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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 takingmeasurements. |  |  |  | * 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 andequipment | **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 andequipment | **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, othercontractor 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, othercontractor 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

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| **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 othercontractor 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.
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| **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.
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| **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**