BEFORE	**THE ELECTRICITY RULINGS PANEL**
UNDER	The Electricity Industry Participation Code 2010
IN THE MATTER OF	A dispute under clause 8.62(1) of the Electricity Industry Participation Code 2010 by Meridian Energy Limited relating to the System Operator's causer determination for an under-frequency event on 1 May 2013.

DECISION OF THE ELECTRICITY RULINGS PANEL

DATED 06 June 2014

ON THE PAPERS

Rulings Panel Members

Peter Dengate Thrush	- Chair
John O'Sullivan	- Panel member
Sue Roberts	- Panel member

The relevant facts

1. On 1 May 2013 Meridian Energy Ltd ("Meridian") conducted a series of planned drop load tests on its "G5" generator at the Manapouri power station. Coincident with one of its test, there was an under-frequency event ("UFE") in the South Island. As it is required to do under the Code, the System Operator ("SO") considered the matter and found that Meridian was the "causer" of that UFE as that term is defined in the Code. Meridian challenges that decision.

2. Meridian filed a Test Plan Form with the SO in January 2013, which was approved in the usual way, but the tests themselves were postponed until May. On 29 April 2013 a revised Test Plan was submitted, differing in that 14 drop load tests were proposed rather than 10, and of which 2 were to be drops of 130MW, and 2 at 135MW. The previous highest load proposed had been 121.5 MW. Meridian was required under the Plan to compensate for the dropped load using other Manapouri generation.

3. The revised Plan was reviewed by the SO Investigation engineers, who reported on 29 April 2013 to the SO Operations Manager as follows:

> *"Approved*
> *Proceed with caution ……..*
> - *Mike P advises that drop load tests of > 40 MW irrespective of compensating with other MAN generation could result in blips in frequency so would require a CAN to be issued. Please liaise directly with Mike on this*
> - *135 MW may be more than we normally treat as risk in the SI*
> - *Please ask Meridian what response time their control systems will act within to compensate for loss of MW*
> - *Please alert Meridian that if they cause an under-frequency IL event they will be responsible for the event charges*
> - *Presumably no HVDC testing can be carried out during these specific tests"*

4. The contents (at least) of this email were passed to Meridian, and by way of conversation about these items between SO System Coordination Manager Darren Pat and Meridian's Howard Williams, the Test Plan was finalised and agreed between the parties. There is a minor dispute between the parties as to the precise details that were discussed, but we find that nothing turns on that. It appears that a CAN (Customer Advice Notice) was not issued on the basis of assurances apparently given by Meridian on their ability to compensate the load reduction.

5. The Pat statutory declaration confirms a lack of detailed dialogue between the parties prior to a set of tests perceived to carry a high level of risk. Mr. Pat confirms he was advised by Meridian that other generation units would compensate sufficiently rapidly, and that fees would be payable in the event of a UFE, but he says that a contribution to compensation by the HVDC was not discussed, nor any other system contingency, the number of Manapouri units Meridian would use, nor the ramp rate that those units would contribute at.

6. Mr. Pat says that had the information concerning any of these items been given, it would have been the base for data to be used by the SO in a revised system study, and that such a study would have been done had that information been supplied at any time up to the running of the tests. (Given the perceived level of risk associated with these tests we would have thought that a robust system study would have been carried out prior to the testing program, and as part of the approval process.)

7. On 1 May 2013, drop load tests at 5MW and 30MW were carried out before 10 am without incident. The parties appreciated that the High Voltage Direct Current ("HVDC") link between the North and the South Islands was being worked on at that time. The HVDC had consisted of a single circuit known as "pole2", and work was going on to add a further circuit known as "pole 3". The parties apparently agreed the day before that the third test at 70MW should not proceed if the HVDC was not operational[1]. The 70 MW drop load test was accordingly delayed when pole 2 was not operational on the morning of 1 May. The SO's requirements concerning the HVDC appears a clear acknowledgement of the importance of the link in the operation of the system under these test conditions.

8. At 12.30 the SO recorded in its manual Operator's Log:

> *"Meridian advised that HVDC is currently on unplanned outage and suggest delaying high MAN U5 drop test loads (100MW+) until pole 2 is back in service. This was not specifically stated as a requirement in the test plan but seemed prudent."*

9. The SO's requirements concerning the HVDC appears another clear acknowledgement of the importance of the link in the operation of the system under these test conditions.

10. At 12.59 the SO logged a similar message about discussions with Meridian, agreeing to delay the larger tests until the HVDC was back in service, which was again said to be not part of the Plan, but prudent. At 13.09 it was noted that the pole 2 outage had been extended by another 30 minutes and the Security Coordinator again requested waiting until it came back online. At 14.45 and 15.04 further tests were carried out at the 5MW and 30MW levels respectively. Pole 2 came back into service at 15.34, approval for the 70MW drop test was given, noting that Pole 2 was now on, and conditional on Meridian managing the drop, and it went ahead at 15.39.

