# Critical Contingency Performance Report

Pursuant to Regulation 65 of the Gas Governance (Critical Contingency Management) Regulations 2008

## Maui Pipeline Outage of 25 – 30 October 2011

Prepared by

Vector Gas Limited

21 December 2011

# INTRODUCTION

This is the Critical Contingency Performance Report on the Maui Pipeline Outage of 25 – 30 October 2011, prepared by Vector Gas Limited[1] (*Vector Gas*), in its role as the Critical Contingency Operator (*CCO*) for the New Zealand gas transmission system and in accordance with the Critical Contingency Operator Service Provider Agreement dated 28 November 2008.

Given the nature and scale of the outage, a number of other post-event reviews and investigations are underway. This report is about one particular aspect of the outage: how various parties with responsibilities under the Gas Governance (Critical Contingency Management) Regulations 2008 (*the Regulations*) and associated documents[2] (*Documents*) that govern the management of critical contingencies performed during the outage. The report is **not** about the causes of the outage, the repair of the Maui Pipeline, the impact of the outage on consumers or the processes by which information related to the outage that was not part of the critical contingency process was communicated. The Acting Minister of Energy and Resources has asked the Ministry of Economic Development to complete a review of the outage which has a much wider focus than contained in this report. The terms of reference of MED's review can be found on its website[3].

## Statutory basis of this report

This report has been prepared in accordance with the requirements of regulation 65 of the Regulations, which require us to prepare and publish a performance report after the end of each critical contingency. The report needs to be prepared and published within 20 business days of the end of the contingency, unless we and the Gas Industry Company agree to an extension. In this case, given the length and severity of the outage that lead to the contingency, we agreed with the Gas Industry Company that the report should be published by 23 December 2011.

We have previously published an Incident Report in accordance with regulation 64. The Incident Report includes material on the cause of the critical contingency and its duration; the actions taken by us and Transmission System

[1] Vector Gas, a wholly owned subsidiary of Vector Limited, is the Technical Operator of the Maui pipeline for Maui Development Limited under the provisions of the Contract of Employment that forms part of the Maui Joint Venture Agreement 1974. Vector Gas has also been appointed as the Critical Contingency Operator for the transmission system under an agreement with the Gas Industry Company.

[2] The Critical Contingency Management Plans, the Critical Contingency Communications Plans and the Critical Contingency Operator's Information the Guide.

[3] http://www.med.govt.nz/templates/StandardSummary____13833.aspx

Owners (*TSOs*) and the general level of compliance by retailers and consumers with TSO directions. A copy of the Incident Report is attached at **Appendix 1** of this report. An electronic copy can be obtained from the publications section of our website[4].

## Statutory requirements for the report

Regulation 65(1) requires the performance report to include three separate parts:

- An assessment of our compliance and that of the Transmission System Owners[5] with the Regulations and the effectiveness of the Documents;
- An assessment of the extent to which we consider that the Regulations and the Documents achieve the purpose of the Regulations; and
- Our recommendations to amend the Regulations or the Documents to better achieve the purpose of the Regulations.

The Regulations require us to consult with each affected Transmission System Owner and any other person we consider necessary in preparing a performance report.

This report has been prepared in consultation with the Transmission System Owners – Maui Development Limited and Vector Gas – and with the Gas Industry Company and the Ministry of Economic Development. We also invited submissions from a range of industry participants and stakeholders. Feedback was received from the following parties:

- Might River Power
- New Zealand Steel
- Contact Energy
- Ministry of Agriculture and Forestry
- Ministry for the Environment
- Greymouth Gas New Zealand
- Energy Direct New Zealand
- Counties Manukau District Health Board
- Tairawhiti District Health Board
- Vector[6]

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[4] https://www.oatis.co.nz/Ngc.Oatis.UI.Web.Internet/Common/Publications.aspx

[5] In the case of the Maui Pipeline, the Transmission System Owner is Maui Developments Limited. For further details of Maui Development Limited, please see their website at http://www.mauipipeline.co.nz. Vector Gas is the Transmission System Owner of the Vector gas transmission system. While the legal entity Vector Gas is also the Critical Contingency Operator, at the operational level, the TSO and CCO functions are undertaken by different business units of Vector.

[6] Units of Vector that are in the gas trading, gas retail and gas transmission business provided feedback to that part of the business that undertakes the critical contingency operator function. In the remainder of this report, if we use the term "Vector", we mean any part of the Vector group other than the critical contingency function.

- Origin Energy Resources NZ
- Wilson Hellaby

## The purpose of the Regulations

The purpose of the Regulations is specified in regulation 3 as "to achieve the effective management of critical gas outages and other security of supply contingencies without compromising long-term security of supply".

We interpret this purpose as requiring that the transmission system remains stable at all times by managing demand levels to avoid the critical contingency threshold pressure limits specified by the Transmission system Owners being breached. This in turn ensures that supply continuity to connected gas distribution networks is secured.

Schedule 2 of the Regulations, which detail the curtailment arrangements that are to apply if there is a critical contingency, also contains the following purpose statement:

> "The objectives of the curtailment arrangements set out in this schedule are to—
>
> (a) ensure that gas is supplied in a safe, efficient, and reliable manner; and
>
> (b) minimise net public cost; and
>
> (c) prioritise the supply of gas to essential service providers; and
>
> (d) allow for minimal load consumer supply; and
>
> (e) ensure efficient utilisation of gas in storage facilities; and
>
> (f) ensure effective operational management of a critical contingency."

## WHAT IS A CRITICAL CONTINGENCY?

A critical contingency is generally declared when gas supply is disrupted to all or part of the natural gas transmission system. Such a disruption can be caused by an outage in a gas production station that prevents gas entering the transmission system or a fault (e.g. a leak or breakage) in a transmission pipeline that prevents gas from being delivered into or from the pipeline.

The pressure in the transmission system needs to be kept within a specific range, and a mismatch between gas demand and gas supply can cause gas pressures to move outside this range, which can jeopardises the safe delivery of gas, this in turn requires that a critical contingency be declared under the Regulations. The Regulations also provide for specific gas pressure threshold limits to be set by the Transmission System Owners. Engineering standards are used to determine the maximum safe limits that pipes can withstand. These limits are then audited and certified by Lloyd's Register in accordance with the Health and Safety in Employment (Pipelines) Regulations 1999.

### What happens during a critical contingency?

As the Critical Contingency Operator, we have the responsibility under the Regulations for declaring and managing critical contingency situations. Once we have declared a critical contingency, our objective is to stabilise pressures and gas supply on the affected parts of the transmission system. Stabilising pressure is important, because if gas pressure drops too low – if the pipeline is effectively sucked dry of gas – then restoring full gas supply to the affected downstream networks can take a very long time (possibly months).

The tools we use to achieve our responsibilities depend on the nature of the contingency.

If the contingency is caused upstream, we would explore options to increase upstream gas production or gas storage outside the system[7].

Where the contingency is the result of a fault in a transmission pipeline, the main tool we have in managing pipeline pressure is the ability to require industrial and commercial gas consumers to stop using gas on the affected parts of the transmission pipeline. We issue our directions directly to the TSOs who then instruct both large consumers (i.e. power stations) to cease their gas usage as soon as possible and to retailers who in turn must instruct their other consumers to curtail demand in accordance with the TSOs direction.

Under the Regulations, gas consumers are separated into bands depending on the level of their gas usage. These are set out in **Table 1** below.

The regulations establish a hierarchy of consumers, based on a range of criteria, including:

- The nature of the use to which the gas is put (e.g. essential service providers are in a separate class);

[7] See regulation 53(1)(c).

- The availability of alternative fuel sources; and
- The volume of use.

The Regulations provide for:

- the appointment of people to perform various roles established by the regulations;
- setting fees to cover the development of the critical contingency system and its ongoing costs;
- the establishment of a critical contingency website;
- processes for:
    - the preparation, review, approval, publication and testing of critical contingency management plans (*CCMPs*) by the Transmission System Owners;
    - the preparation and publication of a communications plan and information guide; and
    - the declaration and termination of a critical contingency, and the curtailment and restoration of gas consumption during a critical contingency;
- the obligations of certain parties before, during and after a critical contingency; and
- a methodology for the calculation of contingency imbalances and the determination of a critical contingency price.

## TABLE 1

## CURTAILMENT BANDS

| Curtailment Band | Consumption in Terajoules (TJ) | Description |
|---|---|---|
| **0** | N/A | Gas off taken for injection into storage |
| **1a** | More than 15TJ per day | Consumers (excluding essential service providers) supplied directly from the transmission system and that have an alternative fuel capability. If minimum load consumer then manage wind-down of plant |
| **1b** | More than 15TJ per day | Consumers (excluding essential service providers) supplied directly from the transmission system and that do **not** have an alternative fuel capability. If minimum load consumer then manage wind-down of plant |
| **2** | More than 10TJ per annum and up to 15TJ per day | Consumers (excluding essential service providers) with alternative fuel capability. If minimum load consumer then manage wind-down of plant |
| **3** | More than 10TJ per annum and up to 15TJ per day | Consumers (excluding essential service providers) **without** alternative fuel capability. If minimum load consumer then manage wind-down of plant |
| **4** | More than 2TJ per annum and up to 10TJ per annum | Consumers, excluding essential service providers. Minimal load consumers in curtailment bands 1a to 3 curtailed in full |
| **5** | More than 2TJ per annum | Essential service providers |
| **6** | 2TJ or less per annum | All remaining consumers (this does not include domestic consumers as domestic consumers are not covered by the Regulations) |

## THE OUTAGE

This report is about a critical contingency that was declared following the detection of a suspected gas escape adjacent to the Maui pipeline in north Taranaki. As noted above, it does not cover issues surrounding the causes of the outage and the repairs to the pipeline, except to the extent that such matters have a bearing on the management of the critical contingency or the operations of the Regulations and the Documents.

To provide some context for the remainder of this report, we outline below a brief chronology of events before, during and after the outage. The source of this section is our previously published Incident Report.

The outage can be divided into five distinct phases:

- *A Potential Critical Contingency Stage:* this ran from the evening of 24 October till 1.25am the following morning. During this stage, we were aware that a suspected gas escape had been detected adjacent to the Maui pipeline and that it was possible that a critical contingency might need to be declared;
- *The Declaration of Critical Contingency Stage:* we determined that a critical contingency situation existed at 1:10am on Tuesday 25 October and at 1:25am issued a notice declaring a critical contingency;
- *A Demand Curtailment Stage*: The curtailment of supply started at 2:35am on Tuesday 25 October with band 1a and 1b large consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory[8] and at 10.15am, we decided that full curtailment of band 2-6 consumers would be required[9];
- *A Demand Restoration Stage*: by 2:00am on Sunday 30 October, Vector had repaired the pipe and restored the system to its pre-outage configuration; and
- *Termination*: we terminated the Critical Contingency at noon on Sunday 30 October.

