JOINT OPERATIONS

KUWAIT OIL COMPANY (K.S.C.) – SAUDI ARABIAN TEXACO INC.

Joint Operations – Standard Operating Procedure

JOSOP 450 – HIGH VOLTAGE ELECTRICAL SAFETY

- **OBJECTIVES**

- This program is to protect personnel, contractors and others who may work on the electrical network.
- This program ensures the protection of the overhead lines and equipment to maintain continuity of supply.
- These Rules must be strictly adhered to at all times. However, should it be considered necessary to deviate from them, the prior written agreement of the Superintendent PGP & Distribution must be obtained.
- Only JO authorized and competent personnel and staff under their control are allowed to enter JO premises connected with the electrical network. Upon their entry and departure they must inform the concerned authorized personnel and necessary entry should be recorded in the logbook.
- Only JO authorized personnel are allowed to operate, isolate or apply earth on high voltage network.
- This program is designed to prevent electrically related injuries and property damage.
- This program also provides for proper training of maintenance & construction employees to ensure they have the requisite knowledge and understanding of electrical work practices and procedures.

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1- References

- *NFPA 70E, Electrical safety requirements for employee workplaces*
- *National Electrical code –“ NEC”.*
- *OSHA standard , Electrical Safety, 29 CFR 1910.331 to 1910.339*

2- Responsibilities

2.1- Management

- Provide training for qualified and unqualified employees.
- Conduct inspections to identify electrical safety deficiencies.
- Guard and correct all electrical deficiencies promptly.
- Ensure all new electrical installations meet codes and regulations.

2.2- Employees

- Report electrical deficiencies immediately.
- Don't work on electrical equipment unless authorized and trained.
- Properly inspects all electrical equipment prior to use.

3- Restrictions of Rules

- These rules are applicable only on the JO electrical distribution network and with JO authorization.
- These rules are issued to senior authorized, authorized and competent persons.
- No works of any nature on the electrical networks is to be carried out by any person ALONE. Visual inspections in control rooms, on transformers, on cables & on overhead lines preferably should not be done ALONE and the instructions of the authorized person should be strictly followed.
- Under no circumstances shall these rules be amended/changed/revised/ terminated without the prior and explicit consent of JO Manager.
- Any implicit or other interpretations of such rules without referring to the Manager are forbidden.

4- Definitions

4.1- Competent Person - a person possessing technical knowledge and experience to avoid danger, and holds a position of supervision over electrical personnel.

4.2-Senior authorized person - an electrical engineer or Gen. Supervisor appointed by the JO Manager to sign the permit to work on 4KV or more and to carry out or supervise specific work over all the system.

4.3- Authorized person – a Supervisor or foreman appointed by the JO Manager upon recommendation from the senior authorized person to sign the permit to work on 4KV or more and to carry out or supervise specific work over part of the system.

4.4- System control engineer or PGP Shift Supervisor – an engineer appointed by the JO Manager to perform the following duties:

- Manage, monitor, direct, plan and coordinate power generation transmission and utilization dependably and economically.
- Keep the network running smoothly and safely.
- Coordinate the network operational activities including work permit procedures, scheduled maintenance planning of the network elements, and fault repairing procedures.
- Discriminate between normal and abnormal operating conditions.
- Reduce the consequences of a disturbance to minimum.
- Assure that the system is kept under close scrutiny in order to quickly identify any problems so that Transmission & Distribution crews can fix them.
- Monitor the system day and night to balance power production with power demand.
- Submit daily, weekly and monthly reports indicating all the operation procedures and faults that occurred on the network.
- Assure safety for personnel and equipment according to the Company safety regulations.

4.5- Senior System control Engineer or Distribution Engineer – an Electrical engineer appointed by JO Manager to perform the following duties:

- Continually review and update all system drawings and/or software programs.
- Organize and implement equipment and system renovation, operation and maintenance history files.
- Take the necessary decision and actions on behalf of the Company regarding any matters related to the operation and load shedding of the system.
- Perform trouble shooting, and short circuit analysis.
- Perform relay setting coordination for the network, to insure optimum operational conditions.
- Assure safety for personnel and equipment according to the Company safety regulations.

