

# Transmission Security and Reliability

Production Outages

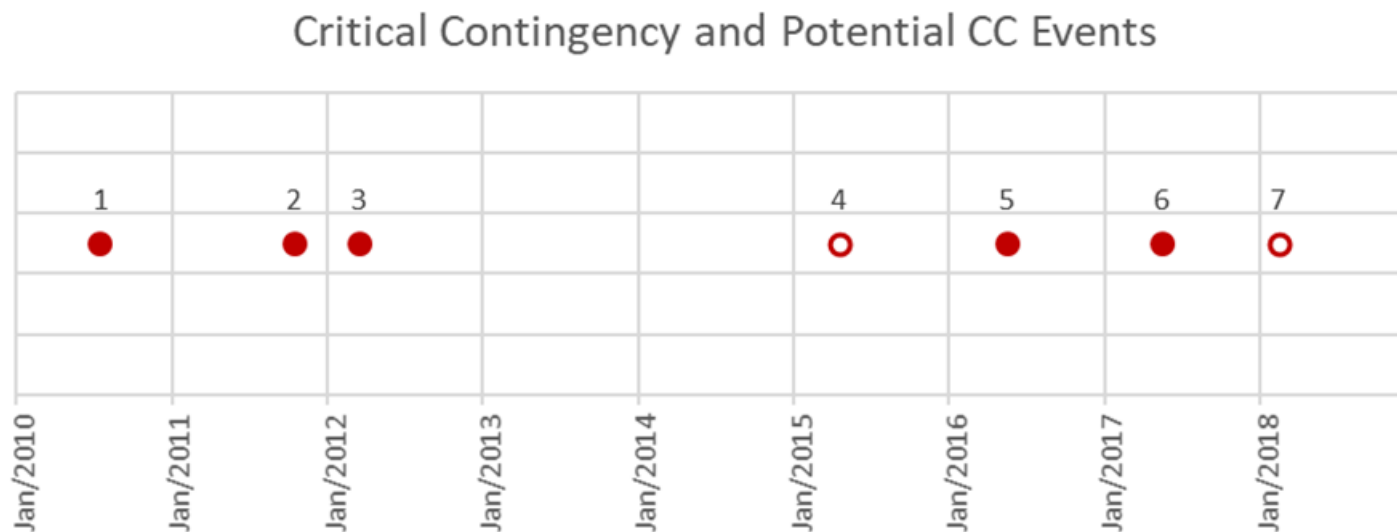
**Firstgas**

- Purpose of presentation
- Review of production outages
- Review of actions taken since May 2017
- Discussion on possible further actions

