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Electricity Specification 225

Issue 5 May 2024

Connections for Embedded Distribution Networks

Amendment Summary

ISSUE NO. DATE	DESCRIPTION
Issue 4 **May 2023**	Updated to new template. Prepared by: Peter Twomey Approved by: Policy Approval Panel and signed on its behalf by Steve Cox, Engineering and Technical Director
Issue 5 **May 2024**	Policy for banked circuits clarified. Arrangements with an IDNO cable banked with an Electricity North West network cable prohibited. 33kV Connection from Bulk Supply Point, 33kV Ring or Overhead System, HV Connection from Primary Switchboard Reinforcement of the requirement to separate Electricity North West and IDNO cables as per EREC G88 General Requirements Prepared by: Peter Twomey Approved by: Policy Approval Panel and signed on its behalf by Paul Turner, PAP Chair.

Contents

1 Foreword

Electricity North West Limited holds a Distribution Licence to distribute electricity within its Distribution Services Area. Other licensed distributors, and distributors who are exempt from requiring a licence, may operate their own networks within that area. These networks, described as "embedded distribution networks", may be connected to and distribute energy derived from the Electricity North West Limited Network.

2 Introduction

Distribution Network Operators (DNO) and Independent Distribution Network Operators (IDNO) operate under identical legal obligations in relation to the provision of network connections and network services. The DNO has an obligation to allow connection to its existing network.

Where embedded distribution networks are connected to the Electricity North West Limited Network, Electricity North West Limited has certain requirements to ensure the safe and secure operation of its own Network and to be able to charge the operators of the embedded distribution networks for the use of the Electricity North West Limited Network for the transport of energy. Commercial arrangements, including charging arrangements for Use of System, are described in Electricity North West Limited's Electricity Specification (ES) 825 - Commercial Arrangements for Embedded Distribution Networks.

3 Scope

This Electricity Specification (ES) describes Electricity North West Limited's requirements for the design of the interface and equipment to be installed between the Electricity North West Limited's Network and an embedded distribution network. The range of connection arrangements covered is from LV up to and including 132kV. The connection arrangements described in this ES are not suitable for connections for customers who operate private networks, even though those networks may connect several buildings, via cables laid under public streets[1].

[1] This document applies to Distribution Networks that are expected to comply with the ESQC Regulations, it does not apply to Private Networks which are expected to comply with BS7671 (known as IET Wiring Regulations).

4 Definitions

Bilateral Connection Agreement (BCA)	An agreement between Electricity North West Limited and an IDNO in accordance with section 9.
Bulk Supply Point (BSP)	A substation transforming from 132kV to a lower voltage.
DCUSA	Distribution Connection Use of System Agreement
Design & Construction Manager	The Design & Construction Manager, Electricity Connections, Electricity North West or his successor or such person specifically nominated on his behalf.
High Voltage (HV)	Any voltage exceeding 1000V ac, measured between phase conductors, or 600V measured between phase conductors and earth.
Independent Connection Provider (ICP)	A private company that provides energy connection to a distribution network in accordance with the requirements of the network owner. In the context of this document, the ICP is seen as providing only electrical connections. NB Both DNOs and IDNOs can adopt connections undertaken by ICPs.
Independent Distribution Network Operator (IDNO)	The licensed or licence-exempt owner and/or operator of an embedded distribution network.
IDNO network	An electricity distribution network, operated by an IDNO, which is connected to and distributes electricity derived from the Electricity North West Limited Network. The individual end-user customers of an IDNO network are free to choose their electricity suppliers.
Low Voltage (LV)	400/230V (declared network voltage)
Master Asset Management System (MAMS)	Electricity North West Limited's electronic record system for its electricity distribution assets.
Meter Operator (MOp)	An accredited party, who installs and maintains metering assets located at the interface boundary between the IDNO network and the Electricity North West Limited Network.
Electricity North West Network (Network)	The electricity distribution network owned by Electricity North West Limited.
Point of Connection	The point, defined by Electricity North West Limited, on its existing Network, from which a new connection is derived.
Point of Supply	The point of supply for an IDNO network from the Electricity North West Limited Network. Also known as the ownership boundary or connection point.

Primary Substation	For the purposes of this document a Primary Substation is one transforming from 33kV to 11kV or 6.6kV.
Private Network	An electricity network confined to the site of a principal end-user customer, who will be registered with a single supplier. Other end-users, e.g. tenants of the principal user, may be connected to the private network, but they have no choice of supplier and may not be charged for electricity according to the quantities they use.
Provider	The ICP or Electricity North West Limited's contractor, including his personal representatives, successors and permitted assigns, who is to provide and install the connection from the Electricity North West Limited Network, including all equipment to be adopted by Electricity North West Limited as far as the interface with the IDNO network.

5 General Requirements for Approvals and Testing

5.1 Product not to be Changed

No change in the product, packaging or labelling shall be made after Approval has been granted without prior notice to the Electricity North West Limited Business Connections Manager, and receipt of a written agreement to the proposed change from the Electricity North West Limited Business Connections Manager.

5.2 Electricity North West Technical Approval

The Provider shall submit proposals for testing which shall demonstrate, to the satisfaction of the Design & Construction Manager, compliance with this ES. Such tests shall be carried out without expense to Electricity North West Limited.

5.3 Quality Assurance

The Provider shall confirm whether he holds approval in accordance with a Quality Assurance Scheme accredited under BS EN ISO 9000. If he does not, he shall submit a statement of the quality assurance procedures employed to control the quality of the product, including the performance of Suppliers and Sub-Contractors.

