Guidelines for determining regional critical contingencies

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Gas Industry Co.

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Purpose of these guidelines

R45(2) of the Gas Governance (Critical Contingency Management) Regulations 2008 (CCM Regulations) requires the industry body (Gas Industry Co) to prepare and publish guidelines to assist the Critical Contingency Operator (CCO) in determining whether a critical contingency event is regional. This distinction is relevant, because the contingency imbalance arrangements do not apply in the case of a regional critical contingency event (r82).

The CCM Regulations include arrangements for settling "inadvertent trades" among shippers and welded parties (r67-r82). These inadvertent trades occur because the order of curtailment is largely determined by customer size and does not consider whether a customer's supplier has gas available or not.

Two different situations can arise:

1. End-users are curtailed but their supplier had nominated gas to meet their customers' needs, and that gas is still flowing. This situation is described as the supplier being "long" on gas in the system.
2. A gas supplier no longer has access to gas (for example, the production station has failed) but some of the supplier's customers continue to use gas as they are in bands that the CCO has not directed to curtail. This situation is described as the supplier being "short" on gas in the system.

Defining a regional critical contingency is necessary to ensure the contingency imbalance arrangements are not operative in circumstances where they are not required. In circumstances where it is not immediately clear whether one or both legs of r45(1) are satisfied, consider whether contingency imbalance arrangements would assist. If not, then that may indicate that it is a regional critical contingency.

Contingency imbalance arrangements

A critical contingency arises because demand exceeds supply.

If a supplier long on gas were to fix that situation by reducing its nominations of gas into the system, it would reduce gas supply into the system making the critical contingency worse.

In situations like this, a way to motivate those who are long on gas is needed to encourage them to maintain, or even increase, supply where possible.

The CCM Regulations provide this incentive through provisions for contingency imbalances and the contingency price, providing suppliers who are long on gas with a way to maintain their nominations. After the critical contingency is over, those who are long and/or short on gas (that is, holding positive or negative contingency imbalances) will receive and/or pay money for their contingency imbalances at the contingency price.

Without this incentive, these parties would have no reason to continue supplying gas into the system (as their own customers have been curtailed), which would make a critical contingency worse.

In most critical contingencies, the existence of the contingency imbalance provisions provides the right incentives for parties injecting gas into the transmission system.

Regional critical contingencies

Contingency imbalance provisions do not serve any useful purpose in managing regional critical contingencies. This is where it is not possible to increase the amount of gas flowing into the affected transmission area.

The Critical Contingency Management (CCM) Regulations define a regional critical contingency (r45(1)) as:

> …a critical contingency characterised by—
>
> (a) a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system; and
>
> (b) complete or partial isolation of that part of the transmission system from any significant source of gas supply.

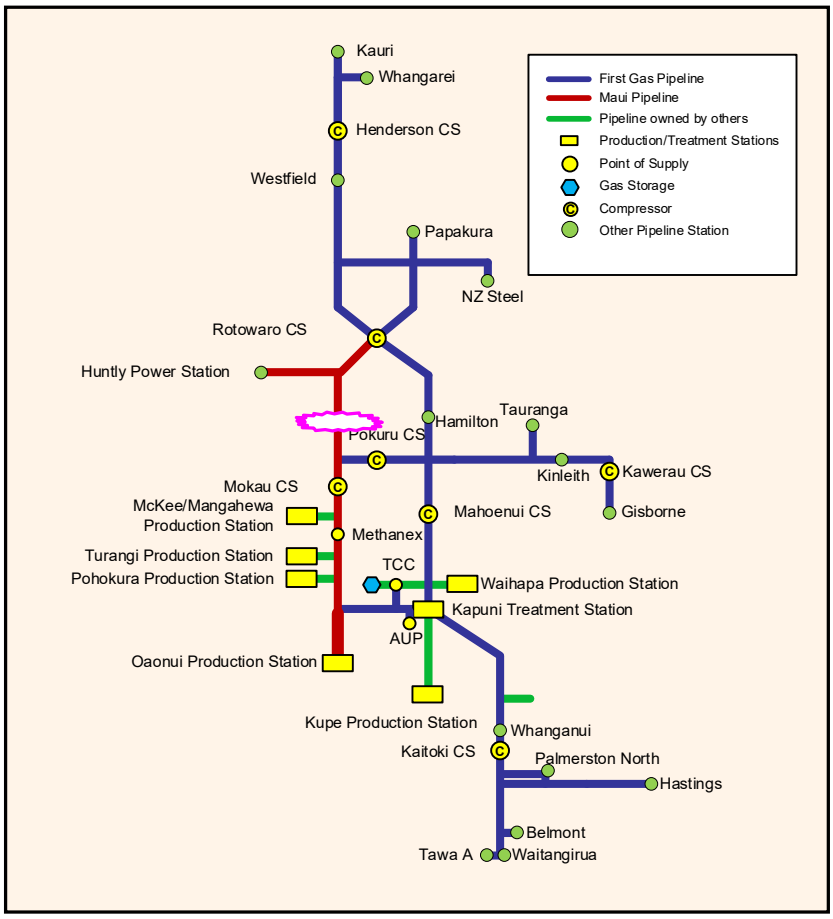
The most obvious example is a contingency created when a transmission pipeline has been damaged, the mainline valves surrounding the damaged section have slammed shut, and the portion of the transmission system downstream of the break has no gas coming in.

