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Project Electrical Safety Procedure

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Project Electrical Safety Procedure

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Project Electrical Safety Procedure

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Project Electrical Safety Procedure

Table of Contents

1.0	PURPOSE	5
2.0	SCOPE	5
3.0	DEFINITIONS	5
4.0	REFERENCES	6
5.0	RESPONSIBILITIES	6
5.1	Project Manager	6
5.2	Site Manager	6
5.3	HSSE Manager.....	6
5.4	Superintendents	6
5.5	Supervisors.....	7
6.0	RISK ASSESSMENT	7
7.0	REQUIREMENTS.....	8
7.1	General.....	8
7.2	Construction Wiring	8
7.3	Distribution.....	8
7.4	Electrical Equipment.....	9
7.5	GFCI ELCB Requirements	9
7.6	Flexible Cords, Extensions, Cables and Accessories	9
7.7	Lighting and Luminaries	10
7.8	Generators.....	10
7.9	Welding Sets	10
7.10	Hand tools	10
7.11	Overhead Transmission/Railway Power Lines.....	10
7.12	Inspection and Testing	11
7.12.1	Residual Current Device (RCD) Testing	12
7.12.2	Hire Equipment.....	13
8.0	WORKING ON OR NEAR ENERGIZED CIRCUITS	13
8.1	Flash-Hazard Protection – Flash-Hazard Analysis	14
8.2	Energized Electrical Work Permit (EEWP).....	15
9.0	RECORDS.....	15
10.0	ATTACHMENTS.....	15
	Attachment 1 - EPM-KSS-TP-000027 - Project Energized Electrical Work Permit (EEWP) Checklist.....	16
	Attachment 2 - EPM-KSS-TP-000038 - HSSE Electrical Safety Assessment Checklist	17



Project Electrical Safety Procedure

1.0 PURPOSE

These guidelines outline specific inspection procedures and the frequency of inspection of electrical equipment. The procedure applies to all electrical cord sets and receptacles not part of the permanent electrical wiring system of a building or structure, and all electrical equipment and tools used in connection with construction activities on any Project.

This procedure does not supersede the requirement to visually inspect all tools and equipment prior to each use. All such equipment must comply with either the assured grounding program or the ground fault circuit interrupter (GFCI) requirements as specified.

The aim of this procedure is as follows:

- Assist in the elimination or reduction of workplace illnesses and injuries by defining the Project's electrical safety requirements.
- Specify the Project requirements for planning, preparation, and implementation of electrical safety requirements.

2.0 SCOPE

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

3.0 DEFINITIONS

Definitions	Description
B/SO	Buddy/safety observer
Current	The flow of electrical energy, measured in Amperes (Amps) or Mill amperes (thousandths of an Amp) flowing through conductor to a device where it is transformed to mechanical or thermal energy.
EEWP	Energized electrical work permit
ELCB	Earth leakage circuit breaker
EPOD	Electrical portable outlet device
FR	Flame Resistant
Ground Fault Circuit Interrupter (GFCI)	An electrical device for personal protection that disconnects a circuit whenever it detects that the electric current is not balanced between the energized (hot) conductor and the neutral exceeds an established limit value.
Ground-(ing)/Earth-(ing)	Intentionally or unintentionally connecting any object to the ground, directly or indirectly, as through a wet soil area or through any other object that is grounded; also, known as "earthing"; "earthed". Grounding is a protective requirement for all metal objects on a site that may accidentally become energized. If an energized circuit meets the grounded soil or equipment, that creates a "ground fault" and a protective circuit breaker(s) should trip. If a person becomes a current-carrying part of the path (circuit) between the electrical source and ground, he is in danger of injury or death.
HSSE	Health, Safety, Security and Environment
JHA	Job Hazard Analysis
LAB	Limited Approach Boundary
LO/TO	Lockout/tagout
LV	Low Voltage
PPE	Personal Protective Equipment
RE	Responsible Engineer
PTW	Permit to work
RCD	Residual Current Device
STARRT	Safety Task Analysis Risk Reduction Talk



