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Dated: <u>August, 2004</u>	Originating Dept: <u>HSE</u>	

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1 Introduction

1.1 Purpose

The purpose of this document is to define thea Azerbaijan Business Unit BP-Caspian functional standard for the safe isolation of electrical plant or equipment from sources of electrical energy.

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21.2 Scope

This document applies to the electrical isolation of equipment for work. It shall be followed at all Azerbaijan Business UnitBP-Caspian operated sites and is applicable to both onshore and offshore.

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1.3 SSOW Specific Cross references

<u>Document No</u>	<u>Title of Procedure</u>
<u>UNIF-HSE-PRO-104</u>	<u>Procedure for: Authorization</u>
<u>UNIF-HSE-GLN-106</u>	<u>Guideline for: Electrical Safety</u>
<u>UNIF-HSE-PRO-103</u>	<u>BU PTW Process</u>
<u>UNIF-HSE-PRO-105</u>	<u>Risk Assessments (Level 2 risk assessment)</u> <u>Work Site Risk Assessment</u>
<u>UNIF-HSE-PRO-107</u>	<u>Energy Isolation-Process</u>

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32 Roles and Responsibilities

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3.42.1 Electrical Functional Work Group

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The Electrical Functional Work Group (EFWG) has produced this document to support the safe system of work. The Document Technical Authority will issue any new revisions of the document for approval.

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2.2

3.2OIM / Site Manager / Site Controller

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The OIM / Site Manager / Site Controller is responsible for ensuring that those performing the roles of Area Authority, Responsible Electrical Person, Isolation Authority and Performing Authority are competent to do so. The OIM / Site Manager / Site Controller is responsible for authorizing any deviations from the isolation standard through the risk assessment process. In doing so, he/she may choose to

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defer or not to carry out the activity and seek further technical guidance if the residual risk is perceived to be excessive.

The OIM / Site Manager / Site Controller is also responsible for ensuring that plant and equipment isolations are subject to the appropriate level of self-regulation and audit.

2.3

3.3 Area Authority (AA)

The Area Authority is responsible for approving the isolation design, providing assurance that the design achieves the highest quality of isolation reasonably practicable. He/she can delegate the detailed isolation design to an appropriately competent or authorized person. The Area Authority is then responsible for authorizing the work to proceed under appropriate controls. This includes approval of any preparatory work and, on completion of the task, the work required to complete reinstatement.

2.4

3.4 Isolating Authority (IA)

The Isolating Authority is responsible for design of an electrical isolation when requested by the Area Authority. He/she is then responsible for safely isolating a specific section of plant or items of equipment to the highest quality and security of isolation, which is reasonably practicable.

The Isolating Authority is also responsible for demonstrating the integrity of the isolation to the Performing Authority. The Isolating Authority will be authorized to the maximum voltage level required for the isolation.

2.5

3.5 Performing Authority (PA)

The Performing Authority is the person charged with the responsibility of carrying out the work and has the right to request demonstration of the integrity of any isolation. The Performing Authority will be a competent person. The Performing Authority will ensure that they have witnessed, at the point of work, that the conductors are dead. The Performing Authority may complete this task themselves if suitably authorized.

2.6

3.6 Responsible Electrical Person (REP)

This is a role under the 'safe system of work' or 'permit to work system' to clearly identify which authorized person, has the responsibility for the electrical system, the REP is nominated by the OIM / Site Manager / Site Controller from those persons having the highest level of authorization required for that site.

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The REP will:

- Approve any switching programs
- Countersign permits with electrical content where the Area Authority isn't electrically competent, ensuring that the isolation has been correctly designed and the Isolating Authority has the appropriate authorization level for the work
- ~~A The REP will~~ assess and recommend site personnel for authorization to AEP, AIP, CI

At any one time there can be only one REP on site. The REP may also be the isolating authority.

2.7

3.7 Electrical Technical Authority (ETA)

The Electrical Technical Authority is an Electrical Engineer who is recognized by management as the site technical authority. The technical authority or their delegate assesses and recommends site personnel for authorization to SAEP and will assess and recommend personnel for the role of REP.

2.8

3.8 Senior Authorized Electrical Personnel (SAEP)

Electrical personnel who have been formally assessed by the site Electrical Technical Authority and authorized by the OIM / Site Manager / Site Controller to switch, isolate and test electrical equipment with voltage levels up to and greater than 1000V. ~~c~~ Can act as an isolating authority under the safe systems of work for electrical systems with voltage levels up to and greater than 1000V.

2.9

3.9 Authorized Electrical Personnel (AEP)

Electrical personnel who have been formally assessed by the site REP and authorized by the OIM / Site Manager / Site Controller to switch, isolate and test electrical equipment with voltage levels less than 1000V. ~~c~~ Can act as an isolating authority under the safe systems of work for electrical systems with voltage levels less than 1000V.

3.10.10 Authorized Instrument Personnel (AIP)

Instrument personnel who have been formally assessed by the site REP and authorized by the OIM / Site Manager / Site Controller to switch, isolate and test control, instrument and telecom equipment with voltage levels less than 50V. ~~c~~ Can act as an isolating authority under the safe systems of work for control, instrument and telecom systems with voltage levels less than 50V phase to earth.