Where the Provider is an ICP, the minimum requirement for quality assurance is accreditation through the National Electricity Registration Scheme.

The right is reserved for the Business Connections Manager to require, from time to time, the repeat of such tests as he may deem to be reasonably necessary to demonstrate continued compliance with this ES.

The right is reserved for the Business Connections Manager to make, from time to time, such inspections of the Provider's facilities as he may deem to be reasonably necessary to ensure compliance with this ES and any Contract of which it forms a part.

6 Generic Technical Requirements

6.1 General Requirements

Electricity North West Limited intends that connections to IDNO networks shall be designed, installed and operated in accordance with the Distribution Code.

Other than low voltage connections as described in 7.1, a means of electrical isolation shall be provided, in order to allow the IDNO to work on his equipment, without the need to disconnect other network customers. For low voltage connections described in 7.1 where a link box or feeder pillar has not been installed, disconnection of the IDNO network shall be achieved by jointing on the cable. A clear space of at least 3 metres to allow this jointing shall be available on the Electricity North West Limited side of the interface point for this purpose.

Other than a low voltage connection as described in 7.1, the IDNO shall install and maintain electrical protective devices such that, in the event of a fault on his equipment, protective devices in the Electricity North West Limited Network would not be expected to operate, except as specifically permitted by this ES.

Notwithstanding the specific requirements of EPD283 Modules 8 and 9, and 216, electricity distribution networks, other than Private Networks and distribution installations within multiple occupancy buildings, fall outside the scope of BS 7671:2008 - Requirements for Electrical Installations (often referred to as the IEE Wiring Regulations). However, distribution networks do fall within the scope of the Electricity Safety, Quality and Continuity (ESQC) Regulations 2002 and Electricity North West Limited is bound by those Regulations to refuse to connect any installation, which it has reason to believe does not comply with those Regulations.

Except for the appropriate circumstances identified in subsections 7.1.7, 7.2.11 and 8.2.8, there shall be only one Point of Supply provided. Within redevelopment areas this may result in substantial co-existence of DNO and IDNO equipment within the same highway. Any operational risk presented by this co-existence shall be highlighted to the extent possible within the network records and be mitigated by normal operational practices. Where co-existence of DNO and IDNO cables is unavoidable, IDNO cables shall be installed in compliance with ES 281 Part 4 section 2.11.5. Otherwise, all reasonable measures shall be taken to separate IDNO and Electricity North West cables in accordance with EREC G88 subsection 6.1.7. May 24

Where an IDNO network is to have generation connected, the requirements of ES259 - Generation Connected to the Electricity North West Limited Distribution Network shall also be complied with.

No variation from the requirements of this ES will be accepted, without the written agreement of the Policy and Implementation Manager, Network Strategy, Electricity North West Limited, who may require any such proposal to be supported with a risk assessment.

6.2 Metering

Metering shall normally be provided at the EHV and 132kV interface between the Electricity North West Limited Network and the IDNO network. Such metering is not for settlement purposes but is to provide Electricity North West with data related to the energy delivered to the IDNO network.

Metering current transformers (cts) and voltage transformers (vts) will be incorporated in switchgear or within an open terminal substation. Ownership and maintenance responsibility of the cts and vts will normally be the same as that of the switchgear but shall in any case be defined in the Site Responsibility Schedule.

Suitable accommodation - space and mounting - shall be provided within the substation for Electricity North West Limited's remote metering panel. Suitable ducting shall be installed to accommodate the multicore cable between the switchgear or fusegear containing the metering transformers and the remote panel.

Electricity North West Limited will appoint the MOp.

6.3 Plans and Drawings

6.3.1 Plans to Accompany First Application

In order to assist Electricity North West Limited in carrying out its statutory duties in a safe and responsible manner and in pursuance of Regulation 4 of the Electricity Safety, Quality and Continuity Regulations 2002, as amended, the IDNO shall provide to Electricity North West Limited a site plan, showing the boundary, within which the IDNO intends to operate an IDNO network. This plan shall accompany the application to Electricity North West Limited for the connection of the IDNO network. Any later modification to this boundary shall be similarly notified to Electricity North West Limited. The network plans shall be of a suitable scale to enable accurate interpretation by Electricity North West Limited staff. Typically, 1:500 is considered suitable for LV and networks up to 11kV.

6.3.2 As-Constructed Drawings

Where an accredited ICP is to supply and install equipment, to be adopted by Electricity North West Limited, which will form all or part of the connection, from the Point of Connection to the Point of Supply to the IDNO network, the ICP or the IDNO shall provide drawings at a scale of 1:500 or larger, showing the equipment as installed. This shall include all equipment installed at the boundary interface, including joints. Such drawings shall be forwarded to the Business Connections Manager prior to energisation.

7 Low Voltage Connections

7.1 Low Voltage Connections from Low Voltage Network

7.1.1 These arrangements are suitable for a connection of up to 300kVA capacity.

7.1.2 The IDNO Network may be directly connected to Electricity North West Limited's network by a cable joint. There is no requirement for a link box or feeder pillar at the interface point in order for Electricity North West Limited to fulfill its obligations.

7.1.3 If the design incorporates a cabinet or feeder pillar at the interface point, Electricity North West Limited's cable will be terminated in the IDNO's cut-out, or similar termination. The ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be the incoming terminals of that termination. Isolation facilities at the interface shall be by means of withdrawable links within the termination. These links shall be either solid links or fuse-links (See 7.1.7.) under the IDNO's control.

