

# The Authority's draft determination of causer

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## Draft determination of the causer of the 3 October 2016 under-frequency event Consultation paper

Submissions close: 5pm 14 March 2017

14 February 2016



# Executive summary

## **An under-frequency event occurred on 3 October 2016**

The Electricity Industry Participation Code 2010 (Code) requires the Electricity Authority (Authority) to determine the causer of an under-frequency event, and prescribes the process for making its determination (clause 8.61).

The purpose of this paper is to:

- (a) set out the Authority's draft determination of the causer of the 3 October 2016 under-frequency event
- (b) consult with interested parties on the Authority's draft determination.

## **The Authority's draft determination**

The Authority's draft determination under clause 8.61 of the Code is that Contact Energy Limited (Contact Energy), as a generator, was the causer of the under-frequency event on 3 October 2016.

The Authority's reasons for this draft determination are:

- (a) the system operator has investigated this under-frequency event (in accordance with clause 8.60 of the Code), and has reported to the Authority that:
  - (i) the interruption/reduction of energy on 3 October 2016 occurred at the Taranaki Combined Cycle (Stratford) power station<sup>1</sup>, which belongs to Contact Energy
  - (ii) no other asset was identified as having caused or potentially caused this under-frequency event
  - (iii) in the system operator's view, Contact Energy is the causer of this under-frequency event
- (b) in a reply to a system operator letter, Contact Energy has accepted that it was the causer of this event
- (c) having considered the system operator's report and the relevant elements of the Code, the Authority (based on the information available to it at this time) concurs with the system operator's findings.

## **Submissions are invited from interested parties**

The Authority must consult with interested parties before making its final determination. Interested parties are invited to make a submission on the Authority's draft determination by 5pm on 14 March 2017.

The Authority will consider submissions received and make a final determination.

The Authority also invites comment on the system operator's calculation of the MW lost during the event, which the system operator uses for calculating the under-frequency event charge. The system operator has applied its published methodology and determined that the loss of injection into the grid as a result of the event was 331.0 MW at the Stratford grid injection point.

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<sup>1</sup> The system operator refers to this station as Stratford power station (SPL).

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# 1 What you need to know to make a submission

## What this consultation paper is about

- 1.1 The purpose of this paper is to consult with interested parties on the Authority's proposal to determine that Contact Energy was the causer of the 3 October 2016 under-frequency event, when the frequency dropped below 49.11 Hz in the North Island and 49.21 in the South Island.

## How to make a submission

- 1.2 Your submission is likely to be made available to the general public on the Authority's website. If necessary, please indicate any documents attached in support of your submission and any information that is provided to the Authority on a confidential basis. However, you should be aware that all information provided to the Authority is subject to the Official Information Act 1982.
- 1.3 The Authority's preference is to receive submissions in electronic format (Microsoft Word) in the format shown in Appendix A. Submissions in electronic form should be emailed to [submissions@ea.govt.nz](mailto:submissions@ea.govt.nz) with "Consultation Paper—Draft determination of the causer of the 3 October 2016 under-frequency event" in the subject line.
- 1.4 If you cannot send your submission electronically, post one hard copy to either of the addresses below, or fax it to 04 460 8879.

### Postal address

Submissions  
Electricity Authority  
PO Box 10041  
Wellington 6143

### Physical address

Submissions  
Electricity Authority  
Level 7, ASB Bank Tower  
2 Hunter Street  
Wellington

- 1.5 Please note the Authority wants to publish all submissions it receives. If you consider that we should not publish any part of your submission, please
- (a) indicate which part should not be published
  - (b) explain why you consider we should not publish that part
  - (c) provide a version of your submission that we can publish (if we agree not to publish your full submission).
- 1.6 If you indicate there is part of your submission that should not be published, we will discuss with you before deciding whether to not publish that part of your submission.
- 1.7 However, please note that all submissions we receive, including any parts that we do not publish, can be requested under the Official Information Act 1982. This means we would be required to release material that we did not publish unless good reason existed under the Official Information Act to withhold it. We would normally consult with you before releasing any material that you said should not be published.

