



Procedure for Energy Isolation – Electrical

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1 PURPOSE / SCOPE

The purpose of this document is to define the Azerbaijan Performance Unit (AzSPU) functional standard for the safe isolation of electrical plant or equipment from sources of electrical energy. All Process Isolation requirements are covered by Energy Isolation - Process Document.

The contents of this Safe System of Work are applicable to all BP owned and managed sites/installations in Azerbaijan and Georgia. Contractors working on BP owned or managed sites/installations are also responsible for alignment with this SSOW.

Any specific procedure developed by specialist contractors should align with requirements of this procedure. Neither does it supersede any national and local regulatory requirements.

All guidelines contained shall be regarded as the minimum requirements for BP owned or managed sites in Azerbaijan and Georgia.

This document applies to the electrical isolation of equipment for work. It shall be followed at all AzSPU operated sites / installations and is applicable to both onshore and offshore.

This procedure is written in sufficient detail that it should be able to be applied consistently at all sites / installations. There may still be the requirement for some local rules covering site / installation specific logistical / administrative arrangements and local variations in responsibilities to reflect differences in organisational arrangements. These local rules should not deviate from the core processes within this document. Any form of deviation from this procedure, including but not limited to local rules, shall be requested and authorised in accordance with the SSOW Deviations from Regulations and Procedures (Doc. No: AZSPU-HSSE-DOC-00011-2)

2 DEFINITIONS

Refer to document AZSPU-HSSE-DOC-00021-2 HSE Definitions for definitions common to this procedure. Definitions specific to this Procedure are included below.

AA	Area Authority
AAA	Affected Area Authority
AEP	Authorized Electrical Person
AIP	Authorized Instrument Person
SPUL	Strategic Performance Unit Leader
CI	Competent isolator
CMAS	Competence Management Assurance System
D	Main phase and neutral conductors disconnected
E	Earth the isolated conductor
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 by means such as a safety isolating transformer or converter 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

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HV	“High Voltage” voltages that exceed 1000Vac or 1500Vdc between conductors or 600Vac or 900Vdc between conductors and earth
IA	Isolating Authority
IAC	Isolating authority Control
IAE	Isolating authority Electrical
ICC	Isolation Control Certificate
IP	Ingress protection
Is	Isolation of the main phase conductors
ISSOW	Integrated Safe System of Work
LL	Lock and Label
LTI	Long-term isolations
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
OIM	Offshore Installation Manager
P	Prove dead with proprietary voltage tester
PA	Performing Authority
REP	Responsible Electrical Person
SAEP	Senior Authorized Electrical Person
SC	Site Controller
SM	Site Manager
SP	Authorized Switching Programme
SSOW	Safe System Of Work
TA	Technical Authority
WCC	Work Control Certificate

3 GENERAL REQUIREMENTS

3.1 Legislation & Standards

This procedure complies with applicable national law. Applicable national law is national law as amended by project specific agreements, e.g. the ACG Production Sharing Agreement (PSA), and relevant International Conventions, if any, in force in Azerbaijan or Georgia, as applicable.

In the absence of national legislation, or where national legislation is inconsistent with the requirements of project specific agreements, BP Group Standards or applicable requirements from UK or US legislation will be complied with.

Where requirements conflict, legal advice has been obtained and a defensible compliance position adopted.

The standards and practices contained in this procedure are consistent with those internationally recognized within the petroleum industry.

3.2 BP Requirements

It is a company requirement that all tasks are subjected to an assessment of risk to demonstrate that risks have been reduced to as low a level as reasonably practicable (ALARP). This can be achieved by complying with the Company's existing standards. Where compliance with

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Company standards cannot reasonably be achieved, a formal level 2 Risk Assessment will be undertaken to identify any additional controls and demonstrate that risks remain as low as reasonably practicable. Whether by compliance with Company Standards or through level 2 Risk Assessment, the Company's Golden Rules of Safety must be complied with. Golden Rules are non-negotiable.

3.3 Stopping Unsafe Work

To stop the continuation of potentially unsafe work at the earliest possible stage the Control of Work (CoW) Policy and this Energy Isolation - Electrical procedure make it very clear that all personnel are obliged and have the authority to “**STOP**” the work that they consider to be unsafe.

3.4 Requirements for Work Activities Involving Energy Isolation

The controls associated with the Golden Rules of Safety directly associated with Control of Work are listed below and shall be applied whenever the work activity is carried.

