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HAZARD IDENTIFICATION PLAN				Document ID : SA-AMI-000-HDAI-710005	
				Contractor Reference : 6601000283	
				Revision: 6	Step: IFU
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Doc. Type: PRC	Discipline: CSE	Phase: DE	Class: 2	Page 1 of 183	
Vendor Reference : N/A			System / Subsystem: NN	Equipment Type: N/A	

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HYUNDAI ENGINEERING & CONSTRUCTION

AMIRAL PROJECT

HAZARD IDENTIFICATION PLAN

Rev.	Step	Date	Revision Description	Issued by SAFETY Supervisor	Reviewed by SAFETY Manager	Approved by PM	Concurred by: Pkg. APMT
6	IFU	13-May-2025	Issue For Use	D.H. CHANG	D.S.LEE	Y.H. JUNG	
5	IFU	01-Sep-2024	Issue For Use	D.H. CHANG	D.S.LEE	Y.H. JUNG	
4	IFU	07-Jul-2024	Issue For Use	D.H. CHANG	D.S.LEE	Y.H. JUNG	
3	IFU	30-Apr-2024	Issue For Use	D.H. CHANG	D.S.LEE	Y.H. JUNG	
2	IFU	05-Mar-2024	Issue For Use	D.H. CHANG	D.S.LEE	Y.H. JUNG	
1	IFU	23-Nov-2023	Issue For Use	D.H. CHANG	D.S.LEE	Y.B. IM	
0	IFR	15-Sep-2023	Issue For Review	D.H. CHANG	D.S.LEE	Y.B. IM	

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1 INTRODUCTION

This plan is in accordance with the SAUDI ARAMCO Construction Safety Manual with document no.(Doc No. SA-AMI-000-ECST-000001)

Method Statements will cover the construction phase of PKG (4) AMIRAL – Utilities, Flares and Interconnecting system Project.

This is a “dynamic” document and will be modified as per required needs, adding to this list other items that may be considered as hazardous or a serious safety issue for the Project. This shall be a Contractor’s and/or Sub-contractor’s obligation and responsibility.

1.1. Objectives

A Hazard Identification Plan (HIP) has been prepared as a supplemented part of the Contractor Site Safety Program (CSSP) in order to identify potential hazards prior to the PKG (4) AMIRAL – Utilities, Flares and Interconnecting system Project.

The aim of the Hazard Identification Plan (referred to as HIP) is to formally record that potential hazards have been identified, associated risks have been assessed and that suitable control measures have been communicated to the construction staff.

The ultimate objective is to prevent all forms of direct and indirect loss and all hazards are properly identified to make sure that all the controls are put in place to make sure we achieve safe work for the project lifecycle.

1.2. Scope

This HIP lists all recognized tasks and activities associated with the PKG (4) AMIRAL Project and the potential hazards of each activity including their apparent control measure to mitigate these hazards. Consequently, this HIP shall identify all potential hazards associated with the work to be performed, and shall not be a list of generic hazards.

2 RESPONSIBILITIES

2.1. Project Manager

The Project Manager is responsible for ensuring that the requirements of this procedure are adhered strictly during execution of the project

2.2. Construction Manager

Construction Manager shall be fully responsible for implementation of all contractual requirements at the job site and shall visibly demonstrate the priority of safety in all activities, including setting a good personal example and as follows:

- Empower all contractor and subcontractor personnel on site to stop their own work and work related to the contract that they deem to be unsafe and take immediate corrective actions as needed.
- Understand and implement the safety and health requirements of the contract, in particular Schedule II D II and this document.
- Implement the CSSP and/or HIP and convey the safety responsibilities of each level of supervisory staff.
- Attend/conduct safety meetings to promote and reinforce proper safety and health performance.
- Periodically inspect the work site, report any unsafe acts/conditions to the contractor's site supervisor and/or foreman, provide recommendations to correct deficiencies and perform follow-up inspections to ensure corrective actions have been taken.
- Routinely consult with the contractor's safety manager/supervisor(s)/officers to assess the job site safety status and identify areas for supervisors and foremen to take corrective action.

2.3. HSE Manager

The contractor's site safety manager/supervisor (site safety superintendent, senior safety engineer, safety coordinator or equivalent position) shall visibly demonstrate the priority of safety in all activities, including setting a good personal example and as follows.

- Be responsible and accountable for the proper performance of field safety officers under his authority.
- Be empowered in writing by his management to stop their own work and work related to the contract that they deem to be unsafe and take immediate corrective actions as needed.
  - Understand safety and health requirements of the contract - in particular Schedule "D" and this document - as well as the CSSP/HIP and CSM .
  - Conduct safety kickoff meetings with subcontractors to explain site-specific safety requirements and expectations.
  - Ensure all contractor and subcontractor personnel attend site safety orientations, including as required by the SAPO, and ensure contractor and subcontractor personnel attend applicable safety training.
  - Communicate safety rules and standards to the contractor and subcontractor workforce.
- Provide/assist with safety training for personnel.
- Periodically inspect the work site, report any unsafe acts/conditions to the area supervisor and/or foreman, provide recommendations to correct deficiencies and follow-up to verify corrective actions have been taken .
- Keep a permanent record of job-related injuries/illnesses, near misses, fires, motor vehicle accidents, property damage, crane and heavy equipment incidents, etc.
- Participate in incident investigations, safety meetings, drills, etc., and conduct/facilitate safety training sessions.
- Ensure general safety rules are printed in languages understood by contractor and subcontractor personnel and are posted in areas where they are clearly visible.

Personnel involved in the preparation and review of HIP, Job Safety/Hazard Analysis and control are trained and competent.

2.4. HSE Supervisor/Officer

The contractor’s field safety officers (safety inspector, site safety engineer, safety advisor, safety representative or equivalent position) shall visibly demonstrate the priority of safety in all activities, including setting a good personal example and as follows:

• Be empowered in writing by their management to stop their own work and work related to the contract that they deem to be unsafe and take immediate corrective actions.
• Understand the safety and health requirements of the contract - in particular Schedule "D" and this document- as well as the CSSP/HIP.
• Communicate safety rules and standards to the contractor and subcontractor workforce.
• Inspect the work site daily, report any unsafe acts/conditions to the supervisor and/or foreman, provide recommendations to correct deficiencies and follow-up to ensure corrective actions have been taken.
• Participate in incident investigations, safety meetings, drills, etc., and conduct/facilitate safety training sessions.

2.5. Section Manager (Discipline Manager)

- Section managers are responsible for the identification of work/tasks to be included in the HIP.
- They shall ensure that all the Supervisors under his charge are fully informed, aware and trained for the work to be performed, the hazards involved, and the safety measures to be implemented.

2.6. Supervisors (Site Engineer / Foremen)

- The contractor's site supervision (field engineers, supervisors, foremen or equivalent position) shall visibly demonstrate the priority of safety in all activities, including setting a good personal example and as follows.
- Be qualified, proficient in both verbal and written English, provide direct and effective on-site supervision and be continuously present on-site.
- Be empowered in writing by their management to stop their own work and work related to the contract that they deem to be unsafe and to take immediate corrective actions as needed.
- Understand the safety and health requirements of the contract - in particular

Schedule "D" and this document - as well as the contractor's CSSP and/or HIP.

- Assess the workplace and work activities to determine hazards that are
- present or are likely to be present, in consultation with the safety manager/supervisor(s) or field safety officer as needed.
- Evaluate hazardous operations and implement needed precautions to ensure the safety of all affected personnel (note: hazardous operations may include, but are not limited to: welding, radiography, abrasive blasting, asbestos removal, electrical work, solvent cleaning, crane operations, etc.).
- Understand the safest method of performing each job activity in their area

of responsibility.

- Verify that all hazard associated with the work have been identified.
- Arrange HIP and Job Safety/Hazard Analysis meeting and ensure attendance of all concern personnel.
- Check worksite before start of work and ensure that control measures are implemented and in place.
- STOP work and request for revision of HIP and Job Safety/Hazard Analysis in case of changes in working conditions or work activities.
- Ensure that identified control measures are in accordance with Project HSE Procedure and Requirements
- The Supervisors shall participate in the preparation of HIP.
- They shall ensure that all the employees under their supervision are fully informed of the methods of working and equipment to be used, the hazards involved, and the safety measures to be implemented.

1.Plan and maintain good housekeeping in the work area.
2.Provide the required PPE and ensure proper use.
3.Ensure equipment and tools (both power and hand tools) are in good operating condition and properly used.
4.Conduct daily work site inspections to identify and immediately correct unsafe acts, conditions and/or equipment.
5.Immediately report all incidents, unsafe conditions and defects in equipment to the contractor's site management and the APO.

6.Provide immediate assistance as requested by the contractor's safety manager/supervisor, emergency response organizations, APO, etc., during emergencies.

2.7. Commissioning manager

A Commissioning Manager shall play a crucial role in ensuring that construction projects, particularly in industries like engineering, manufacturing, or construction, are completed efficiently and meet the required standards. Here's an overview of their responsibilities:

- Quality Assurance and Testing: They oversee the testing and inspection processes to ensure that all systems and components of the project meet specifications and regulatory requirements. This involves creating test protocols, conducting tests, analyzing results, and addressing any deficiencies.
- Risk Management: Identifying potential risks to the commissioning process and developing strategies to mitigate them. This includes assessing safety hazards, regulatory compliance issues, and technical challenges.
- Documentation and Reporting: Maintaining detailed records of all commissioning activities, including test results, equipment manuals, and compliance documentation. They may also generate progress reports to keep stakeholders informed about project status.
- Training and Handover: Providing training to operations and maintenance staff on how to operate and maintain the systems installed during the project. They ensure a smooth transition from construction to operation phase by facilitating the handover process.
- Troubleshooting and Problem-Solving: Addressing any issues or discrepancies that arise during the commissioning process. This may involve collaborating with design and construction teams to implement solutions and ensure the project stays on schedule and within budget.
- Regulatory Compliance: Ensuring that all commissioning activities comply with relevant regulations, codes, and standards. They stay updated on industry best practices and regulatory changes to ensure compliance throughout the project lifecycle.

- Client Liaison: Acting as the primary point of contact for the client regarding commissioning-related matters. They communicate project progress, address client concerns, and ensure client satisfaction with the final deliverables.
- Continuous Improvement: Identifying opportunities to improve commissioning processes and procedures based on lessons learned from past projects. They may implement new tools, technologies, or methodologies to enhance efficiency and effectiveness

2.8. Workers (Employees)

- To ensure that they are fully aware of the methods of work for the activity to be performed and the hazards involved in the task/activity.
- Adequately trained for the tools, equipment to be used, have the appropriate PPE's for the task and knowledge of the safety measures to be implemented.

3 DEFINITION OF TERMS

3.1. Hazard

Any source (e.g. condition, situation, practice, behavior) that has the potential to cause harm or damage, including injury, disease, death, environmental, property and equipment damage.

A hazard can be a thing (object), be it physical / chemical in characteristic or a situation (state of condition).

3.2. Hazard Identification

Residual risk is the risk that remains after all necessary corrective actions as per requirements are taken in place to reduce or eliminate the original risk

3.3. Control Measures (Control)

Any system, procedure, process, device or other means of eliminating, preventing, reducing or mitigating the end results of a potential hazard.

Controls include physical equipment, process control systems, management processes, operating or maintenance procedures, the emergency plan and key personnel and their actions.

3.4. Activity(ies)

Tasks or works perform by an individual or group of persons to achieve the plan work of action to finish the assigned work.

3.5. ABBREATIONS

PTW	Permit To Work
WPI	PTW Issuer
WPR	PTW Receiver
HSE	Health Safety and Environment
MS	Method Statement
JSA	Job Safety Analysis
GI	General Instruction
CSM	Constructions Safety Manual
LEL	Lower Explosive Limit
AGT	Authorized Gas Tester
LOTO	Log Out Tag Out
APO	Amiral Proponent Organization
G.I	General Instruction
PWAS	Proximity Warning Alert System
RVCCCS	Rear View Closed Circuit Camera System

PPE	Personal Protective Equipment

4. HAZARD CATEGORIES (SOURCES)

4.1. Physical Hazards

These includes a wide range of hazards such as physical contact with objects, machinery and equipment, exposures to vibrations, noise, electricity, heat and cold, etc.

Examples are collapse of structure, caught-in by machinery, buried in trenches, contact with flying objects, struck-by moving vehicle or equipment, falling from height, tripping, etc.

4.2. Chemical Hazards

There are different types of chemicals hazards and it can be flammable, corrosive, reactive and toxic. These hazards can affect our body either through ingestion, inhalation, injection and direct contact from chemical substances and gases.

Examples are;

- Flammables – Methanol, adhesive, diesel fuel, mineral spirits, etc.
- Corrosive – Acetic acids, sodium hydroxide
- Reactive – Oxidizers, Peroxides, Explosives, TNT
- Toxic – Carcinogen such as benzene, Poison such as pigments, inks, etc.

4.3. Ergonomic Hazards

This covers risk of injury from manual handling procedures, incorrectly designed work stations, audio and visual alarms, and color coding control mechanisms.

Examples of ergonomic hazards are height of work bench, shape of vehicle seat, repetitive movement, lengths of control lever, arrangements of controls and switches.

4.4. Biological Hazards

These include insects, bacteria, fungi, plants, insects, birds, animals, humans and viruses.

Examples are syringes containing potentially infected blood, specimen containers carrying potentially infected materials and legionella bacteria and viruses from air conditioning systems.

4.5. Radiation Hazards

These are hazards brought about by exposure to ionizing and non-ionizing radiation equipment.

Examples are;

- Ionizing Radiation – x-rays, radioactive gauging devices, radiographic sources, or the radioactive trace elements.
- Non-ionizing Radiation – covers infra-red, lasers, UV radiation (welding, sunlight), microwaves (high frequency welders, freeze drying)

4.6. Psychosocial Hazards

Workplace Stressors (Fatigue, Stress from using equipment without proper training or instructions, overwork, being coerced or bullying, etc.)

4.7. Miscellaneous Hazards

This includes work stress due to demand of work, fatigue due to overwork, the effect of shiftwork, and even bullying / assaults from other people.

5. CLASSIFICATION OF HAZARDS

The hazards identified are classified as A, B or C according to their degree of potential loss considering the probability of occurrence and the severity of outcome.

5.1. Class “A” Hazards

Class "A" Hazards ( )

A condition or practice likely to cause permanent disability, loss of life or body part and/or extensive loss of structure, equipment or material

5.2. Class “B” Hazards

Class “B” Hazards ( )

A condition or practice likely to cause serious injury or illness (resulting in temporary disability) or property damage that is disruptive, but less severe than Class “A”.

5.3. Class “C” Hazards

Class "C" Hazards ( )

A condition or practice likely to cause minor (non-disabling) injury or illness or non-disruptive property damage

6. LOOKAHEAD HAZARD IDENTIFICATION PLAN

Contractor shall submit a monthly Hazard Identification Plan based on the 4-week construction and pre-commissioning/Commissioning lookahead that re-evaluates risks, controls, barriers and safeguards associated with proposed work activities. 4 Week lookahead will be communicated to SAPMT, contractor and sub-contractor managers and supervisors.

7. HAZARD IDENTIFICATION INDEX

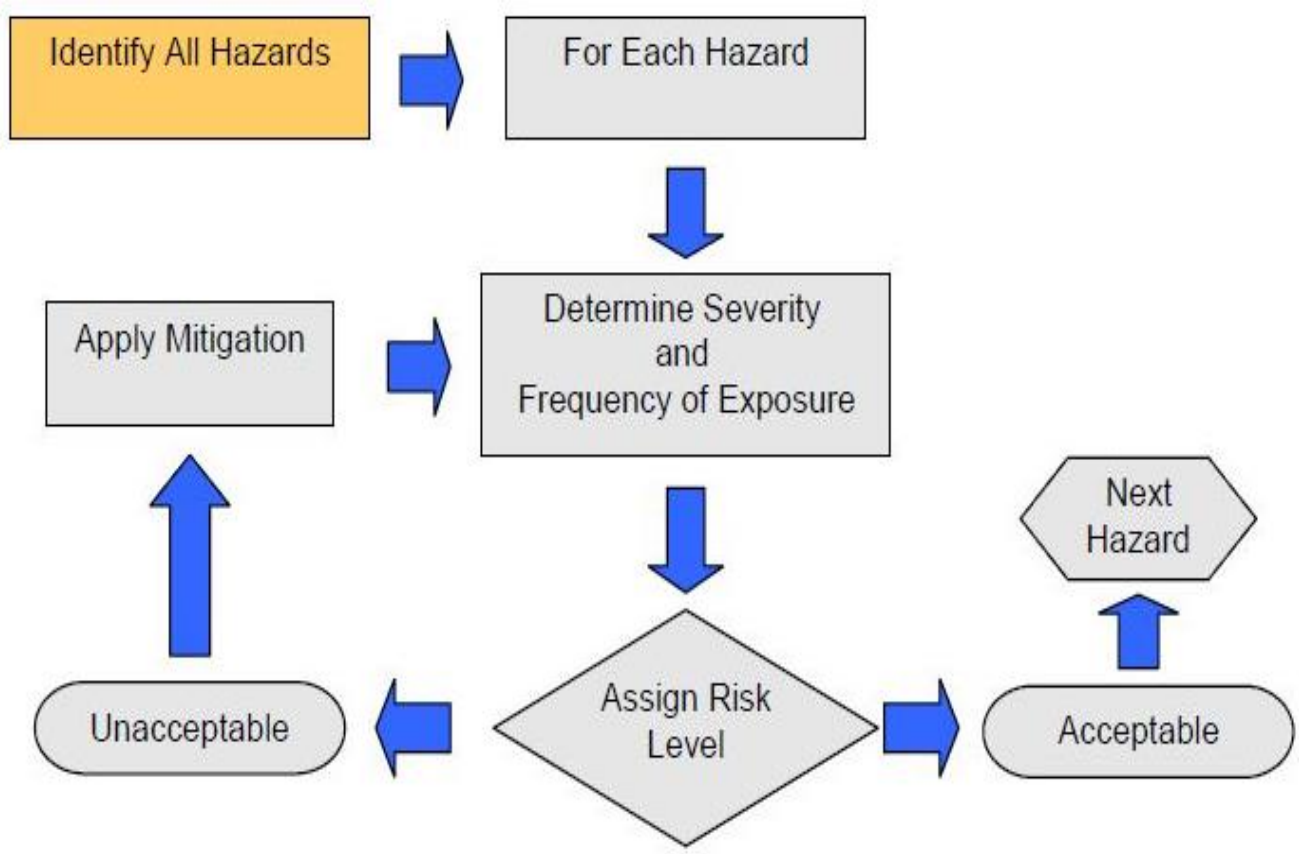
Ref No.	PHASE	ACTIVITY (IES)	*CoH
001	Site Preparation	Site Preparation	B
002	Early Works	Excavation, Grading, Etc.	A
003	General	Vehicle / Heavy Transportation and Operation	A
004	General	Plant / Machine Operation (Static / Mobile)	B

005	General	Material Handling and Stacking	B
006	General	Working with Compressed Gases	A
007	General	Handling & Fabrication of Steel Bar	B
008	General	Handling of Timber/Woods	B
009	General	Removal, Collection and Disposal of Waste Material	B
010	General	Batch Plant / Crusher Plant Operation	A
011	General	Working at Heights	A
012	General	Confined Space working	A
013	General	Working with Hand Tools	C
014	General	Working with Portable Electric Tools	B
015	General	Working with Hazardous Substances and Chemical	A
016	General	Crane Lifting (Tower / Mobile)	A
017	General	Project / Workplace Security	B
018	General	Cartridge / Powder Operated Tools Operation	A
019	General	Working with Asbestos & other synthetic mineral or fibers	A
020	General	Working with Abrasive Blasting or High pressure operations	B
021	General	Housekeeping	C
022	Temporary Works	Erection / Dismantling of Scaffolding	A
023	Temporary Works	Installation of Temporary Power and Lighting	A
024	Temporary Works	Fabrication of Formworks (Carpentry)	C
025	Temporary Works	Installation and Dismantling of Formworks/Shuttering	B
026	Architectural Works	Doors, Windows and Fixtures Installations	C
027	Architectural Works	Tile Works	B
028	Architectural Works	Painting Works	B

