



Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Overview of dangerous goods reportable situations and incidents 2017

March 2018

Level 2, 1 Adelaide Terrace, East Perth, WA 6004
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8002 Facsimile: (08) 9358 8000
www.dmirs.wa.gov.au

Contents

Overview of 2017 reportable situations and incidents.....	3
Number of reportable situations and incidents for 1998–2017.....	4
Explosives and Security Sensitive Ammonium Nitrate (SSAN) reportable situations in 2017	5
Dangerous goods storage and handling reportable situations in 2017	10
Dangerous goods transport reportable situations in 2017.....	13
Major hazard facility reportable situations in 2017	15
Statistical analysis of incident data for 2008–2017	17

Overview of 2017 reportable situations and incidents

This report describes dangerous goods and explosives incidents that occurred in 2017 and are required to be reported to the Safety Regulation Group of the Department of Mines, Industry Regulation and Safety under the *Dangerous Goods Safety Act 2004* and associated regulations. The report also compares the 2017 incident data with comparable data collected since 1998 and provides some analysis of incident data for that period.

The quantity of dangerous goods being stored, handled and transported across the State remains steady. Looking at 20 years of data, the total number of reported incidents, excluding major hazard facility (MHF) incident reports, has remained relatively constant over the period. It is acknowledged that the actual number of incidents is likely to be greater than the number reported, so year-to-year variations should not be over-interpreted. For example, rather than indicating an increase in the number of incidents, the significant increase in the number of explosives incident reports since 2008 most likely reflects an increased awareness of reporting responsibilities by mining companies and users.