Any isolation of energy systems; mechanical, electrical, process, hydraulic and others, shall not proceed unless:

- the method of isolation and discharge of stored energy are agreed and executed by a competent person(s)
- any stored energy is discharged
- a system of locks and tags is utilized at isolation points
- a test is conducted to ensure the isolation is effective
- isolation effectiveness is periodically monitored

4 ROLES AND RESPONSIBILITIES

4.1 Electrical Functional Work Group

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.

4.2 Site Controller (SC)

This is the site manager (SM) or the offshore installation manager (OIM) and is a gate keeper role with authorisation of all categories of WCC's. The principle ISSOW related responsibilities of the SC are to:

- Take overall charge of the Installation/ site and responsibility for the effective operation of ISSOW

- Ensure that regular auditing of the process occurs and that all corrective actions resulting from the audit are carried out
- Ensure persons appointed to roles with ISSOW have undergone and the required training and have been assessed as competent for the roles they fill and that these details are recorded in accordance with the existing competency management process.
- Responsible for authorizing any deviations from the isolation standard through the risk assessment process. In doing so, he/she may choose to defer or not to carry out the activity and seek further technical guidance if the residual risk is perceived to be excessive.

4.3 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.

4.4 Isolating Authorities (IAE & IAC)

Within the ISSOW system there are two identifiers used for persons authorised for electrical isolation IAE and IAC

4.4.1 Isolating Authority (IA)

Note: the IA category in ISSOW will not be used as the specific authorisation approval levels IAP, IAE IAC will be used.

4.4.2 Electrical Isolators (IAE)

Electrical Isolators are 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

4.4.3 Senior Authorized Electrical Personnel (SAEP)

Electrical personnel who have been formally assessed by the TA or delegate as identified in the table below and authorized by the Site Controller, to switch, isolate and test electrical equipment greater than 1000v the upper level of authorization will be detailed on the Electrical Authorization Certificate, can act as an isolating authority under the Safe Systems of Work for electrical systems with voltage levels up to and greater than 1000V. As described in [AZSPU-HSSE-DOC-00048-2](#) Procedure for: Energy Isolation – Electrical.

Level	Scope	Assessed by
SAEP L1	Isolation of HV motors for mechanical work	ETA or REP
SAEP L2	Isolation of HV motors for electrical work	ETA or delegate
SAEP L3	Isolation of HV distribution	ETA or delegate

Note : any restrictions limitations will be identified on the authorisation certificate

Note: Where switching or isolation interfaces with an external organization the authorization may also include an assessment by the external organization or the State Energy Control

4.4.4 Authorized Electrical Personnel (AEP)

Electrical personnel who have been formally assessed as identified in the table below, and authorized by the Offshore Installation Manager / Site Manager / Site Controller, to switch, isolate and test electrical equipment with voltage levels less than one thousand volts (1000V) and act as an isolating authority under the Safe Systems of Work for electrical systems with voltage levels less than 1000V. As described in *AZSPU-HSSE-DOC-00048-2 Procedure for: Energy Isolation – Electrical*

Level	Scope	Assessed by
AEP L1	Single circuit 240VAC MCB	REP
AEP L2	Single circuit LV MCB	REP
AEP L3	Single circuit LV Switchgear	REP
AEP L4	Isolation of LV distribution and generation	REP

Note : any restrictions limitations will be identified on the authorisation certificate

4.4.5 Competent Isolator (CI)

In special circumstances individuals can be assessed as competent isolators and authorized and recognised as IAE by the Site Controller for specific items of equipment providing that they have completed the formal training and have been assessed as competent, as described in *AZSPU-HSSE-DOC-00048-2 for: Energy Isolation – Electrical*

Level	Scope	Assessed by
CI L2	LV specific task	REP
CI L3	HV specific task	ETA or delegate

Note : any restrictions limitations will be identified on the authorisation certificate

4.4.6 Control Isolators (IAC)

Control / Instrument / Telecoms Isolators are responsible for design of a Control / Instrument / Telecoms isolations 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

4.4.7 Authorized Instrument Personnel (AIP)

Instrument /Telecoms/ Control personnel who have been formally assessed by the site REP, and authorized by the Site Controller to switch, isolate and test control, instrument and telecom equipment with voltage levels less than 240 volts, can act as an isolating authority under the Safe Systems of Work for control, instrument and telecom systems with voltage levels less than 240V phase to earth. As described in *AZSPU-HSSE-DOC-00048-2 Procedure for: Energy Isolation – Electrical*