11. The 70MW test appeared to cause the South Island frequency to drop to 49.26Hz, (according to Meridian- the SO recorded it at 49.4Hz) which is below the normal operating range of 50.2Hz to 49.8Hz, and close to the limit of 49.25Hz prescribed in the definition of a UFE[2]. Meridian's notes record that its staff called the SO at 15.39[3]

[1] This is recorded in Mr. Pat's subsequently prepared note of his conversation, and not disputed by Meridian; see document 9.
[2] See para. 16, below
[3] From the transcripts, this call may have occurred at 15.50

as they were certain that it was not the test that caused what they called an "excursion". They record that the SO agreed that "something else had occurred" but would not be specific. The SO's notes show that they noted that:

> *"the HVDC did not ramp in response to the test. Enquiries within the DC Operator established the HVDC did not have its frequency stabilisers on. The DC Operator was asked to turn the frequency stabilisers on."*

12. The SO did not tell Meridian that the Frequency stabilisers had been turned off, that that appeared to be the cause of the problem, and that they had now been turned on. Meridian was told only that it could proceed with further testing. Approval was then given for Meridian to conduct the 100MW drop test, which went ahead at 15.51, followed by the 121.5MW test at 16.04, and after the Security Coordination aligned the risk, approval was given for the 130MW test at 16.18. That test proceeded without incident.

13. Approval was given at 16.29 to conduct the 135MW test. At 16.47 Meridian advised the Energy Coordinator that it was having trouble ramping generation up to conduct the 135MW test. Meridian asked the SO whether it wanted Meridian to come back and get approval before proceeding – the SO replied that it was keeping an eye on it and would need to know if the test was going to take place in the next trading period, as it would have to align the risk again.

14. At 16.58 Meridian completed the drop load test of 135MW. Soon after, at around 16.58.04 the South Island frequency dropped to 49.19Hz, and the Tiwai Potline2 tripped. Tiwai was fully restored by 17.11. Further testing was called off for the day.

15. The approved Test Plan contained the statement:

> *"Meridian will compensate station load during testing"*

16. Meridian's evidence is that it provided that compensation via two other generation units at Manapouri – G1 and G7. Its compensation efforts were sufficient for all other tests, notably including the test at 13OMW at 16.29. Meridian says that what changed, and caused the UFE, was the condition of the HVDC. At the time of the 130MW test at 16.29 the HVDC had a northwards transfer of about 102MW. By contrast, at the time of the 135MW drop at 16.47, northwards transfer on the HVDC had dropped to 49MW

17. The SO challenged that the compensation provided by Meridian via its G1 and G7 generators was adequate, noting that either another generator could have been used, or the "ramp rate" of the two in use could have been higher. These claims have been both challenged by Meridian's technical data and also by Mr. Vong, a member of the SO Investigations and Planning Division, who states that two units should have been sufficient.

The Code

18. A UFE is defined in Part 1 of the Code as follows:

> **"*under-frequency event*** *means—*
> *(a) an interruption or reduction of* ***electricity*** *injected into the* ***grid****; or*
> *(b) an interruption or reduction of* ***electricity*** *injected from the* ***HVDC link*** *into the South Island* ***HVDC injection point*** *or the North Island* ***HVDC injection point****— if there is, within any 60-second period, an aggregate loss of* ***injection*** *of* ***electricity*** *in excess of 60* ***MW*** *(being the aggregate of the net reductions in the* ***injection*** *of* ***electricity*** *(expressed in* ***MW****) experienced at* ***grid injection points*** *and* ***HVDC injection points*** *by reason of paragraph (a) or (b)), and such loss causes the frequency on the* ***grid*** *(or any part of the* ***grid****) to fall below 49.25 Hz (as determined by* ***system operator*** *frequency logging)."*

19. The heading to clause 8.61 of the codes mandates ***"System operator must determine causer of under-frequency event".***

20. "Causer" is defined in Part 1 of the Code as follows:

> ***"causer****, in relation to an* ***under-frequency event****, means—*
> *(a) if the* ***under–frequency event*** *is caused by an interruption or reduction of* ***electricity*** *from a single* ***generator's*** *or* ***grid owner's asset*** *or* ***assets****, the* ***generator*** *or* ***grid owner****; unless—*
> *(i) the* ***under-frequency event*** *is caused by an interruption or reduction of* ***electricity*** *from a single* ***generator's asset*** *or* ***assets*** *but another* ***generator's*** *or a* ***grid owner's*** *act or omission or property causes the interruption or reduction of* ***electricity****, in which case the other* ***generator*** *or the* ***grid owner*** *is the* ***causer****; or*
> *(ii) the* ***under-frequency event*** *is caused by an interruption or reduction of* ***electricity*** *from a single* ***grid owner's asset*** *or* ***assets*** *but a* ***generator's*** *or another* ***grid owner's*** *act or omission or property causes the interruption or reduction of* ***electricity****, in which case the* ***generator*** *or other* ***grid owner*** *is the* ***causer****; or*
> *(b) if the* ***under-frequency event*** *is caused by more than 1 interruption or reduction of* ***electricity****, the* ***generator*** *or* ***grid owner*** *who, in accordance with paragraph (a), would be the* ***causer*** *of the* ***under-frequency event*** *if it had been caused by the first in time of the interruption or reduction of* ***electricity****; but*
> *(c) if an interruption or reduction of* ***electricity*** *occurs in order to comply with this Code, the interruption or reduction of* ***electricity*** *must be disregarded for the purposes of determining the* ***causer*** *of the* ***under-frequency event."***

21. The Code sets out in clauses 8.60 and 8.61 a process by which the SO is to determine the "causer". In summary, this begins by giving notice to relevant parties that a UFE has occurred, and allows the SO to require any participant to supply information: the SO sought on 7 May 2013 and received on 14 March 2014 information from Meridian under this provision[4]. Next, the SO was required to publish a draft decision, finding whether the UFE had been caused by a grid owner or generator, and if so, identifying the causer of the UFE. After a period of public consultation with affected parties, the SO is to make a final determination and publish it. There is a financial penalty payable by a party found to be a causer of a UFE, calculated according to the formula provided in clause 8.64.

