

# A Way to Safer Fuel Delivery Life as we know it.

By Paul Reyner, Secu-Tech Ltd

From Terminal to Tank the reliance is on the driver to 'do the right thing' they have assistance at most terminals enabling them to load the tanker with the right volume for a compartment and they have labels on the loading gantry for product. At the station they have labels. Drivers have procedures which they must adhere to too ensure no errors are made. Drivers are human and therefore errors happen despite training and procedures. How often these errors occur is difficult to quantify and depends on the reporting structures in the various elements of the distribution chain. The 2005 Independent Oakdene report commissioned by the Oil Care Campaign sponsored by Shell indicated that 70% of incidents were not reported and encouraged better reporting procedures.

Evidence from interested third parties indicates it happens quite frequently. Reported incidents in the London region average 1 per month but it is believed actual incidents are higher as the need to report usually means a significant issue where risk assessments and action plans need

low level or considered low risk i.e. small quantities are involved resulting in 'within tolerance contamination' or diesel into petrol.

What would be a typical low level incident, it is usually where the driver realises their mistake very shortly after releasing the fuel into the storage tank. Their action is to stop the delivery and correct the mistake and then in some cases 'balance' the delivery so that it looks as if the correct amount has been delivered compared to tanker delivery tickets and any Wet Stock reconciliation takes place after the event has occurred and unless part of a trend would be dismissed as standard deviation error.

The driver knows what he has done and if he was quick enough it will go undetected, but why not report it, after all doesn't his procedures allow for such errors to be reported 'without blame'. Tanker drivers are well trained and well paid personnel but they are also human and even in a no blame culture,

error counts would be maintained and job security would be considered by the individual as a reason not to alert principles to these perceived low level



to be implemented. Wet Stock reconciliation companies also indicate that their activities are compromised by low level incidents typically the contamination is at a

Let's consider 'within tolerance contamination', some companies do have a policy to cover the above incident provided the

volume of containment is low compare to the volume in storage. In this case how does the driver know until after the delivery they are 'within the tolerance'? Getting it wrong could lead to a small error becoming a big problem. Same product crossovers where premium fuels and standard fuels of the same type are mixed get little considerations as there is little potential for customer complaint. However the impact on the business commercially could be significant. Compare the margin on premium fuels to standard fuels.

Other issues are Tankers returning to the terminal with product still on board but not known, again this is discovered when the loading rack goes into overfill protection but only if the new load is at maximum capacity, if it's less than a full compartment then a product mix could occur. It is the driver's responsibility to declare he is either empty or has product on board. Some terminals now refuse trucks with product already loaded again increasing the responsibility of the driver.

## Consequences

Incidents happen, the consequences of which depends on the level and when remedial action can be taken.

In a straight forward contamination of one tank at a service station with notification by the tanker driver at the time of incidence, the costs are relatively small and confined to:-

- Nozzles connected to the tank being shut down - resulting in lower sales from the station.
- Tank Emptied - requiring at least 1 special tanker, specialist service team.
- New Product delivered - extra logistics costs
- Nozzles decommissioned - requiring specialist service team

- Recovered product 'sold' for reprocessing - Loss of revenue
- Recoverable of state duties - requiring administration diligence  
The above is estimated to cost a minimum of € 20,000.

Larger and more complex incidents including unknown contamination result in larger costs especially if the contamination affects the general public. Even without the public being involved reported incidents within the last year have cost a minimum of € 100000.

In some countries these costs are mitigated by the resale of the contaminated product but Turkey for example recognising this problem has now reduced the price of contaminated product to crude oil price.

