NSW 2021–22 Licensed Pipelines Performance Report

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More information

Manager Pipelines & Gas Networks, OECC, PO Box 435, Parramatta NSW 2124

Acknowledgment of Country

The Office of Energy and Climate Change acknowledges the Traditional Owners and Custodians of the land on which we live and work, and pays respect to Elders past, present and future.

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Summary

This *NSW 2021–22 licensed pipelines performance report* (the report) on the operations of NSW licensed pipelines has been prepared by the Division of Energy at the Office of Energy and Climate Change (the OECC).

These pipelines are regulated under the NSW *Pipelines Act 1967* (the Act) and Pipelines Regulation 2013 (the Regulation). This report consolidates and comments on performance data and information provided by the NSW licensed pipeline operators.

Under the Regulation, licensed pipeline operators[1] are required to implement a pipeline management system (PMS) as outlined in Australian Standard *AS 2885: Pipelines–gas and liquid petroleum* and the reporting criteria are defined by the OECC. This approach has proven effective in providing safe and reliable pipeline operations.

Many factors influence pipeline performance including size, age, construction materials and operating regimes. Comparisons in performance across pipelines and between jurisdictions must consider the factors that differentiate the pipelines and influence their performance.

Key performance indicators (KPIs) have been developed by the department to monitor and analyse the performance of the licensed pipeline operators against pipeline integrity, reliability and safety parameters. The OECC acknowledges that the pipeline operators are continually looking at ways to improve their performance, in accordance with the Regulation, and the OECC is working with pipeline operators to achieve the best possible results.

NSW pipeline licensees report pipeline performance data to the OECC based on the annual reporting template which consists of technical performance, asset integrity and reliability criteria. This data is aggregated for the purposes of this report, along with performance data from the previous 4 years for comparison. Previous annual pipeline performance reports can be viewed on the Energy NSW website.

Key findings

The total amount of energy delivered to New South Wales (NSW) from licensed gas and petroleum pipelines was approximately 329 petajoules for 2021–22.

The collective state-based KPIs indicate that pipeline assets are being maintained and operated within the required standards. KPI definitions are outlined in Appendix A.

Summary of KPIs for the 2021–22 reporting period:

- There was no loss of containment (LOC) and no injuries in the period.
- A high number of activities around pipelines resulted in a higher than average number of near misses being reported.
- Integrity monitoring indicators for pipelines remained broadly within trend for the period
- OECC and most operators continue to work cooperatively on asset findings though there are some concerns around regulatory compliance for some pipelines and operators

OECC has implemented a new risk based regulatory framework for assessing overall risk for each Pipeline Licence (PL) using several technical criteria to rate each PL as Low, Medium or High risk.

[1] Except one pipeline conveying water.

While the assessment of pipeline performance against the nominated KPIs in this report[2] leads OECC to conclude that NSW pipeline operators continue to provide a quality supply of gas, there are 13 pipelines identified under the new risk framework that have elevated risk of either impacts to safety of the public or reliable energy supply. The OECC continues to monitor the performance of pipeline assets to supplement the OECC's immediate and periodic reviews on an ongoing basis.

Introduction

There are currently 31 licensed pipelines in operation in NSW, at a length of more than 4,800 kilometres. Of these pipelines, 30 convey either gas or petroleum products. One licensed pipeline conveys water and is not required to submit an annual performance report.

The report presents performance data of licensed pipelines and any potential public safety hazards identified which are illustrated by key performance indicators (KPIs) that are monitored by the OECC.

The individual annual performance reports submitted to the OECC are prepared by pipeline licensees in accordance with the reporting requirements outlined in the *NSW licensed pipeline performance reporting guidelines* (DPE 2018) established under the Regulation.

The Regulation requires licensees to implement a **pipeline management system** (PMS) which is in accordance with the relevant provisions of Australian Standard *AS 2885: Pipelines–gas and liquid petroleum*. AS 2885 is a series of standards for design, construction, welding, operation and maintenance for gas and petroleum pipelines that reflects international best practice for the pipelines industry.

Clause 11 of the Regulation states:

> ***Pipeline management system to accord with AS 2885***
>
> *A licensee must implement a pipeline management system that relates to the pipeline operated under the licence and is in accordance with the relevant provisions of AS 2885.*

The NSW Government has the power to prosecute or penalise parties who fail to comply with the requirements of the Regulation.

The OECC adopts an outcomes-based approach to safety regulation which focusses on desired outcomes rather than the specific means for achieving those outcomes. This approach enables pipeline operators to adopt the most effective approach in achieving the required safety standards for pipeline operation.

The reporting requirements examine actions taken to prevent any loss of containment from pipelines, as licensed pipelines are considered to form a crucial part of the NSW energy infrastructure. The OECC's primary focus, through the reporting process, is to ensure safety management systems are in place to prevent incidents from occurring and to foster effective risk minimisation and risk management practices.

Reporting requirements for licensed pipelines are divided into 3 main categories:

- accidents, escapes and ignitions
- integrity assessment and monitoring
- operational performance.

[2] Some data revisions from past reports are reflected in this report.

New Risk Tracking Regime

In 2021-22 the OECC began implementing a new regime for assessing the overall risk for each Pipeline Licence (PL) using a number of technical criteria to rate each PL as Low, Medium or High risk. This then enables OECC, as the technical regulator, to focus on PLs which pose the greatest risk to the environment, public, or workers. The table below summarizes the regulation 'approach' for each of the three categories.

Risk category	Regulation Approach	Total number of PLs
Low	Light-Handed	18
Medium	Surveillance	13
High	Active	NIL

The "**Light-Handed**" approach means no monitoring of the PL operations above normal reporting requirements under the Regulation.