Project Electrical Safety Procedure

Definitions	Description
VRD	Voltage Reduction Device
OSHA	Occupational Safety and Health Administration
SWMS	Safe Work Method Statements
WMS	Work Method Statements
PPE	Personal Protective Equipment
ANSI	American National Standards Institute
NFPA	National Fire Protection Association
IEEE	Institute of Electrical and Electronic Engineers

4.0 REFERENCES

- NFPA 70E:2009 Chapter 1 Standard for Electrical Safety in the Workplace
- OSHA 29 CFR 1910 Subpart S Electrical
- OSHA 29 CFR 1926 Subpart K Electrical
- OSHA 29 CFR 1926 Subpart V Electrical Power Transmission and Distribution
- EPM-KSS-PR-000001 Project General Safe Working Requirements Procedure
- EPM-KSS-PR-000016 Project Hazardous Work Permit Procedure
- EPM-KSS-PR-000026 Project Utility Clearance Procedure
- EPM-KSS-PR-000031 Project Lockout/Tagout Procedure

5.0 RESPONSIBILITIES

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

5.1 Project Manager

The Project Manager has full accountability and authority for the following:

- Allocating sufficient resources for the implementation of this procedure.
- Verifying that the criteria for electrical safety outlined in this procedure are implemented in accordance with Project commitments.

5.2 Site Manager

The Site Manager is responsible for overall Construction Management of the site and monitoring so that the site follows the requirements of this procedure. Other responsibilities include the allocation of sufficient resources to implement, develop, and maintain effective electrical safety procedures.

5.3 HSSE Manager

The HSSE (Health, Safety, Security and Environment) Manager is responsible for the following:

- Developing this procedure.
- Providing technical advice and guidance on electrical safety requirements.
- Assessing the Project's compliance with the requirements of this procedure.

5.4 Superintendents

Superintendents are responsible for the following:

- Plan the work as far as practicable to eliminate the need for working on energized electrical equipment.



Project Electrical Safety Procedure

- Coordinate site activities to minimize the amount of work to be conducted on or near energized electrical components.
- Inform the Site Manager and the HSSE Manager of any planned work on energized electrical equipment.
- Verify that JHAs and risk assessments have been completed as required by the nature of the work.
- Verify the implementation of requirements for a task as identified in the Risk Assessment, Permit-to-Work (PTW), Safe Work Method Statement (SWMS), Job Hazard Analysis (JHA), etc.

5.5 Supervisors

Contractor Supervisors responsibilities include:

- Develop Safe Work Method Statements and JHAs for any electrical work activities and submit them to the Responsible Superintendent and Project HSSE Manager for approval.
- Coordinate site activities to minimize the amount of work to be conducted on or near energized electrical components.
- Plan the work as far as practicable to eliminate the need for working on energized electrical equipment.
- Ensure that adequate barriers are provided around areas where hazards may exist, and that such hazards are clearly lit.
- Ensure all necessary tools and equipment are provided.
- Assign qualified electrical workers to perform electrical tasks.
- Arrange for training of their Personnel regarding this procedure.
- Verify the implementation of requirements for a task as identified in the Risk Assessment, PTW, SWMS, JHA, etc.

6.0 RISK ASSESSMENT

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

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

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

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

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

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

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



Project Electrical Safety Procedure

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

7.0 REQUIREMENTS

7.1 General

All portable electrical equipment, permanent and temporary power supplies used during construction are to comply with the relevant Standard and this procedure. Each Contractor is to comply with standards relevant to their portable electrical equipment and scope of work.

This procedure defines the requirements of the assured equipment grounding conductor program. The assured grounding program applies to:

- All electrical cord sets and receptacles not part of the permanent electrical wiring system of a building or structure;
- All electrical equipment and tools used in connection with construction activities.

