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Working Party on the Transport of Dangerous Goods

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Item 6 of the provisional agenda

**REPORT OF INFORMAL WORKING GROUP  
ON THE REDUCTION OF THE RISK OF A BLEVE**

Position of the European LPG Association  
on BLEVE prevention for LPG road transport operations

**Transmitted by the European Liquefied Petroleum Gas Association (AEGPL)**

Related document: ECE-TRANS-WP15-AC1-2007-11 (The Netherlands)

**Background**

Following a non LPG related fireworks accident in Enschede in May 2000, the Dutch Government decided in November 2004 to review societal risks in densely populated urban areas. In that context, the presence of an LPG truck during the delivery of product in LPG filling stations was identified by experts as a potential threat. In the extreme, approximately 200 stations were threatened with closure.

**a) In a first step**, TNO was mandated by the Dutch Ministry of Housing, Spatial Planning and Environment and the LPG Industry to assess which additional measures could be taken in the event of an accident to:

- (i) either avoid the occurrence of a BLEVE in a road tanker, discharging in a LPG Autogas retail outlet, when exposed to heat radiation from a fire,
- (ii) or delay the time before a BLEVE would occur, after the start of the exposure to heat radiation, for a period long enough for safe and successful abatement of the fire and/or for cooling of the tank by the fire brigade.

An agreement was then reached between all parties for the “exploitation permit” concerning all automotive LPG outlets in the Netherlands, if the results of this study

were implemented on the LPG Trucks dedicated for the delivering of Automotive LPG (Autogas).

**b) In a second step**, and with reference to this study, the Netherlands Ministry of Transport decided to extend the scope of the study. The RID / ADR Joint Meeting (JM) in March 2006 was asked to consider thermal insulation to reduce the risk of a BLEVE during the road transport of flammable liquefied gases, such as LPG. The JM decided to create a separate ad hoc Working Group (WG) to look into the BLEVE risk.

The Working Group held a first session in November 2006 in The Hague. This meeting was attended by representatives of Belgium, Canada, France, Germany, the Netherlands, Norway, Poland, United Kingdom and by non-governmental organisations (AEGPL, CTIF, IRU and UIP). Speakers focused on the risk of a BLEVE, how to prevent it and how to reduce its effects. After presentations made by representatives of the Netherlands, AEGPL, Canada, CTIF and Germany, it was agreed to first identify all measures likely to reduce the risk of a BLEVE and then to make a survey of their respective advantages and disadvantages. More than 60 measures were identified and listed.

The Working Group has already started to review advantages and disadvantages of the first three measures: pressure relief valves, complete thermal insulation and sunshields.

The minutes of this 1st meeting are presented in document ECE-TRANS-WP15-AC1-2007-11.

A second meeting of the WG is scheduled in June 2007 in Norway in order to continue to review advantages and disadvantages of the remaining measures.

### **Industry Concerns**

In the last 50 years there have been 6 LPG road transport BLEVEs in Europe (TNO Data Base). None of these would have been prevented by thermal insulation.

On the contrary, AEGPL is concerned that the introduction of thermal insulation on LPG tankers might in fact generate additional risks:

- a) The additional weight of thermal insulation would reduce the carrying capacity of the tanker and would consequently increase the number of journeys required to deliver the same volume of LPG, increasing traffic related risks.
- b) The increased weight of tankers due to thermal insulation would raise their centre of gravity therefore increasing the risk of tanker roll-over.
- c) Insulating the tanker would make inspection of the pressure vessel more difficult, while vessel corrosion could remain undetected beneath the insulation.

d) Potential hot spots on the tank (resulting from the partial destruction of the thermal coating during the accident) are not detectable by fire brigades and may represent a hidden threat).

e) Uncertainty of performance when damaged in an accident would lead to uncertain time to BLEVE and increased risk to emergency services.

### **LPG industry approach**

The LPG industry supports and strives to achieve continuous reduction of risk in the transport of LPG. This approach integrates prevention of all accidents through appropriate and efficient safety devices and equipment and/or non-technical measures. Moreover, the increased requirements on safety devices, and the resulting technological improvement of tankers equipment, would have prevented most of the recorded BLEVEs.

There has been a continuous technical improvement in design, manufacturing, inspection and testing of tanks for the transport of LPG, due mainly to the European harmonisation of construction codes along with adopted standards. Development of new safety equipment and devices, along with the introduction of IT and new technologies in the transport sector has brought significant improvements:

- Prevention of release through effective shutdown systems and safety devices;
- Active safety equipment improvement through fitting of anti-lock brakes, stability programs, endurance braking etc;
- Driver's comfort improvements such as air conditioning and seat comfort to prevent fatigue;
- Routing and monitoring facilities such as GPS, satellite navigation and on board computers.

The management of Health, Safety and the Environment (HSE) has been developed by the LPG sector, through the implementation of comprehensive preventive measures covering procedures (clear, precise, known, accepted) as well as workers (selected, qualified, competent, trained, motivated), to pursue the most efficient organization for the safety of transport.

### **Conclusion**

The LPG industry is committed to prevention of all kinds of accidents and is in favour of promoting current pro-active measures supported by appropriated systems for the management of safety.

The European incidence of BLEVEs in LPG road transport is well below levels in other parts of the world. This is due to the combined efforts of the European regulatory bodies and the industry in introducing regulations, standards, procedures and technical innovations that are world leaders. The very few BLEVEs that have occurred in the history of the industry would be much less likely to occur today.

AEGPL is confident that the industry and regulators can investigate further measures to reduce the chance of a BLEVE and come up with a range of technical and procedural methods which have proven effectiveness in managing this risk.

It is the role of AEGPL, as the representative body of the European LPG industry, to provide expertise and express concern over any proposal such as thermal insulation, which adds to transport risk exposure and in most cases will not maintain sufficient integrity after an accident to be of any use.

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