The **"Surveillance**" approach means some extra monitoring of the PL operations above normal reporting requirements under the Regulation.

The **"Active"** approach means significant monitoring of the PL operations above normal reporting requirements under the Regulation.

At present there are 18 PL's in the Low risk group, 13 in the Medium risk group and Nil in the High risk group. This risk assessment is subject to annual reviews to reflect the current status per PL.

The historical KPI based monitoring regime would normally indicate little to no concerns with operating pipelines in NSW. The new risk tracking regime indicates concerns on some pipelines in terms of elevate risk and/or compliance to regulation. OECC does hold concern around this discrepancy and is continuing to work to reconcile the differences in the data.

It should be noted that the historical KPI regime presents data as an aggregate across all pipelines in the state while the risk tracking regime addresses risk on an individual pipeline basis. OECC is evaluating whether the new risk tracking regime has identified a change in KPIs is required and if the overall KPI framework continues to provide relevant and useful data for regulatory purposes.

Accidents, escapes and ignitions

This section of the report illustrates accidents, escapes and ignitions and includes injuries or property damage. Incidents occurring on high-pressure pipelines can have significant consequences and may result in serious harm to people, property and/or the environment.

The parameters reported are:

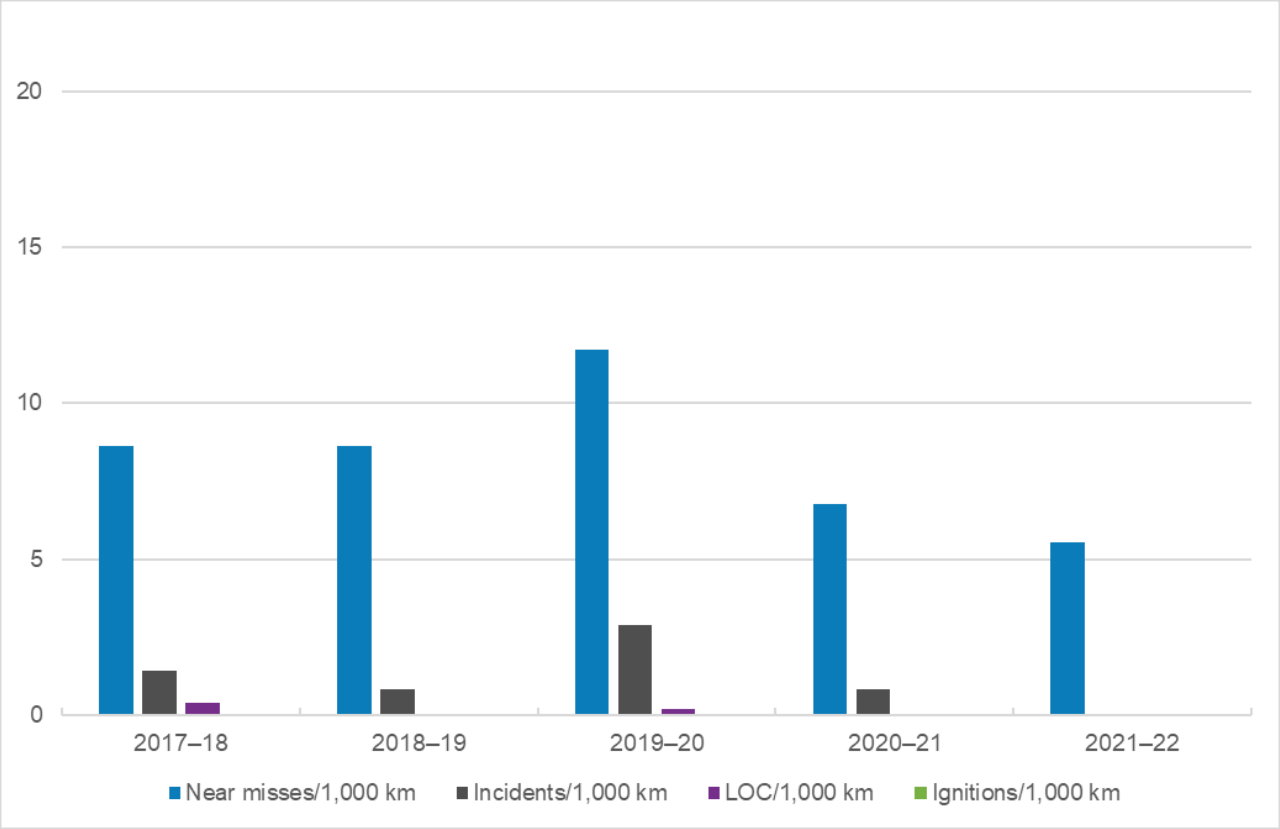
- near misses
- incidents
- loss of containment (LOC)
- ignitions
- injuries
- property damage.

Definitions of KPIs above are outlined in Appendix A. The requirements for reporting are outlined in the *NSW licensed pipeline performance reporting guidelines* (DPE 2018). KPIs that measure these parameters are identified in Table 1. Near misses, incidents, LOC and ignitions are also illustrated in Figure 1. Injuries and property damage events per 1,000 kilometres are illustrated in Figure 2.