Electrical works must be done only by a competent electrician, projects and entities should establish a program to ensure the competency of electricians which include a form of issued competency cards.

No employee should be allowed to work in such a way that the employee may encounter an energized circuit during the work unless means of control are implemented such controls include but not limited to:

- De-energizing power source.
- A Lock-out/Tag-out and permit-to-work system.
- Grounding.
- Insulation.
- Personal Protective Equipment.
- GFCI/ELCB or equivalent.

Electrical distribution panels should be physically locked; keys must be controlled by an authorized person.

Projects should plan ground penetration work is taking place (e.g. excavation, jackhammering.) to protect against underground power lines.

Work pre-start safety assessment shall be used to identify by investigation, visually or through testing equipment whether there is any risk of electrocution.

7.2 Construction Wiring

Cables are to comply with the appropriate Standards and are to be installed in accordance with NFPA 70E:2009 and any other local or internationally recognized standards. ANSI and Nema IEEE.

7.3 Distribution

- Distribution boards are to have a RCD fitted to all final sub-circuits.
- Terminal points will be in an enclosure with feed and outlet cables channeled through the enclosure via rubber/plastic grommets.
- Distribution panels will be kept locked and the keys held by qualified, designated electrical supervisors only.
- Earthing will be fitted to all distribution boards and metal-support frames.
- Splicing of cables will not be allowed; cables will be extended or repaired using the correct fittings.
- Domestic standard cables and fittings will not be allowed on-site. All cables are to be to a standard, resistant to damage, wear and tear from the construction field environment.
- Particular attention will be given to cable management to ensure that cables are routed in a manner that does not create an obstruction or trip hazard. The method of such routing is to be in a manner



Project Electrical Safety Procedure

- that does not damage or affect the integrity of the cable. It is preferred that all distribution cables are supported in elevated cable ladder.
- Main lockable isolation points will be provided in conspicuous and accessible places in workshop/fabrication areas. Machinery is to also have lockable isolation points provided adjacent to the equipment.
 - Cable connections will be made with industrial explosion proof fittings according to applicable codes and standards.
 - Distribution panels will carry an Electrical Hazard warning sign.
 - All extensions and modifications to cabling systems are to be recorded by the responsible superintendent and field engineer on an 'as built' drawing and noted in the electrical test records. A copy of the 'as built' drawing and test records are to be retained by the responsible Contractor electrical engineer.

7.4 Electrical Equipment

For all single-phase receptacles and portable power tools, the following will take place:

- Employees will visually inspect receptacles, extension cords, and equipment connected by cord and plug before each day's use to determine whether there are external defects.
- Where there is evidence of damage, the damaged item will be taken out of service and tagged with a defective tool tag.
- Equipment ground/earth conductor continuity tests and electrical continuity and polarity tests should be performed by a competent electrician. Equipment not passing the continuity test must be repaired immediately or tagged with a defective tool tag.

All equipment ground/earth conductor continuity tests and electrical continuity and polarity tests will be performed as follows:

- Before first use of the equipment.
- At intervals, not to exceed 3 months.
- Before repaired equipment is returned to service.
- Before equipment is used after any incident that may have caused damage.
- All repaired equipment must pass the continuity test before returning to service.
- Equipment casings will be intact with no loose fittings or exposed cables.
- Plug & socket fittings shall be of an approved industrial type.

7.5 GFCI ELCB Requirements

The following requirements pertain to the location and recommended use of a ground fault circuit interrupter (GFCI), also referred to as an earth leakage circuit breaker (ELCB):

- As a minimum GFCIs will be provided for all 120V, single-phase, 15 and 20 Amp receptacle outlets (or 240V, single-phase, 30 and 40 Amp, as applicable) that are not part of the permanent wiring of a building or structure (e.g., temporary wiring during construction), unless the assured equipment grounding conductor procedure is implemented.
- Where applicable, ELCBs will be required according to the national/local codes/standards.
- GFCIs/ELCBs should be provided for lavatory, washroom, and change room outlets and areas having a moist or wet atmosphere where electrical equipment or portable electric tools may be used.
- It is essential that the polarity of conductors in all cords, plugs, and receptacles supplying single-pole portable GFCI/ELCB units be properly maintained or the unit may not protect personnel against shock. It is generally desirable to locate portable GFCI/ELCB units near the equipment being used and to use relatively short cords to each tool or lamp. This may minimize nuisance tripping.
- GFCI/ELCB should be part of a periodic testing and inspection program.

