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Project Fire Prevention and Protection Procedure

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1.0 PURPOSE

This Procedure establishes the minimum fire prevention and protection requirements. It is designed to reduce the fire risk on the Project and prepare for response to fire if needed. The Procedure includes information regarding Project-specific fire prevention and protection procedures and guidance for Subcontractors to develop and implement complementing processes that comply with Project procedures and applicable regulations and standards.

This Procedure is not intended to provide fire protection and response for permanent plant operation.

The aim of this Procedure is as follows:

- Manage the significant fire risks inherent during the construction phase of Projects.
- Provide immediate, efficient, and effective protection from incidents involving fires.

2.0 SCOPE

The scope of this procedure applies to all works performed under all Government Construction Contracts executed throughout the Kingdom of Saudi Arabia.

3.0 DEFINITIONS

Definitions	Description
Approved	For the purpose of this procedure “Approved” means equipment that has been listed or approved by the concerned Saudi organization such as SASO (Saudi Arabia Standards Organisation), Civil Defence, and or internationally recognized standardization organization or testing lab such as Underwriters Laboratories etc..
SASO	Saudi Arabia Standards organisation
HSSE	Health Safety Security and Environment
Combustible Liquid	A combustible liquid is any liquid having a flashpoint at or about 37.7°C They are divided into two categories: **Class II** – Liquids having a flashpoint above 37.7°C but less than 60°C **Class III** – Liquids having a flashpoint at or above 60°C are further divided **Class IIIA** – Liquids having a flashpoint at or above 60°C (140°F) but below 93.3°C **Class IIIB** – Liquids having a flashpoint at or above 93.3°C
Combustion	Any chemical process that involves oxidation that is enough to produce light or heat
Dry Chemical Extinguisher	A fire extinguisher using chemically active powder
Flammable	Capable of being easily ignited, burning strongly or having rapid rate of flame spread.
Flammable liquids	Any liquid having a flashpoint below 37.7°C otherwise known as Class 1 liquids. **1A** – liquids having a flashpoint less than 22.7°C and a boiling point below 37.7°C **1B** – liquids having a flashpoint less than 22.7°C and a boiling point above 37.7°C **1C** – Liquids having a flashpoint at or above 22.7°C and a boiling point below 37.7°C.
Fire Classification	The various types of fires are classified as follows: ***Class A***—fires involving carbonaceous solids ***Class B***—fire involving flammable and combustible liquids ***Class C***—fires involving flammable gases ***Class D***—fires involving combustible metals ***Class E***—fires involving energized electrical equipment

Definitions	Description
	Class F—fires involving cooking oil and fats
Hot Work	Any work activities that introduce a potential ignition source of any kind to the job site. Open flame sources include, but are not limited to, activities such as welding, cutting, brazing, burning, and grinding. When in a Classified Hazardous Area, additional sources are considered: grit blasting, internal combustion engines, and closed flame sources (battery-operated personal electronic devices, such as cameras, cell phones, etc.). Driving vehicles into a classified hazardous area, for example, tank impounding basins, is another source of closed flame ignition.
VRD	Voltage Reduction Device
OSHA	Occupational Safety and Health Administration
CFR	Code of Federal Regulations
WMS	Work Method Statements
JHA	Job Hazard Analysis
STARRT	Safe Task Analysis ad Risk Reduction Talk
PPE	Personal Protective Equipment
NFPA	National Fire Protection Association

4.0 REFERENCES

- OSHA 29 CFR 1926 Subpart F Fire Protection and Prevention.
- EPM-KSS-PR-000001 Project General Safe Working Requirements Procedure.
- EPM-KSS-PR-000002 Project Housekeeping Requirements Procedure.
- EPM-KSS-PR-000009 Project Compressed Gas Cylinder Procedure.
- EPM-KSS-PR-000014 Project Emergency Preparedness Procedure.
- EPM-KSS-PR-000030 Project Safety Watches Procedure.