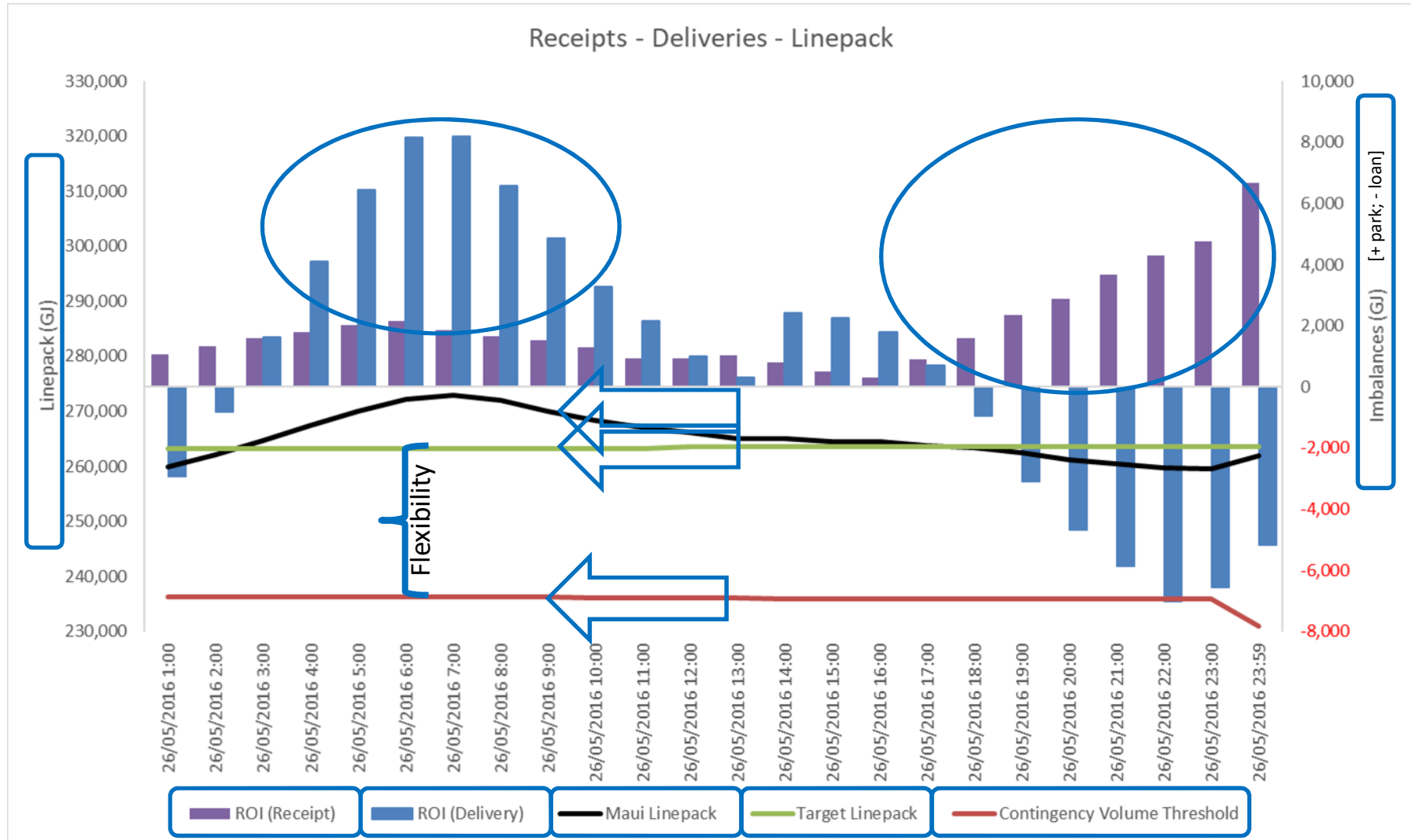
- Increase understanding about the impacts of production station outages
- Increase understanding about the impacts of shipper imbalances leading up to and during production outages
- Review changes implemented following the critical contingency in May 2017
- Seek industry input on how best to manage system-wide risks