7.6 Flexible Cords, Extensions, Cables and Accessories

- Cord extension sets are to comply with the relevant Standards.



Project Electrical Safety Procedure

- Flexible cords are to contain an earth conductor.
- The maximum length of cords (single or joined) is not to exceed:
 - o 30 m for 2.5 mm² conductors;
 - o 50 m for 4.0 mm² conductors
- Flexible cords are to be protected from damage.
- Flexible cords are to be supported off the floor/ground.
- Flexible cords are not to be used while coiled or reeled.
- Double-adaptors and 3-pin plug (piggyback) adaptors are not to be used.

7.7 Lighting and Luminaries

- Hand-held luminaires (lead lamps) are to comply with the National Standard.
- Festoon lighting – lamp holders are to be permanently moulded to the cable, provided with a nonconductive mechanical guard for the lamp and be supported at least 2.5 m above the ground or floor or immediately below the ceiling.
- Temporary lighting (portable light plants) shall be protected from damage and be positioned to prevent contact with structures.

7.8 Generators

- Generators and welding transformers will be maintained in a good condition.
- The area around generators will be maintained free of oil and diesel spills.
- Rotating components will be guarded.
- Grounding/Earthing will be provided on all mobile electrical generators.
- Outlets will be in good condition with no exposed conductors.

7.9 Welding Sets

A self-powered (diesel) welding set is considered to be portable electrical equipment for the purposes of this Procedure and is to be inspected and tagged accordingly.

The 240V outlet, if fitted, on self-powered welding sets is to be fitted with an RCD, if not the outlet is to be tagged out of service and not used. Where the outlet is used, such welding sets must be earthed

All welding sets are to be fitted with a voltage-reduction device (VRD)

7.10 Hand tools

Electrical hand tools and equipment will be to the following standards:

- 240 volts' tools will be double insulated.
- Equipment casing will be intact with no loose fittings or exposed cables.
- Plug fittings will be of an approved industrial type.
- Condition will be good and the tool will be subject to preventative maintenance schedules.

7.11 Overhead Transmission/Railway Power Lines

Where overhead power transmission lines exist on or adjacent to construction sites or site roads, the Supervisor will provide information in the project HSSE Execution Plan describing the methods to be used to prevent contact with the overhead lines.

As a general rule, the following controls will be implemented:

- A risk assessment must be conducted (e.g., JHA or similar method);



Project Electrical Safety Procedure

- Work must be planned, as far as is practical, to avoid proximity to the overhead lines and accidental contact.

The following activities are to be controlled when working around overhead power lines:

- The erection of scaffold and handling scaffold tubes.
- Handling long ladders.
- Operating Mobile elevated work platforms.
- Operating tipper trucks or dump trucks.
- Operating backhoes.
- Operating cranes.

As a rule, no vehicles, plant or equipment should be brought closer than:

- 15 meters of overhead lines suspended from steel towers in any direction.
- 9 meters of overhead lines supported on wooden poles in any direction.

The Supervisor or electricity provider will specify clearance for given voltages. Any work to be carried out within the above limits must be controlled by a Hazardous Work Permit. This procedure will be audited and validated as to implementation within 3 months of the project mobilization.

7.12 Inspection and Testing

In-service testing is necessary for the safety of persons using the equipment and for the proper discharge of the obligations of employers and employees, as listed in legislation covering Occupational Health and Safety matters.