029	Civil Works	Rock Drilling / Pile Driving	A
030	Civil Works	Steel Fixing	B
031	Civil Works	Steel Erection	A
032	Civil Works	Excavation	A
033	Civil Works	Backfilling, Levelling and Compaction	B
034	Civil Works	Concreting Works	B
035	Mechanical	Grinding and Gas Cutting	B
036	Mechanical	Welding	B
037	Mechanical Installation	Installation of Pipeline and Valve Fittings	B
038	Mechanical Installation	HVAC	B
039	NDT	Radiography Works	A
040	Electrical Installation	Cable Drum Handling	B
041	Electrical Installation	Cable Pulling	B
042	Electrical Installation	Cable and Cable Tray Laying / Cable Termination	B
043	Electrical Installation	Electrical Works (Power Energizing / Termination)	A
044	Electronics and Instrumentation	Electronics & Instrumentation (Installations / Termination)	B
045	Commissioning	Cleaning / Flushing / Steam Blowing	B
046	Commissioning	Leak Testing / Pressure Testing / Loop test	A
047	Pre-Commissioning	Equipment and Facility Testing	A

* CoH = Class of Hazard

8. HAZARD IDENTIFICATION PLAN (HIP) FLOW CHART



9. HAZARD IDENTIFICATION AND CONTROL PROGRAMME

Phase: GENERAL			CLASS OF HAZARD: C	
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Reference**
001	**Office works and Site Preparation** - Design Engineering - Site visit/mobilization - Commute to	Used of defective office furniture, Equipment and etc.	1. Office equipment including furniture shall be assemble and inspect by competent person 2. All office equipment including furniture shall properly use according to its purpose 3. All office equipment including furniture shall be clean and maintain in good condition prior to use. 4. All identified damaged furniture's or equipment shall remove immediately from office area and place in quarantine area with safety sign posted "DAMAGED DO NOT USE"	**General**

	site - Site Clearing - Site Survey - Soil Testing - Earth Moving	Slip, trip or fall from same level	1. During a floor mopping, ensure to provide mopping equipment to avoid water spill to the floor. 2. Ensure to isolate under mop area by providing barricade and warning signs 3. Floor cleaning shall be wear anti-slip resistant shoes 4. Electrical extension/s cable management 5. Filing cabinet door, table/desk drawer must be close at all time	
		Fire	1. Ensure all office staff and utility personnel shall understand the fire escape route or exit point 2. Ensure dedicated fire warden shall assign in the office 3. Fire push alarms including smoke detections must be properly working 4. Ensure all electrical outlet and extension are properly inspected by competent electrician. 5. Use approved electrical extensions 6. extension cords shall be protected by an overcurrent protection device (e.g., panel mounted circuit breaker or in-line fuse).	
	Office and Site Preparation - Design Engineering - Site	Ergonomics	1. Proper selection of furniture's such chairs and desk 2. Conduct ergonomic safety meeting in monthly basis 3. Ergonomic safety awareness shall be posted in bulletin boards 4. Ensure proper illumination inside offices 5. Notice regarding Noise shall be posted in strategic areas inside the office 6. Proper manual handling when carrying office materials or equipment	**General**

	visit/mobilization - Commute to site - Site Clearing - Site Survey - Soil Testing - Earth Moving	Poor hygiene	1. Promote proper hygiene inside the office 2. Wash and toilet rooms must be properly clean at all time 3. Hand soap, sanitizer and tissue shall provide inside the wash rooms and toilet 4. No eating I allowed inside the office early 5. Pantries shall housekeep at all time Waste bins shall be provided with lid covers and disposed regularly	
		No Safety orientation and training required on site	1. Contractor companies shall ensure that their employees and subcontractor employees who are new to a particular work site attend and pass their own company's safety orientation, as well as any facility safety orientation that may be required by the SAPO. 2. Contractor shall establish a short service employee (SSE) program. This program shall include identification of new or inexperienced personnel so others may take extra care in their presence and provide additional assistance. 3. Contractor shall ensure that job-skills/craft and safety training fully qualify personnel to perform their job properly and safely. 4. SA reserves the right to test/verify the job skills/craft competency and qualifications of contractor's employees and to remove any employee failing this test/verification.	**CSAR 8.2**

		Defective service vehicles or bus/disregards traffic safety rules	1. CONTRACTOR shall ensure CONTRACTOR Personnel comply with all Kingdom of Saudi Arabia and SAUDI ARAMCO traffic safety rules, laws and regulations, including GI 6.030, Traffic and Vehicle Safety, paying particular attention to the Vehicle Condition and Driver Responsibilities listed in Supplement-I of GI 6.030. Vehicles that are not in good condition shall not be used. 2. CONTRACTOR shall ensure that passengers only travel in vehicles that are provided with air conditioning and passenger seats. Seat belts shall be installed for all seats and used in all vehicles carrying personnel. 3. Contractor and their subcontractors shall provide safe and adequate transportation to and from the work site for their employees. 4. The contractor shall install and maintain roads as needed to access the work site (e.g., for remote capital projects). 5. Contractor's employees shall be transported in the passenger compartments of motor vehicles equipped with seat belts for all occupants. All seats in cars and trucks shall face forward. 6. Motor vehicles and buses shall be in good working order. Documented inspections shall be performed for motor vehicles and buses at least monthly. Motor vehicles and buses shall be maintained in accordance with the manufacturer's instructions. The APO reserves the right to require removal and replacement of any motor vehicle or bus deemed unsafe or unfit for its intended purpose. 7. Contractor site management shall develop and implement a remote area	**SA Schedule D Section 10** **CSAR 4.15**

			travel program to control travel and provide for any necessary search and rescue of their employees in remote areas.	
		Collision with other equipment / worker Interface	1. Drivers, operators and banks men trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. AMIRAL hot work permit shall be obtained prior to the use of equipment with internal combustion engines in restricted areas per GI 2.100. 3. Mechanical and heavy equipment shall be inspected on a regular basis by a competent heavy equipment inspector or mechanic as per the manufacturer's recommendations. In addition, equipment covered under GI 7.030 shall have a valid inspection sticker issued by SA or an SA-approved third-party inspection agency. 4. Pre-use inspections shall be conducted on all mechanical and heavy equipment 5. Reverse/backup alarms shall be audible at a level at least10 dB above ambient noise on all heavy equipment 6. Personnel to establish contact with driver/operator before approaching vehicle. 7. As possible, entry to earth working area shall be barricaded and prohibited. 8. Follow speed limit	CSM III-2 – Mechanical and Heavy Equipment Schedule B Attachment 1 Exhibit II

			9. Prohibit use of mobile phone during operation and driving. 10. Prohibition to use and operate equipment/plant when under the influence of intoxicants or medications which cause impairment to physical mobility and judgment while operating the equipment 11. Exclusion / work zones established 12. Follow traffic signal, safety signs and signage 13. People wearing reflectorized vest 14. Trained grounds men or flagmen shall be used when human traffic is present in a heavy equipment work area. 15. All earthmoving and construction equipment at the Job, Laydown, and Fabrication Sites shall have both PWAS and RVCCCS installed, tested, and operating at all times. 16. Only authorized personnel shall be allowed to enter the work area where mechanical and heavy equipment is in operation. When entering the work area, authorized personnel shall make direct eye contact with the equipment operator(s) to ensure their presence is known. 17. No any personnel shall rest or sleep (e.g., seek shade) under or around mechanical or heavy equipment at any time. 18. Ensure to get permit to enter the area. 19. Supervisor to ensure there is no communication barrier.	

		Excessive Noise	1. Establish preventative maintenance and ensure all equipment are periodically inspected, serviced, repaired and maintained as necessary. 2. Equipment will be fitted with noise-reducing devices. 3. Earthwork working time shall be limited or shall be schedule on time where only limited persons will be exposed. 4. Use of PPE (Hearing protection devices – Ear plugs, ear muffs, etc.) 5. Areas having occupational noise levels exceeding 85 dB(A) shall be regulated as Noise Hazard Areas. The area boundaries and entrances shall be posted with warning signs requiring hearing protection. Additional means of delineating the areas may also be used, such as outlining with painted lines or chain link fencing.	AMIES-A-105 Noise
		Dust	1. Site speed limits will be set and strictly enforced. 2. Provision for water sprayer to control generation of dust during operation. 3. Earth material disposal & transportation shall be provided with covers.	CSM II-11 – Road Works

		Effects of Weather and Environment	1. Use of suitable and appropriate PPEs (Clothing, Mask, Goggles, etc.) 2. Provision of appropriate drinking supplement (ORS, etc.) 3. Provide drinking water stations (e.g., coolers with chilled or ice water) for workers and remind them to drink plenty of water even if not thirsty. 4. Designated shaded break/rest areas shall be provided at distance not greater than 100 m (330 ft) from personnel working in direct sunlight for extended periods of time. When feasible, shade is to be provided for work areas, including single shades to accommodate flagmen, etc. Provision for First-aid and Emergency plans & arrangement 5. Stop operation during high winds, low visibility due to fog, heavy rain or sand storm. 6. Workers shall be encouraged to drink plenty of water prior to the start of each shift. Ample supplies of cool drinking water shall be located within 100 m (330 ft) walking distance of each worker and in all designated break/rest areas. 7. The level of risk is communicated to all workforce by means of colored flag. • Red flag will be raised if heat index is equal or greater than 52 deg. Celsius • Orange flag will be raised if heat index is between 39-51 deg. Celsius • Yellow flag will be raised if heat index is between 30-38 deg. Celsius 8. Suitable warnings for Sand storm, Sun-stroke.	CSM I-13 – Heat Stress

Phase: EARLY WORKS				CLASS OF HAZARD : A
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Reference**
002	**Excavation, Grading, Etc.** Movement and operation of Heavy Equipment / Mobile plant	Defective and/or failure of Equipment / Mobile Plant	1. Pre-inspection of all heavy equipment / mobile plant prior to entry by competent and authorized Hyundai E&C representative. 2. Equipment operators' daily equipment inspections prior to use (360° walk-around) 3. Defects discovered immediately reported, documented and corrected prior to commencing work activities. 4. Equipment operator's awareness/accountability to maintain the equipment/plant in safe operating condition in accordance to manufacturer's instruction manual. 5. Follow periodic maintenance schedule	CSM III-2 – Mechanical and Heavy Equipment

		Collision with other equipment / worker Interface	1. Drivers, operators and banks men trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. Equipment fitted with alarms/flashing lights & other visible safety devices. 3. Personnel to establish contact with driver/operator before approaching vehicle. 4. As possible, entry to earth working area shall be barricaded and prohibited. 5. Follow speed limit 6. Prohibit use of mobile phone during operation and driving. 7. Prohibition to use and operate equipment/plant when under the influence of intoxicants or medications which cause impairment to physical mobility and judgment while operating the equipment 8. Exclusion / work zones established 9. Follow traffic signal, safety signs and signage 10. People wearing reflectorized vest 11. Provision of banks man / signal man 12. All heavy equipment specified from SA Schedule B shall equipped with Proximity Warning Alert System such PWAS Censor that can defect within 6m distance and 360 deg. RVCCCS-rear view closed circuit camera system. 13. Trained Flagman shall position near the entrance to monitor unauthorized entry	CSM III-2 – Mechanical and Heavy Equipment

	Continue . . . **Excavation, Grading, Etc.** Movement and operation of Heavy Equipment /	Equipment Tipping-over / Roll-over	1. Drivers, operators and banks men trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. Operator's knowledge of the limitations and safe operation of equipment in accordance to manufacturer instruction manual. 3. Equipment fitted with safety devices (Roll Over Protection System (ROPS)	CSM III-2 – Mechanical and Heavy Equipment
		Dust	1. Site speed limits will be set and strictly enforced. 2. Provision for water sprayer to control generation of dust during operation. 3. Earth material disposal & transportation shall be provided with covers.	CSM II-11 – Road Works
		Excessive Noise	1. Establish preventative maintenance and ensure all equipment are periodically inspected, serviced, repaired and maintained as necessary. 2. Equipment will be fitted with noise-reducing devices. 3. Earthwork working time shall be limited or shall be schedule on time where only limited persons will be exposed. 4. Use of PPE (Hearing protection devices – Ear plugs, ear muffs, etc.)	AMIES-A-105 Noise

	Mobile plant	Effects of Weather and Environment	1. Use of suitable and appropriate PPEs (Clothing, Mask, Goggles, etc.) 2. Provision of appropriate drinking supplement (ORS, etc.) 3. Regular rest breaks and rest facilities (shades, rest rooms, etc.) 4. Provision for First-aid and Emergency plans & arrangement 5. Stop operation during high winds, low visibility due to fog, heavy rain or sand storm. 6. Monitor the changes of weather conditions.	CSM I-13 – Heat Stress

Phase : GENERAL				CLASS OF HAZARD : A
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**
003	**Vehicle / Heavy Transportation and Operation**	Poor Traffic flow / Interface (Collision with Vehicle / Pedestrian)	1. Exclusion / work zones established 2. Use of traffic signal, safety signs and signage 3. People wearing reflectorized vest 4. Traffic spotters within work zones 5. All drivers shall not exceed the posted speed limit on site at any time 6. Reflective triangles shall be used to warn approaching traffic if a damaged vehicle is blocking traffic or is stopped on the road	CSM 1-8 – Traffic and Vehicle Safety
		Poor road condition	1. Roads and other route inside the construction site regularly maintain in good condition (levelled, compacted and barricaded)	CSM II-11 – Road Works

	Vehicle / Heavy Transportation and Operation	Contact with structures / overhead lines	1 . Install height gauges, made from non-conducting material, distinctively marked with red and white stripes or bunting. 2. Display signs and signage 3. Goal posts of the corresponding height shall be installed at a minimum of 25 meters' horizontal distance from the power line, or as recommended by the AMIRAL Power Operations Department, to warn and assist the operator in determining the Safe-approach distance. 4. Work area checked for presence of overhead power lines and adjacent structure. Line Voltage / Absolute Limit of Approach Up to 50,000 volts: 3.1 meters / 10 feet 50,000 ~ 250,000 volts: 6.1 meters / 30 feet Over 250,000 volts: 7.6 meters / 25 feet	CSM III-3.7 – Working Near Overhead Power lines and Underground Cables
		Incorrect operation or abuse of equipment	1. Drivers, operators trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. Ensure operators has in-depth knowledge and trained under different operational condition. 3. Follow manufacturer instruction manual / operational procedure	G.I. 7.025 – Heavy Equipment Operator Testing and Certification
		Ergonomic (Poor visibility)	1. Adequate lighting / illumination of work area during loading and unloading. 2. The streets/roads/ without lighting shall be equipped with traffic signs that: a. forbid pedestrian traffic and traffic of vehicles other than trucks, bus and cars	CSAR 4.15 - Transportation

			b. restrict vehicle speed limits for night periods c. forbid the vehicle stop or parking along the streets/roads.	
		Ergonomic (Inadequate work space and obstructions to work area)	3. Ensure there is adequate space for equipment maneuvering 4. Clear area of obstructions	CSAR 4.15 - Transportation
		Fall of Passengers due to lack of control	1. Employees only permitted to ride in vehicles designed to carry personnel. 2. No personnel are permitted to ride in the bed or trunk of a truck. 3. All seats shall be required with seat belts and shall be worn at all times during travel. 4. Employees shall open and close door only when vehicle is stopped. 5. Driver shall ensure all personnel getting or getting out before moving vehicle.	CSAR 4.15 - Transportation
	Continue . . . **Vehicle / Heavy Transportation and Operation**	Defective and/or failure of part during operation	1. Pre-inspection of all heavy equipment / mobile plant prior to entry by competent and authorized HDEC representative. 2. Equipment operators' daily equipment inspections prior to use (360° walk-around) 3. Defects discovered immediately reported, documented and corrected prior to commencing work activities. 4. Equipment operator's awareness/accountability to maintain the equipment/plant in safe operating condition in accordance to manufacturer's instruction manual. 5. Follow periodic maintenance schedule	CSM III-2 – Mechanical and Heavy Equipment

		Effects of Weather and Environment (Hot / Cold)	1. Use of suitable and appropriate PPEs (Clothing, Mask, Goggles, etc.) 2. Provision of appropriate drinking supplement (ORS, etc.) 3. Regular rest breaks and rest facilities (shades, rest rooms, etc.) 4. Provision for First-aid and Emergency plans & arrangement 5. Stop operation during high winds, low visibility due to fog, heavy rain or sand storm. 6. All the work permits shall be considered closed automatically during the pause period, while job is restarted all the permits shall be re-endorsed including all the supplementary permits / certificates such as a scaffold inspection certificates, gas test etc.	CSM I-13 – Heat Stress
		Fall to open pits / excavations	1. Clear marking on roads provided and fencing off excavation areas 2. Provide banks man to guide the vehicle and warn personnel 3. Open Pits shall be marked and barricaded.	CSM II-11 – Road Works
		Contact during Loading / Unloading (L/UL) Works	1. Selection of vehicle / equipment to be use (appropriateness for the task) 2. Loading / unloading operations carried in designated area 3. Loads secured, delivery and handling equipment compatible 4. Vehicles breaking system activated and stabilized to prevent movement. 5. L/UL area controlled to avoid unauthorized entry during the activity	CSAR 4.15 - Transportation

	Continue . . . **Vehicle / Heavy Transportation and Operation**	Third-party delivery trucks	1. Sit Acceptance Checklist (Safety Pass) • The safety pass must be completed by the supplier at their facility before sending the truck to site. • It must be verified by the site safety officer and site supervisor when the truck arrives. 2. Site Induction • The site safety officer must give an induction using the attached training material.	CSM 1-8 – Traffic and Vehicle Safety

Phase : GENERAL			**CLASS OF HAZARD: B**	
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**
004	**Plant / Machine Operation (Static / Mobile)** - Generator - Water pump - Etc.	Caught-in by rotating / moving parts	1. Provision of Machine Guard / Screens 2. Emergency sensory switch and other safety devices 3. Isolation / Fencing 4. Good material arrangement and storage design 5. Moving machinery parts shall be guarded if located 2.5 m (8.2 ft) or less above the floor or working surface. This includes flywheels, shafts, pulleys and belt/chain drives. 6. Ensure guards shall be constructed so that no part of the body can contact the moving surface. Guards shall have openings no larger than 1.3 cm (0.5	CSM III-1 – Machine Guarding

			inches).	
		Fire	1. No refueling on-site (allowed only for exceptional conditions) 2. Provide fire extinguishers for each plant or units and in areas of work 3. Workers trained for use of fire extinguishers and emergency procedures 4. Avoid of plant/ machine over-use to prevent overheating.	CSM 1-7 – Fire Prevention
		Ergonomics (Over-exertion, poor positioning)	1. Intermittent Rest / Breaks 2. Maintain good sitting and posture 3. Provide properly designed siting and work-station	CSM I-12 – Material Handling
		Contact with hazardous substances (oil and other chemical)	1. MSDS/CHB available at point of use and trained for its use. 2. Hazardous substances correctly labelled and in proper containers. 3. Availability and issuance of appropriate PPE's 4. Provision and availability of emergency kit and emergency eye wash stations 5. Emergency eye wash station installed and maintained in accordance with AMIES-B-069.	CSM 1-10 – Hazardous Materials
		Electric shock	1. Pre-use check of electrical parts/component for any sign of damage 2. If damaged, report immediately and do not use until repaired 3. If cannot be repaired, do not use. Return to storage or keep in lockable cabinet. 4. Regular maintenance of electrical components	CSM III-3 – Electrical Equipment GI 2.721. ELECTRICAL

