

# Network Asset Design Standard

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## HV SUBSTATION FEEDER EXIT CIRCUITS ISOLATION POLICY

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# Document Control

## Endorsement/Approvals

	Name	Title	Signature
Endorsed by:	R Rogerson	Distribution Policy and Standards Manager	
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## Record of revisions

This document contains multiple formatting sections. When it is updated please ensure all section headers and footers have also been updated with correct version numbers and dates.

Revision no	Date	DMS Version	Revised by	Description
0	November 2007	3907430V5		Original Issue

## Documents referenced in this document

DMS#	Title of document
3515915	HV Feeder Substation Exit Circuits Isolation Policy – Project Definition
3573985	Underground Distribution Schemes Manual - Fifth Edition, Revision 1
3332602	IOI 026 – Nilsen Retrofit CB Operation
	Switching Operators manual

## Other documents that reference this document

DMS#	Title of document
3573985	Underground Distribution Schemes Manual

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Distribution Design Manager
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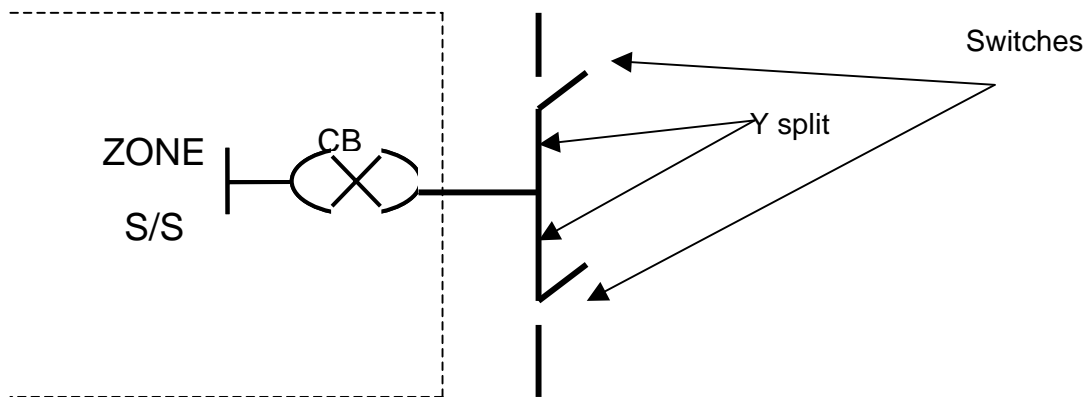
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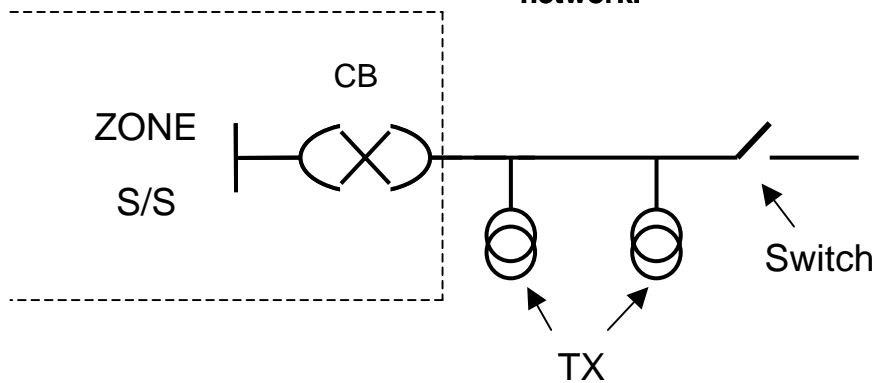
## 1.0 Introduction

In the past there have been occasions where either there have been Y Splits in the HV network (branches in the network) or loads (transformers) connected before the first isolation point on a zone substation feeder exit (ZSFE) circuit. Examples of this are shown in Figure 1 and Figure 2.