## When to make a submission

- 1.8 Please deliver your submissions by **5pm on 14 March 2017**.

- 1.9 The Authority will acknowledge receipt of all submissions electronically. Please contact the Submissions' Administrator if you do not receive electronic acknowledgement of your submission within two business days.

## 2 The Authority's draft determination

- 2.1 The Authority's draft determination under clause 8.61 of the Code is that Contact Energy was the causer of the under-frequency event on 3 October 2016.
- 2.2 The Authority's reasons for this draft determination are:
- (a) the system operator has investigated this under-frequency event (in accordance with clause 8.60 of the Code), and has reported to the Authority that:
    - (i) the interruption/reduction of energy on 3 October 2016 occurred at the Stratford power station, which belongs to Contact Energy
    - (ii) it has not identified any other asset as having caused or potentially caused this under-frequency event
    - (iii) in the system operator's view, Contact Energy was the causer of this under-frequency event
  - (b) the system operator wrote to Contact Energy (on 18 October 2016) setting out its view that the event was initiated at the Stratford power station resulting in a loss of injection, and seeking any information Contact Energy could provide
  - (c) in its reply to the system operator (dated 17 November 2016), Contact Energy has accepted that it was the causer of this event
  - (d) having considered the system operator's report and the relevant elements of the Code, the Authority (based on the information available to it at this time) concurs with the system operator's findings.

## 3 How the Authority reached this draft determination

### **The system operator investigated the causer**

- 3.1 Clause 8.60 of the Code requires the system operator to investigate the causer of an under-frequency event and provide a report to the Authority.
- 3.2 The system operator has fulfilled its obligations under clause 8.60. The system operator's report to the Authority (dated December 2016) is attached as Appendix B of this draft determination. The report describes the circumstances of the event, which can be summarised as follows:
- (a) on 3 October 2016 at 10:55 hours there was an interruption or reduction of energy into the grid
  - (b) the HVDC and instantaneous reserves operated in response, and the frequency fall was arrested at 49.11 Hz in the North Island and 49.21 Hz in the South Island
  - (c) the frequency fall (below 49.25 Hz) and the quantum of MW lost (greater than the 60 MW de minimis) meant that an under-frequency event, as defined in Part 1 of the Code, had occurred
  - (d) the frequency was restored to the normal band quickly and with no significant frequency overshoot

- (e) analysis identified that the interruption occurred at Contact Energy's Stratford power station
  - (f) no other event was identified as contributing to or causing the event
  - (g) Contact Energy provided no other context to the event.
- 3.3 The system operator report includes copies of the following correspondence with Contact Energy:
- (a) the system operator wrote to Contact Energy (18 October 2016) setting out its view that the event was initiated at the Stratford power station resulting in a loss of injection, and seeking any information Contact Energy could provide.
  - (b) in a reply to the system operator (17 November 2016), Contact Energy accepted that it was the causer of this event.

### **The Authority has considered the system operator's report**

- 3.4 Clause 8.61(2) requires the Authority to publish a draft determination that states whether the under-frequency event was caused by a generator or grid owner, and, if so, the identity of the causer. Clause 8.61(3) requires the Authority to give reasons for its findings in the draft determination.
- 3.5 The Authority has considered the system operator's report and liaised directly with system operator staff in relation to the system operator's investigation and report.
- 3.6 Based on the information available to it, the Authority concurs with the system operator's findings that Contact Energy was the causer of the under-frequency event of 3 October 2016. The Authority's draft determination and reasons are set out above.

**Q1. Do you agree with the Authority's draft determination that Contact Energy was the causer of the 3 October 2016 under-frequency event? If not, please state your alternative view on the causer and give your reasons.**

## **4 The Authority will consider submissions and make a final determination**

- 4.1 Clause 8.61(4) requires the Authority to consult every generator, grid owner and other participant substantially affected by an under-frequency event in relation to the draft determination.
- 4.2 The Authority has allowed a consultation period of four weeks for this draft determination.<sup>2</sup> Accordingly, the deadline for submissions is 5pm on 14 March 2017.
- 4.3 The Authority will consider submissions received, and publish its final determination.
- 4.4 Clauses 8.62 and 8.63 of the Code set out provisions relating to any disputes regarding Authority determinations.