5.0 RESPONSIBILITIES

Leadership is the single largest factor for success in the establishment of an injury-free workplace. By their actions, leaders cascade, manage, and drive execution, instill operational discipline, and work to ensure that the entire workforce complies with safety and health requirements.

Commitment to working injury-free is required of all Project personnel. The individual actions of leaders and workers provides for safe work execution and compliance with Health, Safety, Security and Environment HSSE requirements.

5.1 Project Site Manager

The Project Site Manager, or designee, is responsible for the following:

- Allocating sufficient equipment and resources to support the implementation of this Procedure and verifying the proper implementation of this Procedure.
- Verifying that proper evaluation of fire hazards is performed and adequate safeguards are in place during the various phases of the Project.
- Verifying that personnel are informed of the fire prevention and protection measures in place on the Project.
- Verifying prompt action is taken, as needed, to maintain compliance with fire protection and prevention requirements.

5.2 Project HSSE Manager

The Project HSSE Manager, or designee, is responsible for:

- Overseeing the implementation of this Procedure.
- Developing and implementing emergency response procedures specific to each potential emergency type.
- Evaluating fire hazards through periodic inspections as detailed in this Procedure.
- Verifying personnel are trained in fire preventative and defensive measures.
- Coordinating training of fire brigade personnel including fire chief and fire-watch personnel.
- Scheduling and overseeing periodic fire drills.
- Evaluating response during fire drills and making recommendations for improvement.
- Verifying that fire preventative and defensive measures are part of every consideration in regard to equipment and material storage, Project layout, camp layout, and construction execution and commissioning.
- Implementing and monitoring the effectiveness of the fire equipment inspection program (e.g., dry chemical fire extinguisher, hydrants, hose cabinets, smoke alarms, response vehicles)
- Coordinating resources in the event of fire/drill/exercise.

5.3 Project Personnel

In the event of a fire, each person is responsible for:

- Familiarity with fire emergency response procedures, muster point locations, and the proper methods to contact Emergency Services.
- Knowing how to activate fire alarm system and methods used to warn other people in the area.
- Activating the fire alarm system in the event of a fire.
- Warning others of a fire in the area.
- Extinguishing small fires with fire extinguishers within the limits of their training.
- Evacuating the building (area) and assembling at the appropriate muster point.
- Reporting to the appropriate Fire Warden at the muster point.
- Following directions given at the muster points.
- Closing all doors and windows as they exit buildings.
- Shutting down gasoline and diesel powered equipment before leaving area if it is safe to do so.
- Closing valves of compressed oxygen and flammable gas cylinders before leaving an area if possible.
- Not reentering a burning building under any circumstances.

6.0 RISK ASSESSMENT

An integral aspect of the work planning process is the performance of a proper risk assessment. Risk Assessments must be conducted at the Planning Stage to identify the hazard risks and determine control measures.

The Risk Assessments that shall be conducted at the Planning Stage are as follows:

- Project Risk Assessment.
- Work Method Statements (WMS)
- Job Hazard Analysis (JHA).
- Safe Task Analysis and Risk Reduction Talk (STARRT)

It is imperative that prior to beginning any work activity, a STARRT briefing occurs to discuss the contents of the WMS/JHA which includes mitigations for any other hazards noted by the crew at the jobsite. The discussion shall also include job steps, expected hazards associated with the activity, and the mitigation and protection methods that shall be implemented to prevent incidents.

If circumstances change by way of the environment, other work crews are in the area, additional hazards are now present, change of methodology of the task etc..... another STARRT briefing shall occur.

The Hierarchy of control shall be used to reduce the likelihood of an incident occurring.