Producer outages are a major factor in critical contingencies:

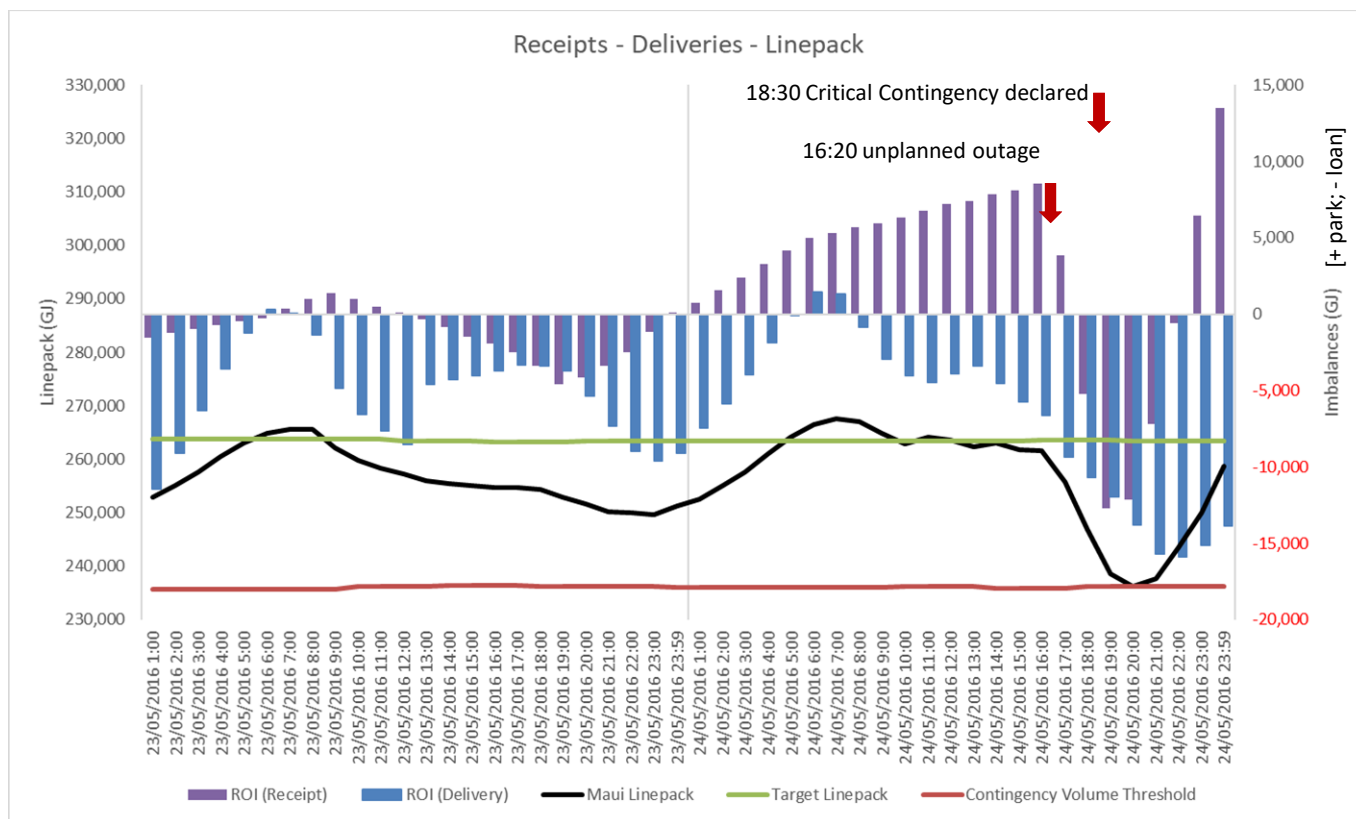
- Significant risk to meeting near term gas demand
- As a significant producer, Pohokura outages have coincided with 4 out of the 5 critical contingencies that have been declared (the other being the 2011 Maui pipeline outage)
- 3 events have also involved large gas demand depleting linepack on the day