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<sup>2</sup> The Authority discusses its approach to setting consultation periods for draft determinations in its consultation on the 8 September 2016 under-frequency event (published in parallel with this consultation).

## 5 The system operator has calculated the MW lost during the event based on its investigations

- 5.1 Clause 8.64 of the Code prescribes how the system operator must calculate the event charge payable by the causer of an under-frequency event. This in turn enables calculation of the rebates paid for under-frequency events (clause 8.65).
- 5.2 Central to the event charge calculation is determining the MW of injection lost at one or more grid injection points as a result of the event.
- 5.3 The system operator determines the MW lost as part of its investigations into an under-frequency event.
- 5.4 The system operator has followed its published procedure “PR-RR-017 Calculating the Amount of MW lost” to determine the MW value provided to the clearing manager for the purposes of calculating the under-frequency event charge.
- 5.5 Based on its investigations and the application of its procedure, the system operator has determined that the loss of injection into the grid as a result of the event was 331.0 MW at the Stratford grid injection point. This calculation is set out in the system operator’s report to the Authority (Appendix B) and referenced in correspondence attached to that report:
  - (a) in its correspondence with Contact Energy regarding the cause of this under-frequency event (18 October 2016), the system operator advised Contact Energy of its calculation that the MW lost due to the event was 331.0 MW
  - (b) Contact Energy’s reply to the system operator (17 November 2016) did not comment on the system operator’s calculation.
- 5.6 Although included in its report to the Authority, the system operator’s calculation of the MW lost during the event for the purposes of calculating the under-frequency event charge does not form part of the Authority’s draft determination (refer clause 8.61 of the Code). However, the Authority acknowledges that the calculation is central to determining the event charge payable by the causer, and therefore also to the rebates paid for under-frequency events.
- 5.7 Accordingly, the Authority invites comment on the system operator’s calculation of the MW lost, as set out in the system operator’s report to the Authority.

**Q2. Do you agree with the system operator’s calculation that, for the purposes of calculating the under-frequency event charge, 331.0 MW was lost at the Stratford grid injection point as a result of the 3 October 2016 under-frequency event? If not, please state your alternative view on the MW lost and give your reasons.**

## Appendix A    Format for submissions

Submitter	
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Question	Comment
<p>Q1.      Do you agree with the Authority's draft determination that Contact Energy was the causer of the 3 October 2016 under-frequency event? If not, please state your alternative view on the causer and give your reasons.</p>	
<p>Q2.      Do you agree with the system operator's calculation that, for the purposes of calculating the under-frequency event charge, 331.0 MW was lost at the Stratford grid injection point as a result of the 3 October 2016 under-frequency event? If not, please state your alternative view on the MW lost and give your reasons.</p>	

## Appendix B Under Frequency Event Causation Report

# Under Frequency Event Causation Report

Under Frequency Event - 3 October 2016

## System Operator

**Transpower New Zealand Limited**

December 2016

*Keeping the energy flowing*



TRANSPOWER



Version	Date	Change
02	2 December 2016	Document Final

	Position	Date
Prepared By:	Scott Avery, Audit and Compliance Manager, System Operations	1 December 2016
Reviewed By:	Dean Eagle, Markets Operation Team Leader, System Operations	1 December 2016

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## IMPORTANT

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### Disclaimer

The information in this document is provided in good-faith and represents the opinion of Transpower New Zealand Limited, as the System Operator, at the date of publication. Transpower New Zealand Limited does not make any representations, warranties or undertakings either express or implied, about the accuracy or the completeness of the information provided. The act of making the information available does not constitute any representation, warranty or undertaking, either express or implied. This document does not, and is not intended to; create any legal obligation or duty on Transpower New Zealand Limited. To the extent permitted by law, no liability (whether in negligence or other tort, by contract, under statute or in equity) is accepted by Transpower New Zealand Limited by reason of, or in connection with, any statement made in this document or by any actual or purported reliance on it by any party. Transpower New Zealand Limited reserves all rights, in its absolute discretion, to alter any of the information provided in this document.