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2.11

3.11 Competent Isolator (CI)

In special circumstances individuals can be assessed as competent isolators by the site REP and authorized by the OIM / Site Manager / Site Controller for specific items of equipment providing that they have completed the formal training and have been assessed as competent.

2.12

3.12 Competent Person (CP)

An essential requirement for persons undertaking electrical work is that they are competent, ~~this~~ established ~~by~~ virtue of training and or experience. A competent person is capable of recognising danger and knows when to seek guidance when the work falls outside their area of competence.

The employing company will certify competency of the employee and will supply BP with copies of their competence assessment as required. The Within-Azerbaijan Business UnitBP certifies the competence of its own employees using this process is managed using CMAS.

3 Self - regulation and Audit

4Self-regulation and Audit

Business Units shall periodically review isolation related activities, including review of individual isolations and review of overall isolation processes. Such reviews may also include:

- General compliance with this document and any local procedures
- The assessment of non-compliant isolations and the extent of any approved deviations
- Registers of competent and authorized persons

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54 Isolating Authority – Training, Competency and Authorization

The Isolating Authority will be authorized by OIM / Site Manager / Site Controller based on the following criteria.

The Isolating Authority will be:

- Familiar with the site
- Have Electrical First Aid Training
- Will be EX certified, when working on Hydrocarbon Plants
- Where appropriate, will have HV operational training
- Will have been formally and practically assessed for electrical isolations and recognised as authorized at a specific voltage level for the work site
- The Authorisation levels on site will be as follows:
- Authorised Instrument Person (AIP) authorised to isolate instrument circuits up to 50Vae
- Authorised Electrical Person (AEP) authorised to isolate electrical circuits up to 1000V
- Senior Authorised Electrical Person (SAEP) authorised to isolate electrical systems above 1000v and prepare and carry out switching operations

In special circumstances individuals can be assessed as Competent Isolators (CIs) for specific items of equipment providing that they have completed the formal training and have been assessed as competent on the specific tasks. Site management is responsible for ensuring that this is recorded so that it is clear which tasks these individuals are competent to undertake.

5 Modification and New Facilities

6 Modification and New Facilities

In relation to existing Installations and sites:

- The design of all modification and new facilities shall include a review of the provision of means of isolation for maintenance to ensure compliance with this document

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- Such reviews shall address both isolations within the modified/new facilities and any opportunities to upgrade existing isolation facilities where these are inadequate

New isolators supplied as part of a modification or as a replacement shall be provided with a facility to be locked off.

7.6 Isolation and Planning

7.46.1 Isolation

The highest quality and security of isolations, which is reasonably practicable in the prevailing circumstances, shall always be used. —This document sets out the minimum recommended isolation standard to be used in the Azerbaijan Business Unit, Caspian

Any isolation, which does not meet the Minimum Recommended Isolation Standard as defined in section 7.6.5, including the application of the Mandatory Safeguards, must be assessed using the Level 2 Risk Assessment Process before the isolation is approved. —Should any non-compliant isolation have to be repeatedly justified by risk assessment, consideration shall be given to a permanently engineered solution.

All key participants in the implementation of the BP Isolations Policy shall be trained and assessed as competent to the appropriate level in the Electrical Isolation Standard.

An audit programme shall be established by the OIM / Site Manager / Site Controller at each site to ensure that regular checks are made on isolations to provide assurance that the isolations policy and standards are being applied and that lessons learned are communicated effectively.

6.2

7.2 Isolation Planning

Isolation of any piece of equipment shall be planned to minimize risk to personnel, production and property. To achieve this the following information will be required:

- A clear description of the work, ensuring that if the activity includes electrical work that this is clearly identified
- A clear description of the equipment which needs to be isolated, this will include the Plant Tag Number and the Plant Tag Description
- A drawing identifying the isolation, earth and disconnection points where this is not obvious
- Tag references of all the switching and isolation points
- Locks and Labels for securing the isolation points

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- Test equipment for proving effectiveness of the isolation
- Switching program detailing the sequence of switching required to achieve the isolation where the equipment is fed from more than one source or at the REP's discretion.

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7.36.3 Switching Programmes

Where main distribution equipment is to be switched it is essential that the equipment is switched in the correct sequence. To achieve this, a switching programme will be required, detailing the switching sequence. This will be accompanied by a marked up single line drawing. The switching programme will be prepared by an SAEP and checked by the REP. Where the REP is alone on site, the site electrical technical authority will check the switching program. Technical advice will be sought as required. See Appendix D6 for a blank Switching Programme. The Switching Programme does not replace an ICC.

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7.46.4 Isolation Methods

The highest quality of isolation, which is reasonably practicable, shall be applied to every individual isolation point. The methods of isolation normally available are detailed below; listed in decreasing descending order of security and effectiveness. Key to all of these isolations is the positive identification of the equipment to be isolated, to this end all equipment and isolation points on a site will be uniquely identified and clearly labeled, a secondary check could be to use the cable numbers which connect the isolator to the equipment. If there is any doubt about the correct identification of the equipment to be isolated and the isolation point then the work should be suspended and clarification sought.