Quarterly safety inspection and testing (ground conductor continuity, electrical continuity, and polarity) shall be completed on low-voltage, single-phase and poly-phase (e.g., nominal 240V and 415V) electrical equipment, connected to the electrical supply by a flexible cord and/or connecting device, which is new equipment placed into service for the first time, or is already in-service, has been serviced or repaired, or is returning to service from a second-hand sale, or is available for hire.

Typical examples of equipment are:

- Portable, hand-held and stationary appliances, designed for connection to the low-voltage supply by a flexible cord.
- Cord extension sets and outlet devices (also known as electrical portable outlet devices (EPODs) or power boards).
- Flexible cords connected to fixed equipment.

An assured equipment-grounding, conductor program will be implemented by each Contractor. The program applies to:

- All electrical cord sets and receptacles not part of the permanent electrical wiring system of a building or structure.
- All electrical equipment and tools used in connection with construction activities.

For all single-phase receptacles and portable-power tools, the following will take place:

- Users will visually inspect receptacles, extension cords, and equipment connected by cord and plug before each day's use to determine whether there are external defects. Where there is evidence of damage, the damaged item will be taken out of service and tagged with a defective tool tag.
- A quarterly test for all circuitry will be performed on all cords and receptacles that are not part of the permanent wiring system. All electrical equipment plugged into those cords and receptacles will have a grounding/earthing line. These tests will be made, recorded, and retained by the Electrical Department, and be made available to the HSE Department upon request. All equipment



Project Electrical Safety Procedure

that undergoes this test will be marked with electrician's tape according to the Project Color Code Schedule. (See Table below).

Portable electrical equipment, other than self-powered equipment, is to be tested quarterly by a qualified electrical worker. The following test standards are to apply:

- Continuity
- Polarity
- Earthing and insulation (as appropriate).

The following standards, as relevant, are to be met as part of the testing process:

- No obvious external damage.
- No damaged or component defects in connections.
- Warning indication of maximum speed and load is intact and legible.
- Dead-man switch is fully operational and cannot be overridden.
- Lock-on type switches, if found, are disabled.
- Suitable guarding is securely fitted and requires a tool to remove.

Any equipment not passing the continuity test will be repaired immediately by a qualified electrician or tagged with a defective tool tag and taken out of service.

All repaired equipment must pass the continuity test before returning to service.

All portable electrical equipment operated only in an office or equivalent environment need only be tested annually.

Any equipment not passing the test will be repaired immediately or tagged as out of service.

Equipment that passes the test is to be tagged with a colored identification tag showing the date of the test, the next due test date and the signature and license/permit number of the electrical worker performing the test. Tags should be durable, non-damaging to the equipment (including flexes), nonconductive and be color coded as follows:

Table Project Color Code Schedule

Quarter	Color
Jan – Mar	Red
Apr – Jun	Green
Jul – Aug	Blue
Oct – Dec	Yellow

A continuity meter, ohmmeter, insulation-resistance tester, RCD tester, calibration instrument, or any instrument used to measure equipment safety compliance is to be of accuracy Class 5 or better and calibrated on an annual basis.

7.12.1 Residual Current Device (RCD) Testing

The minimum test frequency for portable and permanently installed RCDs is:

Type of Test	Portable	Fixed
Inspection and push button	Daily or before each use whichever is the longer	Monthly
Calibration check	Every three months	Annually



Project Electrical Safety Procedure

The inspection and push-button test includes a visual inspection of the RCD to detect obvious external damage, such as casing cracks, moisture penetration, mechanical, chemical or heat damage. This test is to be conducted by the operator for portable RCDs and a qualified electrician for a fixed RCD. Calibration checks are to be conducted by a qualified electrical worker.

After any inspection, the RCD is to be tested by operating the integral push button and ensuring that it trips. Any RCD not passing the inspection, push button or calibration test is to be tagged with an OUT OF SERVICE. Failed RCDs are to be replaced; repairs to such units are not permitted. All new RCD units are to be tested before use.