# How to read the graphs



- **2 TJ** of balancing gas was purchased before ID2 (10am)
- Unplanned outage reduced injections at Ngatimaru Rd by **15 TJ**
- Shippers' Imbalances were at similar levels to the producers' Imbalances.
- A critical contingency was declared at around **6pm** (terminated around **11pm**)

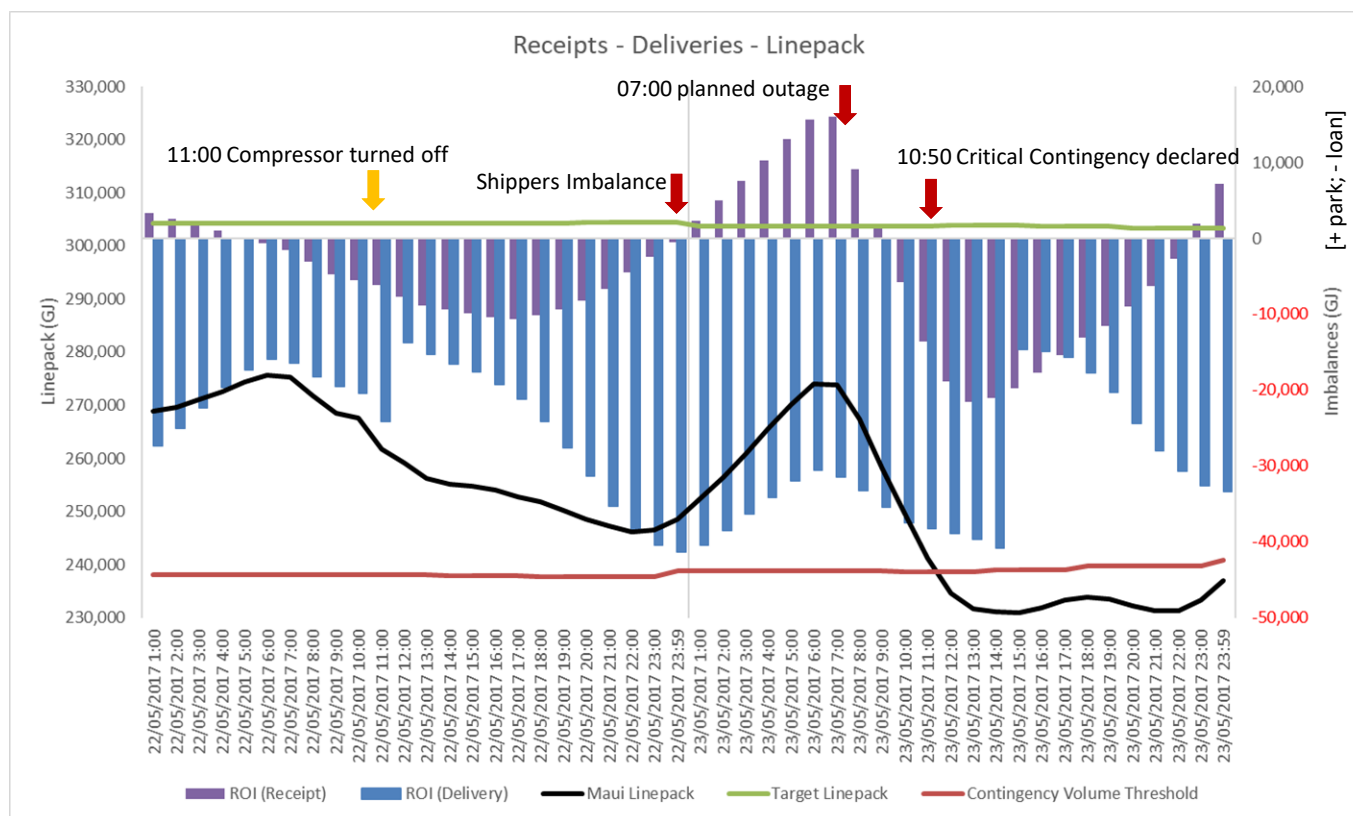


	Linepack	Producers ROI	Shippers ROI
midnight 23 May	251 TJ	~0 TJ	-9 TJ
Outage (16:00)	261 TJ	+8 TJ	-7 TJ
CC declared (18:00)	246 TJ	-5 TJ	-10 TJ
midnight 24 May	259 TJ	+14 TJ	-14 TJ

Target linepack was approx. **263 TJ**  
 Lowest line pack : **236 TJ** at 20:00

# 23 May 2017 Event

- **15 TJ** of balancing was purchased on 22 May
- **6 TJ** of balancing gas was purchased before ID4 (6pm) on 23 May
- A station planned outage resulted in an imbalance of approx. **-17 TJ**.
- Shippers' imbalances greater than **-30 TJ**
- A critical contingency was declared at **10:50 am** (terminated around 6pm)



	Linepack	Producers ROI	Shippers ROI
midnight 22 May	249 TJ	~0	-41 TJ
Outage (07:00)	274 TJ	+16 TJ	-31 TJ
CC declared (11:00)	241 TJ	-14 TJ	-38 TJ
midnight 23 May	237 TJ	+7 TJ	-33 TJ

Target linepack was approx. **304 TJ**  
 Lowest line pack : **231 TJ** at 15:00

## Review actions implemented:

- Balancing Standard Operating Procedures amended to formalise increased flexibility linepack
- Trading protocol revised to support higher priced purchases ahead of cash-outs when required
- Improved First Gas processes to escalate issues and change from “normal” processes to “event” processes
- Improved lines of communications with gas producers
- Impact of increased incentive from 3% to 10% of the Marginal Buy Price adjustment (MPOC s.12.12(d))