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(a) Isolate Circuit, Prove Dead, Disconnect, Lock, Label and Earth

This is a positive isolation of the main phase conductors with an isolator and disconnection of the main phase and neutral conductors by removal of fuses, links or withdrawal of a circuit breaker or some other means of disconnection. In addition, the circuit is earthed proven dead to ensure that the circuit is discharged and is earthed to prevent recharging maintained at earth potential. Locks and labels are applied to all points of isolation and earthing

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Note: When the isolation requires switching of main distribution equipment, a Switching Program is also required.

(b) Isolate Circuit, Prove Dead, Disconnect, Lock and Label

This is a positive isolation of the main phase conductors with an isolator and disconnection of the main phase and neutral conductors by removal of fuses, links or withdrawal of a circuit breaker or some other means of disconnection. The circuit is proven dead to ensure that the circuit is discharged. Locks and labels are applied to all points of isolation.

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Note: Where the isolation switch meets the minimum standard for disconnection, as defined in IEC 60947, and it includes all phases and

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neutral then no further disconnection is necessary if the risk of physical disconnection outweighs the advantage. However, this is a minimum standard and it is expected that if fuses or links are part of the circuit that they will be removed.

(c) Isolate, Lock and Label

This is a positive isolation of the main phase conductors with an isolator; the isolator type will be of such construction that it breaks the main phase conductors when open. Locks and labels are applied to all points of isolation.

Note: Isolation by auxiliary control circuits only is not acceptable for isolation purposes.

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7.56.5 Isolation Standards

Isolation requirements for	Operating Voltages		
	<50V	>50V < 1000V	>1000V
Non-electrical work only	N/A	Is+LL	Is+LL
Electrical work on single circuit	Is+P+D+Label	Is+P+D+LL	Is+P+D+LL+E
Electrical work on distribution system	N/A	SP+Is+P+D+LL	SP+Is+P+D+LL+E
Note 1: If any work requires Proving Dead in a Hazardous Area, a gas monitor will be required with a Hot Work 2 (Spark Potential) Permit.			
Note 2: If any work is done adjacent to live conductors then this must be considered when providing the isolation.			
Is – Isolation of the main phase conductors with an isolator LL – Lock and labeled labelled D – Main phase and neutral conductors P – Prove dead with an approved voltage tester which is proved before and after testing E – Earth the isolated conductors SP – Authorized Switching Programme			
Precautions	<50V	>50V < 1000V	>1000V
Authorisation level required to perform the isolation	AIP, AEP, SAEP	AEP, SAEP	SAEP or AEP under direct supervision of SAEP
Accompanied for proving dead, distribution switching, testing, fault finding	No	AEP, SAEP based on Risk assessment	SAEP
Communications link	Yes	Yes	Yes
Nomex gloves or leather gauntlets	No	Yes	Yes
Note 3: If work is to be accompanied there must be a clear understanding between the Isolating Authority and the accompanying person identifying what the accompanying person will do in the event of an emergency.			

Table 1 Minimum Recommended Isolations Standard

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7.66.6 Risk Assessment of Non-compliant Isolations

In the event that the Minimum Recommended Isolation Standard cannot be achieved, a Risk Assessment shall be carried out in accordance with SSOW guidelines

The assessment team, including the REP shall specify appropriate safeguards, which may replace or be in addition to those listed in Table 1. The team shall be satisfied that these safeguards shall reduce the risks to an acceptable level before the task requiring isolation is permitted to proceed.

The OIM / Site Manager / Site Controller must authorize all level 2 risk assessments prior to any work proceeding.

7.76.7 Live Working

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Live working is defined as work on or in close proximity to live conductors; this includes testing. All conductors will be assumed live unless proven dead. (See section 8.9 ~~for guidelines~~ for proving dead.)

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Live work will not be a normal activity and will not be carried out unless there is no other reasonably practicable method available. ~~Where it is not possible to avoid live work, an appropriate level of risk assessment shall be carried out before work commences.~~

Is the live working justified? Consider:

- If the work could be done when equipment is isolated (an example of work which must be done live would be work on battery systems)
- If isolating the equipment introduces other greater safety risks
- ~~When identifying the risks consider:~~
- Voltage level ~~working on~~
- Fault level of the equipment and the arc energy if a fault develops while working
- Working environment (wet, dusty, noisy, vibration, at height etc)
- What exposed voltage levels will be adjacent to the worksite
- What could go wrong

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Can adequate precautions be taken to reduce risk to an acceptable level? Some precautions which should be considered:

- Competent people with training and experience
- Insulated tools and test equipment
- Accompanied work - /Accompanying person to be First Aid Trained, /and it should be clear what is expected of the accompanying person to ensure that they are competent to accomplish this expectation
- Insulated barriers, mats, grab hooks
- Work site control (e.g. cordoning off area, limiting access)
- Additional and / or specialist personal protective equipment
- Reference to any specific safety rules or guidance
- See Appendix EF for a flowchart covering the Control of Electrical Work.

