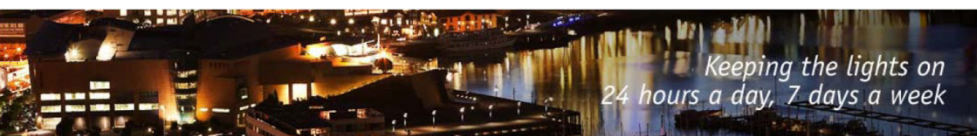


Process for Assessment of Parallel Grid Exit Point Applications

26/10/2010



*Keeping the lights on
24 hours a day, 7 days a week*

SYSTEM OPERATOR

Keeping the energy flowing

TRANSPOWER



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Revision History

| Version | Date | Change |
|---------|----------|---|
| 1 | 12/8/05 | Draft for Consultation |
| 2 | 7/11/05 | Updated with feedback from Distributors |
| 3 | 26/10/10 | Updated for EGR to Code reference changes, no technical changes made to document. |

1 Introduction

Parallel connections of grid exit points are required to enable Distributors and the Grid Owner to carry out daily network operations (eg: maintenance, re-configuration to provide improved network operation, or respond to a fault situation) so that end use customers are not unnecessarily disconnected.

Many hundreds of parallel operations may be required in a year (particularly on large urban networks) and it is not practical for either Transpower or the Distributors to evaluate the implications of these operations in real time.

This document describes a high level process to enable the Distributor, Grid Owner and System Operator to assess and agree to, or decline requests to parallel Grid Exit Points (GXP) in advance of the need to carry out the parallel switching.

The Electricity Industry Participation Code (the 'Code') requires the Distributor to agree with the System Operator, situations where assets can either, temporarily or permanently, become simultaneously connected to the grid at more than one point of connection (Part 8, Schedule 8.3 Technical Code 8 clause 6 of the 'Code').

The parallel connection of GXP's can alter the operating characteristics of the Grid, and can potentially compromise protection operation. If not managed appropriately, these effects can impact on the achievement of the System Operators Principle Performance Objectives (PPO's) and the Grid Owners Asset Owner Performance Objectives (AOPO's).

The Grid Owner and System Operator need to assess the impact of parallel connections to identify any risks that may arise, and with the Distributor, plan to mitigate these where necessary. Paralleling of Grid Exit Points should only be carried out where it can be done safely. The Distributors and the Grid Owner are responsible for ensuring the safe operation of their respective assets. The technical document 'Guidelines for Parallel Grid Exit Point Connection' is a high level document that describes some of the technical issues surrounding paralleling Grid Exit Points. While this document it is not to be considered as expert technical advice, it does highlight the key issues that need to be considered at a technical level before a parallel connection is made

2 Assessment Process

The System Operator will only require applications for paralleling of GXP's, where paralleling occurs directly at either the supply bus or feeder voltage level. This also applies where the paralleling occurs between Transpower supply buses or Transpower feeder voltages of different voltage levels.

If the Distributor is unsure of the impact tying GXP's at lower voltages may have, the Distributor should firstly consult with the Grid Owner to assess any asset related issues.

As the assessment process will require technical analysis, the Distributor and Grid Owner will assess these parallel situations well in advance of when they are required.

Having done the assessment and agreed to the situation or conditions under which the GXP's can be paralleled, the agreement is then entered into a register as an approval which allows the paralleling to occur at any time providing sufficient notice is given.



The System Operator will set up and administer the register of approved applications for paralleling GXP's where the approvals will expire after 2 years. The Distributor is encouraged to reapply for approval to parallel the GXP's before the 2 year expiry occurs. If there have been no regional Grid or Distribution network changes during the two year period it is likely the agreement can be re-approved without the need for technical re-assessment.

If within the 2 year period, there is a change to the Grid or Asset Owners equipment which will impact on the provisions of the parallel GXP agreement, the agreement will need to be re-assessed in preparation for the proposed change.

Where parallel connections are made, operational and asset risks may need to be managed by having appropriate protection systems in place, or mitigating the risk through other arrangements e.g. use of revised protection settings or minimizing switching time.

The application process is:

- The Distributor identifies GXP's where parallels can occur at the supply bus or feeder voltage level, and completes the attached templates with any supporting information.
- The Distributor forwards this information to Transpower via the Transpower Account Executive.
- The Grid Owner assesses application and consults with Distributor as required to ensure their Asset Owner Performance Obligations (AOPO's) can be met.
- The Grid Owner passes agreed application to System Operator.
- The System Operator assesses the application to ensure its PPO's are met.
- The System Operator advises the Distributor and the Grid Owner that the application has been accepted or rejected. If accepted the System Operator updates the GXP paralleling register. If rejected the System Operator advises the Distributor and the Grid Owner of the reasons for declining the application.