Under these circumstances, no gas will be coming into the affected section of the pipeline. The contingency imbalance arrangements would have no use, as no producer or shipper could increase the volume of gas in the affected section of pipeline.

Guideline scenarios

The following six scenarios are intended to provide guidance to the CCO in determining if a regional critical contingency exists in a live critical contingency situation.

Scenario 1: Maui pipeline damaged north of Mokau compressor



Features

- The damaged portion of the Maui pipeline is isolated to allow for repairs.
- No gas is being injected into the pipeline north of the isolated section and pressures in that northern section are falling rapidly.
- Given the time needed to effect repairs, extensive curtailment will be required.
- Gas continues to flow in the Maui pipeline south of the isolated section. This means that the valve on the Firstgas pipeline at Temple View (near Hamilton) that is normally open allows some gas to flow north to Hamilton and Auckland.

Analysis

Option 1: the valve at Temple View is closed

If the valve at Temple View is closed:

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	Yes: the transmission system north of the damage experiences a total loss of supply
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	Yes

Conclusion

Scenario 1: Option 1 is a **regional** critical contingency under this option.

Option 2: the valve at Temple View is open, allowing gas to flow north

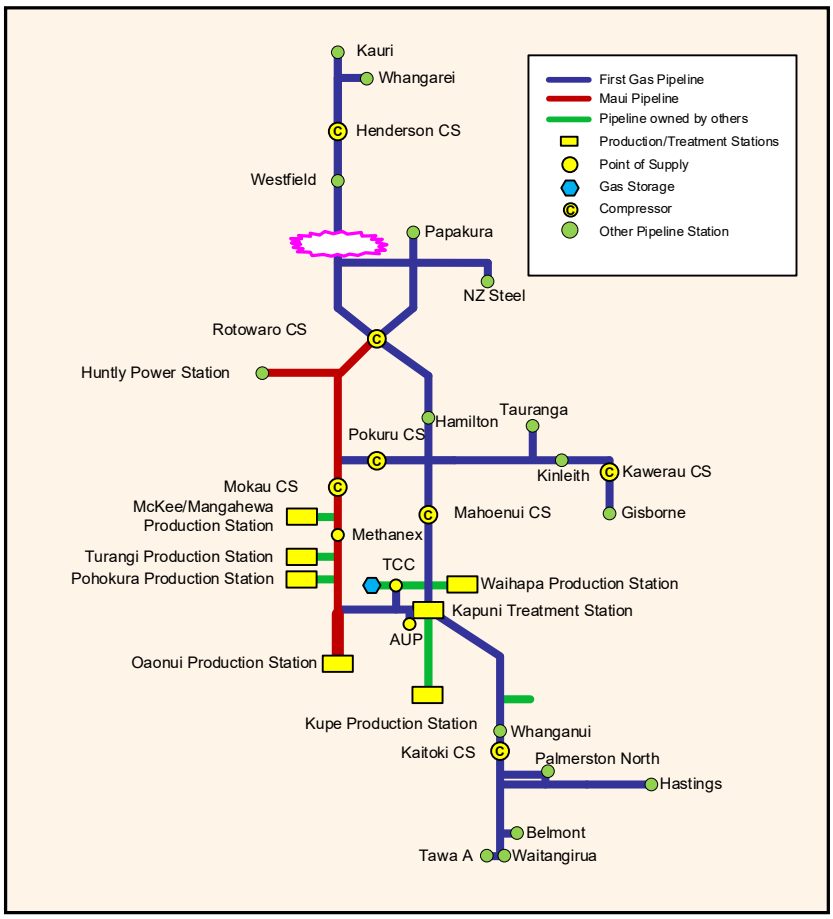
By opening the valve at Temple View, gas can flow north to Auckland via the Firstgas 200 pipeline. This means there is some supply north of the break in the Maui pipeline, but that supply is less because the 200 pipeline capacity is less.