- ***Elimination*** (Remove the Hazard)
- ***Substitution/Isolation*** (Replacing material, process or hazard with a lower risk one/ separate people from the hazard (such as suitable guarding, distance, etc.)
- ***Engineering Controls*** (Redesign or replacement of plant and equipment)
- ***Administration Controls*** (Procedures, training, signage)
- **PPE -** Personal Protective Equipment

No work is to commence until the above has been implemented and signed by the relevant Supervisor in charge.

7.0 REQUIREMENTS

7.1 General Requirement

- Each Project or entity is responsible for the development of the necessary local Fire Protection and Emergency Preparedness Plan to be followed throughout the phases of work. Such plans must be prepared prior to commencement of work activities.
- Combustible and flammable waste must not be allowed to accumulate in any work area.
- Scrap and combustible materials must be removed from structures, partly completed buildings and completed buildings as soon as it is generated.
- Flammable and combustible materials must not be stacked or stored against any temporary or permanent building, structure, or storage facility.
- Rags, fabric, and timber contaminated with any hydrocarbon product must be contained in a closed metal container and removed daily from the workplace to a safe disposal area.
- Smoking will be strictly prohibited in specific areas and buildings. Smoking shall be only allowed in designated areas, prohibition and guiding signs must be placed.

7.2 Housekeeping

Contractors will develop, implement, and maintain strict housekeeping practices as an integral part of daily activities. To reduce the potential for fires, an orderly arrangement of material and equipment shall be maintained always. All equipment will be placed in a manner so as not to obstruct access to fire protection equipment, control valves, fire doors, alarm devices or panels, or electrical panels (A minimum clearance of 90cm shall be maintained). Materials shall not obstruct sprinkler heads. Work areas must be maintained in accordance with the requirements specified in this Procedure. In addition:

- Combustible materials shall be removed from within 10m of a hot work area. If combustible materials cannot be removed, they must be protected by fire-resistant coverings or shields, or kept wet.
- Combustible and flammable waste shall not be allowed to accumulate in any work areas.
- Scrap and combustible materials shall be removed from structures, partially completed buildings, and completed buildings as soon as it is generated.
- Flammable and combustible materials shall not be allowed to accumulate or be stored against a temporary or permanent building.
- Rags, fabric, and timber contaminated with any hydrocarbon product shall be discarded in closed metal containers and shall be removed daily from the workplace.
- Waste receptacles must be provided in a way that does not allow such receptacles to overflow, waste must be segregated in accordance with the governing waste management requirements.
- Where the structure of a building under construction is nearing completion, ALL combustible and flammable waste MUST be removed from the building as it is generated and before the end of every shift.

7.3 Electrical Equipment

Electrical equipment installation will be performed by a competent electrician and will conform to electrical codes.

- Flexible cables, tools, and equipment, including welding equipment, must be inspected for damage prior to use.
- Only approved connectors may be used on electric cords and electric arc welding leads. All electrical equipment must be isolated after working hours or when not in use.
- Task lighting, particularly halogen lamps must be clear of combustible materials when in use.
- Manual Metal Arc Welding power supplies shall be fitted with a voltage reduction device (VRD).
- Portable electric heaters will be equipped with a tip alarm and an automatic shut-off that will turn the heater off when tipped.
- Electrical appliances that do not meet requirements of applicable regulations, standards, codes, or Contractor criteria shall not be used.

Ancillary power outlets on welding power supplies shall be as follows:

- Individually switched with a double pole switch (or a switch of an equivalent level of safety).
- RCD (Residual Current Device) protected.
- IP 55 rated (IP- International Protection)
- Supplied by a separate winding from the welding current (if self-contained unit) Blanked off to prevent use.