The information contained in the agreement will include:

- the GXP's being paralleled
- the switching time
- any special requirements as agreed between the Grid Owner / Distributor (temporary protection changes etc),
- an estimate of how much load will be transferred between the GXP's
- any other identified risks and the mitigation measures.

Figures 1 and 2 outline the process to be followed in getting approval to parallel GXP's.

3 Timetable

Applications to parallel GXP's can be lodged with Transpower at any time in advance of the paralleling being required, but will need to be received at least 8 weeks before the parallel is planned to occur. This allows sufficient time for the Grid Owner and System Operator to assess the application.

Once the application to parallel has been assessed and approved, the details will be entered into a register which will be held by the System Operator to co-ordinate realtime operations.

Approved applications will remain valid for 2 years. Therefore once the application has been approved, the Distributor can parallel those GXP's at any time providing sufficient notice is given to the System Operator.



If within the 2 year period, there is a change to the Grid or Asset Owners equipment that will impact on the System Operators PPO's or the Grid Owners PPO's, during the parallel situation, then the application to parallel the GXP's must be resubmitted for assessment.

In preparing to parallel GXP's, the System Operator needs to be notified the day before switching is planned to occur. This allows time for the System Operator to confirm that the parallel connection will not be adversely affected by the expected system conditions ie: planned outages and scheduled generation.

In realtime the Distributor will then co-ordinate the parallel switching through the Regional Operating Centre. (Refer to figure 2 in this document.) Before agreement to proceed is given, the proposed parallel will need to adhere to any conditions given in the Grid Owner/ Distributor agreement as detailed in the register of agreements

In a Distribution network emergency situation where paralleling of GXP's is required, the Distributor may take independent action to parallel the GXP's without reference to the Regional Operating Centre, providing:

- there is an agreement in place between the Grid Owner and the Distributor that those GXP's can be tied, and
- that the agreement has identified there is no need or specific risk mitigation measures to be in place prior to the switching being done ie:use of temporary protection.

The Distributor will then advise the Regional Operator of the action taken as soon as is practicable following the event.

4 Timetable Summary

| Item | Description |
|--|---|
| 2 yearly | Review of approved applications to parallel GXP's. |
| At least 8 weeks before real time operation | Application to parallel GXP is submitted to Transpower for Grid Owner assessment and System Operator approval. |
| 6 weeks before real time operation | Application is either approved or declined. Approved applications are entered into the Parallel GXP's register. These will be reviewed every two years. |
| Before 10:00 on the day before paralleling is to occur | Distributor provides notice of intention to parallel GXP's to the System Operator (Operations Planning) via the Regional Operator. |
| Real time | System Operator (Security Coordinator) provides permission to proceed immediately before GXP's are to be paralleled via the Regional Operator. |

