: [ATPV rating of 28cal/cm²] [PPE Category 2 (NFPA 70E) or Class 1 (IEC)] Outerwear: [Switching Suit: ATPV rating of 240cal/cm²] [PPE Category 4 (NFPA 70E)] or [Class 2 (IEC)] Neck Protector or Flash Hood: ATPV rating of 240cal/cm² PPE: Safety Glasses, (Voltage-Rated Helmet and Visor ATPV 240cal/cm²) or (Above Flash Hood ATPV 240cal/cm²), Ear Defenders, and Arc-rated Gloves ATPV 240cal/cm², Work Boots (EH Rated where applicable)
*WORKING IN VICINITY OF EXPOSED LIVE PARTS	e.g. Work on equipment where other uninsulated parts are "LIVE" in the working area						
WORKING IN **DEAD CONDITION OR WITHOUT ARC FLASH HAZARD	e.g. work on equipment where there is no electrical risk, where the electrical supply has been physically isolated and where there will be no intervention on the electrical installation	Outerwear - Hitachi Energy's Minimum Standard: Long-Sleeved Shirt and Trousers or Coveralls: ATPV rating of 28cal/cm² (PPE Category 2 NFPA 70E) or (Class 1 (IEC)) NOTE: Where no arc flash hazard exists as determined by risk assessment and approved by PICW, then the minimum arc-flash PPE is NOT required.					

8.3.2. Equipment

- Electrical measurement devices must be rated category III or higher according with IEC 61010-1
- Temporary electrical supplies must be of robust quality to withstand site conditions. Industrial plugs and shocks must be used in construction or industrial environment.
- Ensure that there are no bare conductors/wires visible in any flexible leads or connectors.
- Plugs and sockets are in good condition.
- There are no taped joints in any cables and leads.
- No visible burn marks on any equipment.
- All equipment is checked on a regular basis by a competent electrician and a record kept.
- Tools and equipment should be tagged to indicate that they have been checked.
- Temporary leads/cords etc. are secured to prevent damage from vehicles.
- All portable, handled electrical tools and equipment must be connected to a residual current device (RCD), ground fault circuit interrupter (GFCI), or earth leakage circuit breaker (ELCB).
- Portable electric tools and equipment must be checked that it is in good condition and fit for its purpose.
- Protection devices installed for safety reasons as RCD, GFCI and ELCB must be periodically inspected.

8.3.3. Operational controls - 7 Steps application

All apparatus must be treated as being energized unless made safe following the 7 steps.

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All work on or near power systems are to be under the control of a Nominated Person who is responsible for electrical safety. This must be a trained and authorized Person in Charge of Work (PICW). Before starting work, the PICW will deliver a safety brief to all persons under his responsibility in respect of safety requirements for the work activity. The PICW must remain at the site while work is being done.

No work on energized conductors will be carried out directly. In certain special cases work on energized conductors may be carried out but only after rigorous risk assessment has been prescribed and is duly demonstrated that disconnection is not feasible.

Work near apparatus that is energized must only be carried out after effective identification, protection from contact with energized parts and the relevant safety documentation has been completed in accordance with the steps below.

All work on electrical conductors must be carried out with the conductors deenergized and free from electrical danger and any such work will only be permitted once Hitachi Energy Seven Steps has been applied:

Step 1 – On-site risk assessment and hazards analysis

- Review testing or working procedures to follow
- Engage the person responsible for the electrical installation to review single line diagrams, schematics, and switching plan and when applicable obtain permission to work on the electrical installation.
- Identify exposure to electric shock and/or arc flash events
- Apply hierarchy of controls, eliminating the hazards as best practice and implementing PPE as last barrier
- Determine the minimum electrical clearances and distances

Step 2- Identify the work location and equipment

- Get the single line diagram, layout, and drawings to identify the equipment, how it is connected to the rest of the system and identify the suitable points of disconnection and grounding
- If test is carried out without any interlocking system to avoid contact with live parts, safety perimeter must be in place according to voltage, type of test, and equipment
- An initial risk assessment must consider the condition of any energized equipment, and danger from ancillary systems such as fire protection.
- Processes must ensure continuous and clear identification of both safe and dangerous areas throughout the course of work. There needs to be a written procedure or work instruction to ensure safe access to cells in switchgear where some parts remain energized.