4.6- Dangerous – the risk of loss of life, limb or health from electric shocks, burns or other injury.

4.7- Emergency conditions – conditions arising when there is a danger to life or limb, a risk to plant or apparatus or probability of loss of supply.

4.8- Screen – steps taken to ensure that the boundary between safety and danger, to persons or equipment is clearly defined for work or that the adjacent persons or equipment will not be in danger for such work. This is carried out by the suitable use of colored ropes or tapes.

4.9- Electrical network / equipment - any high or low voltage network / equipment such as cables, switch gears, transformers, overhead lines, alternators, motors, switchboards and instruments.

4.10- High voltage – voltage exceeding 480 volts.

4.11- Low voltage – voltage not exceeding 480 volts.

4.12- Switching – the operation of the switch gears, isolators or other methods of breaking an electrical circuit.

4.13- Isolation – the network / plant / equipment, upon which works is to be carried out, is completely opened and disconnected from all possible source of supply.

4.14- Live - the network/equipment/apparatus is electrically charged with high or low voltage.

4.15- Dead – the network /plant /equipment apparatus is electrically disconnected from live system and is at or about zero potential.

4.16- Earthed – all equipment within the area of work or which could become charged (dynamic or static) are bonded together and connected to ground with a flexible braided conductor in good condition of adequate capacity for the point of application and not less than 70 sq. mm in cross section.

4.17- Safety locks – locks used to lock off all switches at points where the circuit on which work is to be carried out could be energized.

4.18- Electrical Permit to Work Certificate – a declaration that the network/equipment/apparatus is dead, isolated and earthed i.e. it safe to work on. The permit to work should specify the equipment that is safe to work upon, and define the limits/area that is safe for work.

4.19- Logbook – a book kept in the PGP/PCRs/Substation, where any entry or operation is recorded with time and reason.

4.20- Caution sign – a notice attached to plant/equipment warning against energizing as work in progress on it. /

4.21- Caution tag – same as caution sign, but attached to control panel of plant/equipment.

4.22- Danger sign – a notice attached to all live or dangerous equipment adjacent to area/item, within which it is safe to work as defined on permit to work certificate.

4.23- Danger tag – same as danger sign, but attached to control panels of all live or dangerous plant/equipment adjacent to control panel on which it is safe to work as defined on permit to work certificate.

5- Provision for electrical works

5.1- General

- Every telephone, radio-telephone and other message relating to the operation of the high voltage system shall be written down by all parties concerned and shall be repeated in full to insure that the message has been accurately received.
- Before any switching or earthing is carried out an electrical permit to work certificate should be issued by authorized person.
- No high voltage opening operation shall be carried out without the sanction of the Control System Engineer PGP Shift Supervisor except in case of emergency and then shall notify the System Control Engineer. No high voltage closing operation shall be carried out without the sanction of the control system engineer even if they were opened under emergency.
- When operating an outdoor air break isolator by integral remote mechanical control from the ground level, the operator must wear insulating gloves and boots of an approved type.
- Making live or dead by signal or pre-arranged understanding, such as after an agreed interval of time, is forbidden.
- Safety locks, differing from standard locks of the system, shall be used to lock off from live conductors all switches at points where the circuit on which work is to be carried out could be energized. The keys for such locks shall be kept in the possession of the authorized person in charge of the work.
- When the circuit, on which work is to be carried out, is controlled only by fuses or links; the fuses, links and carriers shall be removed and kept in some safe place under the direct responsibility of the authorized person.
- Caution signs shall be fixed on all switch gear controlling the part of the system which has been made dead and on which work is to proceed. Danger signs shall also be attached, where applicable, on or adjacent to live parts of the system at the limits of the zone on which work may be carried out. Warning signs shall also be attached on parts of the system where operation is not allowed, from operational point of view. Caution signs, Danger signs, Warning signs, Barriers and Screens must be fixed or removed under the supervision of authorized persons issuing the permit to work certificate.

