Firstgas

Proposed Changes to Critical Contingency Pressure Threshold Ranges

What is a Critical Contingency?

- Critical Contingencies (**CCs**) occur when there is a shortage of gas supply relative to demand due to damage or failure of assets that make up Firstgas' transmission system or connected upstream assets, including gas producers.
- The pressure on the transmission system can fall to a point where intervention is required by the Critical Contingency Operator (**CCO**) to ensure that enough gas is maintained in the transmission system to supply distribution networks and domestic consumers.
- It's expensive and time consuming to reinstate a gas distribution networks if the pressure drops too low.
- The Gas Governance (Critical Contingency Management) Regulations 2008 (**CCM Regulations**) state how CCs are determined and managed.
- The CCM Regulations state that Firstgas, as a Transmission System Owner (**TSO**), must set CC pressure thresholds at various locations on the Transmission System and record them in Firstgas' Critical Contingency Management Plan (**CCMP**)
- When a CC pressure threshold is breached, the CCO is required to declare a CC.

What are Critical Contingency Thresholds?

- Critical Contingency thresholds must be set by Firstgas within the ranges (lower and upper limits) set out in Schedule 1 of the CCM Regulations.
- These ranges / limits were established in 2008 as part of the original development of the CCM Regulations. These have not been revised since.
- Schedule 1 of the CCM Regulations specifies two key ranges:
  - **Minimum Operating Pressure (Pmin)** – the range of pressures at which point a network failure is considered to possibly to occur
  - **Time to Pmin** – an range of appropriate amounts of time to allow the CCO to take actions to mitigate a potential network failure.
- Firstgas' CCMP must specify the value for the minimum operating pressure and time to minimum pressure within the ranges established in Schedule 1.
- The specific pressure thresholds that Firstgas select are subject to the independent CCMP review and approval process required by the CCM Regulations.
- Firstgas seeks to set CC thresholds that balance the risk of unnecessary declarations against the risk of leaving action too late to avoid system failure.

Current Critical Contingency threshold ranges

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Pipeline	Maximum time before minimum operating pressure is reached	Minimum time before minimum operating pressure is reached	Minimum operating pressure range	Point of measurement*
Maui pipeline				
Rotowaro	5 hours	2 hours	32 (±2.5) bar g	Rotowaro Compressor Station
Vector pipeline				
South	10 hours	3 hours	35 (±2.5) bar g	Waitangirua WTG06910
Hawkes Bay lateral	6 hours	3 hours	30 (±2.5) bar g	Hastings HST05210
Frankley Rd to Kapuni	6 hours	3 hours	35 (±2.5) bar g	Kapuni (GTP) KAP09612
Bay of Plenty	6 hours	3 hours	30 (±2.5) bar g	Gisborne GIS07810
Bay of Plenty	6 hours	3 hours	30 (±2.5) bar g	Taupo TAU07001
Bay of Plenty	6 hours	3 hours	30 (±2.5) bar g	Tauranga TRG07701
Bay of Plenty	6 hours	3 hours	30 (±2.5) bar g	Whakatane WHK32101
Morrinsville lateral	6 hours	3 hours	30 (±2.5) bar g	Cambridge CAM17201
Central (North)	6 hours	3 hours	40 (±2.5) bar g	Westfield WST03610
North	6 hours	3 hours	25 (±2.5) bar g	Whangarei WHG07501
For any other gas gate on the Maui or Vector pipeline	6 hours	3 hours	30 (±2.5) bar g	Gas gate not specified elsewhere

Time to Pmin **Pmin** **Location**

*The codes specified in the fifth column of this table refer to the gas gate codes determined under the Gas (Switching Arrangements) Rules 2008.

- We consider that Schedule 1 is outdated and requires revision
- Greater flexibility needs to be introduced into the CC threshold ranges to ensure that important opportunities can proceed and to enable Firstgas and the gas industry to respond more efficiently and effectively to the rapidly evolving energy environment.

Why change the CC threshold ranges?

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Optimise System & Reliability

- To optimise the operation of the transmission system and maximise reliability for gas users, CC thresholds should not be overly conservative
- High CC thresholds require higher operating pressures, increasing costs to run, maintain and certify the transmission system
- Higher operating pressures contribute to higher emissions as a result of more frequent operation of compressors at higher pressures

Increased Safety

- Firstgas would like to have the ability to potentially reduce the pressure in some sections of transmission pipeline if required for safety reasons, while still maintaining security of supply
- Reducing the maximum allowable pressure in the pipeline means there is a greater margin to absorb defects, damage, external loads etc.