7.4 Mobile Plant and Portable Equipment

Equipment must not be refueled while the engine is running. Approved type of filling and fuel dispensing equipment must be used. Equipment that cannot be shut down for fueling (such as camp generators) will be designed and manufactured to provide for safe fueling activities while the equipment is running. In addition, the following requirements apply:

- A suitable, portable fire extinguisher shall be placed adjacent to electric arc welding sets, electricity generating sets, air compressors, and gas-burning equipment.
- Portable heaters, regardless of fuel source, will be equipped with an approved automatic device to shut off the flow of gas to the main burner and pilot, if used, in the event of flame failure. Heaters having inputs above 50,000 Btu per hour will be equipped with either a pilot, which must be lighted and proved before the main burner can be turned on, or an electrical ignition system.
- All mobile plant equipment, fuel trucks, and vehicles shall carry or have a suitable portable fire extinguisher attached.
- Internal combustion engines on mobile plants such as excavators, tractors, trucks, and cranes must be switched OFF when not in use.
- Refueling operations will have “grounding and bonding” between the equipment.

7.5 Offices and Temporary Site Facilities

Temporary buildings shall be placed, positioned or erected in a manner that does not obstruct or adversely affect any means of exit from the buildings. Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.

Buildings will be constructed and maintained in compliance with Local Regulations/Codes. This includes Emergency Escape Lighting and Exit Signs for Buildings.
Where buildings are required by regulation or standards to have installed sprinkler systems, fire detection systems, and alarm systems, the building and systems will be designed and constructed, and installed in compliance with applicable standards.

- Temporary buildings, when located within another building or structure, will be of either non-combustible construction or of combustible construction having a fire resistance of not less than one hour.
- If a temporary building is not located inside another structure and is not employed for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, then said building will be placed at a distance of not less than 5m from another building or structure. Groups of temporary buildings not exceeding 185.8 m^2 (2,000 ft^2) in aggregate will, for this section, be considered a single temporary building.

- Project facility housekeeping, material storage, vegetation, and other combustible materials will be maintained to reduce the potential for fire.
- No Smoking policy must be enforced in all office and site facilities offices.

7.6 Fire Protection

Before allowing occupation of any temporary or permanent facility, all required fire protection systems shall be implemented and operable.

Any building used for office space and/or accommodation must comply with the national and local fire legislation, codes or ordinances, and shall have as a minimum:

- Smoke detectors installed and maintained in all sleeping quarters, kitchens, dining halls, indoor recreation areas, and offices.
- A fire detection system linked to central fire alarm panel that can identify specific location of the fire.
- An alarm system that can be activated via call points and the detection system.
- An adequate number of alarm sounders located to ensure all personnel are alerted in the event of an emergency.
- Sprinkler systems, when required, placed in service prior to building occupancy
- If sprinkler systems are being installed, their installation shall closely follow construction and they will be placed in service as soon as practical or as building codes require.
- Escape routes that are protected against the passage of smoke and flame for a minimum of 30 minutes; i.e., accommodation room doors are fitted with self-closers, walls are constructed of fire resisting materials to ensure containment of the fire and passage of smoke.
- Self-closing fire doors leading into all protected escape routes, on all sleeping accommodation, on stairways and where local legislation requires compartmentalization due to the layout and size of the building.
- An emergency escape lighting system that will ensure safe evacuation if the main lighting system fails.
- Signage identifying fire points, call points, escape routes and fire exits.
- An adequate quantity of suitable fire extinguishers and/or other firefighting equipment located in the facility.
- All utilities tested and examined, as required, by local legal requirements and have in date certification available.
- A suitable number of final exits leading to a place of safety.
- Trained fire wardens in place to assist with evacuation and liaison with emergency services.
- Personnel trained in the use of fire extinguishers / firefighting equipment to help contain the fire until the emergency services arrive or extinguish fires.
- Fire evacuation procedures and maps shall be clearly and prominently displayed in each building and work area.
- Evacuation procedures practiced with scheduled drills.
- A suitable and sufficient emergency plan outlining what actions are to be taken in the event of fire, responsibilities, training, monitoring, inspection and testing of equipment, drills etc.
- An adequate supply of water linked to a fire hydrant distribution system, or other suitable water feed for means of extinguishing and/or containing the fire until arrival of the emergency services.

