MEMORANDUM

TO: GTAC Stakeholders

FROM: First Gas

DATE: 3 July 2018

RE: Workstream 2 – 2.2 Balancing Tolerances

This memo sets out the GTAC Gas Balancing Principles for the Transmission System. It then goes on to discuss the amount of line pack flexibility available in the transmission system and how First Gas proposes to allocate that flexibility between shippers and OBA parties under the GTAC. These issues will be discussed at the GTAC workshop on 11 July 2018. The outcomes of these discussions will then be incorporated into the Balancing Standard Operating Procedures (SOPs) that will accompany the GTAC. We intend to issue these SOPs for consultation at the beginning of September 2018. The numbers presented in this memo are preliminary and will be confirmed in the SOPs released for consultation.

Final Assessment Paper (FAP) Findings

The findings of the FAP on balancing tolerances were as follows:

- FG has not defined the amount of line pack to be set aside for shipper tolerances and no constraint on setting tolerances. As this is outside GTAC, there is no constraint on FG to act neutrally (19, 75)
- Principles for setting running mismatch tolerances or the tolerances themselves to be included in GTAC (19, 75)

We agree that more information for shippers and OBA parties on tolerances would provide greater certainty on how the GTAC balancing regime hangs together. We certainly intend to act neutrally when developing and revising SOPs, so will consider how best to make sure that the obligations in section 2.6 and 2.7 of the GTAC also apply to SOPs.

The workshop with stakeholders identified the following issue:

- First Gas role as balancing agent

We agree that it's important that stakeholders understand our role in balancing the pipeline. We aim to increase understanding through this paper and discussion at the workshop.

How does First Gas decide how much line pack is available for intraday flexibility on the pipeline?

The line pack in the pipeline needs to be managed to ensure stable operation of the pipeline. This is, and must be, the primary concern for the TSO in order to provide reliable transmission services. The line pack also needs to be managed in a way that avoids system fluctuations leading to a breach of Critical Contingency (CC) Time-To-Pressure Thresholds.

First Gas aims to manage the pipeline relatively conservatively. Hence, we set upper line pack limits to:

- Provide flexibility for pipeline users
- Maintain the Taranaki Target Pressure (i.e. avoid breaching the upper TTP limit)
- Operate within the approved operating envelope of the pipeline and its associated equipment.

When line pack is close to the upper limit, there is an elevated risk of pressure in the southern part of the Maui pipeline rising rapidly in the event of a Mokau Compressor trip (and breaching the upper TTP limit).

We set lower line pack limits to:

- Provide flexibility for pipeline users
- Maintain the Taranaki Target Pressure (i.e. avoid breaching the lower TTP limit)
- Operate within the approved operating envelope of the pipeline and its associated equipment
- Ensure that parties have the ability to respond within appropriate timeframes in the event of an unplanned loss of receipt flows
- Avoid flow fluctuations leading to a breach of a Critical Contingency Time-To-Pressure Threshold (or minimum pressure threshold)
- Ensure there is a reasonable line pack buffer in the pipeline in the event of an unplanned pipeline emergency or major supply outage
- Avoid the TSO having to take swift OFO/curtailment action due to low limits being breached

In addition, the TSO takes into account any volumes required for safe shutdown of user plant. The line pack stack can be considered conceptually as shown in the chart below.
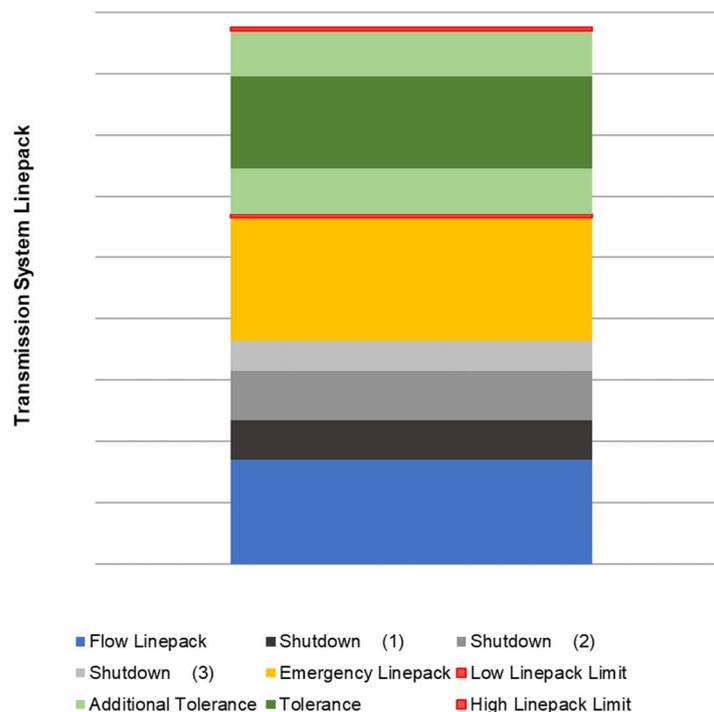
If the line pack is managed within these limits the TSO is able to:

- Ensure availability of DNC and supplementary capacity is maximised
- Ensure reasonable underruns and overruns in flow can be accommodated (provide tolerance)
- Allow for peaking where this is notified and approved
- Provide for park and loan (on an as-available basis)
- Ensure that the proposed use of the system by one user doesn't impact another user (e.g. the tolerance allocated to one user doesn't restrict another user from nominating DNC).

The TSO reacts to changing line pack conditions throughout the course of the gas day and needs to also consider the implications of the current line pack position for the coming days. It therefore requires the discretion afforded to the TSO in section 8.5 of the GTAC. The TSO has the capability, capacity and information to be best placed to make the decisions associated with balancing the pipeline.

In setting the line pack available for intraday flexibility, the TSO takes into account the above factors and uses this to define the total tolerance available to pipeline users.

How much line pack is available for tolerance on the pipeline?

First Gas operates the Mokau Compressor Station partly in order to hold additional line pack north of Mokau. This reduces security of supply risk and offers flexibility to users. However, there will be situations where the Mokau Compressor Station is not available (due to planned and unplanned outages) or not required. Tolerances on the transmission system therefore need to reflect whether Mokau is operating.

Proposed operating regimes are as follows:

Mokau Off Total Tolerance:

- 30 TJ with a lower line pack limit of 250 TJ and an upper line pack limit of 280TJ

Mokau On Total Tolerance:

- 30 TJ with a lower line pack limit of 290TJ and an upper line pack limit of 320TJ
- When Mokau is on, a further 30TJ could be accommodated to allow for extra flexibility (e.g. for park and loan).
- With the extra flexibility option included a lower line pack limit of 275 TJ and an upper line pack limit of 335 TJ become practical.

The TSO would operate the pipeline in the midpoint of the 30 TJ tolerance range to minimise the risk of hitting upper or lower line pack limits.

An example summary of the elements of line pack under each operating scenario is given in the table and chart below (note: the axis does not begin at zero and flowing line pack is therefore a much larger proportion of the total than shown in this chart) with exact values given in the table below.

Line pack Components	Mokau Off (TJ)		Mokau On (TJ)	
	Line pack Allocation (TJ)	Total (TJ)	Line pack Allocation (TJ)	Total (TJ)
Flow Line pack	191		191	
Shutdown (User 1)	13		13	
Shutdown (User 2)	16		16	
Shutdown (User 3)	10		10	
Emergency Line pack	20		45	
Low Line pack Limit		*250*		*275*
Additional Tolerance	0		15	
Tolerance	30		30	
Additional Tolerance	0		15	
High Line pack Limit		*280*	*335*	*335*