Step 3 – Disconnect electrical sources and secure against reconnection

- Ensure the equipment is effectively disconnected from the main power source. If switching is performed prior to arrival, the Person in Charge of Work must walk down the isolation points with the person responsible for the electrical installation.
- Upstream and downstream disconnectors are Locked out and Tagged (LOTO) out by all persons involved in the electrical operations
- Feed applied by test equipment must be under control of the person in charge of work
- In case manual operation switch are required, ensure competency and availability of protective equipment is in place.

Step 4 – Verify the absence of operating voltage. Test before touching.

- Voltage indicators in testing equipment can only be used as reference.
- Use appropriate voltage detectors in compliance with EN61243 or equivalent standard to verify equipment is dead. Check each phase, ground, and earth conductors. Multimeters or proximity detectors are not permitted to verify the absence of voltage.

Step 5 – Carry out earthing and short circuiting

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- Ensure upstream and downstream connections are grounded.
- After each test, automatic or manual discharge must be carried out to eliminate any residual or induced voltage in the equipment under test. Always discharge each phase and ground conductors or bushings.

Step 6 – Protect adjacent live parts

- Identify the equipment and safe distances from live parts.
- If local measurement is required, ensure protective equipment is worn before contact any live element

Step 7 – Complete the permit to work and “walk the permit”

- Capture all information regarding scope, equipment, disconnection devices, earthing applied, protections implemented and include them in a permit to work form. Attach all documents necessary to identify all the barriers in place. Single line diagram and layout as a minimum.
- Issue a permit to test to elaborate the specific risks raised by the nature of the electrical test and highlight the countermeasures to implement.
- Brief all working party members about the details of scope, risks, and safety measures to implement recorded in the permit to work.
- Double check the content of the permit throughout “walking the permit”. Engage the facility representative and the working party members.

8.4. Hot work

8.4.1. General

“Hot Work” is any work activity, which can generate sufficient heat to ignite flammable or combustible materials in the work area. Such work includes but is not limited to welding, burning, grinding, soldering, etc. Personnel who carry out hot work must have received appropriate training and have the necessary permits in place prior to beginning the work.

8.4.2. Hazardous area

Hot work is not to be carried out unless a hot work permit is authorized and a Stop! Take 5 for the task has been prepared. In any area having the potential for chemicals in a liquid, solid or gaseous state, an assessment must be made with a five-gas monitor to determine if the area is safe for the scheduled work activities.

Before hot work in a hazardous area is performed, the contractor and person(s) performing the hot work must:

- Complete a hot work permit.
- Provide suitable locations for equipment, including emergency firefighting equipment.
- Consider any possible changes in circumstances during the hot work, which may render the area unsafe.
- Fire blankets will be used to protect materials that could combust due to sparks and flash shields used to protect personnel from flash.
- Conduct testing of the atmosphere with a five-gas monitor when hot work is performed in an area where combustible or flammable materials are present.
- Ensure that when hot work is performed, welders will not work alone and will be provided with assistance as considered necessary. One of the duties performed by the assistant must be as fire watcher.
- Provide appropriate fire extinguishers and place them in the immediate vicinity of the hot work.
- Ensure that on completion of the hot work the permit has been signed off by the issuing and authorized person, and that fire watch is maintained for at least 30 minutes.
- Ensure that no flammable material is within the surrounding 11 meters (33 ft) from the place the hot work is conducted.

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8.4.3. Welding and cutting

Welding and cutting can cause a fire or an explosion and can cause the accumulation or release of toxic air pollutants, gas, and dust. Exhaust ventilation is required when welding on stainless steel. In confined spaces, exhaust and supply ventilation is required and respiratory protection may be necessary. Contact your Hitachi Energy health and safety or industrial hygiene professional.

Welding also generates strong light, known as flash, which may cause eye damage. Place appropriate screening for people not involved in the work that is being conducted.

8.5. Working in confined spaces

Occupational exposure to hazardous chemicals can occur during work in containers, boilers, silos, wells, pipelines, and other confined spaces with insufficient ventilation.

