

IN THE MATTER of the Electricity Act 1992 and its amendments and the Electricity Governance Regulations 2003

AND

IN THE MATTER of a hearing on penalty against Transpower New Zealand Ltd acting as System Operator in relation to an admitted breach of rule 4.3 of section 111 of Part G of the Electricity Governance Rules 2003 in respect of trading periods 47 and 48 on 6 September 2004.

Rulings Panel Members

Neville Young-Chair

John Isles

John O'Sullivan

Gael Webster

Craig Taylor

Appearances for Electricity Commission

David Pay, General Counsel

Airihi Mahuika, Legal Counsel

Darryl Renner, Senior Advisor

Chadvar Petkov, Senior Investigator

Peter Wakefield, Investigator

Appearances for the System Operator

David Laurenson, Barrister

Chris Browne, Corporate Counsel

Fiona Abbott, System Operator

Dan Twigg, System Risk Manager

Kevin Small, System Operations Manager

Observer from Genesis Energy

Peter Kimber, Wholesale Market Manager

Date and Place of Hearing

26 July 2005, 3 August 2005

EQC Boardroom

DECISION OF THE RULINGS PANEL

Context of this Decision

Under Part 8 of the Electricity Regulations 2003 (the ‘Regulations’) the Rulings Panel (the ‘Panel’), an independent body corporate appointed by the Electricity Governance Board (referred to as the Electricity Commission (the “Commission”)), is given the function to decide complaints referred to it under the Regulations that a participant has committed a breach of these Regulations.

This hearing concerns a formal complaint referred by the Commission under the Regulations. All five members of the Rulings Panel have made this decision.

Referral of the Complaint to the Rulings Panel

The complaint concerns a breach of the Electricity Governance Rules (the ‘Rules’) by the System Operator, which was self-reported on 4 November 2004. The investigation was notified to the System Operator and the market participants pursuant to Reg 74 and 75 on 8 February 2005. Genesis Energy Limited joined the investigation as an affected party on 9 February 2005. By way of background, the parties were unable to reach a settlement of the matter as they disagreed on the matter of compensation. Genesis requested that the System Operator reimburse the parties who incurred increased costs from this error. Genesis was seeking compensation for participants affected other than itself, as Genesis received a net benefit (having received constrained on compensation payments under the Rules). The System Operator would not consider payment of compensation. Genesis stated that it regarded this as a test case and requested that the matter be referred to the Rulings Panel for consideration. The System Operator regarded the matter as unlikely to be suitable for referral to the Rulings Panel for determination. The Investigator provided his report to the Electricity Governance Rules Committee in which he recommended that it not lay a formal complaint. The Electricity Governance Rules Committee rejected this on 9 May 2005 and recommended to the Electricity Commission the laying of a formal complaint. The Commission at its meeting 31 May/1 June 2005 determined to lay a formal complaint with the Rulings Panel under Regulation 90(3).

The Commission’s reasons for the referral of the complaint to the Rulings Panel were that:

- the optimal management of power system frequency was put at risk as a result of the alleged breach. The Commission further noted that this risk had the potential to be considerably more significant had the alleged breach occurred at peak times;
- the alleged breach had caused increased costs and loss of income to some participants;
- no informal settlement could be reached between the System Operator and Genesis; and
- the Commission was concerned to ensure that an adequate remedy in the circumstances resulted from this admitted breach by the System Operator. This might not be the case if the matter was not referred to the Rulings Panel, given the parties’ failure to agree to a settlement (because of differing views as to the need for, or level of, compensation payable by the System Operator).

Under Reg 103 the Rulings Panel wrote to the investigator seeking further information, all correspondence, and a response to various questions it raised. This was provided to the Rulings Panel and the parties. On 5 July 2005 Genesis advised the Commission by letter that it now supported the Investigator's recommendation that no further action be taken and advised the Commission that Genesis would support a Commission withdrawal of the formal complaint. The Commission declined to seek a withdrawal of the complaint. All documents relied on by the Rulings Panel are noted at the conclusion of this decision. Genesis Energy Limited did not make any submissions at this hearing.

The complaint: breach of rule 4.3

The complaint concerns the admitted breach by the System Operator of rule 4.3 of section III of part G of the Rules on 6 September 2004, which provides as follows:

4.3 The system operator may depart from the dispatch schedule

The **system operator** may exercise discretion in departing from the **dispatch schedule** only where it is necessary to meet:

4.3.1 Dispatch objective

The **dispatch objective**; or

4.3.2 Restoration

The requirements of rule 5 of section II of part C in relation to restoration of the power system.