Why change the CC threshold ranges?

Enable Alternate Solutions

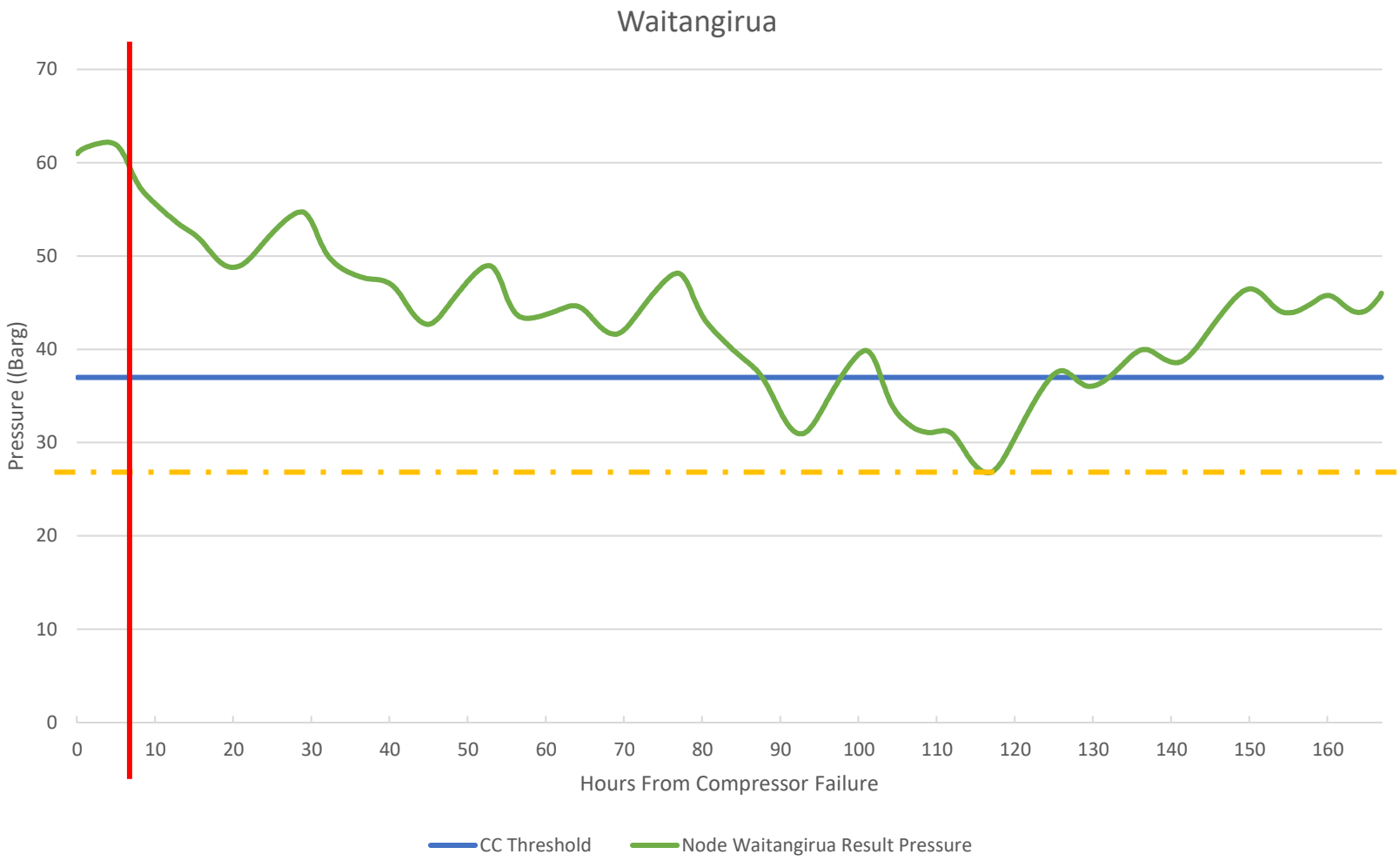
- Existing critical contingency threshold parameters create an artificial barrier to progressing both current and future energy initiatives, which are important in New Zealand's transition towards a zero-carbon future
- Such emerging initiatives include Biomethane production and Hydrogen (located outside of Taranaki) which require or will benefit from lower operating pressures