- Caution tags shall be fixed on all control panels of the part of the system which has been made dead and on which work is to proceed. Danger tags shall also be attached, where applicable, on or adjacent to live parts of the system control panels at the limits of the zone on which work may be carried out. Warning tags shall also be attached on parts of the system control panels where operation is not allowed. Caution, Danger and Warning tags must be fixed or removed under the supervision of the authorized person issuing the permit to work certificate.

5.2- Earthing

- The part of the high voltage system on which work is to be carried out shall be tested to ensure that it is dead and may then be discharged and earthed by an earthing lead applied by means of an insulated stick or other approved apparatus.
- Verify that the circuit is not live and whenever possible, test by means of a voltage detector of approved type. The detector itself shall be tested immediately before and after the verification.
- Earth leads shall be connected to the earth system before being secured to the phases. They shall only be secured to the phases by means of an insulated stick or other approved apparatus. Care must be taken to ensure that good contact is made.
- All phases shall be earthed, even if work is to be carried out on one phase **only.**
- Removing of earth leads shall be done in a manner as to disconnect from the phase first and the earth system last.
- Earth leads and associated clamps shall be of approved type and of adequate capacity and shall be properly maintained and kept always in good condition and examined immediately prior to use.

5.3- Access

- ***Entry to Confined Spaces****:* No person shall enter, in any confined space or underground chamber unless adequate precautions have been taken, e.g., use of suitable natural or forced ventilation and a confined space entry permit is issued "JOSOP 400". A hot work permit is required for all hot work. Where one or more person are required to work in an underground chamber an extra person shall be kept outside the chamber and keep in touch with the workers inside the chamber. Such person may not enter the confined space for any reason.
- ***Locking of premises entries***: All entries to PGP, PCRs and Transformer' yards including feeder pillars or switchboards should remain locked at all times unless there are operators working in there.

5.4-Work on remotely and automatically controlled equipment

- Before work is carried on remotely or automatically controlled equipment such as circuit breakers, all remote control features shall be rendered inoperative to avoid any inadvertent operation.

- No work shall be carried out on the control equipment, wiring or relays except by an authorized person or competent person acting under direct instructions of the authorized person.

5.5- Work on High Voltage System

5.5.1- General Rules

- The authorized person, under whose direct responsibility repairs, maintenance, modifications or testing work on any part of the high voltage system is in progress, must be on site during the work, otherwise the work must be suspended for the period the authorized person is not present at the site.
- No person shall undertake any repairs, maintenance, modifications, testing work on any part of H.V. network unless he is fully conversant with the nature and extent of work and unless such parts of the network are:-
  - Dead.
  - Isolated and all practicable steps taken to lock off from live conductors.
  - Efficiently connected to earth at all points of disconnection of supply to such apparatus, or between such points and the point(s) of work and caution sign and/or tags fixed.
  - Screened where necessary and possible, to prevent danger and Danger sign and/or tags fixed.
  - Released for work by the issue of a permit to work.

5.5.2- Testing with high voltage

- Where any dead part of H.V. network is to be subjected to test voltage, immediately prior to being connected to high voltage system, the authorized person responsible for applying the test voltage shall ensure that such part is adequately guarded to prevent danger and that danger signs are attached in conspicuous positions during test. All parts shall be discharged before and after the application of test voltage.
- Temporary conductors used for testing purposes shall be of an adequate size and easily visible.
- Test connections shall not be applied in a cell or compartment in which there are any exposed live parts at high voltage. The use of approved voltage indicators, or approved devices for testing, is allowed. All live parts should be shielded during H.V. testing.

5.5.3- Work on high voltage metal-clad switch gear

When work is to be carried out on bus-bars or bus-bars contacts or feeders contacts etc… the following operations shall be carried out in strict sequence:

- The section of the bus-bars or the feeders on which work is to be carried out shall be isolated from all points of supply from which it can be made live, and that no part in bus-bar or feeder compartment is left live.