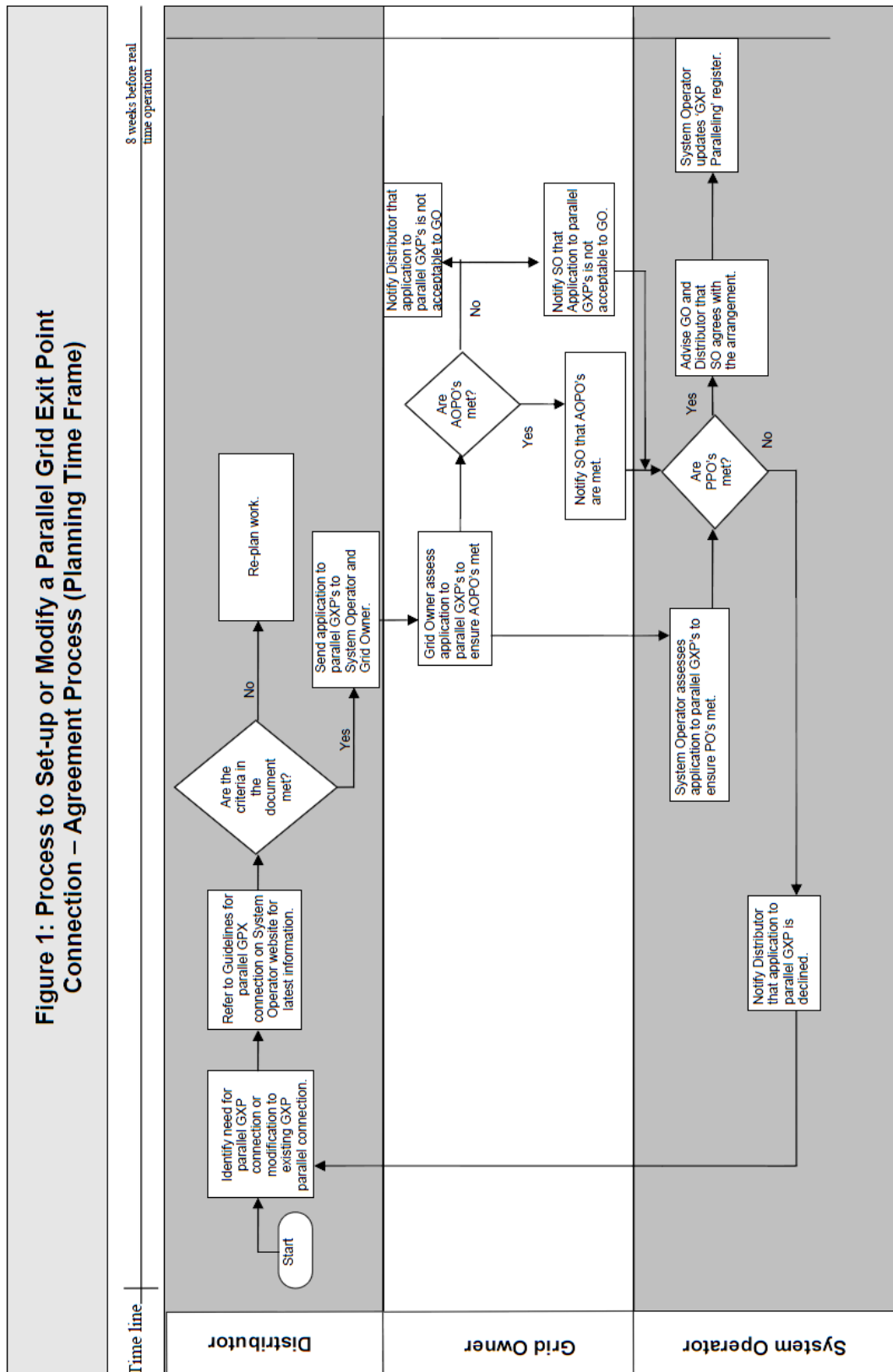
5 Processes

5.1 Set-up or Modify a Grid Exit Point parallel connection - Agreement Process (Planning Time Frame).

5.1.1 High Level Process Steps

| Step | Action |
|------|--|
| 1 | Distributor identifies the need to set-up or modify parallel Grid Exit Point (GXP) connection. Consult document 'Guideline for Parallel Grid Exit Point Connection' on System Operator website. |
| 2 | The Distributor checks that all the criteria are met. |
| 3 | If criteria are met then the Distributor sends an application to parallel the GXP to the Transpower Account Executive for Grid Owner assessment and System Operator agreement. If the criteria are not met then the Distributor will need to re-plan the work. |
| 4 | The Grid Owner and the System Operator receive the application for the Distributor to parallel GXP's and then assesses the application to ensure that the AOPO's and the PPO's are met, respectively. |
| 5 | If the Grid Owner assessment shows that the AOPO's are met then the System Operator is advised. If the AOPO's are not met then the Distributor is advised and may resubmit based on advice given. The System Operator will also be advised. The Grid Owner and the Distributor must provide signed compliance that they have taken appropriate measures to mitigate any operational or asset risks associated with the proposed parallel situation (on the attached template). |
| 6 | If the System Operator assessment shows that system security and the PPO's are met, and the Grid Owner advises that the AOPO's are met, then the System Operator agrees the arrangement. The System Operator then advises the Grid Owner and Distributor, and registers the agreement in the GXP's Paralleling Register. The register will hold all the information provided on the attached agreement sheet. |

