REPORT

Petroleum, Geothermal and Major Hazard Facilities

ANNUAL REPORT 2021/22

December 2022

Te Kāwanatanga o Aotearoa
New Zealand Government

WORKSAFE
Mahi Haumaru Aotearoa

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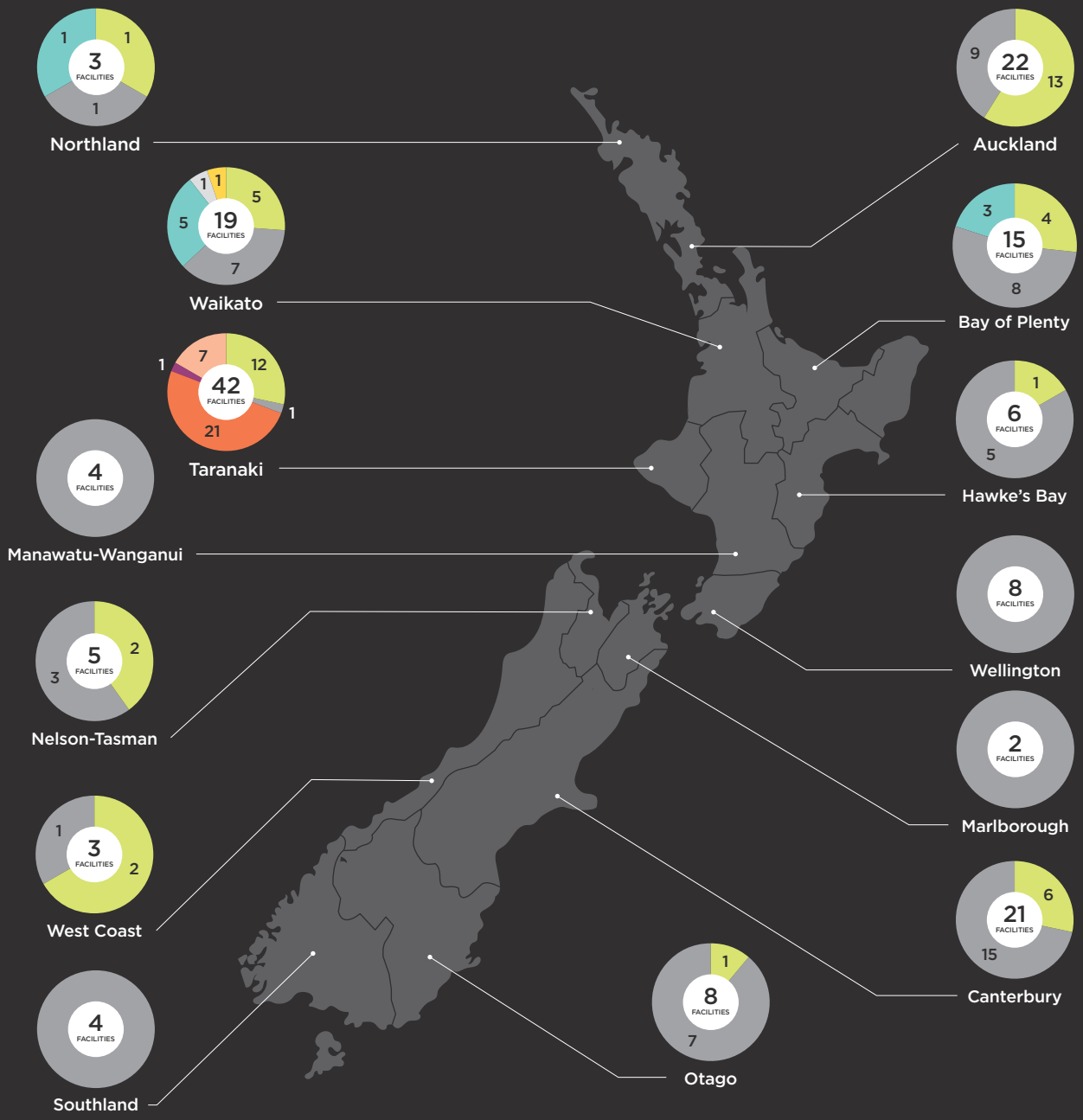

- Upper tier MHF
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- Onshore petroleum
- Offshore petroleum
- Offshore petroleum (decommissioning)
- Non-MHF geothermal and onshore petroleum

Our mission is to transform New Zealand's health and safety performance towards world-class.

Achieving this requires the commitment not just of WorkSafe, but of businesses, workers and a wide range of other players in the health and safety system.

Overview of this report

Haere mai, welcome to our third annual report for Major Hazard Facilities, Petroleum and Geothermal here in New Zealand.

I want to acknowledge the significant efforts made during the COVID-19 pandemic that have continued throughout the year. The ongoing government and industries response to COVID-19 has continued to focus the importance of worker health and wellbeing. The safety of our communities as we work through the pandemic has prioritised a health-focused regulatory approach for all workers, both at work and away from work.

We continue to include our focus on officer duties, upstream duties, and worker engagement, participation, and representation. Positive worker engagement and worker participation allows workers to know their environment, the risks they face and how they can be part of the solution going forward.

We are focused on improving equitable outcomes for all workers who incur a higher rate of harm in the workplace. Our focus on Healthy Work includes the design of the workplace, the environment and how this is safely managed to reduce chronic health effects to workers.

In last year's annual report, I encouraged you to consider and explore the SafePlus health and safety improvement toolkit and the #Betterwork programme. WorkSafe understands the value and importance of inclusiveness of workers in solutions for improved worker health and safety. The social and economic benefits include improved quality of life, providing greater equity, and empowerment of marginalised groups to ensure people come home from work healthy and safe.

A summary of the WorkSafe strategy is within this report. It will help you see and understand our vision and our goals for Aotearoa. As New Zealand's primary health and safety regulator, we want to achieve three goals: healthy work, safe work, and equitable outcomes. In other words, work should be healthy and safe for all workers, and for those affected by work, across Aotearoa.

Across the high hazard industries, we received 270 incident notifications for petroleum geothermal and major hazard facility (MHF) sites in the year to July 2022, compared to 279 the previous year.

Of these, 17 required emergency response plans to be activated and 18 had the potential to cause a major incident had any of the other controls failed.

Included in this report is a selection of incidents that were notified to WorkSafe and a summary of the learnings from those incidents.

Appointing two High Hazard Specialist Investigators has increased our focus on investigation of high potential incidents and determining our regulatory response. We focus on identifying learnings from WorkSafe and duty holder investigations. In order to determine the true root causes and the actions necessary to address these, industry needs to focus on improving the depth and quality of their investigations. Too often the regulator is meeting with industry to discuss correct outcomes of investigation findings.

Over the past year we have continued to target our inspections to verify MHF upper tier sites are working to their agreed safety cases. This report summarises our inspection and enforcement activity and includes one case study that demonstrate our regulatory approach. This will provide insight on how we continue to engage with and educate the sector.

With the restrictions on travel from August 2021 to March 2022 due to the pandemic, we reduced face to face duty holder engagements and implemented virtual interactions with some restricted site-based visits. This meant a higher level of planning by our inspectorate with often more than one duty holder engagement session for each of the planned inspections. There were 69 completed inspections to July 2022, less than the 94 completed inspections the year prior. However, 99 improvement notices were issued to July 2022, compared to 88 improvement notices issued in the year prior.

We continued several of our initiatives for high hazard industries including setting up a number of internal working groups:

- Liquified Petroleum Gas (LPG)
- Storage/Logistics
- Ageing Plant
- Bulk Storage.

These are explained in more detail within this report.

The formal review of the MHF fees and levies was completed and the new fees and levies will be implemented by MBIE in 2023. This was an 18-month programme of work that included a public consultation process that many from the sector were involved in.

Looking to the year ahead we are planning for the MHF revised safety case work in 2024 which is the end of the first MHF 5-year safety case cycle. We continue to support the recently formed WorkSafe Hazardous Industries team, as well as providing technical support across the wider WorkSafe areas of the general inspectorate, specialist interventions and the health and technical services teams. We have planned for the annual MHF forum to occur in New Plymouth 8 November 2022, this will be the first face to face MHF forum since the start of the COVID-19 pandemic. It will be an opportunity for industry to meet with the regulator and engage proactively.

Let me take this opportunity to sincerely thank you all for your efforts and positive contributions as we navigated our way through another year of challenges and uncertainty. I appreciate the willingness of industry to understand how we have changed our regulatory approach to work with you, with the safety of your workers and ourselves as the key priority. In the year ahead I look forward to providing you with further analysis of our findings and the opportunity to engage with you.

Donna Ellis

Chief Inspector High Hazards

He aro ki te rautaki
Our strategy on a page

Our vision

Ka haere ngā tāngata katoa ki te mahi, ka hoki hauora, haumaru mai ki te kāinga
Everyone who goes to work comes home healthy and safe

We will make a measurable difference to health and safety

Our mission

To transform Aotearoa's workplace health and safety performance towards world-class

We will influence the way work is done, so workers prosper, and businesses and organisations thrive

Our values

Our WorkSafe mātāpono (values) will guide our behaviours

WHAKAKOTAHI
We are united in a strong purpose

TIAKINA MAI
We are entrusted with a duty of care

KŌRERO MAI
We engage meaningfully

The impacts we want our mahi to have

- Health and safety is integrated into work design, set-up and practice
- A capable workforce drives sustained health and safety improvement
- Workers are partners in the health and safety at work system
- The health and safety at work system works with and for Māori, Pacific Peoples and all workers
- Knowledge and insights inform practice
- Work-related risks are identified and eliminated or controlled

Through Taura Here Waka, we will

- Choose the most effective intervention
- Make choices based on insights
- Measure what we do
- Listen and tell our story
- Partner across Aotearoa
- Be set up for success

By 2023, we will be a modern, insights-led regulator

The conditions we need to support our success

We will work with others to be successful

Modern, fit-for-purpose legislation and regulations

Engaged and motivated stakeholders and partners

A capable and well-resourced regulator

1.0 About the regulatory regime

The petroleum and MHF regulatory regimes were established in 2013 and 2016 respectively, with the introduction of the Health and Safety at Work (Petroleum Exploration and Extraction) Regulations 2016 ('the PEE regulations') and the Health and Safety at Work (Major Hazard Facilities) Regulations 2016 ('the MHF regulations') under the Health and Safety at Work Act 2015 ('the Act').

The Geothermal Energy Regulations 1961 ('the Geothermal Energy regulations') while still in effect are largely revoked, and for this reason geothermal activities are predominantly regulated under either the Act or the MHF regulations (binary plants are designated as MHFs).