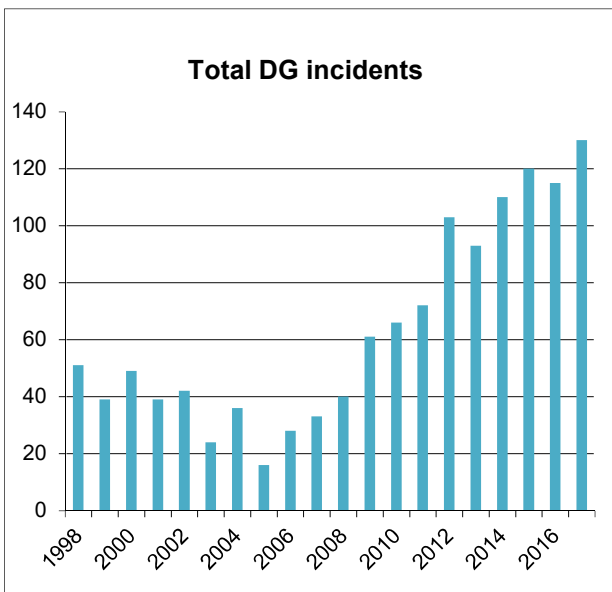
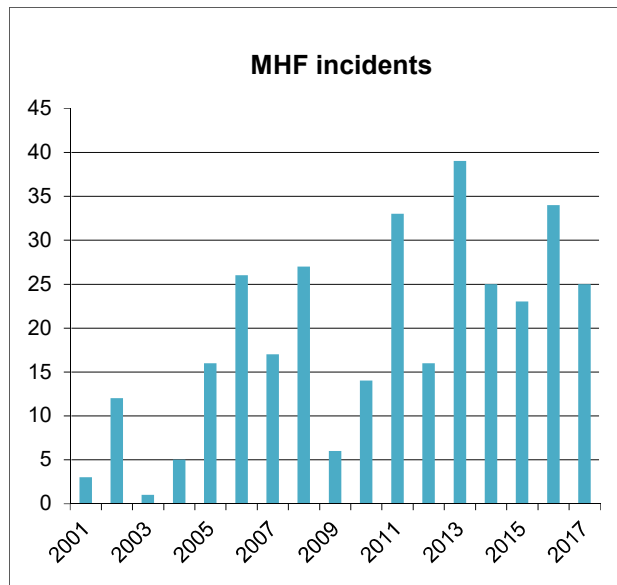
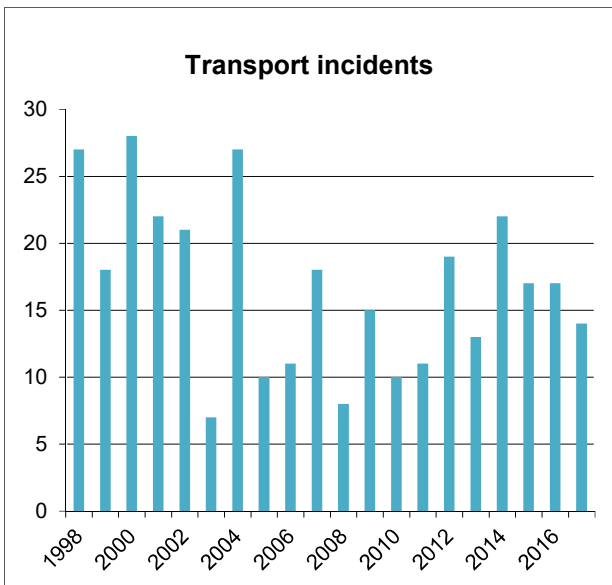
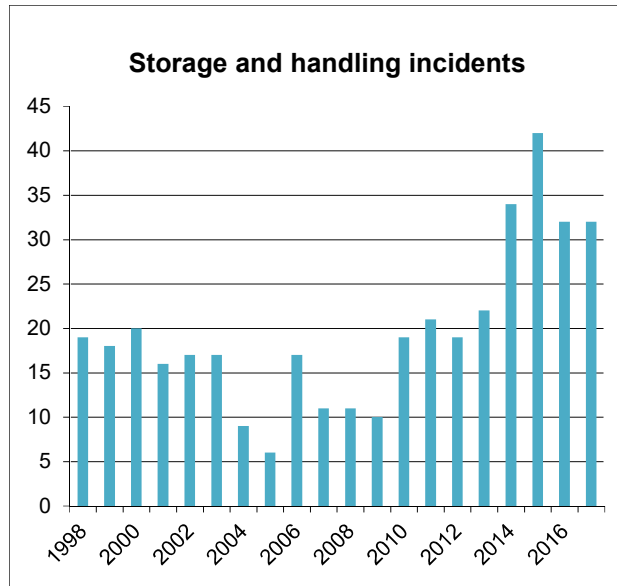
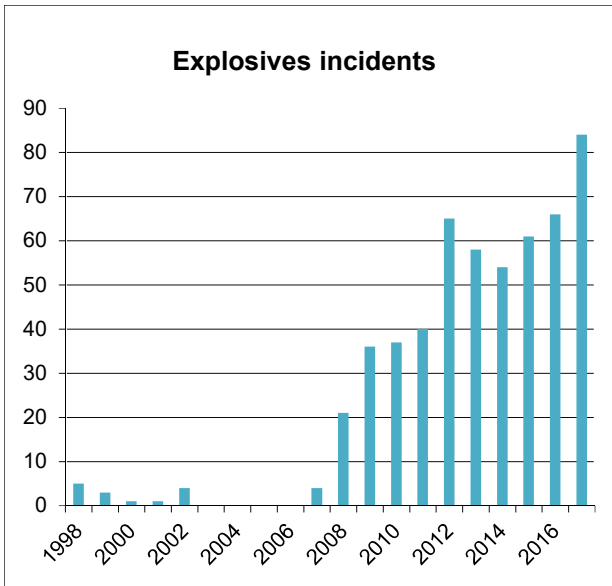
Sadly there was one fatality in 2017, related to the use of explosives and while several injuries received were serious, the majority were minor.

Ross Stidolph

CHIEF DANGEROUS GOODS OFFICER

March 2018

Number of reportable situations and incidents for 1998–2017



Explosives and Security Sensitive Ammonium Nitrate (SSAN) reportable situations in 2017

There were 84 explosives and SSAN reportable incidents notified to the Department in 2017, an increase on the previous year. Thirteen of these were reported to the mines inspectorate only, with the balance reported to the dangerous goods inspectorate. Users of explosives are reminded of their responsibilities under the Dangerous Goods Safety (Explosives) Regulations 2007 to report incidents.