7.86.8 Isolations for Work Near Live Conductor

Frequently, work inside of complex control equipment means that although the circuit to be worked on is isolated, there may be other circuits that are still energised. It is a requirement that the risk from these adjacent conductors is assessed and appropriate precautions taken to reduce the risk.

See Appendix CB for an adjacent working assessment form.

87 Isolation Implementation and Control

8.47.1 Security

Any isolation must effectively disconnect the worksite from all sources of energy. Locks must be used to prevent unauthorized de-isolation; to this end unique locking devices must be used. Keys to any locks used for isolation purposes must be effectively controlled via the Area Authority and the Permit to Work – Isolation Confirmation Certificate (ICC). Only when the ICC allows should the Area Authority make the key available to remove a lock.

The locks should be a high security type which are tamper proof.

See appendix E

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7.2 Isolation Labelling

8.2 Isolation Tagging

All isolation points shall be clearly identified, tagged and recorded on the ICC. Where not obvious, a drawing should be attached to the ICC showing the location of each isolation and earth point (where applied).

At the isolation point there should be a Yellow Isolation Label with the following clearly identified:

• ICC number



• ICC point number

- The Tag number of the isolation point
- Reason for isolation
- Isolation Authority name and signature
- Date
- At the Earth point there should be a Green Earth Label with the following clearly identified:

• ICC number



• ICC point number

- The Tag number of the isolation point
- Reason for isolation
- Isolation Authority name and signature
- Date

Adjacent live circuits will be identified with a Red Danger notice, e.g. live bus bar shutters when work is to be carried on the circuit.

See Appendix G for labels

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7.3

8.3 Positive Identification of Equipment

To allow effective isolation, equipment must be clearly ~~tagged~~ labelled with unique tag numbers. —If equipment is not tagged then another method of positive identification of equipment must be used, e.g. use of the cable number and cable schedule and interconnection drawings. —These provide a unique number, which should be located at each end of the cable. —If there is any doubt about the correct identification of the equipment to be isolated and the isolation point, then the work should be suspended and clarification sought.

7.4

8.4 Control of Isolations

The ICC, cross-referenced to all relevant work permits, shall be the principal means of control once isolations are in place. The ICC performs the following functions:

- Identifies the plant concerned and the reasons for isolations
- Authorises isolation by disciplines
- Records the complete list of isolations s points
- Records ~~the~~ 'prove dead' operations
- Records the position of any earths applied
- Records locking points and lock numbers
- Records where isolation ~~tags~~ labels have been applied
- Confirms that the isolation has been effected
- Authorises any temporary de-isolations and isolations necessary for testing (sanction for test)
- Authorises and records de-isolations on completion of the task
- The Area Authority must effectively control all keys for locks used for isolation.

7.5

8.5 Operational Locks

Operational Locks will be used as required on switchgear to ensure that normal operating standards are maintained. These locks will be kept in the switch rooms; in

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lock cabinets where only appropriately authorised competent personnel will have access.

An example of this would be manual close buttons on switchgear, which will normally be locked for operational purposes and unlocked for maintenance.

Appendix DE shows an example of an operational locking system, which could be used for the control of locks.

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7.6

8.6 Boundary Isolations

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Where an area of plant is isolated such that several activities (typically construction work) can safely take place within this common set of strategically placed isolation points then this can be termed as a 'Boundary Isolation'. It must be clearly identified that the isolation is appropriate for all the individual tasks to be carried out within the Boundary Isolation and all individual Work Permits are cross-referenced to this Boundary Isolation.

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If any of the proposed tasks require a level of isolation or implementation of control measures greater than that covered by the Boundary then a separate Isolation Confirmation Certificate should be raised for this task.

Thorough planning and preparation is essential when planning Boundary Isolation. -A team including the Area Authority and Isolating Authority and any additional technical support required should be set up away from the work place to properly review and agree the scope of the Boundary Isolation and the tasks to be carried out.

Once work is in progress and subsequent Work Permits are applied for within the recognised framework of the Boundary Isolation, they can be added providing it is clearly established that the existing isolation is appropriate to the task. -However, this should be avoided if possible and it is preferable to identify all activities when the Boundary isolation is being planned.

Boundary Isolations shall not be removed until all applicable Work Permits have been cancelled.

If, for any reason, work on a particular piece of plant within the Boundary needs to be suspended (e.g. whilst awaiting spares) then a separate isolation shall be implemented and an ICC raised before the Boundary Isolation can be cancelled and confirmation that the installation can be energised safely.

Where the de-isolation of the Boundary Isolation is proposed, the Area Authority shall ensure that all associated Work Permits have been cancelled. He/she should also ensure that equipment within the boundary is in safe condition.

7.7 Long-Term Isolations

Long-term Isolations (LTIs) are defined as those that no longer have work performed against them. -Each site should maintain a detailed register of long-term isolations with a reason why they are in place.