At the heart of the regulatory regimes is the requirement for upper tier MHFs, upper tier petroleum production installations and non-production installations to have an accepted safety case in place. An accepted safety case is effectively a leading indicator that high hazard risks have been identified by the operator, and that processes are in place to ensure those risks are effectively managed. The integrity of the plant and structures involved in high hazard operations is fundamental to ensuring safety. Ensuring asset integrity is essential to safety, continued economic production and plant reliability. This often requires a close linkage between safety and the investment strategy of the business. Safety must be seen as an integral aspect of operating the business, it cannot be an after-thought or add-on.

Worker engagement is a key requirement of, and fundamental to the effectiveness of a safety case and the effective operation of complex plant. Both WorkSafe as the regulator and businesses need to engage effectively with workers. It's important to ensure that workers understand the instructions and training they are given about the operation of hazardous facilities and installations. Workers know how work is done rather than how it is imagined by senior staff and management, and are therefore better able to identify suitable and effective controls. Effective engagement with the workforce is essential to ensure that workers are properly involved in developing work systems and that what needs to happen on site is being delivered in practice.

2.0 Review of the past year

IN THIS SECTION:

2.1 Safety cases

As reported two years ago, upper tier MHFs are in their first five-year cycle of safety cases. Petroleum installations are into their second five-year safety case cycle. In the past year, the High Hazards team at WorkSafe reviewed three revised Petroleum safety cases and one Major Hazard Facility safety case.

The numbers of safety cases accepted annually for Petroleum, MHF and Geothermal MHF sites since the beginning of the petroleum regime are shown in Figure 1.

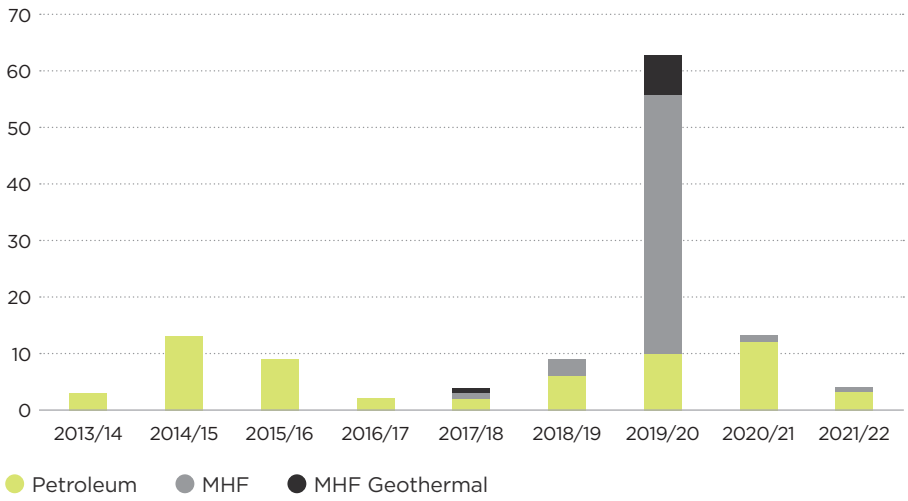


FIGURE 1: Safety cases accepted each year for Petroleum, MHF and Geothermal MHF sites

With all upper tier MHF sites now having an accepted safety case, the focus for inspectors this year shifted to the on-site verification that all elements of the safety case are in place on site and working effectively. We continued to follow up on future inspection topics identified in safety case assessments.

2.2 Site inspections

Sites are prioritised for inspection based on our assessment of the quality of the safety case, the number of future inspection topics, the time since the last inspection, and reported incidents or complaints. Last year, 69 high hazard site inspections were undertaken across a range of industries (Figure 2).

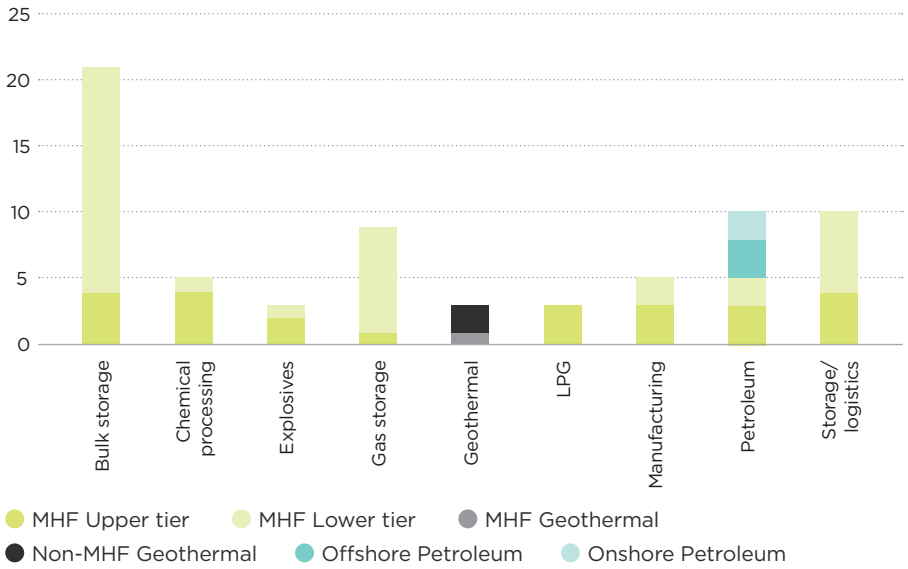


FIGURE 2: Site inspections undertaken in 2021/22 by industry sector

Site inspections in 2021/22 by high hazard site type

24
MHF Upper tier

37
MHF Lower tier

1
MHF Geothermal

2
Non-MHF Geothermal

3
Offshore Petroleum

2
Onshore Petroleum

2.3 Enforcement measures

Where inspectors identify health and safety issues, a range of enforcement measures are available for use. Enforcement measures include prohibition, improvement and non-disturbance notices, sustained compliance notices and directive letters. Recommendations may also be made but these are not legally enforceable. Inspectors are guided as to the appropriate level of enforcement by our Enforcement Decision-making Model (EDM).

Table 1 shows the number of enforcement measures taken in 2021/22 by enforcement and site type. Last year, 680 enforcement measures were taken at high hazard sites across a range of industries (Figure 3). Most of the enforcement measures were taken at lower tier MHF (43%) and upper tier MHF (35%) sites.

Last year, 611 enforcement measures were complied with at high hazard sites (Table 2) – including enforcement measures issued in the 2021/22 financial year and prior. We will continue to focus on following up outstanding enforcement measures in 2022/23 to ensure they are complied with in a timely manner.

ENFORCEMENT MEASURE	MHF UPPER TIER	MHF LOWER TIER	MHF GEOTHERMAL	NON-MHF GEOTHERMAL	OFFSHORE PETROLEUM	ONSHORE PETROLEUM
Directive letter	153	169	17	1	30	44
HSWA improvement notice	32	60	7		2	2
HSWA non-disturbance notice		1				
Recommendation	50	63	4	9	7	22
Sustained compliance letter	2					
Total	**237**	**293**	**28**	**10**	**39**	**68**

TABLE 1: Enforcements issued in 2021/22 by site type

ENFORCEMENT MEASURE	MHF UPPER TIER	MHF LOWER TIER	MHF GEOTHERMAL	NON-MHF GEOTHERMAL	OFFSHORE PETROLEUM	ONSHORE PETROLEUM
Recommendation	63	52	6	7	4	19
Written directive	154	175	13	7	20	37
HSWA improvement notice	25	16	5		1	2
Total	**242**	**243**	**24**	**14**	**25**	**58**

TABLE 2: Enforcements complied with in 2021/22 by site type

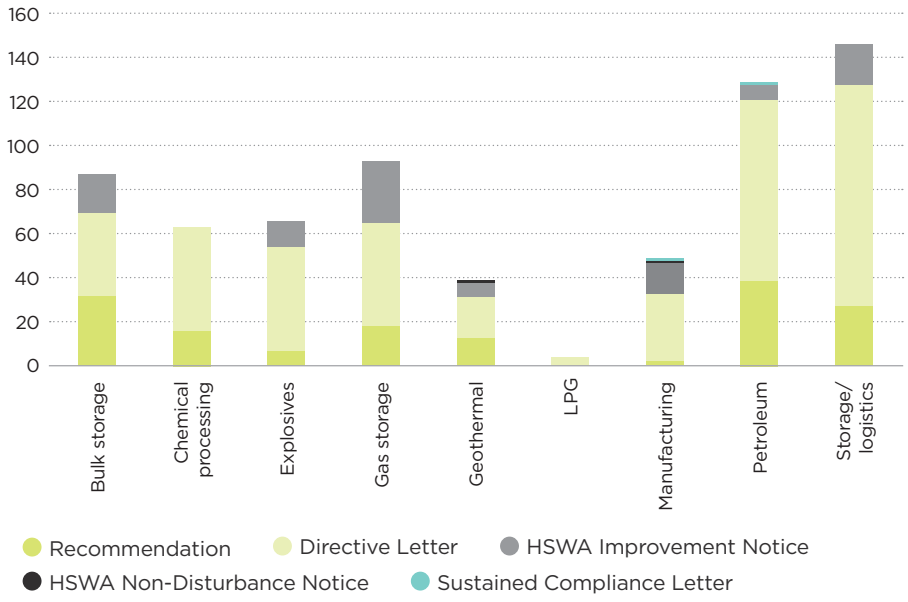


FIGURE 3:
Enforcement measures taken in 2021/22 by industry sector

Figure 4 shows the number of enforcement measures issued in 2021/22 by category and provides an indication of the key areas of concern to our inspectors. Last year, most enforcement measures were issued for health and safety issues relating to operational controls (23%), emergency response plans (15%), and safety assessments (10%).