Table 1. Key performance indicators of accidents, escapes and ignitions

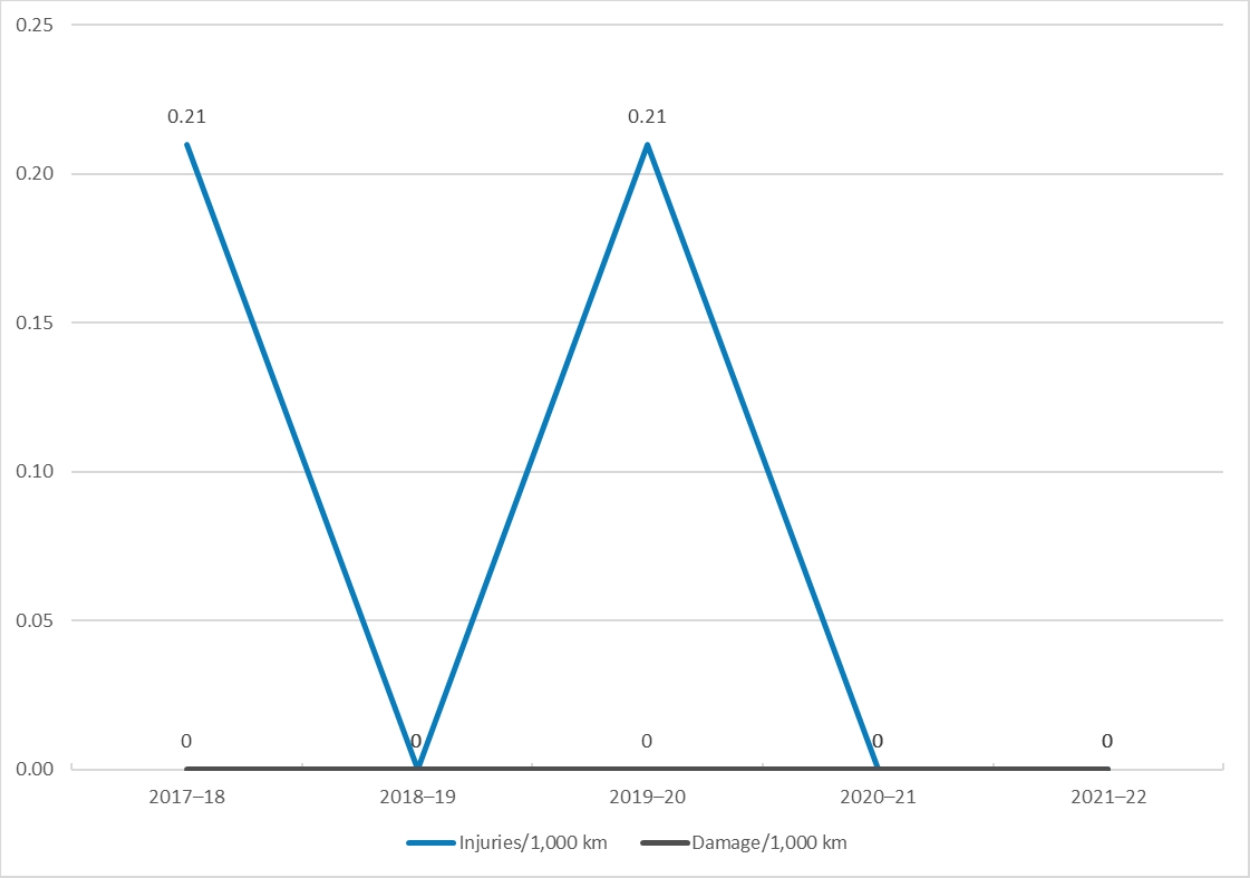
Year	Near misses per 1,000 km	Incidents per 1,000 km	LOC events per 1,000 km	Ignitions per 1,000 km	Injuries per 1,000 km	Property damage events per 1,000 km
2017–18	8.65	1.44	0.41	0	0.21	0
2018–19	8.65	0.82	0	0	0	0
2019–20	11.73	2.88	0.21	0	0.21	0
2020–21	6.79	0.82	0	0	0	0
2021-22	5.56	0	0	0	0	0

Figure 1. Number of accidents and incidents per 1,000 kilometres



Near misses have stayed above the average with high activity near licensed pipelines in the 2021–22 period. This is the result of an increase in construction activities near pipeline easements combined with more frequent pipeline patrols and better reporting by pipeline operators. It is, however, lower than the 2019–20 period as a result of some restrictions on field activities due to COVID-19 restrictions within NSW and neighbouring states.

Figure 2. Number of injuries and damage per 1,000 kilometres



There were no injuries and no damage to property reported on licensed pipelines in the 2021–22 period.

Figure 3 displays an index of the total number of loss of containment (LOC) incidents calculated as a time-weighted average per 1,000 kilometres of pipeline. This index is an internationally recognised measure of pipeline performance and reliability.

$$\textit{LOC Index} = \frac{\textit{Total no. LOC incidents}}{\textit{Time-weighted average}^{*}\ \textit{per 1,000 km pipeline}}$$