7.1.4 If the design incorporates a link box at the interface point, the ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be on the upstream (Electricity North West Limited) side of the interface link-box, at a cable joint within 3m of the link-box or otherwise nominally within 3m of the link-box. Isolation facilities at the interface shall be by means of withdrawable fuse-links (See 7.1.7.) under the IDNO's control.

7.1.5 The interface point, described in subsection 7.1.2, shall be close to the geographical boundary of the IDNO network nearest to the Point of Connection.

NOTE:

The purpose of this requirement is two-fold:

The risk of inadvertent contact or interference with Electricity North West Limited's live cables is reduced by avoiding the installation of cables, which are to be adopted by Electricity North West Limited, alongside cables operated by IDNOs where these cables are substantially within site boundaries.

The possibility of excessive voltage drop, flicker, loop impedance or cable sizes is reduced by avoiding unnecessarily long feeding distances along LV mains.

7.1.6 The interface point shall be clearly identified on Electricity North West Limited's Geographical Information System

7.1.7 Fuse protection of Electricity North West Limited's cable will normally be installed in the Electricity North West Limited substation, feeding the local LV Network. The IDNO network shall be designed, and the type and rating or setting of its protection selected, so as to discriminate with Electricity North West Limited's fuses. Electricity North West Limited shall provide the IDNO with the Electricity North West Limited distributor fuse size, network impedance values and calculated earth fault current at the interface point. This is to allow the IDNO to design their network to be adequately protected, which is the responsibility of the IDNO. This may require a link box with appropriately sized fuses at the interface point. Where network impedance values change materially due to say network reconfiguration work then Electricity North West Limited shall inform the IDNO of such changes and the appropriate revised values.

7.1.8 In appropriate circumstances, more than one Point of Supply may be provided to connect an IDNO network within one site, in which an IDNO operates. Where any such Point of Supply takes its connection from the Electricity North West Limited LV Network, it shall be designed to operate independently of any other Point of Supply and no permanent or temporary means of interconnection with any other Point of Supply shall be installed. Such a Point of Supply shall preferably be designed to connect a distinct and physically separate part of the site.

7.2 Low Voltage Connection from Substation

7.2.1 These arrangements are suitable for a connection of up to 1MVA capacity.

7.2.2 Connection arrangements shall be generally in accordance with ES215 - Design Specification for Third-Party Provided New Connections of up to 1 500kVA Capacity.

NOTE: Connections with capacity in the range 1 000 to 1 500kVA are required to be at HV. See section 8 below. The connection via an Electricity North West Limited air circuit breaker (ACB), described in ES215, subsection 3.1.2 and shown in Figure 2 of the same, may not be suitable, because of the difficulty in providing discrimination between the Electricity North West Limited ACB and the IDNO's protection.

7.2.3 The IDNO shall provide a suitable site to accommodate Electricity North West Limited's substation, segregated from but adjacent to his own LV switchgear/fusegear. Electricity North West Limited's substation shall be designed, constructed and equipped in accordance with ES352 - Design of Distribution Substations & Transforming Points. Legal tenure of the substation site, either freehold or long-term (minimum 60 years) leasehold, shall be procured for Electricity North West Limited, before the final connection is made. Tenure may be secured either by the IDNO, on behalf of Electricity North West Limited, or by Electricity North West Limited, but in either case, it shall be at no cost to Electricity North West Limited.

NOTE: The technically ideal location of the substation is at the centre of the load. However, any reasonable variation, within or immediately adjacent to the geographical site boundary, may be accommodated according to the IDNO network design. See EPD279, subsection 4.7.

7.2.4 The ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be the bolted connections of the IDNO's single-core cables on the LV fuseboard within Electricity North West Limited's substation.

7.2.5 Isolation for the IDNO's equipment shall be by means of withdrawable fuse-links on Electricity North West Limited's substation fuseboard. These fuse-links shall be under Electricity North West Limited's control.

7.2.6 The IDNO network shall be designed and the type and rating or setting of its protection selected so as to discriminate with Electricity North West Limited's protection.

7.2.7 Notwithstanding subsection 7.2.4, where Electricity North West Limited and the IDNO agree that the most appropriate option is for the IDNO LV cabinet to be installed within the Electricity North West Limited substation compound and connected to the Electricity North West Limited LV cabinet in the same substation, the ownership and operational boundary (Point of Supply) shall be at the gland/entry of the Electricity North West Limited LV cable into the IDNO LV cabinet. Electricity North West Limited and the IDNO will need to agree the external design and security of the IDNO LV cabinet and the arrangements for inspection and maintenance of the cabinet, recognising the fact that Electricity North West Limited will carry overall ESQCR responsibility for the substation site.

7.2.8 Electricity North West Limited and the IDNO shall each install its own system of earthing. The layout of earthing electrodes shall be agreed between the parties and shall be in accordance with EPD333 - Supply System Earthing.

7.2.9 Electricity North West Limited will determine the name of the substation and will provide appropriate signs and notices complying with ESQC Regulation 11 (c).

7.2.10 Details of the demarcation of ownership and responsibility shall be set out in a Site Responsibility Schedule, agreed between Electricity North West Limited and the IDNO.