Reduce Early CC / Curtailment Risk

- The current lower end limits of the threshold ranges are significantly higher the actual failure pressures in much of the transmission system
- Reduction in system pressure could result in CC declarations and curtailment occurring earlier than required or even unnecessarily
- Explained more in the following examples at a variety of system locations

Example 1 - Waitangirua

Example shows a CC Declaration occurring significantly before it is required



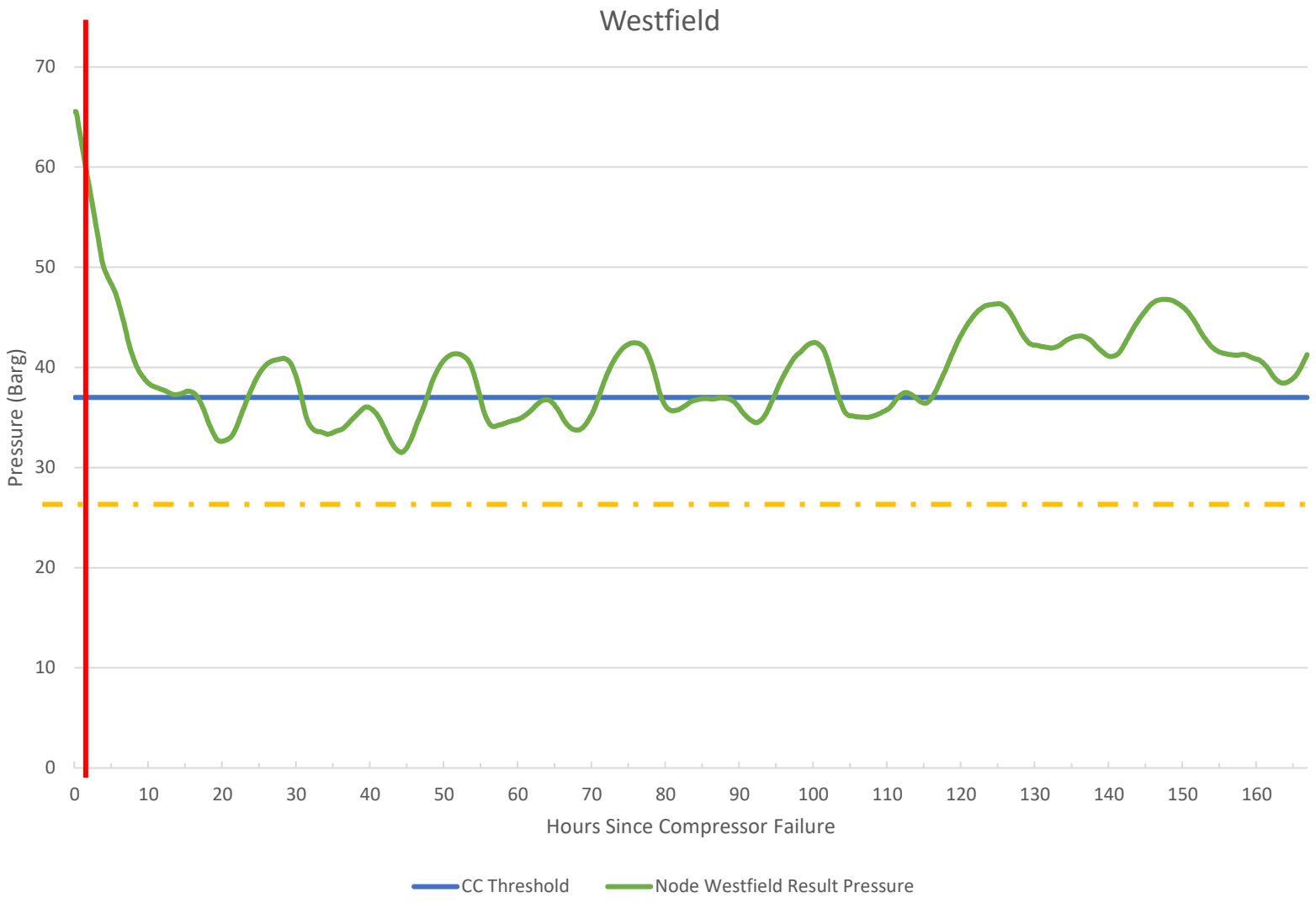
Graph shows the decline of pressure at Waitangirua in the event of a complete compression failure at Kaitoke CS