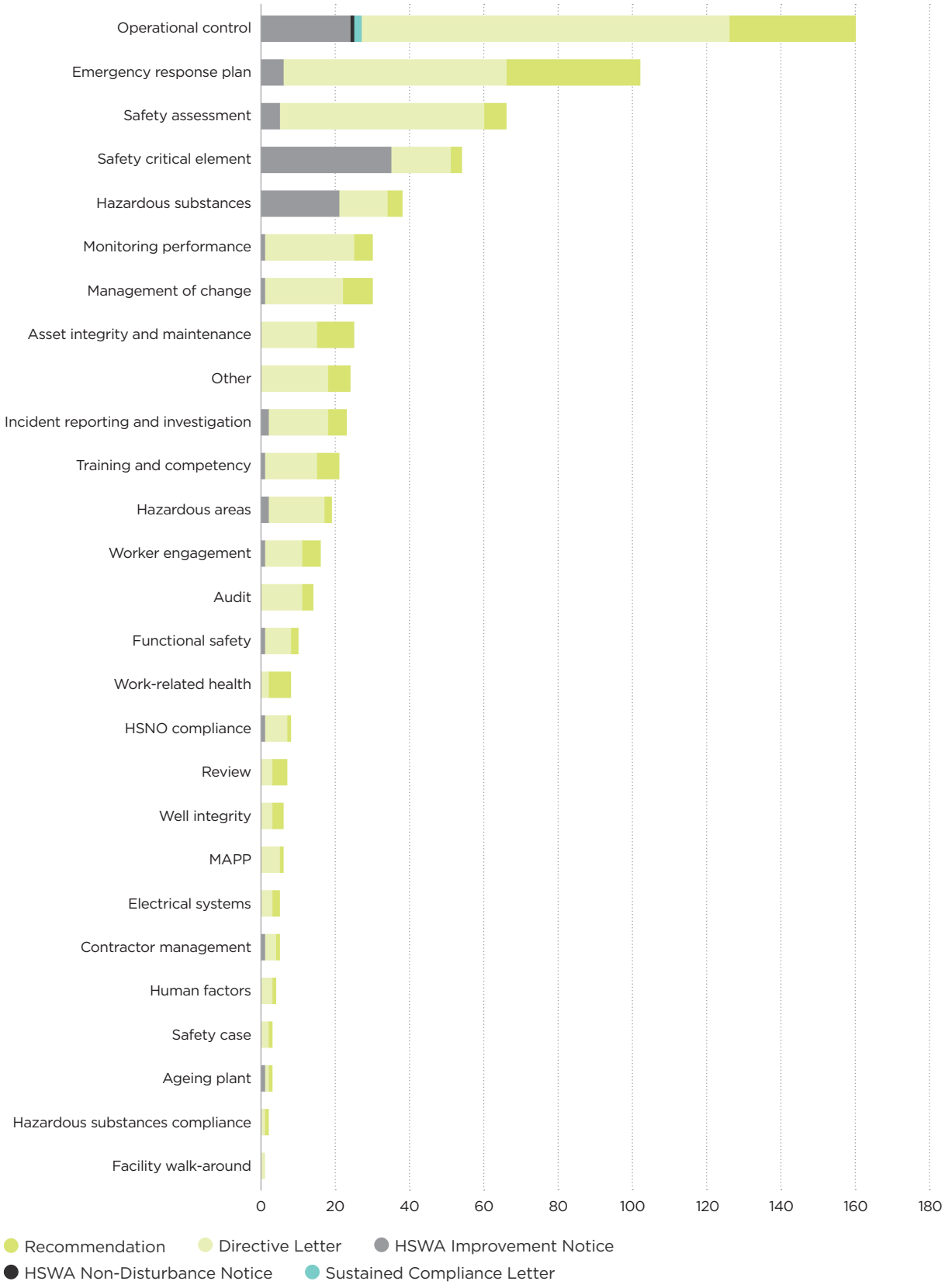


FIGURE 4: Enforcement measures taken in 2021/22 by category

Case study

Using our levers to drive change in the high hazards sector

SUMMARY

High hazards operators must ensure they do the following:

- **consider the likelihood of major incidents occurring, for example, the frequency of forklift movements around piping containing specified hazardous substances**
- **implement control measures to eliminate or minimise the risk of a major incident occurring, for example, installation of bollards and guards to prevent vehicle impact.**

WorkSafe has three primary levers; engagement, education and enforcement. Used together in the right way, they are powerful drivers for health and safety change. We can target our interventions to make a measurable difference, while holding those who do not meet their obligations to account. This year, this was demonstrated through our notifiable incident response work with Alliance Group Limited (Alliance); a meat processing operator in Lorneville, Invercargill.

Alliance, Lorneville (the facility) was designated as a lower tier major hazard facility in 2016. In March 2022 a release of anhydrous ammonia occurred, a specified hazardous substance. A forklift truck impacted piping containing anhydrous ammonia vapour resulting in a loss of containment and the emergency evacuation plan to be implemented. The piping failed at a substandard welded joint. No-one was seriously hurt as a result of the incident. However, the incident had the potential to cause a major incident that could expose workers to a serious risk to their health or safety.

The safety assessment completed in 2016 identified the hazard of vehicle movements around piping. This hazard was identified as a potential major incident. However control measures were not implemented to eliminate or minimise the risk of the identified potential major incident occurring.

Since the incident, Alliance has applied the hierarchy of controls to eliminate or minimise the risk of this major incident.

Alliance has:

- eliminated the hazard of piping containing anhydrous ammonia and forklift truck movements by removing live but redundant piping (elimination)
- installed physical guarding controls in areas where vehicle movements could impact piping containing anhydrous ammonia (isolation)
- trialled forklift truck technology such as proximity detectors that may assist with prevention of forklift impacts on piping (engineering control)
- installed hanging chains from exposed refrigeration piping in large freezers to indicate the proximity of piping to forklift truck drivers (administrative control)
- created standard operating procedures for forklift drivers highlighting the hazards and risks of working around piping containing anhydrous ammonia (administrative control)
- implemented a training program for forklift drivers working around piping containing anhydrous ammonia (administrative control)
- initiated a program of labelling and signage around the facility for piping containing anhydrous ammonia (administration control).
- Initiated a program of examination of piping systems around the facility and other Alliance locations to identify piping joints of insufficient quality and mechanical strength (action to prevent occurrence of a similar incident).

2.4 Notifiable incidents

Notifiable incidents, known to high hazard industries as 'near-misses' or 'precursor events' must be reported to WorkSafe under section 24(1) of the Act, regulation 70 of the PEE regulations, regulation 33 of the MHF regulations, and regulation 35A of the Geothermal Energy regulations.

Figure 5 shows the number of notifiable incidents at high hazard sites between July 2017 and June 2022. Overall, the number of notifiable incidents reported has increased over time as expected, due to improved understanding by operators to notify as per their legislative requirements.

In the past 12 months (July 2021 – July 2022), 270 notifiable incidents were reported, slightly less than the 279 reported in the previous year.

Inspectors will review reporting arrangements as part of our inspection approach. It is essential that operators monitor their processes for notifiable incidents as these are important indicators of failures in risk management. Having identified and reported incidents, operators should also investigate the causes of the incident, and take action to rectify failures and prevent their reoccurrence.

We will increase our emphasis on the investigation and insights from notified incidents in 2022/23 as we are finding the regulator is often reviewing these with the duty holder to ensure correct root causes are identified.

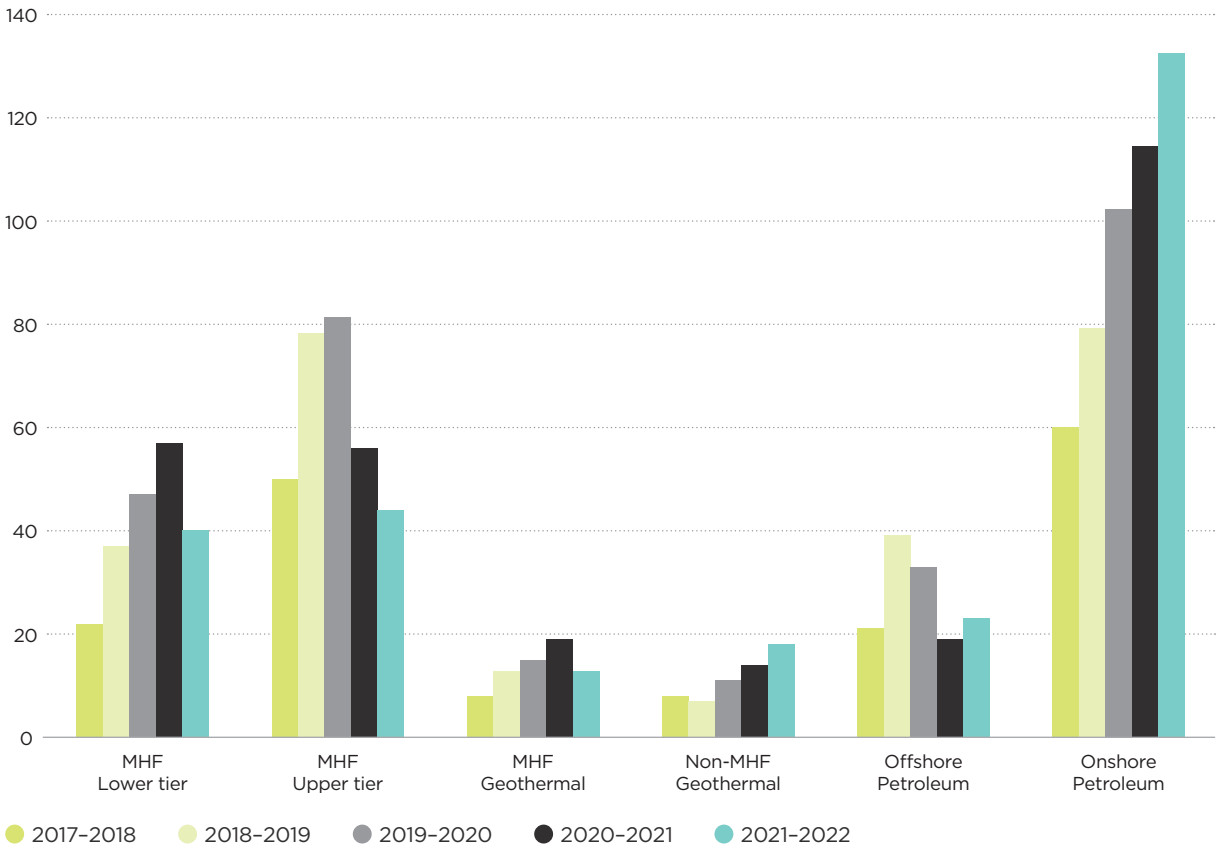
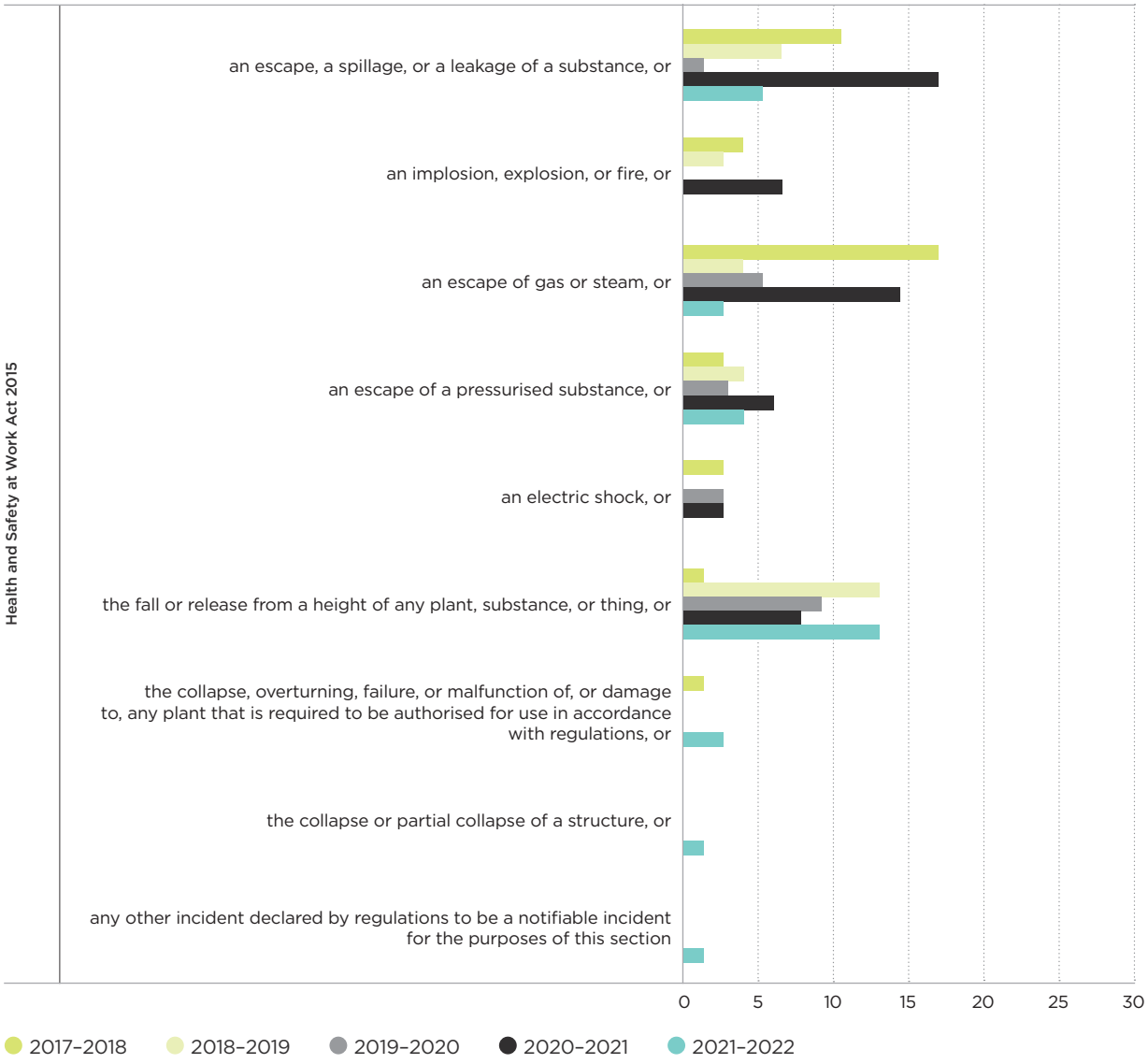