The report covers a wide range of incident types. The number of incidents involving losses of detonators, primers or boosters at mine sites is consistent with previous periods. Mine site operators are expected to continue to improve their accounting and reconciliation processes to eliminate this problem. Other than this, there is no identifiable pattern to the incidents listed.

Sadly there was a fatal non-work related incident and there were some minor injuries as well as damage to mine equipment, buildings, vehicles and plant.

Serial	Date	Location	Goods	Incident details
1*	14 Jan 17	Pilbara	Booster and detonator	A loader operator discovered an unfired detonator and booster in the vehicle tray.
2*	17 Jan 17	Pilbara	Booster	An unfired booster was discovered on the pit floor.
3	17 Jan 17	Pilbara	Booster and detonators	Unfired boosters and detonators were discovered while excavating product.
4	17 Jan 17	Pilbara	Detonators	Two surface delay detonators were lost on a shot.
5	21 Jan 17	Pilbara	Booster and detonator	A booster and detonator were lost on a shot.
6	21 Jan 17	Pilbara	Booster and detonator	A primer was discovered when walking a pit.
7	29 Jan 17	Pilbara	ANFO	An excavator uncovered a drill column containing ANFO while clearing product.
8	08 Feb 17	Pilbara	Ammonium nitrate emulsion	A MPU considered to be empty contained emulsion.
9	08 Feb 17	Mid West	Articles, explosive, N.O.S.	An excavator bucket hit an unfired explosive cartridge, initiating the charge. The excavator sustained minor damage, there were no injuries.
10	12 Feb 17	Pilbara	Booster and detonator	A booster and detonator were found in a muck pile.
11	12 Feb 17	Pilbara	Blasting explosives	Three charged and stemmed drill holes were struck by lightning and initiated.
12	16 Feb 17	Pilbara	Blasting explosives	While loading ammonium nitrate into a MPU, the MPU's auger penetrated the cab of a vehicle. There were no injuries.
13	17 Feb 17	Goldfields	Detonators	The permitted limit for transporting a mixed load of detonators and explosives was exceeded.

Serial	Date	Location	Goods	Incident details
14	17 Feb 17	Pilbara	Blasting explosives	Two charged and stemmed drill holes were struck by lightning and initiated.
15	24 Feb 17	Pilbara	Detonator	A delay detonator was lost down a hole.
16	26 Feb 17	Northern Goldfields	Blasting explosives	Underground production firing was initiated before authorisation was received.
17	26 Feb 17	Pilbara	Detonators	A delay detonator was unaccounted for.
18	07 Mar 17	Pilbara	Booster	A booster was lost down a hole.
19	17 Mar 17	Metropolitan area	Ammonium nitrate emulsion	MPU containing emulsion was left unsecured.
20*	23 Mar 17	Pilbara	Blasting explosives	Fly rock exceeded the safety exclusion zone. There were no injuries or damage.
21	25 Mar 17	Northern Goldfields	Blasting explosives	An electrical fault caused a small vehicle fire in an underground magazine. The fire was extinguished.
22	16 Apr 17	Pilbara	Detonator and booster	A detonator and booster were found while excavating a shot.
23	16 Apr 17	Pilbara	Detonator and booster	A detonator and booster were found while excavating a shot.
24	17 Apr 17	Pilbara	Booster and detonator	A downhole delay detonator and primer were discovered while conducting an area inspection.
25	17 Apr 17	Pilbara	Detonator and booster	A detonator and booster were found while excavating a shot.
26	24 Apr 17	Pilbara	Detonator and booster	A hotseat driller discovered an unfired detonator and primer.
27	30 Apr 17	Pilbara	Ammonium nitrate emulsion	Smoke was detected coming from the axle on MPU.
28	30 Apr 17	Goldfields	Detonator assemblies	On opening a factory-sealed box of detonators, five were missing.
29	02 May 17	Pilbara	Ammonium nitrate emulsion	Smoke was detected coming from the tyre of a MPU.
30*	9 May 17	Pilbara	Blasting explosives	A worker remained inside a safety exclusion zone during a blast.
31	14 May 17	Pilbara	Detonator and booster	A detonator and booster remained unaccounted for.
32	14 May 17	Pilbara	Blasting explosives	An unauthorised person entered the blast zone.
33	15 May 17	Pilbara	Boosters	Three boosters were unaccounted for.
34	15 May 17	Pilbara	Blasting explosives	A stemming truck caught and snapped a nonel down line.
35	17 May 17	Pilbara	Blasting explosives	A MPU drove over a shot and broke a line.
36	18 May 17	Pilbara	Booster and detonator	A dozer operator discovered an unfired detonator and booster in batter trimmings.

