



Government of **Western Australia**  
Department of **Mines and Petroleum**  
Resources Safety

## **Overview of dangerous goods reportable situations and incidents 2014**

**June 2015**

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## Overview of 2014 reportable situations and incidents

This report describes dangerous goods and explosives incidents that happened in 2014 and are required to be reported to the Resources Safety Division of the Department of Mines and Petroleum under the *Dangerous Goods Safety Act 2004* and associated regulations. The report also compares the 2014 incident data with comparable data collected since 1995 and provides some statistical analysis of incident data for that period.

The quantity of dangerous goods being stored, handled and transported across the State continues to increase with economic activity. 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.

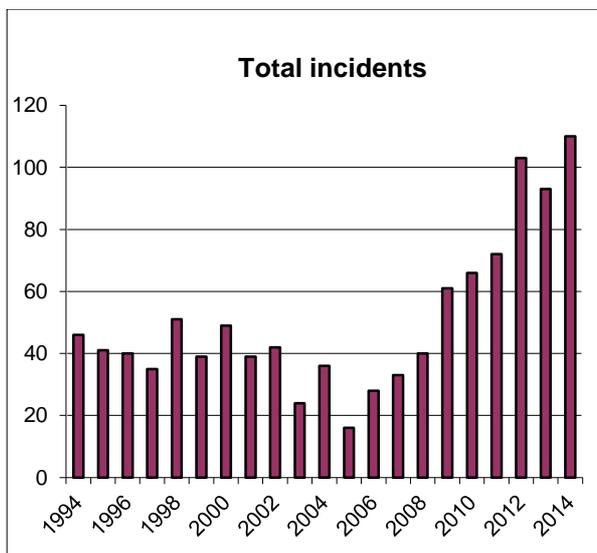
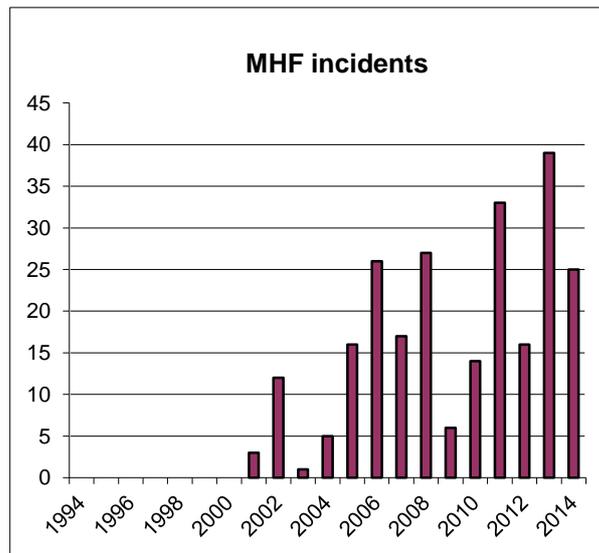
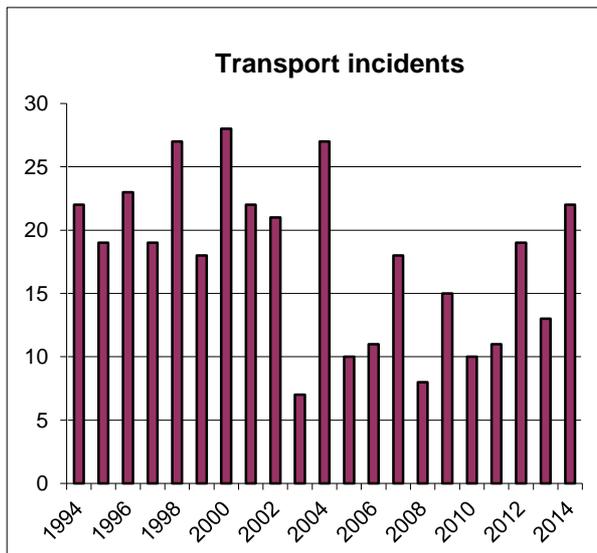
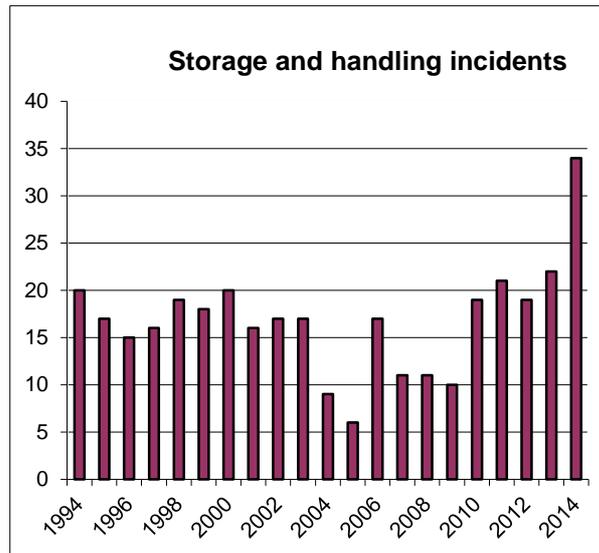
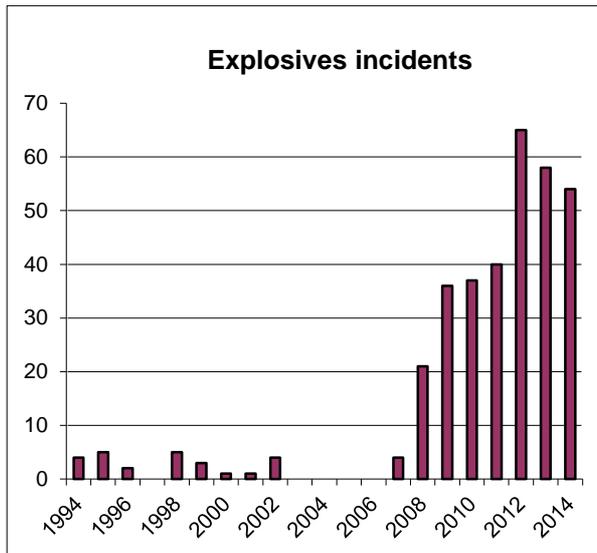
There were no fatalities in 2014. Several injuries received were serious but the majority were minor.

