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| **Site:** | **DUQM INTEGRATED POWER AND WATER PROJECT** | | | | | | | |  | |  | |
| **Assessed by:** | **Name:** | NIZAR AHAMED | | | **Position:** | CONSTRUCTION MANAGER | | | | **Date:** | 22/12/19 | |
| **Signed:** |  | | | |  | | | | | | |
| **Description Of Work:** | ELECTRICAL EQUIPMENT INSTALLATION | | | | | | | | | | | |
| **Task / Job Component** | **Hazard** | | **Risk** | **Persons at risk** | | | **Risk Rating L/M/H** | **Controls / Precautions to Reduce Risk** | | | | **Residual Risk**  **Rating L/M/H** |
| **Loading, transportation and offloading of GIS materials** | * Fall of goods / damage to goods, personnel injuries. * Traffic obstruction. * Damage to vehicle/propert y. | | 4\*4\*=16 | Installers, technicians and labourers | | | **H** | * Proper lifting technique shall be used while lifting of goods. * Proper manual techniques shall be implemented while handling goods. * Goods shall be packed as per convenience of transportation, stacking and handling. * Name of the goods shall be labelled categorised for identity. * Goods shall not protrude more than the transporting vehicle space allocated for it. * Goods transported shall be in approved container specified * Right goods shall be transported in approved container * Vehicle carrying goods shall be rated for the load and verified periodically for performance * All lifting accessories and tackles should be in good condition and third party certified. * Lifting tackles regularly inspected, colour coded. * Use competent and approved operators * Swinging area to be barricaded with signage to restrict unauthorised entry. | | | | **L** |

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| **Loading transportation and offloading of panel** | * Fall of goods/ damage to goods * Traffic obstruction * Damage to vehicle | 4\*3=12 | Installers, technicians and labourers | **H** | * Proper lifting technique shall be used while lifting of goods to vehicle or during offloading. * Proper manual techniques shall be implemented while handling goods. * Goods shall be packed as per convenience of transportation, stacking and handling. * Name of goods shall be labelled, categorised for compensation of dues while handling. * Name of goods shall be labelled ,categorised for identify * Goods shall not extend or protrude more than the vehicle. * Vehicle carrying load shall be rated for the load concerned and verified periodically for performance. * Right goods shall be transported in right vehicles. * All lifting accessories and tackles should be in good condition and third party certified. * Lifting tackles regularly inspected, colour coded and regularly maintained. * Use only competent operators. * Do not overload and tie the load before loading. * Strict supervision shall be ensured. * Swinging area to be barricaded. | **L** |
| **Installation/fixing of supports.** | * Hand or finger bruise when caught between supports and floors * Back pain: | 4\*2=8 | Installers, technicians and labourers | **M** | * Use proper working platform. * Assistance must be there * Avoid working on portable ladder for long duration. * Proper concentration on work. * Keep back bone straight. | **L** |

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|  | extensive work on floor by sitting for long periods, bending spine for taking  measurements. |  |  |  | * Use of appropriate tools. |  |
| **Defective /incorrect equipment spillage of oil/lubricants.** | * Property damage * Tilting of the equipment’s * Fall of load * Land contamination. | 4\*2=8 | Installers, technicians and labourers | **M** | * Competent and certified operator to operate the equipment * Equipment should have valid certification * Equipment regularly inspected and well maintained. * Daily inspection for hydraulic leaks should be done by operator * Drip tray to be used to avoid soil contamination | **L** |
| **Lack of knowledge of operating equipment** | * Personal injury * Property damage * Tilting of equipment * Fail of loaf | 4\*4=16 | Installers, technicians and labourers, other contractor workers and site visitors. | **H** | * Use only competent and certified operators for such operations * Operate with competent rigger * All personnel involved shall be briefed about\ method statement and risk assessment before starting activity. * Always ensure load is below SWL | **L** |
| **Lack of communication between rigger and operator** | * Property damage and personnel injury * Tilting of equipment * Fail of load | 4\*5=20 | Installers, technicians and labourers, other contractor workers and site visitors. | **H** | * Experienced and certified rigger to be assigned * Coordination between operator and rigger through visual contact at all times | **L** |
| **Adverse weather condition** | * Personnel injury | 3\*3=9 | Installers, technicians and labourers, other | **M** | * Do not work at heights during strong winds and storms | **L** |