Level	Scope	Assessed by
<i>AIP L1</i>	<i>ELV circuits with voltage less than 50V</i>	<i>REP</i>
<i>AIP L2</i>	<i>Single circuit 240V MCB</i>	<i>REP</i>

Note : any restrictions limitations will be identified on the authorisation certificate

4.4.8 Competent Isolator (CI)

In special circumstances individuals can be assessed as competent isolators by the site REP and authorized and recognised as IAC by the Site Controller for specific items of equipment providing that they have completed the formal training and have been assessed as competent, as described in *AZSPU-HSSE-DOC-00048-2 for: Energy Isolation – Electrical*

Level	Scope	Assessed by
<i>CI L1</i>	<i>ELV specific task</i>	<i>REP</i>

Note : any restrictions limitations will be identified on the authorisation certificate

4.5 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 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.

4.6 Responsible Electrical Person (REP)

This is a role under the 'safe system of work' to clearly identify which authorized person has the responsibility for the electrical system, the REP is nominated by the SC from those persons having the highest level of authorization required for that site / installation and is technically assessed by site Electrical Technical Authority or delegate for the role of REP.

The REP will:

- Approve any switching programs
- Countersign WCC 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 (Note: REP will have Area Authority training and assessment in support of this)

- Assess and recommend site personnel for authorization for inclusion in the ISSOW

At any one time there can be only one REP responsible for the electrical system. The REP may also be the isolating authority as recognised by ISSOW.

Level	Scope	Assessed by
<i>REP</i>	<i>As defined</i>	<i>ETA or delegate</i>

4.7 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.

4.8 Competent Person (CP)

An essential requirement for persons undertaking electrical work is that they are competent, 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 AzSPU certifies the competence of its own employees using CMAS and or trade qualifications.

5 ENERGY ISOLATION PROCESS

5.1 Self-regulation and Audit

Performance 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

5.2 Isolating Authorities (IAE & IAC) – Training, Competency and Authorisation

The Isolating Authority will be authorized by SC based on the following criteria.

The Isolating Authority will be:

- Familiar with the site / installation

- Have Electrical First Aid Training (level 1 plus AED/ CPR and treatment of burns or level 2 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:

Level	Scope	Assessed by
<i>REP</i>	<i>As defined</i>	<i>ETA or delegate</i>
<i>SAEP L1</i>	<i>Isolation of HV motors for mechanical work</i>	<i>REP or ETA</i>
<i>SAEP L2</i>	<i>Isolation of HV motors for electrical work</i>	<i>ETA or delegate</i>
<i>SAEP L3</i>	<i>Isolation of HV distribution</i>	<i>ETA or delegate</i>
<i>AEP L1</i>	<i>Single circuit 240VAC MCB</i>	<i>REP</i>
<i>AEP L2</i>	<i>Single circuit LV MCB</i>	<i>REP</i>
<i>AEP L3</i>	<i>Single circuit LV Switchgear</i>	<i>REP</i>
<i>AEP L4</i>	<i>Isolation of LV distribution and generation</i>	<i>REP</i>
<i>AIP L1</i>	<i>ELV circuits with voltage less than 50V</i>	<i>REP</i>
<i>AIP L2</i>	<i>Single circuit 240V MCB</i>	<i>REP</i>
<i>CI L1</i>	<i>ELV specific task</i>	<i>REP</i>
<i>CI L2</i>	<i>LV specific task</i>	<i>REP</i>
<i>CI L3</i>	<i>HV specific task</i>	<i>ETA or delegate</i>

In special circumstances individuals can be assessed as Competent Isolators (CI) 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.

5.3 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
- 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.

5.4 Isolation and Planning

5.4.1 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 Strategic performance Unit.

Any isolation, which does not meet the Minimum Recommended Isolation Standard as defined in section 7.5, 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 SC 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.

5.4.2 Isolation Planning

Isolation of any piece of equipment shall be planned to minimize risk to personnel, property and production. 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
- 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 main distribution is to be switched or at the REP's discretion

5.4.3 Switching Programmes

Where main distribution equipment is to be switched it is essential that the equipment be 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. An HV switching programme will be prepared by an SAEP and checked by the REP. Where the REP is alone on site, the site electrical engineer will check the switching program. Technical advice will be sought as required.

While switching two persons will be involved one who will read out loud the instruction and the other who will confirm the instruction out loud and on confirmation that this is correct will perform the operation.

See Appendix C for a blank Switching Programme.
The Switching Programme does not replace an ICC.

