Communications Standards for Electronic Data Communication Facilities and Automatic Logging Devices

Contents

1. References

1. EDL Message Interface Specification [https://www.nationalgrid.com/uk/electricity/codes/grid-code/electrical-standards-documents-including-specifications-electronic~~http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Electrical-Standards-Documents/~~]

2. EDT Interface Specification [https://www.nationalgrid.com/uk/electricity/codes/grid-code/electrical-standards-documents-including-specifications-electronic~~http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Electrical-Standards-Documents/~~]

2. Definitions

The following working definitions are used for the purposes of this document.

Term	Definition
Authorised Party	The person or persons nominated by a market participant, and agreed by National Grid, for the purpose of operating and maintaining communication circuits between the participant's premises and National Grid's premises. This includes persons authorised to receive details of security arrangements relating to such circuits, and to request changes to participant account passwords.
Automatic Logging Device	The computer facility at a Control Point capable of receiving Bid-Offer Acceptances and certain other instructions issued by NGET in accordance with Grid Code BC2. This may be, subject to the time-limits to be specified in the Grid Code, an Automatic Logging Device (EDL) or an Automatic Logging Device (EDL*).
BM Participant	Has the meaning defined in the Grid Code
Control Point	The point at which a market participant receives Bid Offer Acceptances and Ancillary Service instructions from National Grid and submits Export & Import Limits and Dynamic Parameters to National Grid. This would normally be a site from which the participant exercises real-time control of demand, or in the case of a power station, the point where this is physically controlled by the BM Participant.
EDL - Electronic Despatch & Logging	A term used to describe the National Grid application level protocol used on communication links to Control Points. This is also used in a more general sense to refer to the communication circuits between National Grid and Control Points.
EDL Managed Service Provider	A company that provides EDL services including provision of EDL communication circuits or links
EDT - Electronic Data Transfer	A term used to describe the transfer of submission files between Trading Points and National Grid. This is also used in a general sense to refer to the communication links between Trading Points and National Grid.
Electronic Data Communication Facilities	The computer facilities that allow a Trading Point or Control Point to submit specified BM Unit Data and Ancillary Services data to NGET in accordance with Grid Code BC1 and BC2. These may be, subject to the time-limits to be specified in the Grid Code, Electronic Data Communication Facilities (EDL & EDT) or Electronic Data Communication Facilities (EDT*).
Trading Party	The owners and/or operators of a Trading Point.

Trading Point	The point, designated by a market participant, from where Physical Notifications, Export & Import Limits and Bid Offer Data prices are submitted to National Grid.

3. Introduction and Overview of Responsibilities

This document defines the National Grid standard for connection of communication links from Trading Points and Control Points to the National Grid Operational Wide Area Network (WAN). The standards cover the physical means of implementing communication circuits and associated routing, protocol and security arrangements.

Compliance with these communication standards is a condition of approval of requests for connections into the National Grid Operational WAN. This includes EDL and EDT circuits to participant main sites and participant DR sites.

The scope of this document does not include the server platforms, software applications or workstations which utilise the communication links, although some details of application protocols are included for completeness.

The submission of Bid Offer Acceptances to Control Points is a National Grid activity, and National Grid therefore normally elect to provide and own EDL communication circuits to Control Points. The requirement for Automatic Logging Devices to be installed at Control Points, and therefore EDL communication circuits, is specified in Grid Code CC.6.5.8. Where requested by market participants, National Grid shall use its discretion to decide whether to provide EDL link(s) to:

- A ~~-~~Control Point not covered by the provisions of CC.6.5.8
- A point other than the Control Point

~~.~~ The number of EDL links provided to a Control Point is at the discretion of National Grid, being dependent upon the operational need for this facility at the sites in question.

It is a Trading Party responsibility to submit Physical Notifications, Export & Import Limits and Bid Offer Data prices to National Grid, and therefore provide and own the circuits from Trading Points to National Grid.

It should be noted that submissions of Dynamic Parameters and short term Export & Import Limits (i.e.: up to 4 hours ahead of real time) are made from Control Points, and such submissions will therefore take place over the EDL circuits which are also u~~til~~sed by National Grid for Bid Offer Acceptances and other instructions. Longer term submissions of Export and Import Limits must be made via EDT links.

In those cases where National Grid provide and own communication links to a Control Point which is also designated as a Trading Point, the standard arrangement is to have separate circuits for EDL purposes and EDT purposes; i.e. these services do not share common communication links.