RCD inspections shall be documented in a log.

7.12.2 Hire Equipment

Hired portable-electrical equipment is to be identified, inspected and tested in accordance with this Procedure. Test records are to be sighted prior to equipment mobilizing to site.

8.0 WORKING ON OR NEAR ENERGIZED CIRCUITS

Contractor shall assess their scope of work for potential activities on or near energized circuits and implement controls to protect project personnel.

Contractor shall have qualified and licensed electrical workers perform work on or near exposed energized circuits. Contractor shall provide qualified and licensed electrical workers that, at a minimum, possess skills and knowledge related to the construction and operation of the electrical equipment and installations and have received safety training on the hazards involved. Individuals shall be competent in the skills and techniques necessary to distinguish exposed energized parts from other parts of the equipment. They shall be competent in the proper use of special precautionary techniques, personal protective equipment (PPE), insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment. In addition, the qualified and licensed electrical worker must comply with one of the following:

- Documented completion of an electrical apprenticeship program;
- Completion of a trade school electrical training program;
- Completion of military training for electrical related work;
- College graduate in a related electrical field; or
- Demonstrated electrical knowledge through hands on experience.

Contractor shall provide a buddy/safety observer (B/SO). The B/SO is a designated person that will notify emergency safety response personnel, if required. The B/SO shall remain outside the Limited Approach Boundary (LAB) and/or the flash-protection boundary, whichever is greater, to prevent others from unauthorized entry into the LAB. Additionally, this person must be knowledgeable of the location and operation of the device to de-energize the equipment that is being worked on. The B/SO is required when testing is being performed on systems rated at 600 VAC or 250 VDC and higher. The B/SO is required to wear the same level of PPE as the person performing the work.

Working on or near live parts and/or exposed energized electrical equipment shall only be permitted after Contractor has determined that the energy isolation cannot be reasonably accomplished or the needed data can best be obtained while the circuit is energized (e.g., scheme checks, loop checks, control system troubleshooting and testing).

All certified licensed electricians shall have access to a low voltage (LV) rescue kit and have the kit opened and accessible prior to commencing any LV associated work.

Contractor performing work shall be responsible to take an active role in eliminating or minimizing electrical hazards prior to starting any electrical work. If the exposed energized components cannot be electrically isolated, Contractor shall:



Project Electrical Safety Procedure

- Complete a STARRT/JHA (safe task analysis & risk reduction talk/job safety analysis) card for each scope based on specific configurations. The STARRT card will be used on all work activities regardless of the voltage and in voltages above 600 VAC and 250 VDC would require a JHA in addition to the STARRT card.
- Determine the LAB and flash-protection boundary.
- Reduce or mitigate hazards by installing protective shields, where appropriate to prevent accidental contact with exposed energized equipment by workers, material, and/or tools.
- Utilize appropriate PPE that will protect the individual from the hazard.
- Prepare an Energized Electrical Work Permit (EEWP) (see Attachment 1).

Where protection shields have been installed and no exposed energized components are a hazard, the LAB requirements no longer apply. Work activity to remove protective shields shall comply with the requirements of this Procedure.

When work is being performed within the LAB or flash-protection boundary, the following requirements also apply:

- The crew and crew supervisor for Contractor must complete a STARRT card to ensure that each employee is aware of all known hazards in the designated work area. All crew members must sign the STARRT card acknowledging their review before starting work. Contractor shall maintain the signed STARRT card as a record until work is completed. STARRT cards (and JHA) may be developed for multiple activities, such as several loop checks, several scheme checks, troubleshooting controls systems, etc.
- Contractor shall install red and black "DANGER" barrier tape as a visible barrier to preclude unauthorized entry into the LAB or flash-protection boundary from all accessible directions. Additionally, a sign or tag identifying the hazard must be present at the barrier.
- Contractor shall provide a minimum of two personnel to perform this work. The person performing the actual hands-on work must be a qualified electrical worker. The other person shall be the B/SO and must be a qualified electrical worker. The individual appointed as the B/SO shall be identified on the corresponding STARRT card along with the applicable emergency phone numbers.
- Contractor shall have an appropriately rated fire extinguisher available at the work site. For purposes of this Procedure, the work site is defined as the area immediately adjacent to location where the physical work is being performed.
- Contractor must ensure that the work area is dry, adequately illuminated, and free of obstructions or debris that may become a hazard or interfere with the work activity.
- The B/SO shall ensure that all other personnel in the work vicinity are kept outside of the LAB and flash-protection boundary while work is being performed. The B/SO may allow qualified electrical workers and escorted employees to cross the LAB and flash-protection boundary when it is safe.
- Tools shall be kept in temporary storage while not in use. Tools shall not be placed on top of cabinets or any other item where they could possibly fall onto energized components.
- Before pulling a conductor through any area with exposed energized components, the ends of the conductors shall be sufficiently protected with an insulating material of the same rating as the conductor itself. If a pulling device is used, it must nonconductive.
- The organization performing work shall ensure that voltage rated tools (including non-conducting ladders) are used near live electrical conductors.

8.1 Flash-Hazard Protection – Flash-Hazard Analysis

- A flash-hazard analysis shall be performed in accordance with NFPA 70E:2009.
- At voltage levels above 600V, the flash-protection boundary is the distance at which the incident energy level equals 1.2 cal/cm². For situations where fault clearing time is 0.1 second (or faster), the flash-protection boundary is the distance at which the incident energy level equals 1.5 cal/cm².

Protective clothing and PPE for application with a flash-hazard analysis in accordance with NFPA 70E:

- Where it has been determined that work will be performed within the flash-protection boundary, the flash-hazard analysis shall determine, and Contractor shall document, the potential-incident energy exposure of the worker (in calories per square centimeter [cal/cm²]). The incident energy exposure level shall be based on the working distance of the employee's face and chest areas from a



Project Electrical Safety Procedure

prospective arc source for the specific task to be performed. Flame-resistant (FR) clothing and PPE of the appropriate rating shall be used by the employee based on the incident energy exposure associated with the specific task. Recognizing that incident energy increases as the distance from the arc flash decreases, additional calculations will be necessary if the work requires any parts of the body be closer than the distance at which the incident energy was determined.

8.2 Energized Electrical Work Permit (EEWP)

If live parts are not placed in an electrically safe work condition, work to be performed shall be considered energized electrical work and shall be performed by written permit (EEWP). The Energized Work Permit Form found in Appendix 1 shall be used. The following requirements shall be documented:

- Description of the circuit and equipment to be worked on and their location
- Justification for why the work must be performed in an energized condition
- Description of the safe work practices to be employed
- Determination of the LAB from exposed energized parts for unqualified workers
- Determination of restricted- and prohibitive-approach boundary for qualified workers
- Results of the flash-hazard analysis
- Flash-protection boundary (Project may establish generic boundaries for voltages available on-site based on a worst-case analysis of the distribution system)
- Necessary PPE to safely perform the assigned task
- Means employed to restrict the access of unqualified persons from the work area
- Evidence of completion of a job briefing, including a discussion of any job-specific hazards
- Energized work approval signature(s).

Work performed on or near live parts by licensed qualified electrical persons related to tasks such as testing, troubleshooting, and voltage measuring, shall be permitted to be performed without an EEWP, provided a JHA, appropriate safe work practices and PPE, in accordance with all Contractor HSE requirements and NFPA 70E.

The STARRT card supplemental form shall be filled out for the work activities exempt from the EEWP, and kept with the STARRT card at the work location.

9.0 RECORDS

Records generated by this Procedure, Permits to Work, training documents, electrical power-tool inspection documents audits and assessments conducted by Contractor and Subcontractors shall be maintained by each and made available for audit. A record of testing and inspection of portable-electrical equipment is to be maintained by individual Subcontractors for equipment under their control. Records shall be made available to Company for audit upon request.