This rule provides for specific situations whereby the System Operator may depart from the dispatch schedule. In this instance, the System Operator admitted it failed to implement the dispatch schedule for trading periods 47 and 48, commencing at 23:00 and 23:30, on 6 September 2004, and that the reason for the failure to implement the dispatch schedule was not one of the reasons permitted by Rule 4.3. The reason was due to a series of errors described below.

Factual Background

The facts giving rise to the admitted breach were not in dispute between the parties; what was in dispute was the standard of the System Operator's management of the power system and the significance of the potential effects of the breach.

Data corruption in the dispatch schedule due to computer use error.

On 6 September 2004 a routine change was made to a parameter in the System Operator PSCHED database (this contains data of offered generation, demand, grid capability and availability which is input information for the dispatch schedules which are required to be produced and published for every trading period). The System

Operator uses the DMT (Dispatch Management Tool) to electronically formulate and issue dispatch instructions according to the dispatch schedule, and Real Time Dispatch (RTD) is the primary method used by the System Operator to prepare a dispatch schedule.

In order to register the change it was necessary for both operators in each of the Wellington and Hamilton control centres (where dispatch instructions are issued from) to restart their DMT. National dispatch was transferred to Hamilton at 17:30 and the operator in Wellington restarted DMT at that time. When restarting the DMT the Wellington operator inadvertently clicked on the “ Switch DMT to backup’ icon on the computer screen desktop. In doing so, the DMT was switched to the backup database (PPRICE) and the 17:30 dispatch grid was written to the PPRICE database. When in backup mode, all dispatch instructions are written to another database called the PPRICE database for market information purposes. At this time Hamilton had national dispatch control.

At 18:30 the System Operator day shift staff were replaced with the night shift staff. The only indication to the Wellington operator that the DMT was in back up mode was a small visual indicator on the bottom right hand side of the screen, which he failed to notice.

At approximately 22:45, national dispatch control was transferred back to Wellington. On producing a dispatch solution, the Wellington operator noticed there was a considerable mismatch between the DMT dispatch instructions being viewed in the Wellington control centre and the last dispatch instructions produced by the Hamilton control centre, and that the latter were clearly wrong. The dispatch instructions for the 22:30 – 23:00 trading period had been issued by the Hamilton control centre using uncorrupted PSCHED database prior to national dispatch being transferred back to Wellington control centre at approximately 22:45. The dispatch instructions for the 23:00 and 23:30 trading periods were affected by the data problem.

The Wellington DMT was using the dispatch instructions grid copied over to PPRICE from PSCHED at 17.35 (the time that the DMT was linked to PPRICE), which was why there was a mismatch between the instructions last produced by Hamilton (which was linked to PSCHED).

At 22.47 the Wellington operator noticed that DMT was linked to PPRICE and switched to PSCHED, this had the effect of copying the 17:30 dispatch grid from PPRICE to PSCHED. This action overwrote the dispatch grid in PSCHED, which meant it could no longer be used by either control centre to issue electronic dispatch instructions.

Steps taken by operator to remedy the error

At 22:48, the Wellington operator logged a call with IT support. At 22:57 the Wellington operator, assuming a database failure, attempted to use the electronic backup dispatch tool, FreqKemySAD, to issue dispatch instructions. However as FreqKemySAD uses the same dispatch grid, this electronic dispatch tool could not be used.

At 23:10 the Wellington operator shut down and restarted DMT. However, this still did not yield a sensible electronic dispatch solution.

At 23:18, after lengthy discussion with IT support, it was concluded the problem was not the PSCHED database, but the dispatch grid residing in the database. At this point, it was decided that the Wellington operator would continue to work with IT support to resolve the problem, and the Hamilton operator would voice dispatch the results from the last SDPQ. This corrective action occurred approximately 30 minutes after the error was noticed by the operator and too late for voice dispatch according to the schedule in the next trading period. The Hamilton operator dispatched the results of the SDPQ by voice but departed from the SDPQ by omitting some instructions and changing others.

Rule 4.10 section 111 of part G allows voice dispatch when electronic dispatch is unavailable. The System Operator explained that where it is unable to produce and dispatch an electronic dispatch schedule, it reverts to the last sensible solution for the relevant trading period and, using the solution as a base case, takes discretionary action to continue to meet the dispatch objective during real time and issue voice dispatch instructions. The primary basis for dispatch in these circumstances is the last valid SDPQ (a schedule of dispatch prices and quantities produced at the start of each trading period that covers the current trading period and at least the next seven trading periods. SDPQ uses the input information that existed in the PSCHED database at the time the SDPQ was produced).

