TRANSPOWER

GOR Bus Split Principles and Guidelines

This document covers the principles of how the System Operator will use the Gore bus split that has been offered by the Grid Operator.

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Contents

Background

Without generation and voltage support from Manapouri generation system security risks can become present in Grid Zone 14 (GZ14) under different load and generation scenarios.

There are two primary reasons Manapouri may be unable to generate up to its capacity:

1. Planned or unplanned outages impacting generation capacity
2. Waiau scheme lake levels (Lakes Te Anau and Manapouri) dropping to or very near resource consent limitations.

Under steady state conditions the system typically needs a minimum of 3 Manapouri units generating to meet peak demand, and to provide MVAr support.

But during periods of low hydrology, once Manapouri has reached the resource consent limit, its output is restricted. This can be as low as 1.7GWh per day if its outflows cannot exceed its inflows to prevent further lake level decline under its resource consent. This equates to approximately 1 generating unit in operation up to 120MW of capacity. Historically it has also provided up to 4 units on MVAr support during period of low generation.

There are several 110kV system grid reconfigurations/splits that help mitigate system security risks when Manapouri's generation is restricted to such low levels1. However, it should be noted, higher Manapouri generation will typically still be required to maintain system security over peak demand periods requiring flexibility in daily generation profiles.

These grid reconfigurations/splits are outlined in the table below:

Split name	N-1 Security Impact of Split	Remote\Manual
GOR_ROX_1	N – 1 maintained	Remote
ROX_T10	N – 1 maintained	Remote
GOR Bus split	N – 1 maintained	Manual

The new Grid Owner offer for use of the GOR Bus split is in Appendix A.

Note: GOR_ROX_1 and ROX_T10 are existing standing offers that have the flexibility of being operated remotely.

Principles and guidelines for determining if the GO offer conditions are met

All three splits will be considered for use by the System Operator at its discretion in line with the standing Grid Owner offers. The following principles will be used to determine if the situation is in line with the grid offer:

1. The System Operator concludes that within the next 7 days generation in GZ14 may be insufficient to maintain a worst-case load and generation scenario for the time of year. The System Operator will make this assessment based on planning studies that use a worst-case load and generation scenario (not the forecast load or generation in the next 7 days), and or
2. System security risks are present in the forward schedules in GZ14 that the splits above would help mitigate.

In determining if these principles are met the System Operator will:

1. Determine if there will be sufficient generation capacity to maintain system security under worst case load and generation assumptions. Load and generation assumptions will reflect those that apply for outage assessments, adjusted for any more specific information received from asset owners.
2. If the System Operator is considering use of the splits and Waiau storage is low, we would contact Meridian to understand what the maximum sustained Manapouri generation capacity is or is expected to be.
3. If Waiau storage is low due to sustained low hydro inflows, we will also validate the supplied information by reviewing an expected draw down rate and forward view of daily inflows with the information available to the System Operator.
4. Perform system studies to confirm which grid configuration, singular or combination of system splits, will help mitigate any system security risks should Manapouri generation output be restricted.
5. Implement the preferred grid configuration if the conditions are met.

Provided sufficient lead time is available (which would be expected if this issue was due to declining lake levels and low inflows) the System Operator will inform the industry via its fortnight SO forum. This communication should ensure the market is informed of:

- the risks the System Operator is looking to mitigate
- an overview of the risk assessment
- the split options and the expected benefit of them
- timeline for implementing them

Appendix A

Following recent discussions and the supporting assessment completed by Grid Investment, we are offering the GOR 110 kV bus split as a standing semipermanent arrangement to be implemented at the SO's discretion. This approach avoids the need for repeated approvals and reassessments where the underlying circumstances, risks and outcomes are unchanged.

This approach also reflects the recurring and well understood need for the split during dry year or low Lake Manapouri inflow conditions, the strong and consistent net benefit case for implementing the configuration and the successful operational precedent from 2022 when the split was safely operated for several weeks at SO's request.

The standing offer applies subject to the following conditions:

1. The split is implemented only under dry year or low Lake Manapouri inflow conditions
2. The GO is notified and retains visibility when the split is put in place
3. The operating restrictions that applied during the 2022 GOR bus split configuration continue to apply (as confirmed with OE Protection)
4. Both ROX T10 and HWB T6 interconnectors must be in service while the GOR 110 kV bus is split
5. The arrangement is temporary and will be reviewed once the SPS solution currently in design (GOR-ROX COPS and BAL-BWK COPS) becomes operational (expected within ~18 months)

The requirement for ROX T10 and HWB T6 to be in service is to avoid the risk of forming an unintended 110 kV island under credible outage scenarios, noting that there is no antiislanding protection on this part of the network.

Within these boundaries, the SO may initiate the GOR bus split without seeking further AO approval on each occasion.