Prior to working in confined spaces, the confined space must be tested to ensure that a safe level of oxygen is present and that the confined space is free of hazardous or toxic contaminants and a permit must be issued.

Various hazards must be assessed such as:

- Gas dangers
- Flammables and explosives
- Oxygen deficiency
- Toxic chemicals present
- Inert gases present such as nitrogen
- Engulfment hazards
- Hazardous energies
- Electrical hazards
- Mechanical Hazards

Special considerations for emergency must be in place. Suitable means of communication and a standby person shall be appointed to trigger emergency response team in case necessary.

If you must carry out work in a tank or room, which contained flammable liquids or gasses, obtain a hazardous work permit or a confined space entry permit. Typically, the permit will have to be approved by site HSE staff and/or the customer HSE staff. In the absence of an HSE professional, the Site Manager will approve all permits. All elements of the permit must be followed, and the entry supervisor must sign the permit.

8.6. Movement on site – rider operated lift trucks (ROLT)

Only workers who are competent and certified are permitted to operate ROLTS (forklifts).

When moving a load, ROLTs need to be operated with the forks or the pallet approximately 100mm (4 inches) above the ground. On down-grades a loaded truck must proceed in reverse and on upward grades with the load facing forward.

When it is necessary for slings to be used for moving equipment or material, a sling stop must be attached to the fork to avoid the sling from slipping off the forks.

ROLT attachments must be designed specifically for the ROLT that it will be used on and comply with the applicable local standards. The use of project built lifting attachments is prohibited. Use of equipment not designed for the specific ROLT can result in a failure of the equipment with potential for injury or damage to equipment.

Seatbelts are to be worn always to restrain the operator in the event of a rollover.

Additional riders are not permitted in the cab of the ROLT and riding or working from forks is strictly forbidden.

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8.7. Excavations, Trenching and Shoring

The determination of the angle of slope and design of the supporting system must be based on careful consideration of the following:

- Depth of the cut
- Anticipated changes in the soil from air, sun, and water
- Ground movement caused by vehicle vibration or blasting and earth pressures.

Positive barriers or covers need to be provided when a trench is placed adjacent to any roadway.

8.8. Blasting and Spray Painting

Blasting is performed by using special grit in an air stream and directing the stream against a surface to be prepared by removing existing coatings, corrosion, and scale.

Spray painting uses materials, often containing volatile solvents, pumped at high pressures to apply coatings to surfaces prepared by blasting or by other means such as washing or wire brushing.

The following hazards are associated with blasting and spray painting:

- Injury from the blasting and painting processes
- Injury resulting from blasting holes in live pipelines
- Health risks from exposure to harmful substances
- Environmental pollution from grit and paint spillage
- Flammable atmospheres from spray painting processes
- Ignition sources from discharged static electricity

All painting materials, including paint, solvents, thinners, additives, and cleaners must be stored in a non-enclosed area remote from sources of heat and combustion, and protected from direct sunlight.

In areas where major painting projects are undertaken, materials storage should be stored in a dedicated paint storage container fitted with explosion proof air conditioning and light fittings, and a fire extinguishing system.

Portable fire extinguishers must be kept in the immediate vicinity of paint containers and areas where significant amounts of painting materials are stored.

Entry to paint storage areas should only be done in accordance with entry procedures, and a notice of this requirement displayed at the entrances.

All materials must be contained in manufacturers' original containers, durably and legibly marked with descriptions of the contents. This includes:

- Specification number
- Color reference number
- Method of application for which it is intended
- Batch number
- Date of manufacture
- Manufacturer's name
- Initials or recognized trademark
- Any specific storage instructions

SDS must be available for all paint materials.

Materials must be stored in accordance with manufacturers' special instructions or procedures and any stipulations set out in SDS. Incompatible volatile substances must be segregated.

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Unidentified painting materials must not be accepted or kept in store.

The action of spray painting produces airborne paint particles in the form of a mist which can cause irritation to the eyes, nose, throat, and lungs and may possibly lead to more severe health problems.

