

THE ICL INQUIRY

PROPOSED FINDINGS IN FACT

Submitted on behalf of

CALOR GAS LIMITED, a company incorporated under the Companies Acts and having its Registered Office at Athena House, Athena Drive, Tachbrook Park, Warwick CV34 6RL.

1. Supply of LPG to Grovepark Mills began in 1969 when ICL Plastics ("ICL") entered into an agreement with Calor Gas Limited ("Calor") to purchase bulk supplies of LPG and to hire bulk storage tanks from them (ICL/011033). Calor provided a quotation for the supply and fitment of a two or three ton bulk storage tank and the associated bulk storage fitments and first stage regulator.
2. In the notes section of Calor's quotation (ICL/011030) it is noted that "it would be the customer's responsibility to excavate and subsequently infill, a suitable trench to accommodate the high pressure pipeline from the Bulk Storage Vessel to the main building". Calor's quotation was accompanied by a letter dated 28th May 1969 (ICL/011027) addressed to ICL which stated that the installation of pipework beyond the tank and regulator to be installed by Calor was to be "...carried out by your own labour force." The pipework downstream of the first stage regulator was not installed by Calor. ICL used contractors supervised by a firm of engineering contractors Grieben Plant Ltd. to install the pipework.
3. The Calor representative at that time is likely to have informed ICL that ICL would require to open a trench for the installation of pipework connecting the LPG tank to the appliance within the building. Responsibility for backfilling the trench also lay with ICL [evidence of Keith Young, day 2, 18:17-18].

4. There is no evidence that any of Calor's workers saw the underground part of the pipe before it was buried. The trench may well have been backfilled before the tank was commissioned, possibly due to inclement weather. It is, accordingly, unlikely that the Calor representative would have seen the pipework within the trench before it was backfilled by ICL [evidence of William Brodie, day 2, 12:9-12].
5. Had a Calor representative noted any problem with the pipework, it is likely that he would have reported any such problem to Calor. In that event, it is likely that Calor would have written to ICL advising them to remedy the difficulty [evidence of Keith Young, day 2, 21:19-24].
6. No specification for the installation of the pipework by contractors supervised by Greiben Plant has been found. It is not known whether fitters or sub-contractors employed by Greiben Plant were appropriately qualified gas fitters / engineers or had any experience of installing or adequately protecting underground LPG pipework.
7. After the installation of the pipework downstream of the first stage regulator, ICL were responsible for its inspection and maintenance. Had ICL asked Calor for advice or assistance in testing underground pipes, Calor would have provided such advice [evidence of Keith Young, day 2, 22:10-17]. There is no evidence that ICL sought any such advice or assistance with the possible exception of late 1988.
8. It is likely that, on the installation of the tank, Calor supplied ICL with an information leaflet (including safety information), together with emergency contact details in the event a gas escape [evidence of Keith Young, day 2, 20:16-18].
9. The pipework was buried about 0.3 metres below the original surface of the yard and the final section of pipework adjacent to the outside of the former mill building rose vertically about 0.45 metres above the surface of the yard before passing by way of a right angled elbow horizontally through a bricked up window into the area of the pit within the former mill building which subsequently became the basement. After it entered the former mill building, pipework passed through the area that subsequently became the unventilated basement, rose

upwards into the ground floor of the former mill building, and was connected to the LPG oven by means of pipework running along the ceiling.

10. The pipework within the yard was made of galvanised steel and ungalvanised malleable cast iron (ICL/007638).

11. In about 1973, ICL raised the level of the yard. This was done using rubble, and finished with concrete hard standing. At the point where the LPG pipework entered the basement level of the former mill building the surface of the yard was raised by about 1.10 metres, with the effect of burying, at least 0.65 metres underground, the final vertical section elbow and horizontal pipe length into the basement. The new yard level covered the bricked up basement window.

12. No corrosion protection was applied to any exposed pipework before it was buried. No steps appear to have been taken to use appropriate backfill to avoid using rubble which would cause corrosion or other damage to the pipework and a piece of broken concrete slab was allowed to rest on the top of the elbow.

13. In the early 1980s ICL installed a steel floor over the basement area thereby sealing off the basement area where the LPG pipework entered the former mill building and so creating an unventilated confined space. There is no evidence to suggest that Calor were consulted about these changes.

14. The LPG at Grovepark Mills was originally stored in a single bulk storage tank with 2 tons capacity which was installed by Calor. From the 1970s there were visits to the premises by the HSE on matters related to the LPG installation. The principal concerns of the HSE were about the size and siting of the bulk storage tank.

15. Between 1988 and 1991 correspondence passed between Calor and the HSE containing proposals and counter-proposals in order "to bring the storage of LPG within current standards". Following that correspondence, Calor replaced the single two ton tank with two

one-tonne tanks. The size and siting of the tank or tanks had no relevance to the cause of the disaster.