Serial	Date	Location	Goods	Incident details
37	22 May 17	Goldfields	Ammonium nitrate emulsion	An unsecured IBC containing ammonium nitrate emulsion fell off the back of a truck causing a loss of product.
38	07 Jun 17	Pilbara	Booster	While priming a shot a booster was identified as missing. The booster was found, post-blast, in the drill cuttings.
39*	10 Jun 17	Pilbara	Booster	An excavator operator discovered an unfired booster when handling product.
40*	11 Jun 17	Goldfields	Blasting explosive	Drill crew discovered unfired product from a previous blast when drilling new holes.
41	19 Jun 17	Pilbara	Detonator and booster	An excavator operator discovered an unfired detonator and booster.
42	20 Jun 17	Metropolitan area	Explosives	Sixteen cartridges of explosives were stolen.
43	24 Jun 17	Northern Goldfields	Ammonium nitrate emulsion	A mobile mixing unit brake caught on fire and was extinguished. A cause has not been established.
44	29 Jun 17	Pilbara	Detonators	Two boxes of factory-sealed detonators were opened, each box was one detonator short.
45	30 Jun 17	Pilbara	Boosters	Explosives were left overnight unsecured.
46	01 Jul 17	Pilbara	Detonator	A detonator was unaccounted for.
47	03 Jul 17	Northern Goldfields	Detonators	A detonator magazine was left unsecured.
48	03 Jul 17	Pilbara	Detonator and booster	A dozer operator discovered an uninitiated detonator and booster while clearing a tip head.
49	04 Jul 17	Great Victoria Desert	Ammonium nitrate emulsion	Smoke was seen coming from behind driver's side of cab of a mobile mixing unit. The fire was extinguished.
50	04 Jul 17	Pilbara	Booster and detonator	A fatal non-work related incident occurred.
51	04 Jul 17	Pilbara	Blasting explosives	A light vehicle with two occupants breached the blast exclusion barricade.
52	14 Jul 17	Pilbara	Booster	A booster was unaccounted for after a shot.
53	14 Jul 17	Pilbara	Booster	A digger operator discovered an unfired primer while clearing product.
54	20 Jul 17	Northern Goldfields	Blasting explosives	A grader entered a primed shot causing damage to a primed hole.
55	23 Jul 17	Pilbara	Booster	A booster was unaccounted for.
56	27 Jul 17	South West	Detonator	A signal tube lead was severed by a vehicle.
57	27 Jul 17	Pilbara	Boosters	Two primers were unaccounted for, one was recovered after the shot was fired.
58*	28 Jul 17	Pilbara	Boosters	Two boosters were unaccounted for after reconciling a shot.