			5. Only properly equipped technician who are trained and SA certified for the type of electrical/mechanical repair shall perform repair and maintenance work on electrical / equipment. 6. Provide Ground-fault circuit interrupters (GFCI's) to all portable equipment with electrical components. 7. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools 8. Contractor/Subcontractor employees who conduct electrical work/perform switching on electrical equipment operated at higher than 240 volts, must possess a valid Saudi Aramco Electrical Hazards Recognition (EHR) Certificate. 9. Personnel shall not wear rings, wristwatches, jewelry, or other similar metallic objects while working within arm's length of energized electrical equipment. 10. Metal ladders shall not be used when working on or near energized electrical equipment or conductors; only nonconductive ladders (e.g., wood, fiberglass) shall be used.	ARC FLASH HAZARD MITIGATION

	Continue . . . **Plant / Machine Operation (Static / Mobile**) - Generator - Water pump - Etc.	Effects of Weather and Environment (Hot / Cold)	1. Use of suitable and appropriate PPEs (Clothing, Mask, Goggles, etc.) 2. Provision of appropriate drinking supplement (ORS, etc.) 3. Regular rest breaks and rest facilities (shades, rest rooms, etc.) 4. Provision for First-aid and Emergency plans & arrangement 5. Stop operation during high winds, low visibility due to fog, heavy rain or sand storm.	Volume II (1-13) – Heat Stress
		Excessive Noise	1. Establish preventative maintenance and ensure all equipment are periodically inspected, serviced, repaired and maintained as necessary. 2. Plant / Machines shall be fitted with noise-reducing devices as practicable. 3. Provision for Noise containment cover / barrier wall 4. Use of PPE (Hearing protection devices – Ear plugs, ear muffs, etc.) 5. Intermittent rest breaks to reduce exposure	AMIES -A-105 Noise

		Ergonomic (Poor visibility) Slip, Trip, Fall	1. Adequate lighting / illumination of work area during loading and unloading. 2. Floor surface levelled, clear of debris and kept dry 3. Availability of spill kit 4. Provision of bund wall or bund tray (110% capacity of stored substance/ 5. chemical) 6. Housekeeping (Before start / After end of each shiftwork)	CSM I-4 – Temporary Walking andWorking Surface
Phase : GENERAL				**CLASS OF HAZARD: B**
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**

005	**Material Handling and Stacking**	Contact during material loading / unloading	1. Correct selection of plant / machine to be use (appropriate for the task) 2. Loading / unloading operations carried in designated area 3. Adequate room / space for movement and turning 4. Proper material arrangement and control of height of stacking 5. Material Storage and handling area controlled and fenced 6. Applicable road permits shall be obtained prior to transportation of wide, over-height or over-weight loads. The transportation of such loads shall comply with applicable Saudi Arab Government laws and AMIRAL requirements (e.g., movement may be restricted due to heavy traffic or prohibited from traveling during night time). The route shall be preplanned to check for adequate clearances, weight restrictions. An escort vehicle is required when transporting wide, over-height or over-weight loads within a AMIRAL facility.	CSM I-12 – Material Handling
		Incorrect operation or abuse of use	1. Drivers, operators trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. Ensure operators has in-depth knowledge and trained under different operational condition. 3. Follow manufacturer instruction manual and safe operational procedure 4. Approved Method Statement and Risk assessment must available prior to work	CSM I-12 – Material Handling
		Falling materials / Dropped object	1. Limit height of stacking (not over 2 meters height) 2. Load stacked in levelled and hard surface 3. Load package secured and stacked vertically (on center of gravity) 4. Load properly tied and supported 5. Use of approved lifting aid / points 6. Lumber shall be stacked such that it is stable and self-supporting and shall be on level and solidly supported sills. Piles shall not exceed 4.8 m (16 ft) in	CSM I-12 – Material Handling

			height if the lumber is handled manually or 6.0 m (20 ft) when handled with equipment. Used lumber shall have all nails removed before stacking. 7. All materials stored in tiers shall be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse.	
		Sharp Edges and Pointed object	1. Secure sharp edges with covers (rubber or other padding) 2. Provide pointed objects with cap or covers 3. Use appropriate PPE's 4. Sharp edges, odd sizes or shapes of loads, hazardous or fragile material, uneven weight distribution and routes of travel shall be taken into consideration when planning handling of materials.	CSM I-3 – Personal Protective Equipment (PPE) CSM I-12 – Material Handling
		Untidy and slippery surface	1. Material area kept tidy and daily housekeeping conducted 2. Oil, grease and wet surface are cleaned and kept dry 3. Provision for non-skid flooring arrangement (rubberized floor paint) 4. Provision for non-skid foot ware	CSM I-4 – Temporary Walking and Working Surface
		Ergonomic (Poor lifting, Awkward positioning)	1. Avoid lifting beyond physical capability 2. Intermittent rest / breaks 3. Use of mechanical lifting aids 4. Use buddy system or tandem lifting 5. Heavy materials requiring manual lifting shall be stored below waist height.	CSM I-12 (12.6) – Manual Handling

Phase : GENERAL				**CLASS OF HAZARD: A**
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**

006	**Working with Compressed Gases**	Fire / Explosion	1. Conduct of daily leakage test before and after use 2. Cylinders stored, transported and lifted in racks, supported in up-right position to prevent falling and secured at all times. 3. Cylinders segregated by type to prevent fire/explosion risk 4. Valve caps fitted to all gas cylinders when not in use and in storage. 5. Ensure to assign fire watch in all hot work activity 6. Cylinders involved in a fire shall be returned immediately to the supplier, alerting the supplier that the cylinders were exposed to a fire. 7. Water and dry chemical fire extinguishers shall be immediately available within 15 m (50 ft) of the storage area. 8. Personnel handling toxic gas cylinders shall be trained in the hazards of the gas they are handling and how to use a self-contained breathing apparatus (SCBA).	CSM 1-9 – Compressed Gas Cylinder
		Flying object / parts	1. Valves, gauges and other fittings regularly inspected for cracks or damages 2. Only trained worker to handle and operate cylinder valves and gauges	CSM 1-9 – Compressed Gas Cylinder
		Asphyxiation / Irritation	1. Conduct daily leakage test before and after use 2. Provision for hand-held or portable gas/leak detector and monitoring devices 3. Provision for adequate ventilation	CSM 1-9 – Compressed Gas Cylinder
		Incorrect operation or abuse of use	1. Workers trained to the relevant training acceptable to local and SA regulations for competency and certification. 2. Follow safe work instruction manual and safe operational procedure	CSM 1-9 – Compressed Gas Cylinder

			3. Supervisors correctly and closely supervising and monitoring works 4. Use of approved appropriate tools and mechanical lift devices 5. Compressed gas cylinders shall be properly marked or labeled, including their contents, with lettering in Arabic and English as per AMIES-A-067 and CU 22.01. This includes all industrial, medical, laboratory and aviation bottled gases. 6. Cylinders shall not be placed in confined spaces or adjacent to excavations. 7. Flammable/combustible substances (e.g., oil, grease, volatile liquids) and corrosive substances shall not be stored in the same area as gas cylinders. 8. Cylinders shall not be stored at temperatures or locations that could result in the temperature of the cylinder exceeding 54 °C (130 °F). Outside cylinder storage areas shall have protective enclosures or sun shelters installed as needed to prevent cylinders from reaching 54 °C (130 °F)	

Phase : GENERAL				CLASS OF HAZARD: B
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**

007	**Handling & Fabrication of Steel Bar**	Trapping injuries	1. Workers trained in the proper handling and fabrication of steels 2. Workers to wear appropriate PPE's (gloves, eye goggles, steel-toe shoes) 3. Workers to practice team work to avoid caught-in injuries during handling 4. Only trained and experience operator to operate fabrication machines (cutting and bending machines)	CSM I-3 – Personal Protective Equipment (PPE)
		Incorrect operation or abuse of use	1. Follow correct manual lifting practice 2. Consider buddy-system during manual lifting and handling 3. Use of correct lifting devices such as mechanical lift 4. Use of taglines when lifted by cranes 5. Only trained, competent and authorized operator operates forklift 6. Only trained and authorized operator to operate cutting / bending machine 7. During fabrication works, ensure adequate room/space for movement 8. Provision for barricade to control work area and prevent unauthorized entry	CSM I-12 Material Handling
		Slips, Trip and Fall	1. Steels to be arrange accordingly and provided with wedge / sleepers 2. Cut steels to be immediately collected and removed 3. Left-over steel cuttings to be deposited in designated steel boxes	CSM I-12 Material Handling

		Exposure to extreme heat (hot / cold conditions or weather)	1. Suitable and appropriate use of PPE's (clothing as per weather conditions) 2. Provision of rest facilities or shaded area 3. Regular rest breaks 4. provision of oral rehydration fluids and availability of drinking fluid (hot/cold)	CSM I-13 Heat Stress

PHASE: GENERAL				CLASS OF HAZARD: B
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**

008	**Handling of Timber / woods**	Trapping injuries	1. Workers trained in the proper manual handling operation 2. Workers to wear appropriate PPE's (gloves, eye goggles, steel-toe shoes) 3. Workers to practice team work to avoid caught-in injuries during handling	CSM I-3 – Personal Protective Equipment (PPE)
		Sharp Edges and Pointed object	1. Secure sharp edges with covers (rubber or other padding) 2. Provide pointed objects with cap or covers 3. Use appropriate PPE's 4. Nails and timber shall remove or bent over	CSM I-3 – Personal Protective Equipment (PPE)
		Incorrect operation or abuse of use	1. Follow correct manual lifting practice 2. Consider buddy-system during manual lifting and handling 3. Use of correct lifting devices such as mechanical lift 4. Use of taglines when lifted by cranes 5. Only trained, competent and authorized operator operates forklift	CSM I-12 Material Handling
		Slips, Trip and Fall	1. Timber and woods to be arrange accordingly and provided with wedge / sleepers 2. Cut timber and woods to be immediately collected and removed 3. Left-over timber and wood cuttings to be deposited in designated boxes	CSM I-12 Material Handling

		Exposure to extreme heat (hot / cold conditions or weather)	1. Suitable and appropriate use of PPE's (clothing as per weather conditions) 2. Provision of rest facilities or shaded area 3. Regular rest breaks 4. provision of oral rehydration fluids and availability of drinking fluid (hot/cold)	CSM I-13 Heat Stress

PHASE: GENERAL	**CLASS OF HAZARD: B**

Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
009	**Removal, Collection and Disposal of Waste Material**	Ergonomic (Incorrect lifting)	1. Follow correct manual lifting practice 2. Consider buddy-system during manual lifting and handling 3. Use of correct lifting devices such as mechanical lift	CSM I-12 (12.6) – Manual Handling
		Exposure / contact to skin, body parts	1. Waste classified as hazardous shall be collected by licensed and trained collection and disposal company (3rd party) 2. Availability of Material Safety Data Sheet (MSDS) 3. Waste to be collected, segregated according to type and deposited in appropriate bins and boxes. 4. Designated support workers trained in proper and correct collection, removal and disposal of waste. 5. Use of appropriate PPE's (Safety Goggles & appropriate gloves depending on the type of waste material collected, suitable clothing, etc.) 6. Provision of periodic medical check and vaccination for workers assigned in waste collection, removal and disposal works 7. Waste minimization and proper waste management will be vigorously promoted to encourage and assist employees in protecting the environment.	CSM I-3 – Personal Protective Equipment (PPE) GI 0430.001 (IMPLEMENTING THE SAUDI ARAMCO HAZARDOUS WASTE CODE)

		Asphyxiation from gases / fumes	1. Provide adequate ventilation 2. Use of appropriate PPE's (Mask with correct filter-cartridge) 3. Contractor site supervision shall ensure that trash and debris is properly collected and disposed of daily. 4. CONTRACTOR shall establish a site-specific waste management plan.	CSM I-3 – Personal Protective Equipment (PPE) CSAR 10.20 Housekeeping
		Movement of collecting vehicle / equipment	1. Adequate room / space for movement and turning 2. Assign signaler or spotter when maneuvering / reversing 3. Area controlled from unauthorized entry 4. Close supervision during removal, collection and loading activities.	

Phase : GENERAL				CLASS OF HAZARD: A
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**
010	**Batch Plant / Crusher Plant Operation**	Silica Dust and other dust particle	1. Site speed limits will be set and strictly enforced. 2. Provision for water sprayer to control generation of dust during operation. 3. Earth material disposal & transportation shall be provided with covers. 4. Empty cement bags shall not be allowed to accumulate in the work area.	CSM III-2 Section 2.11 Concrete Mixers and Batch Plants
		Excessive Noise	1. Establish preventative maintenance and ensure all equipment are periodically inspected, serviced, repaired and maintained as necessary. 2. Plant / Machines shall be fitted with noise-reducing devices as practicable. 3. Provision for Noise containment cover / barrier wall 4. Use of PPE (Hearing protection devices – Ear plugs, ear muffs, etc.) 5. Intermittent rest breaks to reduce exposure	AMIES -A-105 Noise

		Caught-in by rotating / moving parts	1. Provision of Machine Guard / Screens 2. Emergency sensory switch and other safety devices 3. Isolation / Fencing 4. Good material arrangement and storage design	CSM III-1 Machine Guarding
		Ergonomics (Poor visibility, repetitive movement, over-exertion	1. Intermittent Rest / Breaks 2. Maintain good sitting and posture 3. Provide properly designed siting and work-station 4. Provide adequate lights or illumination	CSM I-12 (12.6) – Manual Handling

		Electric shock	1. Pre-use check of electrical parts/component for any sign of damage 2. If damaged, report immediately and do not use until repaired 3. Regular maintenance of electrical components 4. Only properly equipped technician who are trained and SA certified for the type of electrical/mechanical repair shall perform repair and maintenance work on electrical / equipment. 5. Provide Ground-fault circuit interrupters (GFCI's) to all portable equipment with electrical components. 6. Practice Lock-out/Tag-out 7. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools.	CSM III-3 Electrical Equipment

	Continue . . . **Batch Plant / Crusher Plant Operation**	Fire / Explosion	1. Conduct of daily inspection of batch plant area. 2. Maintain cleanliness and remove combustible materials 3. Stored flammable substances to appropriate containers and storage. 4. Provide fire extinguishers for each plant or units and in areas of work 5. Workers trained for use of fire extinguishers and emergency procedures 6. Avoid of plant/ machine abuse to prevent overheating. 7. Do not overload electrical equipment and other electrical devices 8. Ensure to assign fire watch in all hot work activity	CSM I-7 – Fire Prevention
		(Poor visibility)	1. Adequate lighting / illumination of work area during loading and unloading.	CSM I-12 (12.6) – Manual Handling
		Asphyxiation	1. Provide adequate ventilation in and around the batch plant area 2. Use of appropriate PPE's (Mask with correct filter-cartridge)	CSM I-3 – Personal Protective Equipment (PPE)
		Exposure to extreme heat (hot / cold conditions or weather)	1. Suitable and appropriate use of PPE's (clothing as per weather conditions) 2. Provision of rest facilities or shaded area 3. Regular intermittent rest breaks 4. Provision of oral rehydration fluids and availability of drinking fluid (hot/cold)	CSM I-13 Heat Stress

		Slips, Trip and Fall	1. Ground or floor surfaces maintained leveled, dry and clear of any debris. 2. Stairs, ladders and other access provided with handrails 3. Cables, hoses and other objects which can cause tripping hazard are readily remove or corrected.	CSM I-4 – Temporary Walking and Working Surface

PHASE: GENERAL				CLASS OF HAZARD: A
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**
011	**Working at Heights**	Falling from elevation	1. All working at heights shall be required of Work Permit as per SA GI 2.100 2. Ensure ladder are fixed on base and tied at ledge to prevent movement. 3. Erect ladder at the correct angle (70 deg.) or using ratio of 4:1 (V:H) 4. Ensure ladder has no damage, missing rungs and remove dirt to avoid slips. 5. Always practice the 3-point contact when ascending / descending ladders (2-hands/1-foot or 2 feet/ 1 hand in contact) 6. Provide adequate safe access/egress to and from different WAH locations. 7. Ensure all workers are adequately trained for Working at Heights 8. Ensure workers are physically & medically fit in Working at Heights 9. Use full-body harness with double lanyard when working at heights. 10. Ensure lanyards hooked when moving around at elevations especially in open edges. 11. Anchor point shall be capable of supporting 5000 lbs./person per CSM II-5.6 12. Always maintain 100% tie off at all times in the unprotected elevated areas. 13. Only one person shall be on a portable ladder or stepladder at a time.	CSM II-5 Fall Prevention CSM-II-3 Ladder and step ladder

			14. If work is performed while standing on a ladder and the individual is more than 1.8 m (6 ft) above the ground/lower surface, a properly anchored personal fall arrest system (PFAS) shall be used, or if use of a PFAS is impractical one hand shall always be firmly grasping the ladder. 15. If the work is more than 1.8 m (6 ft) above the ground/lower surface and is long term in nature or requires heavy physical exertion, other methods such as a scaffold or personnel lift shall be used instead of a ladder. 16. Shock-absorbing lanyards shall be either a “Y” lanyard (i.e., two lanyards sharing a common deceleration device) or double-leg lanyard in order to protect the user during hooking/unhooking transitions. 17. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	
		Dropped loads / Falling object	1. Ensure materials are not stored/stacked near open edges / open floors 2. Provide hand tools / portable tools with tool-ties to prevent accidental falling. 3. Use tool-bags to store other tools 4. Provide guardrails, toe-boards on scaffold platforms as per SA GI 8.001 5. Provide overhead covers, roof guard or safety netting	GI 8.001
		Contacts with overhead electrical services	1. Avoid working near electrical services (maintain min. safe distances = 10ft.) 2. Use protective and insulated guard or shield 3. Ensure work platform is protected with accidental live contact 4. If possible, isolate work area and turn-off power sources	CSM III-3.7 – Working Near Overhead Power lines and Underground Cables

	Continue . . . **Working at Heights**	Incorrect operation or abuse of use of MEWP	1. Ensure MEWP's are inspected by SA approved 3rd party inspectors and erected by SA certified operators & on stable, level ground 2. Conduct pre-use inspection and do not overload 3. If provided with out-rigger, ensure all out-riggers are fully extended 4. Do not travel MEWP when platform is raised 5. Suspend work & lower MEWP when high winds is over the allowable speed	GI 7.025 – Heavy Equipment Operator Testing and Certification
		Fragile Roof / work platform (scaffold)	1. Ensure roof surface are strong and sturdy 2. Ensure scaffold erected and inspected by trained scaffold erectors and inspector. 3. Ensure scaffold has no missing components 4. Do not use partially erected / dismantled scaffold. 5. Scaffold planks shall not be used as concrete forms, excavation shoring or as sills for scaffolds. 6. Scaffolds and scaffold components shall not be loaded in excess of their load rating, which shall be noted on the scaffold tag. See GI 8.001.	CSM II-2 Scaffolding
		Floor opening and open edges	1. Provide covers on all floor gaps / opening or fixed barricade all floor openings 2. Provide edge protection barriers on all unprotected edges. 3. Provide safety nets on strategic areas as practicable	CSM II-2 Scaffolding