FIGURE 5: Notifiable incidents reported by high hazard site type between July 2017 and June 2022

Figures 6 and 7 show the legislative categories for notifiable incidents reported to WorkSafe for the four years between July 2017 and June 2022. The data shows that in the 2021/22 year, 77% of notifiable incidents involved damage to, or failure of, a safety-critical element that required intervention to ensure it will operate as designed, an increase from 68% in 2020/21.

A total of 17 unplanned incidents (other than false alarms) requiring emergency plans to be implemented occurred and 13 incidents that did not cause but had the potential to cause a major incident occurred.

There were five incidents involving an uncontrolled release of hydrocarbon vapour (exceeding 1kg) and one incident involving an uncontrolled release of petroleum liquids (exceeding 80L). In different circumstances, any of these incidents could have given rise to a major incident.



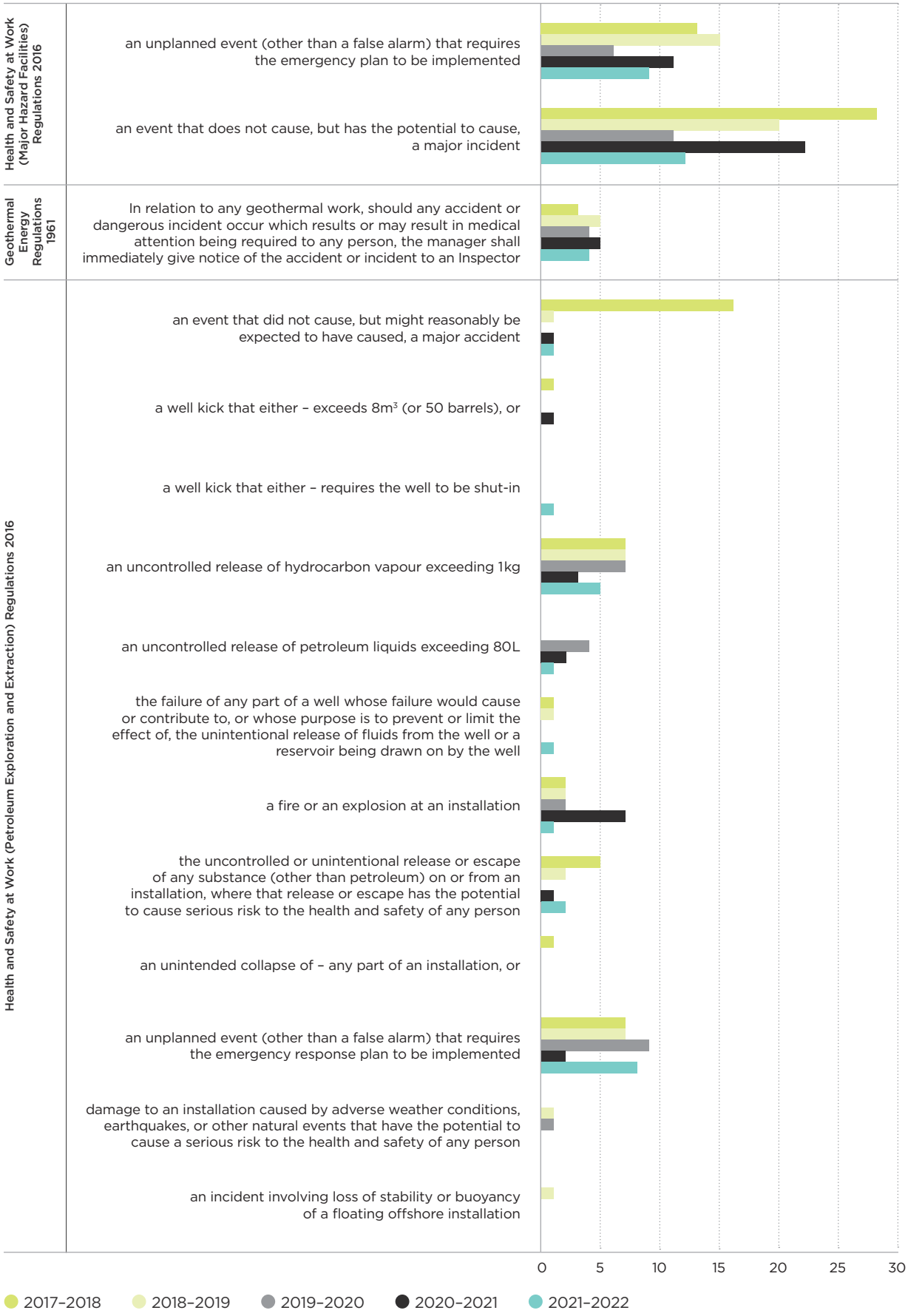


FIGURE 6: Legislative categories for notifiable incidents reported by high hazard sites between July 2017 and June 2022 (excludes damage to, or failure of, a safety-critical element that requires intervention)

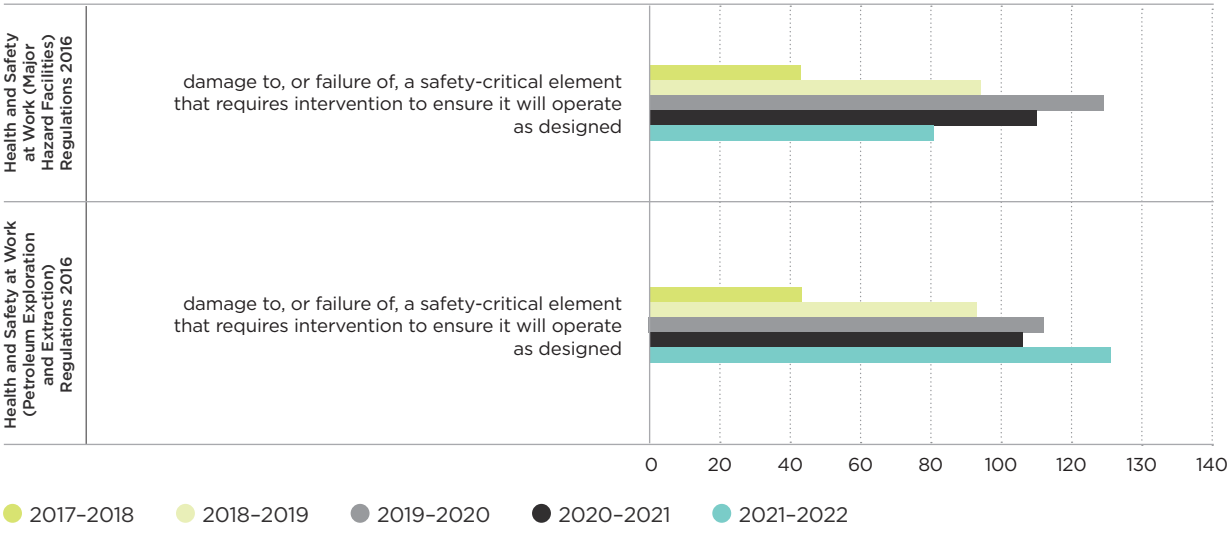


FIGURE 7: Legislative category for notifiable incidents, reported by high hazard sites between July 2017 and June 2022 of damage to, or failure of, a safety-critical element that requires intervention to ensure it will operate as designed

2.5 Petroleum and geothermal regulatory notifications

Operators have regulatory requirements to provide notification to WorkSafe prior to conducting certain operational Petroleum and Geothermal activities.

The PEE regulations require that notifications are submitted within specified timeframes before starting the notifiable operations. The notifications are received by WorkSafe and reviewed by petroleum and geothermal inspectors. Inspectors may follow up with operators as required.

The Geothermal regulations require that notifications of operational activity and bore manager applications are made to WorkSafe.

Figure 8 below shows the legislative notification categories made to WorkSafe for the five years between July 2017 and June 2022. The data shows that most notifications received are well operation and well workover/interventions in the petroleum sector, and geothermal bore consents within the geothermal sector.