The Determination

22. In its Draft Determination, the SO responded to Meridian's claims that the UFE was not caused by a single event by stating that the UFE coincided with Meridian's 135MW drop load test, acknowledged that earlier tests had occurred during periods of higher HVDC transfer, thereby "*providing a greater operational range for the HVDC to respond to frequency fluctuations*" but holding that *"System conditions are inherently dynamic and cannot be relied upon to maintain frequency stability for participant testing."* This appears to be another example of the SO's acknowledgment of the role of the HVDC in system stability. Approval was given, the SO said, to conduct the tests in reliance on Meridian's undertaking to compensate station generation during testing. However, the Test Plan template includes the statement that even after accounting for self-covering arrangements there could be times where such tests pose an unacceptable system risk.

23. In its submissions on the Draft Determination, Meridian said:

> *"Meridian understands that system conditions are inherently dynamic but the System Operator is accountable for informing us that an environment (is) conducive for any approved testing or, in the alternative and if the environment is not conducive, for advising Asset Owners to not proceed with previously approved tests, Given no asset owner can fully mitigate the initial frequency drop of drop load tests, we rely on the System Operator to be accountable for confirming that systems conditions are suitable for assisting in maintaining the system frequency for the initial drop."*

24. Meridian also argued that the SO was constraining the HVDC to low levels, causing potential risks, which were visible to, and should have been identified by the SO.

[4] In summary, Meridian argued that the UFE was not caused by the interruption of a single generator, and that the conduct of another participant, or a change in system conditions was the cause.

25. Contact Energy also filed a response, saying inter alia:

> *"With regards to the draft determination, for there to be a clear causer of the event, the SO needs to show that Meridian did not meet the requirements of the test plan and that system conditions did not contribute to the event (the SO provided qualified guidance on a suitable time)."*

26. The SO published a further paper, setting out and summarising the submissions received on the draft Determination, and providing its views on them.

27. Because Meridian had argued that it was the conduct of the SO itself that was involved in causing the UFE, the SO appointed an independent expert to comment on its Draft Decision. The expert appointed was Ms. Gael Webster, whom, we note for the purposes of complete disclosure, is a former chair of the Electricity Rulings Panel.

28. With due respect to the detailed report prepared by Ms Webster, we summarise the presently applicable parts of her report as finding that Meridian was the causer, as it was Meridian's reduction of electricity that caused the UFE. She noted that while this may seem "unfair" it was open to the SO to make that determination.

29. She also found that only a grid owner or generator could be a "causer" under the Code, and went on to consider whether exception "c" in the definition of "causer" (given above) might apply. Meridian had not argued it was covered by this exception, and the SO's position was that only when a party was complying with its Test Plan could it be said to be doing something required under the code. Meridian was in breach of that part of its Plan that required it to compensate, so was not, in her assessment of the SO's position able to rely on the exception. It seems to us that the ambit and operation of this exception is unclear.

30. Ms. Webster then considered the role of the SO, and whether it had contributed to the UFE. While noting that there was no concept or definition of "contributing causer" and that contribution, if any, would not prevent Meridian from being the causer, as she saw it, she went on to say:

> *"As the System Operator has determined the cause as failure to follow a test plan, it seems reasonable and fair that the System Operator must address claims that system conditions made compliance impossible. The System Operator does not specifically address in the decision the submission from Meridian that the HVDC being lowered to 30 MW by the grid owner immediately prior to the test (although scheduled to be operating at 90MW) resulted in no downwards HVDC modulation being available to support frequency management creating an undesirable system condition for undertaking drop load testing at 135MW.*
>
> *This omission appears to be justified on the basis that this was not a requirement of the Test Plan to be taken into account when approving the 135MW test. In my view the System Operator should*

> *go further and state in its decision whether this change to 30 MW did not (as alleged by both Contact and Meridian) create an undesirable or unacceptable system condition of which it should have been aware and resulted in Meridian's self covering arrangements being incapable of being fulfilled. If the System Operator can't confirm this then it is difficult to support the conclusion that Meridian failed to comply with the test plan."* (Emphasis added)

31. The SO then published its final Determination, in which it set out the history of the UFE and its process. It referred to the conversation between Meridian and SO staff when discussing the amended Plan, noting that SO staff had asked about and received assurances about compensation for lost load. The SO noted that Meridian had said on that occasion that: *"Manapouri could respond quickly and immediately*". Meridian challenges that its staff used the word "immediately" but we do not think anything turns on the precise choice of word here. Meridian accepts that it conveyed the impression that it could provide prompt and effective load compensation, and that approval was given in reliance on that understanding. However, It should be quite clear that any assurances given by Meridian related to the compensation of the shortfall in unit 5 generation, and not an assurance to provide overall compensation to the national grid as a power system.