### Potential Critical Contingency Stage

#### *Monday 24 October 2011*

On the evening of Monday 24 October 2011, Vector Gas Operations Control at Bell Block in Taranaki advised our duty manager that a suspected gas escape had been detected adjacent to the Maui pipeline in north Taranaki.

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[8] At the time of the curtailment, Contact Energy's gas-fired power station at Otahuhu was off-line for routine maintenance. We included it in our notices even though it was off-line, to ensure that it did not have a mandate to commence taking gas during the critical contingency.

[9] On the morning of 26 October, we determined that there was likely to be sufficient gas available for some modest restoration of supply. Over the next three days, progressively more users were restored. We achieved this by issuing "revised curtailment notices", as the Regulations as currently drafted do not expressly envisage a situation where the transmission system is curtailed and then partially restored. This is a matter we address in more detail below in our review of the Regulations.

At about 10.00pm, Vector[10] completed the preparation of plans to isolate and depressurise the 24.2km section of the Maui pipeline between Pukearuhe Main Line Valve and Mokau Compressor Station to facilitate safe investigation and repair of the source of the escape. Field crews were dispatched to prepare for the pipeline isolation.

We issued a Notification of Potential Critical Contingency at 10:50pm.

At 1.00am Tuesday 25 October 2011, Vector closed the Pukearuhe Main Line Valve as the first step in isolating the section of pipeline containing the escape. The pressure in the Maui pipeline at the time of isolation was 44 barg[11]. Mokau Compressor Station continued to operate in order to reduce the pressure between Pukearuhe and Mokau and to increase pressure and line pack[12] north of Mokau.

The Mokau Compressor Station was stopped when the pipeline pressure reached 38.4 barg and the Mokau Main Line Valve was then closed. The pipeline section between Pukearuhe Main Line Valve and Mokau Compressor Station was then fully isolated.

## Declaration of Critical Contingency Stage

### *Tuesday 25 October 2011*

We determined that a critical contingency situation existed at 1:10am on Tuesday 25 October 2011 and at 1:25am issued a notice declaring a critical contingency.

Within five minutes of the notice of a critical contingency, Vector Gas Operations Control informed the control rooms at all large consumers that we had declared a critical contingency and that demand curtailment directions would follow for Huntly Power Station, Southdown Power Station and the Te Rapa Co-generation Plant.

At about the same time, Vector started the Mahoenui Compressor Station to increase pressure and line pack in the Vector 200 line[13].

## Demand Curtailment Stage

The curtailment of demand started at 2:35am when we issued a notice directing demand to be fully curtailed at the band 1a and 1b large consumers at Huntly

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[10] As noted above, different parts of the Vector group have different roles within the gas transmission system and the wider gas industry. In this timeline, we use the general term "Vector" to cover all people and corporate entities within the group.

[11] The standard unit of pressure is a "bar", and is roughly equal to the atmospheric pressure on Earth at sea level. When describing the pressure of gas in a pipeline, the usual practice is to measure the pressure above atmospheric pressure (which is around 1 bar); this is known as the *gauge* pressure and is referred to in writing as *barg* (and spoken as "bar gauge").

[12] Line pack is the technical term for the amount of gas contained in a pipeline at any one time. Subject to the need to maintain pressure in the pipeline at a sufficiently high level to allow restoration of supply, line pack can be used to supply users of gas for a time, even though gas is not being injected into the transmission system.

[13] The high pressure natural gas pipeline owned and operated by Vector which runs near the Maui pipeline in the area of the gas escape.

Power Station, Southdown Power Station and the Te Rapa Co-generation Plant by 3:30am.

In the hours that followed this initial curtailment, we discussed the developing situation with the Vector Emergency Response Team[14] handling the outage, monitored the state of the transmission system and analysed the capacity of the system to provide gas supply to consumers.

Following that analysis, we decided at 10.15am that full curtailment of band 2-6 consumers would now be required in order to conserve line pack in the Vector pipeline should this also need to be isolated and at 10:40am we issued a revised demand curtailment direction for all band 2 – 6 consumers to curtail demand immediately in the affected areas. In light of this decision, Vector and the Gas Industry Company commenced plans to issue a media release including a general public appeal for gas to be used sparingly in the domestic sector.

At 12:55pm, Vector completed depressurisation of the isolated section and at 1:07pm they confirmed that the gas escape has ceased, which provided positive identification that the Maui pipeline was the source of escape.

By 4:00pm, Vector advised us that the Vector 200 line was in a secure condition but surrounding works on the Maui pipeline needed to be carried out carefully to ensure ongoing integrity. This increased our confidence levels on the continued availability of the Vector 200 line to supply a reduced quantity of gas to the affected area for the duration of the incident. We therefore decided that restoration of partial demand could now be considered depending on actual system pressures and off take rates.

Evening peak demand period commenced at 5:00pm and we monitored system performance to assess levels of demand curtailment and to check if calculated demands in the domestic sector matched actual demand profile, using models we have developed that aid in projecting demand under various scenarios.

At 7:30pm, Vector commenced excavation of the Maui pipeline at the location of the escape.

Evening demand peaked at 6.5 standard cubic meters per second (*SCMS*) (950 Giga Joules per hour (*GJ/h*)). Residual line pack from the Maui pipeline was used between 2:00pm and 10:00pm to supply the Vector BOP lateral during the implementation of demand curtailment and the reduction of demand on the Vector pipeline.

### *Wednesday 26 October 2011*

The Vector Emergency Response Team continued to work through the night and at 2:00am discovered a split in the pipeline next to a seam weld. The split was approximately 120mm long.

Morning demand peaked at 7.3 SCMS (1,051 GJ/h), indicating that demand curtailment had been particularly effective and that domestic consumption had

[14] As part of Vector's business continuity policies, Vector has a number of Emergency Response Teams associated with different operational business units that respond to emergency events on an operational level to rectifying the specific problem, acting in accordance with standing emergency response plans. In the case of the Maui outage, the Gas Transmission Emergency Response Team was mobilised and the Gas Transmission Emergency Response Plan activated.

dropped significantly from seasonal norms. Vector pipeline line pack increased moderately during the previous day due to the significant demand curtailment that had been implemented.

After consultation with Vector, we determined that some demand from curtailed bands could be restored if used sparingly. Due to the potential impact of gas curtailment on consumers in band 5 (essential service providers) and the environmental concerns over the inability of dairy factories to receive and process raw milk, we decided after consultation with the industry to issue a revised curtailment direction to restore gas to band 5 consumers (but with a request that they use gas sparingly). We also determined that there might be some system capacity available to restore supply to consumers to be re-designated to band 5 by their retailer. A process for retailers to approve re-designation of consumers into band 5 was agreed in consultation with the Gas Industry Company. We informed retailers that they would need to give us formal notification of these re-designation approvals and that they would be confirmed on a case-by-case basis before being released for restoration.

Vector advised us at 6:00pm that the isolated section of the Maui pipeline had now been purged of gas and that they were preparing plans to cut the pipeline to remove the damaged section. Vector's plans to prepare a new section of pipe to replace the damaged section were in progress.

By 8:00pm we had received confirmation from retailers that they had approved 15 consumer re-designations to band 5. Each of these was assessed and we confirmed that spare capacity would be available.

Evening demand peaked at 7.8 SCMS (1,123 GJ/hour).

### *Thursday 27 October*

Morning demand peaked at 12.3 SCMS (1,771 GJ/hour). This indicated that demand had now built following the restoration of band 5 the previous morning and band 5 re-designations during the previous day. Vector pipeline line pack decreased moderately during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to supply during the previous day.

Based on the underlying peak demand being 9.3 SCMS (1,340 GJ/hour), we determined, after consultation with Vector to determine when repairs were expected to be completed, that some further demand from curtailed bands could be restored, again if used sparingly. We decided that band 6 could be restored under the prevailing conditions while reserving provision for further band 5 re-designations to be catered for if required.

At 11:00am, Vector completed the cut out of the damaged section of pipeline and detailed dimensional checks for the preparation of a new piece of pipe to replace the damaged section.

By 6:00pm, we had received confirmation from retailers that they had approved a further 10 consumer re-designations to band 5. Each of these was assessed and we confirmed that spare capacity would be available.

Vector commenced fabrication of a new piece of pipe to replace damaged section in a contactor's New Plymouth workshop at about 8:00pm. Vector was nearing

completion and approval of the procedure for re-commissioning the isolated stretch of pipeline.

Evening demand peaked at 8.5 SCMS (1,224 GJ/hour).

### *Friday 28 October 2011*

Vector delivered the newly fabricated replacement piece of pipe to the site of the leakage for installation at 4:00am.

Morning demand peaked at 10.5 SCMS (1,512 GJ/hour). This indicated that demand had now built up further following the restoration of band 5 on Wednesday morning followed by the restoration of band 6 on Thursday morning and the band 5 re-designations during the previous two days. Vector pipeline line pack decreased moderately during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to supply during the previous day.

Based on utilising line pack availability in the Vector pipeline with the possibility of using available residual line pack from the Maui pipeline, we determined, after consultation with Vector that some further demand from curtailed bands could be restored if used sparingly. We therefore decided at 9.30am that band 4 could be restored under the prevailing conditions while reserving provision for further band 5 re-designations to be catered for if required.

Vector completed final cutting of the existing pipeline and tack welded the new piece into place ready for final welding at 12:45pm. Vector had received the necessary approval from Lloyd's Register for its planned repair methodology.

We issued a notice to the Gas Industry Company, the Ministry of Civil Defence and Emergency Management and the Ministry of Economic Development at 1:17pm that the critical contingency would extend beyond 3 days from declaration.

By 6:00pm, we had received confirmation from retailers that they had approved a further 7 consumer re-designations to band 5. Each of these was assessed and we confirmed that spare capacity would be available.

Vector had fully welded the new section of pipeline and commenced the initial set of Non Destructive Testing (NDT) of the welds at 8:00pm.

Evening demand peaked at 11.5 SCMS (1,656 GJ/hour).

### *Saturday 29 October 2011*

At 8:00am, Vector informed us that the initial set of NDT was passed as satisfactory.

Morning demand peaked at 13.8 SCMS (1,987 GJ/hour), indicating that general demand was building due to the restoration of bands 4, 5 and 6 during the last three days and the band 5 re-designations. Vector pipeline line pack decreased markedly during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to supply during the previous day.