PHASE: GENERAL			CLASS OF HAZARD: A	
Ref. No.	**List of Activity/(ies)**	**Hazards**	**Control Measures**	**Remarks**
012	**Confined Space Working**	Fires / Explosions	1. All works in a Confined space shall be required of Work Permit as per SA GI 2.100 2. Ensure all workers involved are trained in Confined Space working 3. Atmosphere tested before entry and during occupation as per SA GI 2.709 4. Ensure that a confined space rescue plan is in place for every confined space entry or activity 5. Remove any combustible materials 6. Never place cylinders inside the confined space when working. 7. Establish and communicate emergency plan and procedure to kept workers safety alertness 8. Provide at least one (1) fire extinguisher on each confines space entry points (appropriate to the type of fire hazard material present 9. Residual current devices (RCDs), including ground fault circuit interrupters (GFCIs) and earth leak current breakers (ELCBs), shall be utilized on all electrical-powered equipment (including portable lighting) used inside a confined space regardless of the electrical classification of the space. 10. Hot work shall not be permitted if the atmosphere is above 0% of the LEL. 11. Flammable/toxic gases or vapors vented from a confined space shall be	CSM I-7 – Fire Prevention CSM 1-6 Confined space

			removed in such a manner that the venting does not pose a risk to employees, equipment, or operations. Precautions shall be taken to eliminate potential sources of ignition in areas where flammable gases or vapors are vented. 12. Ignition sources shall be eliminated or controlled within a confined space. If ignition sources are present (e.g., sparks or open flames), a hot work permit shall be issued and periodic gas tests, or continual gas monitoring, as applicable, shall be performed.	
		Toxic and flammable gas leak / release	1. Atmosphere tested before entry and during occupation as per SA GI 2.709 2. All workers involved are trained in Confined Space working 3. Provision of fixed, mobile and portable gas detector and safety alarm devices to detect any form of leak / release 4. Train workers in the use, detection and action responses during gas leak / releases 5. Periodic inspections of fixed, mobile and portable gas detector units and alarm devices to ensure serviceability and functionality of the gas detector units and alarm devices. 6. Flammable/combustible materials shall not be stored inside a confined space.	GI 2.709 Gas Testing Procedure CSM 1-6 Confined space
		Entrapment / Engulfment (drowning)	1. Identify confined spaces with the potential for entrapment / engulfment and properly conduct risk assessment. 2. Ensure all potential source of any form of liquid or a fine flowable solid such as sand, gravel, etc. shall be identified and controlled. 3. All potential means of delivery of liquid or flowable solids such as pipes/ hoses shall be closed including conveyors or slides to ensure the possibility of material to enter the confines spaces are blocked.	GI 2.709 Gas Testing Procedure CSM 1-6 Confined space

			4. Before entering confine spaces with liquid or flowable solid, ensure that the space are drained, vacuumed or pumped clear of all liquid / flowable solids. 5. Isolation and Lockout/Tagout of Confined Spaces. 6. A confined space entry plan shall be developed by the SAPO or the contractor (e.g., for a grassroots construction project) prior to entry into a confined space (see Section 6.5 for confined space entry plan requirements).	
	Continue . . . **Confined Space Working**	Asphyxiation from gases / fumes or lack of oxygen	1. Atmosphere tested before entry and during occupation 2. Provide adequate ventilation 3. Use of appropriate PPE's (Mask with correct filter-cartridge) is available and use where necessary 4. Confined space entry is not permitted at concentrations above 23.5% O2, at or above 10% LEL, above 1,000 ppm CO, above 100 ppm H2S, or above the IDLH of any other potential toxic gas. 5. Carbon dioxide (CO2) type fire extinguishers shall not be used inside enclosed confined spaces.	CSM I-3 – Personal Protective Equipment (PPE) CSM 1-6 Confined space
		Inadequate Access / Egress	1. Provide adequate size of opening or access/egress large enough to allow passage of worker with protective PPE's 2. Provide adequate means of safe access/egress to and from different confined spaces (i.e. proper ladder, platform or other approved means of safe access) 3. If the confined space entry activity is suspended, the entry point(s) shall be barricaded and a "NO ENTRY" sign shall be posted.	CSM I-6 – Confined Spaces

		Uncontrolled CS entry	1. Ensure all activities that require persons to work within confined spaces are identified and recorded 2. Ensure all identified confined spaces are clearly marked and signs posted with languages appropriate for understanding and comprehension of the exposed workforce 3. Ensure all access to confined spaces are restricted and controlled with permit and CSE checklist properly accomplished and signed to ensure requirement are met. 4. Prior to entry, ensure that a proper and appropriate risk assessment has been conducted and all precautions are identified and satisfied before entry. 5. Ensure to assign trained confine space entry supervisor to control and monitor entry and exercise the duties under Sec. 6.4.1 foe CSES responsibilities under SA CSM. 6. Assigned a trained standby watchman on all possible confined space entry equipped with adequate means of communication.	CSM I-6 – Confined Spaces
		Other hazardous energy sources such as electrical / mechanical/ pneumatic, etc.	1. Identify, de-energize and locked-out all potential energy sources within the confined space prior to entry 2. All pipes shall be physically disconnected or isolation blanks bolted. 3. Compressed gas cylinders shall not be placed in a confined space. 4. Confined Space Entry may require training personnel before entering and to check fitness. 5. Continuous adapted gas monitoring in confined spaces is required. It is strongly recommended to put in place a physical barrier to prevent	CSM I-6 – Confined Spaces

			entering the confined space when work activities ceased. 6. Ensure a dedicated rescue plan is done and enforced prior executing the work (including drills). Also, a rescue plan shall be prepared and submitted to Company with the wok permit.	
		Slips, Trip, Fall	1. Ensure all floor surfaces inside confined space are clean and dry from liquids or other form of substance that may render the surface slippery. 2. Ensure to use appropriate footing (non-slip soles) 3. Fall protection (e.g., full-body harness/lanyard, scaffolding) shall be used if personnel could fall more than 1.8 m (6 ft) when working inside the confined space.	CSM I-4 – Temporary Walking and Working Surface

Phase : GENERAL				CLASS OF HAZARD : C
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
013	Use and handling of Hand Tools	Pinch-point (trauma injuries)	1. Workers trained for the use of hand tools 2. Use correct type and size of hand tools for the task. 3. Proper positioning, posturing and sitting 4. Worker to follow safe work practice 5. Avoid the use of modified or damage hand tools	CSM I-11 – Hand Tools and Power Tools
		Sharp / Pointed edges (cuts / lacerations)	1. Make sure all cutting edges, teeth, etc., are adequately covered or otherwise protected. 2. Use only correct and suitable blades, tooth for the material to be cut. 3. Never leave tools lying in walkways or any place where it could pose trip over. 4. Use of appropriate PPE's for the task (Hand gloves) 5. For longer term storage, lock up in boxes or suitable tool containers.	CSM I-11 – Hand Tools and Power Tools

		Ergonomic (joint pain/ pulled string)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure	CSM I-11 – Hand Tools and Power Tools

Phase : GENERAL				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
014	Use and handling of portable operated tools Electrically operated Air-operated Abrasive wheels	Pinch-point (trauma injuries)	1. Check and test tools for any sign of damage to the unit or cable prior to use 2. If damaged, report immediately and do not use until repaired 3. If cannot be repaired, lock-up or quarantine into lockable cabinet. 4. Disconnect from power if not in use or before changing blades, disc or bits. 5. Regular maintenance of electrically operated tools, use of RCD's 6. Never allow repair, modification of untrained and unauthorized technician. 7. Follow hand power tools safe work procedures and instructions	CSM I-11 – Hand Tools and Power Tools
		Caught-in	1. Provide safety guards, covers or screens to avoid contact 2. Do not wear loose clothing and use appropriate PPE's 3. Keep hands and fingers on a safe distance moving/rotating parts	CSM III-1 Machine Guarding

		Flying object, Dust or silica particle	1. Do not remove cover, safety guard of tools 2. Direct path of work away from you and other workers 3. Fence off or provide cover / shield when grinding / cutting 4. Use appropriate type of PPE's (dust mask, face shield and safety goggles) 5. Use correct type and size of blade, disc or wheels	CSM I-3 – Personal Protective Equipment (PPE)
		Vibration	1. Take regular breaks to relieve hands from vibratory fatigue 2. Use at the correct speed and proper positioning to avoid strain 3. Use anti-vibration gloves	CSM I-11 – Hand Tools and Power Tools
		Excessive Noise	1. Use and provide adequate and appropriate ear protection (muffs, plugs) 2. Provide barrier wall or barricade to reduce noise 3. Keep away to a safe distance to reduce excessive noise exposure 4. Use or install noise-reducing device to the tools	AMIES-A-105 Noise

		Accidental release of compressed air	1. Check hose and pipes before use. 2. Do not bend or restrict hoses 3. Install whip arrestor on couplings or connections 4. Never direct nozzle / air jet to yourself or to other person. 5. Do not blow dust or dust off your clothing with air 6. Disconnect from air supply when not in use 7. Electrical equipment shall be rated (e.g., intrinsically Safe) as required for the specific electrical classification of the hazardous area. 8. Electrical equipment shall not be used in electrically classified locations, unless it is marked to show the class, group, and operating temperature for which it is approved. 9. Electrical equipment shall not be used in electrically classified locations, unless it is marked to show the class, group, and operating temperature for which it is approved.	CSM I-11 – Hand Tools and Power Tools CSM III-3 Electrical equipment

Phase : GENERAL				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
015	Working with Hazardous Substances and Chemical	Fire / Explosion	1. Control and segregation of waste and debris 2. Control of hot work (cutting, welding and grinding) 3. No smoking on non-designated places 4. Cylinders to be provided with cap 5. Separate storage areas for gases and flammable substances / liquids to prevent chemical reactions 6. Adequate space, head room and ventilation 7. Regular housekeeping to avoid accumulation of dust 8. Limit storage quantity 9. No decanting near energy or fire ignition sources 10. Provide fire extinguishers when working with hazardous substance Ensure to assign fire watch in all hot work activity	CSM I-7 – Fire Prevention
		Asphyxiation	1. Provide adequate ventilation 2. Conduct oxygen / gas testing and monitoring	GI 2.709 Gas Testing Procedure

		Accidental spills	1. Spillage contained and removed as soon as possible. 2. Provision of bund wall and spill trays on storage areas 3. Use of appropriate funnel to avoid spills 4. Limit amount of substance or liquid kept in the workplace 5. Provide spill kits on work areas and storage places	CSM 1-10 – Hazardous Materials
		Gas, Fume or Vapor Leak / Release	1. Provide adequate ventilation 2. Conduct oxygen / gas testing and monitoring 3. Installation or use of fixed or portable gas detection and alarm devices 4. Use of appropriate PPE's (Gas mask with filter-cartridge) 5. Emergency evacuation procedure 6. Provision of isolation / containment areas 7. Availability of contact with emergency services (high risk situation/places)	GI 2.709 Gas Testing Procedure
		Direct Exposure (contact) to skin / eye / body parts	1. Contractor's workers working with hazardous substances shall be trained and shall be fully aware of safe handling procedures as per the CHB or MSDS. 2. MSDS reviewed, available for inspections 3. Use of appropriate PPE's (Clothing, Gloves and face shield) 4. Provision for emergency shower and eye-wash station	CSM I-3 – Personal Protective Equipment (PPE)

Phase : GENERAL				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
016	Crane Lifting (Tower / Mobile) Continue . . .	Collapse of structure / Overturning	1. All crane lifting shall be required of Work Permit as per SA GI 2.100 2. Ensure correct selection of crane appropriate for lifting as per SA GI 7.028 3. Only SA trained and certified crane erector shall erect / dismantle, modify tower cranes and approved by authorized in-charge person and person in authority. 4. Only SA trained, certified and competent operator to operate the crane 5. Avoid overloading by excessive load weight and excessive boom lowering 6. Conduct trial lift (raise load 0.3m from ground) to verify first if load is balance, secured and all lift accessories in good order, wait for clearance and final signal from designated rigger/signaler before raising to full lift. 7. Ensure materials or load to be lifted are adequately tied, secured and provided in appropriate container / cage 8. Verify SWL, load weight, radius and other lift operating limits before lifting.	CSM III-7 – Crane and Lifting Equipment

			9. For mobile/crawler cranes, conduct pre-assessment of ground to determine load-bearing capability of the site and the consultation to specialist “if required” due to the complexity/magnitude of the lift. 10. Never operate in excess of the allowable wind speed as per manufacturer 11. Cranes shall be secured during high winds or after working hours by snubbing to structures, laying down the lattice booms, withdrawing the hydraulic boom extensions, and/or following manufacturer’s specifications. Tower cranes, when unattended, shall have slew brakes released to allow weather-vanning. 12. Conduct re-assessment and re-inspection after extreme weather conditions. 13. Crane lifts shall not be performed in wind speeds exceeding 32 km/h (20mph) (17.4 knots) (9m/sec), unless otherwise specified by the crane manufacturer. 14. All crane operators shall be properly licensed and certified per GI 7.025 for the crane type/model they are using. 15. 'Critical Lift Plan (AMIRAL 9644) shall be completed and approved per GI 7.028, and made available on-site prior to any critical crane lift. 16. Proper road closure permit system and alternate arrangements shall be introduced for any crane activity which comes within the proximity of access roads. 17. All cranes shall have a valid crane inspection sticker issued by AMIRAL or by an AMIRAL-approved third-party inspection agency.	CSM III-7 – Crane and Lifting Equipment

			18. Cranes shall be inspected by the crane operator using form SA 9466 prior to each shift 19. All riggers shall be certified per GI 7.025 20. Personnel with both an approved crane operator and rigger certification shall not be allowed to act in both capacities for the Same lift. 21 Prior to start to work and to check the stability the crane-driver will slew 360° and stop (+/- 30sec)with the counterweight above each outrigger (test to be done on minimum radius) 22. **All lifting activities MUST have lifting and rigging plans.** These must include: • Plan view of crane setup showing: o Crane location, type, and capacity o Operating radius, load, boom angle, and height o HGV positions, exclusion and swing zones o Daily/monthly inspection sheet • Section view of rigging setup showing: o Anchor points and lifting accessories with type, capacity, and quantity	

	Continue . . . Crane Lifting (Tower / Mobile	Failure of equipment	1. Pre-inspection of crane (over-all conditions), check lifting gears and accessories (chains, slings, other attachments) for obvious damage, signs of wear, tear, deformation or any abnormality. 2. Regular maintenance, testing of structural integrity 3. Only SA trained, certified and competent operator to operate the crane 4. Only SA trained, certified and competent rigger to attach, secure loads and supervise for lifting	CSM III-7 – Crane and Lifting Equipment
		Dropped loads / Falling object	1. All lifting team were trained and well aware of the hazards & controls of lifting 2. Ensure load to be lifted are securely packed, tied or in cage/box when lifted 3. Ensure lift area is adequately managed, controlled and not allowed any unauthorized entry 4. Only SA trained, certified and competent operator to operate the crane 5. Only SA trained, certified and competent rigger to select, attach, secure loads and supervise for lifting	CSM III-7 – Crane and Lifting Equipment

		Collision with structure, plant, equipment and objects	1. Only SA trained, certified and competent operator to operate the crane 2. Only SA trained, certified and competent rigger to select, attach, secure loads and supervise for lifting 3. Assign signaler and spotter (at least two (2) if needed) to avoid collision 4. Ensure the use of tag lines at all times to control, direct and guide the load movement and directions 5. Ensure lift area is adequately managed, controlled and not allowed any unauthorized entry 6. Ensure presence of lift supervisor closely managing and supervising the lift operations.	CSM III-7 – Crane and Lifting Equipment
	Continue . . . Crane Lifting (Tower / Mobile	Contact with overhead electrical lines and cables	1. Only trained, certified and authorize operator to operate cranes 2. Check for presence of aerial electrical conductors 3. Consider all electrical lines as “live” unless it is positively known that is has been de-energized 4. Ensure to follow and maintain minimum safe distance according to electrical voltage rating present on-site, see attached table of safe limit of approach; 5. When working near energized power-lines, designate signalman who shall ensure that the minimum safe distances are maintained. 6. Prepare a Critical lifting plan when lifting near power lines. 7. Coordinate to local power distribution department and secure local permit, approval for lifting near power-lines	CSM III-3.7 – Working Near Overhead Power lines and Underground Cables

			<table><tr><td>Line Voltage</td><td>Absolute Limit of Approach</td></tr><tr><td>Up to 50,000 volts</td><td>3.0 meters / 10 feet</td></tr><tr><td>50,000 ~ 250,000 volts</td><td>6.1 meters / 30 feet</td></tr><tr><td>Over 250,000 volts</td><td>7.6 meters / 25 feet</td></tr></table>	
		Contact with underground services	1. Ensure crane (especially mobile cranes) foundations were clear of any underground services (gas mains, electric cables, sewer pipes, etc.). 2. If this is not possible, ensure adequate protection and cover must be provided against damage and coordinate & secure permit approval to utility company or local department.	CSM III-3.7 – Working Near Overhead Power lines and Underground Cables

Phase : GENERAL				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks

017	Project / Workplace Security	Civil Disobedience	1. Contractor to contract only licensed security agency from COMPANY / SA approved security subcontractors. 2. Contracted security agency must have basic training in crowd management and control or other relevant training. 3. Coordination and consultation with local authorities & regulatory agencies 4. Facility Fencing Wall and Barricade 5. Provision for consultation and assistance from local police authority	General
		Arson / Incendiary Attack	1. Facility Fencing Wall and Barricade 2. All personnel entering / exiting shall be subject to security check 3. All personnel shall be issued an ID system as per SA GI 710.001 4. Removal of combustible material from or around critical areas such as chemical storage, warehouses, restricted & controlled areas like areas with presence of hydrocarbons such as piping \ areas, pressure vessels, etc.	
		Sabotage / Theft / Robbery	All personnel entering / exiting shall be subject to security check All personnel shall be issued an ID system as per SA GI 710.001 Roving security patrol (On-foot and security vehicle roving) Controlled / Restrict movement (Security assisted movement) Use of CCTVs Use of bank cheque, credit cards, electronic transfers in transactions to avoid attraction to robbery	General

		Conventional Attack / Hostage taking / Active-shooting	Restrict workplace access (Permit System) All personnel shall be issued an ID system as per SA GI 710.001 Limit access timing Avoid or limit off-site visit as possible Prohibit lone working Periodic consultation and coordination with local authority	

Phase : GENERAL				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
018	Cartridge / Powder Operated Tools Operation	Fire / Explosion	1. Cartridge tools shall be examined before each use for signs of defects by a competent person. 2. Cartridge tools shall not be used in an area where flammable gases, vapor's or explosive dusts may be present; 3. If necessary, conduct a gas test in the work area including adjacent area to ensure work area is free of any flammable gases, vapor or explosive materials. 4. Exclusion zone shall be identified and controlled around the area where the cartridge tools shall be used. 5. Ensure to assign fire watch in all hot work activity	CSM I-7 – Fire Prevention
		Damaged / Failure of tool parts	1. Cartridge tools shall be examined before each use for signs of defects by a competent person. 2. Suspected faulty cartridge tool shall be taken out of use or quarantine and labelled "Do Not Use" and kept secure or locked-in until examined by a competent person. 3. Any problem with cartridge tools or cartridges shall be reported to the supervisor and to the person who issued them. 4. Maintenance or repair shall only be undertaken by trained and competent person.	CSM I-11 – Hand Tools and Power Tools

			5. All safety guards designed for use with a cartridge tool shall be use.	

		Accidental and Unauthorized use or firing	1. Use of powder actuated tools (cartridge operated tools) shall be in accordance with ANSI A10.3 and the tool manufacturer's instructions. 2. Use correct size (caliber) and strength of cartridge required for the tool, the fixing and the material to be fixed onto shall be properly determined and used. 3. When the tool is removed from the carrying case, it shall be checked to ensure that a cartridge is NOT LOADED. 4. Tools that are not in proper working condition shall be immediately removed from service and not used until properly repaired. 5. The tool shall only be loaded in the area where work is to be performed. 6. The tool shall never be left loaded when not in use. Loaded tools shall not be left unattended. 7. Tools shall be checked to ensure they are NOT LOADED with a cartridge before repair/maintenance/storage. 8. Tools shall be used with the correct shield, guard or attachment as recommended by the manufacturer. 9. Tools shall be retriggered without moving the tool from the work face in the event of a misfire. If the shot fails again, the tool shall be held firmly in the firing position for at least 30 seconds in case of a possible "hang fire" in the cartridge. Misfired cartridge shall	CSM I-11 – Hand Tools and Power Tools

			be removed per the manufacturer's instructions. Nails, knives, etc., shall not be used to pry the cartridge loose. 10. Personnel shall not operate, clean, maintain or repair any cartridge tool without possessing a certificate of competency, issued by an accredited tool vendor or manufacturer's Personnel shall not operate, clean, maintain or repair any cartridge tool without possessing a certificate of competency, issued by an accredited tool vendor or manufacturer's representative. Certificates shall identify the particular model that personnel are qualified to handle. 11. Only authorized personnel shall be allowed access to the storage area. 12. A system for issuing and returning powder actuated fastening tools and cartridges, with signatures, shall be used. A usage log of tools by serial number shall be maintained. 13. Tools or cartridges shall only be withdrawn from the storage area by authorized personnel possessing a valid user certificate. 14. Powder actuated fastening tools and cartridges shall not be left at the job site during a lunch break or at the end of a shift, but shall be returned to the storage area for safekeeping. 15. Loss of a powder actuated fastening tool and/or cartridges shall be immediately reported to the SA proponent organization..	