32. The SO also considered the applicability of exemption "c", and said that had Meridian followed the Plan, and provided compensation, the exemption would have applied. Since it is the SO's view that Meridian did not follow the plan, and did not provide compensation, the exemption did not apply. There seems a certain lack of efficacy in this construction, whereby the protection is only available in circumstances where protection is not needed.

Meridian's Objection

33. Clause 8.62 provides that:

> *"The **Authority** or a **participant** who is substantially affected by a determination may dispute the determination by referring the matter to the **Rulings Panel**."*

34. Meridian has referred the matter to the Rulings Panel. The Panel caused notice of the dispute to be published and allowed time for affected parties to indicate whether they wished to participate or be heard. The current parties to the dispute are the SO and Meridian.

35. Meridian made the following arguments in disputing the SO findings that it was the causer of the UFE on 1 May 2013:

    (1) Meridian was not in breach of an undertaking to compensate to the point that a UFE was avoided. The SO was wrong to interpret the undertaking that Meridian would compensate the station load as extending to preventing a UFE – only the SO has sufficient knowledge of all the conditions and can prevent a UFE. Meridian had

provided reasonable compensation – it was in the hands of the SO, who had the knowledge and the authority to delay or stop the test, which it had exercised in relation to the pole 2 outage. Frequent approvals had to be sought, and were given. Implicit in the giving of that permission to proceed was that system conditions were appropriate. The SO knew, but Meridian did not, that the HVDC transfer had dropped just prior to the 135MW test. The SO knew the resources Meridian was deploying to meet the compensation obligation. It was the SO's decision to proceed that caused the outage. The absence of a rebuttal of this point as recommended by the independent reviewer Ms. Webster was noted.

(2) The SO's interpretation of exemption "c" is in error. Meridian says the wording is that the interruption is exempted if it is "in order to comply". That is different from an interruption which is "in compliance" with the code. That is, what is required is that one is following the order, not that one has succeeded in meeting its objectives. Because Meridian was operating under an approved Test Plan, the electricity was dropped, and the level of compensation provided was done so *"in order to comply*" with the Code.

(3) In the alternative to (1) and (2) above, there were two causative events – the dropping of the HVDC capacity shortly before the drop load test. Under the "first in time" test, that meant that the SO caused the event, although Meridian accepted that the SO could not be a "causer" as defined in the Code.[5]

(4) The SO had found against it on a ground not signaled in the draft determination, i.e. not following the test plan. Meridian referred to Ms. Webster's report, and submitted that before such a finding could be made, her recommendation that the SO confirm that system conditions played no part should have been given.

The System Operator Submissions

36. The SO began by challenging the impression given by Meridian and Ms Webster that the SO actively constrained or otherwise limited the operation of the HVDC. It says that it did not operate the HVDC in that way. If we apprehend the situation correctly, the HVDC operates rather more autonomously than that, and is responsive to electricity levels in each Island.

37. However, the SO also makes it plain that the operation of the HVDC has a direct impact on frequency fluctuations caused by changing load. As the SO explained:

> *"The HVDC link has designed into it a feature called frequency stabilisation control (FSC). FSC allows the HVDC transfer to change automatically within certain limits to correct frequency deviations in an island. If, for example, the frequency drops in the South Island while HVDC transfer is north, FSC will reduce the northwards HVDC transfer if it can. This will reduce the amount of electricity being exported from the South Island, the objective being to redress the generation under-supply in the South Island and thereby the drop in frequency."*

[5] Meridian later abandoned this argument, as the effect of the HVDC was not a loss of electricity.

38. We observe that this confirms the SO's appreciation of the important role the HVDC plays in the system.

39. The SO also confirmed that there is a lower limit to this facility of about 30MW; once the HVDC is operating at or close to that limit, it cannot reduce the northwards flow any further, and redress any drop in frequency that may be occurring or imminent in the South Island. (We observe that the fact that the HVDC was ever operating at or moving towards 30MW should therefor be a signal of great importance to the SO in managing the system conditions).

40. The SO referred to the data provided for the period of the 135MW test, which ran from 16.47 to 16.58. The HVDC transfer north at 16.47 was at 73.864, rising to a peak of 77.105 at 16.54, then falling abruptly from that time to a low of 29.897 at 16.57.03. At 16.57.20 it was rising through 32.108, and at 16.57.40 it was 34.434. By 16.58.00 it was 48.714, it fell to a new low of 29.902 at 16.58.07 then began to rise: at 16.58.20 it was 91.274. A graph of the frequency fluctuation and the HVDC flow in the South Island during this period is attached as Appendix 1.

41. This shows, the SO says, that although there was a fall early on in the northwards flow, at the time of the test, it was increasing and was sitting at about 50MW. Further, the earlier reduction in northwards flow actually increased, not decreased the SI frequency. For those reasons, it cannot be a causer, or a contributing causer of the UFE.

