

# IMPERIAL CHEMICAL INDUSTRIES HEAVY ORGANICS DIVISION

## SAFETY NEWSLETTER NUMBER 21

By Trevor Kletz

### 21/1 AN LPG FIRE

A fire occurred recently in an LPG storage area as the result of a leak from the gland of a propylene pump. One man was hurt and a lot of damage was caused to pipe-lines and other pumps. Many of the lessons to be learnt apply only to this area but some are of general interest.

(a) In designing LPG storage areas and in deciding on the safety precautions we assume that gland leaks very rarely occur on pumps handling LPG at ambient temperature (cold pumps are another matter). The particular pump on which the fire occurred had leaked several times on start-up over a number of years and the operators had come to accept this. Regular leaks should must not be tolerated on pumps handling LPG at ambient temperature.

(b) This incident shows once again that, if equipment leaks regularly, one day it will catch fire even though everything possible is done to eliminate known sources of ignition. The source of ignition in this case is not known — it may have been static, it may have been a hot spot on the pump.

(c) The operator who was injured was near the leak, closing a valve to try to stop it. Perhaps we should fit remote isolation valves or longer spindles. If these are not fitted, operators should not go close to a leak unless protected by water sprays. If it is a big leak, we need the Fire Service to supply the water, but if it is a small leak a one inch diameter fog nozzle is sufficient. We should install these, connected up ready for use, in areas where flammable materials such as LPG, other liquefied gases or "Thermex" are handled above their atmospheric boiling point. Our Chief Fire Officer, Mr. D. W (extn. W.302) can give you details of suitable equipment.

### 21/2 A FURNACE FIRE

A recent fire on a furnace was caused by liquid hydrocarbons getting into the fuel gas supply and then dripping from the burners onto the floor underneath the furnace.

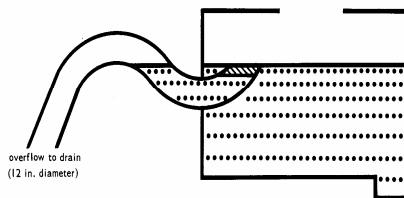
Liquid was separated out in a vessel fitted with a level controller and this went out of order.

All vessels in which liquids are in contact with fuel gas under level control should be fitted with independent high level alarms.

See also 22/2

### 21/3 AN EXPLOSION IN A SUMP

Welding had to take place near a sump



The sump was emptied completely with an ejector and filled with clean water to the level of the overflow pipe.

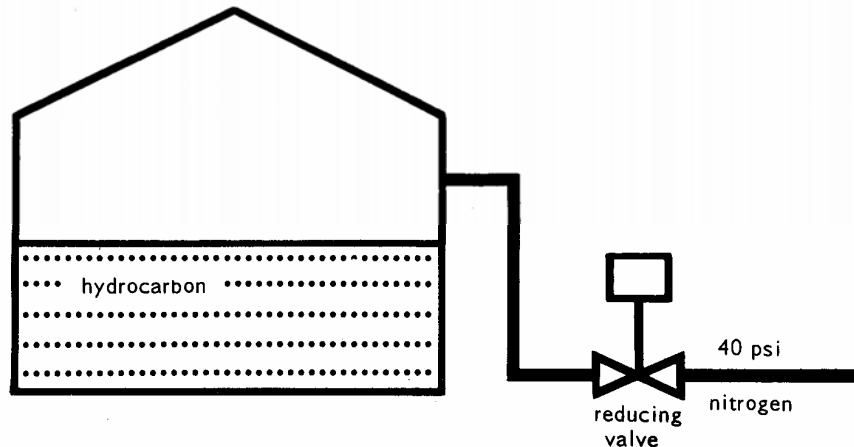
When a spark fell into the sump, an explosion occurred, followed by a fire.

The U-bend had not been emptied and it is believed there was a layer of oil in the bend on top of the water.

#### 21/4 NITROGEN BLANKETING - HOW IT CAN GO WRONG

In HOC Division, all fixed roof storage tanks containing flammable hydrocarbons above their flash points are blanketed with nitrogen.

On one group of tanks the reducing valve on the nitrogen supply was installed at ground level.



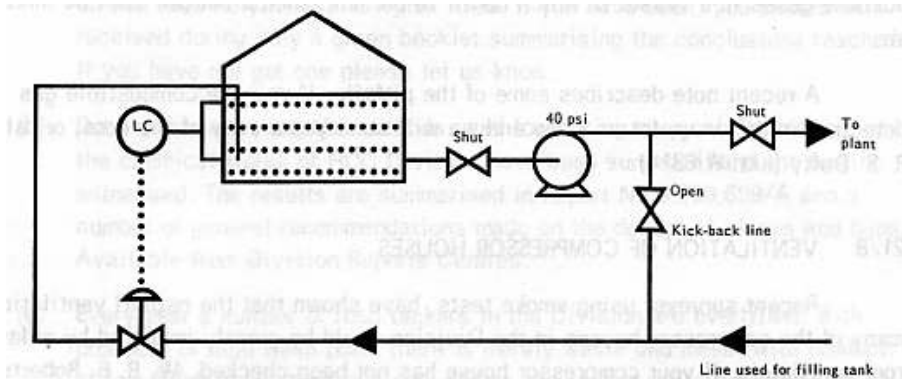
Hydrocarbon vapour condensed in the vertical section of the line and effectively isolated the tank from the nitrogen blanketing.