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Long-term isolations shall be subject to two levels of review:

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- A weekly review of the register to check the status of the isolations in place

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- A quarterly review to physically check all the isolation points to confirm their security and integrity and that the keys to all locks are being adequately controlled
- If the LTI is in place for more than 1 year, review the requirement for LTI. Consider if something else could be done (ie.e. decommission circuit)

Before any work is performed against a long-term isolation a full integrity check of all isolation points is required and the point of work must be proven dead.

Before an electrical LTI is removed a physical check of the equipment to be energized will be made to ensure that the equipment is safe to energize.

An example on an LTI would be a motor being removed for repair, and isolation will need to remain in force until the motor is returned and has been reinstalled.

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8.87.8 Personal Isolations

Personal isolations are intended for short-duration tasks of relatively low risk. For example, when work is required on a single motor feeder circuit or other such tasks where the completion of an ICC is considered to add no significant value in terms of risk reduction. The use of personnel isolation may only be authorized by the Area Authority on the permit to work. The rules for approval of a personal isolation are as follows:

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- One person within one shift performs the task and isolation; the person may receive assistance from others but he/she shall be present at all times when work is in progress
- Before approval, the Area Authority must be satisfied with the competence of the Performing Authority and check that they have sufficient authorisation to both carry out the isolation and execute the work. Personal isolations shall only be carried out by those deemed to be a competent Isolating Authority
- The same isolating standards apply to personal isolations other than the completion of the ICC
- The isolation points shall be labelled with an an personal isolation label (which includes the date, the name of the person isolating and the task information) and locked (the Performing Authority must keep effective control of keys to isolation locks)
- If the worksite is left unattended, the plant shall be left safe, with all covers or barriers in place
- The personal isolation is authorised on the work permit

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An ICC shall be raised if any of these conditions cannot be met or conditions change during the work activity.

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Personal isolations are not allowed on the following:

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- High Voltage
- Safety systems eg.g. Fire and Gas or Emergency Shutdown (ESD) panels or sections thereof
- Equipment fed from more than one source

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7.9

8.9 Testing Isolation Integrity – Proving Dead

All electrical conductors shall be considered to be live until positively proven dead using an approved live line tester suitable for the voltage to be tested; this tester will be proved both before and after use. The conductor will be proven dead between circuit and earth. Where there is a neutral or the system is unearthed the conductors will also be proven dead between all of the circuit conductors. It is a requirement under the BP Golden Rule of Energy Isolation that energy has been discharged and that testing has proved the isolation.

The Performing Authority will be required to witness this test or prove dead themselves before commencing work on any conductor.

It is essential that after testing with an applied voltage, a conductor is be adequately discharged to earth using approved discharging equipment. Once discharged, the conductor is again proven dead.

Proving Dead is considered to be live working and therefore each location must assess the risks of this activity based on site e conditions and produce a standalone risk assessment, which covers this activity. - The understanding of these precautions will form part of the authorisation process for the site.

7.10

8.10 Monitoring Isolation Integrity

Locks and effective control of their keys, maintain the integrity of electrical isolation. An isolation lock may not be removed unless written permission is given on its ICC. A lock may not be removed by any other means than the key. -If for any reason the key is not available, the Area Authority, Responsible Electrical Person, Isolation Authority and Performing Authority must apply in writing to the OIM / Site Manager / Site Controller for permission to remove the lock.

Where possible, a multi-hasp device will be used to allow for more than one padlock at each isolation point.

If the integrity of the isolation requires the use of barriers or shields then their condition will be checked before the start of any work activity.

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8 De-isolation of Plant

9De-isolation of Plant

Before plant is de-isolated the Area Authority shall ensure that all work is complete, all permits are cancelled, all covers and safety barriers have been replaced, the plant has been tested and inspected and any relevant certification is completed. When the Area Authority is satisfied and has checked that there are no other permits cross referenced to the isolation, he will instruct the Isolation Authority to de-isolate the plant.

In a Hazardous Areas before de-isolation, the plant must be inspected to ensure that the equipment meets the requirements to prevent danger in the hazardous area, commonly know as an EX inspection.

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9 Flow Sheet Electrical Isolations

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Appendix A: Abbreviations and Definitions

11 Abbreviations and Definitions

AA	Area Authority
AEP	Authorized Electrical Person
AIP	Authorized Instrument Person
BUL	Business Unit Leader
CI	Competent isolator
<u>CMAS</u>	<u>Competence Management Assurance System</u>
D	Main conductor disconnected
E	Earth the isolated conductor
IA	Isolating Authority
ICC	Isolation Control Certificate
Is	Isolate
<u>IP</u>	<u>Ingress protection</u>
SSOW	Safe System Of Work
LL	Lock and Label
LTI	Long-term isolations
P	Prove dead with proprietary voltage tester
PA	Performing Authority
REP	Responsible Electrical Person
SAEP	Senior Authorized Electrical Person
SP	Authorized Switching Programme
TA	Technical Authority
<u>PTWW</u>	<u>Permit to Work</u>
<u>OIM</u>	<u>Offshore Installation Manager</u>
<u>OIM</u>	<u>Offshore Installation Manager</u>
HV	“High Voltage” voltages that exceed 1000Vac or 1500Vdc between conductors or 600Vac or 900Vdc between conductors and earth
LV	“Low Voltage” is a voltage normally exceeding extra low voltage by not exceeding 1000V ac or 1500 Vdc between conductors or 600Vac or 900Vdc between conductors and earth
ELV	“extra low voltage” Voltage which does not exceed 50V ac rms between conductors or between any conductor and earth, in a circuit isolated from the supply be means such as a safety isolating transformer or converter <u>converter</u> with separate windings. A voltage which does not exceed 50V dc between conductors or any conductor and earth in a circuit isolated from Higher voltage circuits

