

Case Study Two

Rule 4.11 of section III of Part G of the Electricity Governance Rules 2003

Compliance with Dispatch Instructions

Introduction

We had a positive response to our first case study released in August. Thank you to those of you who contacted us with your feedback.

The topic for this, our second case study, will also be rule 4.11 of section III of Part G of the Electricity Governance Rules. This time we are focusing on breaches in circumstances where the automated control system in combined cycle thermal power plant takes the control of the generation output and results in a deviation from dispatch instructions.

The EGR Committee has noted with concern the increasing number of breaches associated with these systems in combined cycle thermal power stations. It sees benefit in informing the market about the existence of this problem and providing some tips on how to handle the situation to reduce the likelihood of breach.

The Committee appreciates Contact Energy Limited's permission to use the events of a breach that Contact reported for this case study. The events surrounding this breach are typical of breaches that other operators have experienced, and therefore contain useful learnings for all operators of combined cycle thermal stations.



Breach of rule 4.11 of section III of part G by operators of combined cycle power plants

A feature of combined cycle power plants is instability at certain levels of generation. This instability is managed by special ramping profiles that, in most stations, are supported by automated control systems. The difficulty where compliance with the Rules is concerned is that once the automated ramping is started it usually cannot be interrupted without tripping the unit, and that the unit controlled by automated system may not comply with its dispatch instructions.

The EGR Committee considered a number of cases involving this type of unit where rule 4.11 is breached after the automated loading has commenced, and operators have claimed a bona fide reason for not complying with the system operator's dispatch instructions. In some of the cases the operators have argued that to comply with the System Operator's instructions would put personnel or plant safety at risk.

Circumstances of the breach

30 June 2008

21:28 - The Otahuhu Combined Cycle Power Station (OTC) went into an automated emergency run-back due to a cooling air fault. Running back from full capacity generation (375 MW) down to 0MW usually takes 50 minutes.

OTC was ramped down for a bona fide physical reason. The operator advised the System Operator of the bona fide event and prepared a revised offer under the provisions of rule 3.17.1.1 of section II of part G.

21:58 Contact's trader submitted a written offer of 0MW (from 375MW) for OTC beginning 22:00

22:00 hours - OTC had continued ramping down. At 22:00 when dispatched to zero (based on the new confirmed written offer), the unit was producing approximately 177MW.

22:09 hours - The intermittent fault cleared and the OTC Operator reset the automated control systems. Once reset, the system attempted to return the generator to its last set point at 375 MW according to its algorithm. The OTC Operator intended to call the System Operator's Energy Coordinator once the status of the plant had been evaluated. Meanwhile the System Operator's Energy Coordinator called the OTC Operator and the OTC Operator made a request to leave the plant to generate at the current level. The System Operator's Energy Coordinator informed the OTC Operator that the plant could not be left to generate at the current level, and the OTC Operator responded that he would ask the Contact Trader on duty to confirm the situation with regard to OTC's offer.

The Trader immediately called the Energy Coordinator, but due to the lack of a written offer to generate (the actual offer was for 0MW), the Energy Coordinator confirmed that OTC was not able to do anything other than ramp down to 0 MW.

22:16 hours - The Trader asked the OTC Operator to ramp the unit down to 0 MW.

22:22 hours - The steam turbine is tripped and the GT shut down under emergency run back.

1 July 2008

03:00 hours OTC is dispatched back under a new revised offer (but only following a full shut down and subsequent check on the plant).