The last SDPQ prior to the loss of the RTD was produced at 22.41. This covered the 22:30 trading period and the trading periods 23:00 to 02:00. From the time RTD was lost (22.45) to the time it became available (23:45), there were no significant changes to demand or generation, and only minor discretionary changes were needed.

At 23:45 the Wellington control centre produced a feasible set of RTD dispatch quantities from the DMT and dispatched the instructions electronically. Normal RTD dispatch resumed at 23:50.

Impact on frequency keeper

At 23:01 the Wellington operator contacted MRP to inform it of the dispatch difficulties, asked where it was in its band, and was told it was near the bottom. The System Operator requested the frequency keeper to notify it if there were any problems operating outside its band.

The lack of dispatch instruction to reduce generation on a declining North Island demand had the effect of increasing North Island frequency and requiring Mighty River Power as frequency keeper to maintain balance by continuing to reduce generation well below the 50MW band.

As a result of the breach, the frequency keeper (Mighty River Power) went 80MW below the control minimum of its frequency-keeping band. Mighty River Power contacted the System Operator at 23:18 to advise that it was operating 80MW below its frequency band.

Impact on the market

The breach disadvantaged some participants who had to pay extra market costs as a result of additional constrained on compensation being paid to generators at a cost to purchasers of \$23,028.58. The investigator provided these figures, and the costs attributable to identified participants in response to a question from the Rulings Panel. The amount of constrained on compensation that would have occurred cannot be calculated but could be considered as small in relation to the approximate \$23,000 total constrained on costs.

Our summary of 'errors'

The recital of facts, whilst necessary, is complex, and the Panel summarises the sequence thus:

1. Inadvertent use of the icon 'switch DMT to backup', suggesting a design issue with the screen layout.
2. The Wellington shift operator at 18.30 shift changeover missing the obscure visual screen indicator showing that DMT was in backup mode, suggesting a lack of robust shift changeover procedures.
3. The compounding of the problem at 22.47 when Wellington, noticing that DMT was linked to PPRICE, switched to PSCHED, which then used the dispatch grid 17.30 dispatch grid copied from PPRICE.
4. The operator attempted to rectify the problem "live", instead of transferring national dispatch back to Hamilton.
5. At 22.57, the Wellington operator, assuming a database failure, attempted to use the electronic backup dispatch tool FreqKeySAD to issue dispatch instructions. This was abortive because the tool uses the same dispatch grid.
6. Reliance on the Frequency Keeper through the period to the extent that it went well outside its' MW band.

Submissions

Submissions were presented in writing and orally on the issue of penalty and compensation. The Commission sought a civil pecuniary penalty at the higher end of the scale, or alternatively a compensation order.

The main arguments put forward by the Commission for imposition of compensation and/or a penalty were:

- System Operator control centre staff did not appear to be sufficiently prepared for such a contingency, and back up processes and procedures of the System Operator did not appear to have been adequately documented or formalised. The Commission considers that the System Operator should have ensured that there were clear instructions and training for such situations to avoid inappropriate decisions being made in the heat of the moment.
- As the SPD model was not available during the incident, there was a high level of departure from the normal processes and procedures, although there was no departure from the normal parameters and configuration of the system.

- Whilst the operational impact of the breach was moderate, the optimal management of the power system frequency was put at risk. This was clarified in subsequent submissions to be - that the breach resulted in the System Operator's management of system frequency causing the frequency keeper to be outside its offer band.
- The breach had the potential for significant operational and market impact had it occurred around peak times (ramping up and/or down), as the breach could have resulted in frequency dropping too low causing plant to trip off with the risk of cascade failure.
- Despite the System Operator assurances that a review of backup procedures was being undertaken, there were two similar system issues that resulted in alleged breach of the rules on 5 October and 12 November 2004. It was only following the October incident that the System Operator updated processes for refreshing databases and introducing a monitoring job to flag any instances of a database link between the development and production databases.
- This breach was particularly serious given its potential impact, even though the financial impact was only approx \$23,000.

The main arguments put forward by the System Operator against imposition of compensation or a penalty were:

- The market impact was relatively minor.
- The availability of the SPD and RTD is not a precondition for system security, the security of the system was never put at risk- and nor would it have been even if the breach had occurred during peak times.
- There is no concept of 'optimal management of the power system frequency' under the rules. In any event the history of operating the system demonstrates very clearly that assigned frequency keepers actually manage the frequency even where they have not received updated instructions.
- Purchasing of frequency keeping is managed through the mandated procurement plan process, which leaves the System Operator with the task of ensuring sufficient services are purchased and provided through ancillary services agreements. The System Operator has an obligation to meet its PPOs which have as their overriding objective system security, and the dispatch objective is 'subject to ... achieving the PPOs. Therefore there is no notion of "optimal power system frequency' in an economic sense in the rules.
- That the breach occurred at the least desirable time from a System Operator staffing perspective and IT back up availability.
- The Commission can more properly address the System Operator's management of the electricity system when it undertakes the annual performance review.

