

LIQUID PETROLEUM GAS: STRENGTHENING THE FUTURE SAFETY OVERSIGHT REGIME

Supplementary submission to Lord Gill's Inquiry by the Health and Safety Executive

1. This submission extends and supplements the paper that the Health and Safety Executive (HSE) submitted to the Inquiry on 15 August 2008 [Part C: **ICL/S0910-S0914**].

2. Paragraphs 21 and 23 [**ICL/S00910-0912**] of that submission set out the context within which health and safety is regulated within the United Kingdom and the principles underpinning the UK's approach.

3. Paragraph 24 [**ICL/S0912-S0913**] of the submission also set out the broad aims of any changes to the health and safety regime applying to the use of Liquefied Petroleum Gas (LPG), in particular that they should:

(a) be fit for purpose to secure the safe and proper installation, management, inspection, maintenance and oversight of LPG installations;

(b) be specific in addressing any defects or gaps identified in the current regime;

(c) reflect the principle that those who create risks should be responsible for managing and mitigating them;

(d) build on available knowledge and information, much of which is in the hands of suppliers and users;

(e) be proportionate to the risk;

(f) be properly administered; and

(g) be based on a thorough analysis of the issues and deal with risks in priority order.

4. It is important also to note that any changes to the existing regulatory framework would need to be consistent with the Government's better regulation policy (set out at <http://www.berr.gov.uk/bre/policy/page44059.html>). The better regulation principles require that all regulation is proportionate, accountable, consistent,

transparent and targeted. This does not preclude new or amended regulation. But it sets a clear standard in terms of the public tests of both for the evidence base underpinning regulation and the proportionality of the regulatory response to any issue or risk it seeks to tackle. Government policy also requires a thorough assessment of the impact of regulation and appropriate consultation, consistent with the Code of Practice on Consultation (Cabinet Office, January 2004) **[ICL/16084-16099]** before new or amended regulations are implemented.

5. Before advising Ministers that new or modified legislation should be introduced, HSE is expected to follow a defined process. This includes consulting widely on proposed changes with representatives of industry, workers and other public interests. In addition to any informal consultation, there is a normal minimum of 12 weeks formal consultation on proposals agreed by the HSE Board in a published Consultation Document. HSE also undertakes an Impact Assessment to identify both the costs that will be incurred as a result of the changes and the benefits that they will bring. This is also subject to consultation. Once the results of consultation have been considered, a final set of proposals is then presented to the HSE Board for approval. If agreed, recommendations are sent to the Minister.

6. Where HSE proposes to introduce new (or revised) guidance, it also consults widely with representatives of the industries concerned (eg trade bodies), worker representatives and other interested persons. It is particularly important to ensure that the impact of guidance is understood and that it can be implemented in practice. Impact assessments are also prepared for new or substantially revised guidance. The HSE Board also expects to consider and approve guidance for which an impact assessment is needed.

7. HSE offers this submission to assist the Inquiry in producing its recommendations. As no formal process of consultation has been undertaken (which would seem inappropriate at this time in light of the Inquiry), HSE cannot present fully developed proposals. We can, however, outline the areas we think should be examined when considering potential improvements to assure LPG safety.

8. Against that background, this submission therefore:

(i) reviews the existing regulatory framework relevant to the issues thrown up by the ICL case;

(ii) identifies the main areas of risk which appear to arise from the ICL case; and

(iii) outlines ways in which those risks might further be mitigated, and by whom, in a strengthened but proportionate safety regime for LPG.

9. HSE has also provided a separate response to the report produced by Mr Sylvester-Evans, which offered independent recommendations to the Inquiry.

(i) The Regulatory Framework

10. The main regulatory regimes relevant to safety are:

- Health and safety at work legislation and associated regulations;
- Building regulations;
- Fire precautions regulations; and
- Planning legislation

11. HSE has the responsibility for the regulatory oversight for the first of these regimes in Great Britain. Similar provisions apply in Northern Ireland overseen by HSE NI. HSE shares the enforcement responsibility with Local Authorities and the Office of Rail Regulator. HSE also shares enforcement of some major hazard legislation with the Environment Agency and SEPA.

Health and safety legislation

12. Health and safety are regulated in the workplace under the Health and Safety at Work etc Act 1974 (HSW Act) **[ICL/ 04618-04691]**, which sets out general duties to ensure safety at all workplaces, and associated regulations. The 1974 Act and subsidiary regulations are enforced by HSE, by local authorities or by the Office of Rail Regulation for railway matters.