- The isolating arrangements shall be locked so that they cannot be operated and shutters of live contacts locked " shut ".
- The bus-bars or feeders shall be checked by means of an approved voltage indicator to verify that they are not live. The indicator itself shall be tested immediately before and after the verification. The checking with the voltage indicators shall be done on the cell to be earthed, on which work is to be carried out.
- Metal-clad switch gear temporary flexible earths shall be applied to all phases at the point of work.
- Caution signs shall be attached at all points where the bus-bars or feeders can be made alive.
- Danger signs shall be attached on or adjacent to the live parts at the limits of the zone in which work shall be carried out.
- The metal-clad switch gear temporary flexible earths may be removed from the contacts, one phase at a time, at the point of work. Each phase earth shall be replaced before a second phase earth is removed.

5.5.4- Work in yards containing exposed live high voltage conductors

- When work is to be carried out in a yards in which there are exposed live high voltage conductors, then the area of work shall be defined by the use of barriers or roping arranged so that the minimum clearance from the nearest exposed conductor to ground level or platform or access way which may be required to be used shall be:

Rated Voltage		Safety Clearance	
From "K.V."	To "K.V."	M.	Ft.
0	4	1.5	5',0"
4	13.8	2.0	6',8"
13.8	34.5	2.5	8',4"
34.5	115	3.5	11',8"

- If the work cannot be carried out without leaving ground level, or such platform or access ways, the above minimum clearance shall also be observed from the nearest exposed live high voltage conductor to the points from which work is carried out.
- If the work is such that these clearance are not sufficient to avoid danger, then no work shall be carried out until suitable arrangement is made by the authorized person in charge of work to provide the requisite degree of safety.
- The barriers or roping shall not be supported by a structure carrying electrical equipment or conductors and the barriers or roping shall not carry any signs. At ground level the section so defined shall be distinguished by green flags fixed on

separate supports about 1m(3ft) inside the safe boundary and not more than 6m(20ft) apart. Danger notices shall be attached to adjoining live high voltage equipment.

- When crane or other equipment such as pre-formed scaffolding are taken into or out of a yards, the route to be followed shall be agreed by an authorized person. The cranes or other equipment shall be connected to the earthing system as soon as practicable. The limits of operation of such equipment shall be defined by an authorized person to the person in charge of the work, and thereafter the equipment shall be erected or moved only within these limits under the direct supervision of the person in charge of the work.

5.5.5- Work on high voltage cables

- No person shall touch the insulation which covers or supports the conductors subject to high voltage unless the conductor is dead, isolated and earthed and permit to work issued.
- Before issuing a permit to work for work on high voltage cable, the authorized person must satisfy himself that he is working on the correct cable and that it is dead, isolated and earthed.
- The circuit will be made dead, isolated and locked-off from the live conductors and earthed before the cable is identified.
- No work is to be carried out on high voltage cable until it is identified and proved dead.

5.5.6- Cable Identification

- Where a cable is exposed and can be visibly traced from one termination to the point of work, no additional means of identification is required.
- Where the cable cannot be readily identified the following procedure will normally be carried out:

a- At one end of the circuit, temporary circuit earths from two phase conductors will be removed and the conductors will be connected together free from earth; the third phase conductor is to remain earthed.

b- At another end of the circuit, temporary circuit earths from the same two phase conductors will be removed; the third phase conductor is to remain earthed, and an approved cable identifier connected to the two isolated cable cores.

c- The cable will be identified at the point of work.

5.5.7- Proving the cable dead

The cable is to be spiked by stick or gun to prove it is dead, the following sequence applies:

- The spiking will be done after the cable identification is made and under the supervision of the authorized person.
- With the identifier still connected, the cable will be spiked, the spike to remain in position.
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- The authorized person will remove the cable identifier and apply circuit earths to all conductors at the circuit ends.
- The authorized person in charge of work will issue a permit to work together with the keys of safety locks to the person in charge of the working party for cutting the cable and jointing work. The authorized person will be present when the cable is cut and the spiking stick is removed.
- Normally no work shall be carried out on high voltage cable unless it has been spiked previously.