7.2.11 In appropriate circumstances, more than one Point of Supply may be provided to connect an IDNO network within one site, in which an IDNO operates. Where any such Point of Supply takes a LV connection from an Electricity North West Limited substation, it shall be designed to operate independently of any other Point of Supply and no permanent or temporary means of interconnection with any other Point of Supply shall be installed. Such a Point of Supply shall preferably be designed to connect a distinct and physically separate part of the site.

8 High Voltage Connections

8.1 Connections of up to 1.5MVA Capacity at 11kV or 1MVA at 6.6kV

These arrangements are suitable for a connection of up to 1.5MVA capacity at 11kV or 1MVA at 6.6kV, depending on the voltage of the Electricity North West Limited HV Network local to the IDNO network.

Connection arrangements shall be generally in accordance with ES215 - Design Specification for New Connections of up to 1 500kVA Capacity.

The preferred arrangement is an IDNO owned substation site containing a close-coupled substation (Unit substation) where Electricity North West Limited owns the HV switchgear and the IDNO owns the HV/LV transformer and the LV cabinet. The substation shall be generally in accordance with ES352 - Design of Distribution Substations and Transforming Points.

The IDNO shall secure legal tenure of the substation site. The IDNO shall grant to Electricity North West Limited rights of access and for the installation and maintenance of equipment, in accordance with the BCA.

The ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be the bolted connections on the HV side of the IDNO's HV/LV transformer.

HV isolation for the IDNO's equipment shall be by means of Electricity North West Limited's HV circuit breaker or switch-fuse, which shall be under Electricity North West Limited's control.

Because of the need for security against third-party interference, Electricity North West Limited's HV switchgear in this arrangement will be kept locked. It is generally accepted that it is impractical to provide the IDNO with means of making its transformer dead.

The IDNO LV network shall be designed, and the type and rating or setting of its protection selected, so as to discriminate with Electricity North West Limited's circuit breaker or switch-fuse.

Electricity North West Limited and the IDNO shall each install its own system of earthing. The layout of earthing electrodes shall be agreed between the parties and shall be in accordance with EPD333 - Supply System Earthing.

If a low voltage supply is required for remote control of HV switchgear, this may be derived, unmetered, from the IDNO's LV cabinet.

Electricity North West Limited and the IDNO shall both use the same name for the substation, which shall be agreed between the parties. The IDNO shall provide the notice of ownership, with emergency telephone number(s), to be affixed externally. Electricity North West Limited will provide a nameplate, in its standard format, including the substation name and CHIME number, to be affixed to the outside of the substation. Electricity North West Limited's ownership and emergency contact details shall not be included. An Electricity North West Limited substation nameplate shall also be affixed inside the substation. The exact wording and provision of signs and notices to comply with ESQC Regulation 11 (c) and in accordance with CP606, Procedure G23 shall be agreed between the parties.

Electricity North West Limited and the IDNO shall agree the arrangements for Electricity North West Limited to gain access to the substation in order to conduct inspection, operation and maintenance of Electricity North

West' Limited's equipment, recognising that the IDNO will carry overall ESQCR responsibility for the substation site.

Details of the demarcation of ownership, operation and maintenance responsibilities shall be set out in a Site Responsibility Schedule, agreed between Electricity North West Limited and the IDNO. A typical arrangement is shown in Appendix A.

8.2 Connection above 1MVA and up to 4.5MVA Capacity at 6.6kV or 7.5MVA at 11kV

These arrangements are suitable for a connection with a capacity above 1MVA and up to 4.5MVA at 6.6kV or 7.5MVA at 11kV, depending on the voltage of the Electricity North West Limited HV Network local to the IDNO network.

Connection arrangements shall be generally in accordance with ES216 - 11/6.6kV Connections of up to 9MVA (6.6kV) or 15MVA (11kV) Capacity.

- The connection arrangements shall be agreed by Electricity North West Limited and the IDNO on a case by case basis. There are two options dependents on the size of the capacity required by the IDNO, viz:
- Connection from one or two ring-main units (RMU).
- Connection from an extensible switchboard.
- For the RMU connection option, as identified in 8.2.3.1, the following requirements apply:
- The RMU(s) shall be owned by Electricity North West Limited. The substation site may be owned by either the IDNO or Electricity North West Limited.
- The IDNO shall provide Electricity North West Limited with a suitable site to accommodate the substation. Legal tenure of the substation site, either freehold or long-term (minimum 60 years) leasehold, shall be procured for Electricity North West Limited, before the final connection is made. Tenure may be secured either by the IDNO, on behalf of Electricity North West Limited, or by Electricity North West Limited, but in either case, it shall be at no cost to Electricity North West Limited.
- The ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be the IDNO cable connections on the outgoing side of the RMU.
- HV isolation for the IDNO network shall be by means of Electricity North West Limited's RMU circuit breaker(s), which shall be under Electricity North West Limited's control.
- In case of emergency (immediate danger to health or immediate risk of bodily injury or damage to plant or equipment), the IDNO may, where practicable, open Electricity North West Limited's circuit breaker and immediately report the operation to Electricity North West Limited's Control Engineer. Hence, there is no requirement for separate emergency tripping facilities.
- The IDNO HV network shall be designed, and the type and rating or setting of its protection selected, so as to discriminate with Electricity North West Limited's RMU circuit breaker(s). Any fault on the HV cable connecting a RMU circuit breaker and the IDNO network will cause the RMU circuit breaker to trip. Therefore, this cable shall, so far as is reasonably practicable, be kept short and protected against third party damage.