12 References

Hold	<u>Authorization procedure</u>
Hold	<u>Electrical Safety Rules</u>
<u>BP CDZZZZ PM PRO-0002</u>	<u>Risk Assessments (Level 2 risk assessment)</u>
<u>UNIF-HSE-PRO-105</u>	<u>Work Site Risk Assessment</u>
<u>BP Golden Rules</u>	<u>Energy Isolation</u>

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13 Appendix B: Applicable to ees

13.1 Appendix A — Applicable to

This document applies to the following job functions:

Area Authority
Authorized Electrical Personnel
Authorized Instrument Personnel
Business Unit Leader
Document Controller
Electrical Technical Authority
Isolating Authority
OIM / Site Manager / Site Controller
Operations Engineer
Performing Authority
Responsible Electrical Person
Senior Authorized Electrical Personnel

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- If any of the above are answered with "NO", then please review work with REP
- **IP Classification list overleaf**

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ADJACENT WORKING ASSESSMENT (working adjacent to live conductors)

IP – INGRESS PROTECTION

The IP classification system designates, by means of a number, the degree of protection provided by an enclosure against impact or dust and water ingress. Please note that the IP classification should not be construed as indicating corrosion resistance.

Degrees of Protection to IEC 529

IP Classification list

IP0X	Non-protected.
IP1X	Protected against a solid object greater than 50mm, such as a hand.
IP2X	Protected against a solid object greater than 12mm, such as a finger.
IP3X	Protected against a solid object greater than 2.5mm, such as a tool or wire.
IP4X	Protected against a solid object greater than 1.0mm, such as wire or thin strips.
IP5X	Dust-protected. Prevents ingress of dust sufficient to cause harm.
IP6X	Dust tight. No dust ingress.

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Appendix DC—Switching Programme:
Switching Programme

Site:
~~ICC number~~
~~WCC number~~

Reason for switching:
Ref Drw no: Electrical-Key Single-Line Diagram

Date:

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Prepared by _____ Date: _____

Checked by _____ Date: _____

<u>Site:</u>	
<u>ICC number</u>	
<u>WCC number</u>	

<u>Reason for switching:</u>
<u>Ref Drw no:</u> <u>Electrical Key Single Line Diagram</u>

Date of switching:

<u>Item</u>	<u>Voltage</u>	<u>Switchboard</u>	<u>Cub/ Cir Ref.</u>	<u>Action</u>	<u>Comments</u>	<u>Key No</u>	<u>By</u>

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<u>Item</u>	<u>Voltage</u>	<u>Switchboard</u>	<u>Cub/ Cir Ref.</u>	<u>Action</u>	<u>Comments</u>	<u>Key No</u>	<u>By</u>

Prepared by Date:

Checked by Date:

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Appendix E: ~~D~~Operational Locking System

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Locking system for electrical equipment after energisation covering operations and isolation control

Operational locks

Each switchboard will have a locking suite of unique locks for each locking point on the switchgear these will be housed in a lock cabinet within the switch room. Access to the locking suite will be controlled to suitably authorized persons.

The locks should be a high security type which are tamper proof. (an example of such a lock is the ABLOY high security padlocks). There should only be one key that fits a lock in the isolation system (any spares or masters are to be removed and controlled by the site manager who should only issue these keys after the REP has made a formal request in writing)

AUTHORIZED ACCESS			
ACCESS	AIP	AEP	SAEP
HV switchboard locking suite SINGLE CIRCUITS	NO	NO	YES
LV switchboard locking suite SINGLE CIRCUITS	NO	YES	YES
Control locks	YES	YES	YES

Operational Locking

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Operational locks will normally be applied to:

- ☐ Local remote switches
- ☐ Manual close switches on circuit breakers
- ☐ Earth switches
- ☐ Racking mechanisms

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The keys to these locks will be kept with the locking suite for the switchboard.

Isolation Locking

When the Area Authority requires an isolation to be locked off, a lock and key will be taken from the switchboard-locking suite that the isolation is required for. Where possible a multi-hasp will be used and the lock and label will be applied.