* time weighting by number of years each pipeline has been operating

Figure 3. Loss of containment index

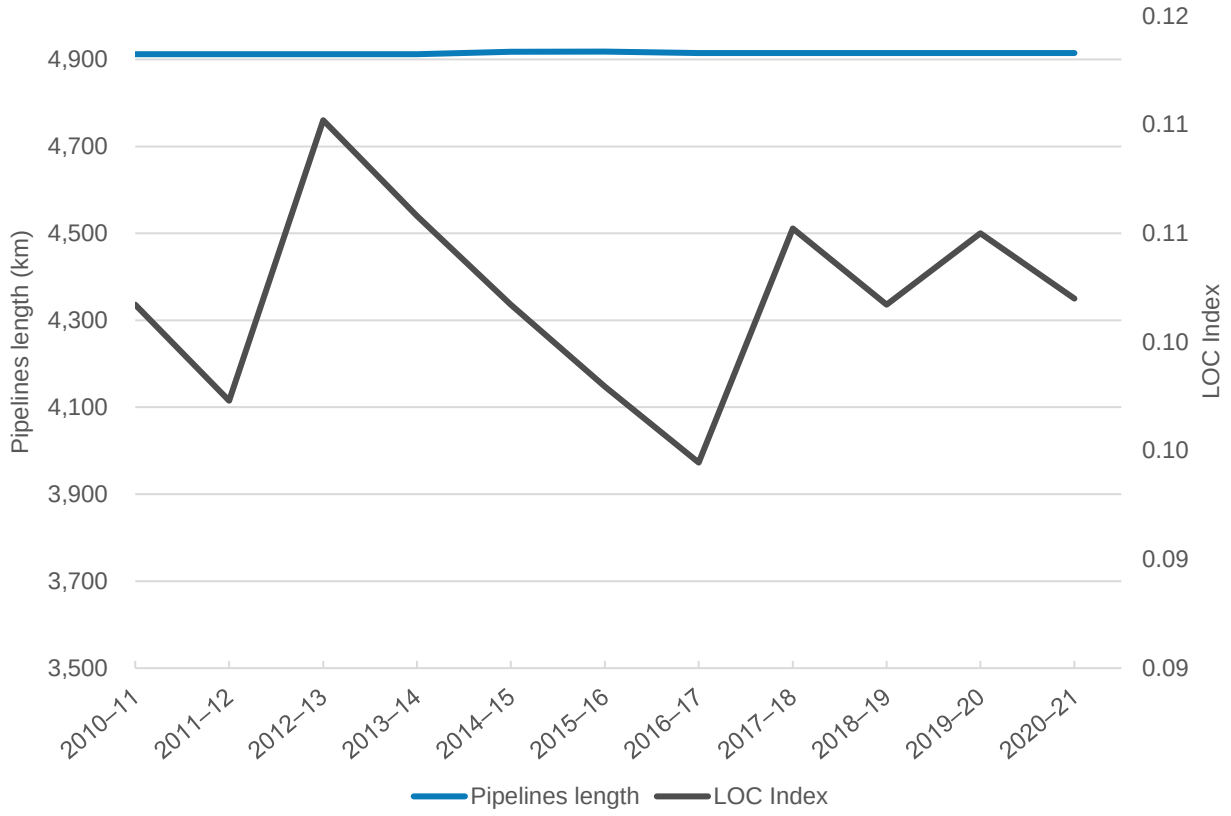


Figure 3 illustrates the number of LOC events relative to the length of the pipeline and the number of years it has been in operation. The pipeline length represents the total length of all NSW licensed pipelines. A lower LOC Index (as indicated by the grey trendline) translates to fewer LOC incidents.

The slight decrease in LOC events in the 2021–22 period indicates no LOC for the reporting period. The average LOC Index is approximately 0.102.

Integrity assessment and monitoring

This section of the report illustrates the integrity assessment of pipelines and the monitoring activities that have been performed by pipeline licensees to reduce the possibility of accidents or incidents occurring on or around pipelines.

The KPIs reported are:

- integrity assessment
- in-line inspections
- field inspections
- cathodic protection (CP)
- pipeline patrols
- 'one-call' system
- supervised third-party activity around the pipeline
- coating defects
- landowner liaison.

Definitions of KPIs above are outlined in Appendix A. The requirements for reporting are outlined in the *NSW licensed pipeline performance reporting guidelines* (DPE 2018).

The KPIs that measure these parameters are identified in Table 2. Figure 4 illustrates the trend of contacting a 'one-call' system (Dial Before You Dig or an operator-provided system), landowner contacts, CP systems in operation and pipeline coverage by CP systems. Figure 5 illustrates the trend of supervised activities and identified defects per 1,000 kilometres.

Table 2. Key performance indicators

Year	Number of supervised activities per 1,000 km*	Percentage that contacted 'one-call' system	Defects identified requiring attention per 1,000 km†	Percentage of landowners contacted	Percentage of CP systems operating correctly	Percentage of pipeline covered by CP
2017–18	552.65	99.34%	41.39	99.15%	100%	99.99%
2018–19	191.66	99.37%	69.17	98.81%	100%	99.99%
2019–20	216.79	99.28%	56.41	93.17%	100%	95.24%
2020–21	232.44	99.48%	29.23	94.40%	99.65%	100%
2021-22	236.97	99.47%	28.41	94.88%	99.16%	99.89%

Notes: * Before 2017–18 these figures include licensed and unlicensed pipelines, such as gas distribution mains.
† This indicator does not reflect defects that have been identified and repaired during the period.

The apparent decrease in supervised activities per 1,000 kilometres since the 2016–17 period is the result of more accurate reporting and the exclusion of activities within close proximity of unlicensed pipelines which have incorrectly been included in previous annual reports. The overall number of supervised activities, including activities on network trunk-mains, would be larger if reported on the same basis. An increase in supervised activities was reported for the 2020–21 period.

NSW legislation requires third parties, or contractors, to contact a one-call system prior to any excavation or work near underground assets. This measure is to assist in preventing serious incidents. In the 2020–21 period, 99% of excavation works included notifications that were made via a one-call system. In summary, NSW pipeline operators continue to operate pipeline assets in a safe and reliable manner which are reflected in KPI trends.