- Electricity North West Limited shall install its own system of earthing for the RMU(s). All IDNO HV equipment within the substation site shall be connected to the Electricity North West Limited earthing system.
- Where the IDNO has LV equipment within the substation site, the arrangements shall be as described in 8.1.9 above.
- Where the IDNO has equipment within the site, Electricity North West Limited and the IDNO shall agree the arrangements for substation access in order that the IDNO can conduct inspection, operation and maintenance of the IDNO's equipment, recognising the fact that Electricity North West Limited will carry overall ESQCR responsibility for the substation site.
- For the extensible switchboard option, as identified under 8.2.3.2, the following conditions apply:
- Electricity North West Limited shall own all HV equipment on the Electricity North West Limited side of the Point of Supply.
- The substation site shall be owned by the IDNO.
- The ownership and operational boundary between the Electricity North West Limited Network and the IDNO network shall be the IDNO bus bar connections on the outgoing side of Electricity North West Limited's circuit breaker.
- HV isolation for the IDNO network shall be by means of Electricity North West Limited's circuit breaker, which shall be under Electricity North West Limited's control.
- In case of emergency (immediate danger to health or immediate risk of bodily injury or damage to plant or equipment), the IDNO may, where practicable, open Electricity North West Limited's circuit breaker and immediately report the operation to Electricity North West Limited's Control Engineer. Hence, there is no requirement for separate emergency tripping facilities.
- The IDNO HV network shall be designed, and the type and rating or setting of its protection selected, so as to discriminate with Electricity North West Limited's circuit breaker.
- The IDNO shall install its own system of earthing for the substation. All Electricity North West Limited HV equipment within the substation site shall be connected to the IDNO's earthing system.
- Where the IDNO has LV equipment within the substation site, the arrangements shall be as described in 8.1.9 above.
- Electricity North West Limited and the IDNO shall agree the arrangements for substation access in order that Electricity North West Limited can conduct inspection, operation and maintenance of the Electricity North West Limited's equipment, recognising the fact that the IDNO will carry overall ESQCR responsibility for the substation site.

Electricity North West Limited and the IDNO shall both use the same name for the substation, which shall be agreed between the parties. The wording and provision of signs and notices to comply with ESQC Regulation 11 (c) shall also be agreed between the parties. These shall include a nameplate, in Electricity North West Limited's standard format, including the substation name and MAMS number, to be affixed to the outside of the substation. Ownership and emergency contact details for the one appropriate party shall also be displayed. An Electricity North West Limited substation nameplate shall also be affixed inside the substation.

In appropriate circumstances, more than one Point of Supply at HV may be provided to connect an IDNO network within one site, in which an IDNO operates. Where suitable arrangements are made, temporary or permanent parallel operation of such Points of Supply might be acceptable. Such arrangements shall be detailed in the Site Responsibility Schedule.

Details of the demarcation of ownership, operation and maintenance responsibilities shall be set out in a Site Responsibility Schedule, agreed between Electricity North West Limited and the IDNO.

Typical arrangements are shown in Appendix B.

8.3 33kV Connection from Bulk Supply Point, 33kV Ring or Overhead System, HV Connection from Primary Switchboard

This subsection applies to connections to IDNO networks from the Electricity North West Limited Network at HV, 33kV or 132kV.

The ownership of HV, 33kV and 132kV infrastructure will always be decided on its merits, given the need to balance the requirements of the IDNO with the ongoing development of the Electricity North West Limited Network in the area. Electricity North West Limited will generally adopt off-site assets constructed by the IDNO. Adoption will be preferred in the interests of efficient design where Electricity North West Limited can use the assets directly for connecting other Electricity North West Limited customers, or where Electricity North West Limited expects to take in turn connections from the IDNO network (i.e. nested connections) to connect other Electricity North West Limited customers.

Electricity North West Limited will not expect to adopt assets where there are not, nor expected to be, any Electricity North West customers fed from any IDNO constructed assets and where:

- at any voltage where a single fault anywhere on the adopted assets will result in interruptions to customers and where it is unlikely that restoration will be achievable in 18 hours; or
- at any voltage where a common mode failure will result in interruptions to customers that are unlikely to be restored in under 18 hours. (e.g. multiple circuits over a cable bridge or through a tunnel where loss of the bridge, tunnel, or damage from fire would be catastrophic) and where there is no alternative for network supplies to be afforded within this 18-hour time; or
- at all voltages above LV where the cost of any single fault repair could, because of special engineering difficulty as to the location of the fault cost more than 5 times the cost of a repair to that asset in normal situations.

Unless the IDNO is the majority asset owner of a new BSP or Primary Substation, the substation and all assets within it shall be owned, designed, installed, commissioned, maintained and replaced by Electricity North West, save for the items described below:

- The design, functional specification and settings of the protection on the feeders connecting the IDNO shall be agreed between IDNO and Electricity North West Limited.
- The ownership of the 33kV cable feeding the IDNO network shall be agreed between Electricity North West Limited and the IDNO and the decision will need to balance the requirements of the IDNO with the ongoing development of the Electricity North West Limited Network in the area.

- When the ownership boundary is located at the BSP or Primary Substation it shall typically be at the gland of the cable box.
- SCADA will normally be provided by Electricity North West Limited, following a request from the IDNO. Remote switching will normally be carried out by the Distribution System Management Centre, operated by Electricity North West Limited, at the request of the IDNO, unless otherwise agreed.