Ross Stidolph

**CHIEF DANGEROUS GOODS OFFICER**

8 June 2015

## Number of reportable situations and incidents for 1995–2014



## Explosives and security risk substance (SRS) reportable situations in 2014

There were 54 explosives and security risk substance (SRS) incidents reported to Resources Safety in 2014. Seven of these were only reported to the mines inspectorate, with the balance reported to the dangerous goods inspectorate.

The number of incidents reported for 2014 is slightly lower than for 2013.

The reports cover a wide range of incident types. The number of incidents involving losses of detonators, primers or boosters at mine sites is not as high as previously reported. However, mine site operators are expected to continue to improve their accounting and reconciliation processes to eliminate this problem. Other than this, there is no particular pattern to the incidents that would cause Resources Safety to undertake targeted education or enforcement actions.

None of the reported incidents resulted in a fatality, but some caused minor injuries as well as damage to mine equipment, vehicles and plant.

Serial	Date	Location	Goods	Incident details
1	03/01/14	Northern Goldfields	Explosives	Stock check revealed one cartridge of explosives was unaccounted for.
2	09/01/14	Pilbara	Explosives	A number of people remained inside the blast exclusion zone when the shot was fired.
3	11/01/14	Pilbara	Detonator Assembly	Reconciliation after a shot left one detonator assembly unaccounted for.
4	12/01/14	Kimberley	Detonator and booster	An unfired detonator and booster were found on a reclaimed stock pile.
5	16/01/14	Pilbara	Ammonium nitrate	The SRS compound was left unsecured. There was no loss of SRS.
6	26/01/14	Perth	Fireworks	A barge loaded with spent fireworks tubes and racks caught fire.
7	28/01/14	Goldfields	Primer	A vehicle operator discovered a primer wedged between the tub and the basket.
8	30/01/14	Pilbara	Explosives	A blast exclusion zone was cleared but not secured. Two employees re-entered the exclusion zone after the clearance.
9	30/01/14	Pilbara	Explosives	A shovel operator discovered ANFO and downlines on a dig face.
10	31/01/14	Kimberley	Booster	A mobile mixing unit (MMU) was driven over a booster.
11	04/02/14	Pilbara	Explosives	A shovel operator discovered an unfired downline and primer on a bench.