Figure 4. Integrity activities and monitoring

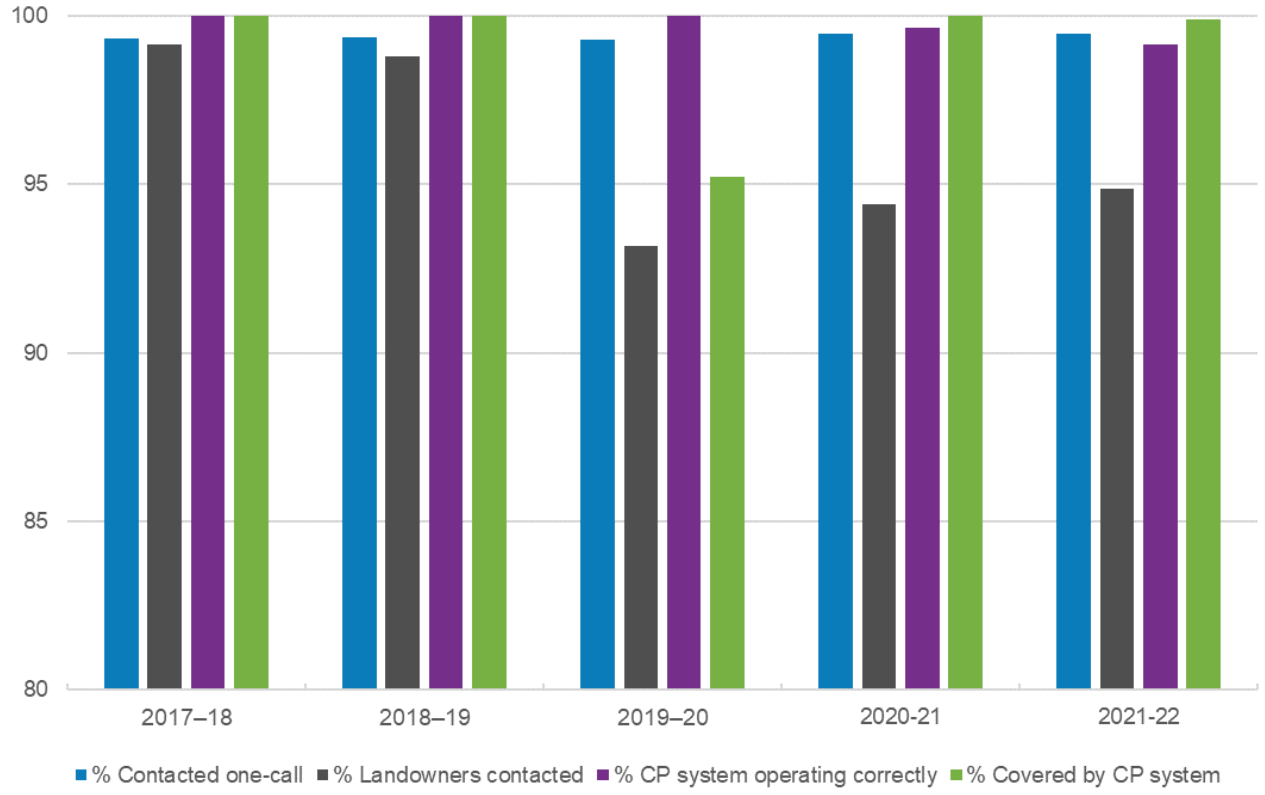
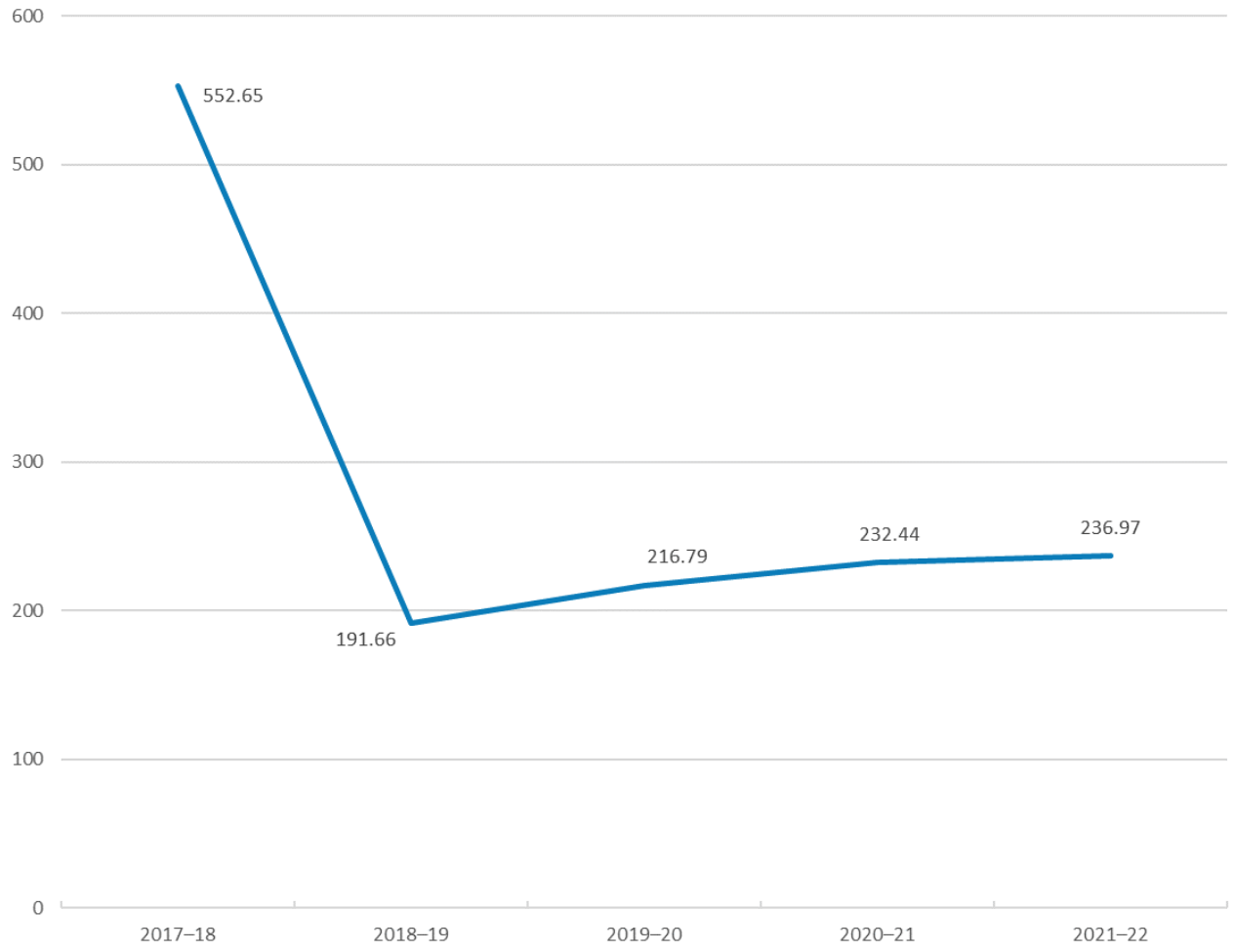