In addition to basic personal protective equipment requirements, protection should be given using air-supplied helmets with a constant supply of breathing quality air. The addition of an air cooler to maintain the air supply within an acceptable temperature range is strongly recommended. Also recommended is the use of visor outer surface 'tear-offs' in acetate or similar material to enable operators to maintain full visibility.

8.9. Extreme Weather Conditions

There is little that can be done to control ambient air temperatures, but there are several measures that can be taken to minimize their effect. There may be situations where engineering control may be impossible or impractical and where the exposure time can vary with tasks and unforeseen critical events.

High Heat

Working where temperatures are often very high with high humidity, particularly during the summer months, places these individuals at risk. Hitachi Energy operates in a diverse range of environments, which may also have a significant impact on the overall potential for workers to become affected by heat illnesses.

Workers at greater risk of heat stress include those who are 65 years of age or older, overweight, have heart disease and/or high blood pressure, or take medications that may have adverse effects in extreme heat.

The following steps need to be taken to protect workers from heat stress:

- Schedule maintenance and repair jobs in hot areas for cooler months
- Schedule hot jobs for the cooler part of the day
- Acclimatize workers by exposing them for progressively longer periods to hot work environments.
- Reduce the physical demands of workers
- Use relief workers or assign extra workers for physically demanding jobs.
- Ensure cool water or liquids is provided to workers
- Remind workers to avoid drinks with caffeine, alcohol, or large amounts of sugar.
- Provide frequent rest periods with water breaks.
- Provide cool areas for use during break periods
- Monitor workers who are at risk of heat stress

Cold Conditions

The following steps should be taken to protect employees in cold environments:

- Regularly used walkways and travel ways need to be salted or cleared of snow and ice as soon as possible.
- Workers will be informed of the dangers associated with working around unstable snow and ice build-ups.
- When dangerous overhead build-ups of snow or ice are present, barricades will be used to prevent workers from walking or driving into potential fall zones.
- Ensure appropriate protective clothing is worn, such as, wearing layers, a hardhat liner, or head band, insulated boots, face and eye protection.

8.10. Asbestos

- Contractors must not expose anyone to airborne concentrations of asbestos greater than applicable local safety standards.

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- Anyone working with asbestos must be currently certified and licensed and will comply with all requirements applicable to asbestos according to local requirements.

8.11. Radioactive Material

In the use, handling, or possession of radioactive material, contractors must abide by regulations governing the use of the radioactive material.

8.12. Pressure testing

Secure the immediate area where pressure testing takes place with the use of guards and signs where necessary.

8.13. Temporary installations and tools

Only skilled and competent personnel/ craftsmen may perform temporary installations or repair electrical tools.

9. Protection of the environment

9.1. General information

- Hitachi Energy expects contractors to work within the aims and spirit of our company HSE & Sustainability policy and minimize any potential negative impacts to the environment.
- The contractor's Risk Assessment should include all potential environmental risks posed by the contractor's work, including any substances (chemicals, fuels, gases etc.) that will be used or brought onto a Hitachi Energy site.
- Compliance with environmental protection legislation requires that we have control over what types of pollutants are discharged and that proper mitigation efforts for spills are implemented. Each site operates a system to collect ideas for environmental improvements. We encourage all contractors to engage with this, and if you see any environmental risks or have any ideas for environmental improvements on the site, please submit your ideas to us in the appropriate way.
- Protection of vegetation, geological and historical sites, as well as animal life, often has specific requirements. Everyone involved in the construction phase shall take every reasonable effort to protect our environment and natural resources.
- Each site operates a system to collect ideas for environmental improvements. We would encourage all contractors to engage with this, and if you see any environmental risks or have any ideas for environmental improvements on the site you are attending, then please submit your ideas to us in the appropriate way.

9.2. Leak and Spill control

- If chemicals are used onsite, provisions and supplies must be in place that addresses spill response.
- Manufacturing facilities and construction sites have very specific requirements regarding storm water control and spill contingency planning. Any temporary storage tank must be a double lined tank equipped with interstitial monitoring.
- Measures should be in place to prevent any leaks or spills of any hazardous substance, or any substance that can potentially have a negative impact on the environment. Examples include:
 - Powders, such as caustic soda
 - Liquids such as oils, fuels, or chemicals
 - Gases, such as SF6 and ammonia
- Soil, air, and water must not be polluted. If there is a leak or spill of any of these substances, the contractor should act quickly to contain the leak/ spill following their own spill/ leak procedures and Hitachi Energy

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guidance, and then report the incident immediately to a member of Hitachi Energy staff who can then assist in recovery and disposal.