Serial	Date	Location	Goods	Incident details
12	19/02/14	Goldfields	Explosives	A shot was initiated from within the blast exclusion zone. Equipment was damaged by fly rock.
13	21/02/14	Kimberley	Detonator and booster	An unfired booster and detonator were discovered when working a face.
14	28/02/14	Pilbara	Explosives	Two personnel remained within the blast exclusion zone during a blast. There were no injuries.
15	01/03/14	Pilbara	Explosives	A dozer operator discovered an unfired booster and detonator and about 10 kg of unfired explosives when excavating a site.
16	05/03/14	Pilbara	Booster	An unfired booster was found in an excavator bucket.
17	09/03/14	South West	Primer	Following a reconciliation of blasting accessories, one primer could not be accounted for.
18	14/03/14	Kimberley	Explosives	A worker remained in a vehicle, inside the blast exclusion zone, when the shot was fired.
19	23/03/14	Pilbara	Primer	A loader operator discovered an unfired primer while excavating a shot.
20	29/03/14	Pilbara	Explosives	While loading on a bench, a mobile processing unit (MPU) was driven over a primed hole.
21	07/04/14	Northern Goldfields	Detonator	A detonator was discovered in a mine camp.
22	26/04/14	Pilbara	Explosives	An MPU was driven over the collar of a primed hole; material fell down the hole and trapped the booster.
23	12/05/14	Kimberley	Booster and ammonium nitrate	An excavator operator discovered an unfired booster and a quantity of ammonium nitrate while excavating a shot.
24	24/05/14	Northern Goldfields	Detonators	A magazine audit found that a number of detonators were unaccounted for.
25	27/05/14	Pilbara	Detonator and booster	An operator discovered an unfired fired detonator and booster while excavating waste material.
26	10/06/14	Northern Goldfields	Explosives	During firing, there was a breach of a blast exclusion zone.

Serial	Date	Location	Goods	Incident details
27	19/06/14	Pilbara	Explosives	An excavator operator discovered unfired explosives while digging a face.
28	20/06/14	Midwest	Explosives	A quantity of abandoned explosives was discovered. It was destroyed by contract disposal.
29	25/06/14	Pilbara	Explosives	An electrical fire on board a MPU, originated from the battery isolation cover.
30	09/07/14	Pilbara	Booster	A booster was unaccounted for after loading a pattern.
31	04/08/14	Pilbara	Detonator and booster	A detonator and booster were discovered prior to firing shot.
32	06/08/14	Pilbara	Explosives	While conducting a periodic inspection of a magazine, cigarette butts were found within 3 m of the magazine.
33	07/08/14	Pilbara	Detonator and booster	During priming operations, a detonator and booster were unaccounted for.
34	30/08/14	Pilbara	ANFO	When excavating a shot, a digger operator discovered a quantity of unfired ANFO.
35	31/08/14	Midwest	Explosives	Ten minutes after detonation of a production blast, while the shot firer was conducting the post blast inspection, a further single charge initiated.
36	03/09/14	Pilbara	Primer	While clearing broken stock, an excavator operator discovered an unfired booster.
37	12/09/14	Pilbara	Primer	A dozer operator discovered an unfired primer while pushing a waste dump.
38	19/09/14	Northern Goldfields	Detonator	During service work, a misfired detonator was found behind the console of a jumbo.
39	20/09/14	Pilbara	ANFO	When excavating a shot, a loader operator discovered a quantity of unfired ANFO.
40	26/09/14	The Pilbara	ANFO	A column of about 40 kg of unfired ANFO was discovered by an excavator operator at the dig face.
41	28/09/14	The Pilbara	Primer	A digger operator discovered an unfired primer while clearing broken stock.
42	01/10/14	Pilbara	Detonator	A detonator was unaccounted for during a shot reconciliation.