Blue line is the current threshold, yellow is a conservative assumption of regulator failure pressure

Red Line is the point a CC declaration would be made

Example 2 – Westfield

Example shows a CC Declaration where it is not required



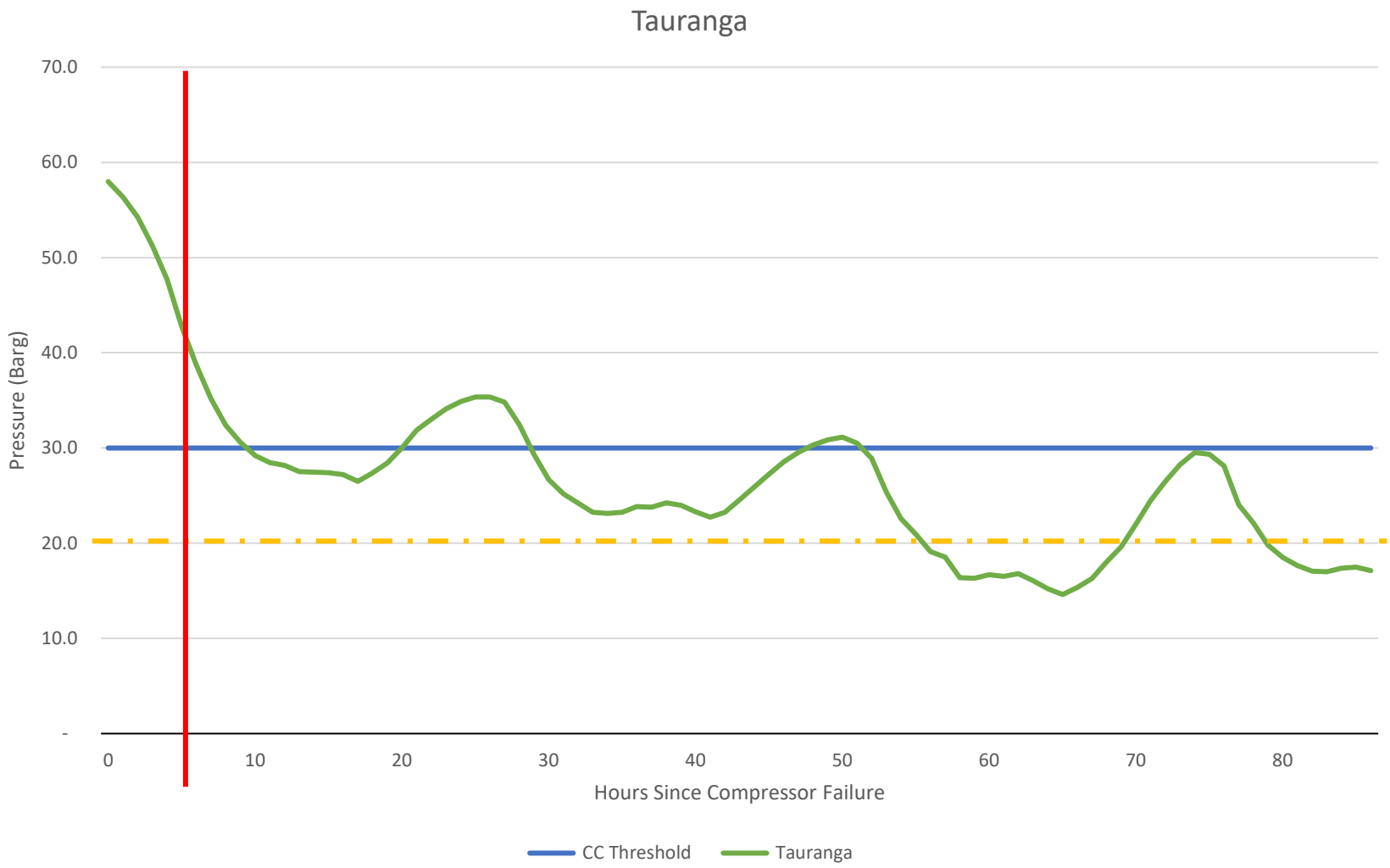
CC Time to Failure Breach– 1 Hour

Regulator Failure Pressure – 26barg

Time to Failure – System does not fail.