5.5.8- Work on high voltage overhead lines

a- Climbing of H.V. towers and gantries: Gates and devices for climbing of towers and gantries supporting H.V. conductors shall always be kept locked except when opened under the instructions of an authorized person.

b- Climbing of wooden poles: Before any pole is climbed it shall be sounded. No pole badly impaired by decay or damage shall be climbed until it has been securely guyed, and if necessary splinted, and then only by one person.

c- Safety harness: No person shall work upon any pole or tower without making proper use of his safety harness, which he shall examine on each occasion before use. All persons, while at work on towers, poles and high structures shall make proper use of their safety harness and shall be in visual range of a second person.

d- Live overhead line: Any live overhead line under which an overhead conductor is to be run shall either be made dead or adequate precautions shall be taken to prevent danger during the running-out and permanent securing of the conductor. In case of a high voltage line that has been made dead, an electrical permit to work shall be issued. Any overhead line over which an overhead conductor is to be run shall be made dead and earthed, and a permit to work shall be issued.

e- Lighting storm: In the event of the near approach of a lighting storm, all works on overhead lines shall be stopped immediately.

f- Patrolling the overhead lines: No person shall patrol an overhead lines across desert alone " off the paved road " & If overhead lines are to be patrolled during nights, suitable lighting equipment shall be used.

5.5.9- Washing of live insulators

Where special equipment is provided, with written approval of the JO Manager, washing of live insulators may be carried out provided that the following requirements are complied with:

- The work shall be carried out under the supervision of an authorized person.
- The relative humidity of the weather is not exceeding 75%.
- The temperature of the water is not exceeding 48 C (110 F).
- The resistivity of the water should not be less than 2500 ohms per cubic centimeter.

- The wind velocity is not more than 25 km/h or 15 miles/hour.
- No washing to be carried out during dust storms, fog or rain.
- If during the work, unfavorable weather conditions develop, work shall be suspended.
- The jets used shall be such that water breaks into a spray before reaching the insulator.
- The nozzle of the hose shall be connected to earth by copper lead of 64.5 sq. mm or 0.1 sq. in. Cross section or equivalent and the operator shall wear rubber gloves.
- The operator shall not be less than 6 m “20 ft”. away from the insulator being washed and should completely observe that no other live insulator or live conductor at a lesser distance is inadvertently sprayed.
- Live washing shall be discontinued in the event of local lightning risk.
- The authorized person shall ensure that, the persons engaged on live line washing, wear and make proper use of the approved protective clothing and other equipment. The equipment has to be checked before they are used.
- The authorized person should confirm that main protection is operative before starting the work.
- The washing area is considered to be a restricted area for the movement of persons and vehicles.

5.5.10- Work on transformers

- Before an electrical permit to work is issued for work on a transformer, the authorized person shall at the point of work, identify the transformer to be worked upon.
- When work is to be carried out on the connections to or the windings of a transformer, the switches controlling all windings shall be opened. The transformer shall be earthed with approved earthing equipment at all points of isolation. Additionally, associated voltage and auxiliary transformers shall be isolated and all low voltage fuses shall be withdrawn and kept in safe custody of the authorized person to prevent the possibility of the transformer being made live by feed-back.
- Where work is to be carried out on a transformer and the low voltage windings of the transformer are controlled by a switch-fuse or isolator, the switch fuse or isolator shall, if practicable, be locked open. Alternatively, means shall be used to prevent the low voltage circuit from being closed during the course of work.
- When switching-out a transformer connected in parallel with others, both the high and low voltage switches must be opened.

- The transformer neutral shall be isolated from common neutral earthing equipment from which it may become live. This does not require the disconnection of the solidly earthed neutrals, or neutral earthing equipment connected solidly to the transformer on which work is to be done.
- Caution signs shall be fixed at all points of isolation including those of low voltage.

6- <u>Electrical Permit to Work Certificate</u>

- An electrical permit is required before any work commences on high voltage system. The permit must be issued and signed by a properly qualified and authorized person. Details of isolation requirements will be written on the permit.
- Construction and maintenance contractors must ensure that the person on its staff holding the electrical work permit has been duly authorized by the company for this function.
- A qualified competent person is to be in charge of the work gang and must be in possession of the permit while carrying out the work. He must also witness and check the isolation requirements indicated on the permit,
- Work on high voltage network is to be carried out in accordance with joint operation safety rules and this electrical safety rules.
- The electrical work permit clearance is to be signed on completion of the work by the competent person responsible for carrying out the work and who was in charge of the actual work force before the electrical equipment is made alive. He must sign the clearance only after earthing safety devices have been removed, all men are clear of the equipment and he has satisfied himself that it is entirely safe for the equipment to be returned to alive condition.
- Where work of non-electrical nature is to be carried out, no electrical permit is required, only section 2 of work permit must be completed before commencement of work to cover isolation or other electrical safeguards, when such work has been completed, section 7 must be signed before the permit is cancelled.