Serial	Date	Location	Goods	Incident details
43	01/10/14	Pilbara	Detonator	A discrepancy was identified during a stocktake of detonators.
44	11/10/14	South West	Detonator	While walking the blast pattern, prior to blasting, the shot firer discovered a non-electric detonator in drill cuttings.
45	22/10/14	Pilbara	Explosives	The door to an explosives magazine was left unlocked when unattended.
46	07/11/14	Pilbara	Detonator	A detonator was unaccounted for after a shot.
47	11/11/14	Pilbara	Explosives	An MPU reversed over a downline.
48	23/11/14	Pilbara	Ammonium nitrate	Unauthorised personnel had access to the ammonium nitrate storage facility.
49	02/12/14	Northern Goldfields	Explosives	A factory sealed box of explosives was found to be one charge short of the marked quantity.
50	06/12/14	Kimberley	Detonator	Following an audit, one detonator remained unaccounted for.
51	14/12/14	Pilbara	Detonator	Following a stock check, three detonators were unaccounted for.
52	19/12/14	Pilbara	ANFO	When clearing a face, an excavator operator discovered a quantity of unfired ANFO.
53	31/12/14	Pilbara	Booster	Following a blast, a booster remained unaccounted for.
54	11/12/14	Northern Goldfields	Booster	A factory-sealed box of explosives was found to be one charge short of the marked quantity.

## Dangerous goods storage and handling reportable situations in 2014

There were 34 reported dangerous goods storage and handling incidents in 2014, an increase on the previous year. There was no general pattern or trends identified with the incidents, with causes ranging from mechanical equipment failure to human error. That said, there were a higher number of incidents involving ammonia and chlorine; Resources Safety will be targeting these industries in the coming reporting period.

Three operations within the State are particularly prone to loss of containment and these operations reported a further 130 spill incidents that involved 1 kL or more; all losses bar one, were contained on-site. Before March 2008, such incidents had not been considered or reported as dangerous goods incidents. The 2014 figure is lower than that reported in 2013 (212). A range of preventative actions are being undertaken to reduce the likelihood of recurrence.

Serial	Date	Location	Goods	Incident details
1	06/01/14	Huntly	Diesel	About 1.6 kL of product was lost into a bunded area.
2	12/01/14	Canning Vale	Polyester resin	There was a fire at a site that held dangerous goods. There were no injuries.
3	17/01/14	Welshpool	Ammonium bisulphite	An intermediate bulk container (IBC) of solution decomposed exothermically.
4	20/01/14	Welshpool	Ammonium bisulphite	Two drums of solution decomposed exothermically.
5	29/01/14	Worsley	Corrosive liquid	There was an uncontrolled release of corrosive liquid when a maintenance activity was left unattended.
6	30/01/14	Canning Vale	Anhydrous ammonia	About 1,000 L of gas were lost when a pipe failed on a roof top ventilator. There were no injuries.
7	30/01/14	Williams	Hypochlorite solution	A dosing line split causing solution to leak.
8	22/03/14	Pilbara	Ammonium nitrate (AN) and ammonium nitrate emulsion (ANE)	A MPU rolled over, spilling about 300 kg of AN and 2,000 kg of ANE. There were no injuries.
9	23/03/14	Henderson	Flammable liquids	There was a fire involving paint stored in a 250 L store.
10	8/04/14	Kwinana	Aluminium phosphide	Two containers of aluminium phosphide were reported stolen.
11	27/04/14	Malaga	Solid caustic soda	There was a fire in a storage location containing dangerous goods.
12	03/05/14	Balcatta	Calcium hypochlorite	There was a fire at premises holding various dangerous goods. There were no injuries.