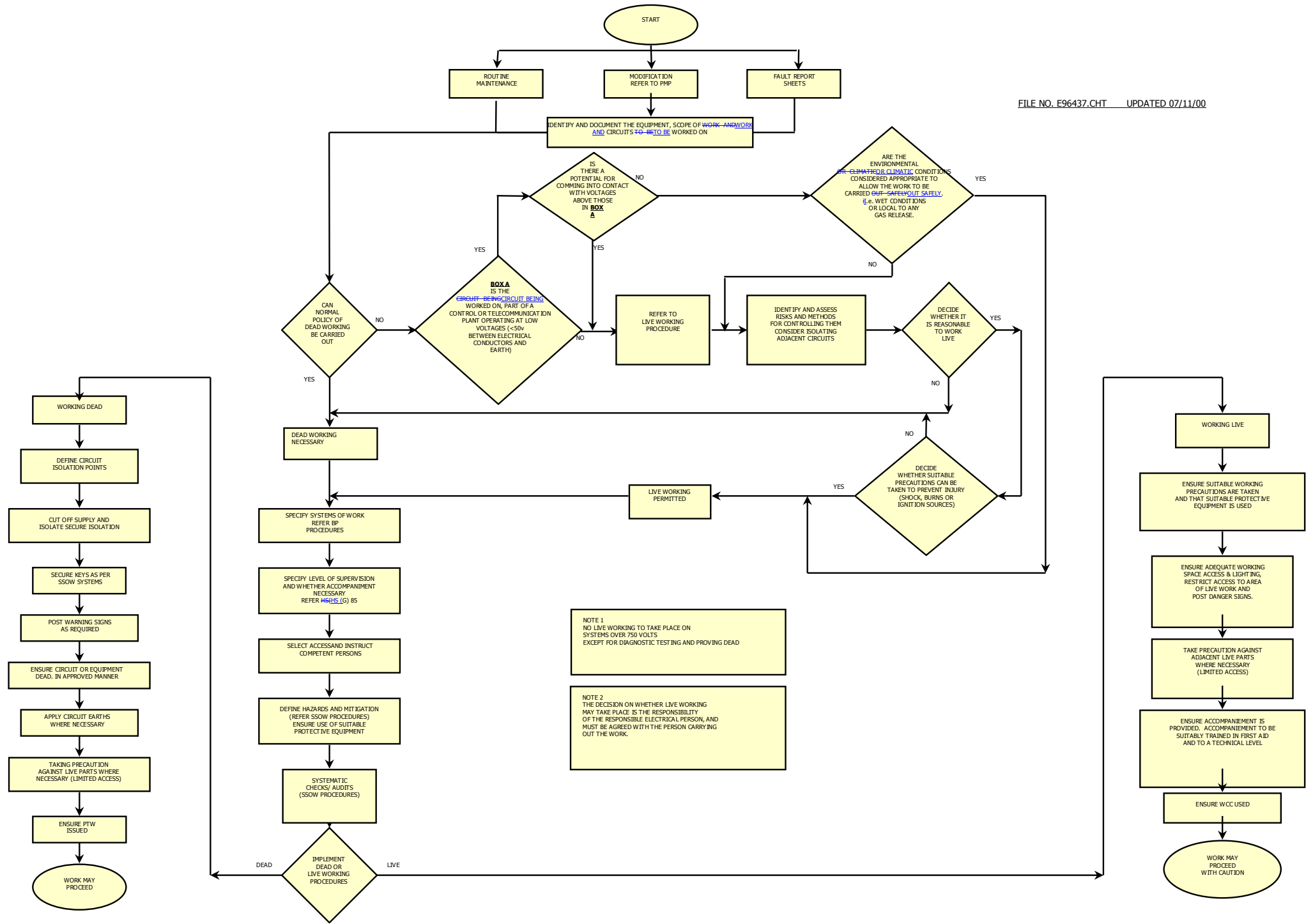
Once the locks are in place the keys will be returned with the ICC to the Area Authority who will control the keys until a de-isolation or a sanction to test has been approved.

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Appendix FE—: Control of Electrical Work

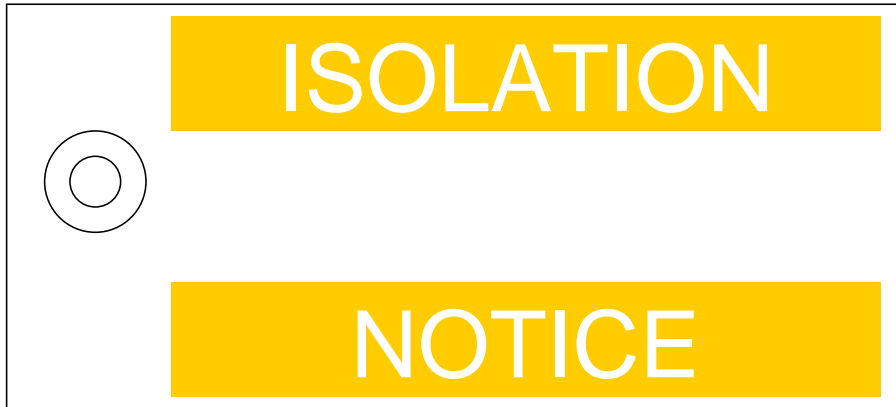


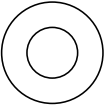
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Appendix G: Labels