5.4.4 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 descending order of security and effectiveness. The 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 labelled, a secondary check could 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.

(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. The circuit is proven dead to ensure that the circuit is discharged and is earthed to prevent recharging. Locks and labels are applied to all points of isolation and earthing

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.

Note: Where the isolation switch meets the minimum standard for disconnection, as defined in IEC 60947, and it includes all phases and 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 (not suitable for electrical work)

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.

(d) Prove Dead, Disconnect, Label

This is a positive isolation typically used for isolating instruments where there is no lockable isolator. It is required that the circuit cable cores are disconnected from the terminal rail and terminated into a temporary terminal block with isolation labelling at the disconnected cores.

General Note:

When completing the isolation confirmation certificate (ICC) for reasons of clarity the following guidelines are given for isolation points where locks and labels will be applied

Isolate (Open/closed)	When the isolation point is a an isolator or a MCB or a MCCB with an OPEN / CLOSE POSITION
Fuse (Removed / Replaced)	When at the isolation point Fuses or Links have been removed

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Disconnect/ Reconnect	When at the isolation point a cable is removed (the isolation point tag reference will be the termination point of the cable and the cable number)
Earths (Applied / Removed)	When any earth is applied (the isolation point tag reference will be the earth application point where the lock and the a green earth label will be applied)
Circuit Breaker (Rack out / rack in)	When the isolation point is a circuit breaker (note at this point identify where the lock & label is to be applied (ie 1S ESW81001 AB racking mechanism))
Bus Bar shutters (locked / unlocked)	When the isolation point is a bus bar shutter, note if there are live conductors behind the shutter then a danger notice should be used
Circuit shutters (locked / unlocked)	When the isolation point is a circuit shutter, note if there are live conductors behind the shutter then a danger notice should be used
Proved Dead	When a point in the circuit has been positively proven dead it is to be identified on the WCC. This should be identified as mitigation for electrical work. The performing authority is required to prove dead at the point of work or have this demonstrated by a competent person.

5.4.5 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+L L	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) WCC.				
Note 2:If any work is done adjacent to live conductors then this must be considered when providing the isolation and an Electrical Adjacent Work Assessment is to be completed.				
Note 3:All conductors to be proven dead at the point of work				
Is – Isolation of the main phase conductors LL – Lock and labelled D – Main phase and neutral disconnected 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 < 250V	>250V < 1000V	>1000V
Authorisation level required to perform the isolation	AIP, AEP, SAEP	AIP, AEP, SAEP	AEP, SAEP	SAEP or AEP under direct supervision

				of SAEP
Accompanied for proving dead, distribution switching, testing, fault finding	No	No	AEP, SAEP based on Risk assessment	SAEP or AEP under direct supervision of SAEP
Communications link	Yes	Yes	Yes	Yes
Nomex gloves or leather gauntlets	No	Yes	Yes	Yes
<p>Note 4: 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.</p> <p>Note 5: Competent Isolator perform isolations for the specific equipment and voltage that they have been authorised for</p>				

Table 1: Minimum Recommended Isolations Standard**5.4.6 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 site controller must authorize all level 2 risk assessments prior to any work proceeding.

5.4.7 Live Working

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)

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
 - 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

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 E for a flowchart covering the Control of Electrical Work.

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 B for an adjacent working assessment form.

5.5 Isolation Implementation and Control

5.5.1 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 WCC 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 D.

5.5.2 Isolation Labelling

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 an ISSOW or Yellow Isolation Label with the following clearly identified:

- ICC 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 attached in addition to the ISSOW isolation label

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

5.5.3 Positive Identification of Equipment

To allow effective isolation, equipment must be clearly 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.

5.5.4 Control of Isolations

The ICC, cross-referenced to the work control certificate, 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 isolation points
- Records 'prove dead' operations
- Records the position of any earths applied
- Records locking points and lock numbers
- Records where isolation 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.

5.5.5 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 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 or for transformer offload tap changers.

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

5.5.6 Boundary Isolations

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.

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.

5.5.7 Long-Term Isolations

Long-term Isolations (LTI) 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.

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

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

5.5.8 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 and should be recorded on the work control certificate. The rules for approval of a personal isolation are as follows:

- 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 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

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

Personal isolations are not allowed on the following:

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

5.5.9 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 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 sited 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.

5.5.10 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 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.