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	Yes
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	Yes – the 200 line capacity is less

Conclusion

Scenario 1: Option 2 is a **regional** critical contingency under this option as well.

Scenario 2: Firstgas North pipeline damaged north of NZ Steel offtake



Features

- The damage to the North pipeline is located in South Auckland.
- There are no pipelines that bypass the damaged and isolated section.

Due to the small amount of linepack in the north system, very rapid curtailment would be needed to ensure the distribution networks in Auckland and points north did not become depressurised.

Analysis

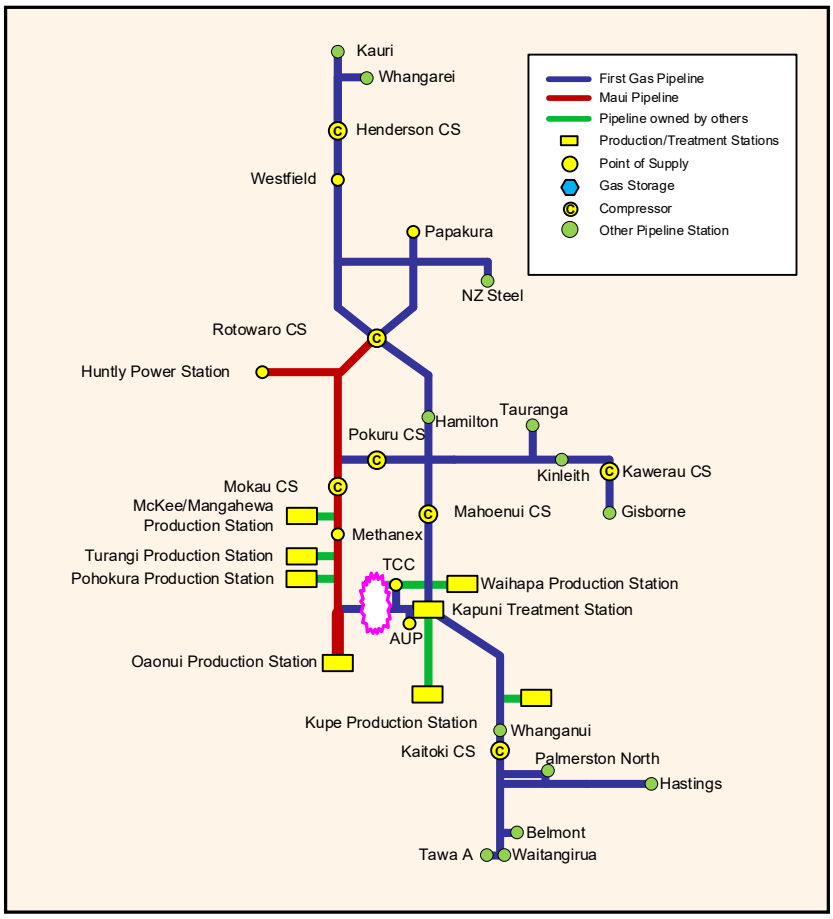
Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	Yes

Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	Yes

Conclusion

Scenario 2 is a **regional** critical contingency.

Scenario 3: Frankley Road pipeline damaged



Features

- There is a damage to the Frankley Road pipeline.
- The entire system would be affected:
    - With Franklin Road being a bi-directional pipeline, damage to this pipeline would mean disconnection of the Maui pipeline from Franklin Road connected producers and users
    - Effectively creating two disconnected systems

It is possible that such a scenario would not lead to a critical contingency, as actions by large consumers and Firstgas would be likely to prevent the decline in pressure needed for a critical contingency to be declared.