From the period July 2019 to June 2022 a steady increase in well operation and well workover/interventions can be observed because of several drilling/ workover campaigns being conducted.

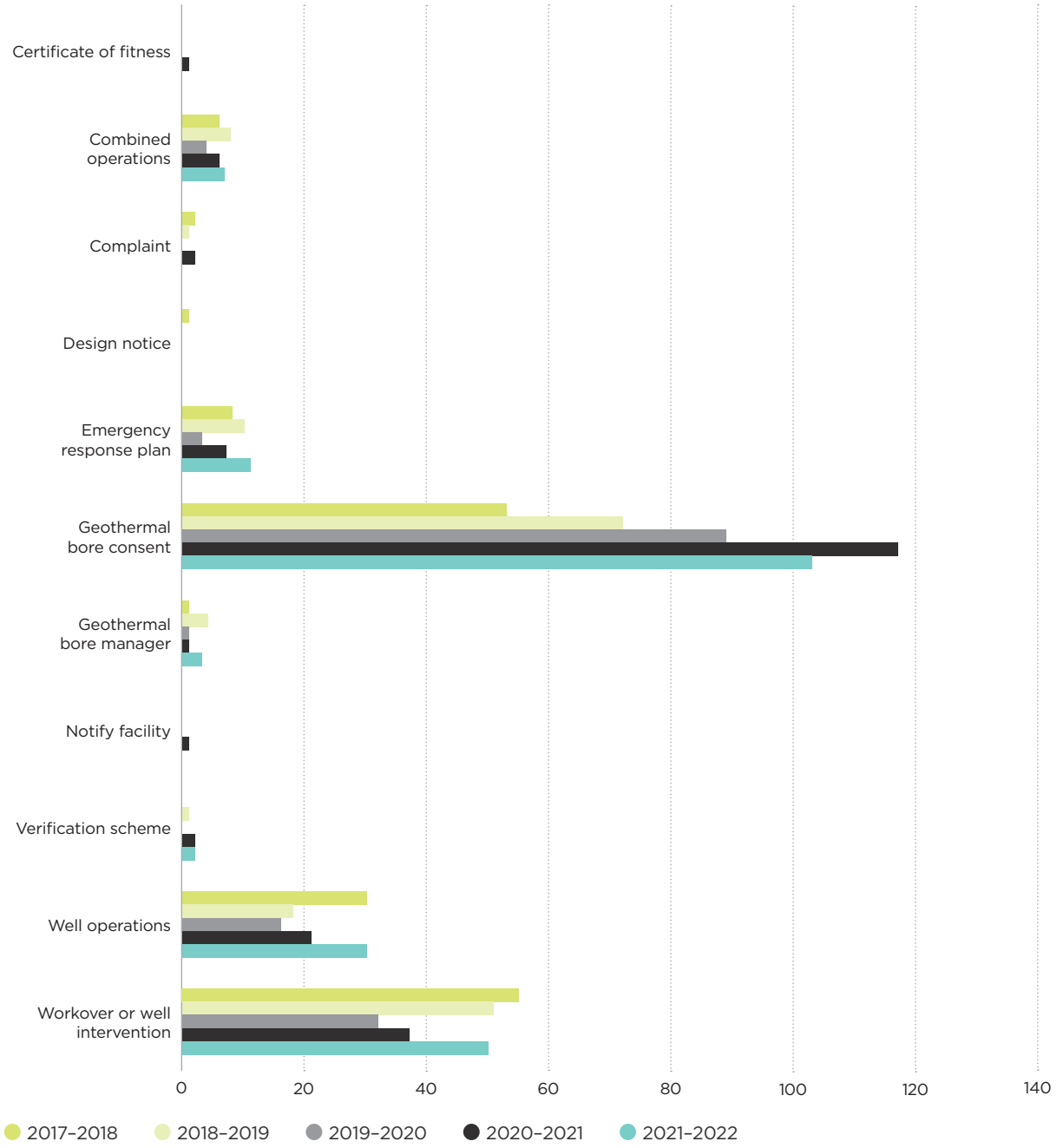


FIGURE 8:
Petroleum and geothermal regulatory notifications between July 2017 and June 2022

The High Hazards Unit (HHU) has adopted the following definition of a high potential incident (HPI):

'An event, or a series of events, that causes or has the potential to cause a significant adverse effect on the safety or health of a person.'

High potential incidents – what are they?

The incident must have occurred at a major hazard facility, petroleum, or geothermal installation to be counted in this measure.

Assessing HPIs in WorkSafe HHU is a four-step process:

1. Incoming notifiable incidents are compared against a list of incident examples and definitions in a prescriptive assessment.
2. If the notifiable incidents relate to one or more of the prescriptive events in step 1, and could meet the definition of HPI, these are then evaluated on the risk of harm by considering the potential consequences and likelihood based on the potential outcomes of a credible escalation scenario.
3. The outcome of the HPI assessment is then recorded in the database.
4. HPI assessments are reviewed by management with the outcome recorded in the database.

HPIs are a metric included in the WorkSafe *Statement of Intent* and are reported accordingly.

Learning from incidents

From notifiable incidents received by WorkSafe over the past year, a selection has been made for this report. Below is a summary of these incidents along with learning that operators may wish to consider where relevant to their organisation(s).

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
Jul 2021	Petroleum and Geothermal	Cargo oil tank cleaning operations were being undertaken and a 2-tonne air hoist with load bag was being used to lift and remove waste products from the tank. During this activity the chain on the air hoist twisted, got caught up, and failed when the empty load bag was being lowered into the tank. The load bag and air hoist hook, together weighing 8kg, dropped approximately 15m to the tank floor below.	– All equipment to be used for the work activity needs to be included and considered in the permit to work (PTW), risk assessment, and work method statement. – All equipment safety devices need to be checked for condition and functionality prior to use. – Use only fully competent personnel to conduct lifting activities. Competence must include knowledge of the equipment and the necessary checks to be made prior to and during use. – Designation and enforcement of exclusion or red (no-go) zones protects personnel from dropped objects.
Jul 2021	Petroleum and Geothermal	Reconstruction work was being undertaken on a cooling tower of a geothermal power generation facility. In the course of the work the shroud door of the cooling fan was removed and set aside near the top of the cooling tower. The shroud was not tied down at the time. Overnight strong wind blew the shroud door off the top of the cooling tower, and it was found the next day to have landed on the gravel beside the road.	– To prevent dropped objects, all materials and equipment need to be secured when at height. Processes and procedures should be in place to ensure this happens. – Construction and maintenance programmes need to ensure that all potential hazards are identified prior to the work being undertaken and measures employed to reduce the risk. The removal of the shroud was planned and as such actions to secure the item whilst work activity was ongoing should have been identified and implemented.
Aug 2021	Petroleum and Geothermal	During well clean-up operations, synthetic based mud (SBM) and well fluids were flowed back to receiving and processing facilities. Fouling of the level bridles in the receiving vessel at the time of receiving the fluids led to an untypical amount of unstabilised condensate flowing through to a glycol tank. This tank has a fixed roof and as the fluids flowed into the tank the vapour space decreased and the pressure vacuum valve activated releasing flashed off gas to atmosphere. This gas was detected by a gas detector located some distance away and the site evacuation alarm sounded.	– During non-standard operations, extra consideration of potential outcomes and associated risk is required. Do your procedures, including temporary procedures, adequately address all potential ramifications of flowing fluids from well clean-ups to process facilities, and how these fluids may affect plant and equipment. – Are extra controls required during non-standard operations? For example, during the flowing of well clean-up fluids to production facilities, are additional gas detection and ignition controls required? – Have you considered the level of manual intervention that may be required if problems with the process are encountered? Do you have enough competent personnel ready to continue the activity safely?
Oct 2021	Major Hazard Facilities	One of two pulp drying lines in a wood pulp manufacturing company caught fire. Immediately prior to the fire normal plant operations were being conducted which involved flash drying pulp and pressing it into bales. The operator was investigating some Firefly system alarms and managing bale ejection from the press at the time as the bales were damp due to Firefly activation and manual intervention was required.	– Effective housekeeping in all areas of plant always reduces the impact or spread of fire. – Detailed shift checklists used during plant walks at shift changeovers help to identify issues requiring attention. – Engage a competent external service provider to regularly inspect and review plant firefighting capabilities including equipment and training.

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
		By using fast infra-red (IR) sensors Firefly can detect sparks and hot particles and eliminate them with steam, water spray or carbon dioxide (CO2), before they create a problem. Whilst redirecting bales down the production line, the fire started from the flash dryer and continued onto the press and up the wall. It set off four sprinklers in the building and the plant was shut down. Emergency services attended the scene and put the fire out. Whilst one employee was near the fire no injuries were sustained. Many adjacent communications and electrical cabling were damaged in the fire.	– Consider the installation of additional cameras to assist with plant observation including the early identification of potential or actual fires. – Fire resistant insulation kept in good condition reduces the potential for the spread of fires. – Ensure critical electrical and communications cabling is protected from potential damage including that from fires. – Consider the implications of any equipment oil leaks in a fire case and address those of concern.
Dec 2021	Petroleum and Geothermal	A rig crew was lowering the drilling rig carrier unit down onto the sub-base during rig-down operations. About halfway through the activity, a crewman noticed that two-metal plates which are used to cover the front support leg pockets were still in place. As the crewman called to stop the job, the two-metal hole cover plates over-balanced and fell off the legs to the ground (nearest crewman approximately 5m from drop zone). The two plates are different in construction as one of the plates is used to support mounting of drill pipe drifting tool while the other plate is a simple cover plate. The cover plate weighs around 3kg while the larger plate weighs around 16kg. The hole cover plates are purposely not tethered as they would pose a trip hazard or interfere with the daily operations. However, they should be removed before the drilling rig carrier unit is lowered. Safe work method statements had been referred to by the crew for several tasks leading up to and including the task of lowering of the drilling rig carrier unit, however these didn't reference the removal of the hole cover plates. Pre-job meetings were held up to and including the lowering of the drilling rig carrier unit. The pre-job for lowering the drilling rig carrier unit included controls and hazards such as: Spotters, hang ups, keeping the drilling rig carrier unit level, live well, and good communications, but with no reference to the removal of the hole cover plates.	– It is rig protocol to clear the entire area whenever the support struts are disconnected to lower down the drilling rig carrier unit onto the sub-base. Is this an effective measure? What if circumstances were slightly different? Designation and enforcement of exclusion or red (no-go) zones protects personnel. – How complete are your procedures? Do they go far enough and include all instruction necessary to manage the risk of all hazards associated with the activity. With worker input, regularly run and test procedures to ensure they are fully comprehensive to manage all risk. – Considering the Hierarchy of Controls, are there any measures that could be taken to remove or mitigate the risk of dropped objects. In this case, the crew, Health and Safety Executive, and engineer opted for hinges to be fitted to the cover plates as these would retain the plates while still allowing the cover and, alternately, the access when required.
Jan 2022	Major Hazard Facilities	While receiving a delivery of aluminium phosphide at a chemical storage and logistics facility, an operator noticed an odour of garlic. Recognising this as the smell associated with phosphine gas, the operator immediately alerted the Branch Manager. An atmospheric test using a gas detector was performed, while wearing appropriate personal protective equipment (PPE), and the detector alarmed as it detected phosphine gas at elevated levels coming from a single container.	– Situational awareness and quick action by the operator led to a timely emergency response by the company and emergency services. – Aluminium phosphide is usually formulated as dark grey or dark yellow crystals that have an odour like decaying fish or garlic. Exposure can occur to aluminium phosphide via the oral route, but because it is a solid material, dermal absorption of aluminium phosphide is unlikely. Aluminium phosphide is highly reactive with water, such that any contact with moisture will result in decomposition to phosphine gas.