Serial	Date	Location	Goods	Incident details
13	06/05/14	Davenport	Anhydrous ammonia	Between 300 and 1,000 L of liquid ammonia spilled at a meat processing factory.
14	14/05/14	Newman	Chlorine gas	A gas leak resulted from a cracked regulator.
15	21/05/14	Exmouth	LP gas	There was a gas leak at a service station
16	10/07/14	Rockingham	LP gas	Three cylinders were damaged and gas leaked when a car crashed into a cage of cylinders at a service station.
17	12/07/14	O'Connor	LP gas	A cylinder leaked while being filled at a service station.
18	21/08/14	Kwinana	Anhydrous ammonia	An LPG cylinder was suspected of being filled with ammonia gas. The cylinder was vented appropriately.
19	21/08/14	Perth	Chlorine	Chlorine gas was released out of schedule from the treatment plant at a leisure centre.
20	08/09/14	Middle Swan	LP gas	A gas cylinder leaked at a service station.
21	25/09/14	Claremont	Chlorine gas	Chlorine leak leaked (out of hours) at a leisure centre.
22	14/10/14	Karrinyup	Liquefied natural gas	A burst disc ruptured on a cylinder releasing about 1.9 ML methane.
23	15/10/14	Crawley	Picric acid	A jar of dry picric acid was found during the clean out of a laboratory. WA Police Bomb Response Unit dealt with the item on site.
24	16/10/14	Crawley	Diisopropyl ether	A bottle of diisopropyl ether, containing the solvent with a layer of solid material, was found. WA Police Bomb Response Unit dealt with the item.
25	16/10/14	Welshpool	Various chemicals	A fire started in machinery during the manufacture of fibreglass products.
26	20/10/14	Crawley	Dinitrophenol	A jar of dry dinitrophenol was found during clean out of a laboratory. There was no damage or injuries. The package was disposed of off-site.
27	03/11/14	Bentley	Hydrogen peroxide and peroxyacetic acid mixture	Acid leaked from the bottom valve of a 1,000 L IBC. The acid was contained in the bunded area.
28	24/11/14	Great Victoria Desert	Cyanide and caustic solution	There were no injuries or environmental damage from a spill during a routine cleaning operation.

Serial	Date	Location	Goods	Incident details
29	26/11/14	Great Victoria Desert	Diesel	8,000 L of diesel leaked from a supply truck tank compartment.
30	26/11/14	Claremont	Chlorine gas	Chlorine leaked from the plant room at a leisure complex.
31	28/11/14	Welshpool	Anhydrous ammonia	Ammonia leaked from a faulty valve on a storage tank.
32	05/12/14	Great Victoria Desert	Cyanide solution	Solution escaped from cyanide dosing pipework into containment. There were no injuries.
33	11/12/14	Hazelmere	Anhydrous ammonia	During chiller maintenance a scissor lift damaged a valve, releasing ammonia. A worker was injured and received hospital treatment.
34	20/12/14	Carlisle	Petrol	A man was splashed with petrol while refuelling. He then lit a cigarette, igniting the vapour, and suffered burns.

## Dangerous goods transport reportable situations in 2014

Twenty-two dangerous goods transport incidents were reported in 2014. This is an increase on the 2013 figure of 13. Resources Safety had an active safety campaign during 2014 and believes the increase in reported situations is as a result of reminding transport companies of the regulatory requirement to report incidents so that trends can be identified and rectified.

About half of the reported incidents can be attributed to human error, with no dangerous goods loads being the causal factor in any incident.