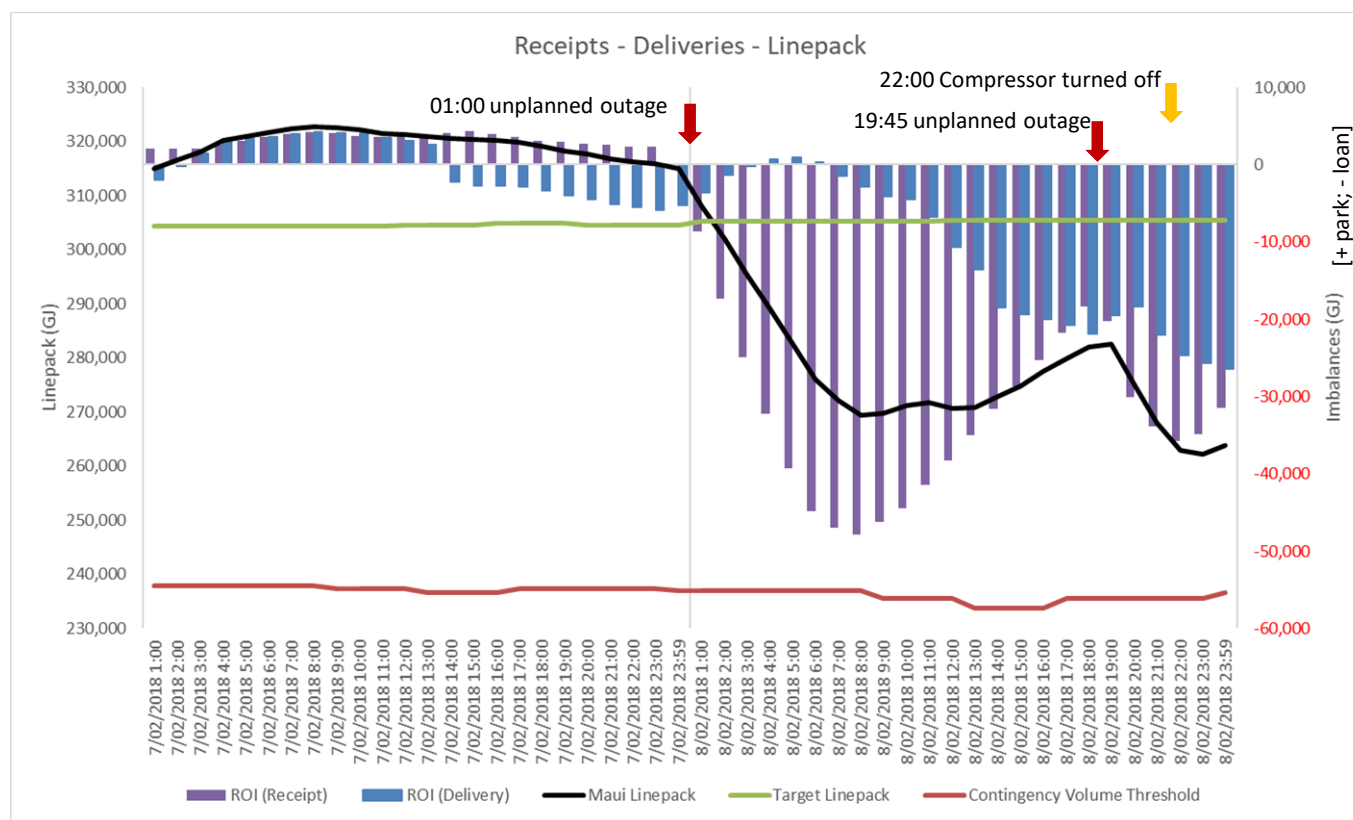
## To be implemented:

- Bilateral contracts to provide access gas where linepack is declining and no gas available on the market
- Improvements to First Gas’ ability to model or simulate pipeline conditions



# 8 February 2018 Event

- Shippers' Imbalance was initially approx. **-10 TJ**, then increased to approx. **-20 TJ**
- An unplanned outage reduced injections at Ngatimaru Rd by **41TJ** and Tikorangi #2 by **14 TJ**
- FGL Increased the balancing price threshold
- No balancing gas purchases on 8 Feb, FGL purchased 8.5TJ on 9 Feb
- ROIL multipliers issued to support restoration towards target linepack



	Linepack	Producers ROI	Shippers ROI
midnight 07 Feb	315 TJ	~0 TJ	-5 TJ
First Outage (01:00)	308 TJ	-8 TJ	-4 TJ
Second Outage (19:00)	282 TJ	-20 TJ	-20 TJ
midnight 08 Feb	264 TJ	-31 TJ	-26 TJ

Target linepack was approx. **305 TJ**  
 Lowest line pack: **262 TJ** at 23:00

# What is this experience telling us?

- Actions from May 2017 appear to have increased ability to manage production outage risk
- More could be done – including actions identified but not yet implemented
- Also suggest reviewing Critical Contingency triggers to better reflect current pipeline operations
- GTAC needs to:
  - Ensure appropriate response to producer curtailment / OFOs
  - Ensure adequate incentives for primary balancing

# 2017 Refinery to Auckland Pipeline Leak and Repair

First Gas Perspective

The logo for Firstgas, featuring the word "First" in a bold, sans-serif font, followed by "gas" in a lowercase, stylized font where the 'g' has a flame-like shape integrated into its loop.

