



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

Overview of dangerous goods incident reports 2008

March 2009

Level 1, 303 Sevenoaks Street (cnr Grose Ave), Cannington WA 6107
Postal address: Mineral House, 100 Plain Street, East Perth WA 6004
Telephone: (08) 9358 8002 Facsimile: (08) 9358 8000
ResourcesSafety@dmp.wa.gov.au
www.dmp.wa.gov.au wa.gov.au

Contents

Overview of 2008 incident reports 3

Number of dangerous goods incidents for 1991–2008..... 4

Explosives incidents in 2008 5

Dangerous goods storage and handling incidents in 2008..... 8

Dangerous goods transport incidents in 2008 10

Major hazard facility incident reports in 2008 11

Statistical analysis of incident data for 2001–2008..... 14

Overview of 2008 incident reports

This report describes dangerous goods and explosives incidents that occurred in 2008. The report also compares the 2008 incident data with comparable data collected since 1991, and provides some statistical analysis of incident data for 2001 to 2008.

Looking at nearly 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 suspected that the actual number incidents is greater than the number reported, so year-to-year variations should not be over-interpreted. This is particularly true for explosives incidents, which are concentrated on mine sites and have been mostly reported to the mines inspectorate, Resources Safety. For example, 109 explosives incidents were reported to the mines inspectorate from 2001 to 2005, while only six incidents were reported to the Chief Dangerous Goods Officer during that time.

The MHF incidents numbers increased dramatically in the period 2005–08. This is attributed to greater awareness among operators about reporting obligations, rather than a significant increase in the number of incidents.

The *Dangerous Goods Safety Act 2004* and associated regulations came into force on 1 March 2008. Awareness-raising about the reporting obligations under this Act has resulted in a significant increase in the number of reported incidents for explosives and for three particular dangerous goods sites. The latter data are reported separately as their inclusion would significantly distort the analysis of long-term trends.