Serial	Date	Location	Goods	Incident details
59	08 Aug 17	Goldfields	Ammonium nitrate emulsion	The brakes failed on an underground vehicle. There were no injuries.
60	15 Aug 17	Pilbara	Booster	A loader operator discovered an unfired booster while loading product.
61	16 Aug 17	Pilbara	Booster	A booster was unaccounted for after charging blast holes.
62	22 Aug 17	Kimberley	Blasting explosives	A detonator and booster were initiated when struck by an excavator bucket. The bucket was damaged, there were no injuries.
63	22 Aug 17	Pilbara	Blasting explosives	An unfired column of explosive, including booster and detonator were discovered in an excavation.
64	28 Aug 17	West Goldfields	Detonating cord	Explosives were left unsecured.
65	28 Aug 17	Pilbara	Explosives compound	An intruder broke into an explosives compound. The magazine was not broken into. No explosives were stolen.
66	02 Sep 17	Pilbara	Booster	A booster was lost down a hole.
67*	27 Sep 17	Pilbara	ANFO	A loader operator discovered and unfired column of ANFO while clearing product.
68	28 Sep 17	Pilbara	Boosters	Two unfired boosters were discovered while conducting digging operations.
69	13 Oct 17	Kimberley	Igniters	When opening a factory-sealed package of explosive items, a discrepancy was identified.
70	14 Oct 17	Pilbara	Detonator	Prior to blasting, reconciliation identified an unaccounted surface delay detonator.
71*	17 Oct 17	Pilbara	Booster	A digger operator discovered an unfired booster during loading operations.
72	25 Oct 17	Goldfields	Blasting explosives	When opening a factory-sealed package of explosives, a discrepancy was identified.
73	25 Oct 17	Mid West	Blasting explosives	When opening factory-sealed packages of explosives, discrepancies were identified.
74	28 Oct 17	West Goldfields	Detonator	A detonator was lost down a hole.
75	29 Oct 17	Pilbara	Primers and ANFO	Fourteen misfired holes were discovered when clearing a row of battered holes.
76	30 Oct 17	Pilbara	Detonator	An accounting error allowed a detonator discrepancy.
77	22 Nov 17	Pilbara	Booster	An unfired booster was discovered during mining activities.
78*	26 Nov 17	Northern Goldfields	Detonators	Five detonators were unaccounted for during magazine stock reconciliation.
79	28 Nov 17	South West	Detonator	A MPU drove over a shot, caught a detonator lead and dragged it from the hole.
80*	29 Nov 17	Pilbara	Booster	A booster was unaccounted for while laying out a shot.

Serial	Date	Location	Goods	Incident details
81*	15 Dec 17	Pilbara	Blasting explosives	An excavator operator discovered an unfired column of ANFO, booster and detonator.
82	20 Dec 17	Goldfields	Ammonium nitrate emulsion	MPU containing emulsion was assumed to be empty and moved on a public road, incorrectly placarded.
83*	25 Dec 17	Goldfields	Booster and detonator	A booster and detonator were lost down a hole.
84	31 Dec 17	South West	Fireworks	When initiating a firework the operator was struck in the face by ignited fireworks. The operator suffered burns to her face.

* Reported to Mines Safety Directorate only.

Dangerous goods storage and handling reportable situations in 2017

There were 32 reported dangerous goods storage and handling incidents in 2017, the same number as the previous year. There was no general pattern or trends identified with the incidents, with causes ranging from mechanical equipment failure to human error. A similar number of incidents involving liquefied petroleum gas (LPG) were reported as in the previous year. The Department will continue monitoring and where necessary, targeting these industries in the coming reporting period.

Three operations within the State are particularly prone to loss of containment. These operations reported a further 197 spill incidents that involved 1kL or more. None of these losses resulted in environmental harm. Before March 2008, such incidents had not been considered or reported as dangerous goods incidents. The 2017 figure is higher than that reported in 2016 (185). A range of preventative actions continue to be implemented to reduce the likelihood of recurrence.

Serial	Date	Location	Goods	Incident details
1	01 Jan 17	South West	Sodium hydroxide solution	A transfer hose burst spraying a worker. Eye injuries were sustained.
2	05 Jan 17	Perth Metro	Rare gases and nitrogen mixtures	A fire protection system leaked gas. There were no injuries.
3	09 Jan 17	Cannington	Liquefied petroleum gas	Car struck a number of decanting cylinders at a retail outlet. There was no gas leak and no injuries.
4	11 Jan 17	Perth Metro	Isopropylamine	A leaking drum was found during the check of an imported shipment.
5	11 Jan 17	Fremantle	Bitumen	While conducting maintenance, residual product caught fire. There were no injuries.
6	17 Jan 17	Perth Metro	Liquefied petroleum gas	Gas leaked from the hydrostatic relief valve on LPG 'bullet'.
7	19 Jan 17	East Kimberley	Chlorine	While conducting a fault finding exercise a small release of gas occurred. There were no injuries.
8	20 Jan 17	Bridgetown	Chlorine	A small leak occurred during the testing of chlorine gas shut down system.
9	27 Jan 17	Pilbara	Diesel	Diesel leaked through a relief valve into a bunded area. The fuel overflowed the bund and contaminated the surrounding area. About 2,000l of fuel was lost. Site fully remediated.
10	08 Feb 17	Perth Metro	Sodium hypochlorite	A hose connection leaked, causing product to be sprayed. A worker wearing PPE was hit by the liquid but did not sustain any injury.
11	22 Feb 17	Ravensthorpe	Chlorine	Chlorine leak detected during testing of vacuum regulator at a water treatment site.
12	27 Feb 17	Moora	Petrol	During cable boring work a hole was made in a disused underground fuel tank.