Serial	Date	Location	Goods	Incident details
1	20/01/14	Perth	Polyester resin	An IBC was damaged in transit and leaked product on to the road.
2	20/01/14	Sandstone	Diesel	The rear trailer of a triple road train overturned with the loss of approximately 30 kL of product.
3	22/01/14	Madura	Explosives	A B-double vehicle carrying explosives caught fire whilst parked in a truck parking bay. The fire was quickly extinguished. There were no injuries.
4	24/01/14	Kalgoorlie	Anhydrous ammonia	Three rail tankers were halted in Kalgoorlie due to heavy rain flooding storage sidings.
5	29/01/14	Perth	Bipyridylium pesticide	Pesticide leaked from a shipping container while in transit between the port and distribution centre.
6	01/02/14	Cue	Ammonium nitrate	A triple road train rolled over, spilling 35 tonnes of ammonium nitrate on the road.
7	03/02/14	Mt Magnet	LP gas	Product was lost when a pressure relief valve on an LP gas tanker failed.
8	03/02/14	Dardanup	Diesel	A diesel tanker rolled, resulting in the loss of about 4,000 L of product.
9	30/03/14	Newman	Diesel	After a diesel tanker driver passed out, the vehicle continued through 500 m of bush and came to rest in a 2 m deep river. There were no injuries or loss of product.
10	01/04/14	Wubin	Ammonium nitrate	A fibre IBC split and about 50 kg of product was lost.
11	06/04/14	Eucla	Various dangerous goods	A road train caught fire after leaving the road and crashing into the bush. The driver fled the scene.
12	03/05/14	Katanning	Diesel	The rear trailer of a combination rolled, resulting in significant diesel spillage.

Serial	Date	Location	Goods	Incident details
13	12/06/14	Port Hedland	Ammonium nitrate	A securing strap came loose and wound around the vehicle axle, causing an ammonium nitrate bag to split and lose product.
14	16/07/14	Roebourne	Liquefied natural gas	While conducting a safety check on his vehicle, the driver detected a leaking valve.
15	21/07/14	Sandstone	Ammonium nitrate emulsion	A vehicle overturned following a tyre blow out. There were no injuries or loss of product.
16	15/08/14	Fitzroy Crossing	Aviation fuel	The rear tanker of a combination vehicle overturned on the Great Northern Highway. Jet A1 fuel leaked onto the road. There were no injuries or fire.
17	21/08/14	Perth	Flammable gas	A vehicle carrying flammable gas containers caught fire.
18	21/08/14	Port Hedland	Flammable gas	A truck driver called 000 after he saw a tanker leaking gas. Extensive searches by WA Police failed to locate the vehicle.
19	14/09/14	Broome	Liquefied natural gas	A triple road train was struck head-on by a 4WD vehicle. The wheels and side of the second trailer were damaged. There was no loss of product.
20	15/10/14	Midwest	Ammonium nitrate	The third trailer of road train rolled over, spilling 18 tonnes of ammonium nitrate on the road.
21	24/10/14	Northern Goldfields	Sodium cyanide	A sparge tanker dissolution pump malfunctioned, resulting in liquid sodium cyanide being transported back from a mine site to Kwinana.
22	28/11/14	Great Southern	Corrosive liquid	A double road train carrying hay and one IBC of corrosive liquid caught fire. There were no injuries.

## Major hazard facility reportable situations in 2014

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

There were 25 reportable incidents in 2014, compared with 39 in 2013. All incidents were minor in nature and some workers received minor injuries.

Serial	Date	Location	Goods	Incident details
1	11/01/14	Kwinana	Sulphuric acid	A spool failed during routine inspection. About 4,360 L of acid spilled. All was recovered and neutralised.
2	22/01/14	Bunbury	Sodium hypochlorite	A tanker loading hose failed, leading to release of substance within bunded area.
3	06/02/14	Pilbara	Flammable gas	A small flame was observed at a leaking bleed and drain valve. It was extinguished by closing the valve.
4	22/02/14	Kwinana	Chlorine gas	Gas was released during the purging and shutting down of a section of plant.
5	07/03/14	Kwinana	Sulphur	A tank was overfilled and 4 t of product was lost.
6	24/03/14	Kwinana	Chlorine gas	Gas was released during the purging and shutting down of a section of plant.
7	11/04/14	Kemerton	Hydrochloric acid	Acid overflowed from a tank to a process sump. The loss was neutralised.
8	19/04/14	Kwinana	Sodium hypochlorite	Sodium hypochlorite spilled into a bunded area during tanker transfer.
9	23/04/14	Karratha	Methane	A gasket failed on an outlet valve resulting in a loss of gas.
10	13/05/14	Kwinana	Hydrocarbon	A hydrocarbon fire in machinery resulted in minor damage to the equipment. There were no injuries.
11	20/05/14	Kwinana	Ammonium nitrate	Ammonium nitrate prill spilled during loading of a truck. Five tonnes of the prill was disposed of.
12	18/06/14	Kemerton	Hydrochloric acid	A tank's high level sensor failed and acid overflowed from the tank into process sump, where the acid was neutralised.
13	18/07/14	Kwinana	Petrol	During maintenance activities, more than 1 kL of petrol leaked from pipework into a bunded area.