9.3. Waste

Industrial and construction activities create much refuse. Whenever possible, adequate measures must be implemented to help reduce waste volume. Packaging material should, where possible, be returned with the transport company. Special waste must be segregated, always be collected, and delivered to an approved recycling center.

Do not dispose of oil or oily material as universal waste. Oils must be recycled, and oil contaminated materials handled as chemically contaminated material. If oil is contaminated with PCBs, it must be disposed of at facilities having regulatory approval to handle such material.

The contractor HSE risk assessment should include waste management and waste flows generated on site.

Major types of waste & valuables (waste that can be used for a valuable purpose) shall be sorted into relevant fractions and taken care of accordingly. Reuse and recycling are strongly encouraged above direct disposal of waste (e.g., incineration and landfilling).

Opportunities to reduce waste and optimize resource use shall be analyzed and communicated to site manager for potential improvement actions.

Transport of waste within the site shall be carried out only by trained personnel. Only licensed waste carriers shall be used to remove waste from site.

Any waste removal from site by 3rd parties should be coordinated with the site team to ensure they are approved to enter and leave site.

9.4. Water

- Monitor water use, avoid wasteful water use and track any leakages. If using, or working on, the site's own water supply then please raise any water leak incidents to the site team as soon as possible.
- The HSE risk assessment includes water management, considering:
 - Water quality risk
 - Water damage risk
- Water discharge is complying with the local regulations or permit requirements on site.
- Chemical's storage is safely isolated to prevent water pollution in the project area.

9.5. Energy

- Contractors should closely manage their energy use and aim to be as energy efficient as possible ideally by minimizing or, where possible, eliminating the use of energy in their work.
- Contractors who require a power supply for any of their equipment should liaise with Hitachi Energy and agree on the source of that power to minimize the GHG emissions that would be generated.
 - For example, if the contractor would normally bring a diesel generator onto the site to generate the electricity needed for their equipment, we should make every effort to provide a power supply from the site instead. As the electricity supply on all Hitachi Energy sites is fossil-free, this will ensure emissions are minimized from the contracted work.

9.6. Noise pollution

Noise pollution from the construction site cannot create undue nuisance for neighbors. Noisy construction and use of construction equipment must be carried out during fixed periods, where possible avoid night work.

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10. HSE inspection and audits

Prior to commencement of work, contractors are required to inspect the work site and equipment to ensure that work can be performed safely. In addition, contractors shall perform HSE inspection/audits throughout the work and shall promptly implement all recommendations made pursuant to the said inspection/audit.

Hitachi Energy shall have the right to conduct its own HSE inspection/audit at the work site and contractors shall comply with all recommendations arising from such inspection/audit

Contractors shall conduct HSE inspections and audits to ensure that preventive and mitigation measures defined in the risk assessments and HSE Plans are in place and implemented. Contractors shall promptly take actions on all recommendations made pursuant to the said inspections and audits.

Prior start of work, all equipment, tools, PPE, and machinery related to the work are inspected and fit for the work. HSE inspections throughout the work are to be maintained and performed continuously by the contractors. All recommendations made by the inspectors are promptly implemented without delay. Hitachi Energy has right to conduct its own HSE inspection and/or audits at site and the contractors shall comply with all the recommendations made.

11. Hazards and incidents Reporting

11.1. Responsibilities

All site personnel are required to report every incident involving personal injury, material, and equipment damage, near miss, and dangerous occurrence to their immediate supervisor directly following the incident.

The incident must also be reported promptly to the customer and to the local Hitachi Energy contact (Site Manager, HSE, Human Resources)

It is the responsibility of the site/ project management team and the affected worker(s) to fully investigate the incident within established guidelines. The site/ project management team will ensure the necessary corrective actions are assigned and implemented and the incident is discussed at the toolbox/ tailgate meeting(s) and/or distributed as a Lessons Learned for more serious events. The incident investigation must identify all direct, indirect and root causes with recommendations to address them.