Electricity North West Limited will hold the site duties under the Electricity Safety Quality and Continuity Regulations 2002 as amended (ESQCR).

Electricity North West Limited works within the BSP or Primary Substation are non-contestable. However, the IDNO may provide and install its 33kV cables up to the circuit breaker cable box, subject to agreement with Electricity North West Limited over access and working arrangements.

Where ownership of the 33kV cables feeding from the BSP or Primary Substation to the IDNO network is to be held by Electricity North West Limited, the cables may, subject to meeting the requirements and procedures under ER G81, be provided and installed under Competition in Connections by the IDNO for adoption by Electricity North West Limited.

Where the ownership boundary is located at the end of an Electricity North West Limited cable connection, it shall normally be positioned at the gland of the incoming cable box(es) if the metering is incorporated in the IDNO equipment. If Electricity North West Limited equipment is installed with metering facilities, the ownership boundary shall be located on the downstream connections of this equipment.

Where the IDNO is the majority asset owner of a new site, the reciprocal to the above shall apply.

The installation of metering for Electricity North West Limited's purposes shall be in accordance with subsection 6.2. Any necessary commercial arrangements for the provision and maintenance of metering equipment for Electricity North West Limited's purposes will be included in the BCA.

Connections from 33kV rings or overhead systems shall be subject to individual agreement within the general principles of this document.

IDNO owned cables shall not be banked with Electricity North West owned cables on the same circuit breaker. Such arrangements introduce unacceptable operational complexity. Cables may be banked on the same circuit breaker in situations where both cables are owned wholly by the same IDNO, subject to current measurement facilities in each cable as required by CP279 4.22. May 24

Details of the demarcation of ownership, operation and maintenance responsibilities shall be set out in a Site Responsibility Schedule, agreed between Electricity North West Limited and the IDNO.

Typical layout arrangements are shown in Appendix C.

9 Connection Agreements

Every IDNO network connection shall be subject to a Bilateral Connection Agreement between Electricity North West Limited and the IDNO. Such an agreement is entered into pursuant to Clause 38.1 of DCUSA, which, unless agreed otherwise by the Company and the User, is substantially in the form set out in Schedule 13 (of DCUSA), and which together with DCUSA shall:

(a) govern the terms under which an IDNO network shall be entitled to be connected and remain connected to the Electricity North West Limited Network at each relevant Point of Supply; and

(b) detail the ownership, operational and maintenance responsibilities and procedures in respect of the connection equipment at each relevant Point of Supply.

10 Documents Referenced

DOCUMENTS REFERENCED	
The Electricity Safety, Quality and Continuity Regulations 2002	
The Balancing and Settlement Code	
The Meter Operator Code of Practice Agreement	
The Distribution Code	
Electricity North West's Distribution Licence	
BS EN ISO 9000	Quality Management Systems
BS 7671:2008	Requirements for Electrical Installations (IEE Wiring Regulations)
EPD279	Distribution System Design - General Requirements
EPD333	Supply System Earthing
CP606	Operations Manual, Procedure G23 - IDNOs.
ES214	New LV Connections of up to 300kVA Capacity.
ES215	New Connections of up to 1500kVA Capacity.

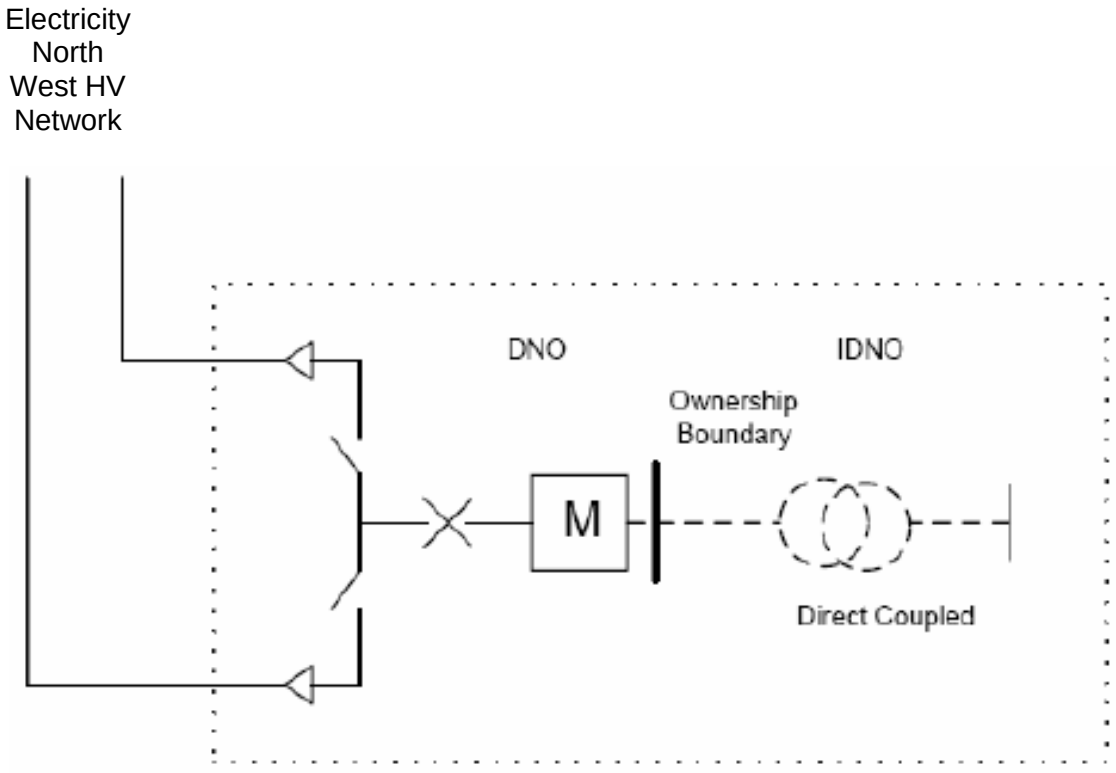
ES216	11/6.6kV Connections of up to 9MVA (6.6kV) or 15MVA (11kV) Capacity.
ES259	Generation Connected to the Electricity North West Distribution Network
ES352	Design of Distribution Substations & Transforming Points.
ES825	Commercial Arrangements for Embedded Distribution Networks