The reducing valve should have been installed at roof height.

Check your tanks – there may be some more like this one.

#### 21/5 A PUMP WAS OVERPRESSURED

A pump body was overpressured and cracked, causing a spillage of flammable oil.



The tank was being filled. Its delivery pump was shut down, but the kick-back valve was open. When the high level trip on the tank closed the motor valve on the filling line, the pressure in the filling line rose to 300 psi and burst the delivery pump which normally operates at 40 psi.

The kick-back line has now been run direct to the tank.

Relief valve reviews and operability studies usually pick-up this sort of thing. In this case it was missed, perhaps because off-sites get less attention than the main plant. This incident — and others — show that off-sites should get the “full treatment”.

The pump body was made of cast iron, not a good choice for a flammable liquid, and not permitted by our current Engineering specification.

## **21/6 CONNECTING SERVICE LINES TO PROCESS EQUIPMENT**

Some nitrogen lines became filled with LPG recently after a permanent connection was made to the process side of an instrument. It is therefore worth repeating the recommendation made in Newsletter 5, Item 4.

When a service such as air or nitrogen is used intermittently, it should be connected to the process equipment by a flex which is disconnected when not in use. A vent must be provided for venting the flex before disconnecting it. Double block and bleed valves may be used instead of a flex.

If the service is in continuous use then it may be connected permanently. If the service pressure is liable to fall below the normal process pressure then a low pressure alarm should be provided on the service supply; if the process pressure is liable to rise above the normal service pressure then a high pressure alarm should be provided on the process side.

Non-return valves should be fitted on the service lines.

## **21/7 USING COMBUSTIBLE GAS DETECTORS IN AN OXYGEN-FREE ATMOSPHERE**

If a combustible gas detector such as the Sieger or MSA is used to detect combustible gases in a vessel in which no air is present, then a sample must be mixed with air.

A recent note describes some of the pitfalls. If you use combustible gas detectors in this way, let us know and we will send you a copy of the note, or talk to Mr.R.S.D (ext. W.6314).

## **21/8 VENTILATION OF COMPRESSOR HOUSES**

Recent surveys, using smoke tests, have shown that the natural ventilation of many of the compressor houses in the Division could be greatly improved by enlarging the roof ventilators. If your compressor house has not been checked, Mr. R. B. R (ext. B.2809) may be able to help you.

## **21/9 "LOOK WHAT I'VE FOUND IN THE SEA, DADDY"**

Many of us have seen unpleasant objects washed up on the beach. Rather late for this year's holidays, but in good time for planning next year's, the Coastal Anti-Pollution League have published their "Golden List" of clean beaches. They list:

Four star beaches — where there are no sewage outfalls

Three star beaches — where the sewage is treated

Two star beaches — where the sewage is partially treated, which may mean that it is merely ground up so that it is unrecognisable.

If a beach is not on the list, don't be surprised at what you find.

The "Golden List" can be obtained from the Coastal Anti-Pollution League, "Alverstoke", Greenway Lane, Bath, Somerset in exchange for a 5/- subscription.

## **21/10 DR. H. G. SIMPSON**

Henry Simpson retired at the end of June but will be returning as a part-time consultant. No man in the Company has done more than he has to take safety out of the field of guess and qualitative judgment and show that some problems at least, can be considered scientifically and quantitatively. Just before he retired he wrote up a lot of the work he has done during the past few years, in a report (No 0.21,186/B) entitled "Safety in Design of Plants Handling Liquefied Hydrocarbons: Review of Work carried out mid-1966 - mid-1970". Copies will be available from Division Reports Centres in September. (See Newsletter 26, Supplement)

I am sure all readers will join me in wishing Henry a long and happy retirement — as well as an active one.

## **21/11 RECENT NOTES**

(a) Since September 1969 about 500 people have attended a half-day discussion on the 1969 Polythene and Nylon fires. If you have been, you should have received during July a green booklet summarising the conclusions reached. If you have not got one please let us know.

(b) During the last year, the methods used for testing every alarm and trip in the chemical Works of HOC Division have been surveyed, and the testing witnessed. The results are summarised in Report No 0.200,699/A and a number of general recommendations made on the design of alarms and trips. Available from Division Reports Centres.

(c) Every year a number of road tankers in the Division are overfilled. With products of high flash point there is merely waste and mess. With products of low flash point there is a risk of fire and in fact a fire occurred two years ago. A note dated 23rd July describes the Division's plans for trying out high-level trips which will shut-off the flow of product when the tanker is full.

(d) The British Cryogenics Council have published a "Cryogenics Safety Manual -A Guide to Good Practice". Available from the Council, price £2.

For copies of (a) or (c) or for more information on any other item in this Newsletter, please write to Mrs J. M. W, Organic House, Billingham, or 'phone B.3927. If you do not see these Newsletters regularly and would like your own copy, please ask Mrs W to add your name to the circulation list.

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