<u>6.1- Procedure for issuing electrical permit to work certificate</u>

- The Senior authorized person, authorized person or shift supervisor performing switching-off-operations must issue the electrical permit to work. He must inform the system control engineer and both parties should log this information.
- Before any work is carried out on a part which may be energized from a high voltage system, an electrical permit to work certificate shall be issued by the authorized person under whose supervision the work is initiated.

- An electrical permit to work certificate shall be issued to a competent person in charge of the work, who after reading it in the presence of the authorized person shall thereupon sign its receipts and duplicates.
- Where persons other than the authorized person who did the switching operation or not belonging to his working team want to work on the same circuit, they must get an electrical work permit from the authorized person who performed the switching operation.

6.2- Rules during progress of work

- The part of the system isolated and earthed for work under the terms of an electrical permit to work shall remain so until it has been cleared, returned to the authorized person and cancelled.

6.3- Clearance and cancellation of permit to work

- When work on part of the system, for which an electrical permit to work certificate has been issued, is suspended or completed the recipient shall sign the clearance and return the certificate to the authorized person, who shall cancel it and inform the control system engineer that he shall re-energize the equipment back to normal. The control system engineer shall record the operation made by the authorized person. The control system engineer shall be informed by the authorized person of any exceptions or limitations in respect of the part of the system being returned to service after cancellation of the electrical permit to work certificate.
- Where more than one electrical permit to work certificate has been issued for work on H.V. part of the system, it is the responsibility of the authorized person to ensure that all earths are removed before all electrical permit to work certificates are cancelled.

JOINT OPERATIONS
Electrical Permit-To-work
ON HIGH_VOLTAGE NETWORK

SERIAL, No:…….

ISSUE

TO …….. STATUS:…….

I hereby declare that, in accordance with the safety rules, it is safe to work on the following:
……
……
……

Period: From / / Time:……. Hrs. To / / Time:…... Hrs.

The above equipment/circuit is dead, Isolated and Earthed at:

1- ……..
2- ……..
3- ……..

And that Lock out & Tag out are posted at:

1- ……
2- ……

Other Precautions: ……

All OTHER EQUIPMENT/CIRCUITS ARE DANGEROUS

Status and extent of work: ……
Signed: …… Name: …….. Authority No.: ……
Date: ……/……./…… Time: …… Hrs.

RECEIPT

I hereby declare that I have satisfied myself that the equipment/circuit stated above is safe to work IN/ON and that I accept full responsibility for adequately carrying out and supervising, in accordance with Safety Rules, the work detailed above.
Signed: …… Name: …….. Date: …/…./…….. Time: …….. Hrs.

CLEARANCE

I hereby declare that all men under my charge have been withdrawn and warned that it is no longer safe to work IN/ON the above equipment/circuit, and that all tools & gear brought-in have been removed, and that site has been cleared from all objects that might cause any potential hazards, leaving the equipment in normal condition ready for inspection and energizing.
Signed: …… Name: …….. Date: …/…./…….. Time: …….. Hrs.

CANCELLATION

I have thoroughly inspected the items covered by the above clearance declaration and satisfied myself that the equipment/circuit is fit for normal service. This “PERMIT-TO-WORK” CERTIFICATE IS HEREBY CANCELLED. And all changes on the equipment/circuit are informed to the system control engineer MR…….. at ……. Hrs.
Signed “issuing eng”:…… Name: …… Authority No.:…….
Date: ……/……/…… Time: ……. Hrs.