4. Registering for Services

Companies wishing to register for new EDL and EDT services, or wishing to undertake modifications to existing services, should send an e-mail précis of their requirements to National Grid at bmu.registration@nationalgrid.com.

If the query concerns the registration of new Balancing Mechanism Units (BMUs), details of the procedures involved will be provided via return e-mail.

In the case of requests for new or modified communication links for EDL or EDT purposes, a questionnaire will be sent out in response to e-mail enquiries.

Completing and returning this questionnaire is the first step in the approval process for communication links into the National Grid Operational WAN. Following receipt of the

completed questionnaire, applicants will receive a follow-up telephone call from National Grid to discuss their requirements.

5. Support Arrangements

Although each of the communication circuits has a designated formal owner, as defined in section 3.0 above, the practical maintenance and operation of these circuits requires the active cooperation of parties at both ends of the circuit and the Multi-Protocol Label Switching (MPLS) provider.

It is the formal responsibility of each Trading Party to diagnose and resolve faults and problems on the EDT communication services to their Trading Point. This excludes responsibility for the core communication infrastructure located ~~at~~ within~~the~~ National Grid's communications provider's MPLS network~~end of the links~~, but includes responsibility for the communication circuits between the Trading Party and the MPLS network ~~National Grid~~ and the EDT routers which terminate these services on the Trading Party premises.

National Grid will, however, provide Trading Parties with reasonable assistance in diagnosing and correcting problems on their EDT communication services.

The maintenance of EDL links ~~to Control Points~~ is the formal responsibility of National Grid; ~~.~~ ~~T~~ this includes the communication circuits ~~to Control Points,~~ and also the EDL communication router~~s~~ which is usually located at each Control Point. The boundary of responsibility ~~in this respect~~ is the Local Area Network (LAN) port on the ~~Control Point~~EDL router~~s~~; i.e. National Grid responsibility does not extend to any networks or network devices which may be connected to the EDL router. ~~at the~~ Beyond this boundary point maintenance and support is the responsibility of the BM Participant~~Control Point.~~

BM Participants and their agents~~Control Point operators~~ are expected to provide National Grid with reasonable assistance to resolve faults and problems on EDL communication services.

Faults should be reported to the National Grid Service Desk on 0800 917 7111 or 0800 085 4806 (overseas callers should use +44 870 521 6121) and quote ~~+44 1793 795591 referring to~~ EDL or EDT as appropriate. Th~~e~~i~~s~~e ~~key words~~ will ensure that the Service Desk engage the correct resolver group.

6. Types of Communication Circuit

The types of communication circuit are described in Appendix A.

7. Services to Control Points

National Grid will provide a Main Route to each Control Point, and may also elect to provide an Alternate Route depending upon the extent of demand or generation which is controlled from that point. The standard for these is described in Appendix A.

In circumstances where National Grid and the BM Participant agree to provide communications to a location other than the Control Point, then National Grid will provide communications to this location, and the BM Participant will be responsible for onward communications to the Control Point. ~~-~~All EDL Managed Service Providers must conform to the requirements in this standard. National Grid reserve the right not to provide EDL to this other location until these requirements are met. In these situations, on National Grid's request, system architecture arrangements shall be shared with National Grid.

Main Routes and Alternate Routes will terminate at geographically separate National Grid premises, with onward linking via the National Grid Operational WAN.

National Grid will provide, install and configure a router to terminate ~~these~~ EDL services at each Control Point, hosting site or alternative location agreed with the BM Participant. Maintenance and operation of the routers is a National Grid responsibility.

The network protocol used over these links is restricted to IPv4, with Border Gateway Protocol (BGP or eBGP) for the exchange of routing information. The use of other routing protocols or static routes is not permitted for this purpose.

The application level protocol is as referenced in the Electrical Standards annex to the Grid Code General Conditions. Further details of the EDL application protocol are given in Reference 1.

Where control telephony is provided to Control Points, this may be delivered via separate communication circuits to the services used for EDL, however National Grid may elect to share communications circuits for both EDL and Control Telephony.

National Grid will act as custodian of all network addresses which communicate with the National Grid Operational WAN, and will allocate Registered Private IP Addresses for EDL at Control Points in accordance with the National Grid standard addressing scheme. These are the only addresses which may be used by Automatic Logging Devices for communication with National Grid.