We determined, after consultation with Vector, that there was no additional system capacity to restore any further curtailment bands and that off take limits had reached maximum allowable limits given the maximum advisable volume the

Vector pipeline could supply and continuing downward line pack trend. We identified that further small additional band 5 re-designations might be able to be accommodated.

By 11:00am, we had received confirmation from retailers that they had approved one further consumer re-designation to band 5. This was assessed and we confirmed that spare capacity would be available.

Due to increasing demand on the Vector 200 line, residual line pack from the Maui pipeline was taken through the Vector Pokuru Compressor Station at 1:00pm to supply the Vector BOP lateral.

At 2:15pm, we discussed with Transpower, Genesis and Mighty River Power the planned build up of power station demand scheduled for early Sunday morning subject to final approvals to re-commission the pipeline. We agreed an incremental demand build plan with them to ensure safe pipeline operation while satisfying the needs of the generators and Transpower.

Vector confirmed that the final set of NDT had been completed and passed as satisfactory at 8:00pm and at 11:45pm, it prepared the pipeline for commencement of the re-commissioning procedure.

### *Sunday 30 October 2011*

At 2:00am, Vector completed purging and re-pressurisation of the isolated section of pipeline and opened the Main Line Valves at Pukearuhe and Mokau Compressor Station to restore the Maui pipeline to normal service. At 2:30am, Vector reconfigured the Rotowaro Compressor Station to accept gas from the Maui pipeline for compression and onward transmission north and re-closed the Main Line Valve at Temple View delivery point to return the Vector pipeline to normal operational configuration.

## Demand Restoration Stage

Together with Vector, we monitored the system closely for any large or sudden increases in demand.

We issued notices for the restoration of bands 2-6 at 2.30am and at 3:30am, in accordance with our previous discussions with the generators, we issued a direction for demand to band 1a and 1b consumers at Huntly Power Station, Southdown Power Station and Te Rapa Cogeneration Plant to be restored in the agreed increments commencing at 4:00am.

## Termination of Critical Contingency Stage

At 11:30am, we discussed system performance and demand build up since the issue of the demand restoration notice with Vector. As we were satisfied that the transmission system was capable of supplying gas to all consumers at the level at which it was supplied immediately before the event, at noon we made a determination to terminate the critical contingency and issue a notice declaring the termination.

The critical contingency had lasted for 5 days, 10 hours and 35 minutes.

## OUR COMPLIANCE WITH THE REGULATIONS

In the table that follows, we have listed our obligations under the Regulations and noted our compliance with those obligations.

## TABLE 2

## OUR COMPLIANCE WITH THE REGULATIONS

| CCM Regulations | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|---|
| Reg 35 | Prior to the Critical Contingency (***CC***), CCO must prepare and publish a communication plan (explaining communication flows). | Critical Contingency Operator (***CCO***) | Communications Plan | Yes | Prescribed consultation process.<br>Published on OATIS |
| Regs 36 & 37 | Prior to CC, CCO must prepare and publish an information guide (explaining communication flows). | CCO | Information Guide | Yes | Prescribed consultation process.<br>Published on OATIS |
| Reg 48 | CCO must make determination that there is a critical contingency | CCO | CCO Checklist<br>Demand Modelling | Yes | |
| Reg 49 | If CCO determines that CC exists, CCO must declare that there is a CC and give notice to TSOs. | CCO | Information Guide<br>Communications Plan | Yes | |
| Reg 51 | CCO must give notice of CC to electricity system operator, director of civil defence, operators of gas storage and gas production facilities, GIC, Minister and Secretary. | CCO | Information Guide | Yes | |

| CCM Regulations | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|---|
| Reg 52 | CCO must publish details of CC on OATIS, including on CC website. | CCO | Information Guide<br>Communications Plan | Yes | Published on OATIS |
| Reg 53 | CCO must:<br>- Monitor line pack;<br>- Receive and consider communications;<br>- Use gas to mitigate severity of CC;<br>- Issue directions to TSOs re curtailment of gas; and<br>- Issue directions to TSOs to restore gas once system stabilised. | CCO | Communications Plan<br>Information Guide<br>SCADA Information<br>Demand Modelling | Yes[15] | |
| Reg 59 | Once CC continued for longer than 3 days, CCO must give notice to GIC, director of civil defence, Minister and Secretary. | CCO | Information Guide | Yes | |
| Reg 61 & 62 | CCO must advise of termination of CC as soon as reasonably practical. Notice must be given to TSOs and persons outlined in Reg 51 above. Notice to TSOs to include time CC terminated and that TSO must tell retailers & large customers of termination. | CCO | Information Guide<br>Communications Plan | Yes | |
| Reg 63 | Notice of termination of CC must be | CCO | Information | Yes | Published on OATIS |

[15] Note that the Regulations are not clear on the treatment of partial restoration. The revised curtailment notices were discussed with the GIC. Recommendation 15 of this report and the associated commentary discusses the clarifications that could be made.

| CCM Regulations | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|---|
| | published on OATIS, including on CC website. | | Guide<br>Communications Plan | | |
| Reg 64 | CCO to complete incident report within 5 days of termination of CC. Report must be published on OATIS, including on CC website. | CCO | Incident Report | Yes | Published on OATIS |
| Reg 65 | CCO to complete performance report by 9 December (date agreed with GIC). Report must be prepared in consultation with TSOs and any other relevant person. Report must:<br>- Assess CCO's and TSOs' compliance with Regulations and effectiveness of Management Plan, Communication Plan & Information Guide (**CC Docs**);<br>- Assess extent CC Docs achieve purpose of Regulations;<br>- Recommend amendments to CC Docs;<br>If necessary, CCO must prepare and publish revised Communication Plan. | CCO | Performance Report | Yes – publication deadline extended until 23 December 2011, but draft to be provided to GIC on 9 December 2011<br>Note that this report is the Performance Report | |

## OUR COMMUNICATIONS PLAN

We prepared our Communication Plan in accordance with Regulation 35 of the Regulations. It governs communications between us and the Transmission System Owners during a critical contingency.

The plan sets out procedures for operational level communications between us and the Transmission System Owners during a critical contingency to ensure compliance with the Regulations is achieved.

In the table that follows we have listed our obligations as set out in the plan and noted our compliance with those obligations, together with the process we used to verify our compliance.

## TABLE 3

## OUR COMMUNICATIONS PLAN

| CCO Communication Plan | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] | Compliance Verification Process |
|---|---|---|---|---|---|
| Para 2.1 | TSO to notify CCO of potential critical contingency situation. | Vector Gas Limited as TO for MDL | Telephone call and email to CCO. | Yes | Vector Gas Limited Critical Contingency Management Process |
| Para 2.1 | CCO to give notification of potential critical contingency to TSOs. | CCO | Verbal notification to TSOs. Notice issued by email, SMS text alert and published on OATIS. | Yes | CCO Management Process |
| Para 3 | CCO to determine and declare critical contingency and issue notice to TSOs | CCO | Verbal notification to TSOs. Notice issued by email, SMS text alert and published on OATIS. | Yes | CCO Management Process |
| Para 4.1 | CCO to issue notices directing curtailment of demand to TSOs. | CCO | Notices issued by email, SMS text alert and published on OATIS. | Yes | CCO Management Process |
| Para 4.2 | CCO to issue notices directing revised curtailment of demand to TSOs. | CCO | Notices issued by email, SMS text alert and published | Yes | CCO Management Process |

| CCO Communication Plan | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] | Compliance Verification Process |
|---|---|---|---|---|---|
| | | | on OATIS. | | |
| Para 4.3 | CCO to issue notices directing restoration of demand to TSOs. | CCO | Notices issued by email, SMS text alert and published on OATIS. | Yes | CCO Management Process |
| Para 4.4 | Alternative demand restoration order directed by CCO if required. It was not required to activate this during the incident. | CCO | N/A | N/A | CCO Management Process |
| Para 4.5 | TSOs to inform CCO of any instances of non-compliance with curtailment directions. The TSOs did not make any such reports during the incident. | TSOs | N/A | N/A | Vector Gas Limited Critical Contingency Management Process |
| Para 4.6 | TSOs to forward retailer and large consumer compliance updates to CCO. | TSOs | Copies of compliance updates emailed to CCO. | Yes | Vector Gas Limited Critical Contingency Management Process |
| Para 5 | CCO to determine and declare termination of critical contingency and issue notice to TSOs | CCO | Verbal notification to TSOs. Notice issued by email, SMS text alert and published on OATIS. | Yes | CCO Management Process |
| Para 6 | CCO to communicate notices as set out in plan using templates in plan appendix. | CCO | Notices issued by email, SMS test alert and published on OATIS in template format. | Yes | CCO Management Process |

### Effectiveness

All processes, procedures and communications detailed in the CCO Communication Plan were employed during the critical contingency.

Feedback from industry participants was that they believed it was effective and achieved the purpose of the Regulations.

### Extent to which it achieves the purpose of the Regulations

The CCO communications plan assisted in achieving the purpose of the Regulations by ensuring timely and accurate information and directions flowed from us to the TSOs.

### Identified amendments to better achieve the purpose of the Regulations

#### *Guidance on application of Regulation 53 (2)*

Some respondents indicated that although Regulation 53 (2) was not activated during the critical contingency, it would be useful if some guidelines were provided to the industry to assist in understanding how the CCO may apply curtailment of subsets of load within a curtailment band.

**Recommendation 1**

CCO to prepare a proposed appendix for inclusion in the CCO Communications Plan to provide guidance on how Regulation 53 (2) may be applied.

#### *Amendments to contents and process for issuing notices*

Recommendations 8 and 11 refer to proposed amendments and efficiencies to the way the TSOs issue notices. These amendments are likely to require some corresponding amendments to the CCO communications plan.

**Recommendation 2**

CCO to prepare proposed amendments to the CCO communications plan regarding improvements to the noticing system in collaboration with the TSOs.

## OUR INFORMATION GUIDE

We prepared the Information Guide in accordance with Regulation 36. It explains communication flows between us and key industry stakeholders.

The Guide is designed to underpin the Regulations and to set out information flows between the CCO and key industry stakeholders during a critical contingency to ensure compliance with the Regulations is achieved.

In the table that follows we have listed our obligations described in the plan and noted our compliance with those obligations.