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## PURPOSE

1. On Monday 3 October 2016 at 10:55am an interruption or reduction of energy occurred in the power system. The frequency fell to 49.11 Hz in the North Island and 49.21 Hz in the South Island.
2. As the frequency had fallen to below 49.25 Hz and as per clause 8.60 of the Electricity Industry Participation Code (EIPC) Transpower, as system operator, investigated this event to assist the Electricity Authority in determining the causer of the under frequency event.
3. The result of this investigation is in this report prepared under clause 8.60(5) of the EIPC, provided to the Authority, and includes:
  - Whether in Transpower's view the UFE was caused by the grid owner or a generator and identifies that potential causer;
  - The reasons for forming this view; and
  - The information considered in reaching this view.

## UNDER FREQUENCY EVENT DETAILS

4. On Monday 3 October 2016 at 10:55 an interruption or reduction of energy occurred into the grid. In response HVDC and reserves operated to prevent a substantial fall in the frequency. The frequency was arrested at 49.11 Hz in the North Island and 49.21 Hz in the South Island.
5. The frequency was restored to the normal band quickly with no significant over frequency overshoot.
6. Excursion Notices were sent immediately following the event

### North Island

Date	Time	Minimum Hz	Island
03-Oct-2016	10:55:41	49.114	North

Date	Time	Maximum Hz	Island
03-Oct-2016	10:55:51	50.29	North

### South Island

Date	Time	Minimum Hz	Island
03-Oct-2016	10:55:41	49.209	South

Date	Time	Maximum Hz	Island
03-Oct-2016	10:55:50	50.401	South

7. On 6 October 2016 Transpower published a 'Confirmation of Event' notice. (see appendix 1.1).
8. Analysis identified that the interruption/reduction in energy occurred at Contact Energy's Taranaki Combined Cycle (TCC) power station. In system operator systems this station is referred to as Stratford power station (SPL). No other event was identified as contributing or causing the under frequency event.

Island Frequency 3 October 2016



9. On 19 October 2016 a letter was sent (see appendix 1.2) that outlined the details of the event and asked Contact Energy, as the asset owner of Stratford power station (SPL):
  - whether Contact Energy, as asset owner, considered itself to be the “causer” of the under-frequency event as defined in the Code;
  - whether Contact Energy, as the asset owner, agreed with the assessment of the loss of injection of electricity to the grid for the event was 331.0 MW (348.4 MW × 95% - to account for the margin of error); and
  - any additional information to support your views
10. On 17 November 2016 Contact Energy, as the asset owner, responded (see appendix 2.1) and accepted that they were the causer of the event and agreed to the assessed MW value of 331.0MW.
11. No context was provided by Contact Energy, as the asset owner, as to the cause that tripped the Stratford generation, interrupting the electricity flow into the grid network.

## CALCULATION OF MW LOST

12. To determine the MW value provided to the clearing manager for the purposes of calculating the under frequency event charge. Transpower, as system operator, follows procedure PR-RR-017 “Calculating the Amount of MW lost”.
13. This procedure follows the formula set out under section 8.64 of the EIPC for evaluating an event charge.

