

Appendix 11.5.6

Results of Incident Review

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Summary of Incidents related to LPG station incidents

Year	Location	Material	Injuries	Death	Description
1955	USA	LPG	0	2	1.5inch LPG pipe broken at service station at 0530 by truck. Vapour cloud spread over adjacent highway and into paint shop. Ignited by passing truck.
1959	USA	LPG	10	11	8555gall stationary LPG tanker struck by vehicle. Escaping gas ignited and flames enveloped rear of tanker. After 45mins tank exploded throwing debris 900ft. 11 spectators killed, 10 injured. Foliage burned by radiant heat up to 500ft away.
1978	Netherlands	LPG	0	0	Tanker with full load of LPG exploded at filling station shortly after fire started underneath tanker during unloading. Fire burned 3minutes before BLEVE which destroyed tanker/station. Radiant heat intensity estimated at 180kw/m ² .
1998	South Korea	LPG	55	0	55 injured in explosion at LPG filling station in the middle of an industrial complex. Three were in critical condition from serious burn injuries. Windows near site of explosion were shattered and dozens of cars in the area were destroyed.
1998	South Korea	LPG	55	0	There was an explosion at an LPG filling station. 55 people were injured including 23 firefighters. Several fires were started and burned through the night. Media blamed faulty equipment and a disregard for safety procedures.
2003	Latvia	LPG	10	5	An explosion occurred at a LPG filling station located next to a market. The explosion killed five and injured 10, some of which were farmers and traders. 30 cars were damaged in the incident and windows were also shattered.
2004	China	LPG	3	0	Loose valve was reported to be cause of gas leak from an underground pipeline, at a new LPG station, which caused gas cloud. Local residents noted leak and 10000 people evacuated in total. 3 residents hospitalized after breathing fumes.
2005	Germany	LPG	0	0	Explosion at a LPG filling station when motorist was filling car. Witness reported that filling connection exploded, but there was no fire. The gas station was ordered to close until the results of an investigation were reported.

Summary of Incidents related to petrol/gasoline stations

Year	Location	Material	Injuries	Death	Description
1966	USA	Gasoline	0	0	Service station under construction. Heavy rain caused gasoline tank to settle breaking pipe connection. 1000gall escaped into storm sewer causing explosions 1.5miles downstream. Severe damage in sewer line.
1980	Canada	Gasoline	0	0	A gasoline tank truck exploded at service station. Two hours later and 2km away there was an explosion at a sewage treatment plant from fumes spreading through a sewer. No injuries reported.
1985	UK	Petrol	0	0	Repumping of a petrol station in 1978 had left suction lines not in use unplugged. Therefore overfills (as on 28/01/85) led to fuel escape to sewers. Detected by smell. Advice-abandoned lines should be removed + sealed at manlid.
1985	UK	Petrol	0	0	Fire at petrol station, 20 pensioners evacuated. Flames leapt 50ft.
1986	USA	Gasoline	0	0	Leak in valve connecting gasoline service station pump to underground storage tank allowed more than 1200galls gasoline to flow into telephone conduit. 1000 people evacuated as a precaution.
1986	UK	Petrol	0	0	Customer at petrol station saw tyre under petrol tanker on fire and fought with hand held extinguisher. Combination of overheated brake shoes and leaking fuel caused wheel to burn.