Serial	Date	Location	Goods	Incident details
14	13/08/14	Kwinana	Flammable gas	Unignited flammable gas was released from a flare due to extinguished pilot lights.
15	13/08/14	Pilbara	Anhydrous ammonia	Workers were exposed to ammonia vapour while performing maintenance work. There were no injuries but one worker was admitted to hospital for observation.
16	13/08/14	Kwinana	Caustic waste	A worker suffered chemical burns from caustic waste exposure.
17	19/08/14	Pilbara	Anhydrous ammonia	A worker was exposed to ammonia vapour while conducting an isolation test. No injury or illness was reported.
18	10/09/14	Kwinana	Chlorine	Chlorine gas was released from a process scrubbing system to atmosphere. No-one onsite or offsite was affected by the release.
19	27/09/14	Pilbara	Anhydrous ammonia	During plant start-up activities, flammable gas and aqueous ammonia was released. An operator was splashed with liquid but not injured.
20	29/09/14	Pilbara	Anhydrous ammonia	Workers on an adjoining site complained of ammonia-like odours. The workers were admitted to hospital for observation.
21	23/10/14	Kwinana	Crude oil	Pipework failure resulted in crude oil draining into a bunded area.
22	07/11/14	Kwinana	Hydrogen	Hydrogen exploded in a boiler. There were no injuries.
23	26/11/14	Northern Goldfields	Hydrogen	Hydrogen ignited after being released from a pressure relief valve. There were no injuries.
24	09/12/14	Pilbara	Chlorine	During installation work, residual gas within a pipe was released. There were no injuries.
25	18/12/14	Kwinana	Flammable gas	Gas was ignited when a gas cylinder valve was disconnected. No injuries resulted.

## Statistical analysis of incident data for 2005–2014

The following table summarises storage and handling and transport incident data for the 10 year period between 2005 and 2014. The data have 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 165 *storage and handling incidents* over this period, 38 per cent are assessed as being caused by mechanical or design failure and 49 per cent through human error. Unfortunately, in 2014, as well as some incidents resulting in minor injuries, there was a serious injury. However, over the 10-year period, the incidence rate for serious injuries and fatalities has remained low.

Of the 125 *transport incidents*, 32 per cent are assessed as being caused by mechanical or design failure and 59 per cent through 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. It should be noted that, in some cases, other vehicle drivers were at fault. Unfortunately, over the 10-year period, there have been four seriously injured and five fatalities.

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

Further analysis of the transport data showed that 56 incidents (38%) involved double or triple road trains and most were roll-overs. In addition, several other incidents involved standard single-tanker vehicles. This is indicative of 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 suggest that dangerous goods transport companies need to focus on ensuring road train drivers do not speed and that they negotiate poor roads more carefully. Vehicle drivers should be well trained and provided with adequate rest breaks to maintain their alertness.

### Storage and handling and transport incident data 2005–2014

	Total number	Assessed cause			Loss of product	Serious injury	Fatality
		Material or design failure	Human error	Other causes			
Storage and handling (number of incidents)	165	62	82	21	124	10	2
		38%	49%	13%	75%	6%	1%
Transport (number of incidents)	125	46	86	14	96	4	5
		32%	59%	9%	77%	3%	4%