## TABLE 4

## OUR INFORMATION GUIDE

| CCO Information Guide | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] |
|---|---|---|---|---|
| Para 2.2 | TSO to notify industry stakeholders of potential critical contingency situation. | CCO | Notice issued by email, SMS text alert and published on OATIS. | Yes |
| Para 2.3 | CCO to determine and declare critical contingency and issue notice to industry stakeholders. | CCO | Notice issued by email, SMS text alert and published on OATIS. | Yes |
| Para 2.4.2 | CCO to issue notices directing demand curtailment to industry stakeholders. | CCO | Notices issued by email, SMS text alert and published on OATIS. | Yes |
| Para 2.4.3 | CCO to issue notices directing revised demand curtailment to industry stakeholders. | CCO | Notices issued by email, SMS text alert and published on OATIS. | Yes |
| Para 2.4.4 | CCO to issue notices directing restoration of demand to industry stakeholders. | CCO | Notices issued by email, SMS text alert and published on OATIS. | Yes |
| Para 2.4.5 | CCO to issue notice of continuing critical | CCO | Notice issued by | Yes |

| CCO Information Guide | Obligations | Responsible Role | Document | Compliant [Yes/No/ Explain] |
|---|---|---|---|---|
| | contingency to selected industry stakeholders. | | email, SMS text alert and published on OATIS. | |
| Para 2.5 | CCO to determine and declare termination of critical contingency and issue notice to industry stakeholders. | CCO | Notice issued by email, SMS text alert and published on OATIS. | Yes |
| Para 3 | CCO to communicate notices as set out in plan using templates in plan appendix. | CCO | Notice issued by email, SMS text alert and published on OATIS. | Yes |
| Para 4.1 | CCO to update CCO free phone information service with details about incident | CCO | CCO free phone service updated at regular intervals. | Yes |
| Para 4.2 | CCO to liaise closely with the Electricity System Operator (**ESO**) regarding gas availability for power generation. | CCO | CCO maintained regular and timely liaison with the ESO. | Yes |
| Para 4.5 | CCO to liaise directly with industry Sector Coordinating Entity if role established by activation of National Crisis Management Centre (**NCMC**) at the Ministry for Civil Defence and Emergency Management (**MCDEM**). NCMC not activated during incident. | CCO | N/A | N/A |

### Effectiveness

All processes, procedures and communications detailed in the Information Guide were employed during the critical contingency. The plan was effective in this regard.

### Extent to which the Information Guide achieves the purpose of the Regulations

The Information Guide assisted in achieving the purpose of the regulations by ensuring timely and accurate information flowed from us to the key industry stakeholders to keep them informed of the situation and provide them with opportunities to assess where wider intervention, collaboration and communications may be required to assist in mitigating the severity of the critical contingency.

### Identified amendments to better achieve the purpose of the Regulations

#### *Guidance on application of Regulation 53(2)*

Regulation 53(2) provides for us to direct curtailment of a subset of load within a curtailment band. Although Regulation 53(2) was not activated during the critical contingency, it would be useful if some guidelines were provided to the industry to assist in understanding how we might apply curtailment of subsets of load within a curtailment band.

**Recommendation 3**

CCO to prepare a proposed appendix for inclusion in the CCO Information Guide to provide guidance on how Regulation 53 (2) may be applied.

#### *Amendments to contents and process for issuing notices*

Recommendations 8 and 11 below refer to proposed amendments and efficiencies to the way the TSOs issue notices. These amendments are likely to require some corresponding amendments to the CCO Information Guide.

**Recommendation 4**

CCO to prepare proposed amendments to the CCO information guide regarding improvements to the noticing system in collaboration with the TSOs.

#### *Communication with Transpower and electricity generators during critical contingencies*

At a CCO/Transpower/generators liaison meeting held following the termination of the critical contingency, the generators felt it would be beneficial if they could

be added to our contact list to receive our notices by email and SMS text direct from us. The generators also requested that we telephone them at the potential critical contingency or critical contingency declaration stage to give early warning of notices to be issued and to provide brief details about the incident. We also felt that an early teleconference between us, Transpower and the generators would be of benefit to better coordinate any required actions on the electricity system. We agreed with Transpower that more regular liaison would be beneficial to cover themes including scenario pre-planning and our participation in Transpower exercises.

**Recommendation 5**

CCO to liaise with Transpower and the generators to put these additional communication steps in place, update the CCO Information Guide to describe the amended processes, revise operational CCO check lists and update the CCO contacts database.

**Recommendation 6**

CCO and Transpower to discuss pre-planning for likely gas transmission system outage scenarios and exercising Transpower emergency response processes.

## VECTOR GAS AS TRANSMISSION SYSTEM OWNER'S COMPLIANCE WITH THE REGULATIONS

This section assesses compliance with the Regulations by Vector Gas, in its capacity as transmission system owner.

In the table that follows we have listed Vector Gas's obligations under the Regulations and noted our assessment of its compliance with those obligations.

## TABLE 5

## VECTOR GAS AS TRANSMISSION SYSTEM OWNER'S COMPLIANCE WITH THE REGULATIONS

| CCM Regulations | Obligations | Responsible Role | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|
| Reg 24 and 25 | Prior to CC, TSO must prepare a CC Management plan<br>Management plan must contain specific information | Vector Gas as TSO | Yes | Published on Oatis |
| Reg 38 | TSO must provide transmission system information to CCO – eg amount of gas in system, technical pipeline information etc. | Vector Gas as TSO | Yes | SCADA<br>OATIS |
| Reg 54 | If CC declared, TSO must comply with CCO directions and issue directions (as set by CCO) on to retailers and large customers in accordance with Management Plan and Communication Plan. | Vector Gas as TSO | Yes | TSO Critical Contingency Management Process |
| Reg 65 and 66 | TSO must assist CCO in preparing performance report following CC. If report recommends alterations to CCMP, TSO must prepare amended Plan, consult (in accord with Reg 26) and submit Plan to GIC for approval. | Vector Gas as TSO | Yes | |
| Reg 67[16] | Nominate industry expert to determine CC price by 4 November (optional). | N/A | Not applicable as Maui Outage a | N/A |

[16] Regs 67-81 of the CCM Regulations do not apply (and those steps will not need to be taken) to a Regional CC (see reg 82).

| CCM Regulations | Obligations | Responsible Role | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|
| | | | Regional CC | |
| Reg 72 | TSO can make submissions on proposed CC price notified by industry expert. TSOs have 5 days after receiving notice of proposed CC price to make submissions. | N/A | Not applicable as Maui Outage a Regional CC | N/A |
| Reg 74 | TSO must determine CC imbalances for affected parties by 19 December. TSO must apply calculation methodology set out in r 75. Methodology set out in CCM Regulations and Management Plans (Vector at Appendix 8; MDL at section 5). | N/A | Not applicable as Maui Outage a Regional CC | N/A |
| Reg 77 | TSO must provide GIC CC imbalances (and assoc info) by 20 December. | N/A | Not applicable as Maui Outage a Regional CC | N/A |

## VECTOR GAS'S CRITICAL CONTINGENCY MANAGEMENT PLAN

Transmission System Owners' Critical Contingency Management Plans (CCMPs) are prepared by the TSOs and include the contents defined in Regulation 25. They are approved by the industry body under Regulation 30 or Regulation 31 in consultation with us.

### Effectiveness

All processes, procedures and communications detailed in Vector Gas CCMP were fully employed during the critical contingency. The CCMP is designed to underpin the Regulations and to set out information flows between us and Vector Gas and between Vector Gas and identified affected parties during a critical contingency to ensure compliance with the Regulations is achieved. The CCMP was effective in this regard.

### Extent to which it achieves the purpose of the Regulations

The purpose of the Regulations is to ensure long-term security of supply is not compromised. This is achieved by ensuring that the transmission system remains stable at all times by managing demand levels to avoid the critical contingency threshold pressure limits being breached. This in turn ensures that supply continuity to connected gas distribution networks is secured. The Vector Gas CCMP assisted in achieving this purpose by ensuring timely and accurate information flowed from Vector Gas to the identified affected parties to keep them informed of the situation and to take the actions required of them under the Regulations.

### Identified amendments to better achieve the purpose of the Regulations

#### *Retailer demand curtailment compliance updates*

Some respondents expressed concern that the process and template included in the Vector Gas CCMP for them to provide compliance updates back to Vector Gas was difficult to use and could benefit from improvement. We consulted with Vector Gas prior to the incident regarding the review and improvement of compliance templates and processes following recommendation 5.3(a) contained in the CCO Exercise Tuarua[17] report published in May 2011.

**Recommendation 7**

Vector Gas to finalise revision proposals as soon as practicable and follow CCMP amendment process to implement any identified desired improvements.

[17] A copy of this report is published on our website at http://www.oatis.co.nz

### *Amendments to contents and process for issuing notices*

Some respondents commented on the reproduction of standard notes on each of the notices issued. Concern was expressed about the cascade process used to issue notices and the delays between issue of our notices and corresponding Vector Gas notices. The existing cascade process was designed to meet the requirements in the Regulations for the TSOs to issue notices based on the notices received from the CCO. We have already consulted with Vector Gas to assist them to develop simplifications and efficiencies to the notice process following recommendation 4.2(a) contained in our CCO Exercise Tuarua report published in May 2011.

**Recommendation 8**

Vector Gas to finalise proposed notice system improvements, amend CCMP to include the changes and then implement new arrangements.

### *Potential critical contingency stage*

Our communications plan and information guide include details about the process and notices issued by the CCO at the potential critical contingency notification and termination of potential critical contingency stages. While Vector Gas also issues potential critical contingency and termination of potential critical contingency notices the CCMP does not include any details about this part of the process.

**Recommendation 9**

Vector Gas to prepare proposed amendments to the CCMP to include details on potential critical contingency notices and progress the CCMP amendment process.

## TABLE 6

## VECTOR GAS'S CRITICAL CONTINGENCY MANAGEMENT PLAN

| Vector CC Management Plan | Obligations | Responsible Role | Compliant [Yes/No/ Explain] |
|---|---|---|---|
| Para 3.3 | Vector to post notices on OATIS. Notification of notices posted on OATIS to be sent to affected parties by SMS and/or email. | Vector Gas as TSO | Yes |
| Para 3.4 – 3.5 | CCO to give notice of declaration of CC to Vector and Vector is to communicate notice to all parties listed in Appendix 4. Communications to be made in accordance with process flow chart in appendix 1. All other notices issued during the CC will be notified to same parties in same way. Communications to be made in accordance with process flow chart in appendix 2. | Vector Gas as TSO | Yes |
| Para 3.5 | Vector will receive updates from affected parties. Vector will pass these communications to CCO as soon as practicable. | Vector Gas as TSO | Yes |
| Para 3.6 | CCO to give notice of termination of CC to Vector and Vector is to communicate notice to all parties listed in Appendix 4. Communications to be made in accordance with process flow chart in appendix 3. | Vector Gas as TSO | Yes |
| Para 3.7 | Vector to communicate with CCO by phone or by email. | Vector Gas as TSO | Yes |

## MDL COMPLIANCE WITH THE REGULATIONS

This section assesses compliance with the Regulations contained in Part 3 of the Regulations.