13. The HSW Act general duties, particularly those set out in sections 2-4 **[ICL/04619-04620]** and 6 **[ICL/04621-04623]** of the Act, reflect the principle that those who create risks should be responsible for managing and mitigating them. By placing duties on everyone whose work-related activities may create risks, the Act ensures that there are no gaps in regulatory coverage or in legal responsibility. Thus section 2 **[ICL/04619]** places duties on employers towards their employees; section 3 places duties on employers and the self-employed towards people other than employees, including the public; section 4 **[ICL/04620]** places duties on people in control of non-domestic premises towards those using those premises; and section 6 **[ICL/04621-04623]** places duties on manufacturers, importers and suppliers of articles and substances for use at work.

14. Organisations (and individuals) may have a primary or a secondary responsibility under health and safety legislation, depending on the degree to which they create risks and the extent to which they have control over them. These duties deliberately overlap each other and with more specific duties set out in subordinate regulations. For example, under the Act, gas suppliers have legal duties under section 3 **[ICL/04620]** where their activities affect the safety of others, for example,

with respect to parts of the installation they do not own, such as service pipework. Where duties overlap, the duty holders may be expected – and in some circumstances are required by law – to co-operate to meet their legal obligations.

15. The HSW Act regulations most relevant to the specific circumstances of the ICL case and the related issues being considered by the Inquiry are:

(a) *Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)* [ICL/ 04445-04472]

DSEAR aim to prevent risks (ie primarily fire and explosion risks) from dangerous substances including LPG. They apply to most workplaces. This includes ICL. They require risks to be assessed and either eliminated or reduced. In implementing European Directives on dangerous substances, they replaced the specific LPG regulations (the Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972) which previously applied to premises subject to the Factories Act.

(b) *Pressure Systems Safety Regulations 2000 (PSSR)* [ICL/ 04546-04568]

PSSR aim to prevent risks from pressure systems above 0.5 bar used at work including pipelines conveying fluids (eg liquids or gases). These regulations covered the installation at ICL. PSSR concern the risks associated with pressure, rather than the risks associated with specific fluids or gases. PSSR requirements include a written scheme for periodic examination by a competent person of parts of the pressure system that may give rise to danger. The results of the examination should be recorded and kept.

(c) *Management of Health and Safety at Work Regulations 1999 (MHSWR)* [ICL/ 04501-04522]

MHSWR supplement the general duties of the HSW Act by setting out requirements for managing health and safety in all work activities. These requirements include carrying out risk assessments to identify the measures needed to comply with all other health and safety requirements; putting in place arrangements for planning, organising and controlling health and safety measures; appointing competent persons to assist with health and safety measures; and the need for employers who share work premises, even temporarily, to co-operate with each other.

(d) *Provision and Use of Work Equipment Regulations 1999 (PUWER)* [ICL/ 04569-04592]

PUWER sets out general duties relating to work equipment, which includes any machinery, appliance, apparatus, tool or installation for use at work. Work equipment must be suitable for its purpose, so far as it affects health or safety; it must be maintained in an efficient state, in efficient working order and in good repair; and where necessary, it must be inspected before being put into service and at suitable intervals thereafter, to detect and remedy any deterioration. The results of the examination should be recorded and kept.

(e) *Gas Safety (Installation and Use) Regulations (GSIUR)* [ICL/ 04473-04500]

Gas safety in the domestic sector (including LPG safety) comes under the GSIUR which regulate domestic gas appliances and associated pipework. These regulations generally work well, as evidenced by the very small number of gas related incidents that occur despite the very widespread use of gas appliances throughout the country. Many commercial users, including premises subject to the Factories Act, are outside the scope of GSIUR. ICL falls outside the scope of GSIUR.