Alternative EDL Arrangements

Where National Grid and the BM Participant agree that National Grid will provide communications to a point other than the Control Point, then the resilience, support and redundancy requirements for the onward communication system to the Control Point is the responsibility of the BM Participant and must comply with the following requirements to ensure that systemic risks are mitigated:

1. Protect data in transit using a product or service certified under the UK's National Cyber Security Centre (NCSC), 'Foundation Grade' assurance scheme.
2. The means of communication should be either of the following:
    a. Use a dedicated circuit replicating the current EDL leased line;
    b. If using an internet based connection:
        i. IpSec VPN to
        ii. Minimum of, cryptographic algorithm based on:
            1. Key length 128 bit;
            2. Symmetric key algorithm: CAST AES-128;
            3. Hashing algorithm SHA-256
        iii. Security event and alarm monitoring, making National Grid aware of significant breaches;

~~1.~~ The Provider shall ensure that penetration tests and vulnerability assessments are carried out on the hosted environment at least annually, based upon HMG National Cyber Security Centre Cyber Essentials (https://www.cyberessentials.ncsc.gov.uk/)

3.

4. The following table shows the fix times, availability and redundancy requirements for the EDL communication system

MW thresholds	No. of BM Units[1]	Fix Time within	Availability	Redundancy	Mains Independence[2] [3]
0 – 100MW	n/a	12 hrs business days only	< 12 hrs downtime pa	Not specified	Not specified
100MW – 3 GW	1 - 20	12 hrs 24/7	< 4 hrs downtime pa	Dual redundancy on communication links	24 hrs
> 3 GW	>20	12 hrs 24/7	< 1 hr downtime pa	Dual Redundancy throughout system (no single fault will remove service)	48 hrs

a. National Grid may review the individual arrangements on a case by case basis to ensure that this standard is met and that the risks have been mitigated sufficiently, and if necessary, may revert to standard EDL arrangements to the Control Point

b. Where National Grid has a communication link to the Control Point and to the EDL Managed Service Provider, then National Grid may use this to provide additional redundancy

The health of the communications route through to the Control Point must be indicated back to National Grid to ensure National Grid's Control Room knows whether electronic instructions will get to the Control Point in question

~~2.~~5.

8. Services from Trading Points

National Grid will expect the Trading Party to implement communication links for EDT using one or more of the circuit types described in Appendix A.

Where a Trading Party provides an Alternate Route, it is recommended that this terminates on geographically separate National Grid premises to the Main Route, with onward linking via the National Grid Operational WAN.

Participants who do not wish to provide an Alternate Route may wish to utilise an ISDN service as their Main Route, rather than an ~~Dedicated~~ MPLS Circuit. This is because an ISDN service, which operates as a dial-up link, may be rapidly reconfigured to communicate with alternative National Grid sites, such as the National Grid DR site. In contrast to this, it would take a period of weeks to establish a new Dedicated Circuit to the National Grid DR site.

[1] The number of BM Units column only applies if more than 1 GW of generation is affected

[2] Subject to the Emergency Restoration Code which, if applicable, takes precedence over these requirements

[3] If the Control Point includes generators that have black start contracts with National Grid, then the ~~onward~~entire communication system must have mains independence for a minimum of 48 hours~~s~~

Participants who opt for a single communications route are also advised that they will lose the ability to submit data to National Grid if their sole Main Route fails, until such time as the route is returned to service.

The National Grid recommended standard for termination of all routes at the Trading Point premises is a Cisco router or compatible alternative.

The Trading Party must agree their selected options with National Grid in advance of placing any orders for communication circuits.

The network protocol used over the links will be IPv4, with Border Gateway Protocol (BGP or eBGP) for exchange of routing information. The use of other routing protocols or static routes is not permitted for this purpose.

Exchange of data is as referenced in the Electrical Standards annex to the Grid Code General Conditions. Further details of the EDT FTP file formats are given in Reference 2.

National Grid will act as custodian of all network addresses which communicate with the National Grid Operational WAN, and will allocate Registered Private IP Addresses for EDT to Trading Parties in accordance with the National Grid standard addressing scheme. These are the only addresses which may be used by Electronic Data Communication Facilities for communication with National Grid.

9. Data Transmission Security

9.1 Application Level Security

9.1.1 Links to Trading Points

Each link from a Trading Point will have an EDT account on National Grid servers which is dedicated for use by that Trading Party only. The accounts will have the minimum access rights which are necessary for data transfer. Submission accounts will have write-only access to a single directory, and notification accounts will have read-only access to a single directory.