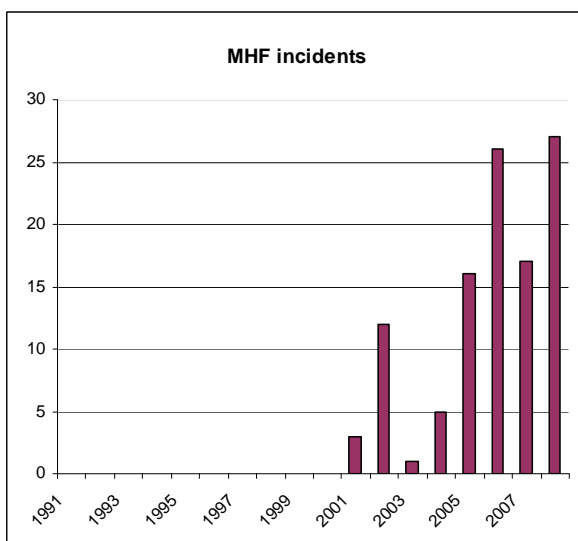
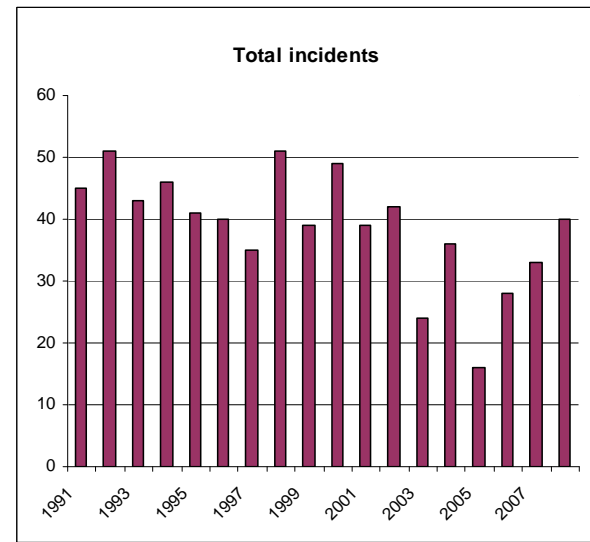
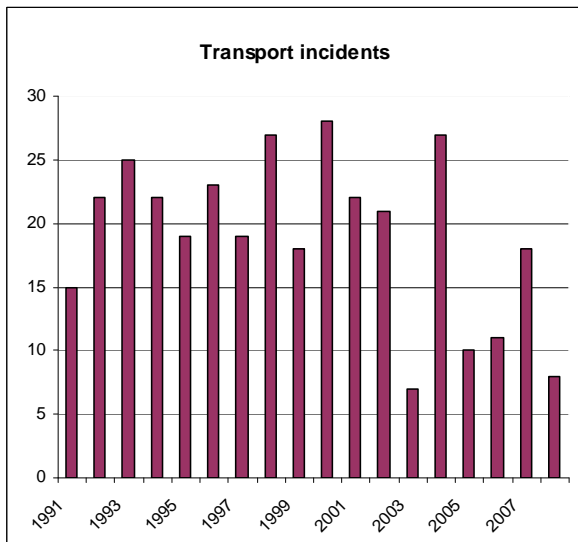
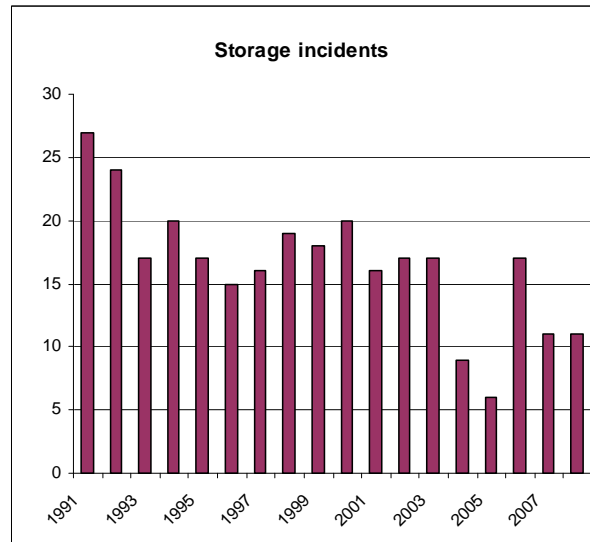
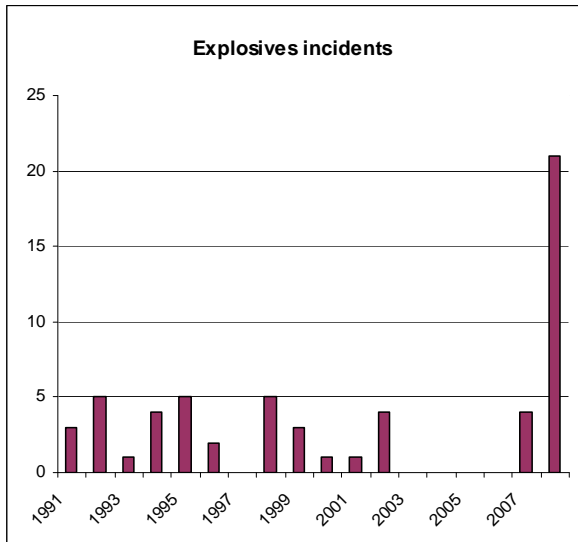
While there were some serious injuries, there were no fatalities as a result of a dangerous goods incident in 2008.

Malcolm P Russell

CHIEF DANGEROUS GOODS OFFICER

3 March 2009

Number of dangerous goods incidents for 1991–2008



Explosives incidents in 2008

There were 21 explosives incidents reported to Resources Safety in 2008. Nine were reported directly to the Chief Officer. A further 12 incidents were reported to the mines inspectorate and were incidents reportable under the *Dangerous Goods Safety Act 2004*.