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1987	South Africa	Petrol	0	0	A petrol tanker discharging at a service station mysteriously caught fire and exploded. The tanker was destroyed and the station badly damaged.
1989	USA	Gasoline	0	0	Gasoline spilt whilst being transferred from a tanker to a storage tank at a service station. Immediately after the transfer valve closed and engine switched off, the gasoline ignited and engulfed the tanker in flames. Tanker consumed in fire. No injuries.
1989	Brazil	Petrol	15	0	Explosion in a petrol station injured 15 people, blew holes in city centre roads and damaged foundations of several buildings. Company to be sued by local council.
1989	UK	Petrol	0	0	A tanker containing 7000gal of petrol began leaking its contents on forecourt of a petrol station. Nearby restaurant evacuated as firemen battled to prevent an explosion. Traffic diverted. Forecourt washed down and drains cleared of petrol. Approx 150gal spill.
1990	UK	Petrol	0	0	Petrol gushed from service station pump when motorist severed hose on bumper as he was driving off. Petrol hit canopy and showered over forecourt. Attendant quickly switched off supply and fire brigade washed down spill.
1990	Greece	Petrol	0	0	500 people were evacuated from island of Kythnos when petrol station with 65te fuel caught fire threatening islands port. No injuries reported.
1990	UK	Petrol	0	0	Petrol spilled from storage tank at filling station causing strong smell around town and fish to die in nearby river.
1990	UK	Petrol	0	0	Firemen stopped blaze at petrol station which broke out in shed behind garage. Fire did not reach pumps.
1990	Australia	Petrol	0	0	Series of blasts set fuel alight in stormwater drain. 3000l unleaded petrol which leaked from 27000l service station tank erupted. Fire burst from drains running under railway line overpass. Probably from spark from train.
1990	UK	Petrol	0	0	Strong petrol odour over long time period instigated investigation of petrol station. Leak located at joint adjacent to petrol pump. Local houses evacuated when explosive atmospheres found in sewers and high levels of petrol vapour up to 400m.
1991	USA	Gasoline	0	0	Petrol leaking from filling station caused closure of 2 highways for 2hrs. More than 1000gal entered sewage system. Tanks initially held 30000gal. "Speedy Dry" powder used in clean-up.
1991	UK	Petrol	2	2	2 people burned to death and 2 injured at petrol station fire. Cause unknown but may have been by welding equipment.
1991	UK	Petrol	0	0	Diesel fuel/petrol discovered on top of water table when excavating for new tanks at motorway petrol station. Stock checks showed suction pipework may have been leaking for 18months. Details given of site clearance and decontamination.
1992	UK	Petrol	0	0	Petrol seeping from underground tanks at filling station and migrating up to 50yards from site. Seepage found when companies removed old tanks during refurbishment.
1992	UK	Petrol	0	0	Tanker driver on top of vehicle making preparations to unload unleaded petrol when 1400l was discharged. Attendants closed down petrol station. Implementation of defined emergency measures prevented ignition.
1993	UK	Petrol	0	0	Tanker jack-knifed while reversing on forecourt of service station. As tanker part of lorry rolled onto car, 7000l petrol spilled from rupture caused by force of impact. Homes evacuated and traffic suspended. Firefighters dispersed spill with hoses.
1993	UK	Petrol	0	0	Pipelines leaking at petrol station caused >300galls petrol to leak into sewers. Levels of petrol saturation in air between 30% and 100% detected by firemen. Emergency services

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					evacuated centres.
1993	Pakistan	Petroleum Products	0	0	Tanker was supplying petroleum products to petrol station and fire broke out while petrol being poured into underground reservoir. Suspected cigarettes being smoked only few yards from reservoir. Tanker and petrol station destroyed.
1994	UK	Petrol	0	0	Filling station closed down by fire chiefs after reports of a strong smell of petrol.
1994	UK	Petrol	0	0	Firemen called to petrol filling station when car bumped into a pump.
1995	USA	Gasoline	0	0	800galls gasoline spilled from tanker truck when filling underground storage tank at petrol station. Gasoline seeped into storm drain and explosion and fire were feared. When fire department called to scene, fuel and tanker truck had gone.
1995	UK	Petrol	0	0	Water main burst forcing petrol, which had lain dormant in disused underground pipes at nearby former petrol station, up to surface. Petrol and contaminated earth cleared away using trial 'damage limitation unit' substance being bagged rather than flushed
1996	UK	Petrol	0	0	Petrol leaked from 4000galls underground tank at service station overlooking estuary. Garage owner stated that thousands of litres of petrol had disappeared from tank over a few days. Resident claims petrol leaked underground into nearby stream.
1997	UK	Petrol	0	0	More than 1700galls petrol leaked from a tank at a petrol station. Drilling was expected to take place to locate the exact source of the leak. Considerable disruption to local businesses and residents. 200metre cordon set up.
1997	UK	Petrol	0	0	About 400 gallons of petrol leaked from a tank at a filling station. Fumes were detected in a neighbouring school playground. The pupils were moved to another school close by.
1998	UK	Petrol	0	0	7000 litres of unleaded petrol was found to have leaked from a petrol station. Vibrations in underground pipework had worn a hole in one of the pipes. A leak was first detected mid-July. Water abstraction point 2 miles away. Only 1000 litres recovered.
1998	USA	Gasoline	3	0	A Cessna light aircraft that was on fire crashed into a gasoline station. The pilot and 2 passengers were treated for burns. The fire was contained to the gasoline pumps and soon extinguished.
1998	UK	Petrol	0	0	Readings on the fuel tanks at a petrol station indicated that 1000 litres of petrol had leaked away. Firecrews were called and declared the area safe. How the petrol leaked and where to is unknown.
1998	UK	Petrol	2	1	A man died and several people were injured after a fire at a petrol station. A lorry was turning into the petrol station off the A14 and collided with another lorry. The lorries then entered the forecourt and hit cars. An explosion and fire resulted
1999	UK	Petrol	0	0	A leak of about 100gallons was discovered at a petrol station. Nearby buildings were checked but the leak was contained under the station. The leaking pipe was fixed a few hours later.
1999	Singapore	Petrol	0	0	A fire started in a furniture warehouse adjacent to a petrol station. The station was evacuated but does not seem to have been otherwise affected by the fire.
1999	UK	Petrol	0	0	15 litres of fuel was spilt from a pump at a petrol station. The spill was mopped up with sand.
1999	UK	Petrol	0	0	Emergency services were put on full alert following report of strong smell of oil. Fears were that a nearby refinery may have had a major leak. The incident was traced to a slow leak at petrol pump. Leak was isolated and cleaned up.
1999	UK	Petrol	0	0	Around 1000 litres of petrol spilled after the hose on the tanker