These arrangements have meant that if the feeder CB or ZSFE circuit needed to be maintained, switching to isolate the circuit so it can be earthed was very difficult. The difficulty is caused by having to feed up the feeder from adjacent feeders which requires multiple switching operations, if it could be fed up at all. Plus, the transformers would have to be fed up from the adjacent LV networks, if they could be fed up at all.



**Figure 1. Incorrect configuration: No isolation point before the first split in the network.**



**Figure 2. Incorrect configuration: No isolation point before the first transformers connected.**

## 2.0 Scope

This policy applies to new, reconfigured and upgraded ZSFE circuits.

## 3.0 Definitions

*ZSFE – Zone substation feeder exit*

*RMU – ring main unit*

*HV – distribution high voltage (i.e. 6.6-33kV)*

*LV – distribution low voltage (i.e. 415V)*

*O/H – distribution overhead*

*U/G – distribution underground*

*PTS – pole top switch*

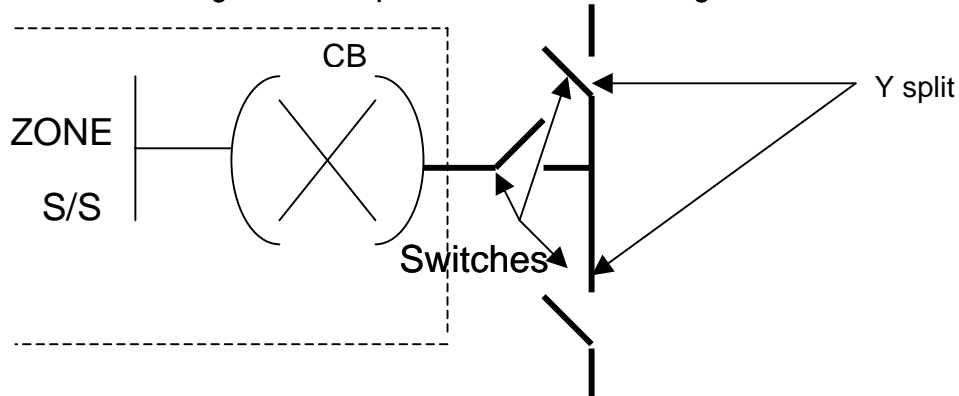
*ZoneS/S – zone substation*

*TX – distribution transformer*

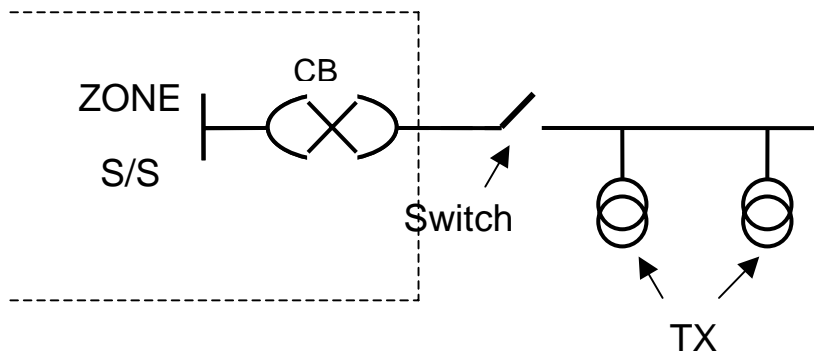
## 4.0 Policy

All distribution HV ZSFE circuits that are to be installed, underground, upgraded or reconfigured, shall have an isolation point (overhead or underground switch) on the remote end of the feeder exit circuit before the feeder Y Splits or transformers are connected to the feeder circuit, to allow complete isolation and earthing of the feeder exit circuit.

The basic configurations required are as shown in Figures 3 and 4 below.