The number of incidents was much higher than in previous years, and this is mostly attributed to greater awareness in industry to report all incidents, including near-misses. The reports cover a wide range of incident types with no obvious pattern or cause for Resources Safety to undertake any targeted education campaign.

Fortunately, none of the reported incidents involved any injuries or fatalities.

Date	Location	Goods	Incident details
26/01/08	SWAN RIVER	Fireworks	A small fire occurred on one of the pontoons towards the end of the Australia Day fireworks display. The fire was put out quickly by the fire patrol boat. The cause of the fire was undetermined.
19/02/08	WAROONA	Explosive	A worker failed to tag-in at an independent underground tag-board. The shotfirer initiated the shot believing the area had been cleared. The worker was far enough away from the shot to avoid injury.
5/04/08	KALAMUNDA	Fireworks	A firework was found in a public rubbish bin. It was an unexploded 10 mm diameter 8-shot Roman candle and was still capable of being fired. The fireworks operator was advised to clean up after displays and dispose of any unfired fireworks properly.
09/04/08	MINE SITE	Emulsion explosive	A small amount of emulsion explosives was found in a crib hut. The area was isolated and an explosives contractor called in to remove the explosive.
15/04/08	BODDINGTON	Explosive	Flyrock fell outside the exclusion zone causing workers to take cover. There were no injuries.
28/04/08	WHIM CREEK	Waterget explosive	One-third of a surface pattern that was loaded with a different delivery of bulk explosives failed to initiate. A faulty batch is suspected.
14/05/08	MOUNT IDA	Blast gas emission	A worker was exposed to post-blast gases due to failure of tag-in procedures. There were no injuries but a worker was sent to hospital for observation.
15/6/08	MINE SITE	Sulfide dust	A planned shot initiated a sulfide dust explosion. This caused minor damage to ventilation ducting and produced noise and fumes. There were no injuries.

Date	Location	Goods	Incident details
24/06/08	COLLIE	Explosive	The practice of adding diesel to a proprietary explosive has stopped as it can cause deflagration.
13/07/08	KARRATHA	Explosive	Considerable flyrock landed in a neighbouring premises. There were no injuries but some property damage. The drilling pattern was altered to avoid a repeat.
3/08/08	HIGGINSVILLE	ANFO	Loading of stope upholes with ANFO resulted in 100–300 kg of spillage, which detonated sympathetically with the main shot causing an unexpected air-blast.
08/08/08	RAVENSTHORPE	Explosive	A misfire occurred while initiating a blast using a remote firing system. The likely cause was a small particle of grit or moisture in the aperture of the signal tube diverting the spark from the exploder. Practices have been changed to reduce the likelihood of grit getting into the firing device.
26/08/08	YANDICOOGINA	Ammonium nitrate	An mobile processing unit (MPU) vehicle entered the blast shot, drove into a hole and rolled onto its side, spilling about 100 kg of ANFO. No-one was injured but there was minor damage to the vehicle. The company has now ceased scalloping the pit floor to create a windrow.
26/09/08	MINE SITE	Explosive cord	A bulldozer operator accidentally initiated misfired cord with the dozer blade on a waste dump. There were no injuries.
11/10/08	TELFER	Explosive	Fumes were noticed coming from a blast hole. An exclusion zone was enforced and the shot was fired without further incident.
27/10/08	MINE SITE	Explosive	A rock breaker operator noticed a minor flash and explosion when a jaw crusher accidentally initiated misfired explosives. There were no injuries.
31/10/08	MINE SITE	Blast box	A shotfirer received a minor electric shock from an unearthed blast box.
11/11/08	COCKATOO ISLAND	Primer	An excavator accidentally initiated a misfired primer. Flyrock travelled 40 m and an incoming truck received minor chips to the windscreen. There were no injuries.