Example 3 – Tauranga

Another example of early declaration – such examples are numerous across the system



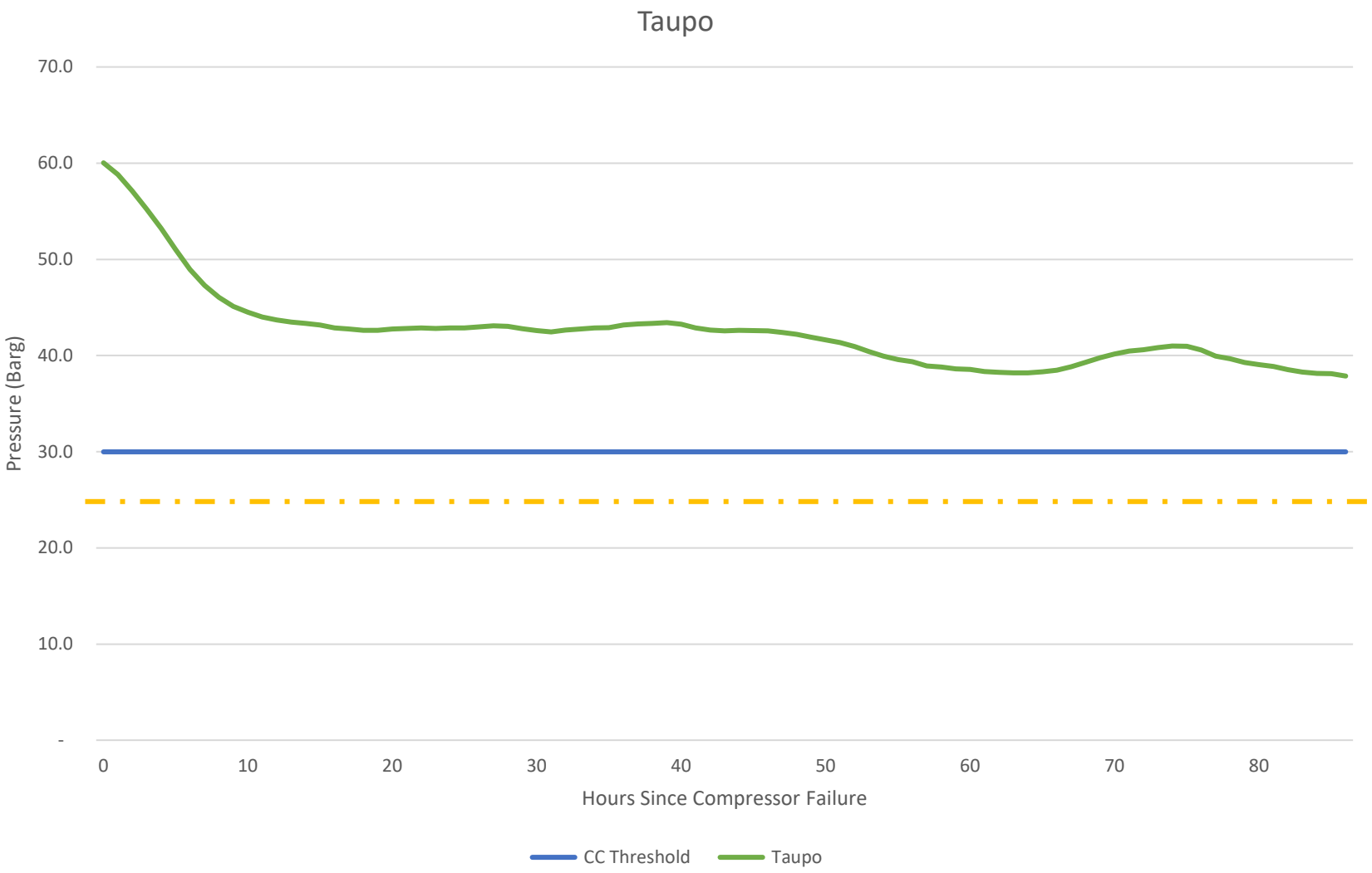
CC Time to Failure Breach – 5 Hours

Regulator Failure Pressure – 20barg

Time to System Failure – 56 hours

Example 4 – Taupo

Example shows where some points no longer are likely critical failure points



CC Time to Failure Breach – NA

Regulator Failure Pressure – 23barg

Time to failure – System Does not fail.