**Figure 3. Correct configuration: Isolation point before the Y split in the network.**



**Figure 4. Correct configuration: Isolation point before the first transformer**

## 5.0 Application

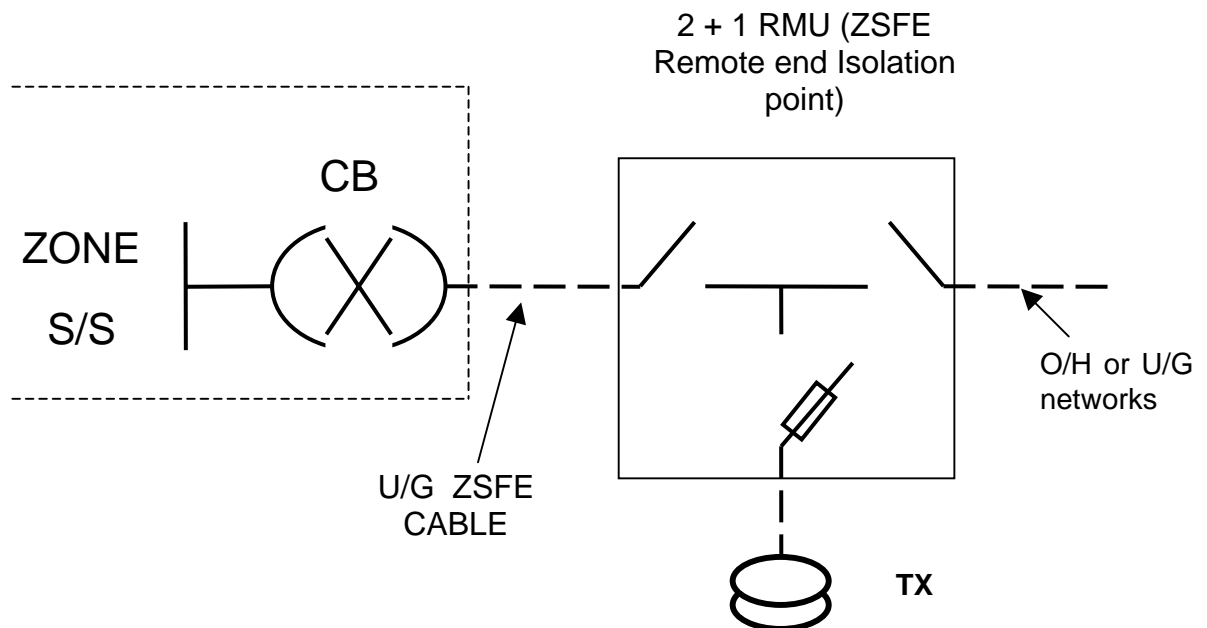
All ZSFE circuits need to have an isolation point on the remote end of the circuit before any Y Splits in the network or connections to transformers to allow isolation and earthing of the circuit when necessary. The remote end of the ZSFE circuit is the end away from the zone substation and the isolation point at the substation is a circuit breaker (CB) and ZSFE circuits are defined as the HV feeders that exit a zone substation.

The isolation and earthing point on the remote end of the ZSFE circuit is to allow easier switching for maintenance operations on the zone substation circuit breaker and ZSFE.