In the table that follows we have listed MDL obligations under the Regulations and noted our assessment of its compliance with those obligations.

We note that all respondents who assessed MDL compliance with the Regulations indicated they believed that MDL was fully compliant.

## TABLE 7

## MDL COMPLIANCE WITH THE REGULATIONS

| CCM Regulations | Obligations | Responsible Role | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|
| Reg 24 and 25 | Prior to CC, TSO must prepare a CC Management plan<br>Management plan must contain specific information | MDL | Yes | Published on Oatis |
| Reg 38 | TSO must provide transmission system information to CCO – eg amount of gas in system, technical pipeline information etc. | Vector Gas as Technical Operator for MDL | Yes | SCADA<br>OATIS |
| Reg 54 | If CC declared, TSO must comply with CCO directions and issue directions (as set by CCO) on to retailers and large customers in accordance with Management Plan and Communication Plan. | Vector Gas as Technical Operator for MDL | Yes | TSO Critical Contingency Management Process |
| Reg 65 | TSO must assist CCO in preparing performance report following CC. If report recommends alterations to CCMP, TSO must prepare amended Plan, consult (in accord with Reg 26) and submit Plan to GIC for approval. | Vector Gas as Technical Operator for MDL | Yes | |
| Reg 67[18] | Nominate industry expert to determine CC price by 4 November (optional). | N/A | Not applicable as Maui Outage a Regional CC | |

[18] Regs 67-81 of the CCM Regulations do not apply (and those steps will not need to be taken) to a Regional CC (see reg 82).

| CCM Regulations | Obligations | Responsible Role | Compliant [Yes/No/ Explain] | Comment |
|---|---|---|---|---|
| Reg 72 | TSO can make submissions on proposed CC price notified by industry expert. TSOs have 5 days after receiving notice of proposed CC price to make submissions. | N/A | Not applicable as Maui Outage a Regional CC | |
| Reg 74 | TSO must determine CC imbalances for affected parties by 19 December. TSO must apply calculation methodology set out in r 75. Methodology set out in CCM Regulations and Management Plans (Vector at Appendix 8; MDL at section 5). | N/A | Not applicable as Maui Outage a Regional CC | |
| Reg 77 | TSO must provide GIC CC imbalances (and assoc info) by 20 December. | N/A | Not applicable as Maui Outage a Regional CC | |

## MDL CCMP

Transmission System Owners (TSOs) Critical Contingency Management Plans (CCMPs) are prepared by the TSOs and include the contents defined in Regulation 25. They are approved by the industry body under Regulation 30 or Regulation 31 in consultation with us.

We note that all respondents who assessed the effectiveness of the MDL CCMP broadly indicated they believed it was effective and achieved the purpose of the Regulations. Some respondents made comments on where the CCMP could be amended to better serve the purpose of the Regulations.

### Effectiveness

All processes, procedures and communications detailed in the MDL CCMP were employed during the critical contingency. The CCMP is designed to underpin the Regulations and to set out information flows between the MDL and the CCO and between MDL and identified affected parties during a critical contingency to ensure compliance with the Regulations is achieved. The CCMP was effective in this regard.

### Extent to which it achieves the purpose of the Regulations

The purpose of the Regulations is to ensure long-term security of supply is not compromised. This is achieved by ensuring that the transmission system remains stable at all times by managing demand levels to avoid the critical contingency threshold pressure limits being breached. This in turn ensures that supply continuity to connected gas distribution networks is secured. The MDL CCMP assisted in achieving this purpose by ensuring timely and accurate information flowed from MDL to the identified affected parties to keep them informed of the situation and to take the actions required of them under the Regulations.

### Identified amendments to better achieve the purpose of the Regulations

#### *Retailer compliance updates*

Some respondents expressed concern that the process and template included in the MDL CCMP for them to provide compliance updates back to MDL was difficult to use and requires improving. We consulted with Vector (in their capacity as Technical and System Operators of the Maui Pipeline) prior to the incident regarding the review and improvement of compliance updates following recommendation 5.3(a) contained in the CCO Exercise Tuarua report published in May 2011. Although Exercise Tuarua tested our systems relating to a critical contingency on the Vector Transmission System and our recommendations for changes where directed at Vector, the experience with the recent outage demonstrates that amendments to the MDL CCMP are also appropriate.

**Recommendation 10**

MDL to finalise revision proposals as soon as practicable and follow CCMP amendment process to implement any identified required improvements.

### *Amendments to contents and process for issuing notices*

Some respondents commented on the reproduction of standard notes on each of the notices issued. Concern was expressed about the cascade process used to issue notices and the delays between issue of CCO notices and corresponding MDL notices. The existing cascade process was designed to meet the requirements in the Regulations for the TSOs to issue notices based on the notices received from the CCO. We consulted with Vector (in their capacity as Technical and System Operators of the Maui Pipeline) prior to the incident regarding the review and improvement of compliance updates following recommendation 4.2(a) contained in the CCO Exercise Tuarua report published in May 2011. Although Exercise Tuarua tested our systems relating to a critical contingency on the Vector Transmission System and our recommendations for changes where directed at Vector, the experience with the recent outage demonstrates that amendments to the MDL CCMP are also appropriate.

**Recommendation 11**

MDL to finalise proposed notice system improvements, amend CCMP to include the changes and then implement new arrangements.

### *Potential critical contingency stage*

Our Communications Plan and Information Guide include details about the process and notices we issue at the potential critical contingency notification and termination of potential critical contingency stages. While MDL also issues potential critical contingency and termination of potential critical contingency notices, the CCMP does not address this issue to the same level of detail as our documents, which we consider to be desirable.

**Recommendation 12**

MDL to prepare proposed amendments to the CCMP to include details on potential critical contingency notices and commence the CCMP amendment process.

### *Telephoning large consumers regarding issue of notices*

We note that the Vector Gas CCMP includes the step of telephoning large consumers regarding the issue of notices to ensure early notification is achieved. It is further noted that Vector Gas in its capacity as the MDL Technical Operator make calls to large consumers in this regard. However this step is not included in the MDL CCMP.

**Recommendation 13**

MDL to include the step of telephoning large consumers regarding the issue of notices in the next revision of their CCMP.

## TABLE 8

## MDL'S CRITICAL CONTINGENCY MANAGEMENT PLANS

| MDL CC Management Plan | Obligations | Responsible Role | Compliant [Yes/No/ Explain] |
|---|---|---|---|
| Para 2.1 | If an (Pipeline) Emergency, (Pipeline) Contingency Event, FM event or interruption under s15 of MPOC occurs and is likely to breach CC threshold, Vector (on behalf of MDL[19]) to inform CCO. | Vector Gas as Technical Operator for MDL | Yes |
| Para 3.2 | Vector/MDL to post notices on OATIS and affected parties to be informed of notice posted on OATIS by text and/or email.<br>Urgent notices to CCO to be communicated by phone or email. | Vector Gas as Technical Operator for MDL | Yes |
| Para 3.3 | MDL/Vector to send notice of declaration of CC to affected parties as soon as practicable. | Vector Gas as Technical Operator for MDL | Yes |
| Para 3.4 | CCO will give notices during CC to MDL/Vector and MDL/Vector is to communicate notice to all parties. | Vector Gas as Technical Operator for MDL | Yes |
| Para 3.4 | MDL/Vector will receive communications from other parties (eg Welded Parties), MDL/Vector to pass communications onto CCO. | Vector Gas as Technical Operator for MDL | Yes |
| Reg 3.5 | CCO to give notice terminating CC to MDL/Vector, MDL/Vector to give notice of termination to | Vector Gas as | Yes |

[19] The MDL CCMP places communication obligations on MDL. However, under the System Operator Agreement, Vector performs these communications. See System Operator Agreement (2010) at Sch2, 1(e).

| MDL CC Management Plan | Obligations | Responsible Role | Compliant [Yes/No/ Explain] |
|---|---|---|---|
| | affected parties. | Technical Operator for MDL | |

# THE REGULATIONS

The purpose of the Regulations is to achieve the effective management of critical gas outages and other security of supply contingencies without compromising long-term security of supply.

It is noted that all respondents who assessed the effectiveness of the Regulations broadly indicated they believed they were effective and achieved the purpose of the Regulations. Some respondents made comments on where the Regulations could be amended to better serve the purpose of the Regulations.

## Effectiveness

The Regulations and their application by those parties with obligations under the Regulations were effective.

### *Extent to which the Regulations achieve the purpose of the Regulations*

The Regulations and their application by those parties with obligations under the Regulations fully achieved the purpose of the Regulations.

## Identified amendments to better achieve the purpose of the Regulations

### *Curtailment Bands*

The Regulations require that all gas consumers be classified for the purpose of curtailing groups of similar consumers. The curtailment bands (which we set out in **Table 1** above), are intended to ensure consistency between consumers and improve curtailment efficiency. In addition to simplifying the curtailment instruction process, we can use the band information to predict the quantum and rate of load reduction in response to a curtailment order. Consumers also benefit from being able to use their classification to make business decisions around their own contingency arrangements and to control their business risks.

The Regulations recognise that some consumers provide essential services and should not be curtailed unless all other options have been exhausted. The designation of essential service providers is addressed in Regulation 44.

The Regulations also recognise that, for some consumers, maintaining a relatively small gas flow to enable an orderly plant shut-down would prevent significant damage to capital plant and/or the environment. Where the potential damage is disproportionate to curtailment objectives, these consumers may be designated as minimal load consumers. The designation of minimal load consumers is addressed in Regulation 45.

Approval of a consumer's designation is the responsibility of its retailer except for large consumers (those using more than 15TJ per day). In this case, the Gas Industry Company is responsible for approving the designation.

The Gas Industry Company has issued the document *Essential Services and Minimal Load Guidelines* to provide principles and procedures for the relevant retailers and Gas Industry Co to ensure:

- designations support the objectives of the Regulations;
- consistency in making designations; and
- clarity for consumers.