Date	Location	Goods	Incident details
19/11/08	NEWMAN	Explosive	A water truck drove through a demarcation signage and cones onto a loaded shot. The truck was stopped by a shotfirer and diverted from the blast area. The company will now establish windrows around all blast patterns prior to any explosives or blasting agents being used.
05/12/08	YANDICOOGINA	Explosives and boosters	While charging a blast pattern, some detonators and boosters were left on the shot. All were recovered and disposed of in a blast the following day. The company will provide retraining for all personnel and develop an audit schedule to ensure controls are effective.
17/12/08	NEWMAN	Detonator lead	A downhole lead caught on a ANFO delivery auger outlet funnel during loading operations.

Dangerous goods storage and handling incidents in 2008

The number of reported dangerous goods storage and handling incidents in 2008 (11) was relatively low compared with the annual average for the last 20 years (17) and thus interpretation of the data was difficult.

Four of the incidents apparently resulted from human error, while five apparently resulted from mechanical failure, but there were no recurring themes in the accidents.

Unfortunately, two of the storage and handling incidents resulted in injury, one severe.

As well as those listed below, a further 325 spill incidents (involving 1 kL or more) were reported for the period 1 March to 31 December 2008 for three operations that are particularly prone to losses of containment. These had not been previously considered or reported as dangerous goods incidents.

Date	Location	Goods	Incident details
04/02/08	GREAT SANDY DESERT	Sulfuric acid	A valve failure on a sulfuric acid storage tank resulted in a 5 kL spill into a bunded area.
24/02/08	PORT HEDLAND	Sodium hydroxide solution	A paint blister caused a pinhole leak on a tank.
14/04/08	KWINANA	Calcium hypochlorite	There was a fire at a bulk liquid storage facility when calcium hypochlorite (20 kg) reacted with oily water, generating sufficient heat to start the fire.
10/04/08	KWINANA	Diesel fuel	20 kL of diesel spilled into a sealed bund.
10/05/08	KWINANA	Diesel fuel	Two drain valves on a diesel storage tank were partially opened, releasing about 20 kL into a bunded area. About 5 kL escaped into a second bunded area. Vandalism is suspected.
25/05/08	WANNEROO	Petrol	A driver was distracted while transferring petrol from a 60 L drum into the fuel tank of his car using a 12 V electric fuel pump, and fuel spilled out of the tank and onto the carport. A citronella lamp burning a few metres from the filling point ignited the petrol. The car was burnt out, and two adjacent cars and a bedroom adjacent to the carport were damaged. The man received first degree burns to his right hand and head, and was admitted to hospital.
31/05/08	COLLIE	Diesel fuel	A truck drove away with the hose attached while refuelling, causing a spill of 8.4 kL of diesel. All except 50 L was caught in secondary containment. The spilt diesel was removed to a waste recycling facility.
02/06/08	TOM PRICE	LP gas	Gas escaped from a loose valve on a storage tank. The emergency stop was activated to stop the leak.

Date	Location	Goods	Incident details
26/06/08	PINJARRA	Sodium hydroxide	Faulty wiring in a backup power system led to a partial power failure, which resulted in a spill of about 140 kL of solution.
3/10/08	COLLIE	Coal, LP gas, oxygen, nitrogen, coal gases	An explosion at a trial coal carbonising plant caused severe damage to the plant and severe burns to the operator.
13/11/08	WAROONA	Caustic wash liquor	A significant volume of caustic wash flowed out of containment following a tank overflow and sump pump failure.

Dangerous goods transport incidents in 2008

There were eight reported dangerous goods transport incidents in 2008, which is much lower than the annual average of 19 for the last 20 years. Given the significant increase in the amount of dangerous goods being transported over this time, this is a good result. Similarly, the number of accidents involving dangerous goods vehicles is below the average for heavy goods vehicles generally.

Most of the reported incidents can be attributed largely to human error, with most being traffic accidents involving dangerous goods, rather than the dangerous goods causing the incident.

Fortunately, no serious injuries or fatalities resulted from these incidents.