However, there is still a chance that a scenario like this would result in a critical contingency, so it is useful to consider how it would be classified.

Analysis

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	No. The entire system would be affected.
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	No. Oaonui and Pohokura production stations, as well as smaller fields, would still be able to supply the north part of the transmission system; Kupe and Kapuni can supply the south.

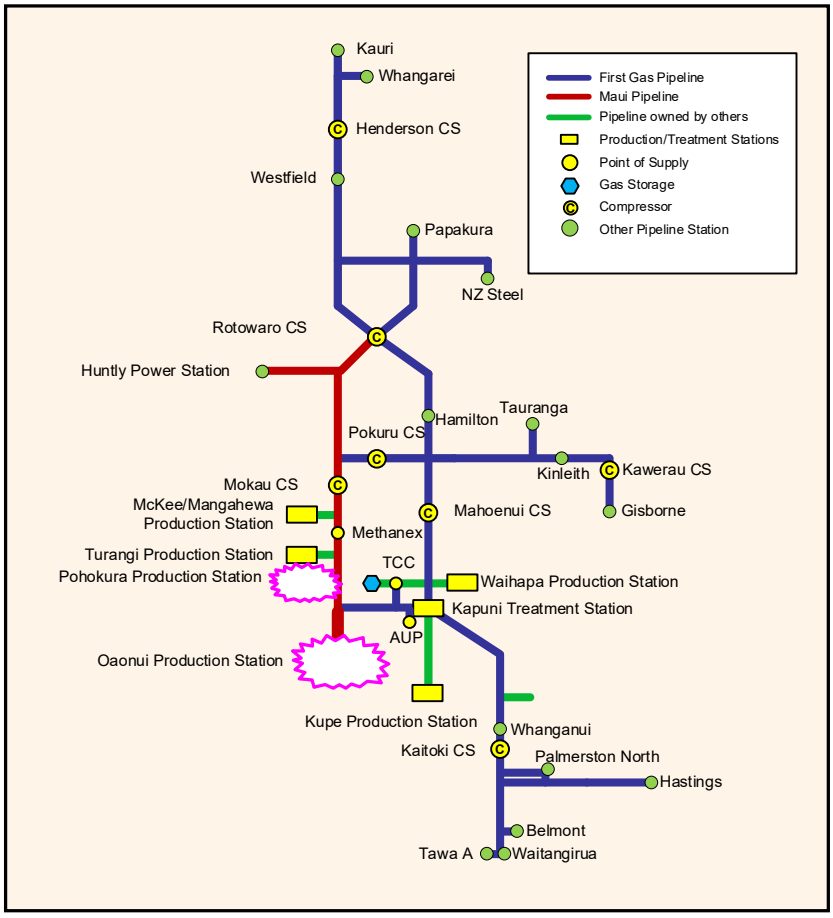
If a critical contingency were declared, it would be helpful for Oaonui, Pohokura and the other production stations north of the break to continue supplying gas, even if their customers were south of the break. Similarly, it would be helpful for Kupe to continue supplying (at least some) gas to the transmission pipeline south of the break, even though its customers might be north of the pipeline break.

Contingency imbalance provisions in this situation would give incentive to the producers (or their contracted customers) to keep supplying gas and would serve as a means to settle the resulting inadvertent trades between producers and/or wholesalers and shippers.

Conclusion

Scenario 3 is **not** a regional critical contingency.

Scenario 4: Earthquake affecting gas production



Features

- A major earthquake has interrupted the supply of Maui and Pohokura gas but the integrity of the transmission system is not affected.
- Gas from Pohokura and Maui accounts for a large proportion of receipts into the transmission system. As a result, losing both of those sources (or any other key producer) would leave a significant shortfall and precipitate a critical contingency.

There are, however, several fields that could continue to produce and supply gas into the transmission system.