16. In 1988 the HSE proposed the excavation of the underground pipework (ICL/011445) in order to ascertain its condition. That proposal, in the circumstances, went beyond the steps recommended by the guidance (and in particular the published guidance) then applicable to underground LPG pipework (ICL/001306, 001232; evidence of Alan Tyldesley, day 6). There had been no reports of any problems with the pipework.
17. Calor were contacted by ICL following the proposals by the HSE. The content of that contact is now lost. Mr. Stott, who was in charge of this matter for ICL, was reluctant to excavate the yard (Mr. Ives Day 5 p.41:7). It is a reasonable inference that the initiative in looking for a suitable test other than excavation would have come from ICL. Calor responded to only some of the HSE's proposals on behalf of ICL having been asked to do so by ICL. Calor proposed that the condition of the pipework could be ascertained by means of an examination of the riser pipe at the LPG tank at the time of vessel exchange, and by a pressure test [ICL/011479]. That proposal was in accordance with the terms of the guidance at that time applicable to maintenance and examination of underground LPG pipework, even for pipes carrying gas under pressure above five bar or liquid. Calor's proposal was accepted by the HSE as satisfactory [ICL/011481].
18. At the time Calor's proposal was made, Calor were not aware of any circumstances – such as a report of a gas leak – which would have indicated that any steps other than a pressure test were appropriate under the guidance then applicable or under Calor's then normal practice.
19. It is likely subsequent to this correspondence that the LPG pipework at Grovemark Mills was pressure tested on a number of occasions to normal working pressure. In particular, it is likely that pressure testing took place at "vessel exchange" on 17th June 1991 when Calor Gas changed tanks; on 26th March 1998 when the first J Gas tank was installed; on 29th November 1998 when J Gas replaced their tank and on 8th April 2002. There is no evidence that any such testing disclosed the presence of a leak. The inference must be that there was no detectable leak in the pipework on or before those dates.

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PROPOSED LESSONS TO BE LEARNT

Submitted on behalf of

CALOR GAS LIMITED, a company incorporated under the Companies Acts and having its Registered Office at Athena House, Athena Drive, Tachbrook Park, Warwick CV34 6RL

- 1 Had the relevant part of the pipework been protected against corrosion when buried, it may not have failed. The pipework should have been properly specified. In 1969, as a minimum, this should have been galvanised steel pipe with all joints wrapped in denso tape. Today, a properly laid pipe would be polyethylene electrofusion-jointed pipework with no mechanical joints underground. Current best practice would be that installation should be carried out by a suitably qualified LPG technician.
- 2 From July 1994, the pipework should have been regularly inspected and maintained by ICL in accordance with a maintenance strategy developed by a competent person for ICL in accordance with the Pressure Systems and Transportable Gas Containers Regulations, now the Pressure Systems Safety Regulations, which apply to systems operating at or above 0.5 Bar. These regulations also require a Written Scheme of Examination for LPG systems operating at such pressures.
- 3 In terms of the Management of Health and Safety at Work Regulations 1992, ICL should have undertaken suitable and sufficient Risk Assessments of its operations and implemented any required actions. Only ICL would have had sufficient information about their whole operation to carry out a thorough risk assessment. This would include Risk Assessments of any pipework which may give release to a dangerous substance (as required under Dangerous

Substances and Explosive Atmospheres Regulations), including the underground LPG pipework. Based on the age and unknown specification of the pipework at this site, such Risk Assessments could have highlighted the need for its replacement or a more frequent inspection period. Such Risk Assessments could also have identified the risks arising from this installation operating at the unusually high pressure and the pipework in the unventilated basement. This could have provided an opportunity for remedial steps to be taken such as the removal of joints and fittings as well as the installation of gas detection equipment. A stenching agent is added to LPG so as to serve as an alert to the presence of leaks. The addition of this stenching agent means that LPG is detectable by individuals with a normal sense of smell at a concentration of below one-fifth of the lower level of flammability. In addition, it was incumbent upon ICL to train staff on the measures to be taken upon detection of a gas leak.

- 4 A Risk Assessment considering the hazards of operating a process furnace (oven) at 1.4 Bar in a factory beneath office accommodation may have led to the conclusion that the furnace should not have been located in the same building as the offices. This may have led to the furnace being located in a separate process building.
- 5 In addition, the selection of a suitable commercial furnace may have allowed the installation to run at a lower pressure. The normal operating pressure of a LPG bulk installation is 37 millibar, which is one thirtieth of the operating pressure in this installation. Operating at a lower pressure would have led to a slower, and perhaps smaller, accumulation of gas in the event of a leak and much less strain on the pipework itself. Also, additional safety measures could have been incorporated with a lower gas pressure.
- 6 The building works carried out to raise the surface level of the yard should have been specified and overseen by a qualified civil engineer in order to avoid causing undue mechanical stresses being placed on the underground pipework. In particular, the burying of the "building end pipe riser" should have been fully assessed and properly designed to protect the newly buried part of the pipe from mechanical stresses and corrosion.

- 7 Additionally, when the pipework was further buried and the basement created in the factory building, the safety implications for the LPG installations should have been considered and advice sought about suitable additional measures that should have been introduced to detect the presence of LPG in the unoccupied, unventilated and confined space e.g. gas detection linked to an automatic shutdown of the external pipework.
- 8 The LPG installation should have been isolated and a competent LPG qualified person asked to check the integrity of the LPG installation following any building modifications carried out at the premises.
- 9 Communication between and within Government agencies charged with responsibility for safety should be systematic, clear, concise, and recorded in a consistent manner to enable different enforcement officers to identify issues that have previously arisen and verify that remedial steps have been taken.