Allocation of Transmission System Linepack
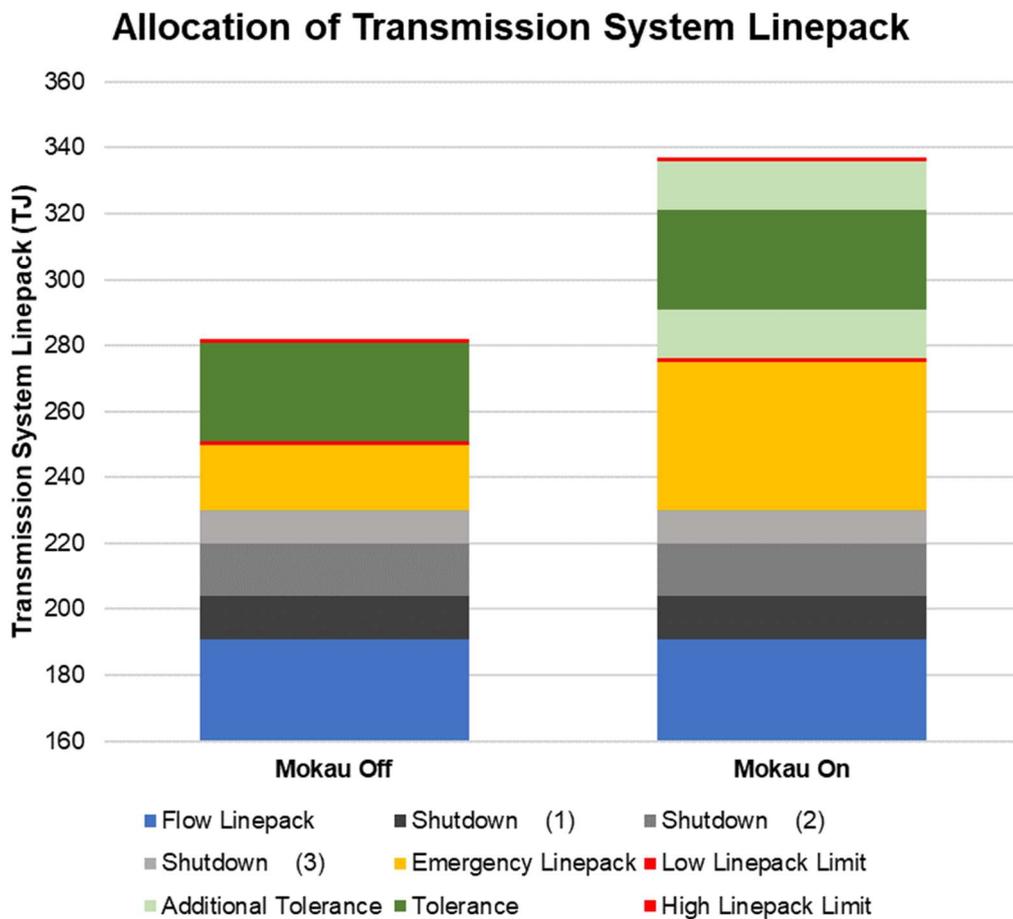
The extra flexibility provided by the operation of Mokau increases the cost of operating the transmission system for users. First Gas announced a change to its compressor strategy in 2017 to make greater use of the Mokau compressor and generally target higher line pack

levels in the Maui pipeline. Customer feedback on this change has been positive and we intend to continue to apply that approach.

We have assumed that the operational behaviour of parties will remain the same independent of whether Mokau is operating or not. The other key assumptions underlying the assessment of total tolerance are:

- Pipeline flows will remain similar to recent historic levels
- Pipeline configurations and compressor locations will remain as per the current configuration.

Our preferred position is that we provide a level of tolerance that is available in all operating conditions. The proposed 30 TJ tolerance is what First Gas believes the transmission system is able to accommodate in all operating conditions. Additional tolerance may available when Mokau is on and system conditions are normal. The TSO offering additional tolerance is dependent on prevailing pipeline conditions and uptake of park and loan (should this service be offered).

As the TSO will aim to operate the pipeline in the midpoint of the tolerance range, the tolerance allocated to pipeline users is directional – i.e. 15 TJ above or below the desired line pack. This ensures that if all parties exercised their tolerance in the same direction on a day, the lower or upper line pack limits would not be breached.

The total tolerance available in the system will be recorded in the Balancing Standard Operating Procedure, which may be changed should the operating parameters above change.

How is this total tolerance divided between shipper and OBA party groups under the GTAC?

Shared and dedicated delivery points have different requirements for tolerance depending on the type of load they supply. At dedicated delivery points, usage is controlled directly by a single user according to their need. However, at shared points, more tolerance may be required as load is less able to be controlled – for example, due to changes in mass market gas demand arising from weather.

In assigning tolerance we also need to understand which parties are taking the balancing risk for gas transportation. At interconnection points where there is an operational balancing arrangement (OBA) in place, the OBA party takes the balancing risk and is subject to excess running mismatch charges. At delivery points where there is an allocation agreement, these charges are borne by the shipper(s). We believe that it is important to ensure that all parties who take risk in balancing have access to a reasonable level of tolerance.