The changing of EDT account passwords is carried out at the discretion of participants, and it is recommended that this be done at minimum intervals of 90 days. Participants wishing to change their passwords should submit an e-mail notification to National Grid at bmu.registration@nationalgrid.com.

National Grid will respond to these requests by contacting one of the Authorised Parties previously nominated by the Participant, and agreeing details and timing of the required change.

9.1.2 Links to Control Points

EDL links to Control Points will use direct application-to-application data transfer using the National Grid-specific Master Message Server and Client Message Server protocol. This protocol has built in security mechanisms, under which client connections are automatically established by National Grid's Master Message Server to the remote EDL Client Server. There are no manual password changes associated with these protocols.

9.2 Router Level Security

9.2.1 IP Addressing

All routed connections will be firewalled at the National Grid end of the circuit, to restrict access rights to designated source and origin IP addresses only, via designated network IP addresses.

ISDN routes will have the additional protection of Point-to-Point Protocol (PPP). Under this protocol the routers at both ends of the link are configured with a password, and exchange of passwords is necessary before any data can be passed in either direction.

In order to ensure that participant data can pass through National Grid firewalls participants should only use the Registered IP Address assigned to them by National Grid at the time their communication links are commissioned. A number of options are available to accommodate the Registered IP address within individual participant addressing schemes:-

i. Use the IP address as a native address where this does not conflict with existing participant addressing schemes.

ii. Use dual-homed servers with two Network Interface Cards to co-reside in two different addressing domains.

iii. The BM Participant ~~Implement~~implements Network Address Translation ~~on the termination router which is located on participant premises~~.

Option (iii) is the most commonly implemented configuration on participant EDT services, and is used by National Grid on all EDL services to Control Points. Further advice on this topic can be obtained via e-mail to bmu.registration@nationalgrid.com.

9.3 Security Monitoring

National Grid will carry out routine security monitoring of external communication links to the National Grid Operational WAN. In the event that activity upon any external link presents a threat to network integrity, the links may be blocked, and associated access rights suspended until the situation is resolved. The circumstances in which this action may be taken include the following: -

i. There is reasonable cause to believe that the links are being used for unauthorised purposes, or being accessed by unauthorised parties.

ii. Breaches of agreed security arrangements on client premises jeopardise the peripheral security of the National Grid network.

iii. Excessive levels of data traffic are detected upon the links, which is outside normal operational parameters to the extent that the ability of application servers to process the data is put at risk.

iv. Corrupt or abnormally formatted data is received which presents a risk to application processing.

National Grid will normally make all reasonable efforts to contact the parties concerned before any action is taken to block a communications link. The blocking of links without any warning will only occur in circumstances where there is an immediate and unacceptable risk to National Grid's operational networks and/or systems.

Access to authorised user accounts on National Grid servers will also be monitored for security purposes. Where three successive failed login attempts are made upon such an account, the account will be frozen until the authorised user of the account contacts National Grid support on the telephone number given in section 5.0 and a new password (and if necessary a new user ID) is issued.

10. FTP File Transfers

The standard method used by Trading Parties to transfer EDT submission files to National Grid is via FTP (File Transfer Protocol), with submission files 'pushed' to the submission directories and corresponding notification files 'pulled' from notification directories. The following guidelines should be followed in relation to this: -

i. Participants should only establish FTP connections to National Grid servers when they have data to submit, or notifications to retrieve. FTP connections should not be left 'permanently' open.

ii. FTP connections should be terminated when submission of data is complete and notification of this has been received. Participants should not rely upon National Grid's inactivity timeout for this purpose.

iii. National Grid currently supports a maximum of 3 concurrent FTP sessions from any single participant.

iv. Participants should not send rapid sequences of FTP connection requests at short intervals to National Grid. This may be construed as abnormal traffic and could result in the disconnection of the participant's link.

v. It is, however, permissible to poll National Grid servers with FTP connection requests at intervals when submissions are due to be sent, or notifications are awaited. The interval between successive connection requests should be no less than 20 seconds.

vi. Once established, a single FTP connection can be used to alternately push submission files and pull notification files.

11. Disaster Recovery Sites

11.1 Control Points

National Grid will not normally provide Disaster Recovery communication circuits relating to the loss of Control Points. The loss of a site on which a Control Point is situated would normally imply that the physical plant controlled from there is no longer available to accept instructions.