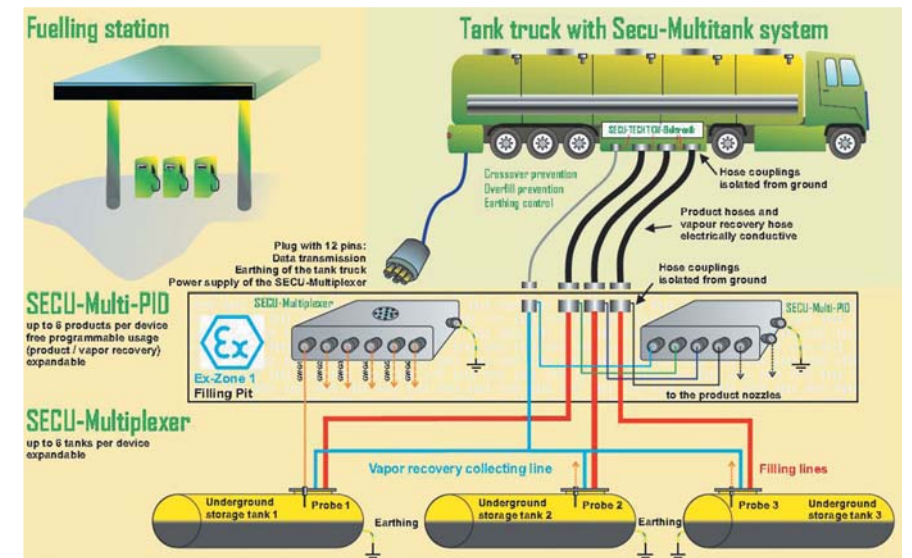
The costs of incidents can be as varied as each individual incident the one constant though is WHO PAYS?

The first shoulder this falls on is the driver or more appropriately the company the driver works for. The delivery company would have to have some compelling arguments why they are not responsible, but to do that they would themselves have to instigate and investigation. In General the blame is accepted and passed through to their Insurance company who in turn would then appoint a loss adjuster to investigate and try and mitigate the potential claim involving all other interested parties and involving each in justifications. These justifications are time consuming and costly. The resulting COST to the Insurance Company could well be 20% higher than the actual true cost of the incident.

Insurance companies make money by insuring risk and claiming a premium from the people they insure, the higher the risk the higher the premium. So the Drivers error quickly translates to HIGHER LOGISTICS COSTS.

## Reduce or eliminate the risk

As previously explained driver training and procedures give a guide to reducing the risk of incidents but the driver still is under



significant pressure and will make mistakes. Crossover prevention systems takes pressure off the driver during the loading and the delivery process, enabling him to concentrate on other areas in the process, helping to reduce other Health and Safety Risks.

This fact was recognised by the industry particularly in Germany where they also wanted a end to end quality control system for the delivery process several years ago and equipment manufacturers developed systems to address these industry needs, unfortunately differing technologies were used to achieve these aims and there was little or no interface between competitive systems. Also like all new emerging technologies some systems worked and others only partially so.

As a result the industry developed in conjunction with CEN a European Standard for such systems in the same way that a European Standard was developed for other equipment in the fuel distribution channel such as overfill prevention. These '2nd generation' systems not only have to work but have to conform to the European standard, which is a performance standard, thus ensuing complete

interoperability between different manufacturers components. It is this new standard that the Secu-Tech MultiTank has been designed, tested and implemented against.

## Secu-Tech MultiTank

MultiTank is split into three zones of equipment

- Loading Rack
- Tank Truck
- Service Station

## Overview of system operation.

The Secu-Tech MultiTank system operates in the background and provided the delivery connections are correct the truck can be loaded and unloaded safely and accurately. The MultiTank only interrupts normal activity if there is an error and then it indicates what the problem is and potential solutions. Typically once the loading or unloading has been prevented the driver quickly recognises the error and corrects it enabling activity to continue. The system works by imposing a digital signal on the earthing circuit of the truck to loading rack/station, this digital signal carries the code for the product concerned according to the European Standard.

## Loading Rack

On the loading rack there is already an earth monitor as part of the overspill protection system

usually already incorporated into terminal automation package. The MultiTank PID (Product Identification Device) integrates with that system requiring the driver to just



connect the truck to the terminal in the usual way. The single Secu-Tech MultiPID can be linked to up to 6 loading or vapour recovery arms. Each arm is electrically isolated typically through the drop hose flange and the earthing circuit completed through the MultiPID. This correctly maintains the safety Earth of the system allowing non MultiTank equipped trucks to load safely as usual. Additionally on the MultiPID for terminals is the ability to be data connected through a Modbus to the terminal automation system allowing for 'on the fly' product grade changes of 2 loading arms which is sometimes practised. This permits correct product grade coding of the truck without external action at the loading rack. The Secu-Tech MultiPID requires no external power supply and is fully ATEX certified.