(f) *Control of Major Accident Hazards Regulations 1999 (COMAH)* [ICL/05701-05747]

COMAH implements the Seveso II Directive (*Directive 96/82/EC as amended by Directive 2003/105/EC*); [ICL/06304-06322] other than the land use planning requirements. COMAH aims to prevent major accidents involving dangerous substances and limit their consequences to people and the environment. It is enforced by a Competent Authority (CA) comprising HSE and the Environment Agency, and in Scotland, HSE and SEPA. COMAH contains the general underlying principles of hazard and risk assessment contained in the HSW Act and MHSWR but is more prescriptive about the range of hazards and risks to be considered and requires COMAH operators to demonstrate to the CA their ability to manage and control major accident risks. Top tier establishments must submit safety reports to the CA and have on-site and off-site emergency plans. Lower tier sites must have a Major Accident Prevention Policy. The COMAH [ICL/05701-05747] qualifying thresholds for LPG inventories are 50 tonnes (lower tier) and 200 tonnes (top tier), and are set at European level. ICL therefore falls outside the scope of COMAH.

16. In addition to the health and safety legislation above, other relevant legislation applies. In an effort to assist the Inquiry, we have listed what we believe are some of the more relevant regulations, which are enforced by other agencies. However, the list should not be considered definitive as there may be other relevant legislation of which HSE is unaware.

Building regulations

17. The Building Regulations 2000 [ICL/05999-06060] and Building (Scotland) Regulations 2005 [ICL/06061-06063] aim to ensure the safety of people in and around buildings, whether domestic or commercial. Although there is no specific requirement in respect of LPG systems for commercial use (other than systems providing space or water heating or for cooking), new buildings and many kinds of alteration to existing buildings require prior approval from local authority building control officers.

Fire precautions regulations

18. The Regulatory Reform (Fire Safety) Order 2005 [ICL/05769-05791] and the Fire (Scotland) Act 2005 [ICL/05343-05426] deal with fire safety in non-domestic premises, such as ICL. They set out general duties (mirroring the HSW Act) to protect employees and to make risk assessments. They also set out specific duties relating to general fire precautions, including reducing the risk of fire, providing means of escape in case of fire and providing means of fire fighting.

Planning legislation

19. The Planning (Hazardous Substances) Regulations 1992 [ICL/06064-06108] and the Town & Country Planning (Hazardous Substances) (Scotland) Regulations 1993 [ICL/06109-06154] implement the land use planning requirements of the European Union Seveso II Directive (see paragraph 14(f) above). The regulations require sites with hazardous substances present above certain thresholds to seek consent from (usually) the local planning authority. Developments around these sites are then subject to certain additional planning controls. These thresholds mirror those in COMAH. ICL does not require hazardous substance consent for its small-scale LPG installation. ICL and the surrounding area are otherwise subject to general planning controls.

Overview

20. From the assessment above, it is clear that safety at ICL was already subject to a wide range of regulation, both in terms of general duties under the 1974 Act and in terms of specific subsidiary regulations, including those relating to work equipment, dangerous substances (including flammable and explosive materials) and higher pressure gas systems. It also fell within the general fire prevention, building control and planning control regimes.

21. It is HSE's position that the ICL incident would have been averted if the existing safety legislation applicable to the installation had been complied with effectively. But

it was not. In our view, the key issue is how best further to ensure compliance with a fundamentally sound safety regime, in a proportionate way. It is of course for the Inquiry to consider if it accepts that view of the legislative regime.

22. In forming this view, HSE explored whether extending the scope of the regime for specified major hazards (COMAH [ICL/05701-05747]) and outside the regulations relevant to domestic properties (GSIUR [ICL/04473-04500]) offered routes to strengthening the prevailing safety regime. However, HSE concluded the extension of either of these sets of regulations would not offer a proportionate response to the risks presented by relatively small scale commercial LPG installations.

23. The COMAH regime is entirely appropriate for those sites that represent very significant hazards where there is potential for catastrophic failures of process plant and equipment with widespread or extreme consequences, eg on local populations. The requirements of COMAH would be disproportionate to the risk presented by much smaller scale installations such as that found at ICL. Reducing the qualifying thresholds to small quantities of LPG and thereby extending COMAH to many hundreds of such installations would be disproportionately expensive for industry, as well as placing significant demands on HSE.

24. The GSIUR are largely designed to cover the installation and maintenance of consumer level appliances in domestic surroundings. A key aim is the prevention of carbon monoxide deaths in domestic premises. They are not readily transferable to the sort of installations, often one-off in nature, that are found in commercial premises which require specific, case-by-case risk assessments and competences beyond those likely to be held by domestic gas fitters. There would also be a risk that the application of the GSIUR to specific non-heating industrial applications in the commercial sector would lead to duplication, and possible conflict, with other relevant regulation (eg the PUWER [ICL/04569-04592]).