While facilities such as offices and camp facilities are under construction, the following shall apply:

- During the construction of facilities, fire extinguishers, a water truck with hoses and trained personnel will be available to extinguish fires.
- Ensure a hot work permit is put in place to control any work that presents a high risk of fire.
- Ensure an emergency plan has been developed and all personnel are aware of actions to take in the event of an emergency.
- Effective means of detecting fire and providing a warning to personnel shall be established whenever employees are on a job site/camps.

- Fire plans and fire emergency instructions must be noticeably posted on entrances, emergency response and reporting protocol must be communicated to all employees through induction and periodic training.
- Fire-fighting equipment (hose, nozzles, fire buckets, fire extinguishers) will be available when the Project begins.
- Fire extinguishers will be provided and maintained at the following locations:

    - 1 for a building and/or one for each 278 m2 of a protected building.
    - Within 15.2m of where more than 18.9l of flammable or combustible liquids or 2.3kg of flammable gases are being used.
    - In open storage yards within 22.9m of uninterrupted travel.
    - At storage areas for flammable or combustible liquids.
    - At any fuel dispensing or service area.
    - On all motorized equipment.

7.6.1 Portable Fire Extinguishers

Fire extinguisher shall be selected and placed in each area of the Project according to the fire risks in each area. A plot plan identifying the location of fire-fighting equipment shall be developed and posted in buildings and on area bulletin boards. Areas that will have extinguishers permanently located include, but are not limited to:

- Open storage yards and construction areas
- Storage areas for flammable or combustible liquids
- Fabrication areas/shops
- Fuel dispensing or service areas
- On all motorized equipment
- Sleeping quarter's common hallways located near exit doors
- Kitchen areas
- Dining halls
- Indoor recreation areas
- Office common hallways located near exit doors

Fire extinguishers will be inspected, tested, and maintained in accordance with applicable codes/standards, such as National Fire Protection Association (NFPA) standards or international equivalent.

Each fire extinguisher will be replaced immediately after discharge with another fire extinguisher that is fully charged and of the proper size and type.

7.6.2 Material Storage and Handling

Materials shall be stored in a manner so as not to obstruct access to fire extinguishers, fire protection equipment, control valves, fire doors, alarm boxes devices or panels. In addition:

- A minimum of 0.9m shall be maintained in aisle ways leading to an exit.
- Materials will not obstruct sprinkler heads. A minimum clearance of 46cm will be maintained from sprinkler heads.
- Materials in work areas shall be limited to actual needs and shall be stored in a manner to protect combustible material from ignition sources.
- Materials shall not be stored or staged on or near roadways, or in other areas where emergency vehicles may need access, unless evaluated by the Emergency Response Coordinator, and authorized by the Project HSSE Manager.
- Stored materials shall not cause blind spots for fire-response vehicle operators or Fire-Brigade personnel, in case response is needed.
- Storage areas shall be kept clean, and materials shall be neatly stacked or placed Construction materials shall be stored or placed in an orderly manner.
- Storage quantities of flammable and combustible materials and liquids shall be minimized.
- Flammables will not be stored with Oxidizers or other incompatible chemicals.

- Hazardous materials shall be segregated and stored with compatible materials.
- Materials shall be stored in a manner so as not to obstruct access to fire extinguishers, fire protection equipment, control valves, fire doors, alarm boxes devices or panels
- Materials will not be stored within 1.8m of any inside opening or hoist way.
- Storage areas will be kept clean, and materials will be neatly stacked or placed
- Storage quantities will be minimized.

7.6.3 Flammable and Combustible Liquids

Flammable and combustible liquids will be labeled, stored, and handled in a consistent manner.