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|  | * Asset damage |  | contractor workers and site visitors and equipment |  | * Deploy only trained workers * Ensure competent supervision * Restart work when it Is safe * Cranes shall cease operation when wind speed exceeds 25 knots or as in manufacture specifications. * Work shall be stopped if humidity exceeds 80ppm and temperature exceeds 50 degree centigrade. * All measuring instruments like anemometer hygrometer, thermometer should be available   with the supervisor during the entire operation.. |  |
| **Overloading** | * Loss of property * Damage to equipment * Personnel injury | 3\*3=9 | Installers, technicians and labourers, other contractor workers and site visitors and equipment | **M** | * Ensure adequate capacity crane is used * SWL to be displayed on the equipment to be used * Only experienced and certified operator to be deployed * Effective supervision * Prior briefing to operators before starting the activity. | **L** |
| **Simultaneous operation** | * Personnel injury * Property damage | 3\*5=15 | Installers, technicians and labourers, other contractor workers and site visitors and  equipment | **H** | * No other activity to be carried out at close proximity * Isolate the swing radius area and proper warning signage to be placed * Proper supervision and briefing. | **L** |
| **Adjacent live circuit** | * Electric shock / Electrocution * Flash over * Electric burn | 5\*4=20 | Installers, technicians and labourers, other contractor workers and site visitors and  equipment | **H** | * Use proper insulated hand tools * Conduct Toolbox talk prior to work start. * Place caution boards to adjacent live parts. * Work should be carried under the direct supervision of competent person. | **L** |
| **SF6 Gas Installation** | * Leak, Inhalation can cause   asphyxiation. | 3\*3=9 | Installers, technicians and labourers, other  contractor workers and | **M** | * Do not vent out the gas into atmosphere. * Contain the gas in designated cylinders. * Adequate ventilation. | **L** |

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|  | * Highly potential greenhouse gas |  | site visitors and equipment | **L**  **H** | * Use SCBA in case of leak * In case of leak ensure adequate purging * strictly ensure no entry to trenches or low lying areas if SF6 leaked is heavier gas and displaces   Oxygen below. |  |
| **Accident hit on the transformer parts while working.** | * Body injury | 2\*2=4 | Installers, technicians and labourers, other  contractor workers | * Use proper PPE | **L** |
| **Working at Height on top of transformer** | * Fall injury * Fatality | 4\*\*5=20 | Installers, technicians and labourers | * Safe scaffold shall be constructed * Work more than 2 meter height requires to having full body harness with double hook lanyard and retractable fall arrester block. * Use PPE I.e. helmet, safety shoes, hand gloves, safety glasses, coveralls etc. * Ensure availability of first aider * Follow approved safety working procedures * Ensure that all precautions for working at heights are taken * Work more than 2 meter height requires to having full body harness with double hook lanyard and retractable fall arrester block. * Use of PPE i.e. helmet, safety shoes, hand gloves, safety glasses, coverall etc. * Deploy only medically fit workers without vertigo * Ensure competent supervision * Ensure availability of first aider. | **L** |
| **Falling down by slipping due to the presence of oil** | * Body injury | 3\*5=15 | Installers, technicians and labourers | **H** | * Clean the oil traces on the transformer. * Keep the floor always clean. * Wear PPE. * Provide proper scaffolding wherever possible. | **L** |
| **Contact with chemical** | * Skin reaction | 3\*4=12 | Installers, technicians | **H** | * Take care while handling chemicals/oil and using | **L** |