1 March 2018

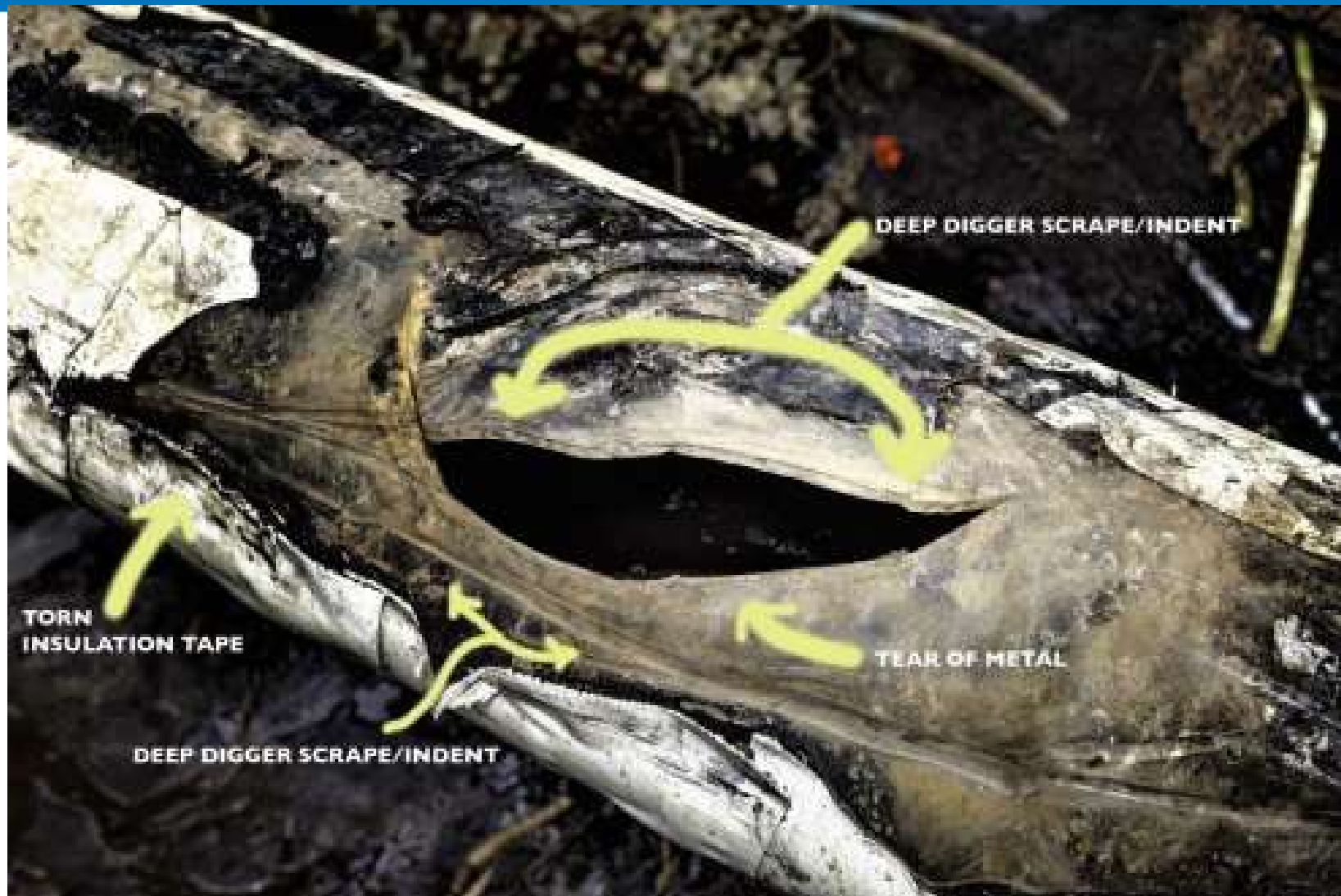
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- The views and information presented here reflect the views of First Gas only and utilise publicly information (Refining NZ Media Releases) in respect of the 2017 Refinery to Auckland Pipeline (RAP) Leak.
- The commentary is from the perspective of the risk presented to Gas Transmission Pipelines only.
- Any questions in respect of Refining NZ assets should be directed to that organisation directly.