11 Keywords

Connection; Control; HV; LV; Network; Protection; Substation.

Appendix A – Typical LV Connection via Close-Coupled Transformer

Figure A1 – Close-coupled IDNO Transformer (Subsection 8.1)



Appendix B – Typical HV Connection Arrangements

Figure B1 – Connection via one or two Ring-Main Units (Subsection 8.2.4)

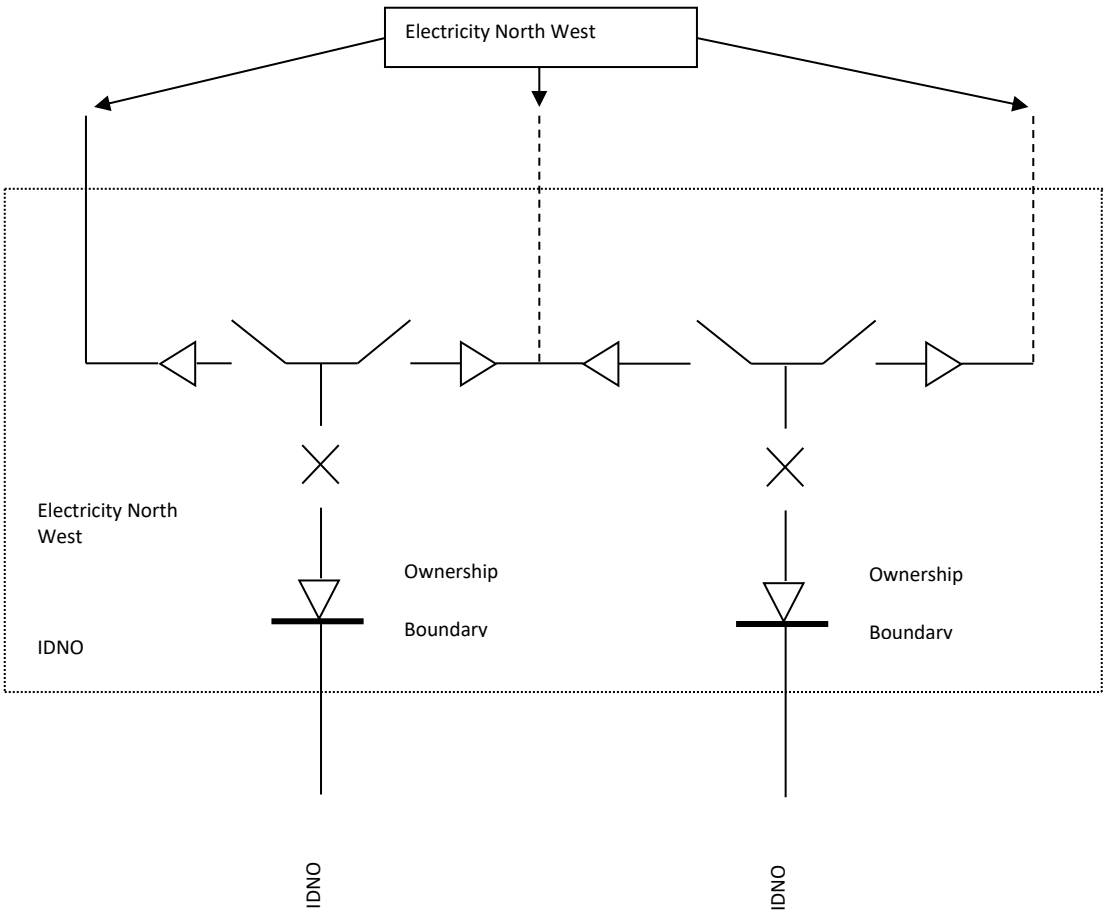


Figure B2 – Extensible Switchboard (Electricity North West Busbars) (Subsection 8.2.5)