The **event charge** payable by the **causer** of an **under-frequency event** (referred to as “Event e” below) must be calculated in accordance with the following formula:

$$EC = ECR * (\sum y (INTye \text{ for all } Y) - INJd)$$

where

EC is the **event charge** payable by the causer

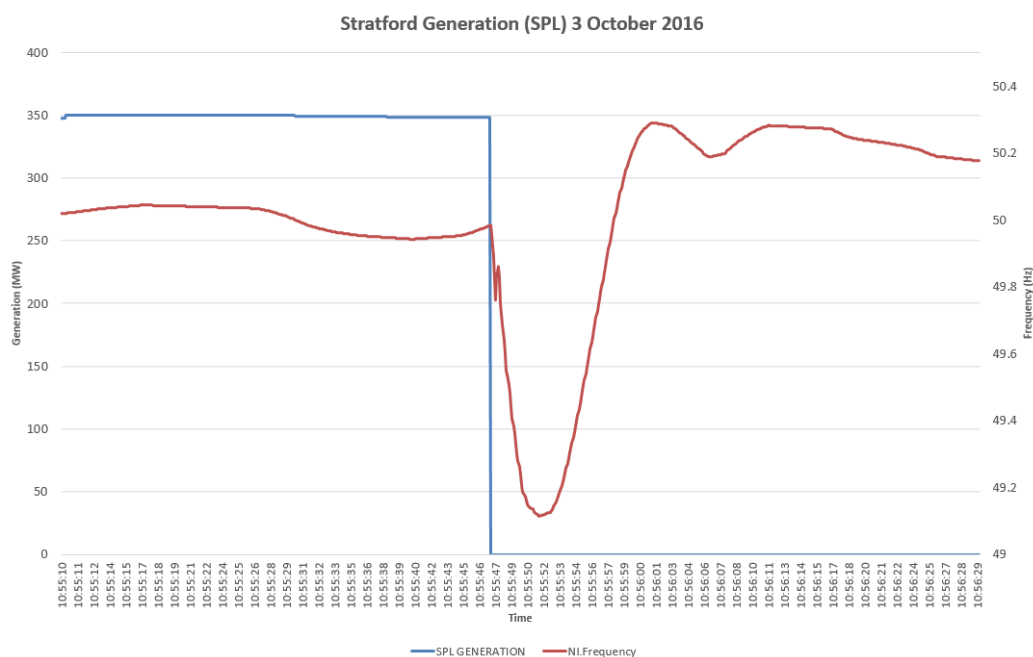
ECR is \$1,250 per **MW**

INJd is 60 **MW**

INTye is the electric power (expressed in **MW**) lost at point y by reason of Event e (being the net reduction in the **injection of electricity** (expressed in **MW**) experienced at point Y by reason of Event e) excluding any loss at point y by reason of secondary Event e

Y is a **point of connection** or the **HVDC injection point** at which the **injection of electricity** was interrupted or reduced by reason Event e

14. As the ECR and INJd values are constants, the values to calculate and complete the formula are Y and INTye.



15. For the event on 3 October 2016 the loss of generation at Stratford power station interrupted the electricity flow into the grid network at the Stratford GIP.
16. To establish the amount of MW lost SCADA data was extracted for the 60 seconds prior to the frequency reaching 49.25 Hz for generation (Stratford power station) behind the Stratford GIP. After evaluation, the amount of MW lost causing the frequency to fall below 49.25Hz was determined to be 348.4 MW. For this event the loss of MW was virtually instantaneous and the 348.4 MW of generation passing through the Stratford GIP into the network was completely lost when the frequency reached 49.25 Hz.
17. A factor of 95% is applied to the MW lost value to account for any error, reducing the MW lost value to 331.0 MW.
18. As a result, the final formula is as follows
 
$$EC = ECR * (\sum y (INT_{ye} \text{ for all } Y) - INJ_d)$$

$$EC = \$1250 * (1 * (331MW) - 60MW)$$

$$EC = \$338,750$$

## FINDING

19. Initial analysis identified the interruption/reduction of electricity on 3 October 2016 occurring at the Stratford power station. This set of assets belongs to Contact Energy, as the asset owner.
20. In the response of 17 November 2016 Contact Energy, as the asset owner, accepted that they were the causer of the event on 3 October 2016.
21. No other asset was identified as having caused or be potentially causing the under frequency event.
22. As such, Transpower, as the system operator, recommends that Contact Energy, as the asset owner, be determined as the causer of the under frequency event on 3 October 2016.