### 5.1 Underground ZSFE Preferred Configurations - RMU Remote End Isolation

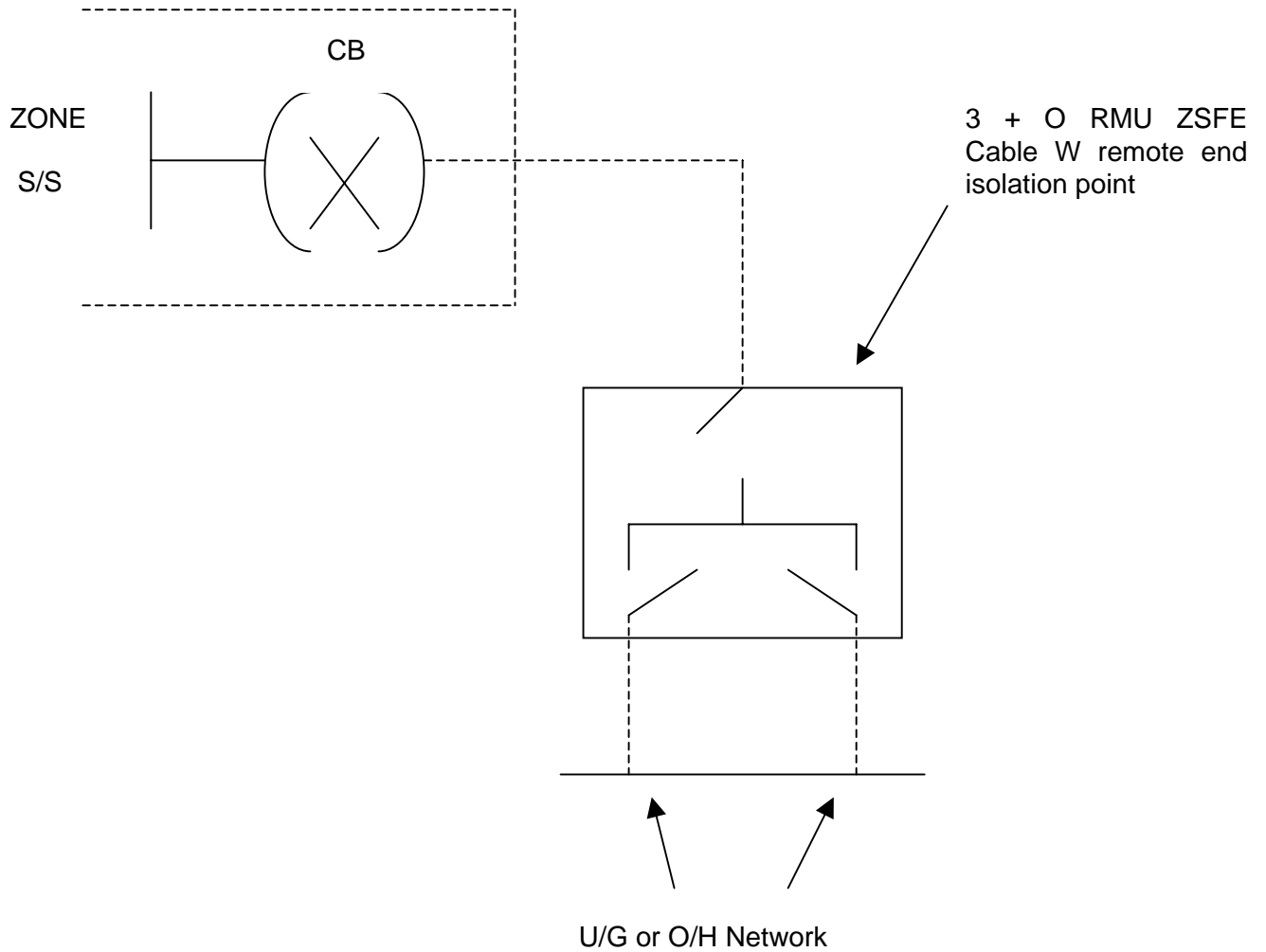
For an underground ZSFE circuit (ie cable), remote end isolation and earthing via an RMU is the preferred arrangement. Terminating on an RMU assists with switching in adverse weather conditions plus allows easier application of earthing, as portable overhead earths are not required.

A typical example of how an RMU is used to provide an isolation point for the ZSFE cable when a transformer load is to be connected to the feeder is shown below in Figure 5. A typical arrangement for Y Split feeder is given in Figure 6 below.