Date	Location	Goods	Incident details
15/03/08	HALLS CREEK	Corrosive liquid	A triple road train rolled over. The first two trailers carried 200 L drums of corrosives and the third trailer had bulk acid. Only the drums of corrosive leaked and required clean up.
27/03/08	BURRUP PENINSULA	Sodium hydroxide solution	The rollover valve of a tanker vehicle failed in transit, spilling 100–200 L of corrosive liquid onto the driveway of a chemical manufacturing plant.
21/05/08	GREAT NORTHERN HIGHWAY	Methanol	Methanol leaked onto a vehicle when a metal 1.5 kL intermediate bulk container (IBC) split. The IBC was stored in a temporary bund and its contents decanted into another IBC.
10/06/08	MUCHEA	Methanol	A leaking metal 1.5 kL IBC of methanol was observed at a transport driver's residence.
08/07/08	WYNDHAM	Ammonium nitrate	While travelling through road works the wheels of a triple road train hit the curb, causing the rear tipper to roll over and lose solid ammonium nitrate.
13/08/08	WELSHPOOL	Corrosive liquid (4% hydrofluoric acid and 20% sulphuric acid mixture)	An IBC, consisting of a rigid plastic inner receptacle and an outer metal mesh frame, cracked as it was being transported, leaking about 800 L of acid onto the road.
16/08/08	CATABY	Crude oil	A collision between a utility vehicle and a road train caused the rear tanker of the road train to rollover, spilling about 40 kL of product.
22/12/08	PORT HEDLAND	Diesel fuel	A rear tanker rolled over while negotiating an intersection, spilling about 2 kL of diesel.

Major hazard facility incident reports in 2008

A critical point about major hazard Facility incident reports is that they are a combination of reports of incidents that involve injury or damage, incidents that did not, and near misses.

The number of MHF incident reports in 2008 (27) was higher than in 2007 (17) but comparable to 2006 (26). It is suspected that there is considerable under-reporting of incidents from some MHFs and therefore no firm conclusions can be drawn from the incident data, except that very few incidents result in injury and there were no serious injuries or fatalities at MHFs during 2008.

The data for 2008 were dominated by a large number of incidents (11) at one facility. Resources Safety has been working closely with the company concerned in an attempt to address its problems.

Date	Location	Goods	Incident details
7/01/08	CHEMICAL MANUFACTURER, KWINANA	Sodium hydroxide	Sodium hydroxide sprayed into the eyes of an employee who was repairing a pump.
2/01/08	GAS PLANT, KARRATHA	LNG	The main electrical substation tripped, resulting in total shut down of the facility. This was followed by depressurisation and flaring of process units.
14/01/08	CHEMICAL MANUFACTURER, KWINANA	Sodium hydrosulphide	A batch of imported sodium hydrosulphide experienced self heating as was immediately isolated as a precautionary measure.
6/02/08	AMMONIA MANUFACTURER, KARRATHA	Anhydrous ammonia vapour	About 800 kg of ammonia was released from a faulty pressure relief valve on an ammonia storage tank. There were no injuries, but ammonia was reportedly detected by construction workers 2 km downwind.
12/02/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Chlorine was released due to inadequate purging.
14/02/08	FERTILISER MANUFACTURER, KWINANA	Chlorine	Chlorine was released from a 1 tonne drum of chlorine through a loose valve gland.
7/03/08	FERTILISER MANUFACTURER, KWINANA	Ammonium nitrate	The AN bulk store had a dangerously high product face due to operator error.
28/03/08	GAS PLANT KARRATHA	Electrical	An electrical fault within the harmonic filters unit resulted in shutdown of three LNG trains.
8/04/08	FERTILISER MANUFACTURER, KWINANA	Cyanide, ammonia	Cyanide and ammonia were released from a waste gas duct.
11/04/08	FUEL TERMINAL, KWINANA	Petrol	About 200 L of petrol was lost in the vapour recovery area from an atmospheric vent.