Serial	Date	Location	Goods	Incident details
13	28 Feb 17	Binningup	Sodium Hypochlorite	Product leaked from a storage tank into a bund. There were no injuries.
14	28 Feb 17	Perth	Petrol	A person deliberately emptied fuel from a container and threatened to light it. There were no injuries.
15	23 Mar 17	Pinjarra	Chlorine	A leak occurred from a cylinder regulator.
16	15 Apr 17	East Perth	Diesel	A spillage occurred from a train filling dispenser. Diesel fuel was contained in the site's drainage system. About 5,100l of product was spilt.
17	20 Apr 17	Paraburdoo	Diesel	A mechanical failure of the main shaft pump bearing caused diesel to ignite. The fire was quickly controlled.
18	30 Apr 17	Kwinana	Caustic soda	During a transfer process a worker was sprayed with a small amount of product. The worker suffered burns to their face.
19	10 May 17	Munglinup	Chlorine	A chlorine leak occurred from a vacuum regulator due to contamination on valve needle and seat.
20	24 May 17	Collie	Sodium aluminate	While undertaking maintenance activities, a worker received chemical injury to both eyes.
21	05 Jul 17	Kwinana	Acrylic acid	About 1,100l of acrylic monomer was released from a process vessel. No injury, environmental harm or property damage sustained.
22	28 Jul 17	Bibra Lake	Bipyridilium pesticides	During unloading operations an IBC started leaking. IBC was placed on its side and the spill was contained.
23	31 Jul 17	Collie	Sodium hydroxide solution	While unloading solution from a train, a surge tank overflowed into a bunded area. The bund then overflowed into a process area and roadway. All damage was remediated.
24	09 Aug 17	Mt Claremont	Chlorine	Automatic detectors identified a chlorine gas leak after-hours. The system was made safe and the chlorine drum was returned to the supplier for further investigation.
25	30 Aug 17	Bassendean	Liquefied petroleum gas	A gas leak was detected, about 1,260l of LPG was released. The site was evacuated, the leak contained and the site was made safe.
26	07 Sep 17	Wangara	Ammonia, anhydrous	Small release of ammonia from a transportable tank located at a chemical manufacturing site. There were no injuries.
27	16 Nov 17	Bayswater	Chlorine	A sub-contractor dug and severed an underground chlorine gas pipe. A minor leak occurred.
28	22 Nov 17	Erskine	Liquefied petroleum gas	A driver filled a 108l LPG cylinder in rear of an enclosed 4WD from an auto gas dispenser.
29	10 Dec 17	Mt Webber	Diesel	A generator fuel system failed causing the loss of 15,000l of product. All damage was remediated.

Serial	Date	Location	Goods	Incident details
30	18 Dec 17	O'Connor	Nitric acid	A plastic drum leaked after it fell from a pallet. The leak was neutralised.
31	22 Dec 17	Geraldton	Anhydrous ammonia	A fire occurred at a seafood processing and storage facility. There was a minor leak of ammonia from the refrigeration system.
32	25 Dec 17	Hocking	Liquefied petroleum gas	When removing the plastic dust cap from the cylinder, LP gas was released and hit a person's forearm causing cold burns to the skin.

Dangerous goods transport reportable situations in 2017

There were 14 dangerous goods transport incidents reported in 2017, slightly down on the 2016 figure. The Department has continued its proactive dangerous goods safety campaign during 2017, including increased engagement with transport operators.