10.0 ATTACHMENTS

1. EPM-KSS-TP-000027 - Project Energized Electrical Work Permit (EEWP) Checklist
2. EPM-KSS-TP-000038 - HSSE Electrical Safety Assessment Checklist



Project Electrical Safety Procedure

Attachment 1 - EPM-KSS-TP-000027 - Project Energized Electrical Work Permit (EEWP) Checklist

EEWP Instructions:

A log for EEWPs shall be maintained by the PE, or designee.

EEWP Preparation

1. The EEWP Requestor (Foreman, General Foreman, Field Engineer, Superintendent, or Subcontractor Representative) shall fill out Section 1 of the permit.
2. The EEWP Requestor shall identify the employees to perform the planned work and ensure they are qualified to perform the work on or near exposed live parts (qualified employees).
3. The EEWP Requestor shall sign the permit and obtain the signature of their supervisor and forward the form to the Tagging Authority or designated individual for logging. The Tagging Authority will then provide the form to the RFE.
4. The RFE shall ensure the EEWP was logged and shall review the EEWP to determine if the EEWP contains a justification that meets the criteria. Then the RFE signs Section 1 of the permit, and completes Section 2 of the EEWP.
5. The RFE enters the permit effective date range. No work authorized by the EEWP shall be performed outside of the permit effective date range.
6. The Site Manager or their designee as appropriate, reviews the EEWP and signs Section 3 of the permit to authorize the planned work.
7. A pre-job brief is conducted by the RFE once the EEWP is authorized to perform the work. The RFE shall notify the person-in-charge of the work area and work operation covered by the EEWP. Any JHAs / STARRTs that are required shall be developed and/or reviewed by the employees that will perform the planned work.
8. Section 4 of the EEWP shall be completed by the RFE as a supplement to the STARRT card. The RFE retains the original EEWP until the permit is closed. The EEWP is kept with the STARRT card at the work location.
9. Closed EEWPs shall be returned to the RFE, or designee, for proper filing and logging.



Project Electrical Safety Procedure

Attachment 2 - EPM-KSS-TP-000038 - HSSE Electrical Safety Assessment Checklist

DIRECTIONS: Check either "YES," "NO," or "N/A." If corrective action is required, answer "NO." For every "NO" answer, provide a brief description of the issue in the "COMMENTS" column. Add the finding / issue to the HSE Tracking Register.					
No.	Electrical Safety	ANSWER			COMMENTS
		YES	NO	N/A	
Subcategory 1: 120V/240V Single Phase Equipment					
1	Do employees visually inspect receptacles, extension cords and equipment connected by cord and plug before each day's use (to determine whether there are external defects)?				
2	Where there is evidence of damage, are the damaged items taken out of service and tagged with a defective tool tag?				
3	Is a test for all circuitry performed on all cords and receptacles that are not part of the permanent wiring system?				
4	Is all electrical equipment plugged into cords and receptacles equipped with a grounding/earthing line?				
5	Are grounding/earthing tests for electrical equipment plugged into cords/receptacles made, recorded and retained by the electrical department or HSE Department?				
6	Is all equipment that undergoes the grounding/earthing test marked with electrician's tape according to the Color Code Schedule?				
7	Are all equipment ground/earth conductor continuity tests and electrical continuity and polarity tests performed before first use of the equipment?				
8	Are all equipment ground/earth conductor continuity tests and electrical continuity and polarity tests performed at intervals not to exceed 3 months?				
9	Does all repaired equipment pass the continuity test before being returned to service?				
Subcategory 2: GFCI/ELCB Requirements					
1	Where applicable, are ELCBs/RCDs provided for all 120V, single-phase, 15 and 20 Amp receptacle outlets (or 240V, single-phase, 30 and 40 Amp, as applicable) that are not part of the permanent wiring of a building or structure?				
2	Are ELCBs/RCDs provided for lavatory, washroom and change room outlets?				