Figure 4 illustrates that the integrity monitoring indicators for pipelines remained within acceptable levels for the 2020–21 period. It was observed that even though AS 2885 does not specify the contact frequency of landowners, pipeline operators continued to be proactive in contacting landowners on an annual basis to maintain liaison with existing landowners and also to establish contact with new landowners.

Figure 5. Number of third-party activities supervised by pipeline operators per 1,000 kilometres



Performance data reported in 2016–17 period included activities near gas networks, gas mains and unlicensed pipelines. The reduction in the 2017–18 period was a result of changes in reporting practices that excluded gas networks, gas mains and unlicensed pipeline reporting rather than an actual decrease in supervised activities.

Operational performance

Pipeline operational performance monitoring is an important parameter to measure. It is an indicator of the effectiveness of risk reduction measures and procedures to prevent incidents from occurring.

The KPIs reported are:

- loss of operations (unplanned interruptions)
- details of any unplanned or abnormal incidents that could have a long-term effect on the safety on the pipeline
- emergency simulations
- non-compliances identified by the independent auditor.

Definitions of the above terms are outlined in Appendix A. The requirements for reporting are outlined in the *NSW licensed pipeline performance reporting guidelines* (DPE 2018).

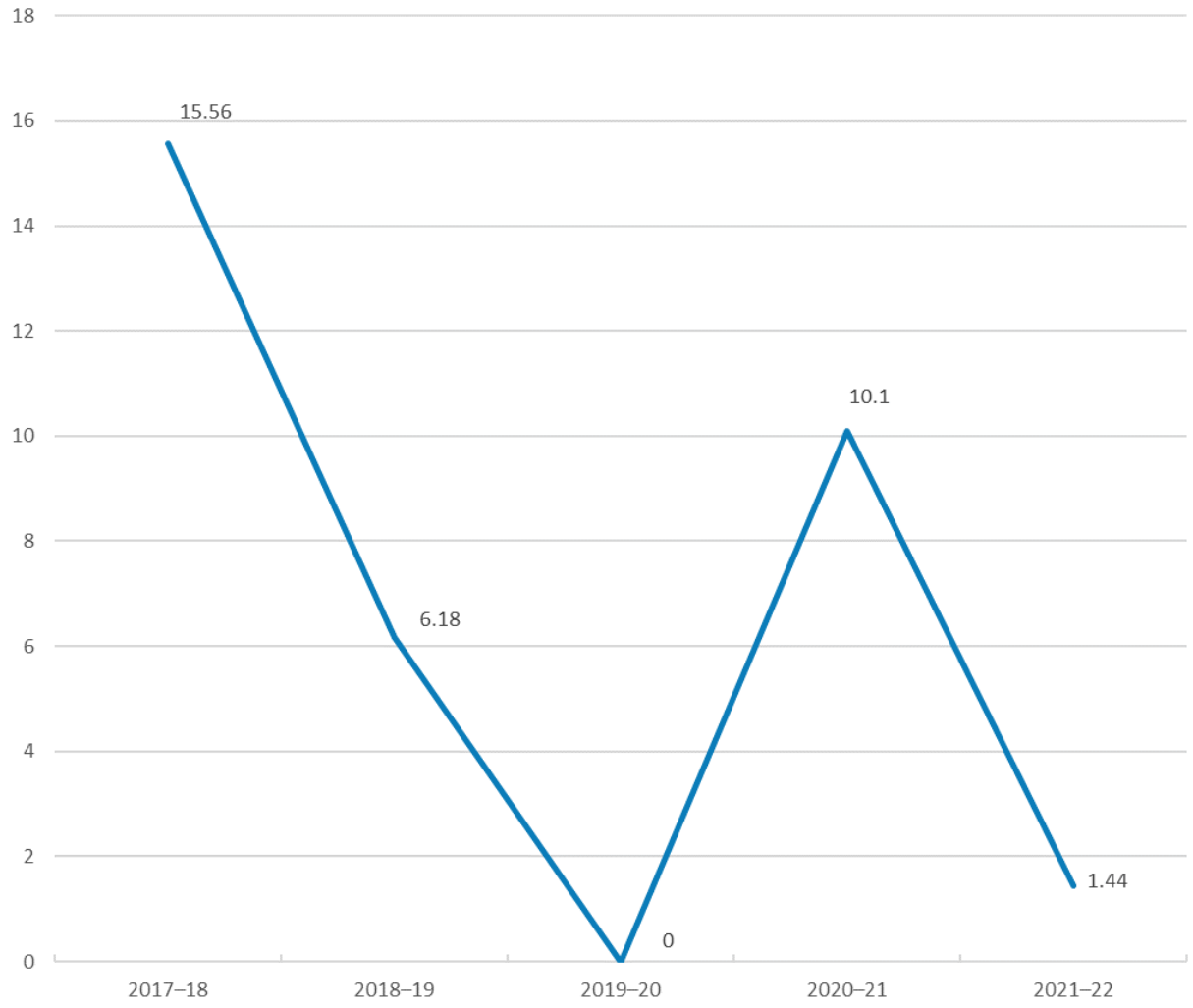
Loss of operations

These KPIs are identified below in Table 3 and in Figure 6.

Table 3. Pipeline operations events

Year	Hours not operational	Hours lost per 1,000 km
2017–18	76	15.56
2018–19	30	6.14
2019–20	0	0.00
2020–21	49	10.08
2021-22	7	1.44

Figure 6. Lost operations (hours per 1,000 kilometres)



The 2017–18 period saw an increase in lost operations in hours per 1,000 kilometres as a result of a leak repair on a liquid fuel pipeline in early 2018. The cause of the leak was investigated by the pipeline operator and appropriate corrective actions were undertaken prior to returning the pipeline to service. In the 2020–21 period, 10 hours per 1,000 kilometres lost hours of operation occurred. These lost hours of operations did not cause any supply restrictions to occur. The 2021-22 figure fell to 1.44 hours per 1,000 kilometres

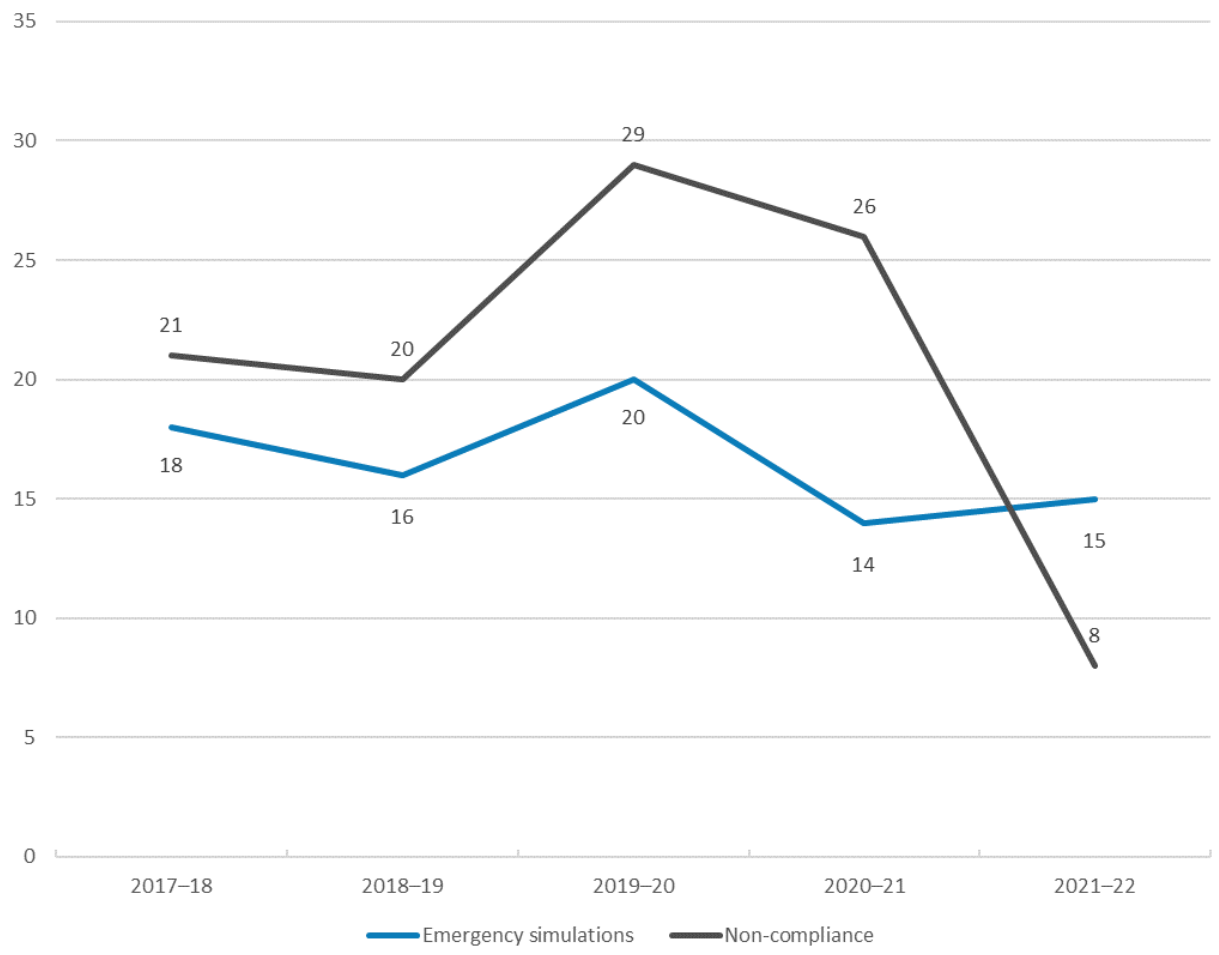
Emergency simulations and non-compliance

NSW licensed pipeline operators are required to conduct annual emergency simulations and annual audits of their PMS by an independent auditor. The number of simulations conducted and the number of non-compliances found during the audits are illustrated in Table 4 and Figure 7. Areas of non-compliance or opportunities for improvement found by the auditor must be actioned as soon as practicable, as specified in the corresponding corrective action plans.