5.6 De-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.

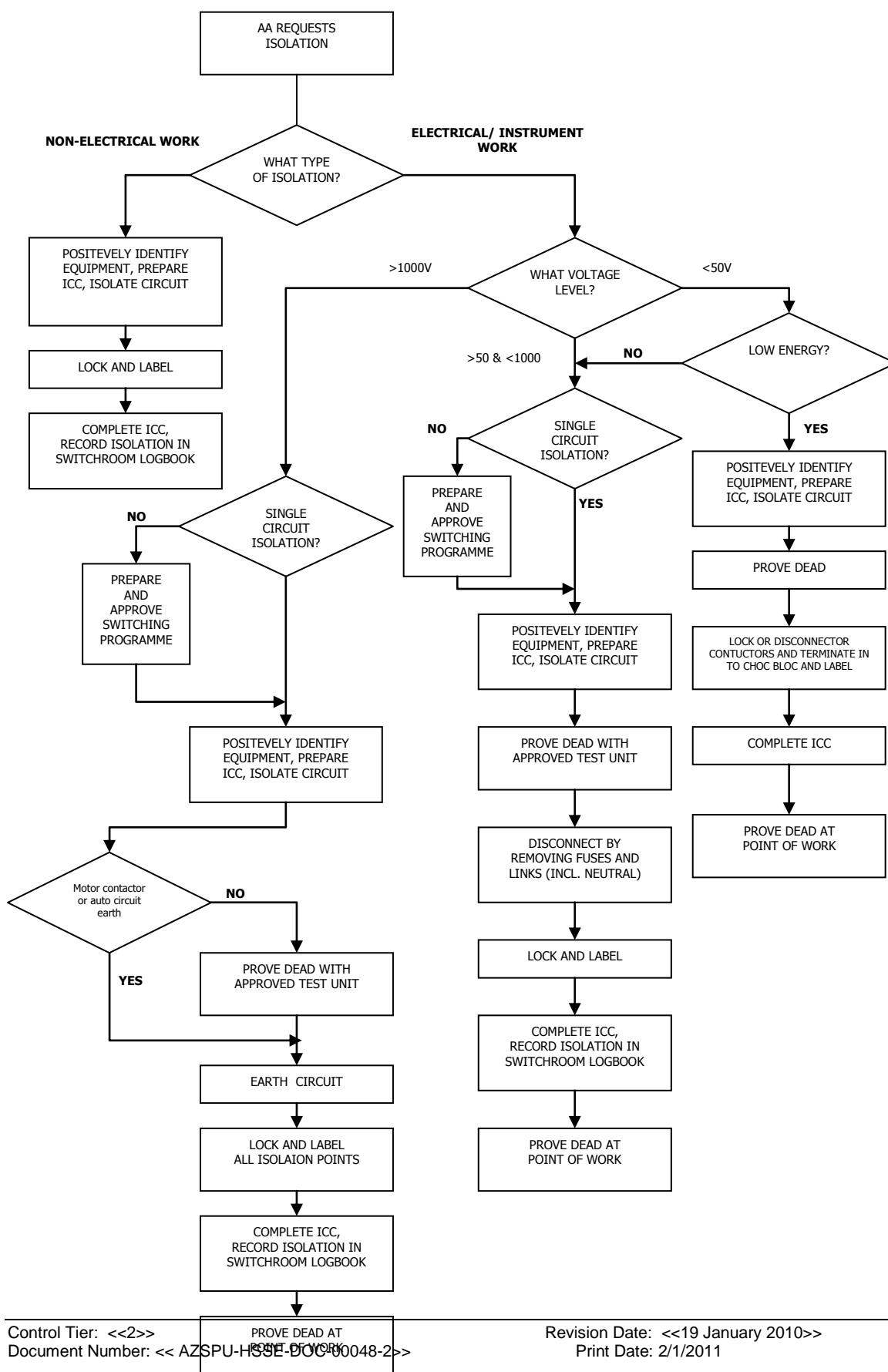
In a Hazardous Areas before de-isolation, the plant must be inspected to ensure that the equipment meets the requirements to prevent danger in the hazardous area, commonly known as an EX inspection.

6 KEY DOCUMENTS / TOOLS / REFERENCES

This procedure shall, where appropriate, be used in conjunction with this suite of AzSPU Procedures referenced below.