42. The SO also says that the northwards drop is not within 60 seconds[6] of the drop load test, but we think the data show that the northwards flow rate was just above 30 at 16.57.20, or within 60 seconds of the test at 16.58. However, as noted above, Meridian is no longer pursuing this issue, so we do not need to consider it further.

43. The SO submits and we accept that it cannot be a "causer" under the code, being neither a grid owner, nor a generator.

44. The SO accepts that complying with a Plan would activate the "c" exemption, but challenges Meridian's interpretation of that exemption, saying policy requires more than simply a good faith effort to comply – actual compliance with a test plan should be needed before the exemption cut in.

45. The SO submits that the only real issue is whether Meridian complied with the Test Plan – it says that it did not provide the required compensation once it dropped the load at 16.58, instantaneously causing the UFE.

46. The SO says that "compensation" must be taken to read as full or effective compensation, sufficient to prevent a UFE. That was what was understood from past practice, and was intended in this Test. Anything less, it says, would be meaningless.

[6] Refer to the definition of UFE

47. The SO says that Meridian had access to the HVDC data, but chose not to monitor it, or to use it in relation to the test. If it were important to Meridian, it should have done so. The SO does appear to undermine this argument at paragraph 44 of its submission where it states that: *"While there is no doubt the System Operator has a better overall view of system conditions than Meridian…."*

48. The SO accepts that it had the authority to stop or postpone tests, but says it was not aware of any conditions that required that: the problem it says was the level of generation by Meridian of the compensation electricity from its G1 and G7 units, into which the SO had no insights. The Systems Operations Manager states that: "initial reviews of SO planning activities (around the test plan approval) do not indicate material failure or need for process change." However the SO modified the test plan template following the UFE and the SO now admits that these changes may have elicited from Meridian full information about its HVDC transfer assumptions and avoided the Event.

49. Meridian did not make the SO aware, either in the agreed Test Plan, or in any surrounding information that Meridian regarded the status of the HVDC as central to its compensation program. The circumstances surrounding the 70MW test, in which the effect of the HVDC on the frequency was noted, were insufficient to lead the SO to understand that the HVDC conditions were to be an important part of the testing, including for the larger tests.

50. The SO called evidence to show that Meridian's G1 and G7 could have, under achievable operating conditions, supplied sufficient compensation to avoid the UFE. It also suggested they should have added a third generating unit to achieve that result.

51. The SO takes up Ms. Webster's point that, having found that it was a failure to follow the test plan that caused the UFE, the SO should address the submissions that:

> *"the HVDC being lowered to 30 MW by the Grid Owner immediately prior to the test (although scheduled to be operating at 90MW) resulted in no downwards HVDC modulation being available to support frequency management creating an potentially undesirable system condition for undertaking drop load testing at 135MW."*

52. The SO confirms via its submissions that the HVDC transfer at the time of the event did not affect the final determination.

53. The SO rejects the claim that there was a significant difference between the draft and final determinations in relation to the compensation issue.

Decision

54. We think a preliminary problem with both the draft and final determinations by the SO is that the SO has not determined with any certainty what the cause of the UFE was. In the draft determination, the SO found that "*an under-frequency event occurred at Manapouri with 122 MW lost at 49.19 Hz*". It then moved to consider who the "causer" was by reference to the Code definitions. In the final Determination, the SO said: *"The draft determination found the loss of 122MW at Manapouri was the cause."* That is, with respect, a description of the event, not an analysis of its cause.

55. The requirement to identify the cause is a pre-requisite to applying the test for the definition of causer in the Code Part 1, which hold that a causer is…

> *"if the under–frequency event is caused by an interruption or reduction of electricity from a single generator's or grid owner's asset or assets, the generator or grid owner…"* (-subject to various exceptions which we don't need to consider at this point.

56. Meridian's position is that it complied with all the requirements of the agreed Test Plan, and yet something prevented the compensation arrangements that it had established from working. This is equivalent to saying that it was not the drop load that caused the interruption, but the failure of the compensation mechanisms to work properly that caused the UFE. It is significant that Meridian had done a number of drop tests that day, and all of them had worked, including the immediately previous test at 130MW.

57. We think it is significant that the SO's Internal Notes document (Document 10 in the "Documents Considered" file) concludes, under the heading:

> *"Cause of the event*
> *A test requirement was that the drop load tests would be managed within the station. This requirement was met for the several tests carried out on the day beforehand but does not appear to have been what occurred in the final test. It is not clear why the last test failed; an enquiry into the actual generator behavior is underway."*

58. However the SO issued its final Determination on 29 November 2013, seven months later, but makes no reference to any outcome from such an enquiry.

59. The SO has taken the view that with the undertaking in place that Meridian provide compensation the problem shifted to Meridian's shoulders. Mr. Pat listed the factors that were not mentioned by Meridian yet were significant enough to have required a further set of tests had they been known. No explanation of why this information was not sought has been provided.

60. Para 47 of the SO submission is difficult to accept. The SO accepts that it had the right to require Meridian to cancel or postpone the Test on the basis of undesirable

system conditions. However, the SO say that they did not know at the time, and claim they could not reasonably have been expected to know, that the system conditions were undesirable for the Test. Meridian disagrees, and we agree with Meridian's position.