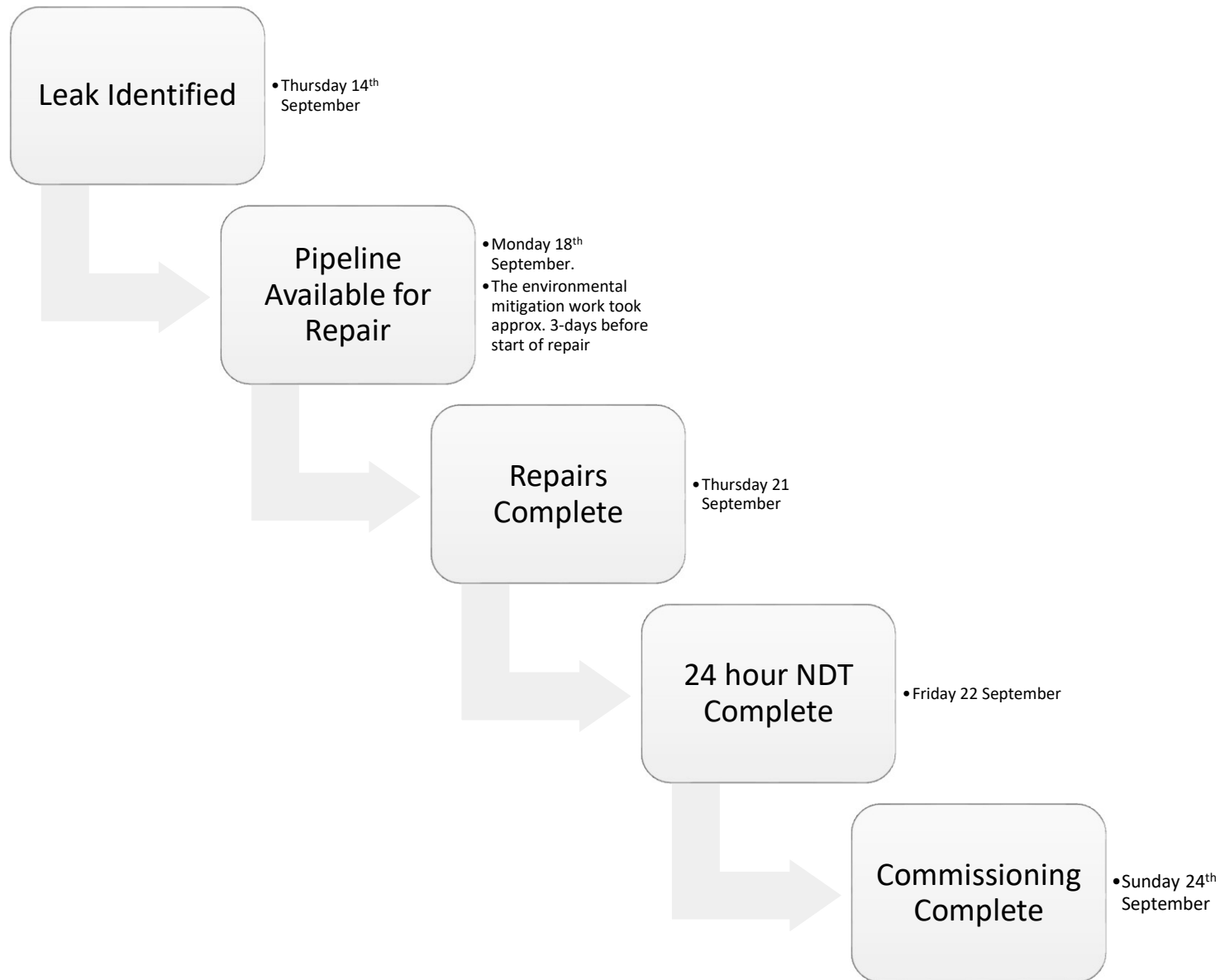
## Contents

- Timeline of events and repair work
  - Pipeline Failure Rates
  - Third Party Damage Prevention - Current Controls
  - Pipeline Emergency Preparedness
  - Change to Risk Assessment?
  - Should More Be Done?
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# Overall Incident Timeline



- Permits, Procedures & other safety documentation.
- Loss of Containment (LOC) site jet fuel clean-up
- Excavations at LOC site, Northern and Southern Stopple Sites
- Gravelling of sites and dewatering
- Welding of stopple fittings onto pipe
- Stoppling to isolate damaged pipe
- Fabrication and testing of 17m repair section
- Cut-out of damaged section of pipe
- Prep and welding in of new section of pipe
- NDT of welds and certification inspections
- Removal of stopples
- DCVG of immediate vicinity to check for further coating damage
- Commissioning of repaired pipe





- Pipeline failure a low frequency / high impact.
- Design and operation is strictly controlled as specified in AS/NZS 2885 Pipelines.
- Historical frequency of events has been trending lower.
- A pipeline rupture in Europe had a probability of <2% per 1000km of pipeline in 2013.
- Pipelines in high risk areas have a more stringent design criteria to reduce the failure rate from third party damage.
- There are design and procedural measures that assist in reducing the likelihood of third party damage.
- The prevention of third party damage is not fully within the control of the pipeline operator, as with any other buried infrastructure.