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
		As a result, the emergency response plan (ERP) was activated, and the site evacuated. Fire and Emergency services (FENZ) were called out along with the product owner who assisted with the clean-up. Damage to the chemical container occurred during product handling, probably from a forklift, prior to delivery to the site.	– Phosphine gas is colourless, flammable, and explosive at room temperature. Therefore, the primary exposure route is via inhalation and absorption by the lungs.
Feb 2022	Major Hazard Facilities	The hydraulic rams of cooling water (CW) pump suction and discharge valves had hoses and fittings replaced during a plant outage. Afterwards, when stroking one of the CW pump discharge valves, the supply hose to the hydraulic ram failed (swaged fitting separated from the hose), at approximately 150barg, and sprayed oil to the ground. The system was shut down immediately and the Person Conducting a Business or Undertaking (PCBU) decided to suspend the use of similar swaged hydraulic components until the cause of the component failure was determined.	– The PCBU decided to employ inspection and test plans for future fabrication of hydraulic assemblies.
Mar 2022	Major Hazard Facilities	A blockage was discovered in an overhead pipe immediately above a reactor in a chemical processing plant. Further investigation determined that the blockage was compromising a pipe connection to the reactor bursting disk. The reactor was shut down and the blockage removed from the piping.	– The reactor in use was undertaking a trial of a modified resin. – Elevated levels of formaldehyde were detected from exposure monitoring being conducted during reactor operation even with operators wearing respirators. – Over time, a build-up of material in the reactor overhead pipework is possible. Maintenance checks on the reactor scrubber equipment did not discover this build-up. However, it was later found that the overhead pipework's flushing system was not fully clearing the pipework. Flushing systems need to be designed and maintained so that flushing sprays clear unwanted material from all relevant sections of pipework.
Mar 2022	Petroleum and Geothermal	A hydrocarbon gas storage facility was shut down and in a depressurised state (safe state). Extraction equipment in the plant was then re-pressurised to allow gas extraction operations to resume. At the same time the gas injection equipment in the plant remained isolated. During re-pressurisation of one of the flowlines, a gas release was noticed by a plant operator. Emergency response was initiated, and the plant was again shut down and depressurised. Production technicians on site had heard the gas release from its inception and overall, it lasted almost an hour. The leak was from a bleed valve which is part of a double block and bleed isolation point.	– There may be a strong desire to investigate significant problems occurring in the plant however the best course of action is to assess the situation from a safe distance and make the plant safe first. – Low points in hydrocarbon process facilities may accumulate solids over time affecting the performance of the system. Low point drains include valves, and solids such as formation sand may create blockages at the valve. With the drain valve open, should the blockage under pressure suddenly release and lead to a larger loss of containment. – Double block and bleed arrangements are installed for added isolation assurance and the ability to test the integrity of the isolation. However, when these are utilised on a plant that is already depressurised, the isolation cannot be proven. – Site evacuation sirens are an integral part of the emergency response system. Good practice is that the sirens are silenced once a full muster has been confirmed. This allows better communication and understanding of the issues during the immediate follow-up to an emergency on site. Mustered personnel should be kept informed of the status of the response.

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
			– All emergency alarms need to be taken seriously and personnel must follow their individual responsibilities in a timely manner in the event of an emergency. Regular reiteration of this may be necessary where there is possible desensitising towards alarms if numerous alarms occur in a short period of time due to, for example, testing, false alarms, and other events. – Safe operating procedures are derived from manufacturer's instructions, standard operating techniques, good industry practice, and empirical knowledge to name a few. For any given activity, the procedure must be suitably comprehensive to encompass all tasks, actions, and checks such that the entire activity is completed safely with risks removed or mitigated. This also ensures consistency of action amongst a range of operators. – Consider limiting, where possible, service contractors and non-essential personnel on site during plant start-up procedures. – Closed circuit television strategically positioned throughout the plant can be very useful in helping to determine incident event scenarios and response actions. – Ensure your emergency response plan includes all possible emergency event scenarios that present the greatest risk to your facilities. These can then be practiced by the response teams to enhance emergency preparedness.
Mar 2022	Major Hazard Facilities	A forklift was transporting and stacking empty wooden pallets in a large, refrigerated store when the forklift mast struck an ammonia pipe mounted to the ceiling of the room some 2.8m above floor level. In the past the pipe had been disconnected from the store refrigeration system and capped as a safety measure although it remained live. The impact of the forklift striking the pipe fractured it causing the pipe to separate at a poorly welded joint. No ammonia was released initially from the pipe as it was principally a return line under suction. The driver left the area, notified his supervisor, and the general alarm was raised. The site evacuated safely with no injuries due to ammonia exposure. Fire and emergency services (FENZ) attended the scene along with a HAZMAT unit. The pipe was isolated, and the store ventilated.	High hazards operators should ensure that: – when hazards are identified through safety assessment that the risk of them occurring is considered correctly, for example, the frequency of forklift movements around piping containing hazardous substances – control measures identified are implemented to eliminate or minimise the risk of a major incident occurring, for example, installation of bollards and guards to prevent vehicle impact – root causes are identified and are not incorrectly discounted, for example, weld quality.
Apr 2022	Petroleum and Geothermal	A welder was gas cutting out a wasted section of steel plate walkway inside a ballast water tank. He felt his arm warming up unexpectedly so stopped the cut. He observed a small fire at the acetylene hose connection to the hand piece. The fire watch in the tank alerted the confined space entry (CSE) safety observer on deck to the fire and the acetylene and oxygen cylinders were shut off. (**Note**: Bottles are located outside the tank).	– This incident highlights the benefits of having fire watchers, confined space entry safety observers, and a robust communication system to alert personnel and raise the alarm.

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
		The welder had crimped over the hoses at the handpiece to stop gas flow to extinguish the fire. The CSE safety observer called the control room to advise of the fire, and the facility general alarm was activated. All personnel in the tank evacuated and a full facility muster was achieved. Emergency Response team members were dispatched to the tank and completed an entry utilising breathing apparatus to check the scene. No further fire or hot points were observed. The welder had sustained no physical injury due to the incident and was checked over by the Medic as a precaution.	– Pre-job equipment checks should identify any faults with the equipment such that these can be addressed prior to work start. This is even more important when the equipment is to be used within a confined space. Procedures for confined space entry and permits to work should emphasise equipment integrity checks prior to entry.
May 2022	Major Hazard Facilities	A desktop review of trip logic for a Safety Instrumented Function (SIF) found errors in the logic which could have prevented the trip from operating on demand. This SIF constituted part of a Safety Critical Element (SCE), a high-high trip function. It is designed to protect a process heater which is used only as part of a cold start-up process for an ammonia loop. The function trips the fuel supply to the burners if temperature and pressure go beyond the safe operating envelope for the heater coils. The error was found while reviewing documentation for another SIF.	– This incident demonstrates the value of desk top reviews of logic associated with key plant components. – Functionality checks of SIFs and SCEs are required to ensure the correct cause and effects relationships are realised.
May 2022	Petroleum and Geothermal	A subcontracted worker contacted live electrical conductors while performing electrical maintenance on a main switchboard in an electrical substation during a major plant turnaround project. This contact led to electric shock and burns to the individuals arm and he was off work for several weeks. Due to work delays early in the turnaround, a small and discrete package of electrical work was brought forward in the turnaround programme. This work involved the installation of an air circuit breaker cradle inside a single cabinet of the main switchboard. An isolation was put in place only for this work. The original plan was to complete this work concurrently with switchboard maintenance and cleaning of the entire switchboard under a full substation isolation. However, the electrical coordinator and work party misunderstood the work scope and the extent of the isolation leading to the work party erroneously carrying out the cleaning activity across one half of the main switchboard, most likely because they had carried out similar work in the previous 24 hours in other substations. Unknown to the work party, a back feed from the emergency board remained live and this is what the worker contacted during cleaning activity.	– A misunderstanding of the work scope to be completed in the revised work programme led to unpermitted work being undertaken. It is imperative that the approved work scope is clearly understood by all parties in the chain of work acceptance, approval, and execution. – The effect of ‘recency’ seemingly led to the work party believing that the work that they were due to complete in Substation 1 was the same work that they completed in Substation 3 just hours earlier, even though a work schedule change meant the approved work was quite different. – Controlling work extends beyond just the permit to work and should include effective clear communication of work scope, competence relating to isolations and relevant line drawings, and site presence by area authorities before, during, and after discreet work packages. – Reliance on the availability of certain equipment required later for another activity can lead to changes to work programmes should that equipment be delayed or unavailable. Irrespective of definitive or compressed activity timelines, such changes need to be thoroughly assessed prior to effecting the change such that all hazards and controls are identified and the intent, content, and expected outcome of the change are fully understood by all parties involved.