61. We disagree also with the views expressed in paragraphs 49 and 50 of the SO submissions, which attempts to cast the onus on Meridian to offer the information. We think that the fact that the SO is now collecting more of that sort of information in its amended template is appropriate, and reflects the kind of prior enquiry that should have occurred in this case.

62. It was clear that the test regime posed potential system risks from the time the amended test plan was submitted by Meridian. In addition to the "proceed with caution" email, there are the many other conditions also contained in the Test Plan, for example:

> *"(1) 2 hours prior: the testing party must notify the Security Co-ordinator that test will be proceeding as planned;*
> *(2) 15 minute prior: Testing party must receive approval from Energy Co-ordinator to proceed with the test;*
> *(3) Immediately prior: Testing party must receive approval from Energy Co-ordinator to proceed with the test;*
> *(4) Prior to any risk of trip, load reduction, or potentially high impact test, the Energy Co-ordinator is to be advised in case system conditions are no longer suitable for the tests to proceed (even after accounting for self covering arrangements there could be times when such tests could pose and unacceptable system risk).*
> *(5) The System operator will manual the SI ACCE risk to 130MW and 135MW respectively for the trading periods pertaining to drop load tests at these levels".*

63. The SO is the appropriate party to carry out an assessment of system conditions. Approval was given by the SO to proceed with planned drop load tests on the understanding that Meridian intended to compensate station generation during testing. Having stated that the system conditions are dynamic the SO would therefore appreciate that compensatory generation was dependent on the system dynamics at the actual time of the specific test. The Test Plan template includes the statement:

> "*Prior to any risk of trip, load reduction, or potentially high impact test, the Energy Coordinator is to be advised in case system conditions are no longer suitable for the tests to proceed (even after accounting for self-covering arrangements there could be times where such tests pose an unacceptable system risk".*

64. Meridian argued that the SO was in a substantially better position to monitor system conditions than it was. We agree. This is the job of the SO, and it is provided with powers and procedures to allow it to carry out that role. The SO has tools available, including a Reserves Management Tool (RMT). The RMT provides an automated process for reserves management within the New Zealand power system, able to

represent the power system in considerable detail. By way of further example, it has the power to cancel, postpone or amend the conditions of any test. It has to be consulted at stated intervals before each test. It is also clear that the calling and approving requirements were substantially followed; we have read the transcripts of phone calls between Meridian and the SO in advance of each test, and reporting events afterwards.

65. The SO takes the position that it was not told that Meridian was relying on the modulating effect of the HVDC, it was not included in the test plan, and that if this is important to Meridian, Meridian should have monitored it. We do not think that is an appropriate response.

66. The SO demonstrated on frequent occasions its understanding of the importance of the HVDC, including the delays until pole 2 was re-activated, and with the checking that the FSC was turned on after the 70MW test had signaled a potential problem. There are several references during the phone calls confirming the importance of the presence of the HVDC – or "DC" including these:

> *SO "I mean, in theory the system should be designed to be able to cope with that without the DC on but the DC does give us some kind of frequency stabilization so…"* (12.59 call)

> *MERI: Yeah XX, have we got 70MW at MAN?*
> *SO: Yes, absolutely. The DC is on now and yeah it's on dispatch so more than happy for you go ahead with that.* (15.39 call, as amended by Ms. O'Loughlin)

67. The SO, in its response to Meridian's submissions on the draft determination, states that:

> *"System conditions are inherently dynamic and cannot be relied upon to maintain frequency stability for participant testing. Approval was given by the System Operator to proceed with planned drop load tests on the understanding that Meridian intended to compensate station generation during testing."*

68. However, having stated that the system conditions are dynamic the SO would therefore appreciate that compensatory generation was dependent on the system dynamics at the actual time of the specific test.

69. Further, the SO in its response to Meridian's response to the draft determination states that:

> *"Earlier successful tests performed on 1 May 2013 occurred at lower generation levels and the larger of these tests occurred during periods of higher HVDC transfer (providing a greater operational range for the HVDC to respond to frequency fluctuations) than the event in question,"*

70. Here, the SO impliedly acknowledges that HVDC transfer had a material impact on system conditions.

71. Mr. Stinton's evidence is to the effect that the environmental or system conditions of the successful 130MW test which immediately preceded the problematic 135MW test were the same, except for a change in the northwards flow via the HVDC. The graph showing that test is in Appendix 2.[7]

72. The northwards flow changes from approximately 102MW just prior to the 130MW test to approximately 40MW, or 62MW of available moderation. For the next test, at only a 3.8 % increase in the size of the drop load to 135MW, the flow at the beginning was approximately 49MW. It fell to about 30MW, providing only 19MW of moderation. This would appear to be a change in the systems environment, outside Meridian's control. If the SO had been monitoring the fall in the northwards flow rate in the HVDC shown in Appendix 1 in the minutes before the 135MW test, it may have been able to suspend the test and avoid the UFE that followed.

73. We note that although invited by Ms. Webster to confirm that this change was not "…*an undesirable or unacceptable system condition of which it should have been aware and resulted in Meridian's self covering arrangements being incapable of being fulfilled* …" the SO chose not to respond on that point in its Final Determination, and instead adopted, at para.59 of its submissions, the different argument "…*that the HVDC transfer at the time of the Event does not affect the Final Determination.*" (Emphasis added)

74. No basis for this conclusion has been provided by the SO.

75. In a dynamic situation, with several potential factors in play such as the HVDC, the obligation remains on the SO to first identify the cause of the UFE.