Based on our experience during the outage, and the views expressed by stakeholders, we consider that a thorough review of the curtailment bands and how individual consumers are classified is required to ensure that the system operates transparently and achieves the purposes of the Regulations. The particular issues that we consider should be addressed include:

- the definitions of essential service providers contained in the *Essential Services and Minimal Load Guidelines*[20] and whether a new designation of "other essential food stuffs" in addition to the existing bread and fresh dairy produce categories is appropriate;
- whether the current designation system creates perverse incentives for consumers to under-invest in back-up energy sources to control risk that they are better placed to manage;
- the appropriateness of basing gas contingency curtailment bands on the Schedule of the National Civil Defence Emergency Management Plan Order 2005, which may be more suited to large scale natural disaster situations rather than gas supply outages;
- the introduction of a new band or sub-band for "Critical Care Providers" or "Life and Limb Services" for hospitals and medical care centres;
- the treatment of support services to essential service providers e.g. laundries servicing hospitals;
- whether it would be appropriate to introduce a requirement for essential service providers to nominate a minimum gas usage value to allow their essential processes to continue to operate at their facilities;
- the appropriate classification of essential service providers with an alternative fuel availability;
- whether, and how, to add avoiding environmental risk as a criteria for placement in curtailment bands;
- whether, and how, to include seasonal variations in usage or maximum daily quantity in place of the current approach of using annual consumption;
- whether, and how, to increase transparency and consistency of band 5 re-designation applications (for example, whether it would be appropriate to introduce a system of independent audit of classifications by retailers or whether it would be appropriate to freeze all designations once a critical contingency has been declared);
- whether it is appropriate for essential service providers to be curtailed prior to band 6 consumers, as currently provided by the curtailment order in Schedule 2 (2) of the Regulations; and

[20] A copy of this document is published on the Gas Industry Company website at www.gasindustry.co.nz

- whether requiring retailers to give curtailment directions to their band 6 consumers in accordance with regulation 56 of the Regulations causes undesirable delays in notices reaching these consumers.

**Recommendation 14**

GIC to lead an industry consultation process (including a representative cross section of consumers) to consider the above points and any other subsequently identified issues and propose and implement any required amendments the Regulations.

### *Regional designation of critical contingencies*

The regional status of the critical contingency was not determined at the start of the incident. We note that price and imbalance provisions do not apply to regional critical contingencies and that the regional status of the contingency is defined in Regulation 82 in Part 4 of the Regulations pertaining to obligations after a critical contingency. We also note that Regulation 82 does not define who should designate the regional status of the critical contingency.

**Recommendation 15**

GIC to lead an industry consultation process to consider the following and any other subsequently identified issues:

(a) if the regional status of a critical contingency should be designated when a critical contingency is declared;

(b) if a single entity should have the obligation to designate the regional status of the critical contingency;

(c) if the pricing and imbalance methodology could be applied to all critical contingencies hence removing the requirement to determine the regional status; and

(d) propose and implement any required amendments the Regulations that result from the consultation process.

### Partial restoration

As we noted in the chronology, we determined that there was likely to be sufficient gas available for some modest restoration of supply and acted to progressively restore consumers. After discussing this matter with the Gas Industry Company, we achieved the partial restoration by issuing "revised curtailment notices", as the Regulations as currently drafted do not expressly envisage a situation where the transmission system is curtailed and then partially restored.

It would be useful if the Regulations were clearer as to how partial restoration should proceed.

**Recommendation 16**

We recommend that the GIC give consideration to amending the Regulations to clarify the process for a partial restoration.

## Consumer knowledge and understanding of the critical contingency system

Fortunately, critical contingencies are rare events. This does mean, however, that the processes to be followed during a critical contingency might not be fully appreciated by all consumers of gas. We regularly undertake training exercises that test the systems in place within the major players in the gas industry (e.g. producers, shippers, retailers and large consumers), experience with this outage showed that the precise mechanics of the critical contingency system where not widely appreciated by the wider range of consumers and the public.

While it is possible that the Regulations might be one vehicle by which knowledge and understanding of the critical contingency system might be enhanced, there are others, including, for example, the civil defence preparedness campaign conducted by Government. We therefore recommend that the GIC and the MED give consideration to this issue, but for now we are not making a specific recommendation of the appropriate changes to the Regulations.

**Recommendation 17**

We recommend that the GIC and MED give consideration to the most appropriate mechanism for increasing knowledge and understanding of the critical contingency system.

## Compliance incentives

Regulation 54 requires each transmission system owner to comply with the directions of the critical contingency operator given during a critical contingency and Regulation 55 requires retailers and large consumers to comply, as soon as is reasonably practicable, with the directions of a transmission system owner. There are no express provisions in the Regulations making it an offence not to comply with any such direction, which means that in the short-term, compliance with the critical contingency system is essentially a matter of good will on the part of industry participants, although we do note that the imbalance methodologies in Part 4 of the Regulations do provide an additional incentive for compliance on the part of some industry players.

**Recommendation 18**

We recommend that the GIC and MED give consideration to introducing greater incentives for compliance with directions under the regulations.

## The Review Process

In carrying out the review required by the Regulations, we have concluded that the review process itself could be improved.

Issues that we have indentified for improvement are:

- the requirement for a self-assessment of our performance under the critical contingency procedures seems inappropriate; while it is appropriate for us to report our actions, to seek a self-assessment does not seem to be particularly transparent, especially as the regulations provide no guidance as to the criteria against which our performance is to be assessed;
- we are required to "prepare and publish" a report, but the regulations do not specify to whom we are reporting; we suggest it should be the GIC;
- the Regulations do not make any distinction, as to either timing, content or process, between different critical contingencies based on ether duration or scale. As we note in the Introduction to this report, the duration and scale of this critical contingencies has lead to a number of post-event reviews, meaning that the resources of all parties involved have been stretched, leading to us seeking an extension of reporting timeframes. We consider that a more flexible approach, which caters for the fact that reports on major incidents will take longer to prepare, should be considered.

**Recommendation 19**

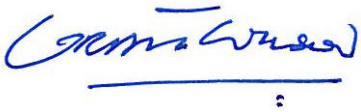
We recommend that the GIC and MED consider potential improvements to the review and reporting process contained in the regulations.

## CONCLUSION

Maui Pipeline Outage of 25 – 30 October 2011 was, fortunately, one of the rare occasions when the critical contingency system has operated.

Our conclusion is that overall, that system worked well and achieved the purposes for which it was designed. Some modest improvements are possible and we have made recommendations which we hope will lead to a better system should it be required to operate again.

We would like to take this opportunity to acknowledge the considerable assistance we received from many parties before, during and after the outage who all contributed to this positive outcome.



Simon Mackenzie
**Director**

Grant Wilson
**Director**

# Critical Contingency Operator

# Critical Contingency Incident Report

# Maui Pipeline Outage 25 – 30 October 2011

# Date of Report: 04 November 2011

## 1. Introduction

This report has been prepared in accordance with the requirements contained in Regulation 64 of the Gas Governance (Critical Contingency Management) Regulations 2008 (Regulations). Regulation 64 requires the Critical Contingency Operator (CCO) to prepare and publish an incident report as soon as reasonably practicable, but no later than 5 business days after making a determination to terminate a Critical Contingency. This report has been prepared in consultation with the Transmission System Owners (TSOs) namely Maui Developments Limited (MDL) and Vector Gas Limited (Vector).

## 2. Cause Of Critical Contingency

Vector[1] investigated a reported gas escape adjacent to the 750mm nominal bore Maui pipeline close to the intersection of Pukearuhe Road and the White Cliffs Walkway in north Taranaki [E2642564 N6256219]. As a result Vector isolated and depressurised a 24.2km section of the Maui pipeline between Pukearuhe Main Line Valve and Mokau Compressor Station to investigate and repair the source of the escape. Under r48 (1) (b) (ii) the CCO determined that there was a critical contingency due to a reasonable expectation that a breach of one or more of the critical contingency thresholds was unavoidable.

This determination was based on an assessment that the line pack contained in the remaining pressurised section of the Maui pipeline to the north of Mokau Compressor Station would only be sufficient to supply predicted demand for approximately 9 hours before the critical contingency threshold of 3 hours to 32 barg would be breached at Rotowaro. Vector also advised that until the cause of the escape was determined the predicted repair time was uncertain but could be a number of days or weeks.

Vector discovered a through wall split of the pipeline at the 12 o'clock position adjacent to the longitudinal seam weld. The split was approximately 120mm long.

Vector is conducting a thorough investigation of the circumstances giving rise to the incident aimed at establishing the cause of the failure.

[1] Vector Gas Limited acts in the capacity of Technical Operator of the Maui pipeline for Maui Developments Limited under the provisions of the Contract of Employment that forms part of the Maui Joint Venture Agreement 1974. Vector Gas Limited is also the Transmission System Owner (TSO) for the Vector pipelines. Vector Gas Limited is a wholly owned subsidiary of Vector Limited.

## 3. Duration Of Critical Contingency

A critical contingency was declared at 01:25[2] on 25 October 2011 and was terminated at 12:00 on 30 October 2011. The duration of the critical contingency was 5 days, 10 hours and 35 minutes.

## 4. Log of Actions Taken by CCO and TSOs Immediately Before and During Critical Contingency

Note: The full contents of OATIS[3] notices issued can be referred to on www.oatis.co.nz by using the notice numbers quoted.

| 1. Potential Critical Contingency Stage | |
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| **Monday 24 October 2011** | |
| **Time** | **Action** |
| 20:33 | Vector Gas Operations Control (GOC) phoned the CCO duty manager and gave a brief overview of a suspected gas escape that had been detected adjacent to the Maui pipeline in north Taranaki. |
| 21:00 | The CCO duty manager arrived at GOC at Bell Block and discussed the situation with the Vector Gas Transmission duty manager. Vector declared an emergency at 21:00 due to the potential severity of the situation and commenced the assembly of an emergency response team. |
| 22:09 | Vector completed the preparation of plans to isolate and depressurise the 24.2km section of the Maui pipeline between Pukearuhe Main Line Valve and Mokau Compressor Station to facilitate safe investigation and repair of the source of the escape. |
| 22:15 | Vector dispatched field personnel to Pukearuhe Main Line Valve and Mokau Compressor Station to prepare for the pipeline isolation. |
| 22:45 | The CCO discussed the situation with the Transpower Security Desk. Transpower indicated that sufficient power generation should be available from non gas fired power generation should demand be curtailed completely at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory. [Note: Otahuhu Power Station was out of service for planned maintenance during the critical contingency]. |
| 22:50 | The CCO issued Notification of Potential Critical Contingency [notice #11219]. |
| 22:52 | The CCO discussed situation with Huntly Power Station Control Room who indicated that they would liaise with Transpower and make preparations to shut down Unit 5 and convert to full coal fuel at units 1-4. |
| 23:05 | Vector GOC informed the control rooms at all large consumers that a potential critical contingency had been notified by the CCO and that demand curtailment was likely at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory. |
| 23:14 | MDL issued a notice giving notification of potential critical contingency (Notice #11220) |

[2] All times given in this report are NZDT using ISO 8601 24-hour format.
[3] OATIS (Open Access Transmission Information System) is the online, interactive software system developed to support operations on both the Maui and Vector pipelines.