Phase : GENERAL			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
019	Working with Asbestos / Other synthetic mineral fiber	Accidental disturbance	11. No cutting with power operated tools shall be allowed in removing asbestos material unless equipped with High Efficiency Particulate Arrestor (HEPA) exhaust ventilation is used. 12. Use of compressed air for cleaning is strictly prohibited. 13. Ensure all work team have adequate and appropriate PPE's as per evaluation by EPD / LPD under SA GI 150.000. 14. Workers engaged in asbestos removal must exit & shower after end of shift. 15. Asbestos waste, scrap, debris and contaminated articles assigned for disposal shall be thoroughly wetted and collected in clear, impermeable heavy-gauge plastic bags which shall be sealed and properly labeled before being transported and isolated by burial in a special landfill as designated by the Environmental Protection Department. 16. Personnel performing ACM work shall be subject a medical examination per GI 150.001.AMIRAL supervisors shall contact the Occupational Medicine Section, Preventive Medicine Services Division, to arrange for a preplacement medical	CSM I-10 – Hazardous Materials

			examination for their employees assigned to abrasive blasting operations, including a chest X-ray and a pulmonary function study. These examinations shall be repeated at least every two years. CONTRACTORs shall establish equivalent bio monitoring programs (using non-AMIRAL medical facilities) for their employees who conduct abrasive blasting for AMIRAL.	
	Continue . . . Working with Asbestos / Other synthetic mineral fiber	Absorption to skin, entry to open wounds	1. Only workers specifically trained and certified for ACM shall be assigned to the task. 2. Trained worker must be aware at all times of the proper use of appropriate PPE's 3. All employees working in jobs where asbestos is present, shall wear clean disposable coveralls, gloves and shoe covers and other protective equipment as prescribed in the Hazard Identification Plan (HIP). 4. Only in designated clean change area shall workers be allowed to change and remove disposable clothing. 5. After end of each work shift, workers are to exit and take shower on designated shower area to clear off asbestos. 6. Removal of asbestos must be done in a manner or using a method which minimizes scatter, dusting, or dispersion of asbestos fibers, and has been approved by EPD. 7. Body protection shall be provided and worn by personnel as needed to protect against hazards such as handling asbestos. This protection may include flame resistant clothing (FRC), Tyvek, leather or no permeable materials.	CSM I-3 – Personal Protective Equipment (PPE) CSM I-10 – Hazardous Materials

			8. At the end of a shift, personnel shall proceed first to a nearby designated area, where contaminated coveralls and equipment shall be removed, collected and disposed of, then proceed to the shower and cleanup area. Selected equipment to be reused shall be collected, cleaned, decontaminated and disinfected prior to reuse. 9. Contaminated waste, ACM and used disposable clothing shall be transported and disposed of in sealed impermeable bags or containers. Bags and containers shall be marked in both Arabic and English.	
		Inhalation of asbestos fiber	1. Wet methods shall be used in removing, or disposing of asbestos fibers. 2. Cutting with power operated tools is prohibited unless equipped with High Efficiency Particulate Arrestor (HEPA) exhaust ventilation. 3. Trained worker must be aware at all times of the proper use of appropriate PPE such as respirators. 4. Supplied air respirators shall be used as per exposure evaluation by EPD indicates the need for this level of protection. 5. Half-face or full-face respirators equipped with HEPA filter cartridges which have been approved by EPD or LPD shall be used only where prior worker exposure evaluations have shown that these respirators would be adequate. 6. Disposable particulate respirators shall not be used for any	CSM I-10 – Hazardous Materials

			asbestos related job. 7. Supervisor shall ensure that all workers have their own respirator and he shall ensure that these respirators fit properly. 8. Supervisor shall ensure that all workers who are required to wear a respirator were properly trained on the use and maintenance. This shall include how to qualitatively test the fit of the respirator, signs of respirator damage and how to clean, disinfect and store the respirator. 9. Supervisor to ensure that respirators are being thoroughly checked, cleaned, disinfected and properly stored at the end of each work period. 10. All workers required to use respirators shall be evaluated for their fitness to use respirators by a qualified physician.	
	Continue . . . Working with Asbestos / Other synthetic mineral fiber	Ingestion of asbestos fiber	1. Eating, drinking and smoking is prohibited at the asbestos removal site. Workers must exit and shower before eating, drinking, and smoking. 2. After end of each work shift, workers are to exit and take shower on designated shower area to clear off asbestos.	CSM I-10 – Hazardous Materials

Phase : GENERAL				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
020	Working with Abrasive Blasting or High pressure operations	Fire / Explosion	1. Abrasive blasting operation shall be required with work permit when performed (Hot work) as per SA GI 6.021 and GI 2.100 2. Only trained and certified operator shall carry out abrasive blasting operation 3. Implement exclusion zone for blasting work to prevent unauthorized entry. 4. Where abrasive blasting is to be carried out in a confined space, confined space entry procedures must be followed (see GI 2.100, Work Permit System, and the Saudi Aramco Construction Safety Manual). 5. An electrical bonding system for nozzle, hose, blasting equipment and the material being blasted shall be provided, and this bonding system shall be grounded to prevent a build-up of static electricity. Grounding wire shall be 21 mm2 (AWG-4) or larger. Ground continuity tests shall be conducted by an electrician to ensure proper grounding (resistance one mega-ohm or less). Bonding and grounding connections shall be inspected before each job is started and whenever equipment is repositioned. 6. Abrasive blasting storage tanks shall be considered in-service when	CSM I-7 – Fire Prevention

			they are pressurized or contain hydrocarbons, other flammable or combustible products, or if any inlet, outlet or overhead piping connected to the tank is not blinded. 7. Continuous periodic gas testing shall be conducted to ensure no flammable are present to storage tanks and to areas where abrasive blasting hoses, equipment and compressors are located. 8. The abrasive blasting machine shall be located at grade level and upwind from the tank. 9. Silica sand and combustible abrasives are prohibited at all Saudi Aramco facilities and construction sites. 10. Abrasive blasting residue shall be cleaned up regularly and disposed of in accordance with the recommendations of the Environmental Protection Department. 11. Ensure to assign fire watch in all hot work activity	
	Continue . . . Working with Abrasive Blasting or High pressure operations	Impact due to hoses becoming uncoupled (Whipping)	1. Pre-use inspection of air hoses shall be made to ensure hose and other component parts are in good condition and securely attached prior to use 2. Regularly inspect all point of connections to ensure all are fitted and no loose connection 3. Air hoses coupling and other terminal connections shall be fitted with whip-arrestor / chains to prevent disengagement.	CSM I-10 – Hazardous Materials

		Excessive Noise	1. All abrasive blasting operators shall be trained in the correct use and hazards associated with abrasive blasting operation. 2. Conduct noise survey to establish noise level & develop controls. 3. Suitable and appropriate PPEs shall be provided and use by all performing party as per SA GI 6.021 such as Ear muffs, etc. 4. Work area shall be controlled, barricaded and warning sign posted. 5. If possible, isolate blasting operation or perform in a controlled room to reduce noise 6. Reduced time and exposure of workers by regular rest break 7. Consider work rotation (alternate operator) to reduce time and exposure	AMIES-A-105 Noise
		Exposure to hazardous material (silica dust, paint, etc.)	1. Abrasive blasting activities shall be performed in accordance with GI 6.021. 2. In restricted areas, abrasive blasting shall be conducted in accordance with GI 2.100. Abrasive blasting is considered HOT WORK and gas tests shall be performed per GI 2.709 prior to initiating abrasive blasting operations. 3. All abrasive blasting operators shall be trained in the correct use and hazards associated with abrasive blasting operation. 4. The type of coating to be removed by abrasive blasting shall be evaluated for hazards from residue. If uncertainty exist, carry out re-assessment to determine potential health and environmental hazard. 5. Use of alternative type of abrasive material (ex. use copper slag instead of silica sand) to reduce generation of dust.	CSM II-8 – Abrasive Blasting

			6. Suitable and appropriate PPEs shall be provided and use by all performing party as per SA GI 6.021 such as; 7. Abrasive blasting operators shall wear an air supplied hood, type "CE" supplied-air respirator, approved for abrasive blasting by NIOSH / MSHA or an equivalent organization as determined by the LPD. 8. Abrasive blasting operators shall also wear safety glasses, heavy duty abrasion resistant gloves and apron, safety shoes and coveralls. 9. Abrasive blasting operators for industrial coatings applications shall be tested and certified by a Certified Coatings Inspector 10. Silica sand is an extremely hazardous abrasive material. The use of silica sand for abrasive blasting operations shall be prohibited at all SA facilities and SA project and construction sites. Safer alternative blasting agents are available and shall be used (e.g., aluminum oxide grit, fruit kernels or synthetic abrasives). 11. Abrasive blasting breathing air equipment shall include a high-efficiency breathing air filter and water/oil traps before the filter in the breathing air delivery system to remove moisture, oil mist and particulates. Continuous inline carbon monoxide (CO) monitoring with an audible alarm shall be provided for oil lubricating breathing air compressors, as the filter does not remove CO. See Figure 8.2., CSM II – 8.3.2 If the work entails removal or disturbance of asbestos materials, comply with all requirements in GI 150.001, Asbestos Hazard Management.	

	Continue . . . Working with Abrasive Blasting or High pressure operations	Continue… Exposure to hazardous material (silica dust, paint, etc.)	12. Other workers in or around the work area must wear a high efficiency dust-filter respirator approved by NIOSH / MSHA or an approved-equivalent. 13. Contractors shall establish medical exams or bio-monitoring programs (using non-Saudi Aramco medical facilities) for their employees who conduct abrasive blasting. 14. AMIRAL supervisors shall contact the Occupational Medicine Section, Preventive Medicine Services Division, to arrange for a preplacement medical examination for their employees assigned to abrasive blasting operations, including a chest X-ray and a pulmonary function study. These examinations shall be repeated at least every two years. CONTRACTORs shall establish equivalent biomonitoring programs (using non-AMIRAL medical facilities) for their employees who conduct abrasive blasting for AMIRAL. 15. Combustible abrasives (e.g., nut shells) capable of forming explosive mixtures with air shall not be used	CSM II-8 – Abrasive Blasting
		Flying abrasive cuttings / material	1. All abrasive blasting operators shall be trained in the correct use and hazards associated with abrasive blasting equipment and abrasive materials. 2. Other workers engage in abrasive blasting works shall be trained and safe instruction and work procedure discussed in daily pre-start tool box meeting	CSM II-8 – Abrasive Blasting

			3. Installation of dead-man switch to shut-off high-pressure abrasive flow in the event of accidental dropping of nozzle or release of control switch. 4. Work area to be controlled and no unauthorized entry shall be permitted 5. Workers shall be prohibited to use compressed air to clean self or clothing 6. Abrasive blasting operators shall also wear safety glasses, heavy duty abrasion resistant gloves and apron, safety shoes and coveralls.	
	Continue . . . Working with Abrasive Blasting or High pressure operations	Impact due to accidental release of stored energy (compressed air)	1. Abrasive blasting operation shall be required with work permit when performed (Hot work) as per SA GI 6.021 and GI 2.100 2. Only trained and certified operator shall carry out abrasive blasting operation 3. Pre-use inspection of air hoses shall be made to ensure hose and other component parts are in good condition prior to use 4. Abrasive blasting gun / nozzle must never be pointed at any person or any part of the body.	CSM II-8 – Abrasive Blasting
		Slip, trip and fall	1. Ensure air hoses do not create tripping hazard 2. Abrasive blasting residue shall be cleaned up regularly and disposed of in accordance with the recommendations of the Environmental Protection Department. 3. Keep floor surfaces dry	CSM I-4 – Temporary Walking and Working Surface

		Ergonomics (Impaired vision)	1. As possible prevent accumulation of dense dust cloud by intermittent blasting operation. 2. Clear glass of face hood in between operation 3. If inside of enclose structure, ensure adequate ventilation and illumination.	CSM I-3 – Personal Protective Equipment (PPE)

Phase : GENERAL				CLASS OF HAZARD : C
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
021	Housekeeping	Dust	1. Provision for use of water spray to limit dust generation 2. Provide adequate and appropriate PPE's (mask, goggles, etc.) 3. Provide support of resources (portable tools, equipment) such as vacuum 4. Waste and disposal trucks shall be covered to prevent dust	CSM I-3 – Personal Protective Equipment (PPE)
		Fire / Explosion	1. Use a fire prevention inspection checklist to evaluate construction site and storage yards/areas. 2. Combustible materials shall be segregated and stored separately. 3. Combustible trash/scrap removed, collected and disposed regularly. 4. Chemicals shall also be separately stored with covers to avoid reactions. 5. Chemical and combustible substances and flammable liquids shall be controlled and stored separately. 6. Smoking and other sources of ignition are prohibited near storage areas. 7. Fuel cylinders stored in cages or with chains and protected from damage.	CSM I-7 – Fire Prevention

			8. Fire watch to be detailed during and at least 30 minutes after welding or cutting operations. 9. Ensure to assign fire watch in all hot work activity 10. For flammable/combustible liquid storage areas located outdoors, portable fire extinguisher(s) suitable for the fire hazard involved shall be located not less than 7.6 m (25 ft) nor more than 23 m (75 ft) from the fire hazard.	
		Pointed / sharp objects	1. Waste segregation, re-processing and de-nailing area shall be identified and designated to de-nail, re-processes used materials 2. Sharp / pointed objects trash / cuttings shall be collected and disposed-off regularly and stored in metal containers. 3. Use appropriate type of gloves when handling sharp/pointed objects 4. Where ever sharp points are protruding in access area, it shall be made blunt or covered with suitable padding.	CSAR 10.20 Housekeeping
		Dropped objects from forklift operation (handling / stacking)	1. Only trained, certified forklift operators to manned forklift operations 2. Operators to have clear visual while operating forklift 3. Forklift operated in accordance to safe work procedure 4. All materials shall be properly arranged, stacked no more than 2 meter high 5. Materials stacking must be secure in package, caged, tied and in upright and balance position.	

			6. Gin wheels shall be mounted on a cantilever tube projecting outward from the scaffold and shall be kept to a minimum distance, not greater than 750 mm (30 in). The horizontal tube holding the gin wheel shall be fixed with right-angle couplers to two scaffold posts (standards).	
	Continue . . . Housekeeping	Dropped objects from manual handling of load / material	1. Avoid lifting beyond physical capability, use mechanical lifting aids 2. Use buddy system or tandem lifting 3. Load to be properly secured and packed to prevent spill and drop-off 4. Use appropriate PPE's (gloves)	CSM I-12 – Material Handling
		Exposure to Bacteria / Vermin	1. All food waste shall be collected daily, stored and disposed in container with covers and transported by SA licensed disposal subcontractors. 2. Periodic infestation spraying to be implemented in kitchen, accommodations and other locations to clean and control infestation. 3. Sanitary waste / wastewater regularly collected by SA license disposal subcontractors.	
		Ergonomics (Incorrect lifting)	1. Avoid lifting beyond physical capability, use mechanical lifting aids 2. Use buddy system or tandem lifting	CSM I-12 (12.6) – Manual Handling

		Slips, Trip, Fall	1. Gangways, roads & pedestrian shall be kept clean of waste and other debris. 2. Roads and walkways shall be kept clean, level and dry Oil spill, grease, mud shall immediately be clean and removed	CSM I-4 – Temporary Walking and Working Surface
		Electric shock	1. Electrical and static-producing equipment, including air movers, shall be properly grounded and bonded and shall be provided with ground-fault protection. 2. Residual current devices (RCDs), including ground fault circuit interrupters (GFCIs, see Figures 3.1 and 3.2) and earth leakage circuit breakers (ELCBs), or ground-fault isolation systems shall be used for portable electrical tools, temporary wiring, confined space entry activities, and in potentially wet or damp areas. 3. Proper personal protective equipment (PPE) to protect against shock hazards, including rubber insulated gloves, rubber insulated sleeves (as required), goggles and face shield (as required), and dielectric shoes, shall be worn when conducting electrical work on or near energized electrical equipment or as required in GI 2.721, Supplement 2, when conducting work that potentially exposes an employee to arc flash hazards. 4. Defective electrical equipment and tools shall not be used and shall be immediately removed from the job site.	CSM III-3 Electrical equipment

Phase : TEMPORARY WORKS			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
022	Erection of Scaffolding Alteration / Modification of Scaffolding Dismantling of Scaffolding Common to Erection / Alteration / Modification and Dismantling of Scaffolding	Collapse / failure of scaffold structure	1. Erection of scaffold shall be according to plan engineering design base on the latest SA Scaffolding Structural Design Criteria. 2. Only trained and SA certified erector shall erect/dismantle/ alter scaffolding. 3. All erection / dismantling and alteration shall be supervised and under the direction of a trained and SA certified Scaffolding Supervisor at all times. 4. Scaffold shall be erected and check using the revised Scaffold Planned Completeness Checklist (SA Form 9613). 5. Only the Scaffold Supervisor (and Inspector, if required per paragraph 6.4) is authorized to sign or affix green or yellow scaffold tag(s). The Scaffold Supervisor (and Inspector) shall not sign scaffold tag(s) for any scaffold he considers to be unsafe or incorrect. 6. Scaffold components used to assemble a scaffold shall be inspected before each use and shall conform to SA Chapter II-2.4, Scaffolding of CSM requirements and GI 8.001. 7. Scaffold components from different manufacturers shall not be intermixed unless the intermixing is expressly approved and tag signed by SA certified Scaffolding Inspector that components are compatible (e.g., fit together without mechanical force) and the scaffold's structural integrity is maintained and components are	CSM II-2 Scaffolding

SA approved equivalent specifications.

8. Scaffold components shall be free from harmful or damaging corrosion.
9. Every access scaffold and scaffold component shall be capable of supporting, without failure, its own weight (dead load) at least four times the maximum intended load (live load) applied or transmitted to it (i.e., D+4L). Self-weight of platform units (including planks) may be considered as dead load.
10. Posts (standards) shall be capable of supporting, without failure, four times all gravity loads (i.e., 4D+4L).
11. Scaffolds shall have a specified load rating, corresponding to the maximum intended load, of light-duty, medium-duty or special-duty. For design, the live load shall be taken as the scaffold's load rating.
    - Scaffold maximum load rating must be clearly specified in scaffold tags and decals posted to inform end-user and to prevent overloading. See below table.

Scaffold Category	Intended Load (Maximum)
Light – duty	120 kg/m2
Medium – duty	240 kg/m2
Special - duty	More than 240 kg/m2

			12. For stability; - Scaffold posts and frames shall be erected and maintained vertical and plumb, and shall be vertically braced in both directions to prevent swaying and displacement. - If possible, support and tie scaffolding to existing building or structure capable of supporting the applied loads, - Ties shall be in accordance to the scaffold manufacturer's recommendations - When outriggers is used, outrigger frames shall extend the base dimension(s) to more than 1/4 of the scaffold height	
		Collapse / failure of scaffold structure	13. For foundations; - Scaffold foundations shall be sound, rigid and capable of carrying the scaffolds self-weight plus the maximum intended (live) load without settling or displacement. Unstable objects such as barrels, boxes, loose bricks or concrete blocks shall not be used to support scaffolds, planks or timber sills. - The ground or floor on which a scaffold stands shall be carefully examined for its load-bearing capacity. Sand or made-up ground (fill) may need compacting to ensure there are no cavities. Bases such as floors, roofs, etc., may need shoring from underneath.	