11.2. Incident reporting and Investigation

Contractors shall report to Hitachi Energy contact immediately of the occurrence of any incident or accident including near misses while engaging with Hitachi Energy assets or properties as per our incident reporting requirements. Contractors shall also alert relevant authorities in relation to the incident whenever necessary.

All incidents that result in or have the potential to cause serious injury or property damage shall be reported to Hitachi Energy and contractors shall provide full cooperation and support to any investigation initiated by Hitachi Energy.

Contractors shall maintain accurate incident and injury records and shall comply with Hitachi Energy's requests for information relating to accidents, injury, or illnesses and/or near misses.

Contractors shall promptly provide notification to Hitachi Energy of any incidents that occur at the work site providing enough detailed information, which allow Hitachi Energy's members understand the root cause of the incidents to prevent same incidents in the future.

All incidents (workplace accidents, near accidents, unsafe conditions and activities, property damage, environmental damage, security etc.) shall be promptly reported to the contracting entity. Documentation shall be coordinated with the contracting entity's health and safety officer. Certifications of First Aid treatments shall likewise be made available to the contracting entity.

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Property damage of any kind at the expense of the contracting entity that occurs in the contractor's work area or for which the contractor bears responsibility or which the contractor identifies shall be promptly reported. In accordance with the duty to minimize damage, immediate measures shall be coordinated with the contracting entity and facilitated.

To avoid future personal injury and environmental damage, a careful analysis of all incidents is required for the purpose of identifying potential improvements. Contractors, therefore, agree to cooperate and assist the contracting entity with accident investigations or to provide the contracting entity with the findings of its own accident investigation. It should be emphasized that findings of incident investigations are not used to evaluate contractors but instead serve solely to improve workplace health and safety as well as environmental protection.

11.3. Hazard reporting and elimination

All workers are encouraged to eliminate hazards on a "see and fix" basis, providing it is within their ability to do so. Any hazard, which is outside their ability to control or cannot be corrected immediately, is to be identified (barricades, information tags, and warning signs, etc.) and reported to the supervisor. The supervisor will immediately initiate the appropriate action to correct the hazard or notify the appropriate person.

12. Emergency Response Plan

The contractor shall have a written emergency action plan as a part of its HSE program/ plan including, but not limited to, action in the following cases:

- injuries to employees
- injuries to the general public on or adjacent to the work site
- property damage with particular emphasis on utilities
- fire and explosions
- environmental damage
- natural disasters such as earthquakes
- other exposures or potential hazards that may occur at the work site
- roles and responsibilities
- communications and contact numbers

The contractor's emergency procedures shall be compatible with the local legislation, fire, and other related authorities, as well as client's requirements as required.

In formulating an emergency action plan, the contractor shall provide for the establishment and staffing of appropriate first aid facilities for the treatment of on- the-job injuries. A first aid kit adequate to service the contractor's work crew (s) shall be always available on site. The locations of first aid kits shall be discussed at the weekly toolbox HSE meetings.

Emergency procedures shall ensure that the contractor's project manager or most senior supervisor present takes charge and directs the handling of the emergency.

Any emergency procedures and actions required shall be discussed regularly with the contractor's supervisory personnel and at toolbox safety meetings.

Hitachi Energy contractor personnel must adhere to and operate under the site emergency procedures. All workers need to be familiar with emergency response procedures through inductions, toolbox/ tailgate meetings and specific area inductions.

Evacuation of the site may be necessary because of fire, structural collapse, environmental incident, bomb threat, or another serious event. No person may re-enter the evacuated area until the "all clear" is received and you have been instructed to do so by your supervisor.

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13. Key terms and abbreviations

Abbreviation or Term	Description
AED	Automated External Defibrillator
HSE	Health, Safety and Environment
ISO	International Organization for Standardization
LOTO	Lockout/ Tagout
PICW	Person in charge of work
PPE	Personal protective equipment
PTW	Permit to work
ROLT	Rider operated lift truck (forklift)
SDS	Safety Data Sheet

14. Revision History

Rev.	Description	Date
A	First release of document	06-27-2022