## Appendix 1: SYSTEM OPERATIONS CORRESPONDENCE

### 1.1 CONFIRMATION OF EVENT NOTICE

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**Date:** 6 October 2016

**To:** Market Participants

**cc:** Clearing Manager

**From:** System Operator

#### Under-frequency Event Confirmation

The System Operator wishes to advise market participants of the under-frequency event which occurred in both the North Island and South Island on 3 October 2016.

**Event ID:** 113

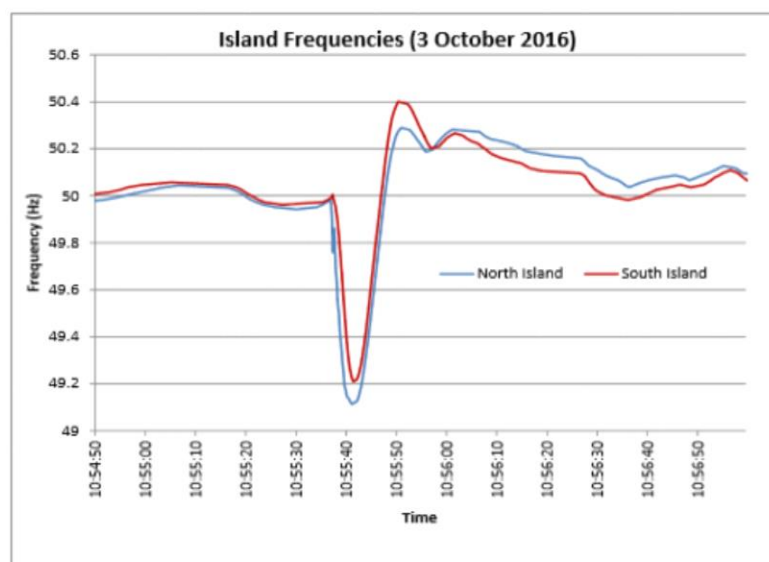
**Affected Islands:** North Island and South Island