The mapping of tolerance onto those parties taking balance risk is shown in the diagram below.
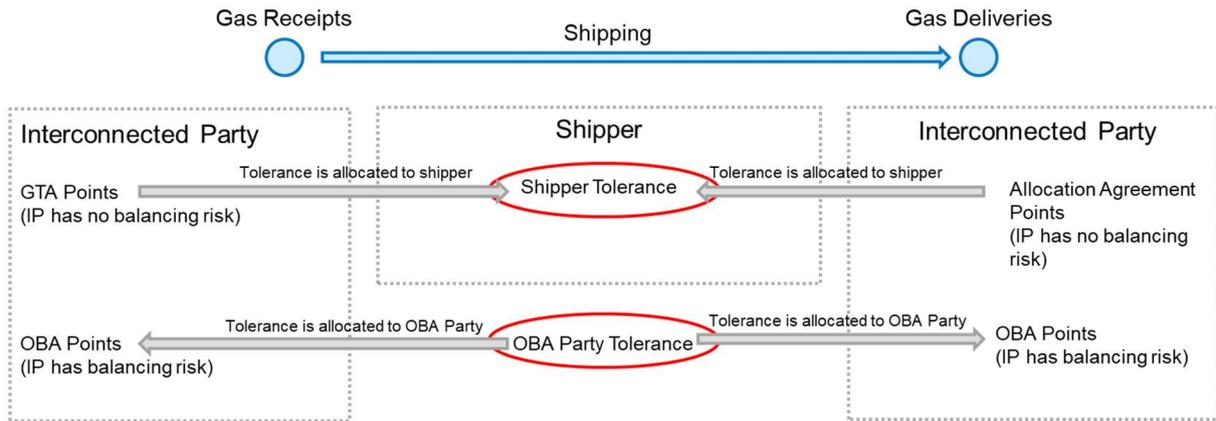
The current drafting of the GTAC conceived that there was an allocation of tolerance between shippers and OBA parties was fixed. On reflection, we feel that this way of splitting tolerance limits our ability to accord tolerance to those taking risk and potentially overcomplicates the calculation. We therefore propose to remove references to shipper and OBA party tolerance.

However, we do think that there is merit in thinking of tolerance in terms of receipt quantities and delivery quantities. This accounts for the physical flows in in the system and is similar to the idea of Welded Point tolerances in the MPOC. We would see the tolerance being split equally between receipt and delivery parties as shown in the diagram below. We can then allocate tolerance to shippers and OBA parties according to who was taking risk on receipt and delivery as per the diagram above.
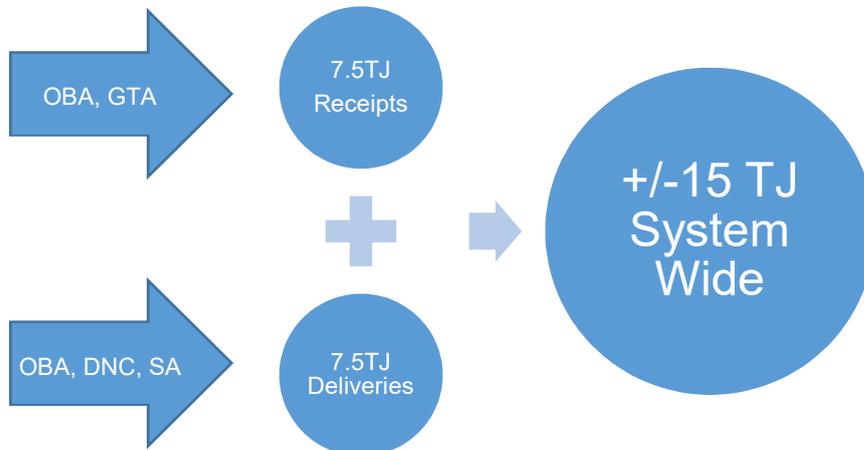
In order to implement this allocation in the GTAC, we would need to implement the following changes:

- Remove references to OBA Party Tolerance and Shipper Party Tolerance
- Add terms for Receipt Tolerance and Delivery Tolerance.

How is the tolerance divided between shippers and OBA parties individually?

Under the current drafting of the GTAC, tolerance is allocated to shippers/OBA parties based on their prior day's DNC nomination/metered quantity. While we think this is the correct basis for allocating tolerance, we agree with Vector's comments in their presentation of 27 March that the current GTAC drafting excludes gas shipped under Supplementary Agreements. The Running Mismatch calculation in the GTAC includes SAs, and therefore the allocation of tolerance should also include these quantities. We will make that amendment.