- Flammable liquids will be handled and used only in approved, properly labelled safety containers.
- Approved and properly labelled, flammable storage cabinets shall be used for the storage of flammable liquids in minor quantities. Flammable Liquid Storage Cabinets shall be grounded to comply with applicable regulations. Materials will be stored based on their compatibility.
- Where alternatives are available, the Project will substitute high-toxicity chemicals with low-toxicity alternatives and use high-flashpoint chemicals and solvents for cleaning purposes.
- Flammable and combustible liquid storage tanks will be provided with secondary containment equal to the tank size plus 10%.

7.6.4 Flammable and Combustible Liquid Storage

Only approved containers and portable tanks shall be used for the storage and handling of flammable and combustible liquids. Approved safety containers with flame arrestors shall be used for the handling of flammable liquids in quantities greater than 3.8l. This rule shall not apply to those flammable liquid materials that are highly viscous; such materials may be used and handled in their original shipping containers. For quantities of 3.8l or less, only the original container or approved safety containers with flame arrestors may be used for storage, use, and handling.

Combustible liquids, including oil or grease, shall be stored in containers or storage tanks labeled with contents and tank capacity. Each tank shall be:

- Capable of withstanding working pressures and stresses compatible with the quantity and type of liquid stored
- Maintained in a manner that prevents leakage
- Located in an area free of combustible materials
- Vented or otherwise constructed to prevent development of pressures of vacuum as a result of filling, emptying, or changes in atmospheric temperature
- Portable storage tanks will be maintained within in a dike area, with provisions made for the handling of spills and groundwater protection. The proximity of tanks to buildings and flammables will comply with local regulations.

Flammable and combustible liquid storage tanks shall be provided with secondary containment equal to the tank size plus 10%.

- Approved and properly labeled, flammable storage cabinets shall be used for the storage of flammable liquids in quantities exceeding 56.8l. Flammable Liquid Storage cabinets will be grounded as required by applicable regulations. Materials shall be stored based on their compatibility.
- Combustible material such as combustible liquids (oils) or combustible solids (cardboard boxes, gloves, rags, etc.) shall not be stored in a flammable storage container or a cabinet containing flammable liquids.
- Flammable and combustible liquids shall not be stored in areas used as exits, stairways, or passageways, and shall not adversely affect a means of egress.

7.6.5 Handling Flammable and Combustible Liquids

The following requirements shall be implemented when handling flammable or combustible liquids:

- Flammable and combustible liquids shall not be used near ignition sources.
- Care shall be taken when welding and cutting in location where combustibles are exposed. When such welding or cutting is done, the surrounding area shall be inspected. Combustible material shall be removed or protected with fire-resistant blankets or equivalent, and adequate number of approved fire extinguishers shall be immediately available.
- Substitute high toxicity chemicals with low toxicity alternatives and use of high flashpoint chemicals and solvents for cleaning purposes; i.e., above 60°C (140°F) will be used.
- Flammable liquids shall be handled and used only in approved, properly labeled safety containers.

7.7 Fueling and Transferring Flammable Liquids

The following requirements apply to fueling activities:

- Smoking shall be prohibited where refueling activities are in progress. Clear and legible signs shall be posted indicating “NO SMOKING” in refueling areas.
- The use of cellular phones or other types of radio-frequency (RF) generating devices (pagers, two-way radios, etc.) shall not be permitted during any fueling or flammable liquid transfer operations.
- Fuel cans shall be placed on the ground for filling to avoid the buildup of a static charge generated by the fuel flowing into the can.
- Flammable liquids will be transferred from one container to another only when containers are electrically interconnected (bonded).
- Fuel lines will be equipped with valves capable of stopping the flow of fuel at the source and will be located and maintained to minimize fire hazards. This does not apply to fuel lines on self-propelled equipment.
- The dispensing units will be protected against collision damage.
- Fueling equipment must be properly grounded and bonded during fueling operations.