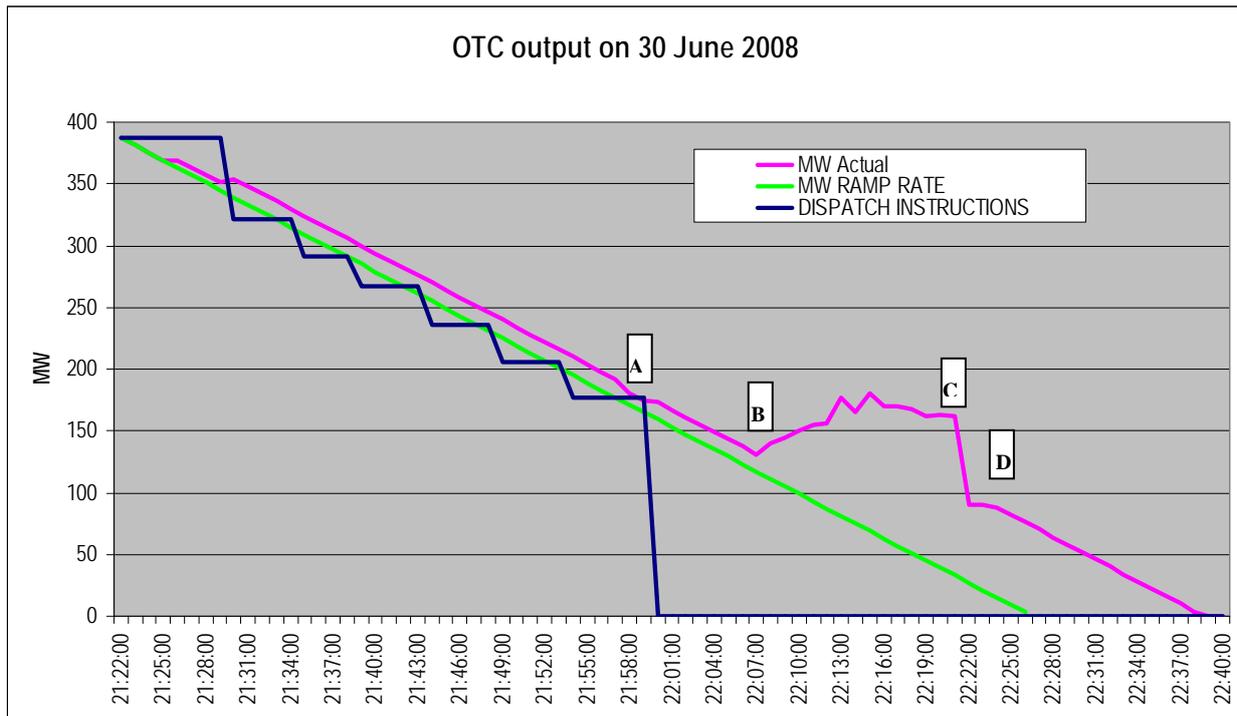
Reporting of breach

Contact self-reported the breach on 25 July 2008. It advised the Commission that it believed it may have breached Rule 4.11 of section III of part G during TP 45 and 46 on 30 June 2008.

On 29 July 2008, the System Operator also notified the breach.

The graph below illustrates the event, including changes to the dispatch instructions and the plant outage.





- A – Dispatch instruction for 0 MW received
- B – Fault cleared, OTC Operator reset the automated control systems
- C – Steam turbine tripped
- D – GT shut down under emergency run back.

Remedial Actions

Following the incident Contact reminded all of its station operators that during such events and in such circumstances they are to immediately inform the System Operator that they are unable to follow dispatch instructions. Contact reminded its traders of the importance of submitting revised offers on time following a bona fide event.

Contact’s Dispatch Manager and Dispatch Trader visited OTC to investigate this incident, seek input from the OTC operator’s perspective and learn more about the operational and physical complexities of the OTC power station with particular emphasis on the events in question on 30 June 2008 and similar events previously recorded.

In this meeting the process of re-offering energy was reviewed, along with the relevant rules of part G. These issues were summarised by Contact’s Operations Manager at OTC, who issued a “Shift Instruction.” This instruction reviews issues and highlights considerations when dealing with an Emergency Run Back situation.

OTC Operators and Dispatch Team members were also trained on the “Shift Instruction”.

Contact expected that, as a result of the remedial actions it took, these types of problems would be better managed in the future.

Effect of breach

Market Governance considered that the breach had minimal impact on the market. No operational or security impact was advised as a result of this incident as it occurred during off peak hours. Market Governance advised the EGR Committee that while no significant price changes were observed,

non-compliance with dispatch instructions is a serious breach and could have had significant market and operational consequences.

It is considered that Contact has lost revenue as a result of the ramping down and tripping of the unit. The operational impact of the tripping of OTC was minimal. However, the situation could have been very different should have it happened in a moment of shortage of generation when it could have serious market and operational impact.

The Committee's decision

The Committee considered the breaches and accepted the investigator's recommendations to:

- decline to pursue notification of the admitted alleged breach in accordance with regulation 67(1) (c); and
- issue a warning letter.

The Committee Chair sent a warning letter to Contact advising of the Committee's decision and the reasons for that decision. The System Operator, who along with Contact also notified this breach, was advised of the Committee's decision as well.

Investigator's tips on how to avoid breaching rule 4.11

The EGR Committee is supported in its role of assessing breaches of rule 4.11 by the Commission's Senior Investigators ("the investigators"). Over time the investigators have looked into many alleged breaches and have the following tips for how to avoid breaching rule 4.11. Remember, the tips are just that; tips. You know best how to run your operations to comply with the Rules!

- **Keep the System Operator informed:**

The investigators' advice is to keep the System Operator informed of any deviation from the dispatch and any events that may cause non-compliance with dispatch instructions. That way steps can be taken to minimise the impact.

- **Co-ordinate ramping up with the System Operator:**

Investigators suggest that you advise the System Operator of your further actions – the fact of ramping down, the ramp rate, and the possible time of ramping down or certain ramping profiles to be followed.

- **Consult with your company's trader when ramping up in these situations:**

Investigators advise you keep your trader or trading agent updated of plant status and your further actions – the fact of ramping down, the ramp rate, the possible time of ramping down or certain ramping profiles to be followed.

- **Submit revised offers on time after a bona fide event:**

Investigators suggest that the revised offer is submitted as soon as possible, preferably before the beginning of the next trading period. Remember, the System Operator may constrain your generation off, but to return it to service a new offer is required.

- **Know well your plant and its automated control system:**

Investigators suggest that all operators should be well aware of the plant limits and its ramping profiles supported by automated control in the light of compliance with dispatch instructions. Please, remember to check with your trader if the plant is properly offered and dispatched before you press the button resetting or starting the automated control system. If you do not check this information be prepared to ramp down or even to trip the unit.

Be aware that dispatching of unoffered generation is a breach of the Rules and the System Operator may insist on reducing and even tripping your generation if it is not properly offered and dispatched.

- **Remember: *Most breaches are avoidable. Most solutions are simple.***

Decisions by the Committee are based on a number of factors and the particular circumstances of the breach on a case by case basis and therefore do not preclude a decision to appoint an investigator to formally investigate a breach with similar circumstances.