25. HSE's view, therefore, is that it would be neither necessary nor appropriate to extend either the COMAH regulations or the GSIUR to cover smaller scale commercial LPG installations such as that found at ICL. Selected aspects or underpinning principles of the GSIUR, however, may have a read across into the possible strengthening of the existing regime for smaller scale LPG installations. We return to this point later.

(ii) Strengthening the existing oversight regime

26. When dealing with risks, HSE takes a hierarchical approach, as illustrated, for example, in the MHSWR [ICL/04501-04522]. The starting point is to consider whether the source of the risk can simply be eliminated. Only where elimination is not possible should risk mitigation be considered. Risks should be reduced so far as

is reasonably practicable through physical control measures. Where these do not reduce risks to an acceptable level, then procedural controls (ie safe systems of work) supported by information, instructions and training are required. In determining the acceptable level of risk a number of measures may be required – depending on the particular circumstances of the case.

27. Analysis of the evidence presented to Phase 1 of the Inquiry suggests that there are six main areas where application of the existing regime might need to be strengthened. Paragraphs 28-33 identify these areas. Paragraphs 34-43 look at ways in which they might best be addressed.

28. It is clear that the primary cause of this incident was a leak from buried unprotected metal LPG **pipework**. This had neither been installed correctly nor properly maintained over its lifetime. It is not clear exactly how many other installations have such pipework, but it is clearly important that this pipework is inspected and made safe - or replaced - before it corrodes and starts leaking. Until such pipework can be replaced, it is important that it is subject to stringent inspection and maintenance to ensure its continuing integrity.

29. The effectiveness of any regulatory regime depends on the effectiveness of the **inspection machinery** that underpins it. Such machinery includes functions that may be provided by third parties (eg commercial undertakings, insurance company schemes, etc) and those of the regulatory bodies.

30. Two parties, users and suppliers, have a particularly influential role in relation to the safety of LPG installations. Some of the evidence presented to the Inquiry indicates that the respective safety **responsibilities of suppliers and users** need to be more clearly delineated and understood by all concerned. Further attention to this area may offer a number of specific opportunities to improve overall safety in the LPG field.

31. Given the hazardous nature of LPG, whether or not the Inquiry finds fault with the original or adapted installation or its maintenance, there is a case for ensuring that such installations are only fitted by **competent people**. At present, while those working on higher pressure systems are regulated, no specific regulations cover the competence of fitters working on lower pressure LPG systems in the commercial field.

32. However good the installation and maintenance framework, gas leaks will inevitably occur from time to time. Although very rare, the impact of such a leak if it goes undetected for any length of time and leads to high gas concentrations in a confined space, as shown in the ICL case, can be very significant. There may be measures which might be relevant to tackle these residual risks. These might include

for example improvements to **ventilation requirements** of rooms, **leak detection** measures and the **routing of pipework** in buildings.

33. The original LPG installation at ICL, inherently deficient in its original design, had also been subject to a number of changes both in parts of the installation itself and in its surrounding **built environment**. There is evidence that these changes had not taken proper account of the hazardous nature of the LPG installation and the risks it presented. It may be appropriate to consider what, if any, further measures might be needed to ensure that building regulations are able to ensure appropriate safety measures are put in place where building works affect LPG installations and their associated pipework. The primary enforcement responsibility rests with local authority building control officers who monitor and approve relevant building works. Any review or changes to the building regulations which are affected by LPG use would need to be taken forward by the Department for Communities and Local Government and its counterpart in Scotland.

(iii) Options for strengthening the regime

34. The following paragraphs set out some considerations that the Inquiry may wish to take into account, subject to its findings, on ways in which the regulatory regime might be strengthened.

35. HSE's view is that the ICL incident has highlighted that there are a number of areas in which the existing regulatory regime needs to be made to operate more effectively, eg through the implementation of more effective guidance and through clearer understanding of the roles and responsibilities of specific parties. HSE does not conclude that the lessons learned from the ICL incident suggest that there is a need for significant reform of regulation or legislation.

36. In the light of the analysis in the preceding section, HSE believes that a number of specific steps would serve to ensure that the application of the existing regulatory regime was more effective in dealing with the risks presented by LPG systems.