7.8 Compressed Gas Cylinders

The usage and storage of compressed-gas cylinders shall be controlled onsite and shall be handled in a consistent manner

7.8.1 Storage

Storage of compressed gases shall be in compliance with the following:

- Compressed gas cylinders will be secured by a substantial chain, cable or other equivalent method in an upright position at all times.
- Welding gases will be stored in isolated areas and segregated by type of gas.
- Oxygen and flammable compressed-gas cylinders in storage shall be separated by a 1.5m high barrier with a 1-hour fire rating or by a distance of 6m.
- Welding-gas storage areas shall be designated non-smoking areas and shall have conspicuously posted “NO SMOKING” signs.
- Compressed-gas cylinder valves shall be closed and valve protective caps in place whenever:
    - The cylinders are in storage
    - The cylinders are empty
    - The cylinders are moved
- Compressed-gas cylinders shall be stored and located in areas to avoid exposures to sparks, hot slag, or flames. If these cannot be avoided, fire-resistant shields shall be provided.
- Cylinders will be stored in well-protected, ventilated, dry locations, at least 6.1m from highly combustible materials, and away from egress routes such as stairways and elevators.

7.8.2 Handling of Compressed Gas Cylinders

The requirements for safe handling of compressed gasses include the following:

- Cylinders will be transported in an upright position and will not be hauled in equipment beds or truck beds on their side.
- Compressed gas cylinders will not be transported with gauges attached. The gauges will be removed from cylinders and protective caps installed during movement or transportation.
- Cylinders, all hose apparatus, and connectors will be kept free of oil and grease, and not handled with oily or greasy hands or gloves.
- Compressed-gas cylinders shall never be hoisted unless secured in enclosed frames specifically designed for hoisting the specific cylinders.
- Compressed gas cylinders will not be hoisted by the valve cap or by means of magnets or slings.
- Compressed gas cylinders will not be used as rollers.
- Compressed-gas cylinders shall not be used or placed in an area if it is possible to become part of an electrical circuit.
- Bars will not be used to pry or loosen protective caps, warm water will be used to loosen caps if frozen.

7.9 Hot Work

Before Hot Work can be carried out in any construction area or welding fabrication area or shop, the area must be cleared of all combustible and flammable material and shall be handled in a consistent manner.

- When planning work, consider all cold work alternatives before performing hot work.
- When considering work that involves Hot Work in a Classified Hazardous area, always consider whether there is a viable alternative, for example, using a hand or pneumatic saw for cold cutting rather than using a cutting torch, or moving the item outside of the Classified Hazardous area.
- Hazards associated with the hot work shall be identified and mitigated prior to beginning work.
- The health effects related to Hot Work shall be assessed prior to the activity commencing and appropriate control measures shall be in place to protect the worker and personnel at adjacent sites. Sufficient ventilation will be provided, as needed, to maintain welding fumes and smoke below permissible exposure limits.
- No welding or cutting will be done where flammable paints, compounds, or dust may create a hazard.
- Where a preservative coating is present, the coating will be removed or alternative methods used for a sufficient distance in each direction to prevent appreciable heating of the coating.
- Personnel involved in hot work activities shall be trained and competent in the roles for which they are responsible.
- When normal fire-prevention methods are not sufficient to adequately verify the prevention of fires, additional personnel will be added (Fire Watch) to guard against potential fires.
- A fire extinguisher with a 13.6kg Class A, B, C rating will be at the work location during welding, cutting, soldering, etc. When a fire watch is assigned, the fire watch will have an appropriate type of fire extinguisher placed at the work location for use, if needed.
- A suitable fire extinguisher must be located within easy reach of operations.
- All employees will use the proper personal protective equipment and clothing when performing or assisting in cutting and welding operations (burning glasses, shields, mole skin suits or flame resistant coveralls and gloves, etc.).
- Shielding will be used to protect people and property from injury or damage from arc welding and cutting operations, grinding, sparks, slag, falling objects, or the ultraviolet /infrared radiation of the arc.