			- Timber sills shall be used to spread the load on sand, made-up ground, asphalt pavement, wooden floors and other soft or slippery surfaces. - The ground beneath sills shall be level and compact. - Screw-jacks shall be used to compensate for variations in ground level, screw-jacks shall not be adjusted to more than 2/3 of the total length of the threaded section. 14. Clearances; - Bases of scaffolds shall be at least 1.5 times the depth of excavation away from the edge of the excavation, unless adequate measures are taken to prevent the collapse of length of the threaded section.	
	Erection of Scaffolding Alteration / Modification of Scaffolding Dismantling of Scaffolding Common to Erection / Alteration / Modification and	Collapse / failure of scaffold structure	15. Scaffold shall be periodically check for completeness as per GI.8.001; - Scaffold Supervisor who is responsible for the scaffold shall personally inspect the scaffold (with the aid of applicable "Scaffold Field Inspection Checklist") as soon as possible after completion by his craftsmen. - At least every two weeks, each scaffold shall be re-inspected by a Scaffold Supervisor employed by the Scaffold Erector who erected the scaffold (and a Scaffold Inspector, if required per paragraph 6.4, GI 8.001). This bi-weekly inspection is to determine if the scaffold has been improperly altered and is still	

	Dismantling of Scaffolding		safe for use.	
		Collapse / failure of scaffold structure	1. All alterations / modification shall be accompanied by work permits. 2. Only trained and SA certified erector shall alter or modify scaffolding. 3. All alteration shall be supervised and under the direction of a trained and SA certified Scaffolding Supervisor at all times. 4. Only scaffold craftsmen, under the direct supervision of a Scaffold Supervisor who originally erected the scaffold, are permitted to alter or repair any part of an existing scaffold. 5. Altered scaffold shall be re-inspected by a Scaffold Supervisor (and Scaffold Inspector, if required per paragraph 6.4) after each alteration. If the scaffold is safe for use, newly signed green or yellow scaffold tags (as applicable) shall be securely attached to the scaffold prior to reuse. 6. Neither the Scaffold Supervisor, nor any other employee of the Scaffold Erector, is authorized to make any scaffold alteration which in their opinion is unsafe.	CSM II-2 Scaffolding

	Erection of Scaffolding Alteration / Modification of Scaffolding Dismantling of Scaffolding Common to Erection / Alteration / Modification and Dismantling of Scaffolding	Collapse / failure of scaffold structure	1. Only trained and SA certified erector shall dismantle scaffolding. 2. All dismantling shall be supervised and under the direction of a trained and SA certified Scaffolding Supervisor at all times. 3. The Scaffold Supervisor shall ensure that dismantling of scaffolds is planned, orderly, and performed level by level from top to bottom. Scaffold components, tools, and fittings shall be lowered to the ground in an orderly manner by rope, etc. and not thrown down. The Scaffold Supervisor shall also ensure that scaffold materials are returned and properly stacked at their designated storage location immediately after the scaffold is dismantled.	CSM II-2 Scaffolding
		Fall of material / Dropped objects	1. Hand tools used during erection shall be provided with tool-ties (Tool Lanyard). 2. Tool bag shall also be provided to carry other tools 3. Throwing of materials shall be prohibited 4. Toe boards shall be installed along all edges of scaffold platforms, stair/ladder landings. 5. Where practicable, provision for the installation of protective screens with a minimum of #18 gauge wire with a maximum 13mm (1/2 in.) mesh shall be made on areas where materials may fall and where other workers are working or passing. 6. Barricading the area below where objects can fall and not permitting entry of personnel to the hazard area.	CSM II-2 Scaffolding

			7. Erecting and installation of debris nets, catch platforms or canopy structures. 8. Gin wheels shall be mounted on a cantilever tube projecting outward from the scaffold and shall be kept to a minimum distance, not greater than 750 mm (30 in). The horizontal tube holding the gin wheel shall be fixed with right-angle couplers to two scaffold posts (standards).	
		Fall from elevation	1. Ensure all side of the erected scaffold platform are protected by guardrail system (top-rails, mid-rails, support. If practicable, provided also with protective screens / netting on all sides, stair/ladder landings. 2. Ensure the use of full body harness with double lanyard while working at heights greater than 1.8 meters. 3. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite. 4. Follow 100% tie-off / hooked at all times and when moving around at heights	CSM II-5 Fall Protection
		Contact with overhead power lines and other electrical services	1. Pre-inspection survey of scaffolding erection location to check for overhead power lines and other electrical conductors 2. Consider all electrical lines as “live” unless it is positively known that is has been de-energized 3. Follow and maintain minimum safe distance from overhead power lines	CSM III-3.7 – Working Near Overhead Power lines and Underground Cables

			4. If power lines cannot be avoided, provide correctly rated insulation covers	

Phase : TEMPORARY WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
023	Installation of Temporary Power and Lighting	Electric shock / explosion	1. Only trained, competent and authorized electrical technician / workers shall install, provide, repair or modify temporary electrical power and lighting sources as per SA GI 2.721 2. Consider all electrical lines as “live” unless it is positively known that is has been de-energized per SA GI 2.721, Sec.7.7 3. Report any unsafe or damage electrical wires, cables, power source and distribution outlet to supervisor or authorized person. 4. Never repair or modify any electrical wires, cables or power sources. 5. Provide Ground-fault circuit interrupters (GFCI’s) to all electrical equipment and electrical components. 6. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools 7. Receptacles shall not be connected to the same circuits that supply temporary lighting.	CSM III-3 Electrical Equipment
		Burns	1. Use appropriate PPE’s (correctly rated and insulated hand gloves, face shield and safety goggles, safety shoes and clothing)	CSM I-3 – Personal Protective Equipment (PPE)
		Fall from	1. Use of proper and enclosed work platform suitable for the task	CSM II-5

		elevation	2. When working with ladders, ensure ladders are of correct type and supported 3. Maintain 3-point contact when ascending/descending the access ladder 4. Use full body safety harness when working above 1.8 meters 5. Do not over-reached during installation or work outside the work platform	Fall Protection
		Slips, Trips and Falls	1. Ensure electrical wires and cables are properly tied (cable tied or hanged) 2. If cables were to cross on the floors, provided suitable protective cover or bury underground if possible to avoid damage 3. Use buddy system or tandem lifting	CSM I-12 Material Handling
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure 4. Use appropriate work-platform / mechanical lift if necessary 5. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

Phase : TEMPORARY WORKS				CLASS OF HAZARD : C
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
024	Fabrication of Formworks (Carpentry)	Impact from hand tools	1. Use of appropriate PPE's (hand gloves, safety goggles, mask) 2. Never used damaged or modified hand tools (mushroom head hammer) 3. Collect, removed and transport to de-nailing area all used or dismantled form 4. Stripped forms and formwork shall be stockpiled promptly after stripping. Protruding nails, wire ties, etc., shall be bent over, pulled, cut or other means taken to eliminate the hazard. 5. Nails shall be blunt when not used. Removed nails shall be segregated and properly disposed	CSM I-3 – Personal Protective Equipment (PPE) CSM II-6 Concrete construction
		Fall of material / Dropped objects	1. Do not over stacked materials or fabricated forms 2. Do not lift beyond physical capacity, use buddy system (tandem-lift) 3. Removed and stored properly unused materials	CSM I-12 Material Handling

		Flying object / particles from sawed wood, striking of nails and other materials	1. Do not removed safety guards or protective covers of portable power tools 2. Properly replace damaged bits, disc or blades when needed. 3. Follow safe working procedure when using power tools	CSM III-1 Machine Guarding
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure 4. Use appropriate work-platform / mechanical lift if necessary 5. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

Phase : TEMPORARY WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
025	Installation and Dismantling of Formworks / Shuttering	Pinched point / trauma and trapping injuries	1. Use of appropriate PPE's (hand gloves, safety goggles, mask) 2. Never used damaged or modified hand tools (mushroom head hammer) 3. Collect, removed and transport to de-nailing area all used or dismantled form	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects	1. Do not over stacked materials or fabricated forms 2. Do not lift beyond physical capacity, use buddy system (tandem-lift) 3. Removed and stored unused materials properly.	CSM I-12 Material Handling
		Flying object / particles from sawed wood, striking of nails or materials	1. Do not removed safety guards or protective covers of portable power tools 2. Properly replace damaged bits, disc or blades when needed. 3. Follow safe working procedure when using power tools	CSM III-1 Machine Guarding
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure 4. Use appropriate work-platform / mechanical lift if necessary 5. Do not lift beyond physical capacity	CSM I-12 Material Handling

		Failure/collapse of formworks / shutters	1. Ensure form works / shutters erected by trained workers 2. Always check and ensure safety and integrity of work platform used 3. Provide adequate support, shoring and ensure parts (pins and connectors) are securely fixed 4. Ensure foundation base (soil) compacted and leveled 5. Never alter or modify formworks without any change approval and integrity check from in-charged engineer/person 6. Never use damaged materials or mixed incompatible materials 7. Where proprietary formworks system are used, ensure to erect in accordance with manufacturer recommendations and instructions	CSM I-12 Material Handling

Phase : ARCHITECTURAL WORKS				CLASS OF HAZARD : C
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
026	Doors, Windows and Fixtures Installations	Pinched point / trauma due to impact	1. Use of correct hand tools for the task 2. Situational awareness 3. Use of appropriate PPE's	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects	1. Use appropriate PPEs (Safety Helmet, Safety Shoes) 2. Use tool ties and tool bags to secure tools 3. Use appropriate tools and resources for handling and under proper supervision.	CSM I-3 – Personal Protective Equipment (PPE)
		Flying objects when striking materials	1. Use appropriate PPE (safety goggle) 2. Use protective shield or safety guards 3. Never remove hand tools safety guard or cover	CSM I-3 – Personal Protective Equipment (PPE)
		Sharp Edges and Pointed object	1. Secure sharp edges with covers (rubber or other padding) 2. Provide pointed objects with cap or covers 3. Use appropriate PPE's	CSM I-3 – Personal Protective Equipment (PPE)

		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure 4. Use appropriate work-platform / mechanical lift if necessary 5. Do not lift beyond physical capacity	CSM I-12 Material Handling

Phase : ARCHITECTURAL WORKS				CLASS OF HAZARD : C
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
027	Tile Works	Pinched point	1. Follow safe work procedure to avoid caught-in between object 2. never use defective or damage hand tools	CSM I-11 – Hand Tools and Power Tools
		Falling material / Dropped objects	1. Do not lift beyond physical capacity 2. Practice correct manual lifting 3. Use mechanical lift device where necessary 4. Use appropriate PPE (Hard hats, safety shoes)	CSM I-3 – Personal Protective Equipment (PPE)
		Flying object	1. Use appropriate PPE (safety goggle / face shield) 2. Use protective shield or safety guards 3. Never remove hand tools safety guard or cover	CSM I-3 – Personal Protective Equipment (PPE)
		Harmful dust (silica)	1. Use water spray to control dust generation during tile cutting 2. Use appropriate PPE (safety filtered mask)	CSM I-3 – Personal Protective Equipment (PPE)
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Provide properly design work bench and work station 2. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 3. Rotation of task to limit prolong exposure 4. Use appropriate work-platform / mechanical lift if necessary	CSM I-12 Material Handling

			5. Do not lift beyond physical capacity	
		Contact to skin or body parts of hazardous substances (cement, grouting, sealants, etc.)	1. Regularly wash hands thoroughly 2. Use appropriate PPE (chemical resistant gloves, cover-all) 3. Immediately remove clothing that becomes contaminated with solvents to prevent chemical burns. Contaminated clothing shall be discarded in closed containers or cleaned as soon as possible, since solvents will continue to vaporize and can present a spontaneous combustion fire hazard.	CSM I-3 – Personal Protective Equipment (PPE) CSM II-9 Painting and coating

Phase : ARCHITECTURAL WORKS			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
028	Painting Work	Contact to skin or body parts with hazardous substances / chemicals (paints / thinners, etc.)	1. Workers must be trained in hazardous material handling 2. Supervisor to review and communicate material safety data sheet to workers involved in painting works 3. Provide and use appropriate PPE's (chemical resistant gloves, filtered mask, safety goggles and suitable clothing 4. Regularly wash hands thoroughly.	CSM 1-10 – Hazardous Materials
		Fire	1. Prohibit hot work in nearby areas 2. Remove all ignition sources 3. Avoid storing paints under high temperature conditions 4. Cover container when paints are not in use 5. Display warning sign of 'No smoking' 6. Provide fire extinguishers at work area 7. Eye and body wash facilities shall be available in the immediate work area when using chemical solvents/cleaners. For any portable wash facilities provided, water pressure shall be adequate and water reservoir flushed and refilled regularly. 8. Spray painting shall not be performed within 75 ft of ignition sources.Solvents and solvent-based paints/ coatings shall not be applied to surfaces hotter than 80 °C.	CSM I-7 – Fire Prevention CSM II-9 Painting and Coating

			9. Work areas shall be cleaned after every shift, including removal of discarded paints, coatings and other materials. All paints, solvent cans, rags, etc., shall be disposed of in closed containers and/or lugger buckets specifically approved and designated for this purpose. Benzene, gasoline, carbon tetrachloride and chlorinated hydrocarbons shall not be used for cleaning purposes.	
		Inhalation of toxic fumes	1. Provide and use suitable respirators 2. Conduct regular air monitoring 3. Cap containers when paints are not in use 4. Be provided with and trained on the proper use of appropriate respiratory protection. Personnel applying spray paints/coatings shall wear organic vapor cartridge respirators or supplied air respirators depending upon the hazards of the paint/coating.Adequately ventilate painting/coating areas.	CSM I-3 – Personal Protective Equipment (PPE) CSM II-9 Painting and Coating
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

		Fall from elevation	1. Use of proper and enclosed work platform suitable for the task 2. When working with ladders, ensure ladders are of correct type and supported 3. Maintain 3-point contact when ascending/descending the access ladder 4. Use full body safety harness when working above 1.8 meters 5. Do not over-reached during painting work when on the work platform	CSM II-5 Fall Protection
		Ingestion of paint materials	1. Containers shall be labeled with the proper hazard communication (HAZCOM) label. Copies of the SA chemical hazard bulletin (CHB) and/or manufacturer's material safety data sheet (MSDS) shall be readily available on-site for all coatings, solvents and cleaning fluids being used. The safety precautions listed on the CHB/MSDS shall be followed. 2. Wash thoroughly before eating and at the end of each shift. 3. Be provided with and trained on the proper use of appropriate respiratory protection. Personnel applying spray paints/coatings shall wear organic vapor cartridge respirators or supplied air respirators depending upon the hazards of the paint/coating. See Chapter I-3, Personal Protective Equipment (PPE),	CSM II-9 Painting and Coating

Phase : CIVIL WORKS			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
029	Rock Drilling / Pile Driving	Underground utilities (Fire / Explosion / Service interruption)	1. Pre-start site inspections and investigation survey to assess and detect presence of any buried underground utilities or services 2. Coordination with various SA Engineering departments, local government unit and existing utilities or service providers 3. Use of existing drawings/plans to determine location of buried utilities / services, if any 4. Trial pit digging to verify / marked existing underground cables/ service utilities. 5. Ensure to assign fire watch in all hot work activity	CSM I-7 – Fire Prevention
		Collapse of equipment	1. Equipment to be use must be appropriate and of adequate size for the task. 2. Outriggers, counterbalances, etc., shall be provided to maintain stability of the rock / pile driver rig. 3. Conduct soil assessment and ensure ground is firm and stable to ensure stability and carry the weight of equipment / machines.	CSM I-12 Material Handling

		Excessive Noise	1. Equipment will be fitted with noise-reducing devices. 2. Rock drilling / pile driving working time shall be limited or shall be schedule on time where only limited persons will be exposed. 3. Noise barrier fence shall be erected as necessary to reduce noise 4. Worker engaged on the task shall have regular rest breaks to reduce exposure 5. Use of PPE (Hearing protection devices – Ear plugs, ear muffs, etc.)	AMIES-A-105 Noise
		Rotating / Moving Parts	1. Provision of Machine Guard / Screens 2. Emergency sensory switch and other safety devices 3. Isolation / Fencing 4. Good material arrangement and storage design	CSM III-1 Machine Guarding
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

Phase : CIVIL WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
030	Steel Fixing	Pinched point / trauma due to impact	1. Use of correct hand tools for the task 2. Situational awareness 3. Use of appropriate PPE's (Gloves)	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects	1. Use of correct type of mechanical lift equipment (forklift, etc.) 2. Use of appropriate lifting accessories 3. Do not manually lift object / materials beyond physical capacity	CSM I-12 Material Handling
		Slips, Trip, Fall	1. Safe means of access to reinforcing bars shall be provided with adequately provided with timber boarding 2. Handrails and grab bars shall also be consider to provide balance.	CSM I-12 Material Handling
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Ensure adequate PPEs (appropriate clothing and cover-all) 3. Provision of work shade / resting facility 4. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : CIVIL WORKS			CLASS OF HAZARD : : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
031	Steel Erection	Pinched point / trauma due to impact	1. Use of correct hand tools for the task 2. Situational awareness 3. Use of appropriate PPE's (Gloves) 4. To prevent tripping hazards, shear connectors (e.g., headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking or other walking/working surface has been installed.	CSM I-3 – Personal Protective Equipment (PPE) CSM II-7 – Steel Erection
			5. high strength Bolts & nuts installtion and wrench-tight hazards details.	

