

The Flaming Badischer

Many people who lived in Widnes & Runcorn around 1966 to 1968 will recall the huge flame that was often emitted from the top of a flare stack at ICI's Castner Kellner Works in Runcorn. Such was the brightness, I recall someone who lived several miles away saying it was light enough to do some gardening at 10 pm in September. The plant concerned was locally known as 'The Badischer'.

For those of us who lived some distance away, the brightness was a curiosity. However, it was a different matter for the residents of Weston village just up the hill from the site - such was the slope of the land, the flare was more or less level with the village, and they could also hear the roar from the flame. With flaring often going on overnight, getting sleep was a problem, and with many of the local residents being employed by ICI, there was probably a reluctance to complain.

Not so the Vicar of St John's Church in Weston. With his church and home facing the flare, his services as well as his sleep were interrupted. When his complaints to ICI were ignored he was able to ratchet up the pressure when he somehow obtained a highly confidential list of the home phone numbers of the key managers, not only of the Castner Kellner works, but for the whole of Mond Division.

So, if the vicar was awake at night due to the light & noise from the flare, he worked his way through the list, phoning people to tell them what their flare was doing to him & his neighbours. In addition, he told them that if the flare was still alight when he got to the end of the list, he would start from the top again. As these were people who needed to be on call in case of an emergency, leaving the phone 'off the hook' wasn't an option. With ICI senior managers being kept awake, there was a sudden change in 'public relations'.

Within days, managers met the vicar to discuss his concerns and arrangements were quickly put in place to restrict the times when the flare could be used. A list went up in the plant control room identifying an early evening cut-off point and the times of services at St John's when flaring was absolutely forbidden.

I recall being in the control room at the plant one Sunday afternoon when they were trying to settle the very temperamental plant into steady operation so as the flare could be turned off before the afternoon service at St John's. With a couple of hours to go, staff were fairly confident they would succeed. An hour later, a problem had cropped up and the tension was building up - if they couldn't quickly get steady operation, hours of effort to get the plant going and a great deal of fuel would have been wasted.

What was the process about? The plant was newly built to produce acetylene, a gas that was then a key component for making other chemicals, the then increasingly popular plastic PVC in particular. The 1960s was the era of making chemicals from oil in refinery type settings. Liquid raw materials stored in tanks were pumped into

reaction vessels by means of motorised valves operated from the distant control room, the staff there being dependent on information provided by instruments. The chemistry took place in these vessels, often unseen by eye. There was usually a flare stack, used at start-up & close down (particularly in an emergency) to burn off inflammable substances that couldn't be used to produce the required product.

As ICI didn't know much about this sort of technology, they bought the rights to a newly developed 'oil refinery' type of process from BASF, a German chemical company that had originally been called Badische Anilin & Soda-Fabrik, hence the 'Badischer' name. Such was the eagerness of ICI to build this plant, construction commenced before BASF had properly tested its own first full size plant.

This process was based on the fact that when oil burns, a significant amount of acetylene can be produced in the flame. However, as acetylene itself burns very readily, most will burn away in the flame that produced it. A key feature of the BASF process was to use a process called quenching that involved squirting a liquid into the flame chamber to cool the flame, so minimizing this extra burning.

A technical challenge was the choice of substances to use to quench the flame because cheap materials like water were not suitable for the task. The chosen material was naphthalene, known to everyone from that era as the constituent of moth balls that gave them their identifiable smell (do they exist nowadays?). Although naphthalene is a solid at room temperature, at the required temperature for quenching it was liquid and could be pumped around.

The quenching liquid also had the important function of removing from the flame chamber the carbon particles (soot) produced in the flame. As naphthalene wasn't a cheap substance it had to be recycled, and the recycling needed to take the carbon particles out of the liquid 'sooty naphthalene' otherwise it would soon become unusable.

With construction going ahead at Runcorn, word came from BASF of problems with their original plan to recycle the naphthalene, namely by distilling it off in 'kettles' - yes, that was what they were called! The idea was to boil the naphthalene off, leaving the soot behind; then the now clean naphthalene was condensed to a liquid for re-use. This boiling process BASF advised ICI not to install kettles but to use centrifuges instead. So, with some quick and expensive re-designing, the ICI plant was built with centrifuges. However, with construction nearly complete, word came from BASF, 'Sorry, centrifuges don't remove the soot but we have now got the kettles working'. 'But because of your advice we haven't got kettles!', said ICI.

When ICI tried to get the plant working using centrifuges, the same problems that BASF had reported soon cropped up - there were also lots of unreliability problems in the complex process as well. ICI was having to pay to get rid of lots of 'sooty naphthalene' and buy lots of fresh naphthalene - such was the demand, the world price shot up.

Senior management asked, 'Who is the Castner's expert on centrifuges?' No answer. Stage by stage the net was cast wider, up to 'Who in ICI across the world knows about centrifuges?' Still no answer. This highlighted the problem of buying technology you have no experience of! Hurriedly, a group was formed in the Research Department to try to find how to get the centrifuges working efficiently. This was how I got involved.

We learned a lot about both centrifuging and how to get those darned fine particles of soot to glue together - bigger particles would be more easily removed by a centrifuge. However, to implement what we proposed on the huge plant would cost a lot of money & take many months to implement. Also, the previously mentioned reliability problems of pumps and instruments continued to be a second headache. And, by this stage, another 'non-acetylene' route to making PVC was becoming available.

In the end ICI decided to abandon efforts to get the plant working. It had cost a vast sum of money - all the new cars in the plant car park and first ventures into continental holidays were evidence of this, paid for by endless overtime.

Prior to the Badischer process, acetylene was produced at Castner Kellner Works by the Carbide process. In a method little changed since its invention in 1888, coke and lime were heated to 2,000°C, a temperature that required a special electric furnace. Molten calcium carbide, glowing white with the heat, was run off from the furnace into trucks where it cooled & solidified - a hot & spectacular sight. Once the carbide was made, acetylene was released by crushing it and adding water. In the early days of motor cars their lights operated in the same way, if on a much smaller scale - water was dripped on to calcium carbide and the acetylene given off was burned, giving a very bright light.

Prior to the 'oil refinery' type of chemical manufacture with its 'at a distance' operation, processes tended to rely more on physical effort & experienced 'hands on' control. Typical of its era, the Carbide plant required many process workers doing lots of physical work in extremely hot conditions. It was an expensive way to make acetylene. But it worked, although did not produce the quantity required.

To be reasonably brief I have omitted all sorts of personality issues, memorable moments, etc. When the pressure is on & careers can be ruined or enhanced, human nature can become very raw!

Well over 40 years on, that is how I recall it!

P.S. If anyone has some sooty naphthalene they want to clean up, get in touch.

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