76. Accordingly, we hold that although the 135MW drop load test conducted by Meridian on 1 May was the occasion of the UFE, we do not think the SO has established that that was its cause. It cannot therefore be said that Meridian is the causer of that event under clause 8.61

77. We consider next, if it should prove that Meridian were a causer of the UFE, and it were the interruption of supply, not another factor which had caused the UFE, whether Meridian would be entitled to the exemption provide by "c". That reads:

> *"(c) if an interruption or reduction of **electricity** occurs in order to comply with this Code, the interruption or reduction of **electricity** must be disregarded for the purposes of determining the **causer** of the **under-frequency event"**.*

[7] Note the inversion of the scale for frequency on the left vertical axis

78. Meridian argued that because it was performing the testing program according to a process provided under the Code, the reduction in electricity, being part of an approved testing process required by the Code, could be said to be "in order to comply with the code". The SO has argued that it can only apply when a party is complying completely with its approved Test Plan. It says Meridian was not complying, as its compensation efforts were insufficient to avert the UFE.

79. We think Meridian is correct, and that it is entitled to the exemption. If a testing program calls for the switching off of electricity generation, or the withdrawal of generation capacity from the grid for regular testing purposes, then, provided it were done pursuant to a properly approved Test Plan, which gives the opportunity for the setting of proper security and continuity protections, surveillance and other measures by parties such as the SO, a party operating under such a Plan is intended to be exempted if the result of that program were to be a UFE. We agree with Meridian's interpretation of *"in order to comply with the code"* in (c).

80. The SO submitted that:

> *"…it would be inconsistent with the scheme of the Code if the rigor around testing and test plan compliance were relaxed when interpreting paragraph (c) of the definition of "causer". It would also undermine the incentive purpose of the causer regime."*

81. We feel there is some force in the SO's approach, and could contemplate a party losing its exemption where it had been clearly shown by the SO to be operating carelessly, or without regard to the requirements of the Plan. Such an approach would not dissuade generators and asset owners from conducting regular testing programs, and incents the SO to ensure Test Plan proposals and their safeguards are thoroughly reviewed before implementation.

82. We think that the SO's submission is the equivalent of saying that an indemnity for breach is provided, but it is lost if there is a breach. We think the better interpretation is that the exemption is available for a generator not shown to have acted unreasonably[8] in the performance of its approved Test Plan. A generator acting recklessly or negligently would not be exempted.

83. On that approach, we do not think that the SO has established that the performance by Meridian under the approved Test plan was unreasonable.

84. The issue appears to be the adequacy of the load compensation. The method adopted worked well for all tests up to the 130 MW, but something caused a failure at 135 MW. The SO has not established that it was not some other factor, such as the loss of response from the HVDC that caused the problem.

85. Because of the position we have reached above, we now deal with some of the other contested issues in a more abridged way.

[8] "reasonable" by reference to the standards of the reasonable generator

86. In relation to Meridian's objection to the SO's determination process, we agree with the SO that the issues were made sufficiently apparent, that opportunities were provided to make submissions on the relevant points, and that Meridian in fact did make submissions on the issues in question.

87. We find the question of what was to be compensated somewhat harder to resolve on the papers. The Test Plan required Meridian to compensate for "station load during testing". This is not necessarily the same as system load, but the conduct of the parties during the tests suggests that it was apparent to all that the major risk in question was a UFE. In the email from the Investigators referred to above, this was explicitly addressed:

> *"Please alert Meridian that if they cause an under-frequency IL event they will be responsible for the event charges"*

88. We think that it would be better for Test Plans not to include unbounded statements to the effect that "Meridian will compensate" and that a tighter definition of the circumstances as to what would be compensated and how would be helpful. The improved template appears to be an improvement in that direction.

Orders

89. The Rulings Panel, has the power under clause 8.63 to:

> (a) Confirm the determination; or
> (b) Amend the determination; or
> (c) Substitute its own determination; or
> (d) Refer the determination back to the **system operator** with directions as to the particular matters that require reconsideration or amendment.

90. On this occasion, the Rulings Panel substitutes its own determination. It was open to the SO, in the context of the Code, to find that there was no causer.

91. We do not believe the SO has adequately shown that;

(1) Meridian's reduction of electricity on the occasion of its 135 MW drop load test caused the UFE on 1 May 2013;
(2) Meridian did not follow its Test Plan;
(3) That units G1 and G7 were not operated in a correct and responsible manner and that their response during the Event was not as would be reasonably expected;
(4) The HVDC transfer at the time of the Event did not affect the system conditions, and on Meridian's ability to comply with the Test Plan.

92. Therefore, there was no causer of the UFE on 1 May 2013, as

(1) The cause of the UFE remains unknown, or,
(2) In the alternative, if Meridian were the causer it is required to be disregarded as the causer by the operation of the exemption in the Part 1 (c) definition of causer.