#### Tank Truck

The heart of the Secu-Tech MultiTank is on the tank truck. It is the truck that controls whether products are loaded and unloaded. The reason for the truck to be the focus of the system is because the truck is the one continuously variable storage for product in the logistics chain. Loading arms general always have the same product in them, Storage tanks at retail site are usually fixed in which product they store but the compartments on the truck change by load. Keeping track of

which product goes into which compartment on the truck is what the MultiTerm does and then controlling the system of the truck to ensure that no product is mixed with another either at the Terminal or the Station. The system is monitored through a 4 line LCD display which gives a clear indication of the product in each compartment and whether it will permit loading or offloading. Any errors can be quickly corrected by direct reference to the display. Additional benefits of the system is the ability to customise the loading and unloading procedures to suit individual clients ensuring that company rules are followed. Integration with the GPS receiver enables exact positioning of the system and further increasing security with Geofencing where the system does not allow loading or



unloading except in the specified company locations. The system logs what product has been loaded into which compartment at which terminal and then also which product is offloaded into which tank at the retail location. This data provides a complete audit trail for effective logistics and quality management and assistance in incident investigation. The data can be retrieved directly from the MultiTank Terminal or through interfaces to onboard truck computers and could even be automatically transmitted to the terminal or operations base.

The system can also interface with other sensors on the truck to provide additional information on activity on the truck including compartment sensors.

#### Service Station

At the retail station another Secu-Tech MultiPID unit is installed, this is programmed using a PC with the appropriate product code for each tank and each tank fill fitting is isolated from ground and the ground connection made through the MultiPID. It is a very simple installation as there is no external power required for the MultiPID. As the programming is done via a PC the site configuration is saved and can be simply updated during any product change programs without

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requiring further installation work other than tank labelling. An earthing connection point for the tanker needs to be located near to the fill point. In the case where electronic overfill is incorporated then the Secu-Multiplexer is installed which is connected to either the overfill probes installed in the tanks or to the overfill alarm of the tank gauge.

Additional Benefits of the MultiTank System

### Overfill Prevention

Secu-Tech in designing the Multitank also incorporated its established electronic overfill prevention system so not only can crossovers be prevented but individual tank overfills can be avoided. The system on connection to the station through the earthing cable, note that no additional actions are required by the driver, powers up the overfill sensors in each individual tank and only if they are fully functional will a delivery be permitted. Should the fuel in the tank reach the overfill sensor then that tank and only that tanks delivery is stopped. Indication on the Tanker terminal alerts the driver to why the delivery has stopped. This method of overfill prevention allows the tanker hose to be discounted from the fill point without the normal

delay associated with mechanical overfill valves. This ensures the delivery vehicle is not delayed.

### Data Collection

The Secu-Tech MultiTank systems can be fitted with a GPS receiver thus enabling the truck mounted controller to log where and to which compartments product has been loaded and where and to which tanks products have been offloaded. This provides a complete audit trail for both product quality and financial integrity. This data also allows speedy resolution in investigation of incidents greatly reducing management time and cost.

### Earthing Control

As the MultiTank operates through



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### Enclosed Bunded Tanks

Options: Pumps Fuel Management Systems Roller Shutter Doors Overfill Alarms Gauging Leak Detection

Compliance with control of pollution (oil storage) (England) Regulations 2001



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the earthing circuit of the tanker to rack/ tanker to station if these connecting are not made or sufficiently good then the system prevents a possibly hazardous incident.

The MultiTank system provides an integrated solution to achieving quality products delivered accurately and safely to the retail customer with less stress on the tanker driver and increased management control from the logistics company whilst not requiring extensive retraining or installation work.

### Summary

- Even highly trained drivers make mistakes
- Incidents Happen
- Incidents Cost Money
- Secu-Tech MultiTank prevents incidents
- Safer operations
- Less stressed more efficient drivers
- Lower cost operations.