About half of the reported incidents can be attributed largely to human error, with no dangerous goods loads the causal factor in any incident. Unfortunately, there was one fatality, and some serious injuries from these incidents, although dangerous goods were not the cause.

Serial	Date	Location	Goods	Incident details
1	03 Feb 17	Byford	Liquefied petroleum gas	A vehicle carrying LP gas cylinders collided with another truck. Sadly, the driver of the LP Gas vehicle died in the incident.
2	06 Feb 17	Menzies	Ammonium nitrate emulsion	The driver lost control of the vehicle, rolling tanker and prime mover onto its side. No product was lost and there were no injuries.
3	18 Feb 17	Great Northern Hwy, NW of Newman	Ammonium nitrate emulsion	A fire started in trailer lining. The fire was extinguished and the prime mover disconnected from the load and moved away.
4	18 Feb 17	Tropicana Mine Access Road	Ammonium nitrate emulsion	Temperature checks on a vehicle's rear dog trailer identified excessive heat. The driver managed the situation and all product was safely delivered.
5	07 Mar 17	Great Northern Highway, N of Meekatharra	Ammonium nitrate	The last trailer of a triple road train rolled and product spilt onto the road.
6	20 Mar 17	South Perth	Sulphuric acid	An IBC moved during transport and acid leaked onto the freeway.
7	27 Mar 17	Midvale	Ammonium nitrate	The rear axle brake drum overheated, causing smoke. The hub was cooled and the vehicle safely continued to its destination.
8	06 Jun 17	Laverton	Sodium hydroxide	A vehicle sustained a tyre fire. The situation was contained and the product successfully transferred to another vehicle.
9	10 Jul 17	Myalup	Liquefied petroleum gas	A trailer rolled over causing cylinders to spread along the verge and road. There were no injuries or product loss.
10	27 Jul 17	Great Northern Highway, N of Meekatharra	Ammonium nitrate	The centre axle of a road train vehicle trailer caught light. The fire was extinguished and did not spread to the load.
11	03 Aug 17	Fremantle	Sulphur dioxide	A damaged ISO container holding 23 tons of product was offloaded at the port.
12	08 Sep 17	Great Central Road, E of Laverton	Diesel	Foot valve of tanker compartment failed causing approximately 2,300l of product to leak.

Serial	Date	Location	Goods	Incident details
13	14 Sep 17	Upper Swan	Bitumen	A B-double road train trailer detached as the vehicle was leaving a transport yard. There were no injuries or loss of product.
14	30 Nov 17	Port Hedland	Methane	A quantity of natural gas was discharged from a tank vacuum port. There were no injuries.

Major hazard facility reportable situations in 2017

Major hazard facility (MHF) incident reports and reportable situations cover circumstances involving injury, damage or near misses.

There were 25 reportable incidents in 2017, compared with 34 in 2016. All incidents were minor in nature and some workers received minor injuries.

Serial	Date	Location	Goods	Incident details
1	22 Feb 17	Northern Goldfields	Sodium hydroxide	A water injection pipe joint failed, splashing a worker.
2	23 Feb 17	Burrup	Ammonia	Gas released from a tank vent.
3	06 Mar 17	Burrup	Ammonium nitrate solution	Ammonium nitrate solution was spilt.
4	17 Mar 17	North West	Liquefied natural gas	A gas leak was detected from a flange joint.
5	17 Mar 17	Northern Goldfields	Anhydrous ammonia	An incorrect valve line up during venting resulted in ammonia emissions.
6	19 Mar 17	Burrup	Ammonia	Ignition of gases exiting from a plant vent caused damage to equipment. Workers were exposed to the gas.
7	24 Apr 17	Kwinana	Liquefied natural gas	A heat exchanger tube failed, leading to release of 100-200l of LPG to atmosphere.
8	29 Apr 17	Kwinana	Ammonia	A hydrostatic relief valve failed causing a release of ammonia. There were no injuries.
9	29 Apr 17	Burrup	Nitrogen oxides	High concentrations were released.
10	02 May 17	North West	Liquefied natural gas	A gas leak was detected from a valve stem.
11	25 May 17	Burrup	Ammonia	Three pressure safety valves activated.
12	11 Jun 17	North West	Nitrogen	Approximately 678m ³ of product was released through a relief valve during pressure testing activity.
13	13 Jun 17	North West	Flammable gas mixture	Flammable gas was released through flare pipeline flanges. There were no injuries.
14	22 Jun 17	North West	Nitrogen	Approximately 1800m ³ of gas was released to atmosphere through an open flange during start-up activities.
15	23 Jun 17	Kalgoorlie	-	A vehicle collided with an overhead cable tray and pipe rack containing steam, hydrogen, ammonia, water and cabling. No pipes were damaged.
16	17 Jul 17	Kwinana	Crude oil	Approximately 1,130l of product was spilt from a spill tray.