**North Island Minimum Frequency:** 49.11 Hz

**Time (of min. frequency):** 10:55:41

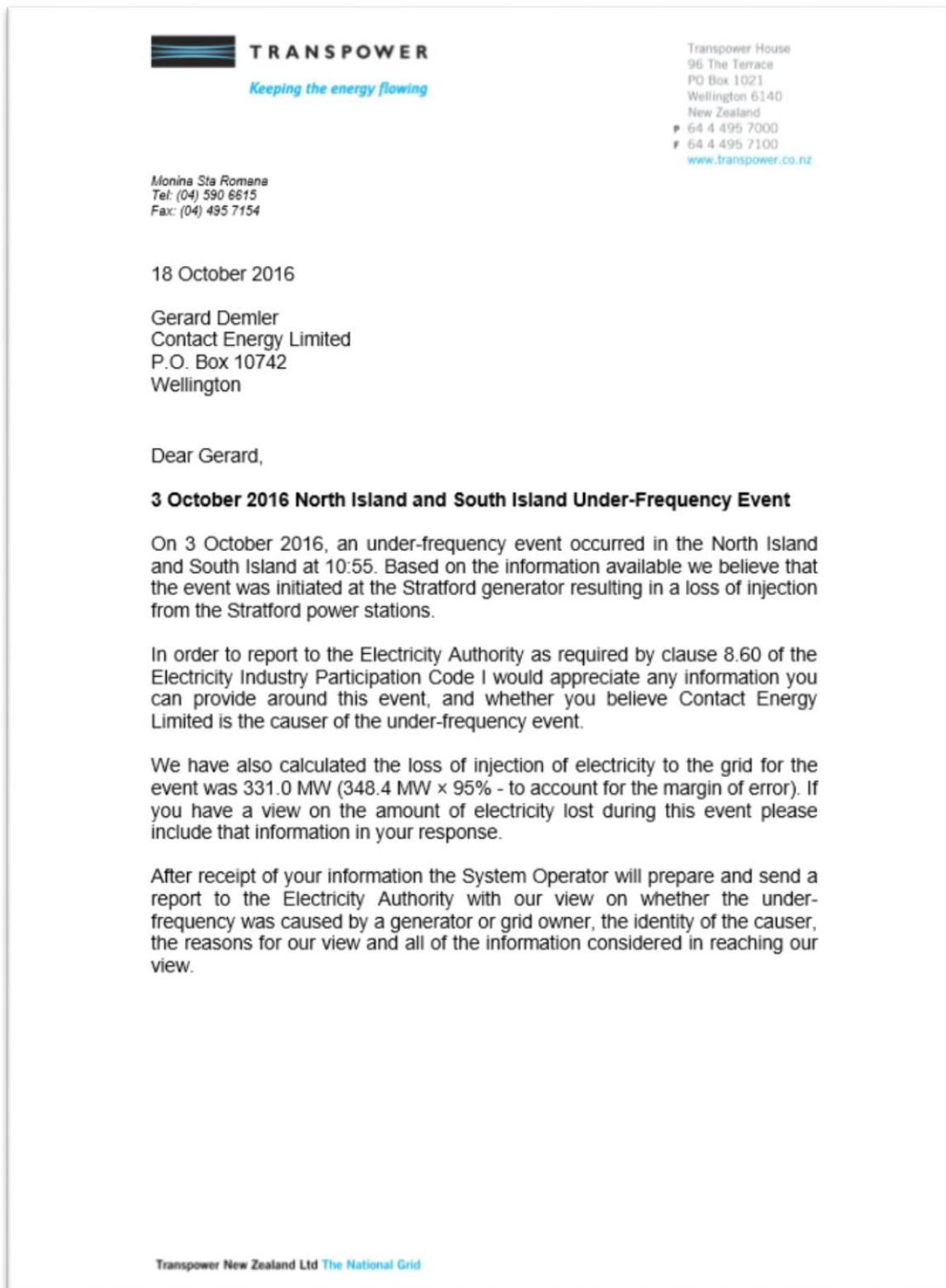
**South Island Minimum Frequency:** 49.21 Hz

**Time (of min. Frequency):** 10:55:41



Transpower New Zealand Ltd The National Grid

## 1.2 PRIOR NOTIFICATION OF CAUSER





TRANSPower

Keeping the energy flowing

Transpower House  
96 The Terrace  
PO Box 1021  
Wellington 6140  
New Zealand  
P 64 4 495 7000  
F 64 4 495 7100  
[www.transpower.co.nz](http://www.transpower.co.nz)



Please respond to the System Operator with your information relating to this event no later than 17 November 2016.

Return email address: [market.services@transpower.co.nz](mailto:market.services@transpower.co.nz)

Regards,

Monina Sta Romana  
**Market Analyst, Market Operations**  
CC Scott Avery (System Operator)

Transpower New Zealand Ltd [The National Grid](http://www.transpower.co.nz)

## Appendix 2: CONTACT ENERGY CORRESPONDENCE

### 2.1 CONTACT ENERGY RESPONSE

From: Gerard Demler [mailto:Gerard.Demler@contactenergy.co.nz]  
 Sent: Thursday, 17 November 2016 3:33 PM  
 To: Monina Sta Romana <Monina.StaRomana@transpower.co.nz>  
 Subject: RE: Under-Frequency Event on 3 October 2016

**Cyber Security Alert: This is an external email. Please take caution when opening any links or attachments.**

Hi Monina,

I had a note to reply to this yesterday but our office was closed.

We accept that Contact Energy Limited was the causer of the under-frequency event on 3 October 2016 due to the loss of our TCC generation, and agree with the amount of electricity lost during this event as mentioned in the attached.

Please let me know if you require any further information from me.