INCIDENT DATE	INDUSTRY	SUMMARY	CONSIDERATIONS
			– Appropriate signs and labelling of equipment and hazards go some way to preventing incidents from occurring. While not totally effective on their own, along with other controls these raise the likelihood that incidents can be prevented. – Work parties have a responsibility to check the approved work requirements and controls prior to the work commencing to ensure their and others safety. – Comprehensive knowledge of plant and equipment is part of the make-up of a competent operator or technician, especially when these personnel are preparing work documents for others to execute
May 2022	Major Hazard Facilities	During a maintenance shutdown of a boiler, work was undertaken on the gas burner and damper assembly. Once completed, the burner was re-commissioned along with associated Safety Critical Elements (SCE). These included checks of the solenoid valve that starts and stops fuel gas flow to the pilot burner. Commissioning progressed and it was noticed that after a burner start the pilot flame remained despite the fuel solenoid valve being closed. This appeared to be an intermittent fault as the item had passed testing in the past. It was further found that the preventative maintenance task to validate the function of the solenoid valve is insufficient to confirm the sealing of the valve. The fuel volume in pipework upstream of the valve is such that a pressure change from any small leak would be indiscernible.	– The failed solenoid valve was in service for many years and had been subjected to repeated heat cycling due to its mounting position. Do you have any equipment such as this that may have been overlooked for servicing or replacement? – There had been a history of functional checks that 'proved' the equipment's integrity in service. However, these checks lacked the detail required to prove the solenoid valve was operating as expected. – Consider remote location and mounting of equipment such as this to prevent the effects of heat cycling on lifecycle performance.
May 2022	Major Hazard Facilities	During unloading of chlorine drums from a truck, the tines of the forklift protruded through the cradle of the first drum and inadvertently caught the cradle of the second drum. When the tines were raised this also raised the second drum. It was a wet day and Genie grips were used on the tines for additional grip and as the forklift backed away from the truck the second drum, containing 200kg of gas, was dragged past the edge of the truck deck and fell to the ground. There was no injury to any person and no loss of containment of chlorine.	– Competence assurance of personnel using forklifts for specific activities is as necessary as experience, training, and supervision. – Genie grips add additional grip to forklift tines especially during wet conditions. In this case, if genie grips were not in place the fork tines may have slipped out from under the second drum and it would not have been dragged off the truck, however other forklift movements carried out in the rain, with metal-on-metal contact, would have been more hazardous. – Two types of drum cradles were available, one wider than the other. When stacked on a truck, as the forklift moves in to lift off the first drum, the tips of the tines would be much closer to the second cradle. Further the structure of the cradles in use meant they were more susceptible to being caught by the tines. Both conditions were present during the incident. A decision was subsequently made to revert to a standard drum cradle design that was narrower and constructed in a way that made it less likely to be caught by the tips of forklift tines during offloading. – Certified forklift tine attachments for dedicated loads may reduce the general lack of means for the forklift operator to accurately determine tine tip position.

TABLE 3: A summary of incidents along with learning that operators may wish to consider where relevant to their organisation(s)

Root cause analysis

From the notifiable incidents received by WorkSafe throughout the year some 25 notifiable incidents have been assessed as high potential incidents (HPI). Specialist Investigators have reviewed these incidents and the associated investigations to collate applicable underlying, or root, causes.

Using Tripod Beta Basic Risk Factor (BRF) definitions, each HPI root cause has been categorized from the range of 11 BRF categories listed below:

DE	**Design**	Deficiencies in layout or design of facilities, plant, equipment, or tools that lead to the misuse or sub-standard acts, increasing the chance of particular types of errors and violations.
HW	**Hardware**	Failures due to inadequate quality of materials or construction, non-availability of hardware and failures due to ageing (position in the life cycle). The BRF does not include: – error-generating mechanisms due to poorly designed equipment – Design BRF – hardware failures caused by inadequate maintenance – Maintenance Management BRF.
MM	**Maintenance Management**	Failures in the systems for ensuring technical integrity of facilities, plant, equipment, and tools, for example, condition surveys, corrosion barriers and function testing of safety and emergency equipment. Issues relevant to the execution aspects of maintenance are considered in the BRFs: Error-enforcing Conditions; Procedures; Design; Hardware; Communication.
HK	**Housekeeping**	Tolerance of deficiencies in conditions of tidiness and cleanliness of facilities and workspaces or in the provision of adequate resources for cleaning and waste removal.
EC	**Error Enforcing Conditions**	Factors such as time pressures, changes in work patterns, physical working conditions (hot, cold, noisy) etc, acting on the individual or in the workplace that promote the performance of sub-standard acts – errors or violations.
PR	**Procedures**	Unclear, unavailable, incorrect, or otherwise unusable standardised task information that has been established to achieve a desired result.
TR	**Training**	Deficiencies in the system for providing the necessary awareness, knowledge, or skill to an individual or individuals in the organisation. In this context, training includes on the job coaching by mentors and supervisors as well as formal courses.
CO	**Communication**	Failure in transmitting information necessary for the safe and effective functioning of the organisation to the appropriate recipients in a clear, unambiguous, or intelligible form.
IG	**Incompatible Goals**	Failure to manage conflict; between organisational goals, such as safety and production; between formal rules such as company written procedures and the rules generated informally by a work group; between the demands of individuals' tasks and their personal preoccupations or distractions.
OR	**Organisation**	Deficiencies in either the structure of a company or the way it conducts its business that allow responsibilities to become ill-defined and warning signs to be overlooked.
DF	**Defences**	Failures in the systems, facilities and equipment for control or containment of source of harm or for the mitigation of the consequences of either human or component failures.

TABLE 4:
Tripod Beta Basic Risk Factor definitions

BRF categorisation was completed for HPIs within Site Types, recording the number of root causes per BRF. Results are as follows:

Chemical processing

DE	2	**TR**	2
HW	2	**CO**	
MM	1	**IG**	
HK		**OR**	1
EC	2	**DF**	
PR			

Underlying causes for chemical processing sites involve:
- poor reactor pipework flushing system (DE)
- flushing system failed to clean pipework (HW)
- material build-up in reactor pipework not detected (MM)
- chemical reactor undertaking new product trial (EC)
- failure to identify incorrect logic applied to SIF during installation (TR)
- failure to verify SCEs (OR)
- forklift tines catch drum cradle (DE)
- forklift tine attachments available for use (HW)
- offloading using forklift during wet weather (EC)
- forklift operator inexperience (TR)

Floating production, storage and offloading

DE		**TR**	1
HW		**CO**	1
MM	2	**IG**	
HK		**OR**	
EC		**DF**	1
PR	1		

Underlying causes for FPSO sites involve:
- lifting equipment checks not done (MM)
- operator not familiar with equipment (TR)
- lack of equipment consideration in work controls (CO)
- exclusion zones not implemented (DF)
- welding equipment checks not done (MM)
- equipment checks poorly proceduralised (PR)

Gas storage

DE	1	**TR**	
HW	2	**CO**	2
MM	3	**IG**	3
HK	1	**OR**	
EC	2	**DF**	1
PR			

Underlying causes for gas storage sites involve:
- OEM spares unavailable for valve repair (HW)
- management of change inadequate – failure to identify dimensional differences (MM)
- work scope communication ineffective (CO)
- process low points tend to collect debris (DE)
- no sand filtering equipment (HW)
- unproven process isolation (MM, IG)
- drain valve left open (MM, IG)
- produced sand blocked drain valve (EC)
- failure to follow emergency procedures (IG)
- remote location of ESD call point and resets (DF)
- no server cooling fan cleaning regime (HK)
- dusty and dirty operating environment (EC)
- risk of dust affecting computers not identified (CO)

Geothermal power station

DE	1	**TR**	1
HW		**CO**	1
MM	1	**IG**	1
HK		**OR**	3
EC	1	**DF**	2
PR	2		

Underlying causes for geothermal power station sites involve:

- oversized brine bypass valve (DE)
- only single block isolations used (MM)
- operators under pressure to reinstate brine flow after PLC failure (EC)
- emergency response inadequate and poorly implemented (PR)
- commissioning actions based on informal risk assessment (IG)
- failure to control work and changes (OR)
- normalisation of steam hammer risk (OR)
- conflict between people and plant priorities (OR)
- no ability to remotely detect steam hammer (DF)
- securing items at height not proceduralised (PR)
- poor understanding of dropped object risk (TR)
- work controls failed to communicate dropped object risk (CO)
- failure to identify need for exclusion zone (DF)

Hydrocarbon production station

DE	3	**TR**	3
HW	1	**CO**	2
MM	1	**IG**	
HK		**OR**	2
EC	2	**DF**	
PR	1		

Underlying causes for hydrocarbon production station sites involve:

- underestimated manual intervention required on existing plant during non-standard operation (DE)
- failure to consider additional controls required for non-standard operation (DE)
- inadequate procedures for well clean-up operations (PR)
- not enough competent personnel for extended activity (OR)
- failure of level indicating controller (HW)
- testing instructions ambiguous (MM)
- fouling of level switch (EC)
- no physical barrier between worker and live electrical equipment (DE)
- inadequate activity planning and work controls (EC, CO)
- gap in technician electrical plant knowledge (TR)
- failure to understand and comply with PTW (TR)
- missing signs and labelling to highlight risk (CO)
- inadequate management of change and risk management (OR)

Manufacturing

DE	2	**TR**	
HW	2	**CO**	
MM		**IG**	
HK	1	**OR**	1
EC	1	**DF**	2
PR	2		

Underlying causes for manufacturing sites involve:

- multiple potential ignition sources in complex system (DE)
- poor housekeeping helped spread fire (HK)
- strong wind present at the time (EC)
- inadequate safety checklists (PR)
- provision and effectiveness of firefighting equipment and training (DF)
- poor weld quality (HW)
- failure to implement control measures determined by risk assessment (OR)
- lack of impact protection (DF)
- burner pilot equipment subject to repeated heat cycling (DE)
- solenoid valve was in service many years (HW)
- preventative maintenance task for functional checking lacked detail (PR)

Storage and logistics

DE		**TR**	1
HW		**CO**	
MM		**IG**	
HK		**OR**	
EC		**DF**	
PR			

Underlying causes for storage and logistics sites involve:

- improper handling and care of transport containers during loadout and transfer (TR)

Wellsite

DE	4	**TR**	3
HW	3	**CO**	4
MM	1	**IG**	
HK		**OR**	5
EC	5	**DF**	
PR	3		

Underlying causes for wellsites involve:

- no requirement to use baskets for small items (HW)
- inadequate procedures for loading equipment (PR)
- acceptance of transport method (OR)
- geothermal well casing failed due to age (HW)
- active transition zones between formations (EC)
- no retention mechanism used (DE)
- ineffective procedures for managing exclusion zones (PR)
- procedures lacked detail to ensure all tasks covered (PR)
- no eyelet included on flowline (DE)
- use of elevated work platform restricted sling placement (EC)
- use of rig jib crane resulted in severe sling angle (EC)
- inexperienced supervisor (TR)
- poor understanding of sling positioning (TR)
- poor work planning and management of change (OR)
- inferior swaged fitting (HW)
- lack of inspection and test plans (MM)
- safety pin able to be inserted in elevator door when not properly latched (DE)
- elevator latched confirmation not included in risk assessment (CO)
- multiple sizes of elevator inserts not clearly identifiable (EC)
- complacency when changing elevator inserts (TR)
- fitting incorrect elevator inserts not considered in risk assessment (CO)
- insufficient supervision of inexperienced crew (OR)
- failure to appreciate higher risk of human error (OR)
- use of incorrect sling sizes to prevent twisting (DE)
- irregular casing roundness catches elevators (EC)
- failure of site team to feed back to management key challenges (CO)
- failure to inform oncoming workers of key and present risks (CO)
- normalisation of the risk of elevators rotating with casing during casing running (OR)

2.6 Virtual inspections

Travel and physical interactions have been impacted due to COVID-19 restrictions. WorkSafe shifted to 'virtual inspections' using digital technology. This has allowed WorkSafe to complete their Regulatory function and, where appropriate, defer physical inspections.