		Falling material / Dropped objects	1. Steel Erection operation shall be required with work permit when performed as per SA GI 2.100 2. Use of correct type of mechanical lift equipment (forklift, etc.) 3. Use of appropriate lifting accessories 4. Access and pathways shall be wide enough to freely moved steel sections 5. Proper arrangement and stacking of steel sections shall be monitored 6. Use of tool kit and tool bag for all steel erectors 7. Steel erection area shall be restricted and controlled by fence. 8. Routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for: - Workers engaged in the initial connection of the steel; or - Workers necessary for the hooking or unhooking of the load.	CSM II-7 – Steel Erections
		Collapse / failure of metal decking (steel grating)	1. Metal decking (steel grating) shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement. 2. No bundle of decking shall be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met; 3. the structure or portion of the structure is capable of supporting	CSM I-12 Material Handling CSM II-7 – Steel Erection

			the load as determined from qualified person and documented in the site-specific erection plan; 4. the bundle of decking is placed on a minimum of three steel joists; 5. the joists supporting the bundle of decking are attached at both ends at least one row of bridging is installed and anchored; 6. the total weight of the bundle of decking does not exceed 4,000 pounds (1816 kg); 7. placing a load on steel joists shall ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist 8. The steel erector shall, at all times, be responsible for the adequacy and installation of any temporary bracing or guy cables required to counteract loadings imposed during erection. 9. High strength bolts and nuts installation and wrench tight hazard details	
	Continue . . . Steel Erection	Collapse of steel structure	1. All steel erection activities shall have the required work permits. 2. Ensure a written approval regarding the structural integrity of concrete footings, walls, masonries, piers, etc. has been achieved and can support the loads imposed on these structures during steel erections. 3. Ensure that all bolts, guys and bracings are fixed and secured to ensure stability.	CSM II-7 – Steel Erections

		Collapse/failure of equipment	1. Only SA trained, certified and competent operator to operate the crane 2. Only SA trained, certified and competent rigger to select, attach, secure loads and supervise for lifting 3. Cranes used in steel erection shall be inspected prior to each shift by a competent and SA certified inspector and all licenses/certification are valid and up-to-date. 4. Cranes shall be erected in compacted, firm and solid ground and all other crane safety requirements describe for crane lifting operation.	CSM II-7 – Steel Erections
		Fall from elevation	1. All steel erectors team are fully trained with all required training and certified for the task to relevant SA regulations. 2. Establish Control Decking Zone and access to this area shall be limited and restricted only to those workers engage in steel erections works 3. Provide proper guardrail systems, safety net systems, and personal fall arrest systems, positioning device systems and their components on erected steel structure. 4. Provide perimeter edge protection as soon as decking are installed. 5. Use appropriate PPE's (full body harness with double lanyard,	CSM II-5 Fall Protection CSM II-7 – Steel Erection

			etc.) 6. Maintain 3-point contact when ascending/descending the access ladder. 7. Do not over-reached during steel erection work 8. Steel erection personnel performing activities on walking/working surfaces with unprotected sides or edges more than 1.8 m (6 ft) above a lower level shall be protected by a guardrail system, AMIRAL safety net system, personal fall arrest system, etc. 9. CDZ boundaries shall be established and clearly marked by use of control lines. Personnel working in CDZs shall have completed proper CDZ training. Unsecured CDZ decking shall not exceed 280 m2. 10. Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of personnel, equipment and materials that may be on the cover at any given time. 11. Installed covers shall be secured to prevent displacement by wind, equipment or personnel. 12. When large sizes, configurations or other structural designs do not allow openings to be decked over (e.g., elevator shafts, stairwells), personnel shall be kept from the edge of the opening by the use of warning lines at least 1.8 m (6 ft) from the edge	

	Continue . . . Steel Erection	Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Ensure adequate PPEs (appropriate clothing and cover-all) 3. Provision of work shade / resting facility 4. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : CIVIL WORKS			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
032	Excavation	Cave-ins / landslides	1. Excavations shall be properly sloped or benched according to the type and composition of soil. 2. Provide appropriate protective system and/or supports relative to the type, consistency and the dimensions of the excavation. 3. Adequate number and appropriate type of access / egress route shall be provided on excavation at 7.5 m. lateral distance (if ladders are use, placed at least every 15 m. along the trench) 4. Adequate space around the excavation shall be maintained and no storage of materials shall be allowed around the edge of excavations. 5. Stacking of soil spoilage must be kept to at least 0.6m (2 ft.) from the edge of the excavation. 6. Excavation shall be regularly inspected especially after extreme weather to verify current condition 7. Train workers to look for signs of shoring or sidewall bulge, surface cracking, cracked shoring, etc. which can be a warning sign weakness or of an impending collapse that is about to happen. 8. Suitable shoring shall be installed, or the sides benched or	CSM II-1 Excavation

			sloped back to a Safe angle, for all excavations 4 ft deep or greater, or for soil piles over 5 ft high 9. The impact the excavation will have on access for emergency vehicles/personnel and egress of personnel in the event of an emergency. 10. Adequate and suitable protective systems (i.e., benching, sloping or shoring) shall be planned for if the excavation will be at a depth of 1.2 m (4 ft) or more in soil other than stable rock, as per Section 1.7. Excavations less than 1.2 m (4 ft) deep may also require protective systems if sidewall cave-in hazards exist.	

		Engulfment - Ground water / Water run-off	1. Workers shall not work in excavations where there is of pooled water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees. 2. De-watering (pumping) methods shall be provided if water have emerged inside the excavation. 3. Include also support shield / shoring systems to protect from possible cave-ins 4. Provide diversion ditches, dikes or other suitable means to prevent surface water from entering excavation and adequate drainage of the area adjacent to the excavation.	CSM II-1 Excavation
		Fall into Excavation	1. Provide hard barricades around excavation 2. Reflective signs and signage to be provided on critical areas of excavation 3. Visible light shall be provided during night time across the work site locations and around excavations within traffic routes where night light is mandatory. 4. Roll-over protection (ROPS) shall be fitted to equipment 5. Properly completed Confined Space Entry Permit shall be obtained to enter excavations equal to or greater than 0.9 m (3 ft) deep. 6. Equipment shall be located at safe distance from the edge of excavation.	CSM II-1 Excavation

	Continue . . . Excavation	Asphyxiation / Toxic and flammable gases	1. Provide ventilation to work area as possible. 2. Atmospheric and gas testing shall be conducted when the conditions require or when the depth of excavation exceeded and fall under the conditions of confined space. 3. Equipment exhaust pipe (fumes) are directed away from operators. 4. When an internal combustion engine is used in or near an excavation, precautions shall be taken to ensure that exhaust gases are discharged so as not to be a hazard to personnel working in the excavation.	GI 2.709 Gas Testing Procedure
		Contact to buried underground utilities (power cable, sewer pipes, gas lines, communication line, etc.)	1. Pre-start site inspections check and investigation survey conducted to assess and detect presence of any buried underground utilities or services 2. Coordination with various SA Engineering departments, local government unit and existing utilities or service providers 3. Use of existing drawings/plans to determine location of buried utilities / services, if any 4. Trial pit digging to verify / marked existing underground cables/ service utilities 5. Mechanical excavators shall not be used until all underground utilities and installations have been exposed by hand digging. 6. Excavation permit and other certifications secured when required.	

		Collision (Contact between equipment to persons)	1. Equipment movement to be directed and controlled by dedicated banks men (flaggers). 2. Banks men to wear bright orange or yellow-green vest (possibly reflectorized) 3. Where possible restrict or keep the number of workers in the work area to minimum. 4. Workers exposed to equipment movement should wear visible and reflectorized vest especially during hours of darkness (night time).	CSM II-1 Excavation
		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, cloudy day, overcast days) 6. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : CIVIL WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
033	Backfilling, Levelling and Compaction	Collision (Contact between equipment to persons)	1. Equipment movement to be directed and controlled by dedicated banks men (flaggers). 2. Banks men to wear bright orange or yellow-green vest (possibly reflectorized) 3. Where possible restrict or keep the number of workers in the work area to minimum. 4. Workers exposed to equipment movement should wear visible and reflectorized vest. 5. Post warning signs to alert workers of busy equipment movement.	CSM II-1 Excavation
		Falling of material (soil spoils)	1. All dumping of backfill materials shall be done in pre-arranged order. 2. No worker or passenger shall be allowed near the equipment during dumping. 3. Do not manually lift object / materials beyond physical capacity	CSM II-1 Excavation

		Vibration Exposure (Vibrator / compactor use)	1. Regular and intermittent rest break shall be taken to reduce vibration exposure due to vibratory compactor operation. 2. Rotation of task shall also be considered	CSM II-1 Excavation
		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, overcast days) 6. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : CIVIL WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
034	Concreting Works	Collision	1. Equipment movement to be directed and controlled by dedicated banks man (flagger) 2. Dedicated entrance/exit route to control traffic flow of concrete trucks	
		Collapse of structure / formworks	1. All formworks shall be engineered and designed to adequately support concrete placing. 2. Only member of concreting team shall be allowed in the concreting area during concrete placement.	

		Fall from elevation	1. Safe means of access/egress for personnel to be provided on formwork / shuttering 2. Concreting works shall be closely supervise by competent Supervisor 3. Access to reinforcing bars and concrete placement shall be provided with adequate timber boarding (walkways) or other acceptable means. 4. Concrete workers assigned to work at elevation are fully aware and trained on Working at Height (WAH). 5. Provide proper guardrail systems, personal fall arrest systems and other positioning device systems. 6. Use appropriate PPE's (full body harness with double lanyard, etc.) 7. Do not over-reached during concreting work 8. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection
		Vibration Exposure (Vibrator / compactor use)	1. Regular and intermittent rest break shall be taken by vibrator operator to reduce vibratory exposure 2. Rotation of task shall also be considered	

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, overcast days) 6. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : MECHANICAL WORKS			CLASS OF HAZARD : B	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
035	Grinding and Gas Cutting	Fire / Explosion	1. All combustible materials shall be collected, removed from grinding and cutting work area. 2. Metal bins to be provided for slags and other excess cuttings. 3. Grinding and Gas cutting operation shall be required with work permit when performed (Hot work) as per SA GI 6.021 and GI 2.100 4. Gas hoses and gauges to be maintained in a safe condition and inspected daily. Defective hoses and gauges are to be replaced immediately. 5. Cylinders to be used in the vertical position and secured against falling.	CSM I-7 – Fire Prevention

			6. Oxygen cylinders valves/fittings to be kept free from grease/oil. 7. Suitable measures such as use of fire blankets, isolation fence/barrier, spark arrestor cages and fire watchers, will be taken to prevent the risk of fire during grinding cutting operations. 8. If appropriate, water / wet down the area (by damping) from time to time to extinguish sparks or slags during grinding/cutting. 9. Ensure no other ignition sources in close proximity. 10. Ensure to assign fire watch in all hot work activit 11. Fire extinguisher(s) shall be readily available near the hot work area. Compressed gas cylinders shall not be placed adjacent to the actual cutting operations so that sparks, slag or flame could reach them. If necessary, fire resistant shields shall be used. them. If necessary, fire resistant shields shall be used.	
		Toxic Gas, Fumes (Asphyxiation)	1. If working in enclosed area / structure, provide adequate ventilation and exhaust system to avoid accumulation of fumes Suitable PPE's to be provided to workers (Mask with cartridge, etc.)	GI 2.709 Gas Testing Procedure
		Flying objects (Grinding/ cutting sparks, slags, etc.)	1. Never remove grinder safety guard or cover. 2. Running speed shall not be exceeded to prevent disc disintegration. 3. Isolate work area with barrier fence or install fire-proof spark arrestor cage around the part of material to be grinded or cut to contain sparks/slags	CSM III-1 Machine Guarding

			4. Use appropriate PPE's (safety goggles, face shields)	
		Entanglement/ caught-in with rotating parts (grinder)	1. Grinding tools shall not be used unless the maximum permissible speed is clearly marked on the wheel and case. 2. Do not wear loose clothing. 3. Never remove grinder safety guard or cover.	CSM III-1 Machine Guarding
	Continue . . . Grinding and Gas Cutting	Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, overcast days) 6. If inside structure, ensure sufficient ventilation and exhaust in the work area 7. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : MECHANICAL WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
036	Welding	Fire / Explosion	1. All combustible materials shall be collected, removed from welding area 2. Welding cutting operation shall be required with work permit when performed (Hot work) as per SA GI 6.021 and GI 2.100 3. Suitable measures such as use of fire blankets, isolation fence/barrier, spark arrestor cages and fire watchers, will be taken to prevent the risk of fire during welding operations. 4. Metal bins to be provided for slugs and other cutting 5. Ensure no other ignition sources in close proximity. 6. Ensure to assign fire watch in all hot work activity 7. All hazardous and unsafe Concurrent jobs by other contractors / team shall also be considered. (Ex. Painting works from another concurrent contractor near welding work) and shall be controlled systematically. 8. Fire extinguisher(s) shall be readily available near the hot work area.Compressed gas cylinders shall not be placed adjacent to the actual welding operations so that sparks, slag or flame could reach them. If necessary, fire resistant shields shall be used.	CSM I-7 – Fire Prevention

		Electric Shock (Arc)	1. Ensure welding unit and portable generator were properly grounded. 2. Check welding cables, welding handle and welding joints are free from damage and maintained 3. Provide proper rated fuse to both electrical equipment. 4. Provide residual circuit devices (RCD) 5. Use of appropriate PPEs (Insulated welding gloves) 6. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools	CSM III-3 Electrical Equipment
		Toxic Gas, Fumes (Asphyxiation)	1. If working in enclosed area / structure, provide adequate ventilation and exhaust system to avoid accumulation of fumes 2. Suitable PPE's to be provided to workers (Welding Mask, Welding clothing / apron, leather shoes and gloves, etc.) 3. Intermittent rest breaks	GI 2.709 Gas Testing Procedure
		Flying objects (Welding sparks/slags, etc.)	1. Isolate work area with barrier fence or install fire-proof spark arrestor cage around the part of material to be grinded or cut to contain sparks/slags 2. Use appropriate PPE's (safety goggles, face shields)	CSM I-3 – Personal Protective Equipment (PPE)

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, overcast days) 6. Intermittent rest and breaks	CSM I-13 Heat Stress
		Concurrent activities from other contractor affecting hot work activities such as painting works	1. Coordinate with other contractor regarding the hot works to be carried out. 2. Flammable liquids shall be kept in securely capped metal containers or steel drums upon which the contents are clearly marked. 3. Flammable material around the work area shall be removed and/or protected against sparks, slag or heat using fireproof material. 4. Before welding, cutting or heating a surface covered with a coating whose flammability is not known, a test shall be performed to determine its flammability.	CSM I-7 Fire Prevention CSM II-10 Cutting, welding and Brazing

Phase : MECHANICAL WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
037	Installation of Pipeline and Valve Fittings	Failure of pipes, valve / fittings	1. Ensure pipes, valve and fittings are properly installed according to design and installation instruction. 2. Installation to be carried out by trained and competent workers 3. Avoid excessive force to prevent damaged to valve or fitting	
		Pinched point / impact trauma	1. Appropriated PPEs to be provided and use (hand gloves, safety shoes) 2. Appropriate tools shall be provided to avoid use of homemade or modified tools	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects (during manual handling / mechanical lifting)	1. Heavy fittings will be lifted using suitable certified lifting equipment (crane, etc.), lift accessories (tackle, slings, etc.) and tag lines 2. Pipelines, valves and fittings shall only be installed on structures, which have been vetted as mechanically complete or safe to work from. 3. Do not manually lift object / materials beyond physical capacity 4. Consider tandem-lift for manual handling and lifting (buddy system) 5. Tools in use to be provided by tool ties or tool bags 6. Isolate and keep entry in installation area to a minimum to reduce workers exposure.	CSM I-12 – Material Handling

		Fall from elevation (during installation at heights)	1. Installation works shall be closely supervise by competent Supervisor 2. Access to pipe racks, pipe installation area shall be provided with adequate safe means of access/egress, walkways or other acceptable means. 3. Workers assigned to work at elevation are fully aware and trained on Working at Height (WAH). 4. Provide proper guardrail systems, personal fall arrest systems and other positioning device systems. 5. Use appropriate PPE's (full body harness with double lanyard, etc.) 6. Do not over-reached during installation works. 7. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection
	Continue . . . Installation of Pipeline and Valve Fittings	Flying objects (From grinding sparks / welding slags, etc.)	1. Isolate work area with barrier fence or install fire-proof spark arrestor cage around the part of material to be grinded or cut to contain sparks/slags 2. Use appropriate PPE's (safety goggles, face shields)	CSM I-3 – Personal Protective Equipment (PPE)
		Fire / Explosion (From wielding / cutting)	1. All combustible materials shall be collected, removed from welding area 2. Welding / cutting operation shall be required with work permit when performed (Hot work) as per SA GI 6.021 and GI 2.100 3. Suitable measures such as use of fire blankets, isolation	CSM I-7 – Fire Prevention

			fence/barrier, spark arrestor cages and fire watchers, will be taken to prevent the risk of fire during welding operations. 4. Metal bins to be provided for slugs and other cutting 5. Ensure no other ignition sources in close proximity. 6. Ensure to assign fire watch in all hot work activity	
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Slip, Trip, Fall	1. Safe means of access/egress for workers to be provided 2. Work area to kept clean and clear of objects, materials which will obstructs passage and render surface unsafe for walking	CSM I-4 – Temporary Walking and Working Surface

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPE's (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Schedule heavy work on the cooler period of the work shift (e.g. early morning, overcast days) 6. If working in enclosed area / structure, provide adequate ventilation and exhaust system to avoid accumulation of fumes 7. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : MECHANICAL WORKS			CLASS OF HAZARD : B	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
038	HVAC Works	Pinched point / impact trauma	1. Appropriate PPEs to be provided and use (hand gloves, safety shoes) 2. Correct tools shall be provided to avoid use of homemade or modified tools	CSM I-3 – Personal Protective Equipment (PPE)

		Falling material / Dropped objects	1. Heavy fittings will be lifted using suitable certified lifting equipment/tackles. 2. Tools in use to be provided by tool ties or tool bags 3. Do not manually lift object / materials beyond physical capacity Consider tandem-lift for manual handling and lifting (buddy system)	CSM I-12 – Material Handling
		Asphyxiation	1. If working in enclosed area / structure, provide adequate ventilation and exhaust system to avoid accumulation of fumes 2. When working on confined spaces, follow confine space work procedure and conduct oxygen and gas test	
		Fall from elevation	1. Provide adequate and safe work platform (fixed / mobile) 2. Use fully body harness and maintained 100% tie-off 3. Use correct type of ladder. 4. Provide ground support when working on ladders (buddy system) 5. Workers assigned to work at elevation are fully aware and trained on Working at Height (WAH). 6. Provide proper guardrail systems, personal fall arrest systems and other positioning device systems. 7. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection

		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 – Material Handling
		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : NDT WORKS				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
039	Radiography Works	Radiation Exposure	1. Site radiography will be carried out in accordance with the provisions of Saudi Government radiation protection regulations and SA radiation protection standards, G.I.150.003, Ionizing Radiation Protection; and section IV-2, “Ionizing Radiation” of the COMPANY Construction Safety Manual). As a minimum Contractor shall; 2. Radiography works shall be required to prepare and secure a work permit (Hot Work / Radiation Protection Permit). 3. Site radiography will only be under the supervision of a competent, experienced, SA government and Aramco certified Radiation Protection Officer. 4. Ensure that all radiation workers employed by the Contractor are adequately trained, competent and SA certified radiation worker in the safe use and handling of ionizing radiation sources. 5. Ensure all radiation works and practices are licensed by the government regulatory authority. 6. Work area under radiation works shall be under “Controlled Work Zone” and is restricted to unauthorized persons.	CSM III-5 – Ionization Radiation

			7. Radiation area shall be cordoned or provided with barriers ropes or tape complete with pennants (hanging signs) space every 3 meters. Pennants shall have a yellow background with radiation symbol printed in black. 8. Danger / Warning signs shall also be posted around the work area including flashing lights to indicate when radiation work is in progress. 9. Radiation meters to be calibrated and certified to ensure it is operating in the design parameters. 10. A radiation survey shall be conducted as soon as the source is exposed to confirm correct barrier radiation limits. 11. HSE Officer shall be assigned to assist in the constant surveillance to prevent unauthorized entry and ensure the safety precautions for NDT before start of works. He shall monitor from time to time at a safe distance the radiation work until completion. 12. All industrial radiography shall be performed in accordance SAEP-1143. Radiographic techniques not covered in SAEP-1143 shall be submitted to the SA Inspection Department (ID) for approval prior to use.	CSM III-6 – Non Destructive Testing (NDT)

			13. Technician shall have the following radiation dosimeters and monitoring devices, as a minimum: •Calibrated radiation survey meter • Thermoluminescent dosimeter (TLD) or film badge • Pocket or electronic dosimeter • Personal radiation alarm (combined with a electronic dosimeter) 14. Hot work permits per GI 2.100 shall be issued for all radiographic work 15. Radiation sources shall not be transported in vehicles at speeds exceeding 90 km/h.	

	Continue . . . Radiography Works		1. For radioactive source storage facilities; 2. All radioactive storage facilities design (permanent or temporary) must be approved by RPU/EPD. 3. The location of permanently installed facilities and storages must be pre-approved by RPU/EPD. 4. Equipment producing ionizing radiation and radioactive sources must be secured in approved locked storage. These include Source Storage Bunker, Source Storage Pit (Temporary or Permanent) or in transport containers. 5. X-ray equipment shall be stored in secure cabinets; containers or other lockable means that securely restricts access by authorized personnel only. 6. Personnel accessing storage facilities for Equipment producing ionizing radiation and radioactive sources used for industrial radiography must be in possession of a valid RPP (Radiographer's Permit) and have the required personal dosimeter. 7. Radiation Warning signs (in Arabic and English) should be displayed on all doors, cover of the pit and fences of all types of the storage facilities. 8. Storage facilities shall be kept locked at all times.	

			9. All sealed sources used for industrial radiography by Saudi Aramco radiographic personnel shall be housed in approved; remote operated, or shielded projector type devices. 10. When performing radiographic operations a radiation survey shall be made after each exposure to determine that the radiation source has been properly returned to its shielded position.	