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| **oils** | * Irritation * burning |  | and labourers |  | chemical and oil resistant hand gloves.   * Follow safe working procedures. * Use proper PPE. * Available of first aider with first aid box. |  |
| **Overpressure inside the tank** | * bursting of the tank * loss of oil * asset damage | 4\*4=16 | Installers, technicians and labourers, other contractor workers | **H** | * keep breather line and valve in the conservator line open and close maintaining of pressure in the machine * proper maintenance | **L** |
| **Bursting of tank** | * Burns due to oil spillage * Land contamination | 4\*4=16 | Installers, technicians and labourers, other contractor workers | **H** | * Ensure the pressure within the tanks is within safe limits by proper monitoring * Follow manufacturers’ instruction | **L** |
| **Improper operation of machine** | * Equipment damage | 3\*3=9 | Equipment | **L** | * Operate according to the manufacturer instruction | **L** |
| **Uneven /unstable ground** | * Fatality * Equipment damage due to fail. | 4\*2=8 | Installers, technicians and labourers | **M** | * Ensure ground is firm and stable * Ensure proper soil compaction * Extend the outrigger fully * Keep wooden support beneath outrigger * Provide warning signboards * Ensure availability of banks man during heavy equipment movement * Ensure first aid facility | **L** |
| **Manual handling** | * Slipping/tripping of the load. * Imbalance or loss of control * Back pain * Cut injuries/ sprain, etc | 3\*3=9 | Installers, technicians and labourers | **M** | * When specifying/ordering material, consideration will be given to manual handling requirement and will be purchased in packages of 25kg or less where possible * When planning the operation/activity consideration will be given to use handling aids where possible * Where the handling load will be above 2kg sufficient number of operatives to be assigned | **L** |

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|  |  |  |  |  | * Operatives shall be explained about manual material handling basics * The surround area will be level and stable where possible and free from tripping hazard. * PPE shall be provided and used i.e. gloves for handling sharp materials and accessories. * Experienced person to handle GIS material and avoid contact with sharp edges * Beware and take extra care about pinch point. |  |
| **Pinch/nip point: Finger/hand struck between machine/equipment** | * Finger/Hand injury | 3\*3=9 | Installers, technicians and labourers | **M** | * Training in Safe Manual handling practice * Wear personal protective equipment’s like safety helmet, hand gloves, coverall, safety shoes, goggles, etc. * Trained work force * Maintain good housekeeping * Avoid horse play * Cordoned off the area and affix awareness signs boards | **L** |
| **Unaware about work procedure** | * Injury to persons * Damage to assets | 3\*3=9 | Installers, technicians and labourers | **M** | * Supervision should be present within the duration of work * Skilled and experience workers shall be involved in the activity * TBT Should be conduct prior to start of work * Unauthorized employee not allowed to enter * Qualified first aider to be there in the site * Ensure good supervision * ERP should be communicated with concerned work force | **L** |
| **Dismantling of Packing materials** | * Injury to person * Damage to assets | 2\*2=4 | Installers, technicians and labourers | **L** | * All tools in use should be inspected and ensure that they are appropriate to the task to be   performed. | **L** |

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|  |  |  |  |  | * Maintain good housekeeping and denial all dismantled packing materials. * Remove all scattered nails from the surface. * Do not store the packing materials in the site. * Ladders used must be in good condition. * Wear necessary PPE. * Presence of first aider at site |  |
| **Use of improper/substandard Tools** | * Upper limbs disorder * Muscular sculptor Disorder * Personal Injury | 2\*3=6 | Installers, technicians and labourers | **L** | * Ensure use of right type of tools for the job being performed. * All Tools should be Pre-Inspected/calibrated. * Home Made Tools Should not be used. * Routine inspections to check & replace poor conditioned tools. * Periodic rest breaks & job rotation. * Use proper PPE. | **L** |
| **Unsafe handling of hand and power tools**  **/Defective hand tools/equipmanet electric shock/poor earth** | * Major/minor injuries/propert y damage | 4\*4=16 | Installers, technicians and labourers | **H** | * Strict supervision required * Only competent person to handle the tools * All electrical installations shall be inspected and tested prior to use * All electrical installation and alterations shall be undertaken by competent electricians only. * Adequate earth and ELCB with 0.03 A shall be provided * Regular inspection of electrical equipment, tool, and connections shall be carried out. * Ensure properly rated cables, sockets are used and safe condition of insulation cables. * Electrical equipment’s shall be away from water to enter inside live wires. * Tools/equipment’s shall have relevant guards | **L** |