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| 23:19 | Vector issued a notice giving notification of potential critical contingency (Notice #11221) |
| 23:29 | The CCO requested a download of SCADA data from GOC to feed demand modelling calculations. |
| 23:50 | Vector carried out operations to increase line pack in the Vector 200 line and Bay Of Plenty (BOP) lateral in anticipation of isolation of Maui pipeline. |
| 23:55 | The CCO demand modelling indicated that line pack to the north of Mokau Compressor Station would only be sufficient to supply existing demand for approximately 9 hours before the 3 hours to 32 barg critical contingency threshold at Rotowaro would be breached.<br><br>The CCO modelling also indicated that if the band 1a and 1b large consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory were curtailed there would be sufficient line pack to supply demand for approximately 21 hours before the 3 hours to 32 barg critical contingency threshold at Rotowaro would be breached. |
| **Tuesday 25 October 2011** | |
| 01:00 | Vector closed the Pukearuhe Main Line Valve as the first step in isolating the section of pipeline containing the escape. The pressure in the Maui pipeline at the time of isolation was 44 barg. Mokau Compressor Station continued to operate in order to reduce the pressure between Pukearuhe and Mokau and to increase pressure and line pack north of Mokau. |
| 01:20 | Mokau Compressor Station was stopped when the pipeline pressure reached 38.4 barg and the Mokau Main Line Valve was then closed. The pipeline section between Pukearuhe Main Line Valve and Mokau Compressor Station was then fully isolated. |
| **2. Declaration of Critical Contingency Stage** | |
| 01:10 | The CCO determined that a critical contingency situation existed. |
| 01:25 | The CCO issued a notice declaring a critical contingency [notice #11224]. |
| 01:30 | GOC informed the control rooms at all large consumers that the CCO had declared a critical contingency and that demand curtailment directions would follow for Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory. |
| 01:35 | Vector started Mahoenui Compressor Station to increase pressure and line pack in the Vector 200 line. |
| 01:41 | MDL issued a notice of declaration of critical contingency (notice #11223). |
| 01:44 | Vector issued a notice of declaration of critical contingency (notice #11222). |
| **3. Demand Curtailment Stage** | |
| 02:35 | The CCO issued a notice directing demand to be fully curtailed at the band 1a and 1b large consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory by 03:30 [Notice #11227]. |
| 03:00 | GOC informed the control rooms at all large consumers that the CCO had issued demand curtailment directions for Huntly Power Station, Southdown |

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| | Power Station and Te Rapa Dairy Factory to fully curtail by 03:30. |
| 03:03 | MDL issued a notice directing demand to be fully curtailed at the band 1a and 1b large consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory by 03:30 (Notice #11225). |
| 03:12 | Vector issued a notice directing demand to be fully curtailed at the band 1a and 1b large consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory by 03:30 (Notice #11226). |
| 04:00 | The CCO and the Vector emergency response team discussed and agreed the principles to be applied when using the Vector 200 line and any residual line pack in the Maui pipeline to supply demand in the Vector pipelines.<br><br>• Normally closed Main Line Valve at Temple View delivery Point to be opened to allow gas in the Vector 200 line to flow north towards Rotowaro Compressor Station.<br><br>• Rotowaro Compressor Station to be re-configured to allow gas from the Vector 200 line to be compressed for onwards transmission north. Re-configuration will temporarily prevent gas from the Maui pipeline being available for compression for onward transmission.<br><br>• Residual line pack in the Maui pipeline available for compression at the Vector Pokuru Compressor Station for onward transmission to the Vector BOP lateral.<br><br>• Mahoenui Compressor Station to be utilised to manage pressure and line pack in the Vector pipelines. Vector advised the CCO that the maximum flow available from Mahoenui Compressor Station would be approximately 10 SCMS [1,440 GJ/hour]. Capacity would need to be used to supply demand off take and replenish pressure and line pack during off-peak periods.<br><br>• Demand in the Vector pipeline north of Mahoenui Compressor Station to be controlled carefully by curtailing demand to minimum levels and making public appeals to use gas sparingly. System to be monitored carefully and demand levels at morning and evening peaks noted. Any spare identified capacity to be utilised where possible to resupply any curtailed demand.<br><br>• Time to repair and resumption of normal service of the Maui pipeline indeterminate at this stage. |
| 07:00 | Vector advised the CCO that they had concern that the Vector 200 line may be impacted. In view of this the CCO decided that further curtailment in the affected areas would now need to be activated. |
| 08:00 | The CCO estimated domestic demand in the affected area would peak at approximately 8.5 SCMS [1,224 GJ/hour]. The CCO carried out further demand modelling to assess peak demand levels in bands 2-6. |
| 10:00 | Morning demand peaked at 20.5 SCMS (2,952 GJ/h) in the affected area. Gas continued to be drawn from residual line pack in the Maui pipeline for compression and onward transmission at Rotowaro Compressor Station. |
| 10:15 | Due to the uncertainties associated with the integrity of the Vector 200 line and the time it may take for curtailment directions to be effectively implemented the CCO decided that full curtailment of band 2-6 consumers would now be required in order to conserve line pack in the Vector pipeline should this also need to be isolated.<br><br>Vector and the Gas Industry Company (GIC) commenced plans to issue a |

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| | media release including a general public appeal for gas to be used sparingly if in the domestic sector. |
| 10:35 | Vector commenced depressurisation of the isolated section by venting gas at Mokau Compressor Station. |
| 10:40 | The CCO issued a revised demand curtailment direction for all band 2 – 6 consumers to curtail demand immediately in the affected areas [notice #11237 and #11238]. |
| 10:53 | Vector opened the Temple View Main Line Valve to allow gas in the Vector 200 line to flow north towards Rotowaro Compressor Station. |
| 11:08 | MDL issued a revised curtailment direction for all band 2 – 6 consumers to curtail demand immediately in the affected areas [notice #11239]. |
| 11:09 | Vector issued a revised curtailment direction for all band 2 – 6 consumers to curtail demand immediately in the affected areas [notice #11241 and #11242]. |
| 11:26 | Vector issued a corrected revised curtailment direction for all band 2 – 6 consumers to curtail demand immediately in the affected areas [notice #11243 and #11244]. |
| 12:55 | Vector completed depressurisation of the isolated section. |
| 13:07 | Vector confirmed that the gas escape has now ceased giving positive identification that the Maui pipeline was the source of escape. |
| 15:42 | Vector completed re-configuration of Rotowaro Compressor station to accept gas from the Vector 200 line for compression and onward transmission north. |
| 16:00 | Vector advised the CCO that the Vector 200 line was in a secure condition but surrounding works on the Maui pipeline needed to be carried out carefully to ensure ongoing integrity. This meant that confidence levels had increased in the continued availability of the Vector 200 line to supply the affected area for the duration of the incident. The CCO decided that restoration of partial demand could now be considered depending on actual system pressures and off take rates. |
| 17:00 | Evening peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment and to check if calculated demands in the domestic sector matched actual demand profile. |
| 19:30 | Vector commenced excavation of the Maui pipeline at the location of the escape. |
| 20:00 | Evening demand peaked at 6.5 SCMS (950 GJ/h). Residual line pack from the Maui pipeline was used between 14:00 and 22:00 to supply the Vector BOP lateral during the implementation of demand curtailment and the reduction of demand on the Vector pipeline. |
| **Wednesday 26 October 2011** | |
| 02:00 | Vector discovered a through wall split of the pipeline at the 12 o'clock position adjacent to the longitudinal seam weld. The split was approximately 120mm long. |
| 06:00 | Morning peak demand period commenced. CCO monitored system performance to assess levels of demand curtailment and to check if calculated demands in the domestic sector matched actual demand profile. |

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| 09:00 | Morning demand peaked at 7.3 SCMS (1,051 GJ/h). This indicated that demand curtailment had been particularly effective and that domestic consumption had dropped significantly from seasonal norms. Vector pipeline line pack increased moderately during the previous day due to the significant demand curtailment that had been implemented.<br><br>After consultation with Vector, the CCO determined that some demand from curtailed bands could be restored if used sparingly. This view was also supported by the information Vector provided at 16:00 on 25 October regarding increased confidence levels about continued 200 line integrity. Due to the potential hardships gas curtailment was causing in band 5 (essential service providers) and the environmental concerns over the inability of dairy factories to receive and process raw milk, the CCO decided after consultation with the industry that a revised curtailment direction to restore gas to band 5 consumers (but to use sparingly) would be issued.<br><br>The CCO also determined that there may be some system capacity available to restore supply to consumers to be re-designated to band 5 by their retailer. The CCO indicated that retailers would need to give him formal notification of these and that they would be assessed on a case-by-case basis before being released for restoration. |
| 09:45 | The CCO issued a revised demand curtailment direction for band 5 to be restored but to use gas sparingly in all circumstances (notice #11260 and #11261). The CCO demand modelling indicated that band 5 demand would peak at approximately 1.6 SCMS (230 GJ/hour). The total number of band 5 consumers in the affected area was 202. |
| 10:08 | MDL issued a revised demand curtailment direction for band 5 to be restored but to use gas sparingly in all circumstances (notice #11263). |
| 10:19 | Vector issued a revised demand curtailment direction for band 5 to be restored but to use gas sparingly in all circumstances (notice #11259 and #11264). |
| 17:00 | Evening peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment and to check if calculated demands matched the actual demand profile. |
| 18:00 | Vector advised that the isolated section of the Maui pipeline had now been purged of gas and that preparations were being made to cut the pipeline to remove the damaged section. Vector plans to prepare a new section of pipe to replace the damaged section were in progress. |
| 20:00 | By this time the CCO had received confirmation from retailers about 15 consumer re-designations to band 5. Each of these were assessed and approved based on an assessment that spare capacity would be available. |
| 20:30 | Evening demand peaked at 7.8 SCMS (1,123 GJ/hour). |
| **Thursday 27 October 2011** | |
| 06:00 | Morning peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment compliance and to check if calculated demands matched actual demand profile. |
| 09:00 | Morning demand peaked at 12.3 SCMS (1,771 GJ/hour). This indicated that demand had now built following the restoration of band 5 the previous morning and band 5 re-designations during the previous day. Vector pipeline line pack decreased moderately during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to |