What changes to ranges does Firstgas recommend?

- Firstgas proposes the following amendments to Schedule 1:

Pipeline Name	Point of Measurement	P_{min} (barg)
Maui	Rotowaro	30 +/- 5
South	Waitangirua	27.5 +/- 7.5
Hawkes Bay Lateral	Hastings	25 +/- 5
Frankley Road to KGTP	KGTP	35 +/- 2.5
Bay of Plenty	Gisborne	25 +/- 5
~~Bay of Plenty~~	~~Taupo~~	(Removed)
Bay of Plenty	Tauranga	25 +/- 5
Bay of Plenty	Whakatane	25 +/- 5
Morrinsville Lateral	Cambridge	25 +/- 5
Central (North)	Westfield	27.5 +/- 7.5
North	Whangarei	25 +/- 5
First Gas and Maui Pipeline	Any other gas gate*	25 +/- 5

*Excluding gas gates supplied by pipelines operated at distribution pressures (<20barg)

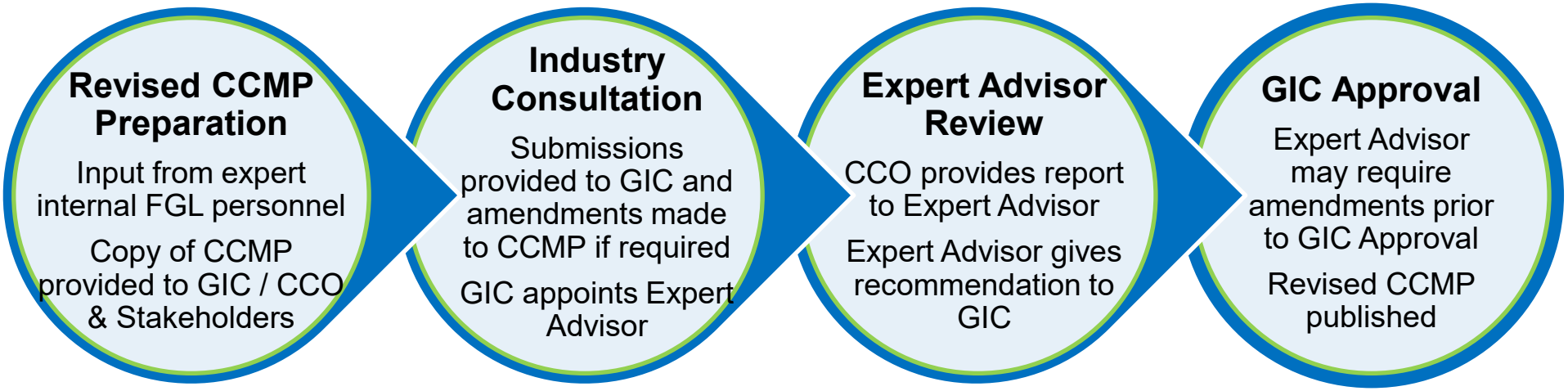
- These have been selected based primarily on approximately the current estimated failure pressures, with the tolerances expanded to cover the existing CCMP threshold where possible.