**Figure 5. ZSFE cable remote end isolation via RMU with a transformer load.**

**Figure 6. Correct method of connecting ZSFE cable via a RMU with a Y Split Feeder.**

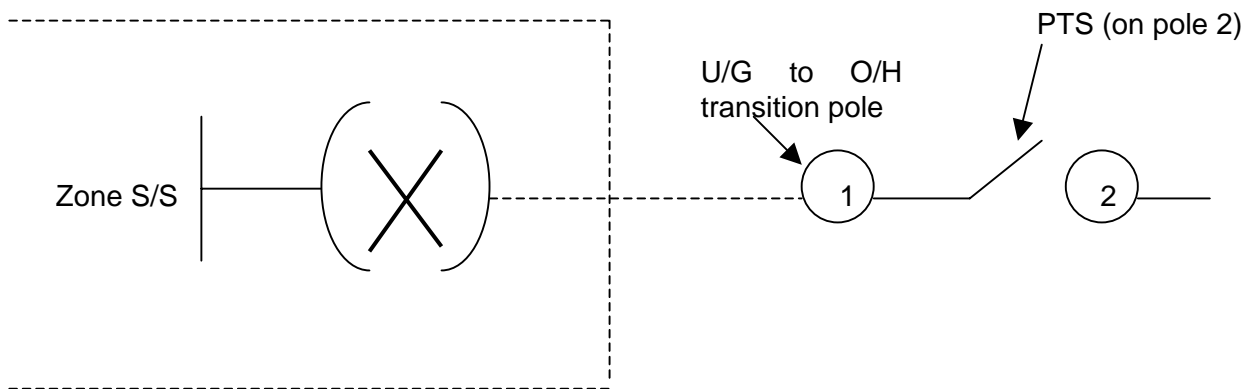




### 5.2 Underground ZSFE Alternative Configuration – PTS Remote End Isolation

For an underground ZSFE circuit (ie cable), where an RMU cannot be installed, use of an overhead PTS switch is acceptable. It is important that the remote end of the ZSFE circuit can be both isolated and earthed. To be able to apply the remote end ZSFE overhead earths typically the pole top switch has to be installed on the next suitable pole downstream from the cable termination pole.

There must be no transformers or Y Splits installed prior to the remote end PTS. The configuration with the PTS placed downstream of the cable termination is shown below in Figure 7. Where suitable earthing points are available on the transition pole the extra bay is not required. Suitable earthing points are earth clamp parking bays.

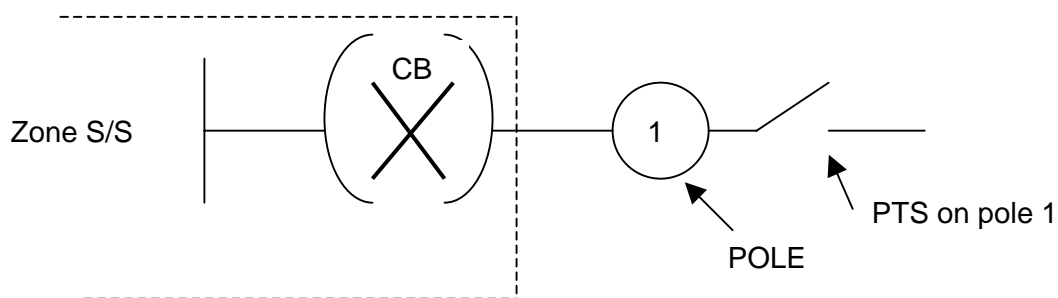


**Figure 7. ZSFE cable with PTS on the closest available pole downstream of cable termination**

### 5.3 Overhead ZSFE Configuration – PTS Remote End Isolation

For an overhead ZSFE circuit a PTS must be used to provide remote end isolations and earthing. There must be no transformers or Y splits installed prior to the remote end PTS.

This configuration is shown in Figure 8.



## 6. References

1. HV Feeder Substation Exit Circuits Isolation Policy – Project Definition
2. Underground Distribution Schemes Manual – Fifth Edition, Revision 1
3. IOI 026 – Nilsen Retrofit CB Operation
4. Switching Operators manual (Western Power Internal Document)