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7- Hazard Control

7.1- General

- All electrical distribution panels, breakers, disconnects, switches, junction boxes shall be completely enclosed or out of normal reach.
- A clear approach of 3 feet side clearance shall be maintained for all distribution panels.
- Only trained and authorized employees may conduct repairs to electrical equipment.
- Contractors performing electrical work must be hold an electrical permit to work certificate.
- Areas under new electrical installation or repair will be sufficiently guarded with physical barriers and warning signs to prevent unauthorized entry.
- Access to electrical distribution rooms is limited to those employees who have a need to enter.
- All electrical control devices shall be properly labeled.
- Qualified employees will wear electrically rated safety shoed/boots, safety helmet & safety gloves etc.
- All tools used for electrical work shall be properly insulated.

7.2- LOCKOUT / TAGOUT

- JOSOP 460 are procedures developed, documented, and used for the control of potentially hazardous energy.

8- Training

- Employees shall be trained in and familiar with safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments.
- Authorized employees shall also be trained and competent in:
  a) The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.
  b) The skills and techniques necessary to determine the nominal voltage of exposed live parts.
  c) The minimum approach distances corresponding to the voltages to which he will be exposed.
  d) The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.

e) Trained in fire extinguishing, and first aid including cardiopulmonary resuscitation (CPR).

- The company shall determine, through regular supervision and inspections conducted on at least an annual basis, that each employee is complying with the safety-related work practices required.
- An employee shall receive additional training or retraining under any of the following conditions:
  a) If the supervision and annual inspections, indicate that the employee is not complying with the safety-related work practices required.
  b) If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those which the employee would normally use.
  c) If he must employ safety-related work practices that are not normally used during his regular job duties.
- The company shall consider tasks that are performed less often than once per year to necessitate retraining before the performance of the work practices involved.
- The training required shall be of the classroom or on-the-job type.
- The training shall establish employee proficiency in the work practices required and shall introduce the procedures necessary for compliance with this training.
- The company shall certify that each employee has received the training required. This certification shall be made when the employee demonstrates proficiency in the work practices involved and shall be maintained for the duration of the employee's employment.

Note: Employment records that indicate that an employee has received the required training are an acceptable means of meeting this requirement.

9- Summary "Important notes"

- These rules do not replace or cancel any of the previous regulations, but must be additional to such regulations.
- These safety rules are issued by the Joint Operation to all senior authorized, authorized and competent personnel whose duties may involve work on the high voltage power system for the purpose of ensuring the safety of all workers, and of the system.
- It is the duty of all employees and also of all other persons who may be required to work upon the high voltage system, to make themselves thoroughly conversant with these rules, and at all times to conduct their work in accordance thereby.

- During temporary failures of supply, all apparatus connected to the power system must be regarded as being live, unless isolated from the system in accordance with these rules.
- No person or persons unless accompanied by an authorized person or competent person may enter any of the company's premises in which there are exposed live conductors.
- Only persons approved by JO Manager as senior authorized, authorized and competent may carry out electrical work.
- All electrical work must be carried out in a safe manner with full observance of "Electrical Safety Rules".
- All work on or near electrical equipment must be covered by an appropriate electrical work permit, indicating that electrical isolation has been carried out or other appropriate steps taken by an authorized person to render the work area electrically safe.
- No unauthorized person is to remove, tamper with or ignore safety tags, labels, or warning notices attached to equipment by an authorized person.
- Electrical faults on high voltage over-head lines are to be reported immediately to the System control engineer. Under no circumstances are unauthorized persons to attempt to rectify such faults or improvise temporary repairs.
- No cranes, hoists, scaffolds, etc., shall be used or erected near overhead power lines without a permit authorized by an authorized person.
- All portable electrical equipment for high-voltage use is to be approved by Distribution engineer and used in accordance with his recommendations.
- Any interruption of electrical supply due to tripping of circuit breaker, blowing of fuses, operation of cut-outs or any other causes, on the high-voltage grid must be reported to distribution engineer or system control engineer without delay.
- Notices giving instructions on the resuscitation of persons rendered unconscious due to electric shock should be posted in PGP, all power control rooms "PCRs" and at other points as considered desirable by PGP & Distribution Division.