

# TREAD Act Legislation Pressures Environment

*Phillip A Cohen \* April 3<sup>rd</sup> 2007*

The US Department of Transport's National Highway Traffic Safety Administration's September 05 final rule on Tire Pressure Monitoring may turn into a nasty environmental scandal. This is not what Congress intended when it passed a 2000 law requiring that all vehicles be equipped with such monitors by September 1 this year. The TREAD Act legislation came in the wake of a recall of 13 million tires on Ford Explorers and other vehicles that were linked to nearly 280 deaths.

The scandal surrounds the Environmental impact of the TREAD Act and NHTSA's Final Rule, Docket No. NHTSA 2005-22251, which has a requirement for mandatory Tire Pressure Monitoring systems (TPMS). Specifically, in its present form, the rule will result in the introduction of 64 million new batteries annually into the US environment.

NHTSA's ruling has no preference for low cost Battery-Less TPMS technology which is available and so vehicle manufacturers are choosing to implement Battery Powered Wheel Sensor Modules on a massive scale.

In the US there are approximately 16 million new passenger vehicles manufactured annually which must ultimately comply with the legislative requirements of the TREAD Act and be fitted with TPMS. If each vehicle has four wheels fitted with battery-powered RF TPMS rim modules there will be approximately 64 million batteries introduced annually into the environment. Assuming that battery manufacturers observe pollution control during their manufacturing processes, there will still be consumer abuse and disposal phases of the batteries life cycle impacting on individual's safety and the environment. Hence, concerns about safety and handling in such a widespread consumer applications should be carefully considered by the US Environmental Protection Agency. However, the EPA is strangely silent on NHTSA's ruling

The nature of the problem may be more clearly understood as follows. In order to achieve long service life between replacement intervals, manufacturers of battery powered RF-based TPMS wheel modules are specifying high energy density batteries. These batteries are predominantly based on Lithium Thionyl Chloride chemistry.

Material Safety Data Sheets on such batteries list hazardous decomposition products, when exposed to water, which include Sulphur Dioxide gas, Hydrogen Chloride gas and strongly acidic wastewater. Furthermore, the safety data toxicological information for Thionyl Chloride lists acute toxicity

which is corrosive on contact with eyes and skin. Another component of lithium battery's chemistry is Aluminium Chloride which the fetotoxicity safety data lists as having "adverse effects on growth and behaviour".

In general the hazards associated with Lithium Thionyl Chloride batteries may be divided into two categories:

1. Toxicity: external physical abuse such as cell incineration and puncture will cause corrosive contents to leak and be hazardous. Inhalation of contents may result in pulmonary oedema; Skin, eye and fetotoxicity hazards. Environmentally, because of the highly toxic and corrosive Thionyl Chloride in the cell, this chemistry of lithium cell is not recognized as normal waste and requires special handling and disposal.
2. Fire and Explosion: battery may vent or be explosive at higher temperatures above 150 oC; Explosions due to abnormal electrical operation ie., short-circuit of these high energy density batteries may result in explosion and fire. Because of its high energy density capability, the lithium cell must be constructed with an internally fused design. If the battery is inadvertently charged or shorted, and the fuse mechanism fails, the cell may rupture and explode (an examples of this happening resulted in the recent Recall by DELL Corporation of its Sony batteries used in its laptop computers and FAA rulings on laptop Computers carried on board airplanes).

In general the hazards associated with disposal of Lithium Thionyl Chloride batteries are related to aquatic toxicity if battery contents are released into waterways, groundwater, wastewater or marine environments.

The batteries used in TPMS products utilize chemical reactions and are thus classified as chemical products. Hence the TPMS are subject to any US Environmental Protection Agency legislative guidelines for the environment and safety, during both their active life cycle in the TPMS product and at the time of their disposal?

When the full extent of the environmental problem becomes clear NHTSA will have to justify why its final rule 2005-22251 failed to give due consideration of the impact of such a large scale consumer application where so many batteries will be introduced into the environment. The US Environmental Protection Agency will also have to explain why it has remained silent if NHTSA's rule is not in harmony with the Agency's rulings and laws?