Rulings Panel may make certain orders

Orders under Section 172KE (1) (f) of the Act

Under section 172KE (1) (f) of the Electricity Amendment 2004 (the 'Act') the Panel has the power to make certain orders. The Commission sought a civil pecuniary penalty or compensation, considered below, and the Rulings Panel decided no other orders were appropriate.

Under section 172KE (1) (f) the Panel is to take into account any previous decisions. The Rulings Panel has attempted to be consistent in its consideration of an appropriate remedy in both this and the first decision, which were heard contemporaneously.

The Breach

The breach was the departure from the dispatch schedule for a reason other than that permitted by Rules 4.3. This departure was due to the failure to issue voice dispatch instructions in line with the dispatch schedule. The Systems Operator is entitled to revert to voice rather than electronic dispatch; indeed it is required to do so if it doubts the efficacy of electronic dispatch. Had it reverted to voice dispatch soon after it was aware of the data base problems there would have been no breach.

Issues such as ‘optimal management of frequency’ go to potential consequences and possible penalty rather than to the definition of the breach itself.

Factors to be taken into account when determining penalty

Under Reg 109 (2) the Rulings Panel must take into account the level of civil pecuniary penalties it has ordered in any similar situations, which it has done, and must seek to order payment of a civil pecuniary penalty that is commensurate with the seriousness of the case.

Further, the Rulings Panel must have regard to the matters set out below (Reg. 109(3)).

a) Severity of breach

There are two contrasting contentions regarding the severity of the breach. The System Operator contends that:

- The breach is admitted but is of a lower, ‘technical’ order. It was the failure to give correct voice dispatch instructions.
- At no point was the security of the transmission system in danger.
- Given the demand conditions (stable and low), there was little danger in opting to attempt to fix the IT error.
- If the event had occurred during a period of ramping up or down, generators would have recognised any significant disparities between actual and predicted supply. The fact that there was comparatively little disparity corroborates this.
- At a conceptual level, the System Operator is not required to dispatch according to the economic optimising model (SO Risk Manager)—“*The absolute requirement of the System Operator to meet its PPOs (that are all about security and nothing to do with optimal price) means that there is no concept of “optimal management of power system frequency” and again “the notion of optimal power system frequency does not relate to the dispatch objective, at least as the rules are currently drawn”* (paras 36 & 37 of submission).

The Electricity Commission contends that:

- the breach was potentially severe if it had occurred during periods of ramping up or down;
- but since the outcome had relatively little market significance, it is of a moderate nature.

The Panel's view:

In considering the severity of the breach, the Panel needs to avoid undue reliance on hindsight. The dispatch system operates in real time with a mixture of largely automatic or pre-determined instructions according to the regulatory objectives and Rules. When unplanned events occur, the System Operator must judge the nature of the event and its potential impact at the same time as attempting to fix it, all in real time. There will be inherent conflicts in the overall objectives when departures from the norm occur requiring the System Operator to make judgement calls. The key tension is the balance between security of supply and economic dispatch.

The Panel considers the operational errors surrounding the breach to be potentially serious because they could have led to a significant departure from economic dispatch for a longer period. Efforts to remedy the problem actually appear to have compounded it.

The alternative approach would have been to immediately revert control to Hamilton and adopt voice dispatch whilst the linkages between DMT, PSCHED and PPRICE were untangled.

The System Operator submitted that this alternative would have been followed during periods of ramping up and down, and that shift changes are set to avoid these times. We accept this submission.

Last, in cross-examination, the System Operator did not appear to accept that economic pricing dispatch is a key part of the Rules. Mr Twigg contended that the sole function is to ensure security of the system. The System Operator explained that operators are not concerned with economic dispatch when trying to remedy a system failure in real time, and in any event economic dispatch is achieved through the SPD model.

The Panel agrees that the first priority when an unplanned event occurs, is to ensure security of the system. We also agree that "optimal management of power system frequency" of the system is not explicitly set out in the Rules or regulations.

However, our understanding of Part G- Trading Arrangements, Section III Rule 2 is that economic pricing underlies the dispatch rules/formula and deviation is only permitted under certain circumstances.

Section III of Part G suggests re-establishment of normal operation should have regard, *inter alia*, to restoration of 'economic dispatch'.