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|  |  |  |  |  | fitted   * Tools/fittings. Alignment and general condition shall be inspected prior to use |  |
| **Electrocution** | * Injury to person * Damage to assets * Legal issues | 5\*4=20 | Installers, technicians and labourers | **H** | * All work in the live equipment area shall be carried out with Electrical Permit by authorized party. * Work shall only be under the guidance and supervision of a competent supervisor * Tools shall be double insulated and only 110V tools should be used. * ELCB to be tested before work starts. * Authorized and trained persons to carry out the Job. * Prevent body contact with earthed surface * Ensure adequate information instruction, training for all workers. * Isolate the machine/equipment and to be connected to primary earth and double insulated * Affix sign board and cordoned off the area to avoid unauthorized entry * All construction activities must be prohibited in the panel erection area to avoid conflicting activities * Complete PPE(Goggles, Safety shoes, safety helmets ,coverall ,HV resistance hand gloves ) * ERP communicated with concerned work force * Qualified first aider to be there in the site | **L** |
| **Entry into existing Buildings/Premises** | * Accidental contact with | 5\*4=20 | Installers, technicians and labourers | **H** | * Obtain valid Work permit from higher authority prior to start work near the live area | **L** |

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|  | energized part   * Personal injury |  |  |  | * Authorized Entry * Valid gate pass * Competent person to be used * Conduct Tool box meeting prior to work starts * Use all mandatory PPE. * Ensure Proper communication systems * ERP should be in place and communicated with all work force. * Good supervision |  |
| **Trip, Slip and Falls** | * Major/minor body injuries | 4\*3=12 | Installers, technicians and labourers | **H** | * Maintain good house keeping * No trip hazard in the area * Good cable management * Enough lighting * Remove the empty paint containers regularly * Do not block the access * Working on drums/temporary stands is prohibited | **L** |
| **Nearby works** | * Major/minor injuries/propert y damage | 5\*4=20 | Installers, technicians and labourers other contractor workers | **H** | * Other work shall not be allowed in the vicinity of GIS/Penel installation area * Strict supervision required * Barricade area coming below and place necessary warning signs    | **L** |
| **Inadequate access and egress** | * Major/minor injuries/propert y damage | 3\*4=12 | Installers, technicians and labourers other contractor workers | **H** | * Strict supervision required at all time * Access shall be free from obstruction of materials and to be identified easily * Suitable and sufficient safe access by means of ramps or stair ways. |  |
| **Illumination and humid temperature** | * Major/minor injuries/propert   y damage | 3\*4=12 | Installers, technicians and labourers other  contractor workers | **H** | * Ensure lighting level minimum 100-150 at worksite. * The entire access route to be well illuminated. | **L** |

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|  |  |  |  |  | * Temperature control shall be ensured, provide adequate air conditioner. |  |
| **Floor openings** | * People and material falling down | 5\*4=20 | Installers, technicians and labourers other contractor workers | **H** | * Protect the floor opening with adequate protective cover * Provide adequate illumination * Provide warning signage * Never keep the openings open * Tool box talk shall be conducted every day before starting work. | **L** |
| **Working at height** | * Major/minor injuries/propert y damage | 4\*3=12 | Installers, technicians and labourers. | **H** | * Competent person shall inspect the A type ladder before using it. * Stand by peon will be always available for holding the ladder. * People should come down every time while moving the mobile scaffold. * Work platform shall be fully boarded with proper toe boards and railings * Only trained competent person will erect, modify or dismantle the scaffold. * Materials shall not be thrown from height. * PPE for fall protection system shall be used * No excess material shall be kept on the platform. * Working on drums/temporary stands is prohibited. * Red tagged scaffolds shall not be used. | **L** |
| **Human behaviour** | * Absent minded   /inattention | 2\*3=6 | Installers, technicians and labourers. | **M** | * Promote human behaviour campaign. * Communicate personal loss due to behavioural aspects * Communicate the hazards and risks involved in unsafe act * Provide adequate supervision | **L** |