Date	Location	Goods	Incident details
18/05/08	FERTILISER MANUFACTURER, KWINANA	Sulfuric acid	About 1 kL of sulfuric acid spilled when a tank was overfilled.
13/05/08	FERTILISER MANUFACTURER, KWINANA	Ammonia	There was a controlled release to seawater of about 0.5 tonnes of ammonia from a surge drum on the ammonia unloading system after the surge drum level tripped.
28/05/08	GAS PLANT, KARRATHA	LNG	Gas was released during servicing of a valve during maintenance.
9/05/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Failure of distributed control system (DCS) logic led to release of chlorine gas.
18/06/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Corrosion in a pipeline led to release of chlorine gas.
19/06/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Chlorine gas leaked due to improper valve installation.
16/07/08	PIGMENT MANUFACTURER, KWINANA	Titanium tetrachloride	Improper shut down process led to release of titanium tetrachloride.
16/07/08	PIGMENT MANUFACTURER, KWINANA	Titanium tetrachloride	Valve failure led to release of titanium tetrachloride.
19/07/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Chlorine was released due to mixing of incompatible chemicals.
18/09/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Chlorine gas leaked due to insufficient scrubbing.
18/09/08	PIGMENT MANUFACTURER, KWINANA	Unknown process gas	A process upset resulted in leak of process gas.
18/09/08	FERTILISER MANUFACTURER, KWINANA	Sodium cyanide solution	100 L of sodium cyanide solution leaked in a bund, and 1 L sprayed outside the bund from a failed weld on replacement pipework.
22/10/08	CHLORINE MANUFACTURER, KEMERTON	Sodium hypochlorite	Loss of containment of sodium hypochlorite following vehicle collision with a pipeline rack.
28/11/08	OIL REFINERY, KWINANA	Fuel oil	Fuel oil leaked from a corroded pipeline within the tank farm.

Date	Location	Goods	Incident details
3/12/08	PIGMENT MANUFACTURER, KWINANA	Chlorine vapour	Fire in a pre-treatment sump resulted in the burning of a fibreglass pipe and release of chlorine vapour.
19/12/08	FERTILISER PLANT, KWINANA	Ammonium nitrate	3 t of ammonium nitrate spilled from the tailgate of a truck onto internal road as the truck pulled away from the loading bay.
26/12/08	PIGMENT MANUFACTURER, KWINANA	Chlorine	Chlorine gas leaked through a hole in a demister.

Statistical analysis of incident data for 2001–2008

The following table summarises storage and handling and transport incident data for the period 2001 to 2008. The data have been analysed to identify the proportion of incidents nominally caused by mechanical failure or human error, and determine whether there was loss of product involved, serious injuries or fatalities.

Of the 100 *storage and handling incidents*, 51% were caused by mechanical or design failure and 43% by human error. Fortunately, there were only two serious injuries and no fatalities during the eight-year period, although one injury occurred in 2008.

Of the 124 *transport incidents*, 36% were caused by mechanical or design failure and 58% by human error. For the purposes of this analysis, incidents such as truck roll-overs were classified as being due to human error on the assumption that the main cause was driver inattention, excessive speed or both, although it should be noted that, in some cases, other drivers were at fault. Over the period, unfortunately, there were four incidents resulting in serious injuries and three involving fatalities. There were no serious injuries or fatalities during 2008.

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

Further analysis of the transport data showed that 42 (34%) incidents 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 pay more attention to ensuring road trains do not speed, and drivers are well trained and provided with adequate rest breaks to optimise their alertness.

Storage and handling and transport incident data 2001–2008

	Total number	Material or design failure	Human error	Loss of product	Serious injury	Fatality
Storage and handling (number of incidents)	100	51	43	71	2	0
		51%	43%	71%	2%	0%
Transport (number of incidents)	125	45	73	95	4	3
		36%	58%	76%	3%	2%