Neither safety nor security was an issue in this event and there was no submission that the System Operator was failing to meet its PPOs. The Panel accepts there will be occasions when the first priority is given to maintaining the system and the economic dispatch objective is overridden.

The Panel accepts the System Operator's submission that the security of the system was not at threat.

We consider the breach to be "moderate" on the grounds that, whilst it was potentially severe, the Operator would have reverted to voice dispatch much earlier if demand had been ramping.

b) Impact of breach on other participants

It had a relatively minor effect on other participants. Our concern is focussed more on what it reveals of the Systems Operator's internal processes.

c) Extent to which the breach was inadvertent, negligent, deliberate, or otherwise

The initial error was inadvertent. The failure to not switch to voice dispatch in accord with the schedule as soon as possible was, in all the circumstances, unwitting at the realtime operator level.

d) Circumstances in which the breach occurred

These have been set out in the earlier summary of facts.

e) Any previous breach of these regulations or the rules by the participant

The Panel does not consider this factor to be relevant in this case.

f) Whether the participant disclosed the matter to the Board

There was voluntary disclosure.

g) Length of time the breach remained unresolved

The first error occurred at 17.30. However, the effect of this, and the subsequent compounding errors, did not take effect until 22.47 and then continued until 23.45 when the correct dispatch schedule was applied. The effective period of breach was approximately one hour.

h) Participants actions on learning of the breach

The System Operator has undertaken significant restorative actions:-

- Improved the screen layouts;
- Automatic referral to IT support when the database is switched to PPRICE.
- Shift change validation;

- Review of backup processes and operator training.
- i) *Any benefit that the participant obtained, or expected to obtain, as a result of the breach*

The participant neither gained nor sought any benefit from the breach.

- j) *Any other matters that the Rulings Panel thinks fit*
 The Panel was considerably helped by the description of operating processes given by Kevin Small, and his amplification of the remedial measures made by the System Operator.

Penalty

A penalty of \$2500 is imposed taking into account the ‘errors’ set out in the recital of facts, the mitigating points put by the System Operator and set out in the context of the matters the Panel is required to take into account.

Reg 111 Liability of system operator in relation to security issues:

The Rulings Panel notes that the heading of Regulation 111 refers to security issues, but the text refers to a wider range of matters the Panel must take into account when considering the liability of the System Operator or whether to impose a penalty or costs, including *‘the fact that the real time operation of the power system may involve a number of complex judgements and interrelated issues.’*

The parties did not consider that Reg 111 had any bearing on complaint before us, the Panel considers that any relevant matters under Reg 111 have effectively been taken into account when determining the factors considered under Reg 109 (3).

Compensation

The Panel has power under section 172KE (1) (f) of the Act to ‘order any participant to pay a sum by way of compensation to any other person’.

The Commission submitted that simply leaving the losses where they fall may not be fair to the participants that were affected by the System Operator’s breach, and that there is a need to ensure that the System Operator has incentives to ensure such potential risks are minimised quickly in the future.

The Panel considers as a matter of general principle that compensation should be paid to, and funded by, participants to put them back in the position they would have been in, but for the breach occurring.

It follows that any participant who received a benefit as a result of the breach should be required to pay compensation equivalent to that benefit. Similarly where a participant has breached the Rules and there is a shortfall in any compensation payable by the participant who has benefited, then the participant who breached the Rules should make up that shortfall.

The Panel has the figures provided by the Clearing Manager on where the losses and benefits fell as a result of the breach; neither party challenged these figures. However the System Operator noted that the assessment of the market impact by the Clearing Manager was hypothetical and could be less than stated. The System Operator submitted that on the basis of the figures the net market impact in terms of over payments is \$17,290.21, whereas the Commission considered this should be the gross market impact at \$23,028.58.

The Panel concludes that in the particular circumstances of this breach, the cost of determining precise compensation would greatly outweigh the 'purity' of a decision ordering that all parties be restored to their status quo ante. However the Panel states that it will consider imposing compensation in future, to the extent permitted by the Rules and Regulations.

Costs

The Commission did not seek costs. The Panel reserves its decision on costs until it determines the issues it has raised in its draft decision on the Otahuhu SPD breach, as to where costs finally reside.

The Panel wishes to thank the parties for their co-operation in resuming the hearing at short notice and their willingness to engage with the Rulings Panel as it familiarised itself with the issues.

Documents

The following documents were relied on by the Panel:

- All documents in the Correspondence folder compiled by the Investigator
- The Investigator's response to the questions raised by the Panel
- The initial submission and supplementary submission provided by the System Operator
- The initial submission, and submission on penalty provided by the Electricity Commission

NGA Young
Chairman
Rulings Panel

26 September 2005