Table 4. Emergency simulations and non-compliances found during audits

Year	No. emergency simulations	No. non-compliances
2017–18	18	21
2018–19	16	20
2019–20	20	29
2020–21	14	26
2021-22	15	8

Figure 7. Number of emergency simulations and non-compliances



The non-compliance issues revealed in annual audits are generally administrative matters which are easily rectified by pipeline operators or are scheduled for rectification. The OECC also meets with the licensee to ensure that the corrective actions are taken within an appropriate timeframe.

Conclusion

The objective of the NSW regulatory framework for licensed pipelines is to validate that pipeline operators continue to achieve safe and reliable operations to protect workers, the public and the environment.

Based on the assessment and key performance indicators that outline pipeline performance as illustrated in this report[3], the OECC can conclude that this objective has broadly been met for the 2021–22 period.

It should be noted however that the new risk tracking regime developed by OECC indicates the presence of risks that the KPI regime cannot currently identify leading to different conclusions around risk. OECC continues to improve the new risk tracking regime and is working to validate whether elevated risks on some pipeline assets are genuine. Initial indications are there are previously undetected risks which require further investigation over the 2022-23 period.

[3] Some data revisions from past reports are reflected in this report.

Appendix A. Definitions

Definitions and explanations of terms used in the report as detailed in the *NSW licensed pipeline performance reporting guidelines* (DPE 2018).

Coating defects – the coating is an important part of the pipeline to help prevent corrosion occurring. If the coating is badly damaged this will affect the performance of the CP in operating correctly.

Cathodic protection (CP) – the pipeline may be protected from corrosion (including stray currents) by a CP system. Should the CP system not fully protect the pipeline, the pipeline may suffer corrosion which can become a contributing factor to an LOC.

Details of any unplanned or abnormal incidents that could have a long-term effect on the safety of the pipeline – the pipeline is designed to operate within certain parameters which includes pressure and temperature. Operating the pipeline outside of these conditions can affect the long-term life of the pipeline.

Emergency simulations or exercises – exercises conducted by the operators which are designed to test and identify improvements to the emergency response plan. The simulations may involve the Emergency Services to improve their preparedness to react to any incidents that might arise.

Field inspections – periodically the pipeline and easement will be inspected to ensure that any existing known pipeline defects have not re-occurred or existing defects progressed.

Ignitions – when the LOC event also ignites. Ignitions are the most hazardous event which can occur on a pressure pipeline. This data allows for clear understanding of how often LOC events ignite.

Incident – any third-party activity where contact is made with the pipeline, whether or not the pipeline suffers a loss of containment or damage. Identification of incidents that occur after the licensee became aware of the activity provides an indication on the effectiveness of the licensee's management measures.

Injuries or property damage involving the pipeline – when a person is injured, or property is damaged and the pipeline or the pipeline's easement area has played a part in the incident occurring. This provides an indication of the consequence of any hazardous event.

In-line inspections – a pipeline integrity gauge (PIG) inspection can determine if a pipeline is suffering 'ovality', dents, internal corrosion; or it may be used to clean the internal surface a pipeline. An intelligent PIG provides a method of checking the pipeline for pipe wall / welding defects that may have occurred over time.

Integrity assessment – AS 2885 requires 3 primary reviews with respect to pipeline integrity to be conducted at intervals not exceeding 5 years:

- review of maximum allowable operating pressure (MAOP)
- review of location class
- review of risk assessment.

Landowner liaison – continuing contact with local government and landholders is designed to inform the landowner of easements within those properties and also should identify who, as the licensee, should be contacted. This also should address matters dealing with how assets on easements are to be handled.

Loss of containment (LOC) – uncontrolled escape of any substance from the pipeline. The number of LOC events is the prime indicator of the effectiveness of the licensee's safety management system.

Loss of operations – when the pipeline, or part thereof, becomes non-operational due to circumstances that are unplanned.

Near miss – a non-authorised or un-notified third-party activity which does not contact or damage the pipeline[4]. As with incidents occurring after notification of work, the number of near misses is an indication of the effectiveness of the licensee's management measures.

Non-compliances identified by independent audit – an independent audit of the pipeline management system (PMS), as per AS 2885, is performed and the auditor documents all non-conformances identified.

One-call system – a 'one-call' system allows people that are working within an area to find out what assets are in that area and gives the operators an opportunity to check that the work will not affect a pipeline.

Pipeline patrols – personnel monitor the pipeline easement to maintain the condition and safety of the pipeline by preventing uncontrolled or unauthorised activity.

Supervised activity around the pipeline – third-party construction work is regularly performed near the vicinity of the pipeline that requires monitoring to make sure the pipeline is not damaged during such occasions. Third-party damage is the most common cause of pipeline LOC events.

[4] Near misses are considered to result from uncontrolled activities within 3 metres of the licensed pipeline and a depth of 300 mm.

References

DPE (Department of Planning and Environment) (2018) *NSW licensed pipeline performance reporting guidelines* [PDF 300KB], DPE, Parramatta.