Inspectors have shared what they have learnt to ensure virtual inspections deliver the maximum benefit. WorkSafe are considering how virtual inspections can be used as part of the mix of tools used for completing inspections.

2.7 Industry working groups

Ageing plant

A working group was established in May 2022. Three initiatives were identified, looking to build off previous work developed by inspectors.

The working group has multiple purposes:

- raise awareness within inspection teams of ageing plant risks
- share knowledge of risks and lessons learnt in effective inspection practice related to ageing plant
- offer platform for inspectors to raise ageing plant-related queries
- develop a strategy to address ageing plant based on findings from inspections.

The working group held a kick-off and alignment meeting. The following initiatives for further work were agreed:

- draft a simple screening tool to enable inspectors, who have not necessarily worked in the ageing plant space before, to perform a high-level 'screening' of their operators to determine the ageing plant-related risks they're carrying and whether those risks are being appropriately managed
- look to put together an informal 'matrix' of industrial experiences possessed by inspector population – the intention is to give inspectors some direction when looking for internal help/guidance related to specific industries
- continue development of a formalised ageing plant/asset integrity guidance document, initially for internal use and with a view to developing guidance material thereafter for public usage.

LPG

The LPG working group was established in June 2021 to share knowledge between HHU inspectors, coordinate across LPG operators, and define our strategy for facilities holding LPG.

All HHU inspectors with responsibility for operators and facilities holding LPG are members of the group, alongside the Deputy Chief Inspectors and Chief Inspector.

A key focus for the group has been to identify the process safety maturity of operators and intervene as required. This has included benchmarking of control measures (including safety-critical elements), comparison of consequence models and safety assessments, and emergency planning. Compliance with the Hazardous Substances Regulations has also been topic for the group.

We have held meetings with the LPG Association (LPGA) board and technical committee, as well as initiated and facilitated a regulators forum on transport of LPG. Engagement with other regulators and the LPGA will continue.

The group will continue to work together on setting expectations for operators of high hazard facilities with LPG. This will include ageing plant management, overlapping with that working group.

Storage/logistics

- There are several facilities that are MHFs because dangerous goods (DG) are stored there.
- Storage/logistics facilities may be seen as low risk but globally there have been several major incidents at these types of facilities.
- At the end of 2021 MHF lead inspectors for storage/logistics facilities formed a group to discuss issues common to these facilities and approaches by the operators.
- The aim of the group is to ensure consistency and common standards at storage/logistics facilities.

Inspectors visiting storage/logistics facilities are meeting quarterly to share their experiences of standards seen at these facilities in New Zealand. Controls in place at the different facilities have been noted and compared, with a view to ensuring that all operators work to the same standard. For example, inspectors have ensured all operators have considered toxic gas detection where toxic gases are stored.

Third party logistics companies have common issues compared to other MHFs. Many products are stored and the inventory changes regularly. Inspectors have found discussing how the different operators approach this helpful.

There has been a focus on upskilling inspectors and ensuring consistency both on major incidents due to the goods stored and on more traditional safety issues such as traffic management and racking safety, which are very relevant in these workplaces.

Bulk storage

- The Bulk Storage Working Group was established in March 2022. This group continues and expands on the scope of a previous working group focused on the Buncefield recommendations for in-scope operators The group currently covers all bulk hydrocarbon storage operators but will expand to include bulk tank storage of other chemicals in due course.
- The working group consists of inspectors/representatives from Major Hazard Facilities, Petroleum and Geothermal, Technical Services, and Hazardous Industries and Certification teams.
- The group meets periodically to discuss topics and share learnings from recent inspections and incidents.
- The aim of the group is to improve consistency amongst the inspectors and to collaborate on identifying areas to focus on at future inspections.

Inspectors have been upskilling on occupational health risks at bulk storage facilities and on the pipelines and transfer lines that connect to these facilities. Along with asset integrity management these topics will be a focus for our inspectors in the coming years.

Safety critical elements will continue to be a focus area for this working group and our inspectors will be seeking to build up a database of what safety critical elements each facility has. This will be part of enabling the working group to assess where there has been positive uptake of controls and where further improvement may be warranted.

The group will also be considering additional means of engagement with the industry outside of inspections and the potential for sharing targeted learnings in the future.

2.8 Petroleum Workshop May 2022 – New Plymouth

The first Petroleum Workshop since 2019 was held in New Plymouth during May 2022. We were fortunate to be able to hold this event in a face-to-face. The aspiration for these workshops is to hold these annually.

The workshop provided an opportunity to engage with the petroleum sector and allowed WorkSafe to provide some updates, insights from engagements and notifications over the last 12 months and provide some expectations for the next 12 months.

Several topic areas were presented by WorkSafe and these included:

- learning from Incidents
- safety critical elements
- functional safety survey feedback.

Expectations for the coming 12 months:

- hazards and risks created by operators' continue to be adequately managed, with a focus on process safety systems
- monitoring performance of safety management systems and the development of process safety performance indicators
- increased focus on incidents and incident reports concentrating on root cause analysis methodology, whether root causes have been adequately identified and measures to prevent re-occurrence put in place. WorkSafe High Hazards now have two dedicated specialist investigator resources to support this work
- notification process for notifiable incidents and communicating with the HHU Petroleum and Geothermal team is part of the notification process
- worker engagement is regularly conducted by operators; this is a key requirement of, and fundamental to the effectiveness of a safety case and the effective operation of installations and facilitates
- managing ageing assets, facilities and installations are approaching if not past their original design life and field life extension projects are becoming increasingly more popular. A working group has been put together to develop a strategy for reviewing the management of ageing assets within the sector
- working groups focusing on LPG and Bulk storage to drive consistency across the industry on minimum acceptable standards
- like industry WorkSafe has adapted the way it conducts engagements and interactions, with an increase in virtual components for inspections because of COVID-19, to maintain a regulatory oversight
- WorkSafe continues to be an active contributing member of the International Regulators' Forum (IRF) for Global Offshore Safety Industry to view the range of information relevant to high hazard industries.

Sector representatives also presented on the following subjects:

- process safety management KPIs
- cyber security
- update from Environmental Protection Agency (EPA).

2.9 Fees and levies review

The higher costs of regulating major hazard facilities that store large amounts of hazardous substances are recovered directly through fees and levies, to cover the additional costs of WorkSafe's regulatory oversight.

The fee and levy rates for major hazard facilities were set in 2016 with a requirement to review these after five years. The Ministry of Business, Innovation and Employment (MBIE) and WorkSafe have carried out the review of the fee and levy rates.

It concluded major hazard facilities fee and levy rates are no longer set at the right level to fully recover the expected future costs of regulatory oversight:

- there is cross subsidisation amongst levy payers
- surpluses have built up in the memorandum accounts for both fee and levy due to lower than expected costs over the first five years of the major hazard facilities regime, while it was embedding in.

It is now proposed to reset the fee and levy rates to:

- return the current surpluses to fee and levy payers through applying a discounted fee or levy for a period
- minimise cross subsidisation amongst fee and levy payers
- move to full cost recovery and ensure that the memorandum account balances track to zero over time, without requiring significant changes to fee or levy amounts at the next review.

The proposals to reset levy and fee rates do not have a significant impact on major hazard operators and their businesses.

MBIE and WorkSafe carried out targeted consultation with operators, and other interested parties on options for resetting fee and levy rates over a six-week period, between January and March 2022.

3.0 Our focus for the year ahead

IN THIS SECTION:

3.1 Inspections

High Hazards inspectors have prioritised closing out issues identified during safety case assessment and undertaking inspections to ensure operators are conducting their activities in general accordance with accepted safety cases. Inspectors remain committed to detecting and addressing non-compliance with HSWA and associated regulations despite the restrictions on travel because of the COVID-19 pandemic. This has meant finding new ways to continue with this core work including conducting virtual inspections or hybrid inspections which limit the number of inspectors attending a facility to reduce the risk of exposure to, and transmission of COVID-19 by using technology such as video conferencing. This approach also allows ongoing engagement with duty holders and can at times, and where appropriate, reduce carbon emissions and cost associated with travel.

3.2 Investigation and analysis of notifiable incidents

In the 2022/23 year further emphasis will be placed on ensuring complex process-safety incidents and other precursor events are followed up, considered for investigation, investigated as required to identify root causes, and reported on in a timely manner. Concurrent assessment of HPIs remains a significant focus area. In some cases, the outcomes of this work will support decisions as to whether enforcement or other measures will be taken or not. Along with these activities, the Specialist Investigators continue to strengthen processes and procedures to ensure investigation thoroughness and consistency.

We will continue to gather incident data from notifiable incidents reported to WorkSafe and analyse these for themes, trends, and common learning. Each reported incident will be added to the database and collectively analysed to identify and develop trend information. Conclusions drawn from the analyses will be used to assist the determination of strategies for ongoing site inspections. Learning from incidents is an important part of analysing the data to which we aim to present back to industry for ongoing consideration and continuous improvement.

3.3 International regulatory engagement

WorkSafe is an active contributing member of the IRF for global offshore safety. This group of international regulators is made up of representatives from New Zealand, Australia, UK, USA, Mexico, Canada, Brazil, Norway and Denmark. The forum meets twice annually, and we encourage you to check out the IRF website irfoffshoresafety.com to view the range of information relevant to high hazard industries.

The IRF and industry identified three problem statements to be addressed collaboratively with the internationally recognised industry associations of International Association of Drilling Contractors (IADC) and International Association of Oil & Gas Producers (IOGP). More information on these problem statements can be found on the IRF website, with regular updates published. You are welcome to contact us to discuss these further.

In addition, the IRF publishes monthly articles which you are welcome to view on the IRF website: irfoffshoresafety.com

The articles for 2021 and 2022 are on the IRF website: irfoffshoresafety.com
This group of international regulators met virtually due to global COVID-19 travel restrictions.

3.4 Feedback

We are keen to know what you think and how we can provide better or more useful data next time. Please send any feedback to: hhu.mhf@worksafe.govt.nz

Disclaimer

WorkSafe New Zealand has made every effort to ensure the information contained in this publication is reliable, but makes no guarantee of its completeness.

It should not be used as a substitute for legislation or legal advice. WorkSafe is not responsible for the results of any action taken on the basis of information in this document, or for any errors or omissions.

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