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|  |  |  |  |  | * Counselling the person to understand the circumstances for remedy. |  |
| **Chemical Handling** | * Acute & Chronic Skin disorders, Irritation * Chemical Burns * Burns of Eyes. | 3\*4=12 | Installers, technicians and laborers, other contractor workers and site visitors. | **H** | * Follow instructions as per MSDS. * Avoid direct contact with Electrolyte. * Ensure Adequate Ventilation and Exhaust Fans. * Mixing of Electrolyte as per vendor’s instruction. * Use of proper PPE-Safety Googles, Hand Gloves, and safety Shoes and Apron. * Proper Tool Box Talk should be given to workers covering all safety precautions. | **L** |
| **Battery Charging/Testing.** | * Severe injury to person. * Utility/Asset Damage * Blast or battery acid splash. | * 3\*3=9 | * Installers, technicians and laborers, other contractor workers and site visitors. | **M** | * Battery charging/discharging/Testing should be carried out only as per the instruction of Manufacturer. * Experienced person should be present while carrying out activity. * There should be adequate ventilation and Exhaust Fan and ensure that Hydrogen Gas should not get Trapped. * Condition of battery should be monitored before testing using Hydrometer(Specific Gravity should be analysed) * Proper Tool Box Talk should be given to workers covering all safety precautions. * Use proper PPE. * Fire Extinguisher & other firefighting aid should be present | **L** |
| **Uneven /Unstable Ground/**  **Existing structure/** | * Personal injury. * Equipment | 4\*4=16 | Installers, technicians and labourers | **H** | * Transformer to be mobilized to site only after pre inspection visit from supplier and site clearance | **L** |

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| **scaffold /inadequate access** | damage due to fall.   * Structure or scaffold damage. |  |  |  | from consultant.   * Work to be started only after obtaining permit to work. * Ensure access road and ground is firm and stable. * Ensure adequate soil compaction, soil density shall be tested and certified by third party. * Extend the outrigger fully * Keep correct size wooden pad under outrigger. * Provide warning sign boards * Ensure availability of competent rigger. * Safe distance to be maintained between scaffold and crane * Existing gate barrier has to be temporarily removed or modified. * All temporary materials obstructing equipment and trailer movement shall be removed. |  |
| **Defective/incorrect use of lifting tackles** | * Injury to person * Damage to assets * Legal issues | 3\*3=9 | Installers, technicians and labourers, other contractor workers and site visitors. | **M** | * All lifting accessories and tackles should be third party certified. * Lifting tackles regularly inspected, colour coded and well maintained. * Lifting belts and tackles should be inspected prior to the lift by rigger. * Follow safe work procedures. * Swinging area to be barricaded with signage. | **L** |

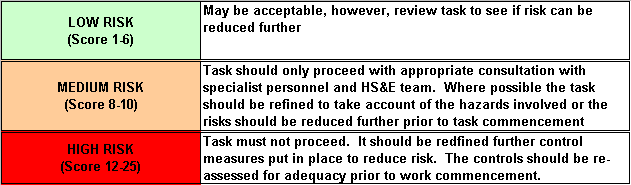
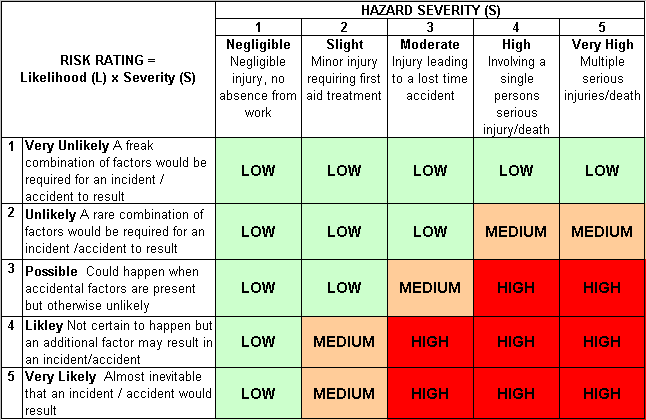
# I have read and understand how I am to carry out the activities listed in this RA.

**I have been supplied with the personal protective equipment identified on this JSA and I have been given training in the safe use of this equipment.**

I have read and understand the requirements set out in the material safety data sheets for the hazardous substances identified in this RA.

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| **Date** | **Position / Job title** | **Name** | **Signed** | **Date** | **Position / Job title** | **Name** | **Signed** |
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# Likelihood



How often could the hazard occur? Consider the task, frequency, duration, method of work, employees involved.

# Severity

How serious would the hazard’s effects be if

realised? Consider the type of hazard, biological, ergonomic, physical and chemical.

**Risk =** Likelihood x Severity

E.g. Likelihood (4) X Severity (3) = 12 **HIGH RISK**