Costs

93. As this is the first time a case of this nature has come before the Rulings Panel, we invite further written submissions from the parties on costs within 10 working days of the date of this decision. The parties may care to provide information on their actual costs and disbursements incurred in this complaint.

94. We thank Counsel for their careful and helpful submissions, which we found of great assistance.

Issued 5 June 2014

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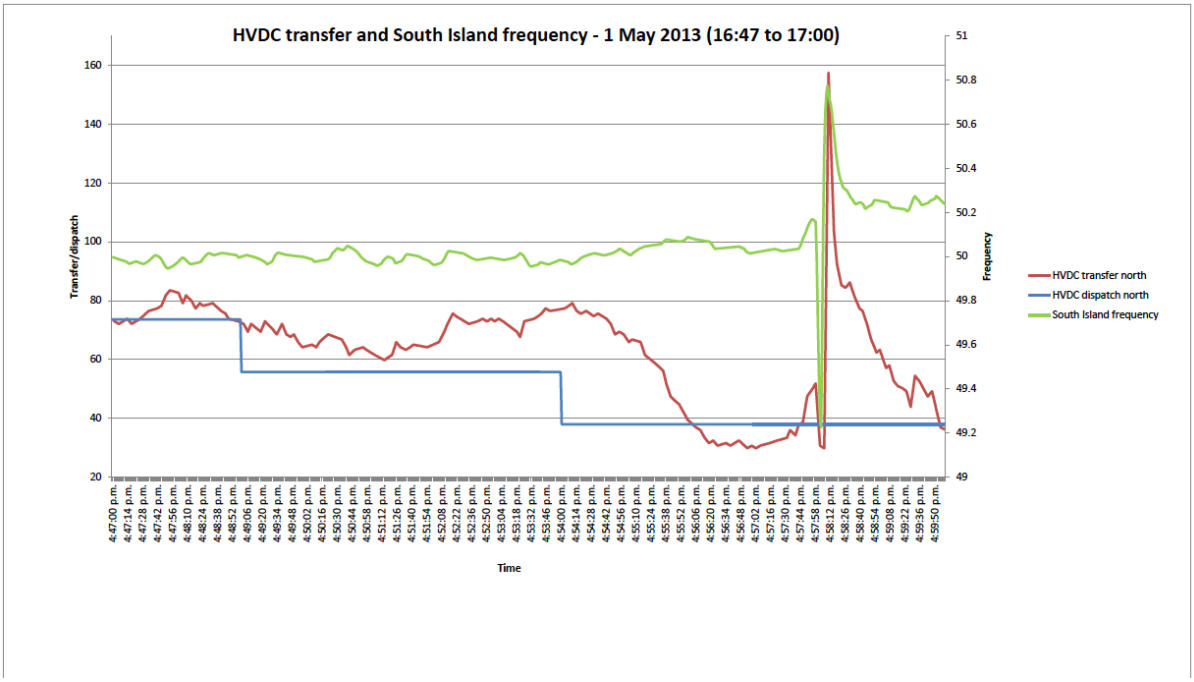
P.C. Dengate Thrush
Chair, Electricity Rulings Panel

Appendix One



Appendix Two

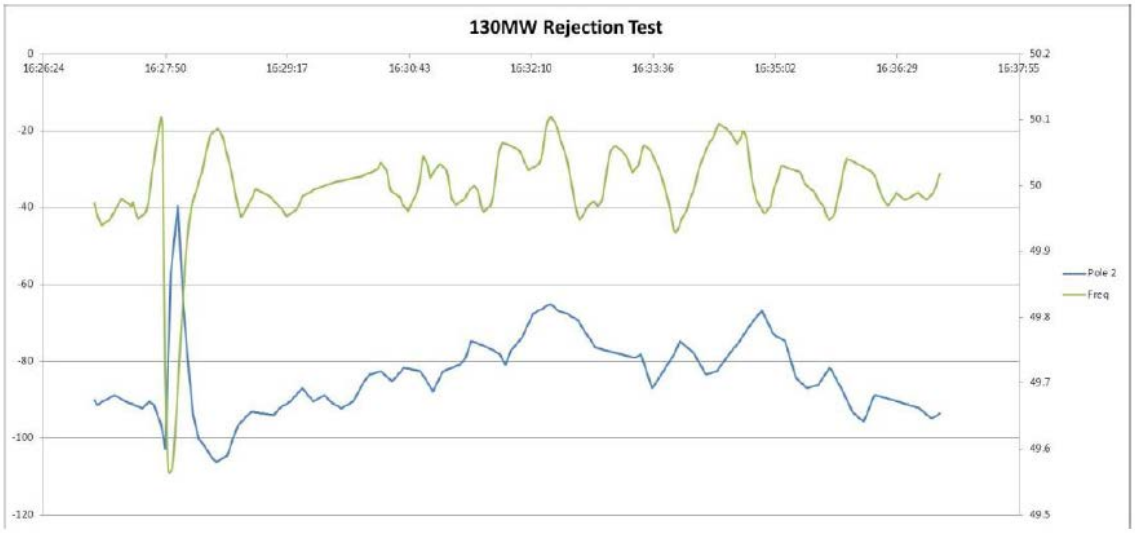


Figure 3 Pole 2 and South Island Frequency responses – 130MW Rejection Test