Hot Work at heights and from scaffolding presents special hazards. The controls are as follows:

- All work must be coordinated with other Subcontractors working in the area.
- Areas beneath Hot Work must be cleared of all combustible and flammable materials.
- Fire retardant material must be used to cover scaffold boards and to enclose operations.
- Fire retardant material must be removed at the end of every shift to expose scaffold boards or combustible materials.

7.9.1 Hot Work Equipment

- Welding leads and equipment will be properly maintained and inspected before use. Defective equipment will not be used and will be reported to supervision.
- Arc welding and cutting operations, including grinding, will be shielded by non-combustible or flameproof screens, shields, or other safeguards for the protection of personnel or materials exposed to sparks, slag, falling objects, or the ultraviolet /infrared radiation of the arc.
- The frame of all electrical generating and arc welding machines will be effectively grounded when the machine's power outlets are being employed as a power source and ground fault interrupter (GFCI) or RCD is required to be used.
- Pipelines containing flammable liquids or gases or electrical cables will not be used as a ground.
- If electrode holders are to be left unattended, the electrodes will be removed and the holder placed where it is protected from unintentional contact.
- Welding personnel will be provided a fire-resistant container for the collection of spent electrode stubs.
- Portable welding machines will be turned off when being moved or when the welder must leave the work area for any length of time
- Fuel gas hose and oxygen hoses will be easily distinguishable and will not be interchangeable.
- A suitable fire extinguisher must be located within easy reach of operations.
- Fuel gas cylinders will not be placed in confined spaces. Fuel gas hoses will be removed from confined spaces when not in use.
- Cylinders, all hose apparatus, and connectors will be kept free of oil and grease, and not handled with oily or greasy hands or gloves.
- Oxygen/fuel gas systems will be equipped with approved back-flow valves, flash back arresters, and pressure relief devices.
- Fuel gas/oxygen equipment will be disconnected from the source when left unattended, such as at lunch or at completion of the task. Torches will not be left inside a confined space unattended.
- Welding leads and equipment will be properly maintained and inspected before use. Defective equipment will not be used and will be reported to supervision.
- Arc welding and cutting operations, including grinding, will be shielded by non-combustible or flameproof screens, shields, or other safeguards for the protection of personnel or materials exposed to sparks, slag, falling objects, or the ultraviolet (UV) or infrared (IR) radiation of the arc.
- No welding or cutting will be done where flammable paints, compounds, or dust may create a hazard.
- If normal fire prevention methods are not sufficient to adequately ensure the prevention of fires, a competent fire watch must be assigned to guard against potential fires.
- Hot Work at height and from scaffolding presents special hazards and therefore requires extra precautions.

7.10 Inspection and Testing

- General and specific inspection schedules will be developed and implemented.
- General inspections will be conducted weekly covering all construction areas, storage and lay down areas, fabrication and painting areas.
- All inspections will be conducted to an agreed standard and recorded using an Inspection Checklist Record.
- High activity and high risk areas such as substantially completed and completed buildings, fuel oil and gas feed stock and storage facilities and power distribution areas, will be inspected daily or more frequent dependent on activity and risk.
- Inspections required by Hot Work Permit will be carried out as per Permit requirements.

8.0 TRAINING

Fire Prevention and fire precautions training will be given to all Supervisors, Fire Watches, Authorized Hot Work Permit Applicants, Security personnel, Stores personnel and selected employees. As a minimum, the Training Program will include:

- Checking portable fire extinguishers.
- Hazard recognition and risk potential.
- Inspection methods.
- Hot Work Permit requirements.
- Emergency Fire procedures.
- Selection and use of portable fire extinguishers.
- Equipment refueling procedures.
- Storage and handling of flammable and combustible liquids.

It is highly recommended to execute fire drills to ensure staff familiarity with the emergency plan, and maintain coordination with Saudi local authorities such as Saudi Civil Defense, and Red Crescent to improve the effectiveness and response time.

9.0 ATTACHMENTS

N/A