Exceptions to this may be made from time to time at the discretion of National Grid in cases where a Control Point is acting as a Control Agent for a number of geographically dispersed supply or demand blocks. When making such decisions, National Grid will take into account the total amount of supply or demand which is under control, and the operational need to re-establish electronic despatch if the Control Agent site is lost.

11.2 Trading Points

Requests for communication circuits to Trading Party DR sites should be submitted for approval in exactly the same way as requests for connections to Trading Party main sites. If approved, then National Grid will assign a specific IP address for use by the Trading Party for their DR servers. This will be a different IP address to that assigned for the main site servers.

In the event that participants lose facilities at their main site and need to invoke DR facilities, then the National Grid Operational WAN should already be configured to allow access from the IP address assigned for DR use. It may, however, be necessary to contact National Grid support (on the telephone number given in section 5.0) for other reasons, for example to align EDT sequence numbers.

12. Network Access Tests

All new communication circuits to the National Grid Operational WAN must undergo Network Access Tests (NATs) before they can be approved for the transfer of live operational data. These tests are normally conducted using offline servers within National Grid.

If participants are commissioning new EDL or EDT servers, additional tests to confirm the functionality of the application software running upon the servers are also needed. This may also apply when participants make software modifications to their existing servers. Participants should contact National Grid on bmu.registration@nationalgrid.com at an early stage in drawing up their programme of work in order to determine the extent of testing required, and to agree any test dates.

All tests, whether involving network access or application software, shall be agreed in advance with National Grid.

Where participants are undertaking development work at the same time as they are running existing production systems, National Grid may assign an additional IP address to the participant to use for development system testing.

Appendix A: Types of Communication Circuit

~~**Private Circuit**~~

~~The standard for these is a 64 kbit/s synchronous point-to-point private service, with individual X21 presentation at the Trading Point or Control Point premises.~~

~~In the case of EDT circuits which are provided and owned by Trading Parties, the form of presentation at the National Grid end of the circuit must be approved in advance by National Grid before any orders are placed for communication circuits.~~

~~National Grid use a variety of means of aggregating individual circuits, and details of the agreed form of presentation are necessary in order for Trading Parties to give correct instructions to their chosen Service Provider. Orders placed without advance approval may require subsequent modification, and this may result in Service Providers rescheduling the circuit installation.~~

~~**BT 21CN Programme – withdrawal of legacy communications circuits:**~~

~~BT has given notice that it will cease to supply KiloStream Private Circuits from March 2016, and will be withdrawn from service in March 2018. National Grid are no longer using BT KiloStream for new EDL orders and have initiated a programme to replace existing KiloStream circuits used for EDL with MPLS circuits.~~

~~Trading Parties using BT KiloStream circuits for EDT purposes should make arrangements for their replacement, contacting National Grid before any orders are placed so that the form of presentation can be agreed.~~

MPLS (Multi-Protocol Label Switching) Circuit

MPLS circuits are now used for EDL connections because legacy KiloStream private circuits are no longer available. MPLS networks assign labels to customer's data which allows routing decisions to be made by the network infrastructure. MPLS also allows data streams to be segregated enabling separate virtual private circuits to be delivered via the Service Provider's network.

Trading Parties wishing to order MPLS circuits for EDT should contact National Grid to discuss their requirements before placing orders. Orders should be placed with the same MPLS provider that National Grid use. This ensures connection to the correct virtual private network in order to access National Grid services. Primary and Secondary (backup) connections can be made using this service.

ISDN Dial-up Circuit

The standard for these is a 64 kbit/s ISDN service, with Primary Rate ISDN presentation on National Grid premises and Basic Rate ISDN presentation to the Trading Party or Control Point.

As this is a dial-up service, Trading Parties ordering ISDN links for EDT purposes do not have to specify presentation details for the National Grid end of the service. Trading Parties should still notify National Grid in advance of placing orders for ISDN services, however, in order to ensure that capacity is reserved for them on the National Grid primary channels.

ISDN services provided by National Grid for EDL at Control Points are reserved exclusively as Alternate EDL routes. These ISDN services must not be used for any other purpose.