Review of Schedule 1 Pressure Ranges

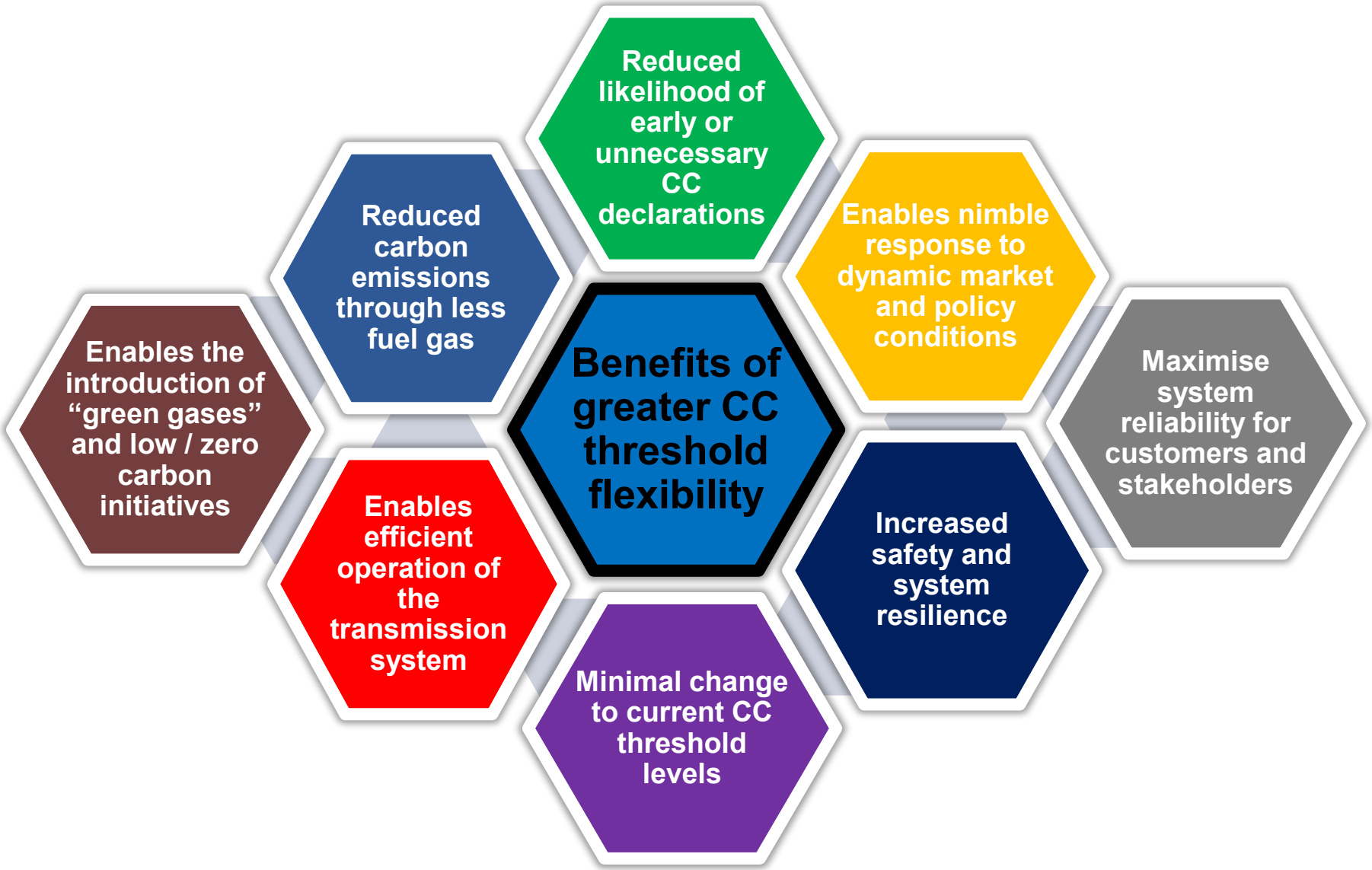
- GIC engaged Logicamms to review Firstgas' proposed changes to the Schedule 1 ranges who recommended that the GIC accept the proposed changes given:
  - The minor impact on most response times available to the CCO;
  - The CCMP review and approval process;
  - The potential to reduce emissions;
  - The potential to enable (or reduce the barrier to entry for) low/no fossil gases.
- Logicamms notes that "*changes to the CCMP require approval by the governing regulatory body and allow for detailed review of the specific changes within the approval timeframe*"

Robust CCMP Review and Approval Process

- Firstgas sets a specific CC pressure threshold (within the prescribed ranges) at various locations on the Transmission System and records them in the Firstgas CCMP
- The steps required by the CCM Regulations in updating the CCMP ensure that any threshold change is subject to robust independent scrutiny before being implemented
- All material changes to a CCMP require industry consultation and review and approval from both the CCO and GIC-appointed “Expert Advisor”.
- Schedule 1 only sets the boundaries in which a CCMP value may be proposed. It does not set the failure pressures or time to failures values themselves, as this is only ever set by the CCMP process.



Recap of benefits of greater flexibility in setting Critical Contingency thresholds



Customers will benefit from reduced risk and cost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Questions?