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					became disconnected during delivery. Spill was dealt with by firemen.
2000	USA	Gasoline	0	0	A rusted plug in gasoline station storage tank allowed up to 20,000 US gallons of gasoline to leak. About 3,000 US gallons of fuel were re-captured. A pool of the fuel additive MTBE has penetrated soil and moved quickly underground with groundwater.
2000	UK	Petrol	0	0	An underground storage tank is thought to have cracked and leaked petrol into drains and sewers in town centre. Town centre evacuated and shops remained closed for four days to avoid ignition of fumes.
2000	USA	Gasoline	0	0	Gasoline delivery tank truck leaked about 1000 US gallons due to a valve failure. Gasoline was kept on the property and away from sewers, firefighters covered pooled gas with foam.
2000	UK	Petrol	0	0	Routine inspection of a disused railway line found a petrol spillage. Fire service and environment agency called in to clean-up. Leak most likely from local petrol station although investigation was not yet complete.
2000	USA	Gasoline	0	0	Some 26.5 cubic metres of gasoline leaked from an aboveground storage tank at a gas station. Foam was applied to the gasoline pool and freezing temperatures helped minimise the risks.
2000	USA	Gasoline	0	0	Explosion and fire at a service station during routine tank cleaning operations. Fumes ignited after a 40 cubic metre underground tank was emptied to road tanker. Facility closed.
2001	UK	Petrol	0	0	Two hundred litres of petrol leaked from a tanker onto the forecourt of a petrol station. The swift response of firecrews and police meant that evacuation of nearby residents was unnecessary.
2002	Congo	Petrol	100	0	60 to 100 people were incinerated in inferno after trying to siphon off fuel at abandoned petrol station in wake of volcanic eruption.
2002	Malaysia	Gasoline	0	0	Tanker with 38m ³ gasoline hit culvert when arriving at retail petrol station, damaging piping. 100l gasoline leaked before rupture could be plugged.
2003	USA	Gasoline	0	0	Residents evacuated after leak of gasoline near petrol station. Release occurred when tanker barrel separated from tractor and overturned while pulling out of petrol station. Part of the tanker's cargo of 4200galls spilt. Remaining cargo was transferred.
2003	USA	Gasoline	0	1	Explosion in underground tank, presumed due to ignition of vapours. Tank was under repair at a petrol station, which was open for business at the time of the incident. Fatality was undertaking the repair work.
2004	Spain	Gasoline	0	0	Road tanker with gasoline and fuel oil crashed, but managed to avoid service station, and exploded. Some material reached river, and other vehicles destroyed in explosion.
2004	USA	Gasoline	0	0	Fire crews sprayed the tank barrel and extinguished a cab fire which occurred while a tanker was preparing to unload gasoline at a service station. The tanker was carrying 30m ³ of cargo.
2004	USA	Gasoline	0	0	An electrical spark is thought to have caused a fire and subsequent explosion at an oil depot. The incident occurred while a road tanker arrived to load gasoline. Foam was applied to tanks with 18,000gall gasoline.
2005	Iran	Gasoline	0	0	During the delivery of gasoline to a petrol station a hose disconnected, spilling 7000 litres. Unfortunately petrol station workers responded to the release with water. Spill ran 1km along street and was then ignited probably by a discarded cigarette.