Document No	Title of Procedure
<u>AZSPU-HSSE-DOC-00012-2</u>	AzSPU Procedure for Authorisation
<u>AZSPU-HSSE-DOC-00011-2</u>	AzSPU Procedure for Deviation
<u>AZSPU-HSSE-DOC-00048-A2</u>	AzSPU Electrical Safety Guidelines
<u>AZSPU-HSSE-DOC-00063-2</u>	AzSPU SSOW Procedure for Task Risk Assessment
<u>AZSPU-HSSE-DOC-00049-2</u>	AzSPU Procedure for Energy Isolation - Process
<u>AZSPU-HSSE-DOC-00060-2</u>	AzSPU Procedure for Permit To Work
<u>AZSPU-HSSE-DOC-00002-2</u>	AzSPU Procedure for Control of Work

FLOW SHEET ELECTRICAL ISOLATIONS



Control Tier: <<2>>

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<http://docs.bpweb.bp.com/dkazspu/component/hssesms>

APPENDIX A: APPLICABILITY

This document applies to the following job functions:

Area Authority
Authorized Electrical Personnel
Authorized Instrument Personnel
Electrical Technical Authority
Isolating Authority
Site Manager / Site Controller / Offshore Installation Manager
Operations Engineer
Performing Authority
Responsible Electrical Person
Senior Authorized Electrical Personnel

APPENDIX B: ADJACENT WORKING ASSESSMENT

<http://docs.bpweb.bp.com/dkAzSPU:/content/hse/spu/records/AZSPU-HSSE-DOC-00048-A3>

APPENDIX C: SWITCHING PROGRAMME

<http://docs.bpweb.bp.com/dkAzSPU:/content/hse/spu/records/AZSPU-HSSE-DOC-00048-A4>

APPENDIX D: OPERATIONAL LOCKING SYSTEM

<http://docs.bpweb.bp.com/dkAzSPU:/content/hse/spu/records/AZSPU-HSSE-DOC-00048-A5>

APPENDIX E: CONTROL OF ELECTRICAL WORK

<http://docs.bpweb.bp.com/dkAzSPU:/content/hse/spu/records/AZSPU-HSSE-DOC-00048-A6>

APPENDIX F: LABELS

<http://docs.bpweb.bp.com/dkAzSPU:/content/hse/spu/records/AZSPU-HSSE-DOC-00048-A7>

Revision/Review Log

Revision Date	Authority	Custodian	Revision Details
24 Aug 2004	Central Engineering Senior Authority	EI (electrical) Technical Authority	Initial issue as controlled document
18 June 2007	Steve Grittner (Central Engineering Senior Authority)	Yvonne Hepburn EI (electrical) Technical Authority	<p>Table of Contents changed as follows: Sub-sections included into the Table of Contents.</p> <p>General: Throughout the procedure the document numbering for referred procedures has been changed.</p> <p>Section 1. Introduction: 1.1 is now Scope. 1.2 is now General Requirements. 1.3 is now Stopping Unsafe Work. 1.4 is now Deviations. 1.5 is now Document Review. 1.6 is now BP Golden Rules of Safety. 1.7 is now SSOW Specific Cross References. 1.8 is now Language Facilitation. 1.9 is now Procedure Summary. 1.10 is now Document review.</p> <p>Section 2. Roles and Responsibilities: 2.6 Responsible Electrical Person: Added on to end of paragraph, <u>“and assessed by site Electrical Technical Authority or delegate”</u>. 2.11 Competent Isolator: Added into the paragraph after REP is <u>“with the agreement of the ETA”</u>.</p> <p>Section 6. Isolation & Planning: 6.4 Isolation Methods: New sub-section added titled <u>“(d) Prove Dead, Disconnect, Label”</u>. 6.5 Isolation Standards: Note 4 added to the standard stating <u>“Competent Isolator perform isolations for the specific equipment and voltage that they have been authorized for”</u>.</p> <p>Section 7. Isolation Implementation and Control: 7.5 Operational Locks; Added into the second paragraph after maintenance is <u>“or for transformer offload tap chargers”</u>.</p> <p>Appendices. 2 additional appendices included to the document as follows:</p> <ul style="list-style-type: none"> • Procedure Summary • Procedure Feedback & Improvement Suggestions
19 January 2010	Chris Houghton AZSPU Engineering Authority	Yvonne Hepburn AzSPU Electrical Technical Authority	<p>Formatting aligned to the new HSE standard Changes made to align the document with the ISSOW system Changes to the authorization levels.</p> <p>The paragraph where specific Golden Rules Energy Isolation requirements were stated now is substituted for appropriate requirements as stated in Group Defined Practice for CoW.</p>

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