We also think that there should be a minimum tolerance for each party for their Running Mismatch Position, which would provide certainty for Shippers and OBA Parties on a day (regardless of their previous day DNC). We propose to set this minimum at 400 GJ.

The allocation of tolerance between parties would therefore be the higher of 400 GJ and:

For OBA Parties at receipt and/or delivery points:

- Receipt Tolerance: Their pro-rata share of Receipt Tolerance based on their Approved Quantity (AQ) at all receipt points divided by the sum of all OBA receipt point AQs and shipper receipt nominations via GTAs; **plus**
- Delivery Tolerance: Their pro-rata share of Delivery Tolerance based on their AQ at all delivery points divided by the sum of all OBA delivery point AQs and all shipper quantities under Transmission Services Agreements (TSAs) and Supplementary Agreements (SAs)).

For Shippers:

- Receipt Tolerance: Their pro-rata share of Receipt Tolerance based on their receipt nominations at all receipt points via their GTAs divided by the sum of all OBA receipt point AQs and shipper receipt nominations via GTAs; **plus**
- Delivery Tolerance: Their pro-rata share of Delivery Tolerance based on their quantities shipped under their TSA and SAs divided by the sum of all OBA delivery point AQs and shipper delivery nominations via TSAs and SAs)

The Receipt Tolerance and Delivery Tolerance on a day need to be separated into different pools for allocation as the receipt quantifies may differ from delivery quantities on a day. If this split were not made, the could be imbalances between the tolerance afforded to receipt and delivery quantities.

The Delivery and Receipt Tolerance is additive for Shippers and OBA Parties if they are taking risk on both receipt and delivery balancing. We understand that users may be dealing with separate parties on receipt and delivery and therefore the risk profile associated with receipts and deliveries may be different. Given tolerance at both ends of the pipeline allows users to manage these risks.

The 400 GJ is based on the current number of parties and rates of flow. We feel comfortable that this gives large Shippers/OBA Parties adequate tolerance, while allowing smaller parties certainty. This would be revised if the number of parties increase by more than 2 and would be adjusted in the Balancing SOP.

This principle gives all parties the certainty of having at least +/- 400 GJ of tolerance.

How does this compare to tolerance values under the current codes?

It is difficult to make a comparison that is meaningful for VTC shippers as there is no concept of cashout under this code. Cashouts flow through from the Maui system and therefore the only comparison is the MPOC. Under the MPOC, the following tolerances are set:

- 3% of scheduled quantities or 3,000 GJ for large stations as a daily operational imbalance limit
- 1% of scheduled quantities or 1,000 GJ for large stations as a running operational imbalance limit (ROIL)

Interconnection points with the ex-Vector system (Frankley Rd, Pokuru, Pirongia and Rotowaro) are afforded more tolerance; as is the Mokau compressor station. Small welded point stations are not given any tolerance in terms of balancing as they are not cashed out. Shippers are also not given tolerance as the balancing regime relates to welded points only since OBAs apply at all points.

The relevant tolerance for comparison is the ROIL as this is the most like RM. In practice a multiplier is applied to the fixed ROIL quantity for each point of 1.5 to give an actual limit of the higher of 1.5 TJ or 1% of flows.

Under the proposed GTAC allocation of tolerance, users would have the following tolerance over the system:

Daily system flow = c. 500 TJ/d

Tolerance as a percentage of daily system flow = 7.5/500 = 1.5% of flow

Hence delivery and receipt tolerance for users will be comparable to that under the MPOC in terms of percentage of their receipt and delivery volumes. As the quantities are additive over the system and RM is a system-wide parameter, the receipt and delivery tolerances would combine to give operational flexibility in proportion to system usage.

Summary and Next Steps

The balancing tolerances outlined in this paper represent the proposed way that First Gas will allocate balancing tolerance among pipeline users. We believe that the way that this has been allocated is a fair solution for the pipeline:

- The total amount of tolerance allows the pipeline operator to manage pipeline flows safely while giving users flexibility on how they use the pipeline
- Small and large users are allocated tolerance
- Tolerances are allocated to those taking a risk in balancing of the pipeline
- Tolerances are allocated based on use and exposure

We look forward to discussing these options with stakeholders at our workshop on July 11.