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : ELECTRICAL INSTALLATION WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
040	Cable Drum Handling	Pinched point / impact trauma	Appropriate PPEs to be provided and use (hand gloves, safety shoes)	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects	Heavy fittings will be lifted using suitable certified lifting equipment and tag lines Do not manually lift object / materials beyond physical capacity Use of mechanical lift shall also be considered to avoid excessive manual lifting Use timber wedge to support cable drum base and prevent unnecessary movement	CSM II-5 Fall Protection
		Ergonomics (Poor posture, repetitive movement, poor lifting)	Ensure to take regular rest breaks to avoid soreness, pain and discomfort Rotation of task to limit prolong exposure Use appropriate work-platform / mechanical lift if necessary Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	Provision of hydration pack (water, oral rehydration salt, food) Provision of drinking fluid (Hot / Cold) Ensure adequate PPEs (appropriate clothing and cover-all) Provision of work shade / resting facility Intermittent rest and breaks	CSM I-13 – Heat Stress

Phase : ELECTRICAL INSTALLATION WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
041	Cable Pulling	Pinched point / impact trauma	1. Appropriate PPEs to be provided and use (hand gloves, safety shoes)	CSM I-3 – Personal Protective Equipment (PPE)
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Falling material / Dropped objects	1. Heavy fittings will be lifted using suitable certified lifting equipment and tag lines 2. Do not manually lift object / materials beyond physical capacity 3. Use of mechanical lift shall also be considered to avoid excessive manual lifting 4. Use timber wedge to support cable drum base and prevent unnecessary movement	CSM II-5 Fall Protection

		Exposure to extreme heat (hot / cold stress / sunburn, etc.)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 – Heat Stress

Phase : ELECTRICAL INSTALLATION WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
042	Cable and Cable Tray Laying / Cable Termination	Pinched point / impact trauma	1. Appropriate PPE's to be provided and use (hand gloves, safety shoes)	CSM I-3 – Personal Protective Equipment (PPE)
		Falling material / Dropped objects	1. Heavy fittings will be lifted using suitable certified lifting equipment/tackle. 2. Cable, Cable trays and other fittings shall only be installed on structures, which have been vetted as mechanically complete or safe to work 3. Tools in use to be provided by tool ties or tool bags 4. Do not manually lift object / materials beyond physical capacity	CSM II-5 Fall Protection
		Asphyxiation	1. Ensure work location is properly ventilated 2. When working on confined spaces, follow confine space work procedure and conduct oxygen and gas test	GI 2.709 Gas Testing Procedure

		Fall from elevation	1. Provide adequate and safe work platform (fixed / mobile) 2. Use fully body harness and maintained 100% tie-off 3. Use correct type of ladder. 4. Provide ground support when working on ladders (buddy system) 5. Provide proper guardrail systems, personal fall arrest systems and other positioning device systems. 6. Workers assigned to work at elevation are fully aware and trained on Working at Height (WAH). 7. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 – Heat Stress

Phase : ELECTRICAL INSTALLATION WORKS			CLASS OF HAZARD : A	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
043	Electrical Works (Power Energizing / Termination)	Electric Shock (Live Equipment)	1. All live electrical working shall be required of Work Permit as per SA GI 2.100 2. Work must be correctly plan by the work team and pre-start briefing shall be conducted to discuss plan of work & the safety precautions. 3. Only qualified persons shall work on electrical equipment operated at higher than 240 volts. Contractor workers who will work on electrical equipment operated at higher than 240 volts shall receive formal safe electrical work training, which includes the following: 4. Arc flash hazards and prevention of injuries, 5. Reading and understanding arc flash hazard and task warning signs, 6. Proper selection, inspection, use of arc flash PPE/FRC, and 7. Safe work procedures for electrical isolation, switching, voltage testing, etc. 8. Contractor and their subcontractors shall install Arc Flash and Shock Hazard Warning on electrical equipment operated at higher than 240 volts.	CSM III-3 Electrical Equipment

			9. Contractor and their subcontractors shall install Task Warning Signs, in a highly visible location, at all new and at all existing installations with electrical equipment operated at higher than 240 volts (e.g., substations & electrical rooms). These Task Warning Signs shall show the tasks along with the arc flash Hazard/Risk Category personal protective equipment (PPE) and insulated tools required for each task. 10. Consider all electrical lines as “live” unless it is positively known that is has been de-energized per as SA GI 2.721, Sec.7.7 11. Report any unsafe or damage electrical distribution panel, wires, cables and power source to supervisor or authorized person. 12. Never repair or modify any electrical wires, cables or power sources. 13. Use appropriate PPE’s (correctly rated and insulated hand gloves, face shield and safety goggles, safety shoes and clothing) 14. Provide and post visible warning and danger signs in electrical power sources. 15. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools	

	Continue . . . Electrical Works (Power Energizing / Termination)	Fire / Burns	1. Only properly equipped personnel who are trained and certified for the type of electrical work shall perform maintenance or operation work on electrical equipment. 2. Contractor and their subcontractors shall install Arc Flash and Shock Hazard Warning on electrical equipment operated at higher than 240 volts. 3. Contractor and their subcontractors shall install Task Warning Signs, in a highly visible location, at all new and at all existing installations with electrical equipment operated at higher than 240 volts (e.g., substations & electrical rooms). 4. Electrical conductors shall be considered energized until proven otherwise (e.g., by voltage testing). 5. Work Permits shall be properly issued in accordance with GI 2.100. For work in substations, the work permit issuer shall verify that the fire detection/alarm system is operational and ensure that a Carbon Dioxide (CO2), Type BC, fire extinguisher(s) is available. 6. Whenever feasible, remote racking and remote switching devices shall be installed and used. When racking and switching is not being performed remotely, proper personal protective equipment (PPE) shall be worn and bodily exposure to potential arc flash minimized (e.g., by standing as far away from the equipment as possible). 7. Fire detection shall be active before energizing system inside buildings.	CSM I-7 – Fire Prevention

			8. Personnel shall not work alone on electrical equipment, except when performing remote switching outside of the Arc Flash Protection Boundary. 9. Provide and use appropriate PPE's (correctly rated and insulated) 10. Face shield – arch flash rating minimum of 8 cal./cm2, 11. Flame resistant clothing – arch flash rating minimum of 8 cal./cm2, including arc-rated flash hood and gloves 12. When Category 4 protection (minimum arc rating of 40 cal./cm2) is required, an acceptable option is to wear a Category 3 arc flash suit over Category 2 FRC (pants/shirt or coveralls). This provides a total protection of over 40 cal./cm2 for the wearer's body. However, in this case, a Category 4 (not Category 3) arc flash hood shall be used. 13. Proper eye protection (e.g., safety glasses marked as meeting ANSI Z87.1) shall always be worn under a face shield or arc flash hood. 14. Ground Fault Circuit Interrupters (GFCIs) or ground-fault isolation systems shall be used for portable electrical tools and temporary wiring.	

	Continue . . . Electrical Works (Power Energizing / Termination)	Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 – Heat Stress

Phase : ELECTRONIC AND COMMUNICATION WORKS			CLASS OF HAZARD : B	
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
044	Electronics & Instrumentation (Installations / Termination)	Pinched point / impact trauma	1. Appropriate PPEs to be provided and use (hand gloves, safety shoes) 2. Correct tools shall be provided to avoid use of homemade or modified tools	CSM I-3 – Personal Protective Equipment (PPE)
		Asphyxiation	1. Ensure work location is properly ventilated 2. When working on confined spaces, follow confine space work procedure and conduct oxygen and gas test	GI 2.709 Gas Testing Procedure
		Falling material / Dropped objects	1. Heavy materials/units will be lifted using suitable certified lifting equipment/tackle and tag lines 2. Cable and other fittings shall only be installed on structures, which have been vetted as mechanically complete or safe to work from. 3. Tools in use to be provided by tool ties or tool bags 4. Do not manually lift object / materials beyond physical capacity	CSM II-5 Fall Protection

		Fall from elevation	1. Provide adequate and safe work platform (fixed / mobile) 2. Use fully body harness and maintained 100% tie-off 3. Use correct type of ladder. 4. Provide ground support when working on ladders (buddy system)	CSM II-5 Fall Protection
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Use appropriate work-platform / mechanical lift if necessary 4. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : PRE-COMMISSIONING WORKS				CLASS OF HAZARD : B
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
045	Chemical Cleaning / Flushing	High Pressure Water Jet / Air	1. Plan the work correctly and conduct a pre-start tool box meeting 2. Provide hose whip arrestor to all coupling and connection 3. Never direct nozzle to person, always direct nozzle away 4. Open the valves slowly and start in low pressure before gradually increasing 5. Use appropriate PPEs (safety goggles/face shield or both, apron, gloves)	CSM III-4 Pressure Testing
		Exposure to hazardous chemical (Toxin, acid, etc.)	1. All workers are trained in Hazardous substances / dangerous goods and flammable chemicals legal requirements as per SA GI 150.100 2. Understands and follow MSDS with copy be available on-site for inspections 3. Use of appropriate PPE's (Clothing, Gloves, face shield, mask if needed) 4. Provision for emergency shower and eye-wash station	CSM I-10 Hazardous Materials

		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling
		Flying objects (from pipes residues being blown by air/water jetting)	1. Use appropriate PPEs (use safety goggles, face shield or both) 2. Install barricade and isolation of the working area with appropriate signage	CSM I-3 – Personal Protective Equipment (PPE)
		Asphyxiation (accidental leak of nitrogen gas during pipe purging)	1. Ensure any enclosed work location is air / gas tested and properly ventilated 2. Install passive air / gas monitoring safety devices on strategic locations of piping in enclosed areas 3. When working on confined spaces, follow confine space work procedure and conduct oxygen and gas test	GI 2.709 Gas Testing Procedure

	Continue . . . Chemical Cleaning / Flushing	Fall from elevation	1. Plan the work correctly and conduct a pre-start tool box meeting 2. Provided appropriate working platform and ladder 3. Maintain 3 point contact when ascending and descending the ladder. 4. If working at height, follow WAH procedure and use full body harness 5. Never over-reach to prevent fall 6. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection
		Slips, Trip, Fall	1. Plan and arrange hose direction and placing to avoid trips 2. Use appropriate PPEs (non-slip foot ware)	CSM I-12 Material Handling

Phase : PRE-COMMISSIONING WORKS				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks

046	Pressure and Leak Testing (Pneumatic / Hydrostatic Testing)	Explosion (Uncontrolled release of stored energy from compressed air, gas, fluids)	1. Avoid the poor hydro-testing practices examples enumerated in SA GI 2.102 – Pressure Testing which may result in incidents. Such as (non-exhaustive); - Striking or working on equipment while it is under pressure. - Improper or missing test equipment, such as testing without a relief valve, having an inadequately sized relief valve, or having no pressure gauge(s) - Omitting or changing steps in the test sequence such as failing to conduct a low pressure tightness test to check for leaks prior to strength pressure tests at higher pressures - Failure to vent air from the system prior to the test - Use of gas instead of water as a test medium - System not adequately supported to withstand the weight of water during the test 2. Pressure gauge(s) and relief valve must be calibrated and tested. 3. Before Start of Test (Assign responsibility); - Assign Responsibility for (a) Preparation of the test procedures, (b) Delivery of the approved test procedures to job sites, (c) Safety aspects of the pressure test, (d) Coordination and implementation of the pressure test in a safe manner. - Before any test(s) are carried out, the Contractor shall thoroughly inspect equipment - Review all test procedure, historical data, inspection reports,	GI 2.102 – Pressure Testing Safely

			safety instructions for the equipment to be tested. Consult to specialist (plant process or instrument engineer) to ensure that test relief valves & capacity is adequate for the pressure test and size of the test system. And others…(Refer to SA GI 2.102 for full details)	

	Continue . . . Pressure and Leak Testing (Pneumatic / Hydrostatic Testing)	Continue… Explosion (Uncontrolled release of stored energy from compressed air, gas, fluids	4. Use proper Test Medium; - Water shall be the pressure test medium for pipelines such as flow-lines, trunk-lines, water injection pipelines and gas lift pipelines. Water shall also be the pressure test medium for other facilities except those as allowed per AMIES-A-004. Whenever the test medium requirements of AMIES -A-004 are not practicable, approval is required from the Manager of the Inspection Department. - Air shall not be permitted as a pressure test medium in a system that was in hydrocarbon service unless the system has been cleaned to avoid an explosive hydrocarbon-air mixture. - The following shall never be used as pressure test mediums because they are extremely hazardous: - oxygen - toxic gases - liquids above their flash points or atmospheric boiling points - liquids above 66 deg. C (150 deg. F), except where necessary for pressure testing hot-tapping connections on hot lines, Installation of Hot Tapped and Stopple Connections. - And others…(Refer to SA GI 2.102 for full details) 5. Use Appropriate Test Equipment; - To avoid corrosion and possible resulting failures from	GI 2.102 – Pressure Testing Safely

			hydrostatic test water, the requirements of AMIES-A-007 for chemical treatment and selection of hydrostatic test water shall be followed. - The relief valve shall have adequate capacity to prevent overpressure during the test and shall have been - Others…(Refer to SA GI 2.102 for full details) 6. Obtain Work Permits 7. Isolate Equipment Not Adequate for Test Pressures Others…(Refer to SA GI 2.102 for full details)	

	Continue . . . Pressure and Leak Testing (Pneumatic / Hydrostatic Testing)	Failure of equipment / tools or fittings	1. All leak and test activities must be carried out and permitted in accordance with SA GI 2.100, 2.102, AMIES-A-004, AMIES-A-007 2. Only trained workers to be engaged in the testing 3. Conduct pre-start briefing, discuss work procedures and safety controls 4. Check and verify all equipment in good order and conditions 5. Never strike or force on equipment while it is under pressure 6. Use appropriate type, size and calibrated relief valve and pressure gauge 7. Pre-inspect and test the test equipment before putting into service 8. Testing activity to be closely supervise and monitored by competent Supervisor	GI 2.102 – Pressure Testing Safely
		Flying Object / Projectiles (from failure of material during explosion)	1. Never over-pressure test equipment, test only on the design parameters 2. Provide screens / connection guards 3. Use appropriate and suitable PPEs (safety goggles, face shield or both, etc.)	CSM III-1 Machine Guarding
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Provision of work shade / resting facility 5. Intermittent rest and breaks	CSM I-13 Heat Stress

Phase : PRE-COMMISSIONING WORKS				CLASS OF HAZARD : A
Ref. No.	List of Activity/(ies)	Hazards	Control Measures	Remarks
047	Equipment and Facility Testing (Fans, HVAC, Piping, BMS, Electronic /Instrumentation Controls, etc.)	Electric shock	1. All equipment and facility testing activities must be carried out and permitted in accordance with SA GI 2.100 especially when entry to restricted areas. 2. Practice Isolation procedure and Lock out – Tag out system, ensure all power are switch-off and locked before making any adjustment. 3. Ensure all electrical appliances are adequately earthed and GFCI's installed 4. Only trained and competent workers to be engaged in the testing operation 5. Conduct pre-start briefing, discuss work procedures and safety controls 6. Check and verify all equipment in good order and conditions 7. Use appropriate PPEs (Insulated and rated hand gloves, safety goggles, face shield, clothing and safety shoes) 8. Residual current devices (RCDs), including ground fault circuit breakers (GFCIs) and earth leak current breakers (ELCBs), shall be used for all 110/220 V portable electric power tools..	CSM III-3 Electrical Equipment

		Fire / Explosion	1. Remove any combustible materials 2. Provide adequate fixed and mobile firefighting equipment/ appliances (fire extinguishers, Sprinkler system, Fire water hose and fire water stand) 3. All workers trained in firefighting, emergency reporting and procedure. 4. Ensure to assign fire watch in all hot work activity.	CSM I-7 – Fire Prevention
		Asphyxiation (oxygen deficiency)	1. Conduct atmospheric and gas test prior to entry in any enclosed structure, isolated rooms or areas identified as confined spaces (in this case, follow confined space procedure). 2. Use portable safety alarm devices 3. Provide and maintained adequate ventilation to work area	GI 2.709 Gas Testing Procedure
		Pinched point / impact trauma	1. Appropriate PPEs to be provided and use (hand gloves, etc.) 2. Correct tools to be provided and use, prohibit use of homemade or modified tools	CSM I-3 – Personal Protective Equipment (PPE)
		Ergonomics (Poor posture, repetitive movement, poor lifting)	1. Ensure to take regular rest breaks to avoid soreness, pain and discomfort 2. Rotation of task to limit prolong exposure 3. Do not lift beyond physical capacity	CSM I-12 (12.6) – Manual Handling

	Continue . . . Equipment and Facility Testing (Fans, HVAC, Piping, BMS, Electronics /Instrumentation Controls, etc.)	Caught-in by rotating / moving parts (Fans, machines)	1. Ensure pre-checking of provisions for machine guard / screens 2. Ensure provision of emergency switch and other safety devices (dead-man switch) 3. Ensure power is off and Isolated before making any adjustment 4. Ensure enclosures / cages / grills are fixed and secured	CSM III-1 Machine Guarding
		Fall from elevation	1. Provide adequate and safe work platform (fixed / mobile) 2. Use fully body harness and maintained 100% tie-off 3. Use correct type of ladder. 4. Maintain 3 point contact when ascending and descending the ladder. 5. Provide ground support when working on ladders (buddy system) 6. Provide proper guardrail systems, personal fall arrest systems and other positioning device systems. 7. Workers assigned to work at elevation are fully aware and trained on Working at Height (WAH). 8. Verify that a site-specific work-at-height rescue plan is prepared, documented, and readily available at the worksite.	CSM II-5 Fall Protection

		Slips, Trip, Fall	1. Safe means of access to reinforcing bars shall be provided with adequately provided with timber boarding 2. Handrails and grab bars shall also be consider to provide balance. 3. Ensure floors are dry, clean and no obstructions (left-over materials, cables, wires, etc.)	CSM I-12 Material Handling
		Exposure to extreme heat (hot / cold environment)	1. Provision of hydration pack (water, oral rehydration salt, food) 2. Provision of drinking fluid (Hot / Cold) 3. Ensure adequate PPEs (appropriate clothing and cover-all) 4. Intermittent rest and breaks	CSM I-13 Heat Stress

10.

RISK RATING (RR) = Severity (S) x Likelihood (L)

No	TASK	HAZARD	RISK RATING			RISK CONTROL MEASURES	RESIDUAL RISK			ACTION PARTY	TARGET DATE
			S	L	RR		L	M	H		

HAZARD IDENTIFICATION PLAN				Document ID : SA-AMI-000-HDAI-710005	
				Contracotr Reference : 6601000283	
				Revision: **6**	Step: **IFU**
				Rev. Date: **13-May-2025**	
Doc. Type: **PRC**	Discipline: **CSE**	Phase: **DE**	Class: **2**	Page **183** of **183**	
Vendor Reference : **N/A**			System / Subsystem: **NN**	Equipment Type: **N/A**	

			HAZARD SEVERITY				
			Negligible (1)	Slight (2)	Moderate (3)	High (4)	Very High (5)
LIKELIHOOD OF OCCURRENCE	Very Unlikely	(1)	LOW	LOW	LOW	LOW	MEDIUM
	Unlikely	(2)	LOW	LOW	LOW	MEDIUM	MEDIUM
	Possible	(3)	LOW	LOW	MEDIUM	MEDIUM	HIGH
	Likely	(4)	LOW	MEDIUM	MEDIUM	HIGH	HIGH
	Very Likely	(5)	LOW	MEDIUM	HIGH	HIGH	HIGH

RED (High Risk)	**Intolerable** - Risk must be produce from any cost by applying Engineering controls,or otherwise operation shall be followed to continue.Action must be resolved by 30 days. Continued operation must be approved by the manager with interim measures.
YELLOW (Medium Risk)	**As Low As Resonably Practicable (ALARP)** - Risk reduction measures, must be incorporated based on cost benefit. Action must be resolved by 90 days. Continued Operations must be approved by the Manager with interim measures.
GREEN (Low Risk)	**Broadly Acceptable** - Implement measures to maintain risk at this level. Improve through administrative measures and manage for continuous improvement