	<div style="background-color: yellow; color: black; text-align: center; padding: 5px;">ISOLATION</div>	REASON FOR ISOLATION :	
		ISOLATION POINT	NAME _____
		TAG No _____	SIGNED _____
		ICC _____	DATE _____

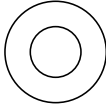
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	<div style="background-color: black; color: white; padding: 5px; text-align: center; writing-mode: vertical-rl; transform: rotate(180deg);">EARTH</div>	CIRCUIT MAIN <input type="checkbox"/>	ADDITIONAL <input type="checkbox"/>
		REASON FOR EARTH :	
		ISOLATION POINT TAG NO _____	NAME _____ SIGNED _____
		ICC No _____	DATE _____

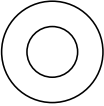
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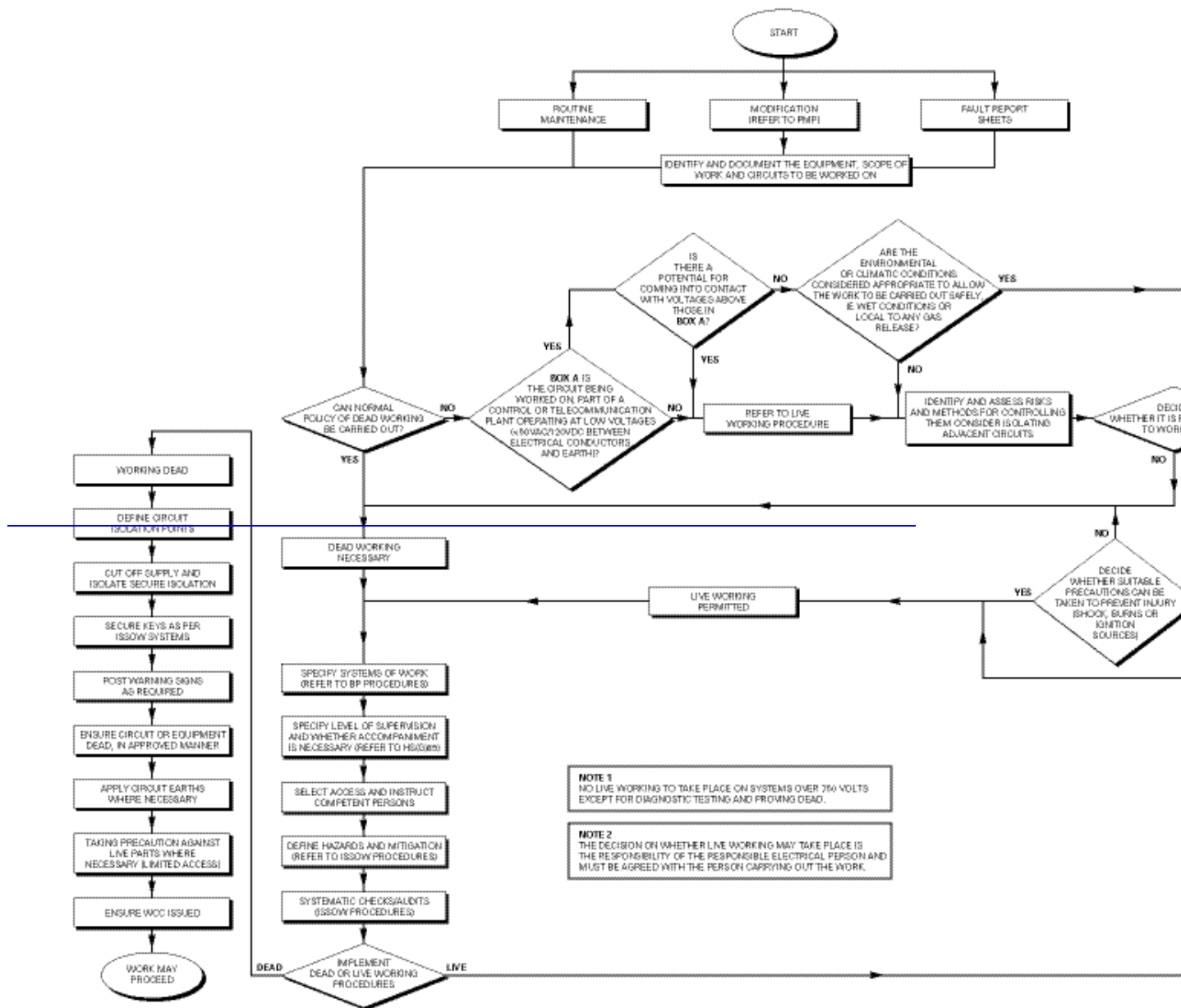
	<div style="background-color: red; color: white; text-align: center; padding: 10px;">DANGER</div>	<u>LIVE EQUIPMENT</u> <u>DO NOT INTERFERE WITH THIS EQUIPMENT</u> REASON FOR DANGER NOTICE :
		NAME _____
		SIGNED _____
		DATE _____

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