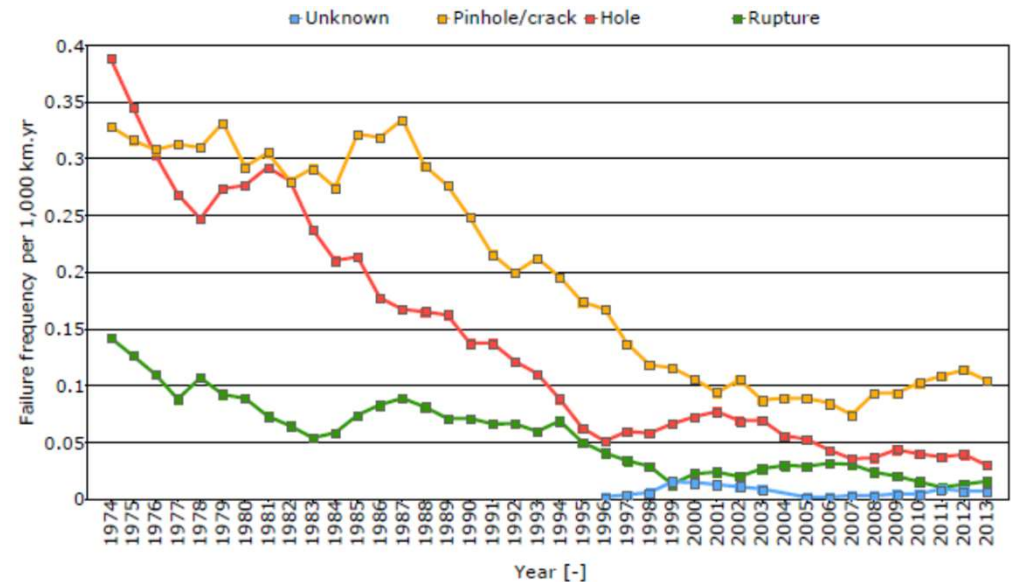


Figure 13: Primary (5-year moving average) failure frequency as a function of leak size

Pipeline Integrity Management Plan lists controls for external interference threats, predominantly:

- Land owner / user activities
- Utility contractor activities
- Pipeline operator activities (shared easement operators or pipeline contractors)
- Malicious activities

Risks addressed using a standard threat assessment to determine a baseline set of control activities.

In order to reduce the level of threat presented by unauthorised activity, the following activities are undertaken:

- 3rd Party Pipeline awareness – (mailouts, presentations, visits, trades and shows, publications/press)
  - Pipeline route marking signage
  - Pipeline patrolling (air, vehicle, foot)
  - Vegetation management,
  - Signage maintenance and upgrades
  - Risk assessment based site-specific actions
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- Emergency response preparation is required under AS/NZS 2885.
  - First Gas has the appropriate plans, trained and experienced people, equipment and spares to respond to an emergency repair on Gas Transmission pipelines and stations. This includes the following:
    - Full range of hot tapping and stoppling equipment, including a recent investment in an additional \$5M of equipment in this area.
    - Spare line pipe for emergency which is stored in a warehouse near the main operational base.
    - Undertaking annual emergency response exercises.
    - Training and competency assessment of staff, including skills and tasks involved in emergency repairs.
    - Procedures and strategies for managing the emergency response, engineering of repairs, and detailed repair plans.
    - Experienced staff who have been involved in previous urgent repairs.
    - Dedicated emergency control room adjacent to the pipeline control centre.
    - On-call experienced contractors to support an emergency repair.
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**The learnings from the refinery event has potentially affected the basis of the First Gas risk assessment and the additional information/ learnings has resulted in the following plan.**

- Action: Review and update risk assessments:
    - Kauri hunting as a specific risk in known areas (add risk / review locations)
    - Illegal activity (review effectiveness of controls and level of threat)
    - Non-cooperative landowners (review effectiveness of controls)
    - Public underestimate of risk (review education program)
    - Ensure learning captured in future risk assessments
    - Operating pressure change - process review
  - Action: Study to determine any improvements in damage detection (e.g. changes to use of in line inspection tools, surface tests, monitoring technology)
  - Action: Detailed review of incident controls – what limitations in each control allowed the failure to occur and consequently review effectiveness of First Gas controls
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- Whilst measures currently in place provide effective mitigation, more can always be done.
  - Optimal set of measures depends on how much additional value would be obtained by committing more resources to mitigate risk.
  - Additional measures to mitigate the risk of third party damage to the gas transmission system could include:
    - Licencing of excavation and drilling contractors and operators with strict enforcement of using Dial Before You Dig.
    - Stronger enforcement and additional legal provisions to deter unauthorised activity.
    - Additional looping of pipelines (noting that this is a relatively high cost solution)
    - More signage — although recent experience suggests that if someone wants to dig they will do so irrespective of the presence of a warning sign.
    - Increased resources on landowner engagement—this involves reassessing the level and form of landowner engagement.
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