Analysis

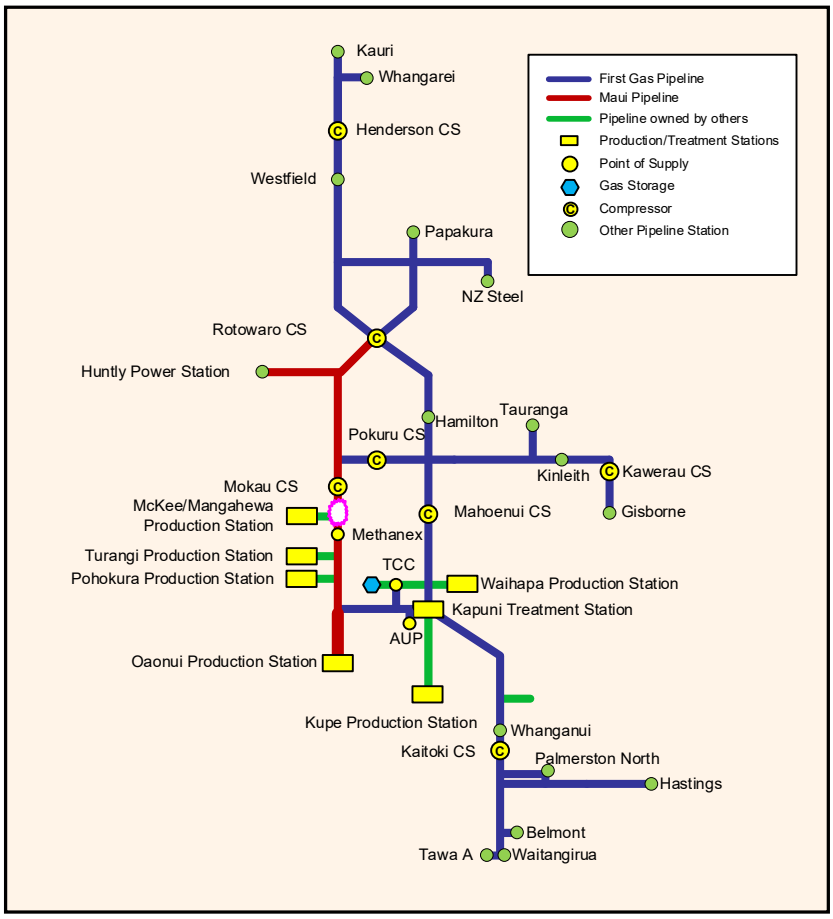
Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	No. The entire system would be affected.
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	No. The transmission system will continue to receive gas into the pipelines.

Conclusion

Scenario 4 is **not a regional** critical contingency.

This conclusion is consistent with the fact that in such a scenario, the contingency imbalance provisions would serve a useful purpose: the parties with contracts with the remaining fields supplying gas into the system are not necessarily the same set of parties whose customers have not been curtailed. Thus, there will be a need for a system to wash-up the inadvertent trades that will occur.

Scenario 5: Maui Pipeline damage between Tikorangi and Pukearuhe main line valves



Features

- Pohokura, McKee/Mangahewa, Turangi unable to supply gas into the pipeline
- No gas injection north of the break
- South of the break, Oaonui, Kupe, and Kapuni are able to keep operating.
- Demand curtailment would be required in the north
- The transmission system south of the break would also be affected, as it will have lost the supply from Pohokura and other fields, but curtailment probably won't be required.