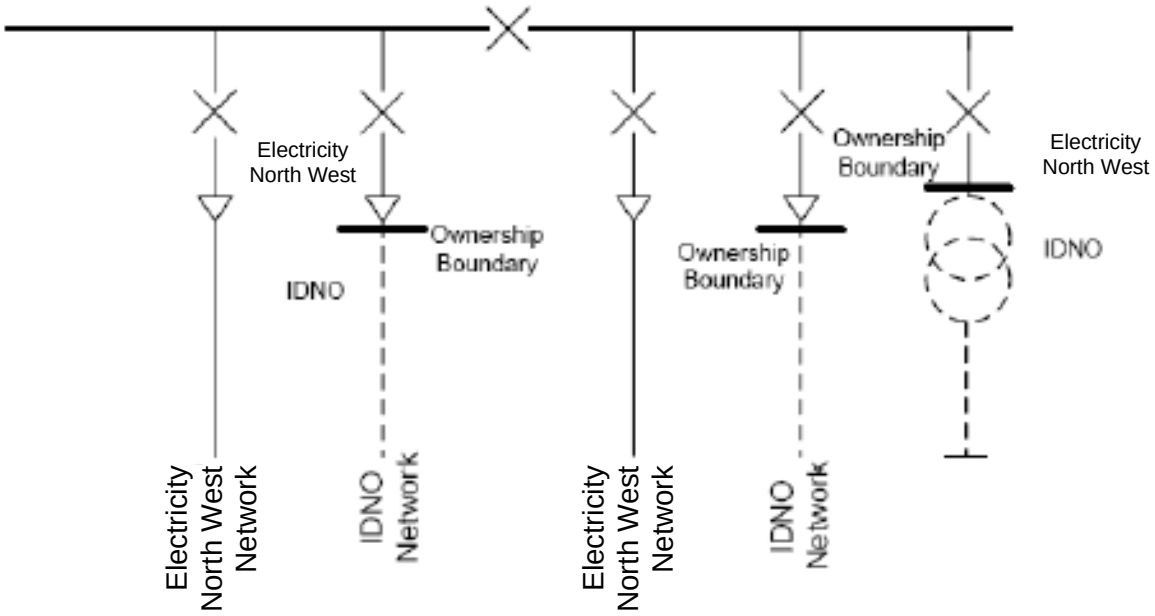
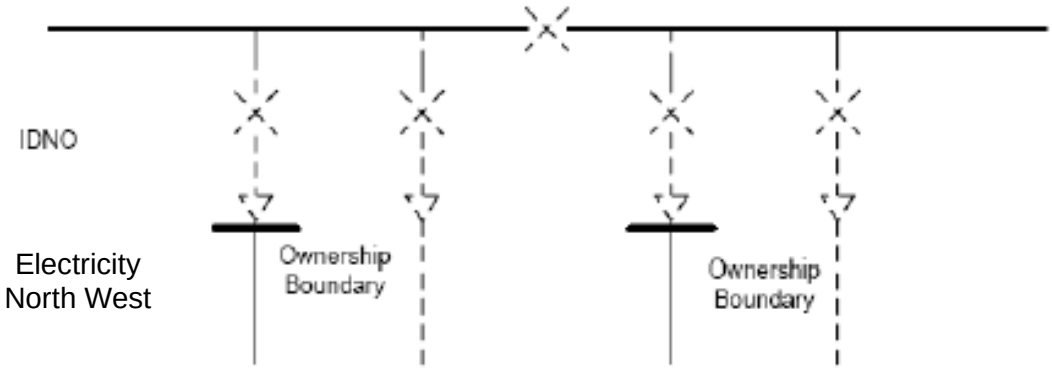


Figure B3 – Extensible Switchboard (IDNO Busbars) (Subsection 8.2.5)



Appendix C – Typical 33kV Connection Arrangements

Figure C1 – Cable Connection at BSP or Primary Substation (Subsection 8.3)

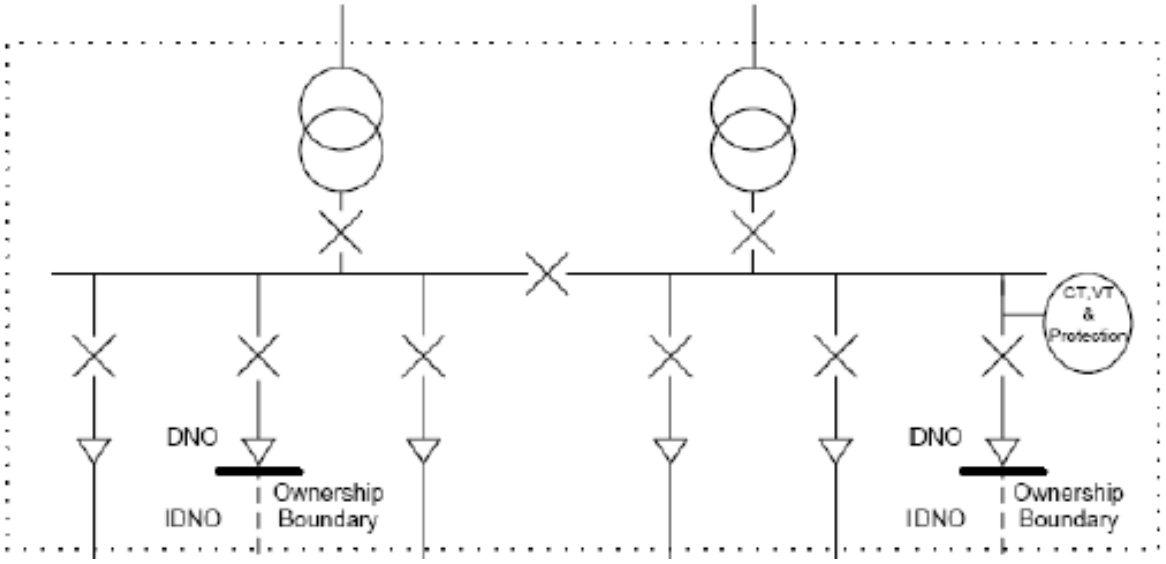


Figure C2 – Overhead/open Terminal Connection at BSP or Primary Substation (Subsection 8.3)