~~**MPLS (Multi-Protocol Label Switching) Circuit**~~

~~MPLS circuits are now widely available as an alternative to private circuits. MPLS networks assign labels to customer's data which allows routing decisions to be made by the network infrastructure. MPLS also allows data streams to be segregated enabling separate virtual private circuits to be delivered via the Service Provider's network.~~

~~Trading Parties wishing to order MPLS circuits for EDT should contact National Grid to discuss their requirements before placing orders.~~

Private Circuit (legacy – no longer available)

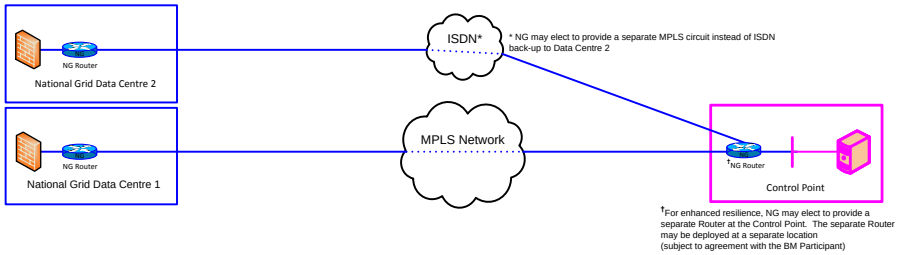
The legacy connection method for EDL and EDT was KiloStream Private Circuits which were 64 kbit/s synchronous point circuits with X21 presentation.

However, BT has ceased to supply KiloStream Private Circuits from March 2016, and will withdraw support for existing circuits by <<TBD>>. Consequently, National Grid are no longer using BT KiloStream for new EDL orders and have initiated a programme to replace existing KiloStream circuits used for EDL with MPLS circuits.

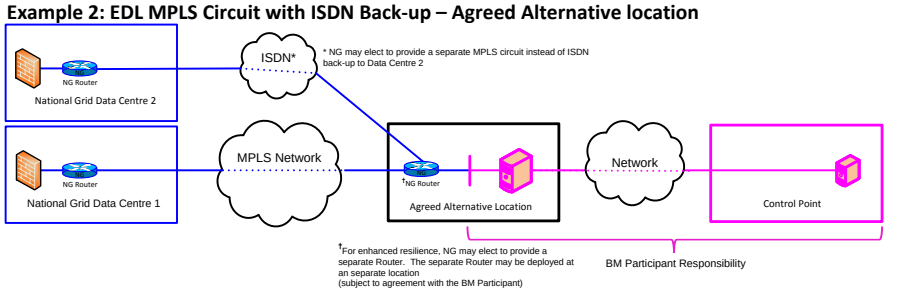
Trading Parties using BT KiloStream circuits for EDT purposes should make arrangements for their replacement, contacting National Grid before any orders are placed so that the form of presentation can be agreed.

Schematic Diagrams: The diagrams below show the various circuit types

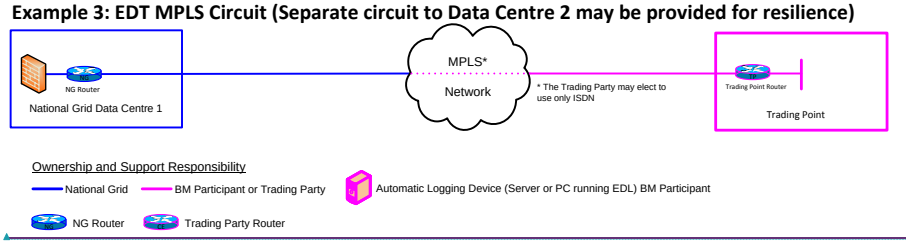
Example 1: EDL MPLS Circuit with ISDN Back-up – Control Point



Example 2: EDL MPLS Circuit with ISDN Back-up – Agreed Alternative location



Example 3: EDT MPLS Circuit (Separate circuit to Data Centre 2 may be provided for resilience)



Field Code Changed

Appendix B: Document Information

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Distribution:

Name	Position	Reason for Distribution
Adrian Davis	Electricity BM Service Support Manager	Approval
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~~Robert Paterson~~Tim Truscott	~~EBS External Requirements Manager~~Control Support and Review	Approval
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~~4.0 Draft 1~~	~~2 Jan 2014~~	~~Mark Bingham~~	~~Draft update for internal review~~
~~4.0 Draft 2~~	~~20 Jan 2014~~	~~Mark Bingham~~	~~Updated with comments from Robert Paterson and Steve Beaumont~~
~~4.0 Draft 3~~	~~14 Feb 2014~~	~~Robert Paterson~~	~~Updated with comments from Adrian Davis prior to circulation to market participants and system suppliers for review~~
4.0	26 Aug 2015	Steve Roberts	~~Approved version issued~~Updated to reflect changes since 2002
5.0	dd mmm 2018	Ivan Kileff	Updated with provisions for Alternative EDL Arrangements and other updates

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