Regards,

Gerard

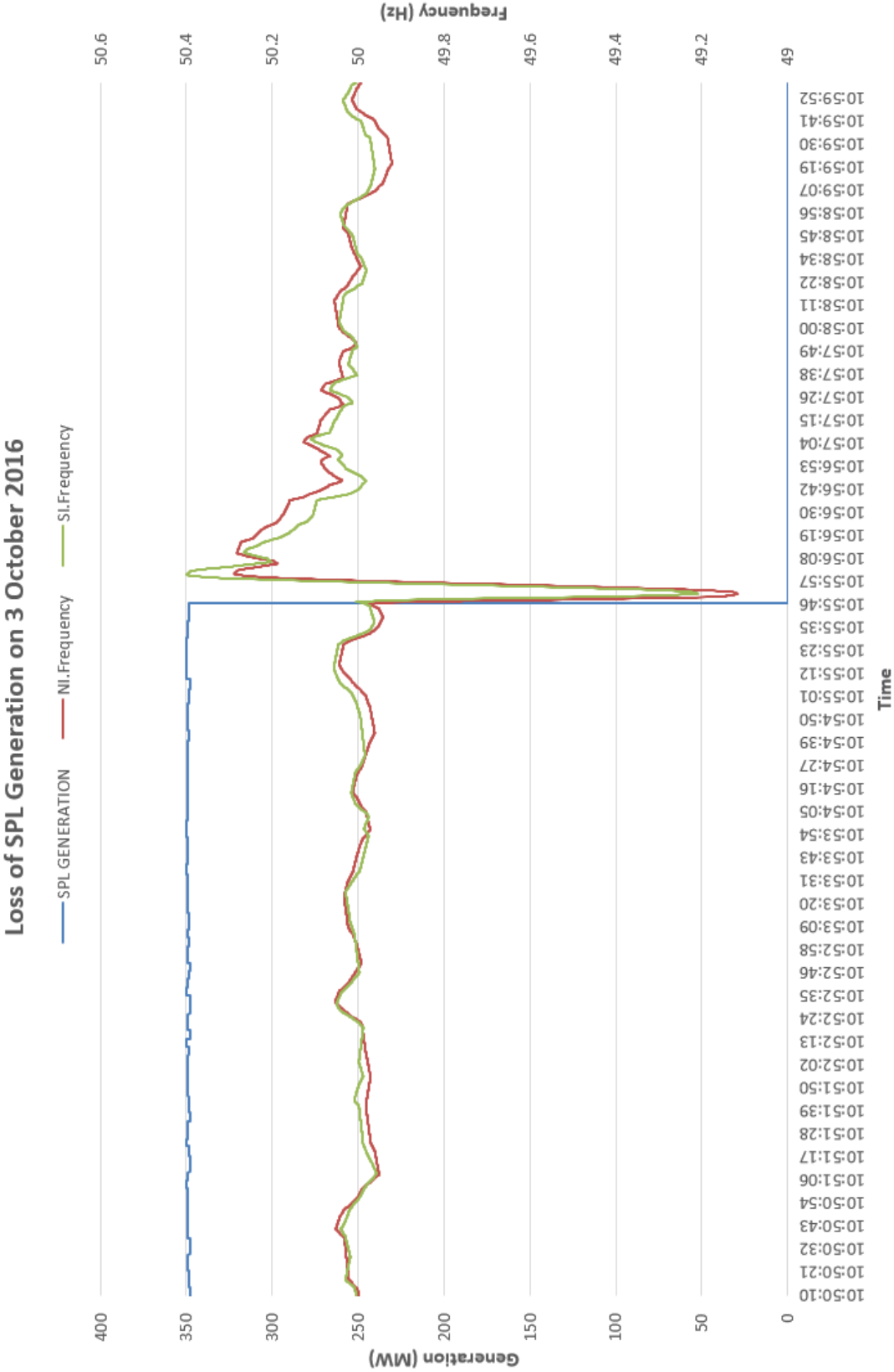
**Gerard Demler**  
 Transmission Manager  
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Appendix 3: CHARTS

3.1 ISLAND FREQUENCIES



3.2 LOSS OF STRATFORD GENERATION