5.1.2 Flowchart

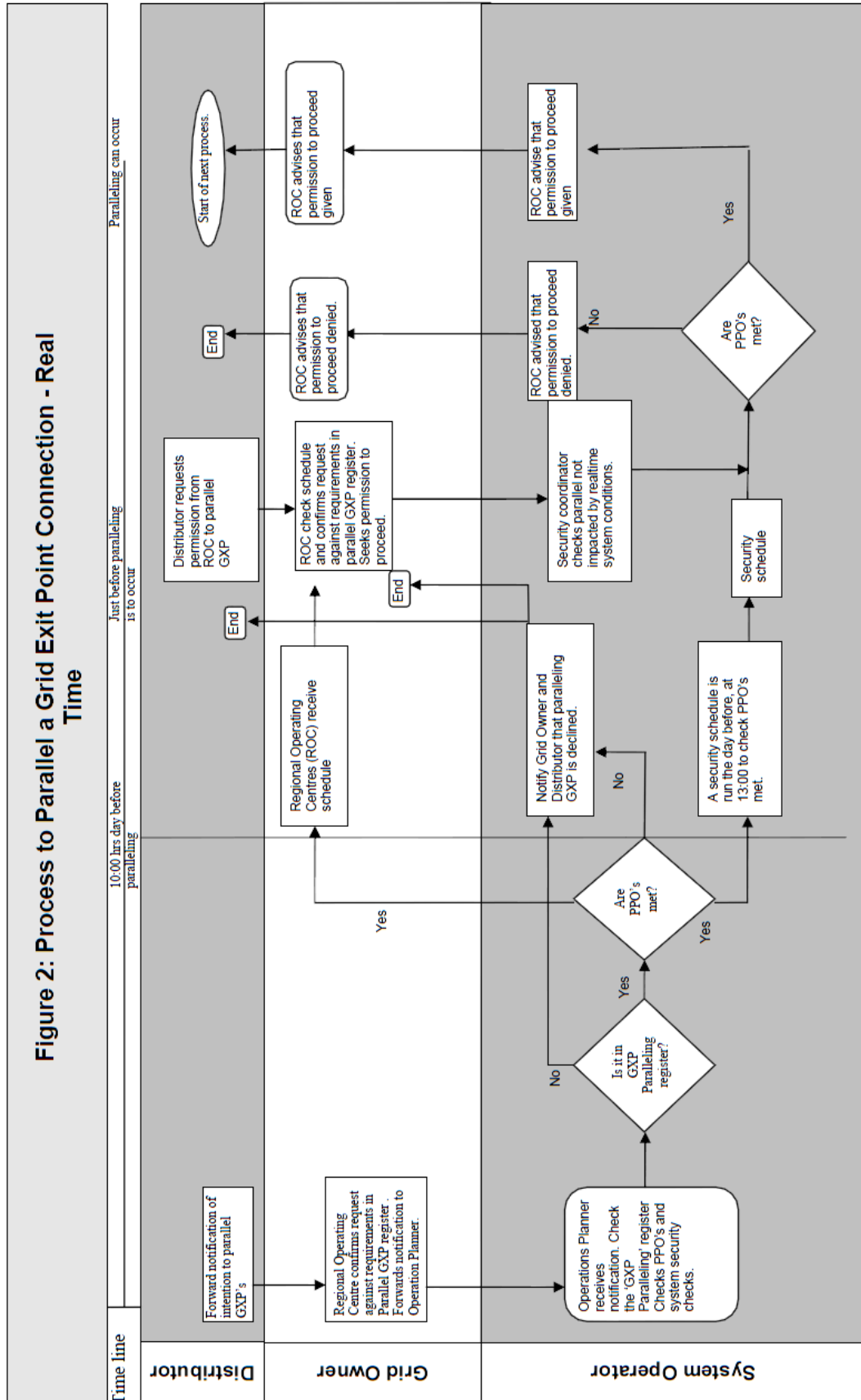


5.2 Process to Parallel a Grid Exit Point. – Real Time

5.2.1 High Level Process Steps

| Step | Action |
|------|--|
| 1 | Before 10:00 on the day before the proposed parallel is planned to occur. The Distributor provides notification of intention to parallel GXP's to the Regional Operator. The amount of load to be transferred needs to be provided with the notification. |
| 2 | The Regional Operator validates the notification against the Parallel GXP's register, confirms any special requirements will be in place as noted in the register, and forwards notification to the Operations Planner. |
| 3 | The Operations Planner validates the notification against the Parallel GXP's register, confirms any special requirements will be in place as noted in the register, checks that the load to be transferred is within the range provided during the initial assessment and assess any impacts on PPO's. If the proposed parallel is not contained in the register, or PPO's are not met the request to parallel will be declined. |
| 4 | Immediately before switching is to begin. The Distributor seeks permission to parallel GXP's via the respective Regional Operating Centre. The Regional Operating Centre confirms that any necessary special arrangements as noted in the register are in place and seeks permission to proceed from the Security Coordinator |
| 5 | The Security Coordinator confirms that its PPO's will be met with current system conditions and provides permission to proceed. |
| 6 | The Distributor is to notify the Regional Operator when the paralleling of the GXP's is complete. |
| 7 | The Regional Operator notifies the Security Coordinator when the paralleling of GXP's is complete. |