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| | supply during the previous day.<br><br>It was identified that 3.0 SCMS (432 GJ/hour) of this peak demand was being consumed by a large consumer previously directed to curtail demand fully. The CCO urgently discussed this situation with the large consumer and their gas supplier and demand was promptly curtailed in full. |
| 09:30 | Based on the underlying peak demand being 9.3 SCMS (1,340 GJ/hour), the CCO determined, after consultation with Vector that some further demand from curtailed bands could be restored if used sparingly. The CCO decided that band 6 could be restored under the prevailing conditions while reserving provision for further band 5 re-designations to be catered for if required. |
| 10:20 | The CCO issued a revised demand curtailment direction for band 6 to be restored but to use gas sparingly in all circumstances (notice #11273 and #11274). The CCO demand modelling indicated that band 6 demand would peak at approximately 2.0 SCMS (288 GJ/hour). The total number of band 6 consumers in the affected area was 8997. |
| 10:35 | MDL issued a revised demand curtailment direction for band 6 to be restored but to use gas sparingly in all circumstances (notice #11275). |
| 10:36 | Vector issued a revised demand curtailment direction for band 6 to be restored but to use gas sparingly in all circumstances (notice #11276 and #11277). |
| 11:00 | Vector completed the cut out of the damaged section of pipeline and detailed dimensional checks for the preparation of a new pipe spool to replace the damaged section. |
| 17:00 | Evening peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment and to check if calculated demands matched the actual demand profile. |
| 18:00 | By this time the CCO received confirmation from retailers about a further 10 consumer re-designations to band 5. Each of these were assessed and approved based on an assessment that spare capacity would be available. |
| 20:00 | Vector commenced fabrication of a new pipe spool to replace damaged section in a contactor's New Plymouth workshop. Vector was nearing completion and approval of the Non-Routine Operational Procedure for re-commissioning the isolated pipeline. |
| 20:30 | Evening demand peaked at 8.5 SCMS (1,224 GJ/hour). |
| **Friday 28 October 2011** | |
| 04:00 | Vector delivered the newly fabricated replacement pipe spool to site for installation. |
| 06:00 | Morning peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment compliance and to check if calculated demands matched the actual demand profile. |
| 09:00 | Morning demand peaked at 10.5 SCMS (1,512 GJ/hour). This indicated that demand had now built up further following the restoration of band 5 on Wednesday morning followed by the restoration of band 6 on Thursday morning and the band 5 re-designations during the previous two days. Vector pipeline line pack decreased moderately during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to supply during the previous day. |

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| 09:30 | Based on utilising line pack availability in the Vector pipeline with the possibility of using available residual line pack from the Maui pipeline, the CCO determined, after consultation with Vector that some further demand from curtailed bands could be restored if used sparingly. The CCO decided that band 4 could be restored under the prevailing conditions while reserving provision for further band 5 re-designations to be catered for if required. |
| 10:50 | The CCO issued a revised demand curtailment direction for band 4 to be restored but to use gas sparingly in all circumstances (notice #11280 and #11281). CCO demand modelling indicated band 4 demand would peak at approximately 1.0 SCMS (144 GJ/hour). The total number of band 4 consumers in the affected area was 816. |
| 11:08 | MDL issued a revised demand curtailment direction for band 4 to be restored but to use gas sparingly in all circumstances (notice #11285). |
| 11:11 | Vector issued a revised demand curtailment direction for band 4 to be restored but to use gas sparingly in all circumstances (notice #11286 and #11287). |
| 12:45 | Vector completed final cutting of the existing pipeline and tack welded the new pipe spool into place ready for butt welding. Vector had obtained the required approval from Lloyds register for the repair methodology. |
| 13:17 | The CCO issued a notice to the Gas Industry Company, the Ministry of Civil Defence and Emergency Management and the Ministry of Economic Development and the Ministry of Energy regarding the continuance of the critical contingency beyond 3 days from declaration. |
| 17:00 | Evening peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment and to check if calculated demands matched the actual demand profile. |
| 18:00 | By this time the CCO received confirmation from retailers about a further 7 consumer re-designations to band 5. Each of these were assessed and approved based on an assessment that spare capacity would be available. |
| 20:00 | Vector had fully welded the new section of pipeline and commenced the initial set of Non Destructive Testing (NDT) of the welds. |
| 20:30 | Evening demand peaked at 11.5 SCMS (1,656 GJ/hour). |
| **Saturday 29 October 2011** | |
| 06:00 | Morning peak demand period commenced. The CCO monitored system performance to assess levels of demand curtailment compliance and to check if calculated demands matched actual demand profile. |
| 08:00 | Vector informed the CCO that the initial set of NDT was passed as satisfactory. |
| 09:00 | Morning demand peaked at 13.8 SCMS (1,987 GJ/hour). This indicated that general demand was building due to the restoration of bands 4, 5 and 6 during the last three days and the approved band 5 re-designations. Vector pipeline line pack decreased markedly during the previous day due to demand restoration. No residual line pack from the Maui pipeline was required to supply during the previous day. |
| 09:30 | The CCO determined, after consultation with Vector, that there was no additional system capacity to restore any further curtailment bands and that off take limits had reached maximum allowable limits given the maximum advisable volume the Vector pipeline could supply and continuing downward |

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| | line pack trend. The CCO identified that further small additional band 5 re-designations may be allowable. |
| 11:00 | By this time the CCO received confirmation from retailers about one further consumer re-designation to band 5. This was assessed and approved based on an assessment that spare capacity would be available. |
| 13:00 | Due to increasing demand on the Vector 200 line, residual line pack from the Maui pipeline was taken through the Vector Pokuru Compressor Station to supply the Vector BOP lateral. |
| 14:15 | The CCO held discussions with Transpower, Genesis and Mighty River Power regarding the planned build up of demand scheduled for early Sunday morning subject to final approvals to re-commission the pipeline. An incremental demand build plan was agreed to ensure safe pipeline operation while satisfying the needs of the generators and Transpower. |
| 20:00 | Vector confirmed that the final set of NDT had been completed and passed as satisfactory. |
| 23:45 | Vector prepared the pipeline for commencement of the re-commissioning procedure. |
| **Sunday 30 October 2011** | |
| 02:00 | Vector completed purging and re-pressurisation of the isolated section of pipeline. Vector opened the Main Line Valves at Pukearuhe and Mokau Compressor Station to restore the Maui pipeline to normal service. |
| 02:30 | Vector reconfigured Rotowaro Compressor Station to accept gas from the Maui pipeline for compression and onward transmission north. Vector re-closed the Main Line Valve at Temple View delivery point to return the Vector pipeline to normal operational configuration. |
| **5. Demand Restoration Stage** | |
| 02:30 | The CCO issued a direction for demand to be fully restored to bands 2 and 3 and for the restriction to use gas sparingly for bands 4, 5 and 6 lifted from 03:00 (notice #11293 and #11294). CCO demand modelling indicated that bands 2 and 3 demand would peak at approximately 2.0 SCMS (288 GJ/hour) and 10 SCMS (1,440 GJ/hour) respectively. The total number of consumers in bands 2 and 3 were 11 and 1039 respectively. |
| 02:55 | MDL issued a direction for demand to be fully restored to bands 2 and 3 and for the restriction to use gas sparingly for bands 4, 5 and 6 lifted from 03:00 (notice #11290). |
| 03:00 | Vector issued a direction for demand to be fully restored to bands 2 and 3 and for the restriction to use gas sparingly for bands 4, 5 and 6 lifted from 03:00 (Notice #11291 and #11292). |
| 03:00 | Vector and the CCO monitored the system closely for any large or sudden increases in demand. |
| 03:30 | The CCO issued a direction for demand to band 1a and 1b consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory to be restored in the agreed increments commencing at 04:00 (notice #11295 and #11296). |
| 03:50 | MDL issued a direction for demand to band 1a and 1b consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory to be |

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| | restored in the agreed increments commencing at 04:00 (notice #11299). |
| 03:50 | Vector issued a direction for demand to band 1a and 1b consumers at Huntly Power Station, Southdown Power Station and Te Rapa Dairy Factory to be restored in the agreed increments commencing at 04:00 (notice #11300 and #11301). |
| 04:00 | Vector and the CCO monitored the system closely for any large or sudden increases in demand. |
| **6. Termination of Critical Contingency Stage** | |
| 11:30 | Vector and the CCO discussed system performance and demand build up since the issue of the demand restoration notice. The CCO was satisfied that the transmission system was capable of supplying gas to all consumers at the level at which it was supplied immediately before the event. |
| 12:00 | The CCO made a determination to terminate the critical contingency and issue a notice declaring the termination (notice #11303). |
| 12:08 | Vector issued a notice declaring the termination of the critical contingency (notice #11305). |
| 12:09 | MDL issued a notice declaring the termination of the critical contingency (notice #11304). |

## 5. Level Of General Compliance By Large Consumers And Retailers With TSO Directions

General compliance levels by retailers and large consumers appeared to be very good. This is borne out by the significantly reduced demand levels observed on the system during the critical contingency.

During the incident the CCO became aware of a small number of circumstances where large consumers did not fully comply with the curtailment direction issued at 02:35 on 25 October 2011 (notice #11227).

During the incident the CCO also became aware of a small number of circumstances where band 3 consumers did not fully comply with the curtailment direction issued at 10:40 on 25 October 2011 (notice #11237 and #11238).

No large consumers supplied the TSOs with demand curtailment compliance updates in accordance with r55. All large consumers are directly linked to the SCADA system and hence real time gas usage can be monitored on-line.

All retailers apart from one supplied the TSOs with regular demand curtailment compliance updates in accordance with r55. The quality and format of compliance reporting from retailers varied significantly. Most compliance reports did not report the number of consumers who had curtailed demand as required by r55 (2) (d). The inconsistency of the information supplied by retailers did not materially affect the transmission system performance during the critical contingency or any of the decisions taken by the CCO. It should be noted that the processes and procedures for retailers and large consumers' compliance updates is currently being reviewed and improved. The experience during this incident confirms this need.

## 6. Level Of General Compliance By Consumers With Retailers Directions

General compliance levels by consumers with retailer directions appeared to be very good. This is borne out by the significantly reduced demand levels observed on the system during the critical contingency.

The CCO received a retailer report that some consumers had refused to curtail or did not specifically respond positively when instructed to curtail.

## 7. Other Observations

During the critical contingency retailers re-designated thirty three consumers into band 5 – essential service providers. These re-designations were forwarded to the CCO to consider if demand could be restored to these consumers. The CCO considered these re-designations on a case-by-case basis and released restoration to each one under the revised curtailment direction issued by the CCO at 09:45 on 26 October 2011. This indicates that deficiencies may exist in the process for designating consumers as essential service providers.