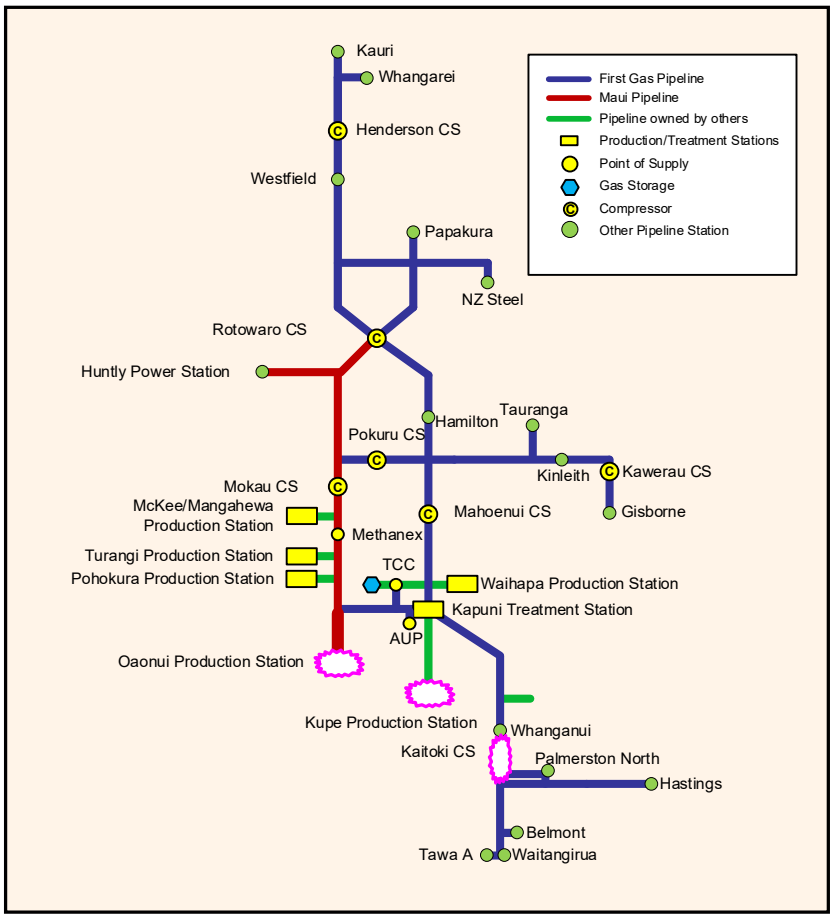
Analysis

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	Yes. The system north of the break would be affected.
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	Yes.

Conclusion

Scenario 5 is **a regional** critical contingency.

Scenario 6: Evolving scenario



Features

Stage 1:

- A mechanical failure of the Kaitoke Compressor Station
- This led to a breach of the critical contingency pressure threshold at Waitangirua, near Wellington.

Stage 2:

- Sometime later, damage to the electricity supply network resulted in unplanned outages at the Kupe and Oaonui Gas Production Stations. This led to a rapid loss of Maui Pipeline linepack
- The Kapuni Gas Treatment Plant (KGTP) and Rotowaro critical contingency pressure threshold were breached.

Analysis

Stage 1: Failure of Kaitoke Compressor Station

The failure of the Kaitoke Compressor Station caused a breach of the Waitangirua pressure threshold. This only affected part of the transmission system.

As can be seen from the schematic, there are no pipelines that bypass the damaged and isolated section. As a result, and due to the small amount of linepack in the south system, very rapid curtailment would be needed to ensure the distribution networks in points south of Kaitoke Compressor Station did not become depressurised.

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	Yes
Is there a complete or partial isolation of that part of the transmission system from any significant source of gas supply? (r45(1)(b)?	Yes

Conclusion

Scenario 6: Stage 1 is a **regional** critical contingency.

Stage 2: Unplanned outages at Kupe and Oaonui Gas Production Stations

When the unplanned outages of the Kupe and Oaonui Gas Production Stations occurred, it resulted in a significant reduction in gas supply to all the transmission system. This led to a breach of the KGTP and Rotowaro pressure thresholds.

Losing gas supply from both Kupe and Maui would leave a significant shortfall and precipitate a critical contingency. There are, however, some fields that could continue to produce and supply gas into the transmission system.

Has there been a substantial reduction to, or total loss of, the supply of gas to a part of the transmission system? (r45(1)(a))	No. The entire system would be affected.
Is there a complete or partial isolation of that part of the transmission system from	No, the transmission system will continue to receive gas into the pipelines.

any significant source of gas supply? (r45(1)(b)?	

Conclusion

Scenario 6: Stage 2 is updated from a regional critical contingency to **a non-regional** critical contingency.

In such a developing scenario, the contingency imbalance provisions would serve a useful purpose: the parties with contracts with the remaining fields supplying gas into the system are not necessarily the same set of parties whose customers have not been curtailed. Thus, there would be a need for a system to wash-up the inadvertent trades that would occur.

Price and imbalances provisions do not apply to regional critical contingencies, but they do apply once the critical contingency is upgraded from regional to non-regional.

In this staged scenario r53(1)(h) and r53(1)(h)(ii) are relevant for the CCO's decision to upgrade the critical contingency:

The CCO must consider whether any event has occurred that would revise the critical contingency operator's determination under regulation 52A and, if so, publish a notice stating either—

(i) that a regional critical contingency has been determined and which parts of the transmission system are subject to the critical contingency determination; or

(ii) that the critical contingency is no longer a regional critical contingency.