37. As regards the replacement of **pipework**, DSEAR [ICL/04445-04472] covers all pipework containing hazardous substances. Higher pressure pipework is also already covered by the *Pressure Systems Safety Regulations 2000* [ICL/04546-04568] which impose a specific requirement for a written scheme of examination for dangers resulting from the stored energy associated with higher operating pressures. As regards LPG pipework, it makes sense to tackle first the risks presented by older, underground, metal pipework. For all non-domestic premises with LPG installations, there should be a written scheme of examination identifying pipework in which a defect may give rise to danger. Any metal pipework found to be unprotected, corroded or in a dangerous condition should be immediately replaced. Otherwise, owners should be required to plan for its

replacement within a bounded time period. HSE will take further steps to **increase awareness** amongst LPG users of this issue and of their legal duties.

38. It is important that the high risk pipework is identified and addressed first. Research is currently under way at the Health and Safety Laboratory to help to identify whether there are particular areas of the country that, given their geological make up, warrant prioritising in an accelerated programme of pipework replacement. The research will inform a decision on the possible use of a model developed for natural gas to identify pipework where the risk of gas entering a building from a leak is high. The findings of this research are expected to be available in October. In the light of this research, HSE will work with the LPG industry to produce a **suitable action plan** for prioritising pipework replacement. HSE will also consider whether any regulatory changes will be needed to achieve the objectives of a prioritised replacement programme. Such an approach was previously adopted by HSE and has proved successful with addressing the risks arising from the aging infrastructure of buried cast iron mains pipes carrying natural gas. HSE worked in partnership with the gas supply industry in a non-legislative way to achieve significant (and ongoing) improvements to safety.

39. All the above requires there to be a suitable scheme in place to drive up levels of compliance with legal requirements. One possibility is some form of **third party inspection** of LPG installations. There could be a range of options for this (for example, involving insurance companies, gas supply companies, independent commercial organisations). In developing further proposals HSE will draw on its experience from other aspects of safety regulation (including domestic gas) where such schemes already exist.

40. HSE considers that one of the lessons of the ICL case is the need to improve understanding at the interface between the respective **responsibilities of LPG suppliers and users**. HSE is of the view that LPG suppliers have duties under the current legislation which are owed to those not in their employment. HSE will produce guidance on this point to complement its current guidance, which focuses on technical standards for installations. In developing the guidance HSE will consult with those affected on how in practice how these duties can be discharged.

41. In addition to clarifying legal responsibilities, it is notable that there are only a very small number of suppliers of LPG in the UK – very much smaller than the number of users. HSE is actively involved in working with the LPG industry to improve safety standards. HSE will consider how these suppliers can better help deliver the safety outcomes that are being sought, for example by making their LPG expertise and knowledge even more readily available to users. HSE will also consider and discuss with the LPG industry control measures that may be available, and these will include those circumstances where suppliers should no longer continue to supply LPG if there are safety concerns.

42. To ensure that only **competent people** are engaged in the installation, maintenance and repair of those industrial LPG systems that fall outside the GSIUR [ICL/04473-04500], HSE will review the current regulatory requirements placed on fitters engaged by suppliers and users to undertake such work.. The GSIUR framework, which requires the registration of fitters involved in domestic gas (including LPG) and similar other work, may offer an opportunity here. While we do not think it would be appropriate to apply the GSIUR as a whole to the commercial sector, adaptation or extension of the domestic sector gas installer registration scheme to the commercial sector may offer an effective way of strengthening the competence of fitters and installers working with commercial LPG systems.

43. There may be further measures to those outlined above which might be implemented to tackle residual risks from LPG – although they may not, after suitable detailed analysis, offer significant or practical improvements to safety. Such measures might include: improvements to the **ventilation requirements** of rooms, methods to **detect LPG leaks** and the **routing of pipework** in buildings. HSE will consider these and other proposals for their practical benefits for where on an individual case by case basis they can improve LPG safety.

Wider lessons

44. This note addresses specifically the key changes that may be necessary in the regulatory and oversight regime pertaining to commercial LPG systems to reduce the risk of another incident such as that at ICL. LPG is also, of course, used widely in domestic systems that already come under the GSIUR. Insofar as any changes in the commercial environment may demonstrate an opportunity to strengthen the domestic regulatory framework, HSE will also pursue such changes in the domestic environment.

Health and Safety Executive
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