5.2.2 Flowchart



5.3 Supporting Information.

5.3.1 Grid Owner Checklist for Parallel GXP Connections Checklist

The following is a general list of items to be checked before approved parallel connections can be made between substations.

| Step | Action |
|------|---|
| 1 | Check sites are not backfeeding onto a transmission circuit without an effective earth. If so, take steps to remove that point of supply. |
| 2 | Clarify the duration of the tie with the Distributor. The tie duration should be kept to the minimum required by the System Operator. |
| 3 | Confirm adequate protection is installed and set prior to the substations being tied. |
| 4 | Check appropriate procedures can be used to clear a fault, should a fault occur. |
| 5 | Check that there is no large power system angle present. |
| 6 | Check fault levels |
| 7 | Ensure that metering will function correctly. |

Supporting information for each of these checks is provided in the document 'Guideline for Parallel Grid Exit Point Connection'

5.3.2 System Operator Checklist for Parallel GXP Connections Checklist

The System Operator assessment of the security implications of parallel GXP connections will incorporate the following checks.

| Step | Action |
|------|--|
| 1 | A check for concurrent parallel path circuit outages (and outages in the region of the proposed parallel GXP connection). |
| 2 | A check on the quantity of load being transferred as a result of or to facilitate the parallel GXP connection (complete voltage study as required) |
| 3 | Check for stability problems. |

5.3.3 Templates for joint Grid Owner and Distributor Technical Proposal and System Operator Agreement documents

| Parallel GXP Connection Technical Proposal | |
|---|--|
| Proposed connection: | e.g. Parallel connection of distribution assets between Bromley and Islington Grid Exit Points |
| Proposed connection date (if known) | |
| Duration of tie | |
| 'Tying' Voltage | |
| Safe, legal and adequate protection in place | Yes/No |
| Protection arrangements co-ordinated | Yes/No |
| Metering changes required | Yes/No .. Details |
| Grid Configuration Changes required | Yes/No .. Details |
| Proposal to move load from one GXP to the other? | Yes/No .. Details |
| Operational Steps required? | |
| Signed | For Distributor: For Grid Owner |
| Date: | |

| System Operator Parallel GXP Connection Agreement | |
|--|---|
| Agreement granted in respect of: | e.g. Proposal to set-up a parallel connection of distribution assets between Bromley and Islington Grid Exit Points |
| Reference number | |
| Date agreement granted | e.g. 15th October 2004 |
| | This approval has been granted subject to the following conditions: |
| Condition one | <i>Grid Configuration to be in place</i> |
| Condition two | <i>If load greater than X is to be moved to GXP A ... then</i> |
| Condition three | |
| Condition four | |
| Switching Time Duration | e.g. <i>Switching time for this operation is</i> |

5.3.4 Known Places of Tying (to be supplied by distributors) RWA

| | RWA 33 kV | HEY 11kV | NEL 11kV | WTH 11kV | CIL 33kV | BUF 11kV | DED 33kV | ADP 11kV | TIM 11kV | BOB 33kV | BEN 11kV | DOD 11kV | MAR 11kV |
|-----------|--------------|-------------|--------------|--------------|---------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|
| RWA 33 kV | | | | | | | | | | | | | |
| HEY 11kV | No | | | | | | | | | | | | |
| NEL 11kV | 11kV 400V | No | | | | | | | | | | | |
| WTH 11kV | No | No | No | | | | | | | | | | |
| CIL 33kV | 33kV 400V | No | No | 33kV 400V | | | | | | | | | |
| BUF 11kV | 11kV 400V | No | No | No | 11kV 400 V | | | | | | | | |
| DED 33kV | No | No | No | No | No | No | | | | | | | |
| ADP 11kV | No | No | No | No | No | No | No | | | | | | |
| TIM 11kV | No | No | No | No | No | No | No | No | | | | | |
| BOB 33kV | No | No | No | No | No | No | No | No | 33kV 400V | | | | |
| BEN 11kV | No | No | 11kV 400V | No | No | No | No | No | No | No | | | |
| DOD 11kV | 11kV 400V | No | 11kV 400V | No | No | No | No | No | No | No | No | | |
| MAR 11kV | 11kV 400V | No | No | No | 11kV 400V | No | No | No | No | No | No | No | |

Any other information that is pertinence to ties can be included as notes