Serial	Date	Location	Goods	Incident details
17	20 Jul 17	Kwinana	Titanium tetrachloride	A worker was hospitalised after exposure to TiCl ₄ while carrying out preventative maintenance works.
18	22 Jul 17	North West	Flammable gas mixture	An air supply valve was damaged resulting in release of flammable gases.
19	30 Jul 17	Burrup	Ammonia, hydrogen and nitrogen	Gas leaked from a pipe flange during plant start-up.
20	22 Sep 17	Kwinana	Petrol	Approximately 90l of crude oil leaked from a jetty into the sea.
21	12 Oct 17	Kwinana	Titanium tetrachloride	A gland seal leaked on a pressure vessel.
22	19 Oct 17	Kwinana	Dilute caustic solution	A drain valve inadvertently opened causing dilute caustic solution to flow into a sewer leading to the wastewater treatment facility.
23	20 Oct 17	North West	Flammable gas	A nitrogen hosed ruptured resulting in a loss of flammable gas.
24	28 Nov 17	Kwinana	Sulphuric acid	Between 1,500l and 1,800l leaked into a bunded area. There were no injuries.
25	21 Dec 17	North West	Flammable gas	There was an unplanned release of flammable gas from a water disposal tank.

Statistical analysis of incident data for 2008–2017

The following table summarises storage and handling, and transport incident data for the 10-year period between 2008 and 2017. The data has been analysed to identify the proportion of incidents nominally caused by mechanical failure or human error, and whether there was loss of product, serious injuries or fatalities.

Of the 241 storage and handling incidents over this period, 39 per cent are assessed as being caused by mechanical or design failure and 47 per cent by human error. Unfortunately, in 2017, as well as some incidents resulting in minor injuries, one serious injury was sustained. However, over the 10-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 146 transport incidents, 32 per cent are assessed as being caused by mechanical or design failure and 56 per cent by human error. For the purposes of this analysis, incidents such as truck roll-overs were classified as due to human error on the assumption that the main cause of the incident was driver inattention, fatigue, excessive speed or a combination of these, although it should be noted that, in some cases, other vehicle drivers were at fault. Unfortunately, over the 10-year period, there has been one serious injury and three fatalities.

For storage and handling and transport incidents, there was a wide variety of mechanical failures involved that do not show any consistent pattern or trend requiring further investigation.

Further analysis of the transport data shows that 60 incidents (41%) involved double or triple road trains and most were roll-overs. In addition, several other incidents involved standard single-tanker and trailer vehicles. This reflects the extensive use of these vehicles for dangerous goods transport and the inherently greater risk of driving these vehicles, particularly where long distance transport is involved. The data suggests that dangerous goods transport companies need to focus on ensuring road train drivers do not speed and that they negotiate poor roads carefully. Vehicle drivers should be well trained and provided with adequate rest breaks to maintain their alertness. There were also a higher number of tyre, brake and wheel hub based incidents reported but root cause analysis did not identify any particular trend, however vehicle operators should concentrate efforts to reduce these type of incidents.

Storage and handling and transport incident data 2008–2017

	Total number	Assessed cause			Loss of product	Serious injury	Fatality
		Material or design failure	Human error	Other causes			
Storage and handling (number of incidents)	241	94	113	34	195	10	2
		39%	47%	14%	81%	4%	1%
Transport (number of incidents)	146	46	82	18	91	1	3
		32%	56%	12%	62%	1%	2%